Planning Commission
Regular Meeting Agenda
Wednesday, January 28, 2026
6:30 PM - 9:00 PM
Fraser Town Hall, 153 Fraser Avenue and Virtually

NOTE: Times are approximate and agenda subject to change

Watch the meeting live on Fraser's YouTube Channel

https://www.youtube.com/channel/UCs5aHnl7d-kk0j1cxV28DSg

Participate in the meeting through our virtual platform
Zoom Meeting Information

https://us02web.zoom.us/j/2590408013

Meeting ID:259 040 8013
Phone 1-346-248-7799

1. **Roll Call**
2. **Approval Of Agenda**
3. **Consent Agenda**
   a. Minutes November 12, 2025

      Documents:

      PCM 2025-11-12.Pdf
      Sign In Sheet November 12, 2025.Pdf
4. **Open Forum**
5. **Public Hearing And Possible Action**
   a. Grand Park West Mountain Filing No. 1 (Planning Areas 10W & 11W) - Revised FPDP And Final Plat

Documents:

00 Staff Report_TF22-10 Grand Park WMF1 (PA 10W And 11W) Revised Final Plat And FPDP.pdf
01 West Mountain Filing 1_Final Plat.pdf
02 West Mountain Filing 1_FPDP.pdf
03 Preliminary Civil Construction Documents_WMF 1 And 2.Pdf
04 Phase II Drainage Report_WMF 1 And 2.Pdf
05 Wetland Exhibit_WMF 1 And 2.Pdf
06 Grand Park West Mountain TIS_January 2026.Pdf
07 Combined 7th Submittal Referral Review Comments.pdf
08 Proof Of Public Notice.pdf
09 Receipts For Mailed Notices.pdf
10 Adjacent Property Owners List.pdf

a.i. PC Resolution 2026-01-01 Recommending Approval Of Grand Park WMF1 (10W And 11W) Final Plat And FPDP

Documents:

PC Resolution 2026-01-01 Recommending Approval of Grand Park West Mountain Filing 1 (Planning Areas 10W and 11) Final Plat and FPDP.pdf

b. Approving And Certifying The Fraser Forward Comprehensive Plan

Documents:

DRAFT_Fraser Forward Comprehensive Plan_1-23-26.Pdf
Affidavit Of Public Notice.pdf

b.i. PC Resolution 2026-01-02 Approving And Certifying The Fraser Forward Comprehensive Plan

Documents:

PC Resolution 2026-01-02 Approving and Certifying the Fraser Forward Comprehensive Plan.pdf

6. **Other Business**
7. **Future Agenda Items**
8. **Adjourn**

UPCOMING MEETING

WEDNESDAY FEBRUARY 25, 2026 PLANNING COMMISSION

Please contact the Town Clerk to request accommodations to assist people with disabilities to participate in public meetings. Listening devices for people with hearing impairment are available upon request.

Town Clerk, Antoinette McVeigh 970-531-9943 or amcveigh@town.fraser.co.us

FRASER PLANNING COMMISSION
MINUTES

DATE: November 12, 2025

MEETING: Planning Commission Regular Meeting

PLACE: Fraser Town Hall and Virtual On-Line Meeting

PRESENT Commission: Commissioners: Chair Andy Miller, Margaret Bowles, Brian Cerkvenik and Katie Soles

Staff: Town Planner Garrett Scott, Assistant Town Planner, Alan Sielaff, Town Manager Michael Brack, Town Clerk Antoinette McVeigh

Others: See list, Virtual Donna Nortz, Fritz Westover, Sabrina Innocenti, Mike Scott, Adrianne Scott

Chair Andy Miller called the meeting to order at 6:30 p.m.

1. **Roll Call:** Chair Andy Miller, Margaret Bowles, Brian Cerkvenik, Katie Soles

2. **Approval of Agenda:**
Commissioner Soles moved, and Commissioner Cerkvenik seconded the **motion** to approve the agenda. **Motion carried: 4-0.**

3. **Consent Agenda:**
a. Minutes October 22, 2025

Commissioner Bowles moved, and Commissioner Cerkvenik seconded the **motion** to approve the consent agenda. **Motion carried: 4-0.**

4. **Open Forum:**
none

5. **Discussion And Possible Action:**
a. Review of the Draft Fraser Forward Comprehensive Plan

Town Planner Garrett Scott presented an overview of the draft Fraser Forward Comprehensive Plan. The presentation began by reviewing the document structure, which includes an executive summary, a section on Fraser today with existing conditions data, a community voices section detailing public input, and the main body organized by season (spring, summer, fall, and winter) with vision statements, goals, strategies, and actions. The implementation matrix and future land use maps were also highlighted.

Members of the Planning Commission identified items that could be improved in the plan:

- A typo was identified on page 34 regarding "5000 zip codes" in the trade area description; clarification needed.

- The graph on page 32 showing housing data from 2018-2022 was noted to be unclear and potentially misleading in representing vacation homes versus primary residences.

Proposed additions to the plan included:

- Add a snowmelt facility to the town services and infrastructure section (TSI 1) to address snow storage contamination concerns.
- Include Colorado Open Lands as a potential partner for open space efforts in section IGC 6.1.
- Enhance the focus on dark sky initiatives in the plan, suggesting it should be added to the implementation matrix with a priority level of 2, including future costs for the town to switch out lights.
- Balance the discussion about updating fees on page 91 with language about maintaining community affordability.
- Expand the vision for the Elk Creek Trail to potentially connect to the National Forest, rather than just ending at County Road 72.

Public Comment was received from John Ladd, Parnell Quinn, Clark Lipscomb, Justin LaFrancois, Mike Scott, Adrienne Scott, Fritz Westover and Sabriena Innocenti.

- Concerns were raised about stormwater runoff and snow being plowed into streams, highlighting the need for additional measures to prevent contamination.
- Questions arose about the town's economic development section, specifically the need for more housing to support year-round businesses.
- Feedback indicated a perception that the plan prioritizes Old Town Fraser while overlooking other areas, such as Grand Park and Rendezvous, with specific inconsistencies in data on vacation rentals and population growth.
- Suggestions included enhancing awareness of community assets, such as the Grand Park Community Recreation Center, The Foundry Cinema & Bowl, and the Middle Park Health Fraser Medical Center, which are major local employers.
- Calls were made to increase focus on education and infrastructure goals.
- Concerns were expressed about transportation plans impacting private roads, highlighting historical agreements regarding road use, specifically relating to Sun River Condominiums. The feasibility of a proposed road connection was questioned due to limited space and ADA compliance concerns.

Garrett, the town planner, acknowledged the suggestion to make the Fraser Today section more of a "sales pitch" for the town, highlighting its amenities. The Planning Commission suggested adding more information about special districts that have received accolades for exceptional performance.

Concerns were raised regarding the issue that the Riverwalk District code should be modified to encourage more restaurant and commercial spaces facing the river rather than just the main street.

b. 2025 Year in Review and 2026 Look Ahead

Town Planner Scott presented a review of accomplishments for 2025, highlighting:

- 84 building permits issued as of the end of October, which is more than the previous two years
- Higher building permit valuation due to major projects including the Spring Hill Suites hotel and St. Louis Landing Phase I

- 13 land use applications received, including 5 administrative reviews, 3 sketch plans and 5 public hearing applications
- Key projects completed or under construction include the Middle Park Health Medical Center, Strom Townhomes, Market Street buildings, Spring Hill Suites, and St. Louis Landing Phase I
- Five code amendments implemented
- A total of 13 different engagement/discussion opportunities as part of the Comprehensive Plan update across Board of Trustees, Planning Commission, and Downtown Development Authority Board meetings, as well as public open houses

Looking ahead to 2026, staff outlined several priorities:

- Adoption of the Comprehensive Plan and implementation priorities
- Proposition 123 fast-track review process for affordable housing
- Adoption of the Colorado Wildfire Resiliency Code
- Various other code amendments and updates

6. **Other Business:**
None

7. **Future Agenda Items:**
None

8. **Adjourn:**
Commissioner Soles moved, and Commissioner Cerkvenik seconded the **motion** to adjourn. **Motion carried: 4-0.** Meeting adjourned at 7:53 p.m.

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Antoinette McVeigh, Town Clerk

PLANNING COMMISSION REGULAR MEETING
REGISTRATION SHEET
NOVEMBER 12, 2025

The Public Forum is an opportunity for the public to present their concerns and recommendations regarding Town Government issues to the Planning Commission. Those wishing to address the Planning Commission will be allowed a three-minute presentation. If a topic that you wish to discuss has been scheduled for a formal Planning Commission Meeting, we would ask that you reserve your remarks for that specific date and time. Topics that are in litigation with the Town will not be heard during this forum. All presenters are urged to: (1) state the concern; and (2) list possible solutions. Please keep the following guidelines in mind:

- **Remarks that discriminate against anyone or adversely reflect upon the race, color, ancestry, religious creed, national origin, political affiliation, disability, sex, or marital status of any person are *out of order* and may end the speaker's privilege to address the Board.**
- **Defamatory or abusive remarks or profanity are *out of order* and will not be tolerated.**

Anyone attending Planning Commission meetings must sign in to ensure accurate records and minutes. Sign your name, address, and email on the sign in sheet. Thank you for your cooperation.

NAME	PHYSICAL ADDRESS	EMAIL
John Ladd	524 Sum River Dr, #10	johnladd1954@gmail.com
Clark Lipscomb		
John Church	542 GCR 830	john@coloradochurch.net
[illegible]	Fraser	

NAME	PHYSICAL ADDRESS	EMAIL
Brittney Frenette	524 Sun River Dr.	brittneyfrenette@gmail.com
Justin LaFrançois	524 Sun River Dr.	justin.lafrancois.@gmail.com
Brandon Jing		
Clark Upkamp		
[illegible]		

Town of Fraser
PO Box 370, Fraser, CO 80442 office: 970-726-5491 fax: 970-726-5518
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PLANNING COMMISSION Date Prepared: January 23, 2026
STAFF REPORT Meeting Date: January 28, 2026

RE: Grand Park West Mountain Filing 1 (Planning Areas 10W and 11W) – Revised Final Plat and FPDP
To: Town of Fraser Planning Commission
From: Garrett Scott, Town Planner
Project Number: TF22-10
Project Address: North of a proposed extension of Grand Park Drive, west of the UP railroad
Applicant: West Mountain Development, LLC
Property Owner: West Mountain Development, LLC
Zoning: Planned Development (PD)
CC: Michael Brack, Town Manager
Alan Sielaff, Assistant Town Planner

BACKGROUND

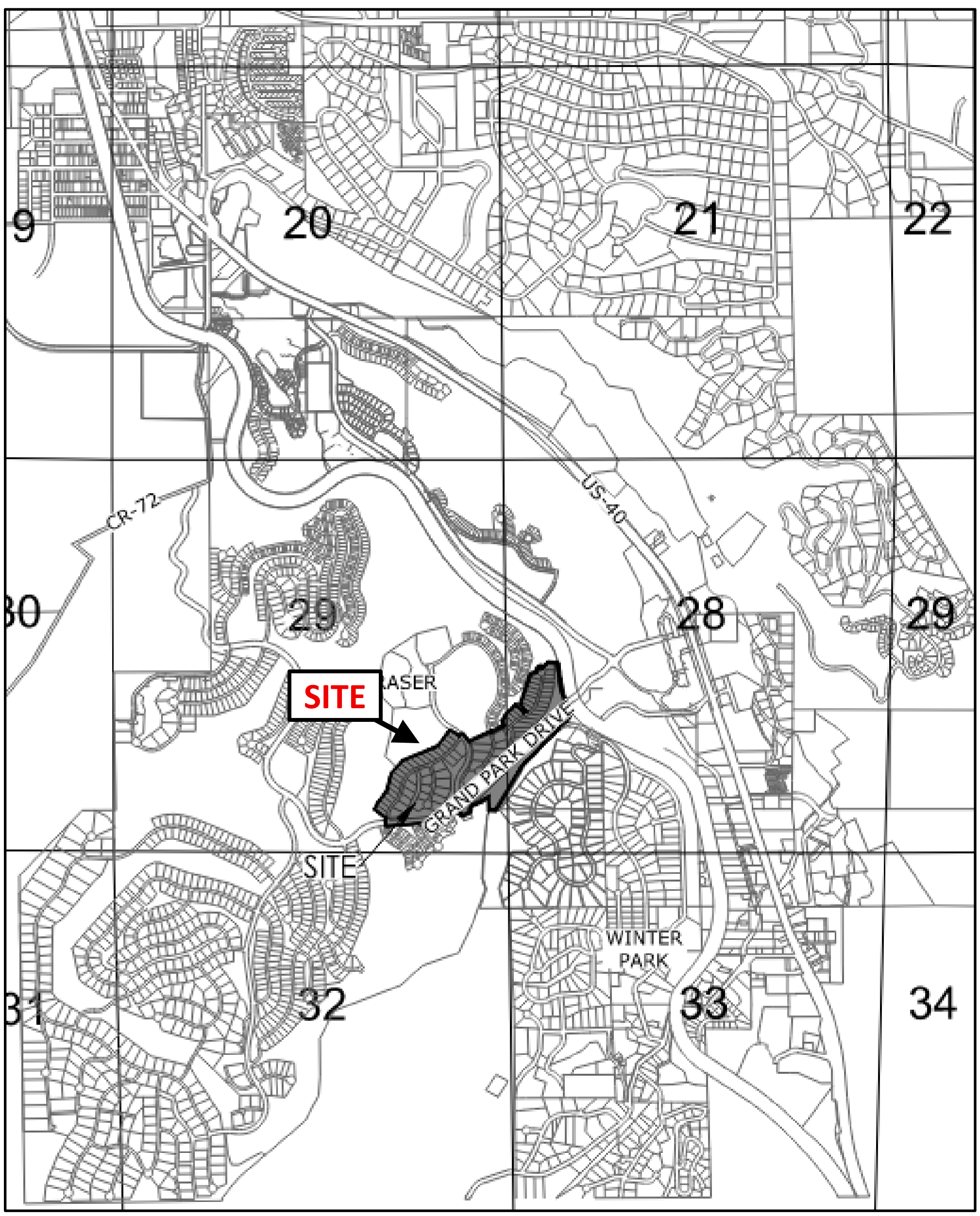
In 2005, the Fraser Board of Trustees approved the current Planned Development District Plan (PDDP) for the Grand Park Development. The PDDP encompasses approximately 1,311 acres of land divided into 27 planning areas. Each planning area is associated with an approximate acreage and a maximum allowed number of residential units, lodging (i.e., hotel) units, and commercial square footage. Pertaining to this proposal as the first phase of the West Mountain Development, the PDDP depicts Planning Area 10W as containing 40.8 acres while 11W contains 16.1 acres. The current approved Final Planned Development Plan (FPDP) and Final Plat proposes 79 detached residential units on 33.2 acres within these two planning areas, with additional development in 10W to be included in future development phases.

The initial West Mountain Filing 1 Preliminary Plat and Final Planned Development Plan (FPDP) applications were submitted to the Town in October of 2022. On March 22, 2023, through PC Resolution 2023-03-01, the Fraser Planning Commission approved the Preliminary Plat with conditions and recommended approval of the FPDP with conditions. The applicant then submitted a Final Plat application in February 2024. On May 22, 2024, the Fraser Planning Commission recommended approval of the Final Plat with conditions via PC Resolution 2024-05-02. The Board of Trustees then approved the Final Plat and FPDP on June 5, 2024 through Resolution 2024-06-04. In December 2024, the applicant submitted a revised Final Plat and FPDP application which was determined to be a major amendment requiring action by the Planning Commission and Board of Trustees. On January 15, 2025, the Fraser Planning Commission recommended approval of the Final Plat and FPDP with conditions via PC Resolution 2025-01-02. The Board of Trustees then approved the amended Final Plat and FPDP on January 22, 2025 through Resolution 2025-01-09. The applicant has since worked with Town staff on addressing the conditions of approval, particularly conditions 1 and 2 that relate to pending referral review comments and the requirement of obtaining final approval of the West Mountain Water Master Plan and associated construction design drawings and reports as stipulated in Articles 5.3, 5.5, and 5.6 of the 2003 Annexation Agreement. Presently, neither the FPDP nor any phase of the Final Plat have been recorded given that the conditions of approval have not yet been fully met.

The applicant has now requested a second revision to the FPDP and Final Plat and proposes to reorient the street and lot arrangement while keeping the total unit count for West Mountain Filing 1 the same at

79 units. The applicant submitted materials on December 19, 2025 and upon review of the applicable provisions of the Fraser Municipal Code, including but not limited to [Sec. 19-2-160 (PD Amendments)] and in concurrence with the Town Attorney, staff determined that this modification, specifically a rearrangement of lots, blocks, and building tracts, and changes in the provision of common open spaces, is considered a major amendment to the approved FPDP and requires approval by the Planning Commission and Board of Trustees. While the proposed amendment does not alter the previously approved 79 units, it significantly adjusts the road network and lot arrangement by proposing a roundabout intersection on Grand Park Drive that connects to the future Outpost Club and mixed-use development proposed in West Mountain Filing 2. The current proposal for West Mountain Filing 1 also adds an additional (third) road connection into the development from Grand Park Drive.

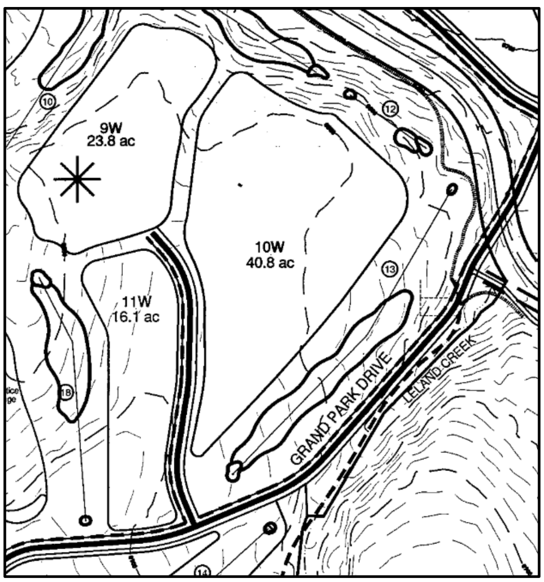
LOCATION MAP



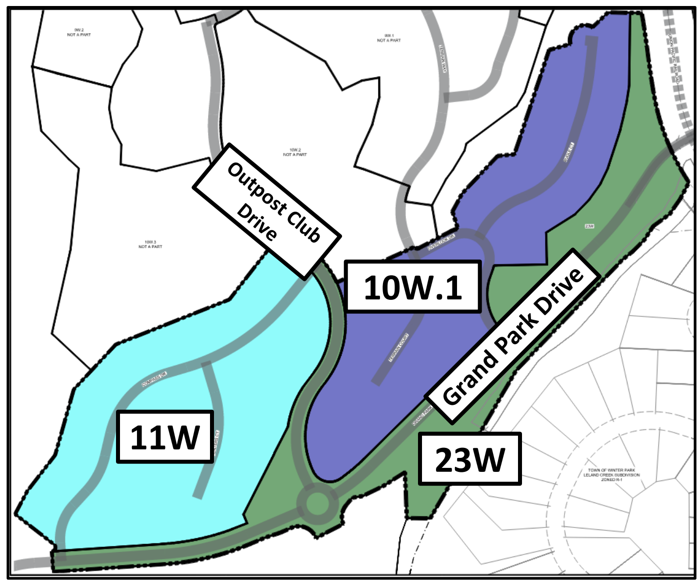
ZONING & LAND USE

The property is zoned Planned Development (PD) and regulated by the Grand Park PDDP. Planning Area 10W allows for 174 residential units, 350 lodging units, and 30,000 square feet of commercial space while 11W allows 41 residential units and 50 lodging units. The original FPDP approved in June 2024 proposed 72 residential units, which was then increased to 79 units (consisting of 47 units in 10W and 32 units in 11W) with the amendment approved in January 2025. The FPDP that is now under consideration does not change the total unit count but redistributes the units within the planning areas, proposing 38 units in 10W and 41 residential units in 11W. The January 2025 FPDP included a total acreage of 33.2 acres across Planning Areas 10W.1, 10W.2, and 11W. This proposed amendment increases the acreage for 10W.1 and 11W to 36.8, an increase of 3.6 acres, while now including 16.7 acres allocated to open space and major roads in Planning Area 23W, for a total FPDP area of 53.5 acres.

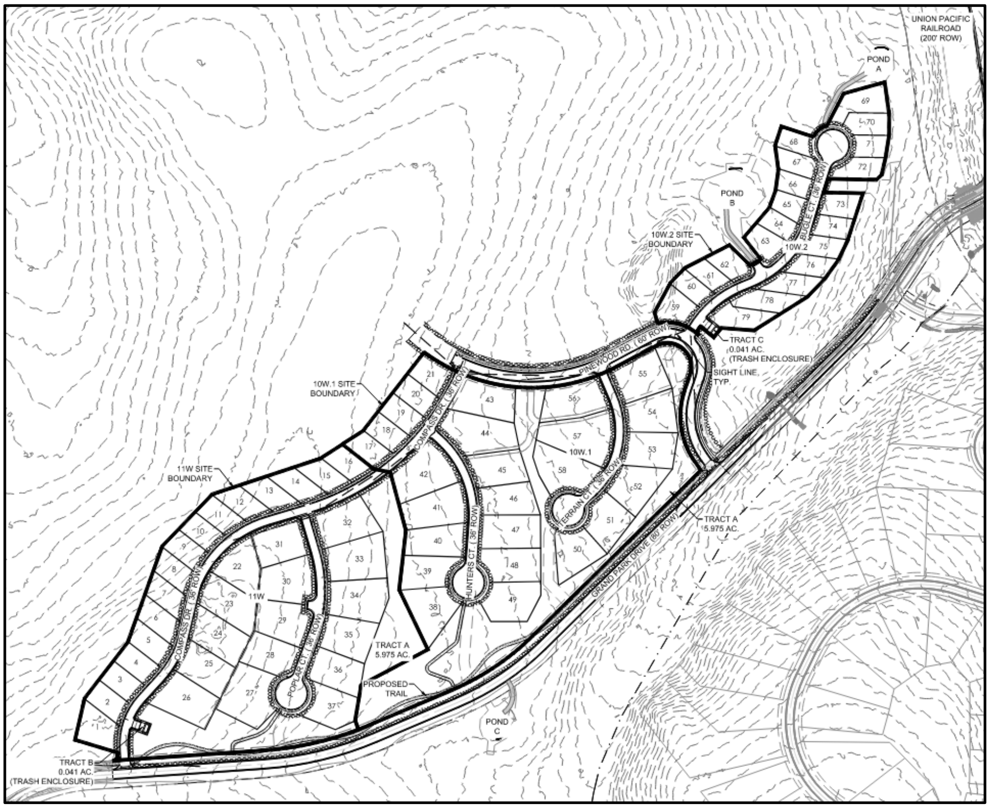
GRAND PARK PDDP



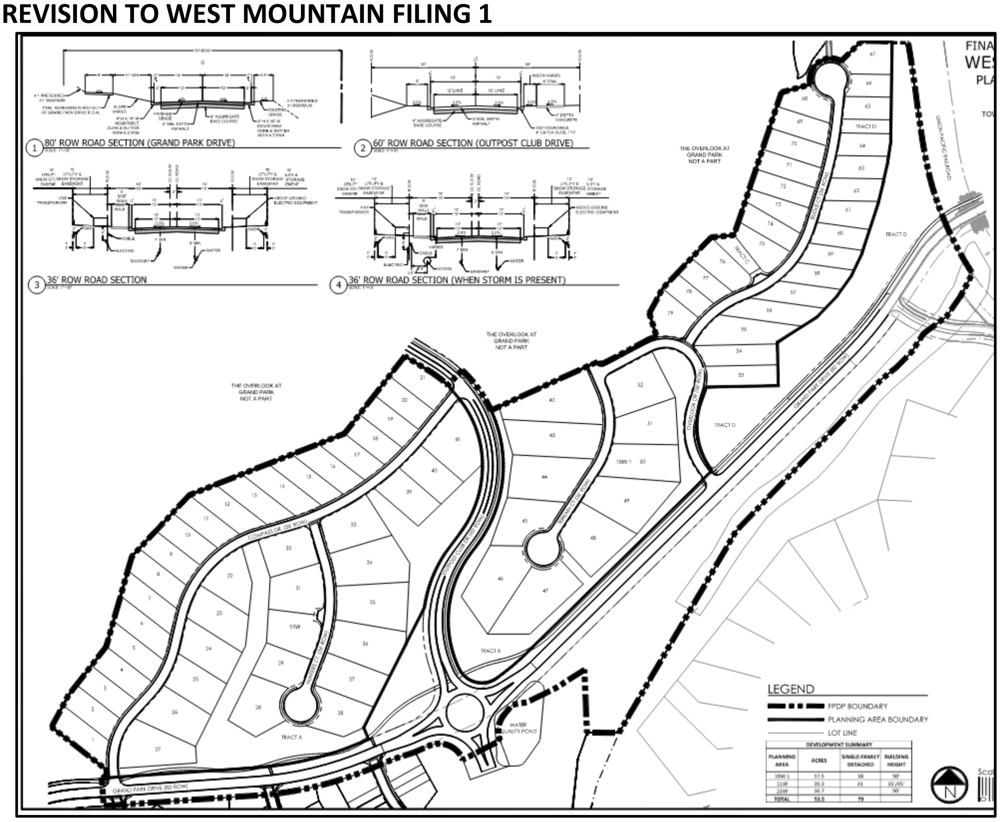
PROPOSED LAND USE MAP



EXISTING APPROVED WEST MOUNTAIN FILING 1



PROPOSED REVISION TO WEST MOUNTAIN FILING 1



SITE PLAN, PARKING, LANDSCAPING & SNOW STORAGE

As identified as the reason for the major amendment, the main revision proposed is the addition of a roundabout at the intersection of Grand Park Drive and the collector roadway (Outpost Club Drive) that serves both West Mountain Filing 1 and the proposed West Mountain Filing 2 development, which is anticipated to include the Outpost Club and additional commercial, lodging, and multifamily residential uses. The Planning Commission previously reviewed a Sketch Plan for West Mountain Filing 2 on April 23, 2025, and the applicant has since submitted an FPDP and Preliminary Plat for this development area consisting of Planning Areas 8Wb, 9W, 10W.2, 10W.3, and 23W. The Planning Commission will review this proposal at a future meeting; however, various submittal items (e.g., civil plans, drainage report, etc.) have been combined for both development areas and are provided in the packet for reference.

In terms of impacts to the Filing 1 development area, the collector road connection to Filing 2 was previously called Pinewood Drive and proposed as the first intersection along Grand Park Drive to the west of the railroad. A second local road connection, Compass Drive, was proposed further west along Grand Park Drive. In the current proposal, the first intersection west of the railroad is proposed to be a local road, Overlook Drive, serving 10W.1 and connecting into the Filing 2 area, followed by a larger roundabout intersection (Outpost Club Drive) which will serve as the main roadway access into Filing 2. A third, minor intersection follows to the west at Compass Drive, which serves Planning Area 11W. Following the submittal of this amendment to West Mountain Filing 1, the applicant has since provided a Traffic Impact Study (TIS) for the entire Grand Park West Mountain development area, which is currently under review. However, a preliminary review of this study indicates that the traffic generated by the Filing 2 development area warrants an improved roundabout intersection as is proposed with this FPDP. Because the Filing 1 area was previously approved at the current density, staff has no concerns about the proposal to increase the capacity of the Grand Park Drive / Outpost Club intersection as it pertains to Filing 1. Full review of the traffic study will be completed with the Filing 2 development review.

There are minimal to no changes to the proposed parking, landscaping, and snow storage requirements from the previous approval. For parking, the proposed development consists of both single-family detached and single-family attached residential dwelling units. Section 19-4-230 of the municipal code requires 2 off-street parking spaces for each unit. While no specific parking areas are depicted as part of the FPDP, each unit shall have at least two (2) off-street parking spaces and will be reviewed for compliance when a building permit is submitted.

Section 19-4-185 requires one (1) square foot of snow storage for every three (3) square feet of impervious surface area, or 33%. The applicant is proposing snow storage equal to 53% of the impervious surface area, i.e., the roadways proposed to serve the development. Additional snow storage for areas to be cleared on individual lots must be shown at the time of building permit application. It is noted that Mountain Parks Electric and Xcel Energy have consistently provided referral review comments that revisions to the plat notes and depicted snow storage areas are required in order to meet their operational needs. This item will continue to be tracked as part of the referral review process and is captured through proposed condition of approval #1, consistent with prior approval conditions.

Sheet 7 of the FPDP identifies the landscaping to be provided with the project, which only consists of revegetating all areas disturbed during construction with a native grass mix. This is consistent with the previous FPDP. Because this is a purely residential development within the Grand Park PDD, further landscaping is not required per Section 14-5-40.

REFERRAL REVIEW

The Final Plat and FPDP submittal documents were sent out on referral on December 30, 2025, and referral agency comments and planning review comments returned to the applicant on January 23, 2026. Due to the compressed timeline ahead of the requested public hearing, the applicant has not had the opportunity to provide a response to the most recent comments. The review summary is included as an attachment to this staff report.

The following agencies/entities provided comments on the latest submittal (Major Amendment, 7th submittal overall). Addressing all comments to the satisfaction of that agency/entity, as well as any new comments provided as a result of any revisions, is recommended as a condition of approval for the Final Plat and Final Planned Development Plan (FPDP).

- Town of Fraser Engineering (Merrick) and Public Works – Greg Steed, Donna Barrentine, Jeanne Boyle, and Katherine Knight
- JVAM Law Firm, as Town Attorney – Cooper Gehle
- East Grand Fire Protection District No. 4 – Ryan Mowrey
- Xcel Energy – Julie Gittins
- Mountain Parks Electric, Inc. – Jessica Tain

PUBLIC NOTICE

Sec. 19-1-215 establishes the requirements for public notice when public hearings are required with land use review. Newspaper publication and mailed letters are required for the Final Plat review, and were published/distributed as follows:

- Newspaper: Published in the Sky-Hi News and Middle Park Times on January 14, 2026 (Town responsibility)
- Mailed letters: Sent by certified/return receipt mail on January 14, 2026 (applicant responsibility)
- Affidavits of publication and mailing receipts are included with the Planning Commission packet

CONDITIONS OF FINAL PLAT AND FPDP APPROVAL – RESOLUTION 2025-01-09

On January 22, 2025, by Resolution 2025-01-09, the Board of Trustees voted to approve the amended FPDP and Final Plat with five conditions. The following table lists the conditions of approval and current status.

Resolution 2025-01-09 Conditions of Approval	Status
1) Prior to FPDP and Final Plat recordation, the Applicant must address all outstanding review comments to the satisfaction of the Town and/or applicable entity and revise and resubmit all documents accordingly.	**Unresolved**
2) Prior to recordation of the FPDP and the Final Plat, the Applicant shall receive approval from the Town of Fraser of the West Mountain Water Master Plan and associated construction design drawings and reports, as stipulated in Articles 5.3, 5.5, and 5.6 of the 2003 Annexation Agreement.	**Unresolved**

3) Prior to Final Plat recordation, the Applicant shall execute an approved Development Improvements Agreement and provide the appropriate surety.	**Unresolved**
4) Prior to Final Plat recordation, the Applicant shall provide the Town with the following items as outlined in the Major Subdivision Final Plat Checklist: a. Proof of filing the applicable articles of incorporation with the Secretary of State and the executed originals of all legal documents, including a final executed SIA and any required collateral. b. Final plat Mylar with appropriate signatures c. A fourteen (14) inch by eighteen (18) inch black line Mylar for the purpose of incorporating the data into a 911 emergency system, containing the name and subdivision, the section, township and range in which the subdivision is located, all street names, lot numbers, street addressing numbers, and unit numbers (if applicable). d. A digital file of the approved final plat and 911 emergency system drawing in both CAD and PDF format for the Town's Geographic Information System (GIS).	**Unresolved**
5) Concurrent with Final Plat recordation, the Applicant shall record the Development Improvements Agreement (DIA) as well as the necessary HOA declaration, restrictive covenants, and bylaws.	**Unresolved**

REQUEST: Approval of an amended Final Plat and FPDP for West Mountain Filing 1 (Planning Areas 10W and 11W) of Grand Park.

RECOMMENDATION: Staff recommends that the Planning Commission APPROVE the amended Final Plat and FPDP subject to the following conditions:

CONDITIONS:

1) Prior to Final Plat recordation, the Applicant must address all outstanding review comments to the satisfaction of the Town and/or applicable entity and revise and resubmit all documents accordingly.

2) Prior to recordation of the FPDP and the Final Plat, the Applicant shall receive approval of the West Mountain Water Master Plan and associated construction design drawings and reports from the Town of Fraser, as stipulated in Articles 5.3, 5.5, and 5.6 of the 2003 Annexation Agreement.

3) Prior to Final Plat recordation, the Applicant shall execute an approved Development Improvements Agreement and provide the appropriate surety.

4) Prior to Final Plat recordation, the Applicant shall provide the Town with the following items as outlined in the Major Subdivision Final Plat Checklist:

   a. Proof of filing the applicable articles of incorporation with the Secretary of State and the executed originals of all legal documents, including a final executed DIA and any required collateral.
   b. Final plat Mylar with appropriate signatures
   c. A digital file of the approved final plat and 911 emergency system drawing / address map in both CAD and PDF format for the Town's Geographic Information System (GIS).
5) Concurrent with Final Plat recordation, the Town shall record the Development Improvements Agreement (DIA) as well as the necessary HOA declaration, restrictive covenants, and bylaws.

Attachments:

01 West Mountain Filing 1 Final Plat
02 West Mountain Filing 1 FPDP
03 Civil Construction Documents West Mountain Filing 1 and 2
04 Phase II Drainage Report West Mountain Filing 1 and 2
05 Wetland Exhibit West Mountain Filing 1 and 2
06 Grand Park West Mountain TIS (January 2026)
07 Combined 7th Submittal Referral Review Comments
08 Proof of Public Notice
09 Receipts for Mailed Notices
10 Adjacent Property Owners List

Planning Commission Resolution 2026-01-01

FINAL PLAT

WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.

DEDICATION AND NOTARY CLAUSE:

KNOW ALL PEOPLE BY THESE PRESENTS: THAT WEST MOUNTAIN DEVELOPMENT, LLC, A COLORADO LIMITED LIABILITY COMPANY, IS THE OWNER OF THAT REAL PROPERTY SITUATED IN THE TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 29 AND THE NORTH HALF OF SECTION 32, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: THE NORTH LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 29, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, WAS ASSUMED TO BEAR SOUTH 89°49'44" WEST, A DISTANCE OF 1,321.23 FEET, BEING MONUMENTED AT THE EAST QUARTER CORNER OF SAID SECTION 29 BY A 1-1/2" STEEL POST WITH 2-1/2" GLO BRASS CAP STAMPED "US GENERAL LAND OFFICE SURVEY 1/4 S29 S28 1933" AND AT THE CENTER-EAST SIXTEENTH CORNER OF SAID SECTION 29 BY A NO. 6 REBAR WITH 3-1/4" ALUMINUM CAP STAMPED "DEA INC. T1S R75W E 1/16 C-C S29 2014 PLS 34592".

COMMENCING AT SAID EAST QUARTER CORNER;

THENCE SOUTH 41°09'00" WEST, A DISTANCE OF 910.38 FEET TO THE SOUTHERLY BOUNDARY OF THE 200-FOOT-WIDE UNION PACIFIC RAILROAD RIGHT-OF-WAY AND THE POINT OF BEGINNING;

THENCE ALONG SAID SOUTHERLY BOUNDARY THE FOLLOWING TWO (2) COURSES:

1. SOUTH 07°48'24" EAST, A DISTANCE OF 294.34 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE EASTERLY HAVING A RADIUS OF 816.78 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 82°07'05" EAST;
2. SOUTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 12°55'27", AN ARC LENGTH OF 184.24 FEET TO THE MOST NORTHERLY CORNER OF PARCEL 2, GRAND PARK DRIVE EXEMPTION PLAT RECORDED AT RECEPTION NO. 2016002214 IN THE OFFICIAL RECORDS OF THE GRAND COUNTY, COLORADO CLERK AND RECORDER'S OFFICE AND THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 250.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 34°09'07" EAST;

THENCE ALONG THE NORTHWESTERLY AND SOUTHWESTERLY BOUNDARY OF SAID PARCEL 2 THE FOLLOWING FOUR (4) COURSES:

1. SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 44°11'42", AN ARC LENGTH OF 192.84 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 150.00 FEET;
2. SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 33°48'01", AN ARC LENGTH OF 88.49 FEET;
3. SOUTH 45°27'20" WEST, A DISTANCE OF 135.92 FEET;
4. SOUTH 44°31'03" EAST, A DISTANCE OF 84.39 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 1,040.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 49°03'10" WEST;

THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 04°24'52", AN ARC LENGTH OF 80.13 FEET;

THENCE SOUTH 45°21'41" WEST, A DISTANCE OF 204.83 FEET;

THENCE SOUTH 44°52'10" WEST, A DISTANCE OF 200.03 FEET;

THENCE SOUTH 45°27'20" WEST, A DISTANCE OF 843.10 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 840.00 FEET;

THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 05°56'24", AN ARC LENGTH OF 87.09 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 50.00 FEET;

THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 09°39'58", AN ARC LENGTH OF 8.44 FEET;

THENCE SOUTH 41°43'46" WEST, A DISTANCE OF 83.60 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE EASTERLY HAVING A RADIUS OF 73.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 51°02'34" EAST;

THENCE SOUTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 60°47'55", AN ARC LENGTH OF 77.46 FEET;

THENCE SOUTH 62°31'49" WEST, A DISTANCE OF 120.63 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 73.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 68°37'00" WEST;

THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 92°24'02", AN ARC LENGTH OF 117.73 FEET;

THENCE SOUTH 68°38'59" WEST, A DISTANCE OF 170.87 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 1,040.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 23°00'41" WEST;

THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 19°05'05", AN ARC LENGTH OF 346.41 FEET;

THENCE SOUTH 86°04'23" WEST, A DISTANCE OF 445.44 FEET;

THENCE NORTH 03°55'37" WEST, A DISTANCE OF 80.00 FEET;

THENCE NORTH 86°04'23" EAST, A DISTANCE OF 2.00 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 15.00 FEET;

THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 90°00'00", AN ARC LENGTH OF 23.56 FEET;

THENCE NORTH 03°55'37" WEST, A DISTANCE OF 8.26 FEET;

THENCE NORTH 52°12'55" WEST, A DISTANCE OF 200.13 FEET;

THENCE NORTH 27°58'25" EAST, A DISTANCE OF 102.73 FEET;

THENCE NORTH 37°47'05" EAST, A DISTANCE OF 178.77 FEET;

THENCE NORTH 15°51'37" EAST, A DISTANCE OF 268.33 FEET;

THENCE NORTH 43°06'31" EAST, A DISTANCE OF 242.12 FEET;

THENCE NORTH 68°25'25" EAST, A DISTANCE OF 480.75 FEET;

THENCE NORTH 37°55'55" EAST, A DISTANCE OF 282.21 FEET;

THENCE SOUTH 58°58'37" EAST, A DISTANCE OF 80.26 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 320.00 FEET;

THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 12°31'12", AN ARC LENGTH OF 69.92 FEET;

THENCE NORTH 43°32'35" EAST, A DISTANCE OF 60.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 380.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 43°32'35" WEST;

THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 21°35'44", AN ARC LENGTH OF 143.23 FEET;

THENCE NORTH 65°25'10" EAST, A DISTANCE OF 299.51 FEET;

THENCE NORTH 23°18'18" WEST, A DISTANCE OF 4.49 FEET;

THENCE NORTH 66°41'42" EAST, A DISTANCE OF 36.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 15.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 66°41'42" EAST;

THENCE EASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 94°34'40", AN ARC LENGTH OF 24.76 FEET;

THENCE NORTH 62°07'01" EAST, A DISTANCE OF 137.41 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 120.00 FEET;

THENCE EASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 15°51'46", AN ARC LENGTH OF 33.22 FEET;

THENCE NORTH 17°29'08" WEST, A DISTANCE OF 70.91 FEET;

THENCE NORTH 28°01'24" EAST, A DISTANCE OF 79.96 FEET;

THENCE NORTH 43°23'08" EAST, A DISTANCE OF 204.05 FEET;

THENCE NORTH 84°30'09" EAST, A DISTANCE OF 66.55 FEET;

THENCE NORTH 18°22'32" EAST, A DISTANCE OF 431.96 FEET;

THENCE NORTH 74°33'59" EAST, A DISTANCE OF 87.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 60.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 75°54'23" EAST;

THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 133°54'35", AN ARC LENGTH OF 140.23 FEET;

THENCE NORTH 46°00'10" EAST, A DISTANCE OF 83.14 FEET;

THENCE SOUTH 89°02'49" EAST, A DISTANCE OF 86.97 FEET;

THENCE SOUTH 72°11'31" EAST, A DISTANCE OF 52.67 FEET TO THE POINT OF BEGINNING.

CONTAINING AN AREA OF 47.838 ACRES, (2,083,844 SQUARE FEET), MORE OR LESS.

DEDICATION AND NOTARY CLAUSE CONTINUED:

IN WITNESS WHEREOF, WEST MOUNTAIN DEVELOPMENT, LLC., A COLORADO LIMITED LIABILITY COMPANY, HAS CAUSED ITS NAME TO BE HEREUNTO SUBSCRIBED THIS

__________ DAY OF ____________, 20___.

BY: ____
C. CLARK LIPSCOMB, PRESIDENT

STATE OF COLORADO)
)SS
COUNTY OF GRAND)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ______________________ DAY OF ____________________, 20___
BY: C. CLARK LIPSCOMB AS PRESIDENT OF WEST MOUNTAIN DEVELOPMENT, LLC.

WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES: ______________________________

____
NOTARY PUBLIC

MORTGAGEE'S CONSENT:

THE UNDERSIGNED, BEING THE AUTHORIZED REPRESENTATIVE OF U.S. BANK, N.A., THE HOLDER OF A BENEFICIAL INTEREST IN AND TO THE PROPERTY DESCRIBED ON THIS PLAT, UNDER DEED OF TRUST RECORDED JUNE 28, 2012 AT RECEPTION NO. 2012-005143 AND RECEPTION NO. 2012-005144 OF THE GRAND COUNTY, COLORADO REAL PROPERTY RECORDS, HEREBY CONSENTS TO THIS PLAT AND AGREES THAT THE LIEN OF THE DEED OF TRUST IS HEREBY SUBORDINATED TO THIS PLAT.

BY: ____

NAME: ____________________________________

TITLE: ____________________________________

STATE OF _______________________)
)SS
COUNTY OF _____________________)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ___________ DAY OF

_______________, 20___

BY ____ AS

____________________________________ OF U.S. BANK, N.A.

WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES: ____

____
NOTARY PUBLIC

BOARD OF TRUSTEES APPROVAL:

APPROVED AND ALL PUBLIC DEDICATIONS ACCEPTED THIS _________________ DAY OF ____________, 20___ BY THE FRASER TOWN BOARD. THE TOWN OF FRASER DOES NOT ASSUME ANY RESPONSIBILITY FOR THE CORRECTNESS OR ACCURACY OF ANY INFORMATION DISCLOSED ON THIS PLAT NOR ANY REPRESENTATIONS OR INFORMATION PRESENTED TO THE TOWN OF FRASER WHICH INDUCED THE TOWN TO GIVE THIS CERTIFICATE.

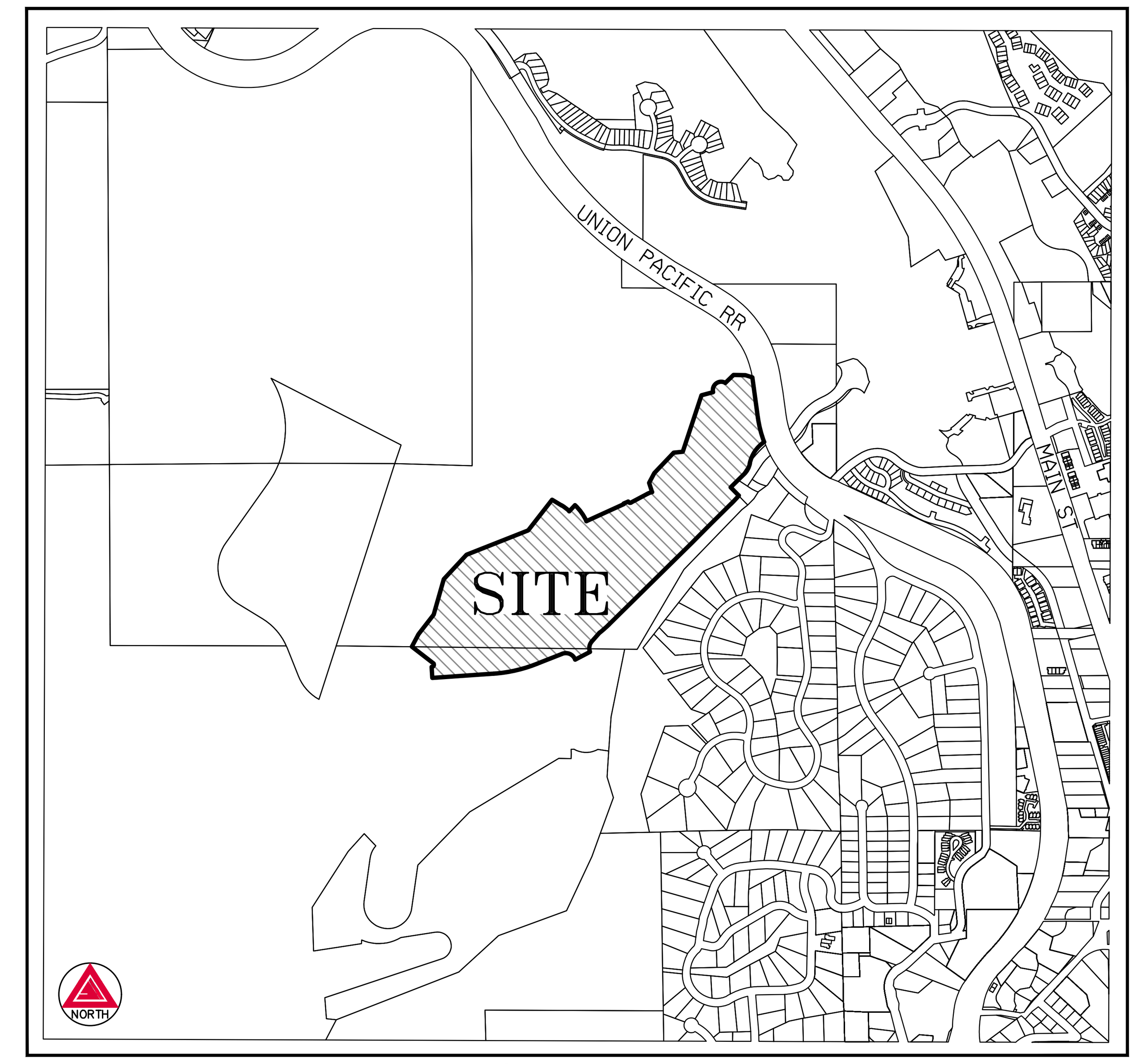
BY: ____________________________________

____
MAYOR, TOWN OF FRASER

GENERAL NOTES:

1. BASIS OF BEARINGS FOR THIS PLAT IS THE NORTH LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN WHICH WAS ASSUMED TO BEAR S89°49'44"W, AS MONUMENTED AS SHOWN HEREON.
2. SET 18" LONG #5 REBAR WITH 1-1/4" PINK PLASTIC CAP MARKED "PLS 38636" AT ALL EXTERIOR BOUNDARY CORNERS UNLESS OTHERWISE NOTED.
3. THIS PLAT DOES NOT CONSTITUTE A TITLE SEARCH BY AZTEC CONSULTANTS INC., TO DETERMINE OWNERSHIP, RIGHTS OF WAY OR EASEMENTS OF RECORD. FOR ALL INFORMATION REGARDING EASEMENTS, RIGHTS OF WAY AND TITLE OF RECORD, AZTEC CONSULTANTS INC., RELIED UPON ______________________ COMMITMENT NUMBER ________________ WITH AN EFFECTIVE DATE OF __________ ____, ____, __:__ A.M./P.M.
4. LEGAL DESCRIPTION PREPARED BY ANTHONY K. PEALL, AZTEC CONSULTANTS INC., 300 EAST MINERAL AVENUE, SUITE 1, LITTLETON, CO, 80122
5. THE U.S. SURVEY FOOT WAS USED FOR ALL MEASUREMENTS ON THIS SURVEY. PURSUANT TO C.R.S. 38-52.103(2) METRIC CONVERSION IS: ONE METER EQUALS 3937/1200 FEET.
6. TRACT USE SPECIFIED BELOW SHALL BE:

   TRACT C IS FOR OPEN SPACE PURPOSES.
   TRACTS A, B AND D ARE FOR OPEN SPACE & UTILITY PURPOSES.
   TRACTS A-D SHALL BE OWNED AND MAINTAINED BY GRAND PARK HOMEOWNER'S ASSOCIATION INC.
7. ONSITE EASEMENTS ARE HEREBY DEDICATED BY THIS PLAT IN THE LOCATIONS SHOWN HEREON.
8. FIRE PROTECTION SERVICES FOR WEST MOUNTAIN FILING NO. 1 SHALL BE PROVIDED BY THE EAST GRAND FIRE PROTECTION DISTRICT NO. 4.
9. PERPETUAL NON-EXCLUSIVE 10-FOOT UTILITY EASEMENTS ARE HEREBY GRANTED AND SHALL APPLY UPON, ACROSS, ABOVE, OVER, UNDER AND THROUGH THE UTILITY EASEMENTS SHOWN ON THIS PLAT FOR THE PURPOSE OF INGRESS TO AND EGRESS FROM, AND THE INSTALLATION, REPAIR, REPLACEMENT, OPERATION AND MAINTENANCE OF ALL UTILITY LINES AND EQUIPMENT. ANY CONSTRUCTION AND PLACEMENT OF LINES, EQUIPMENT, OR BUILDING STRUCTURES OR CHANGES IN GRADE SHALL COMPLY WITH THE STANDARDS OF ALL UTILITY PROVIDERS UTILIZING THE EASEMENT.
10. THE TOWN OF FRASER HEREBY AGREES ABOVE GROUND UTILITY EQUIPMENT SHALL BE ALLOWED IN THE FRASER TOWN RIGHT-OF-WAY AS DEPICTED HEREIN WHEN PLACED A MINIMUM OF 2' BEHIND THE SIDEWALK OR 3' BEHIND THE 6" CURB WHERE THERE ARE NO SIDEWALKS.
11. UPON COMPLETION OF ALL REQUIRED IMPROVEMENTS, AND IN ACCORDANCE WITH THE ACCEPTANCE PROCESS DETAILED IN THE SUBDIVISION REGULATIONS, ALL ROADS AND DRAINAGE IMPROVEMENTS SHALL BE PUBLIC AND MAINTAINED BY THE TOWN OF FRASER.
12. WHILE BUILDING PERMITS MAY BE ISSUED PRIOR TO FINAL COMPLETION OF SUBDIVISION IMPROVEMENTS, NO CERTIFICATE OF OCCUPANCY MAY BE ISSUED FOR A STRUCTURE ON ANY LOT, PARCEL OR TRACT UNTIL ALL SUCH IMPROVEMENTS, AS REQUIRED BY THE DIA, HAVE BEEN COMPLETED AND PRELIMINARILY ACCEPTED BY THE TOWN PURSUANT TO SECTION 19-3-445.
13. TRAIL/SIDEWALK EASEMENTS ARE HEREBY GRANTED TO THE PUBLIC ACROSS ANY TRACTS THAT CONTAINS TRAILS OR SIDEWALKS, SUCH TRAILS OR SIDEWALKS WILL BE CONSTRUCTED PER THE CONSTRUCTION PLANS FOR THE PURPOSE OF ACCESSING THE TRAIL SYSTEM. THE WIDTH AND LOCATION OF SAID EASEMENT WILL BE DEFINED BY THE WIDTH AND LOCATION OF SAID CONSTRUCTED TRAIL/SIDEWALK.
14. THE PROPERTY IS SUBJECT TO THE AMENDED AND RESTATED ANNEXATION AGREEMENT RECORDED DECEMBER 30, 2003 AT RECEPTION NO. 2003-016733, AS AMENDED; GRAND PARK PLANNED DEVELOPMENT DISTRICT PLAN RECORDED NOVEMBER 8, 2005 AT RECEPTION NO. 2005-012709; THE FINAL PLANNED DEVELOPMENT PLAN FOR WEST MOUNTAIN FILING NO. 1 RECORDED __________________, 2025 AT RECEPTION NO.___________________; THE COMMUNITY CHARTER FOR GRAND PARK RESIDENTIAL PROPERTY RECORDED DECEMBER 7, 2005 AT RECEPTION NO. 2005-13834, AS AMENDED AND SUPPLEMENTED; AND THE COVENANT FOR COMMUNITY ENHANCEMENT FEE RECORDED DECEMBER 7, 2007 AT RECEPTION NO. 2005-013836, AS AMENDED AND SUPPLEMENTED.



VICINITY MAP
SCALE 1" = 1000'

OWNER/DEVELOPER:
WEST MOUNTAIN DEVELOPMENT, LLC.
P.O. BOX 30
WINTER PARK, CO 80482

LAND PLANNER:
TERRACINA DESIGN
10200 E. GIRARD AVE. STE. A-314
DENVER, CO 80231
303-632-8867

SURVEYOR:
AZTEC CONSULTANTS, INC.
300 E. MINERAL AVE., SUITE 1
LITTLETON, CO 80122

DATE PREPARED:
DECEMBER 17, 2025

SURVEYOR'S CERTIFICATE:

I, ANTHONY K. PEALL, A DULY LICENSED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THIS PLAT OF WEST MOUNTAIN FILING NO. 2, TRULY AND CORRECTLY REPRESENTS THE RESULTS OF A SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT SAID PLAT COMPLIES WITH THE REQUIREMENTS OF TITLE 38, ARTICLE 51, COLORADO REVISED STATUTES, 1973, AND THE MONUMENTS REQUIRED BY SAID STATUTE AND BY THE TOWN OF FRASER SUBDIVISION REGULATIONS HAVE BEEN PLACED IN THE GROUND.

__________ ____________________________
ANTHONY K. PEALL, CO PLS 38636
AZTEC CONSULTANTS, INC.

FOR REVIEW
DO NOT RECORD

NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

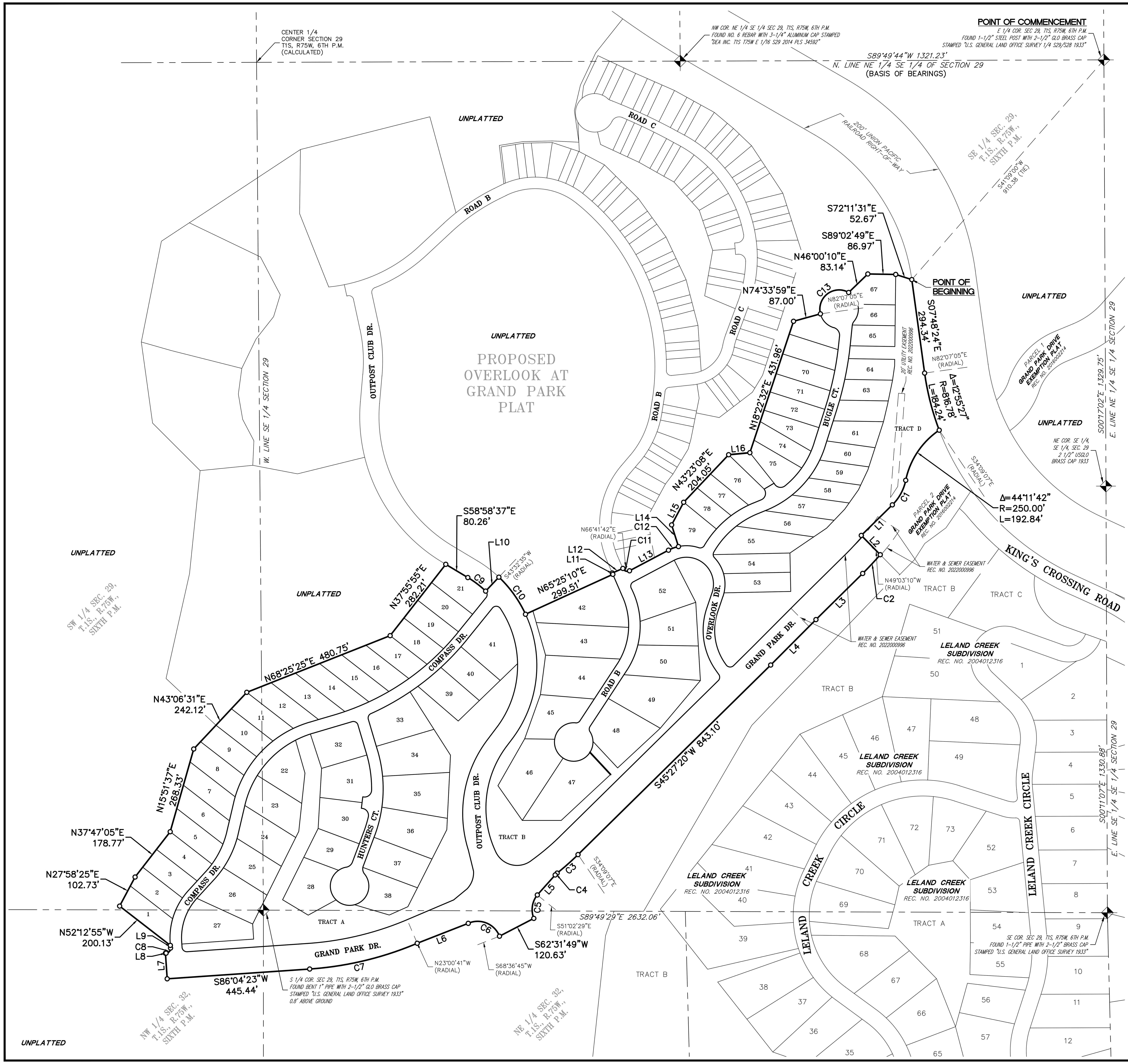
NOTICE: PER THE STATE OF COLORADO BOARD OF LICENSURE FOR ARCHITECTS, PROFESSIONAL ENGINEERS, AND PROFESSIONAL LAND SURVEYORS RULE 1.6.B.2 THE WORD "CERTIFY" AS USED HEREON MEANS AN EXPRESSION OF PROFESSIONAL OPINION AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTY, EXPRESSED OR IMPLIED. THE SURVEY REPRESENTED HEREON HAS BEEN PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE AND IS BASED UPON MY KNOWLEDGE, INFORMATION AND BELIEF.

AZTEC CONSULTANTS, INC.
300 East Mineral Ave., Suite 1
Littleton, Colorado 80122
Phone: (303) 713-1898
Fax: (303) 713-1897
www.aztecconsultants.com

AzTec Proj. No.: 181122-01 Drawn By: BAM

DEVELOPER
GRAND PARK DEVELOPMENT, LLC
P.O. BOX 30
WINTER PARK, COLORADO 80482
(970) 726-8600

DATE OF PREPARATION:	12-17-2025
SCALE:	N/A
SHEET 1 OF 7	



FINAL PLAT
WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.

LINE TABLE		
LINE	BEARING	LENGTH
L1	S45°27'20"W	135.92'
L2	S44°31'03"E	84.39'
L3	S45°21'41"W	204.83'
L4	S44°52'10"W	200.03'
L5	S41°43'46"W	83.60'
L6	S68°38'59"W	170.87'
L7	N03°55'37"W	80.00'
L8	N86°04'23"E	2.00'
L9	N03°55'37"W	8.26'
L10	N43°32'35"E	60.00'
L11	N23°18'18"W	4.49'
L12	N66°41'42"E	36.00'
L13	N62°07'01"E	137.41'
L14	N17°29'08"W	70.91'
L15	N28°01'24"E	79.96'
L16	N84°30'09"E	66.55'
L17	N03°55'37"W	8.88'
L18	S03°55'37"E	17.14'
L19	S42°30'30"W	79.16'
L20	N42°30'30"E	79.16'
L21	N13°12'29"E	92.61'
L22	S13°12'29"W	92.61'
L23	N73°31'26"E	80.79'
L24	S16°28'34"E	102.14'
L25	N16°28'34"W	94.49'
L26	S83°00'34"E	2.77'
L27	N06°59'26"E	36.00'
L28	N83°00'34"W	2.77'
L29	N20°31'13"E	101.41'
L30	S20°31'13"W	101.41'
L31	N03°55'37"W	47.29'
L32	N65°56'02"E	63.74'
L33	N50°23'41"E	54.06'
L34	N13°46'23"W	67.20'
L35	N36°55'07"E	51.25'
L36	N36°55'07"E	30.40'
L37	S36°55'07"W	30.40'
L38	N45°23'05"E	83.57'
L39	N18°48'14"E	50.00'
L40	S18°48'14"W	50.00'

LINE TABLE		
LINE	BEARING	LENGTH
L41	S01°11'59"E	120.00'
L42	N67°39'10"E	26.25'
L43	S67°39'10"W	29.84'
L44	S67°39'10"W	29.84'
L45	N59°35'16"E	36.00'
L46	N30°24'13"W	2.56'
L47	S30°24'13"E	2.54'
L48	N17°37'41"E	120.32'
L49	S17°37'41"W	120.32'
L50	N05°49'49"E	22.08'
L51	S05°49'49"W	58.96'
L52	S08°15'55"W	45.37'
L53	S11°35'50"W	66.14'
L54	S13°17'01"W	56.30'
L55	S25°15'16"W	68.94'
L56	S35°16'34"W	74.05'
L57	S43°44'52"W	81.87'
L58	S84°10'11"E	27.97'
L59	N18°48'14"E	50.00'
L60	N35°19'15"W	15.62'
L61	N56°45'10"W	2.00'

CURVE TABLE			
CURVE	DELTA	RADIUS	LENGTH
C1	33°48'01"	150.00'	88.49'
C2	4°24'52"	1040.00'	80.13'
C3	5°56'24"	840.00'	87.09'
C4	9°39'58"	50.00'	8.44'
C5	60°47'55"	73.00'	77.46'
C6	92°24'02"	73.00'	117.73'
C7	19°05'05"	1040.00'	346.41'
C8	90°00'00"	15.00'	23.56'
C9	12°31'12"	320.00'	69.92'
C10	21°35'44"	380.00'	143.23'
C11	94°34'40"	15.00'	24.76'
C12	15°51'46"	120.00'	33.22'
C13	133°54'35"	60.00'	140.23'
C14	90°00'00"	15.00'	23.56'
C15	46°26'06"	182.00'	147.50'
C16	46°26'06"	218.00'	176.68'
C17	29°18'01"	282.00'	144.21'
C18	29°18'01"	318.00'	162.62'
C19	60°18'57"	343.00'	361.08'
C20	60°18'57"	307.00'	323.18'
C21	90°00'00"	15.00'	23.56'
C22	82°13'10"	15.00'	21.52'
C23	17°05'14"	382.00'	113.92'
C24	36°59'47"	418.00'	269.91'
C25	96°22'46"	22.00'	37.01'
C26	96°22'46"	22.00'	37.01'
C27	7°09'02"	382.00'	47.67'

CURVE TABLE			
CURVE	DELTA	RADIUS	LENGTH
C28	59°36'36"	25.00'	26.01'
C29	59°36'36"	25.00'	26.01'
C30	107°12'19"	15.00'	28.07'
C31	85°26'45"	15.00'	22.37'
C32	47°44'41"	73.00'	60.83'
C33	103°42'07"	73.00'	132.13'
C34	8°42'13"	760.00'	115.45'
C35	80°46'35"	15.00'	21.15'
C36	97°33'33"	15.00'	25.54'
C37	62°04'59"	120.00'	130.03'
C38	73°18'05"	15.00'	19.19'
C39	77°52'28"	15.00'	20.39'
C40	37°07'38"	318.00'	206.06'
C41	37°37'49"	282.00'	185.21'
C42	98°03'23"	22.00'	37.65'
C43	98°50'59"	22.00'	37.96'
C44	50°01'29"	318.00'	277.64'
C45	33°07'07"	282.00'	163.00'
C46	11°47'52"	980.00'	201.79'
C47	11°47'52"	1016.00'	209.21'
C48	79°48'57"	25.00'	34.83'
C49	33°23'21"	25.00'	14.57'
C50	4°47'36"	960.00'	80.31'
C51	89°04'58"	15.00'	23.32'
C52	4°35'46"	1000.00'	80.22'
C53	65°35'08"	15.00'	17.17'
C54	62°10'55"	15.00'	16.28'

LEGEND

FOUND ALIQUOT CORNER AS SHOWN HEREON
SET NO. 5 X 18" REBAR WITH 1-1/4" PINK PLASTIC CAP STAMPED "AZTEC PLS 38636"
U.E.* UTILITY EASEMENTS & SNOW STORAGE EASEMENT
(ROW) RIGHT-OF-WAY
(NR) DENOTES NON-RADIAL

FOR REVIEW
DO NOT RECORD

FOR AND ON BEHALF OF
AZTEC CONSULTANTS, INC

AzTec Consultants, Inc.
300 East Mineral Ave., Suite 1
Littleton, Colorado 80122
Phone: (303) 713-1898
Fax: (303) 713-1897
www.aztecconsultants.com
AzTec Proj. No.: 181122-01
Drawn By: BAM

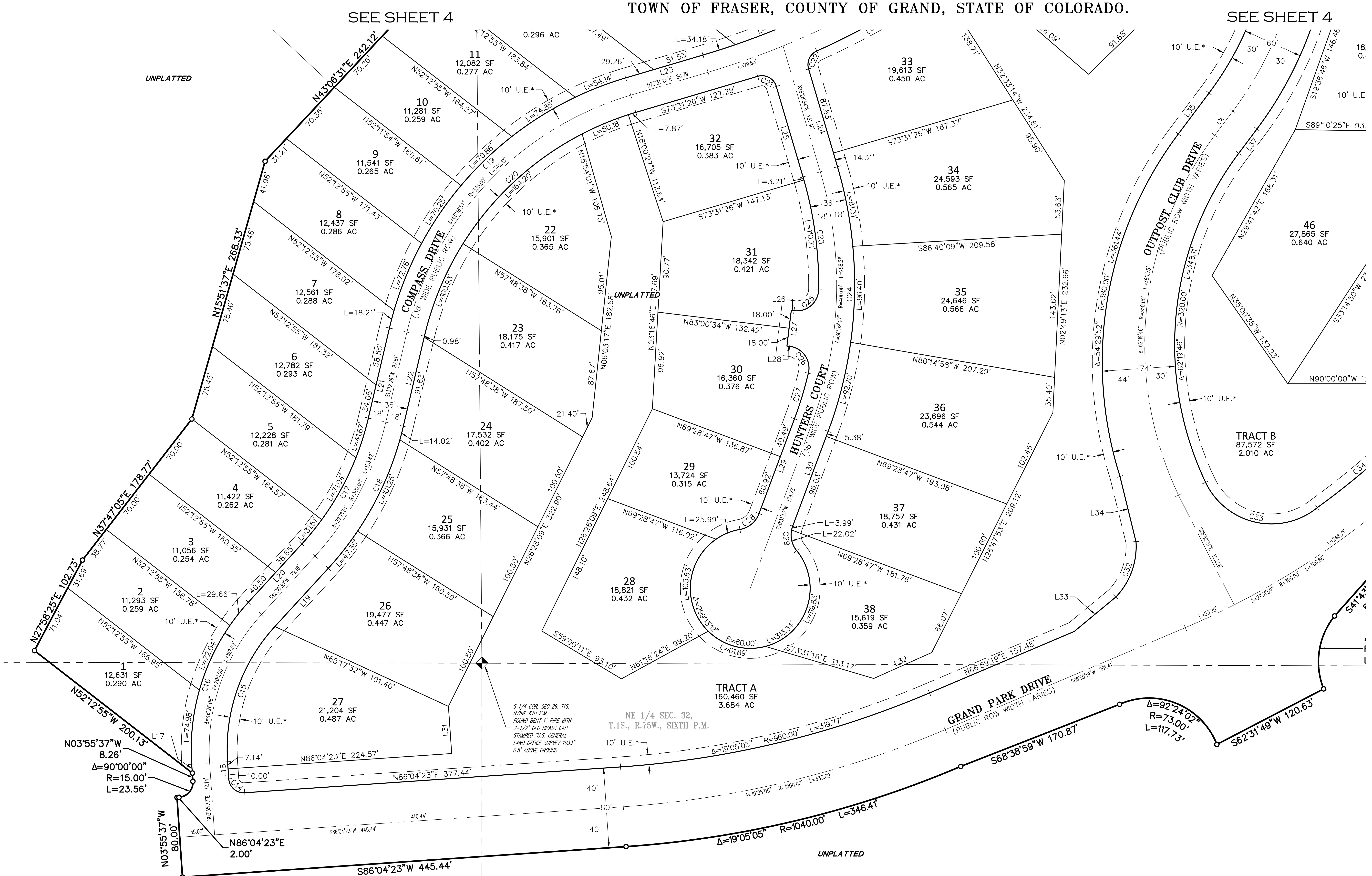
DEVELOPER
GRAND PARK DEVELOPMENT, LLC
P.O. BOX 30
WINTER PARK, COLORADO 80482
(970) 726-8600

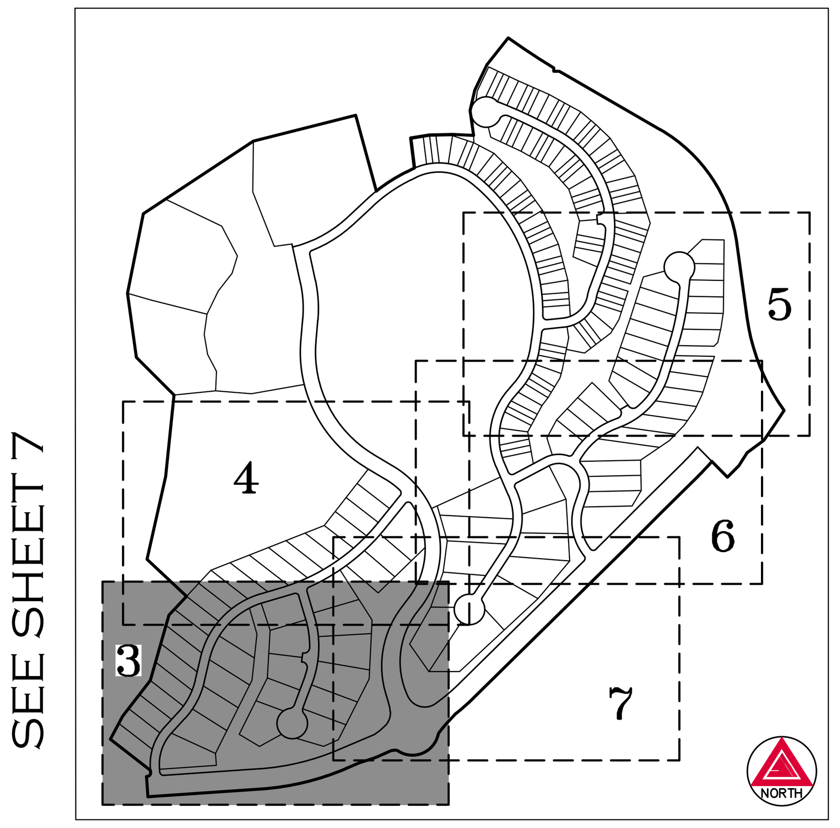
DATE OF PREPARATION:	12-17-2025
SCALE:	1" = 150'

FINAL PLAT

WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND
THE NORTHWEST QUARTER OF SECTION 32,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.





KEY MAP
SCALE: 1" = 600'

LEGEND

- FOUND ALIQUOT CORNER AS SHOWN HEREON
- SET NO. 5 X 18" REBAR WITH 1-1/4" PINK PLASTIC CAP STAMPED "AZTEC PLS 38636"
- U.E.* UTILITY EASEMENTS & SNOW STORAGE EASEMENT
- (ROW) RIGHT-OF-WAY
- (NR) DENOTES NON-RADIAL

SEE SHEET 2 FOR LINE & CURVE TABLES

SCALE: 1" = 50'

FOR REVIEW DO NOT RECORD

FOR AND ON BEHALF OF AZTEC CONSULTANTS, INC

AZTEC CONSULTANTS, INC.
300 East Mineral Ave., Suite 1
Littleton, Colorado 80122
Phone: (303) 713-1898
Fax: (303) 713-1897
www.aztecconsultants.com

AzTec Proj. No.: 181122-01 Drawn By: BAM

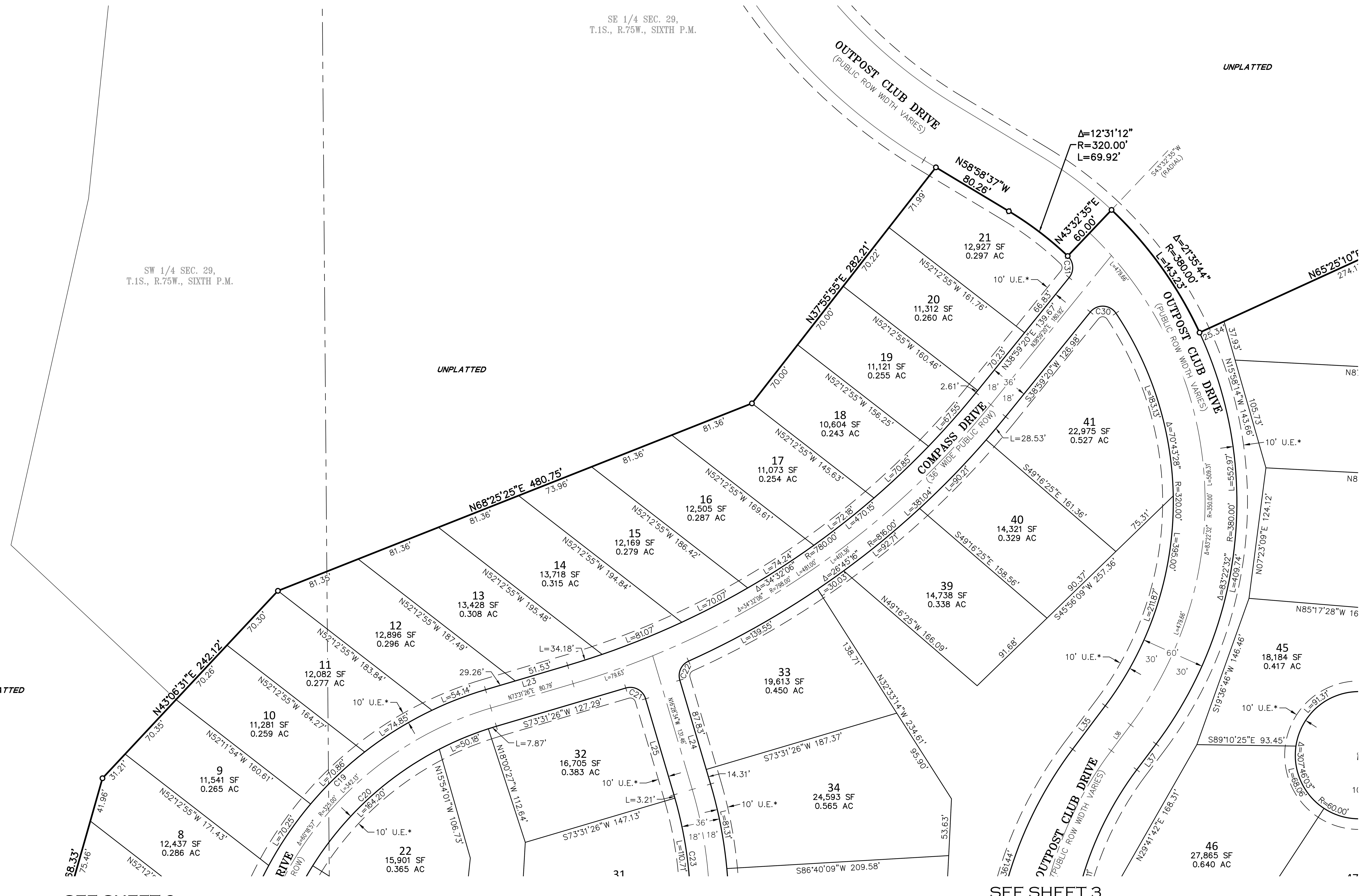
DEVELOPER
GRAND PARK DEVELOPMENT, LLC
P.O. BOX 30
WINTER PARK, COLORADO 80482
(970) 726-8600

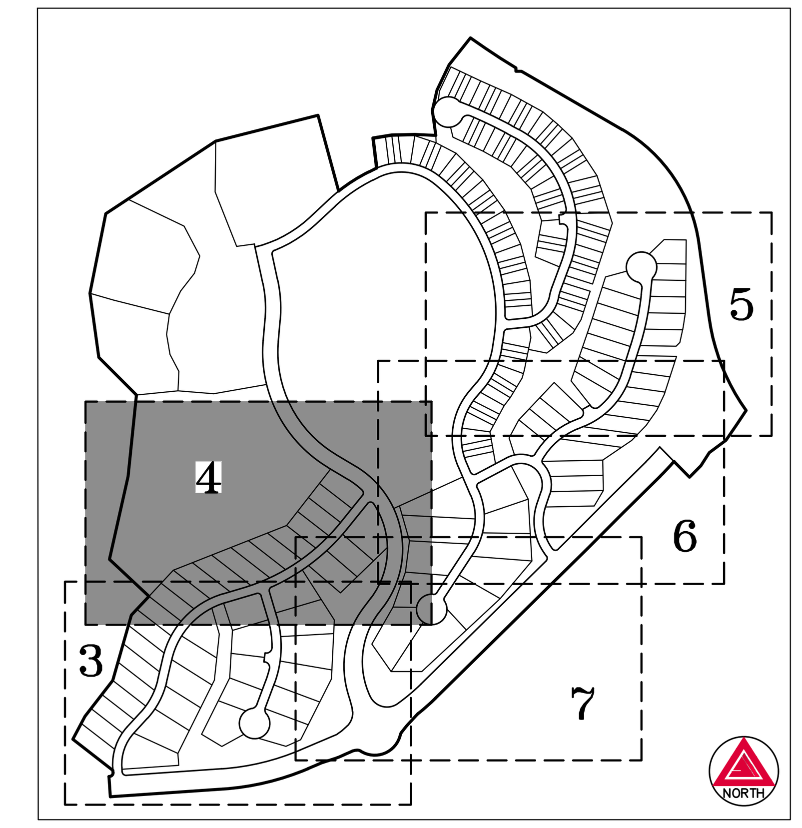
DATE OF PREPARATION:	12-17-2025
SCALE:	1" = 50'

FINAL PLAT

WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND
THE NORTHWEST QUARTER OF SECTION 32,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.





KEY MAP
SCALE: 1" = 600'

LEGEND

- FOUND ALIQUOT CORNER AS SHOWN HEREON
- SET NO. 5 X 18" REBAR WITH 1-1/4" PINK PLASTIC CAP STAMPED "AZTEC PLS 38636"
- U.E.* UTILITY EASEMENTS & SNOW STORAGE EASEMENT
- (ROW) RIGHT-OF-WAY
- (NR) DENOTES NON-RADIAL

SEE SHEET 2 FOR LINE & CURVE TABLES

SCALE: 1" = 50'

FOR REVIEW DO NOT RECORD

FOR AND ON BEHALF OF AZTEC CONSULTANTS, INC

AZTEC CONSULTANTS, INC.
300 East Mineral Ave., Suite 1
Littleton, Colorado 80122
Phone: (303) 713-1898
Fax: (303) 713-1897
www.aztecconsultants.com

AzTec Proj. No.: 181122-01 Drawn By: BAM

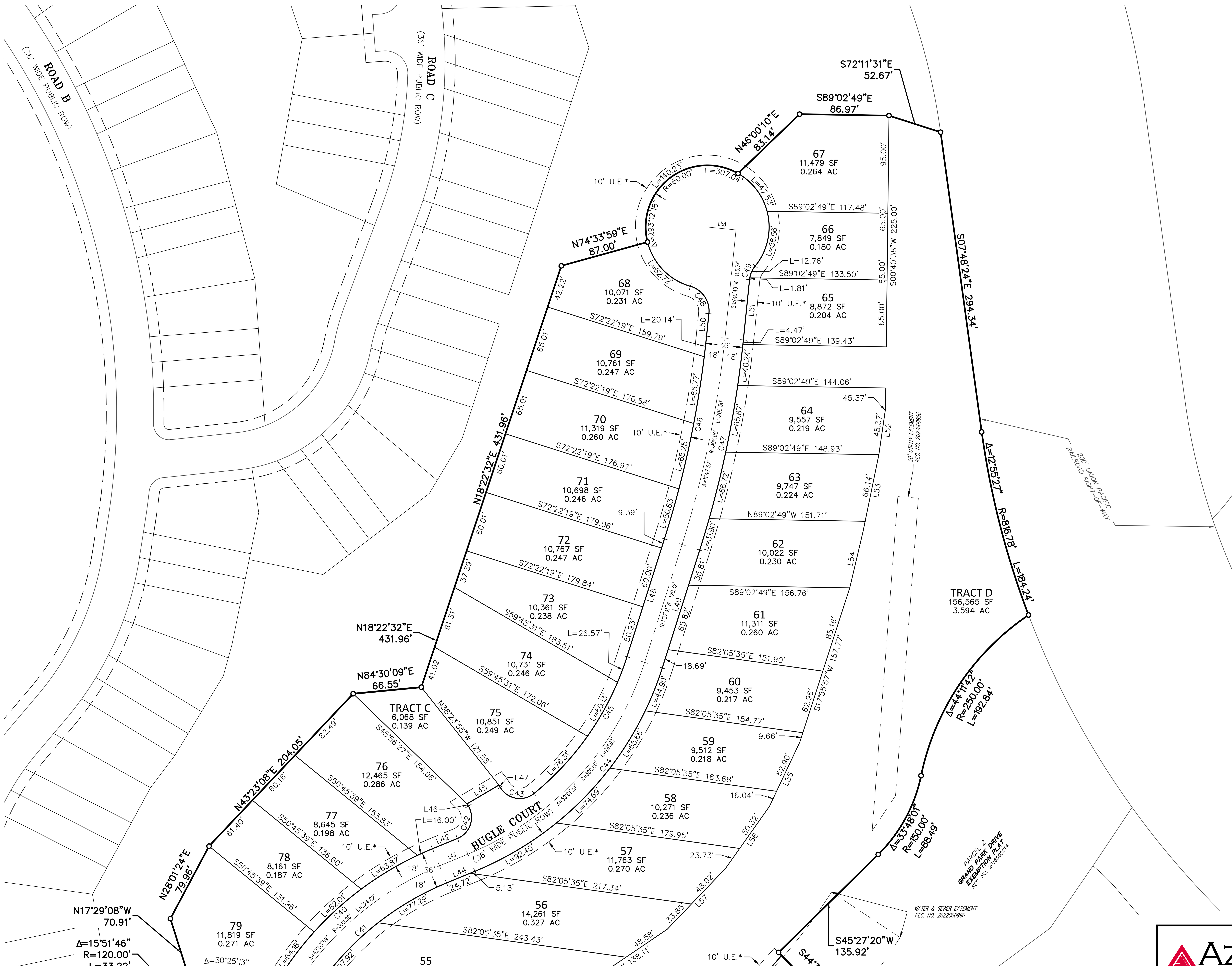
DEVELOPER
GRAND PARK DEVELOPMENT, LLC
P.O. BOX 30
WINTER PARK, COLORADO 80482
(970) 726-8600

DATE OF PREPARATION:	12-17-2025
SCALE:	1" = 50'
SHEET 4 OF 7	

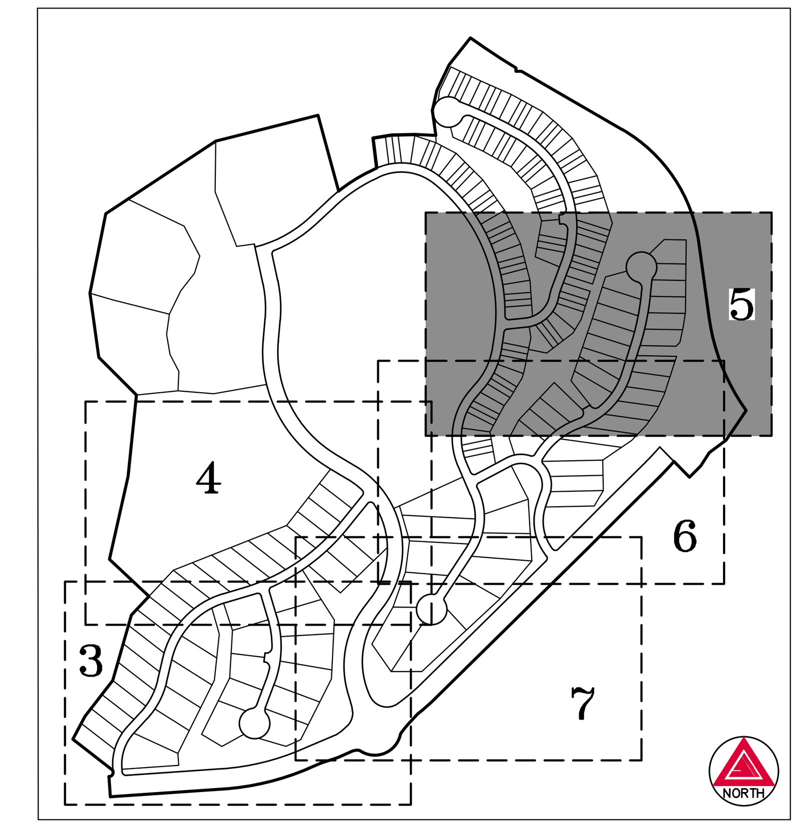
FINAL PLAT

WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND
THE NORTHWEST QUARTER OF SECTION 32,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.



SEE SHEET 6



KEY MAP
SCALE: 1" = 600'

LEGEND

✦	FOUND ALIQUOT CORNER AS SHOWN HEREON
○	SET NO. 5 X 18" REBAR WITH 1-1/4" PINK PLASTIC CAP STAMPED "AZTEC PLS 38636"
U.E.*	UTILITY EASEMENTS & SNOW STORAGE EASEMENT
(ROW)	RIGHT-OF-WAY
(NR)	DENOTES NON-RADIAL

SEE SHEET 2 FOR LINE & CURVE TABLES

SCALE: 1" = 50'

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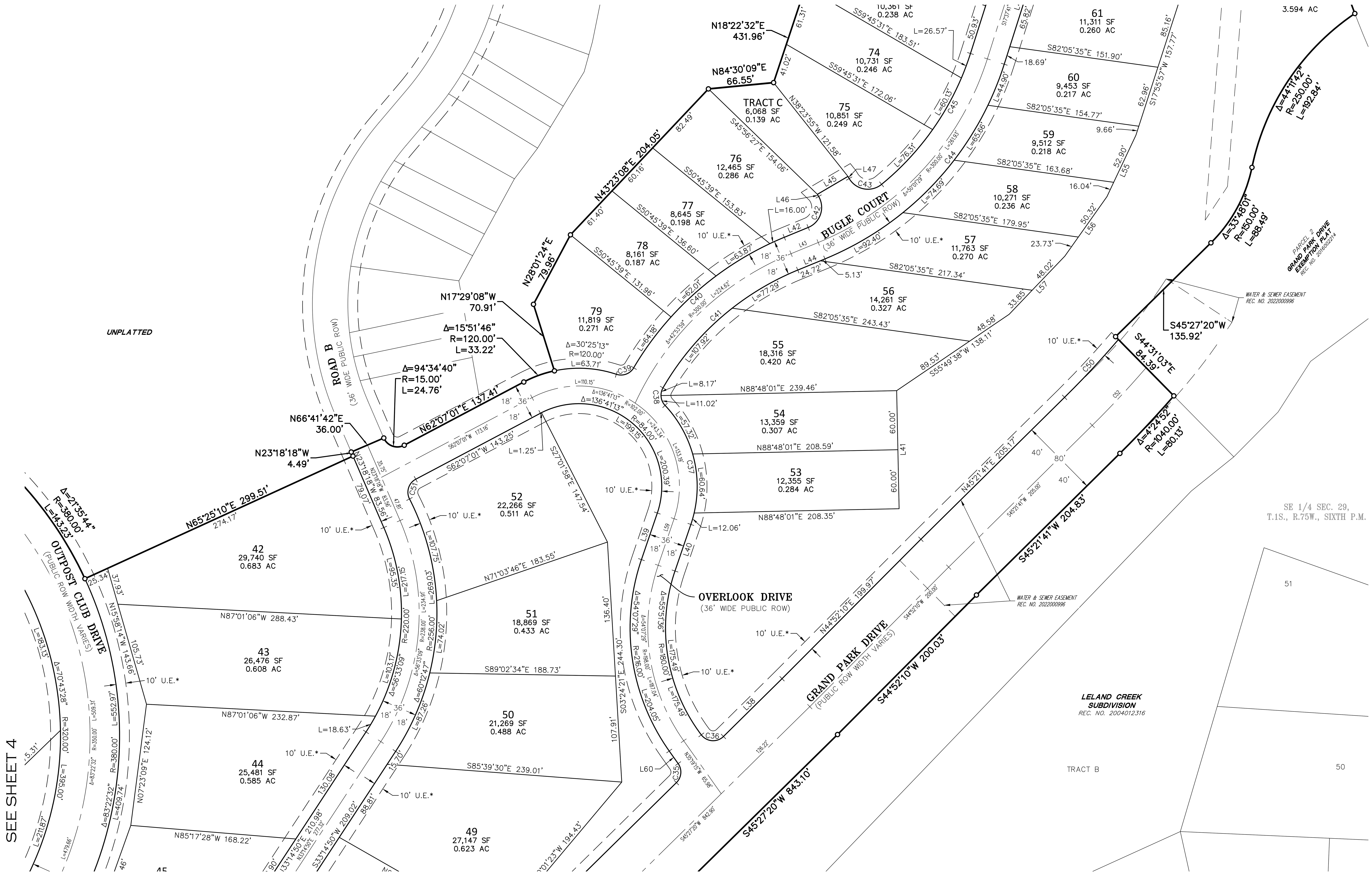
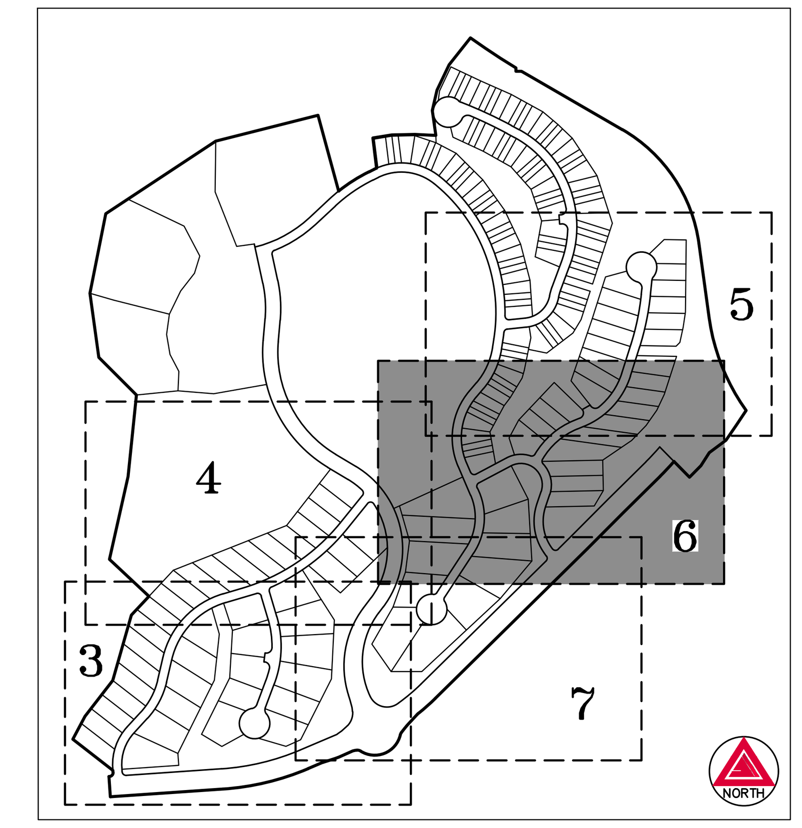
DATE OF PREPARATION: 12-17-2025
SCALE: 1" = 50'
SHEET 5 OF 7

FINAL PLAT

WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND
THE NORTHWEST QUARTER OF SECTION 32,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.





KEY MAP
SCALE: 1" = 600'

LEGEND	
	FOUND ALIQUOT CORNER AS SHOWN HEREON
	SET NO. 5 X 18" REBAR WITH 1-1/4" PINK PLASTIC CAP STAMPED "AZTEC PLS 38636"
U.E.*	UTILITY EASEMENTS & SNOW STORAGE EASEMENT
(ROW)	RIGHT-OF-WAY
(NR)	DENOTES NON-RADIAL

SEE SHEET 2
FOR LINE &
CURVE TABLES

SCALE: 1" = 50'

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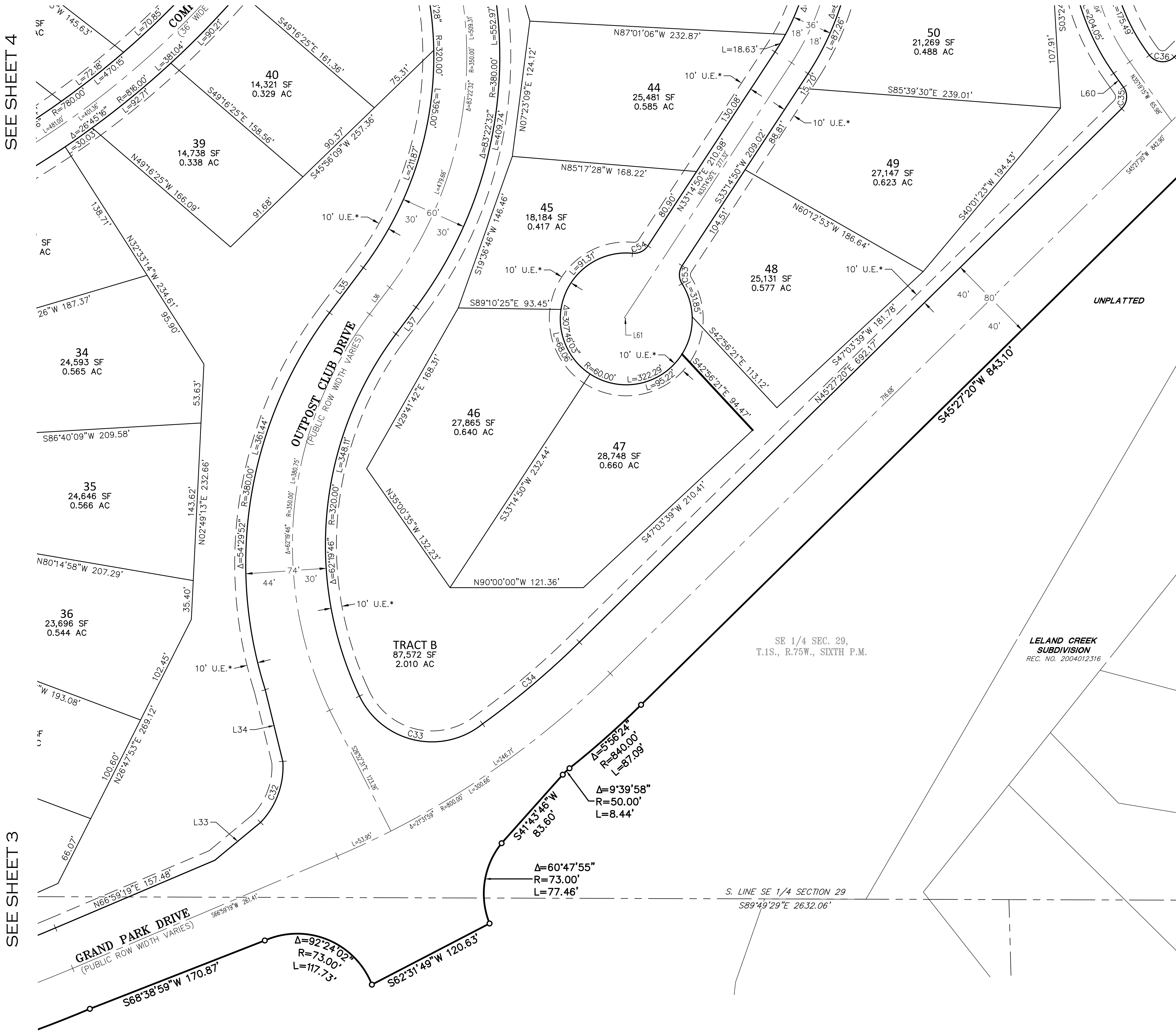
(970) 726-8600

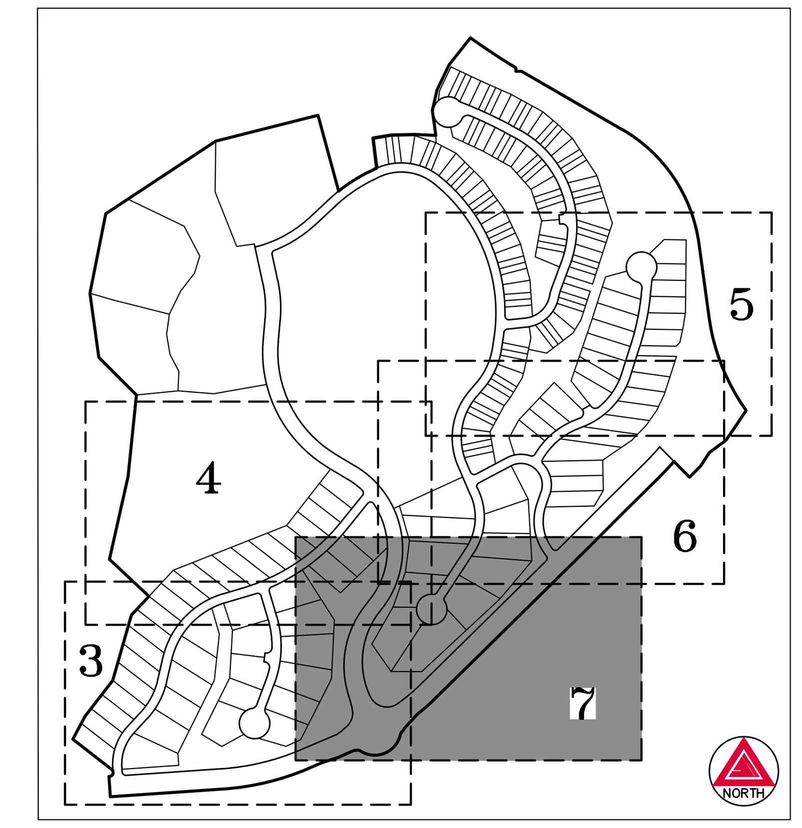
DATE OF PREPARATION:	12-17-2025
SCALE:	1" = 50'

FINAL PLAT

WEST MOUNTAIN FILING NO. 1

A PARCEL OF LAND LOCATED IN SECTION 29 AND
THE NORTHWEST QUARTER OF SECTION 32,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.





KEY MAP
SCALE: 1" = 600'

LEGEND

(symbol)	FOUND ALIQUOT CORNER AS SHOWN HEREON
○	SET NO. 5 X 18" REBAR WITH 1-1/4" PINK PLASTIC CAP STAMPED "AZTEC PLS 38636"
U.E.*	UTILITY EASEMENTS & SNOW STORAGE EASEMENT
(ROW)	RIGHT-OF-WAY
(NR)	DENOTES NON-RADIAL

SEE SHEET 2
FOR LINE &
CURVE TABLES

N

0' 25' 50' 100'
SCALE: 1" = 50'

FOR REVIEW
DO NOT RECORD

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DEVELOPER
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P.O. BOX 30
WINTER PARK, COLORADO 80482
(970) 726-8600

DATE OF PREPARATION:	12-17-2025
SCALE:	1" = 50'

FINAL PLANNED DEVELOPMENT PLAN

WEST MOUNTAIN FILING 1

PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO

LEGAL DESCRIPTION

A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 29 AND THE NORTH HALF OF SECTION 32, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS

BASIS OF BEARINGS: THE NORTH LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 29, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, WAS ASSUMED TO BEAR SOUTH 89°49'44" WEST, A DISTANCE OF 1,321.23 FEET, BEING MONUMENTED AT THE EAST QUARTER CORNER OF SAID SECTION 29 BY A 1-1/2" STEEL POST WITH 2-1/2" GLO BRASS CAP STAMPED "US GENERAL LAND OFFICE SURVEY 1/4 S29 S28 1933" AND AT THE CENTER-EAST SIXTEENTH CORNER OF SAID SECTION 29 BY A NO. 6 REBAR WITH 3-1/4" ALUMINUM CAP STAMPED "DEA INC. T1S R75W E 1/16 C-C S29 2014 PLS 34592".

COMMENCING AT SAID EAST QUARTER CORNER;

THENCE SOUTH 41°09'00" WEST, A DISTANCE OF 910.38 FEET TO THE SOUTHERLY BOUNDARY OF THE 200-FOOT-WIDE UNION PACIFIC RAILROAD RIGHT-OF-WAY AND THE **POINT OF BEGINNING**;

THENCE ALONG SAID SOUTHERLY BOUNDARY THE FOLLOWING TWO (2) COURSES:

1. SOUTH 07°48'24" EAST, A DISTANCE OF 294.34 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE EASTERLY HAVING A RADIUS OF 816.78 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 82°07'05" EAST;

2. SOUTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 12°55'27", AN ARC LENGTH OF 184.24 FEET TO THE MOST NORTHERLY CORNER OF PARCEL 2, GRAND PARK DRIVE EXEMPTION PLAT RECORDED AT RECEPTION NO. 2016002214 IN THE OFFICIAL RECORDS OF THE GRAND COUNTY, COLORADO CLERK AND RECORDER'S OFFICE AND THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 250.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 34°09'07" EAST;

THENCE ALONG THE NORTHWESTERLY AND SOUTHWESTERLY BOUNDARY OF SAID PARCEL 2 THE FOLLOWING FOUR (4) COURSES:

1. SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 44°11'42", AN ARC LENGTH OF 192.84 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 150.00 FEET;

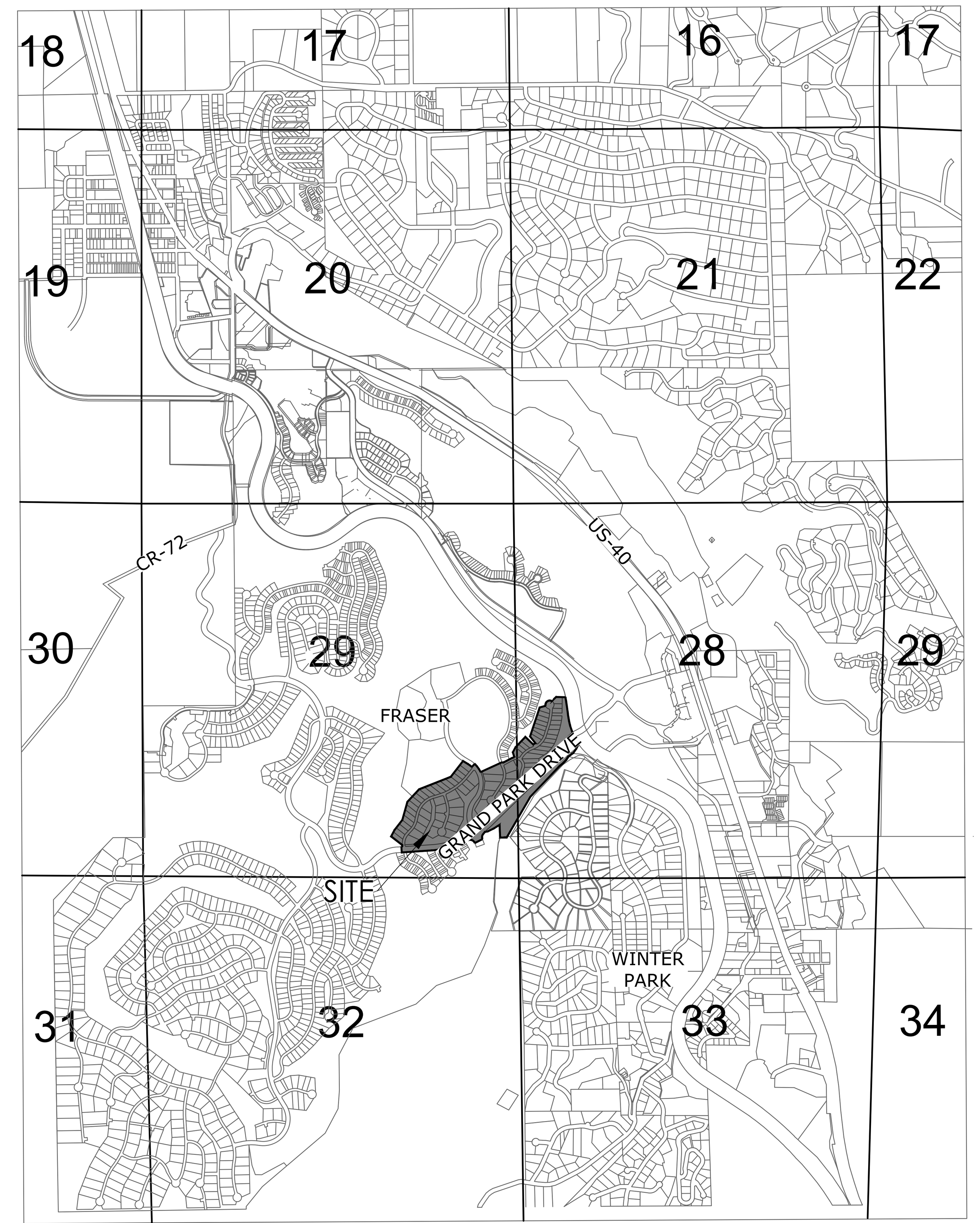
2. SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 33°48'01", AN ARC LENGTH OF 88.49 FEET;

3. SOUTH 45°27'20" WEST, A DISTANCE OF 135.92 FEET;

4. SOUTH 44°31'03" EAST, A DISTANCE OF 84.39 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 1,040.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 49°03'10" WEST;

THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 04°24'52", AN ARC LENGTH OF 80.13 FEET;
THENCE SOUTH 45°21'41" WEST, A DISTANCE OF 204.83 FEET;
THENCE SOUTH 44°52'10" WEST, A DISTANCE OF 200.03 FEET;
THENCE SOUTH 45°27'20" WEST, A DISTANCE OF 843.10 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 840.00 FEET;
THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 05°56'24", AN ARC LENGTH OF 87.09 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 50.00 FEET;
THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 09°39'58", AN ARC LENGTH OF 8.44 FEET;
THENCE SOUTH 41°43'46" WEST, A DISTANCE OF 83.60 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE EASTERLY HAVING A RADIUS OF 73.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 51°02'34" EAST;
THENCE SOUTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 60°47'55", AN ARC LENGTH OF 77.46 FEET;
THENCE SOUTH 62°31'49" WEST, A DISTANCE OF 120.63 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 73.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 68°37'00" WEST;
THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 92°24'02", AN ARC LENGTH OF 117.73 FEET;
THENCE SOUTH 68°38'59" WEST, A DISTANCE OF 170.87 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 1,040.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 23°00'41" WEST;
THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 19°05'05", AN ARC LENGTH OF 346.41 FEET;
THENCE SOUTH 86°04'23" WEST, A DISTANCE OF 445.44 FEET;
THENCE NORTH 03°55'37" WEST, A DISTANCE OF 80.00 FEET;
THENCE NORTH 86°04'23" EAST, A DISTANCE OF 2.00 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 15.00 FEET;
THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 90°00'00", AN ARC LENGTH OF 23.56 FEET;
THENCE NORTH 03°55'37" WEST, A DISTANCE OF 8.26 FEET;
THENCE NORTH 52°12'55" WEST, A DISTANCE OF 200.13 FEET;
THENCE NORTH 27°58'25" EAST, A DISTANCE OF 102.73 FEET;
THENCE NORTH 37°47'05" EAST, A DISTANCE OF 178.77 FEET;
THENCE NORTH 15°51'37" EAST, A DISTANCE OF 268.33 FEET;
THENCE NORTH 43°06'31" EAST, A DISTANCE OF 242.12 FEET;
THENCE NORTH 68°25'25" EAST, A DISTANCE OF 480.75 FEET;
THENCE NORTH 37°55'55" EAST, A DISTANCE OF 282.21 FEET;
THENCE SOUTH 58°58'37" EAST, A DISTANCE OF 80.26 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 320.00 FEET;
THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 12°31'12", AN ARC LENGTH OF 69.92 FEET;
THENCE NORTH 43°32'35" EAST, A DISTANCE OF 60.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 380.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS SOUTH 43°32'35" WEST;
THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 21°35'44", AN ARC LENGTH OF 143.23 FEET;
THENCE NORTH 65°25'10" EAST, A DISTANCE OF 299.51 FEET;
THENCE NORTH 23°18'18" WEST, A DISTANCE OF 4.49 FEET;
THENCE NORTH 66°41'42" EAST, A DISTANCE OF 36.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 15.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 66°41'42" EAST;
THENCE EASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 94°34'40", AN ARC LENGTH OF 24.76 FEET;
THENCE NORTH 62°07'01" EAST, A DISTANCE OF 137.41 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 120.00 FEET;
THENCE EASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 15°51'46", AN ARC LENGTH OF 33.22 FEET;
THENCE NORTH 17°29'08" WEST, A DISTANCE OF 70.91 FEET;
THENCE NORTH 28°01'24" EAST, A DISTANCE OF 79.96 FEET;
THENCE NORTH 43°23'08" EAST, A DISTANCE OF 204.05 FEET;
THENCE NORTH 84°30'09" EAST, A DISTANCE OF 66.55 FEET;
THENCE NORTH 18°22'32" EAST, A DISTANCE OF 431.96 FEET;
THENCE NORTH 74°33'59" EAST, A DISTANCE OF 87.00 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 60.00 FEET, THE RADIUS POINT OF SAID CURVE BEARS NORTH 75°54'23" EAST;
THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 133°54'35", AN ARC LENGTH OF 140.23 FEET;
THENCE NORTH 46°00'10" EAST, A DISTANCE OF 83.14 FEET;
THENCE SOUTH 89°02'49" EAST, A DISTANCE OF 86.97 FEET;
THENCE SOUTH 72°11'31" EAST, A DISTANCE OF 52.67 FEET TO THE **POINT OF BEGINNING**.

CONTAINING AN AREA OF 47.838 ACRES, (2,083,844 SQUARE FEET), MORE OR LESS.



VICINITY MAP

GENERAL NOTES

1. LOCATIONS DEPICTED ON THIS PLAN ARE APPROXIMATE ONLY.
2. SETBACKS:
   - 2.2. LOTS 1-52 (SINGLE-FAMILY DETACHED IN 11W): 10' FRONT, 6' SIDE, 10' REAR.
   - 2.3. LOTS 53-79 (SINGLE-FAMILY ATTACHED ELIGIBLE IN 10W): 10' FRONT, 20' FRONT TO GARAGE, 0' ATTACHED SIDE, DETACHED SIDE MUST MEET BUILDING AND FIRE CODES, 10' REAR.
3. LOTS 53-79 MAY BE DETACHED OR ATTACHED UNITS.
4. BUILDING HEIGHT SHALL NOT EXCEED 35'-0" IN 11W AND 50'-0" IN 10W, EXCLUDING CHIMNEYS, VENTILATORS, AND PIPES. BUILDING HEIGHTS SHALL BE MEASURED FROM THE AVERAGE FINISHED GRADE OF THE PRIMARY FOUR CORNERS OF THE STRUCTURE.
5. LANDSCAPING SHALL BE REQUIRED AND INSTALLED PER THE TOWN OF FRASER MUNICIPAL CODE AND THE GRAND PARK CC&R'S.
6. TO PROTECT AGAINST WILDFIRES AND ENHANCE FOREST HEALTH THE FOLLOWING WILDFIRE MITIGATION MEASURES ARE REQUIRED:
   A.) WATER HYDRANTS WILL BE SITED AT APPROPRIATE DISTANCES; AND
   B.) UTILITIES WILL BE CONSTRUCTED UNDERGROUND.
7. NO ROADS SHALL BE GATED.
8. ALL ROADS SHALL BE PUBLIC.
9. SIGNAGE DETAILS, INCLUDING MATERIALS, DIMENSIONS AND SIGN AREA WILL BE PROVIDED WITH BUILDING PERMIT. SIGNAGE SHALL COMPLY WITH GRAND PARK SIGNAGE PLAN.
10. IF THERE IS ANY CONFLICTING INFORMATION BETWEEN THIS FINAL PLAN AND THE FINAL PLAT, THE FINAL PLAT SHALL GOVERN.

CERTIFICATE FOR APPROVAL BY THE TOWN BOARD:

APPROVED AND ALL PUBLIC DEDICATIONS ACCEPTED THIS ____ DAY OF ____, BY THE FRASER TOWN BOARD. THE TOWN OF FRASER DOES NOT ASSUME ANY RESPONSIBILITY FOR THE CORRECTNESS OR ACCURACY OF ANY INFORMATION DISCLOSED ON THIS PLAN NOR ANY REPRESENTATIONS OR INFORMATION PRESENTED TO THE TOWN OF FRASER WHICH INDUCED THE TOWN TO GIVE THIS CERTIFICATE.

BY:______________________
BRIAN CERKVENIK, MAYOR

MORTGAGEE'S CONSENT

THE UNDERSIGNED, BEING AN AUTHORIZED REPRESENTATIVE OF THE U.S. BANK, N.A., THE HOLDER OF A BENEFICIAL INTEREST AND TO THE PROPERTY DESCRIBED ON THIS PLAN, UNDER DEED OF TRUST RECORDED AT RECEPTION NO.____________________ OF THE GRAND COUNTY, COLORADO REAL PROPERTY RECORDS, HEREBY CONSENTS TO THIS PLAN AND AGREES THAT THE LIEN OF THE DEED OF TRUST IS HEREBY SUBORDINATED TO THIS PLAN.

U.S. BANK, N.A.

BY:____________________
NAME:__________________
TITLE:__________________
NOTARY:
ACKNOWLEDGED BEFORE ME THIS _____ DAY OF _______, 20___, BY _____________AS _____________ OF U.S. BANK, N.A.
WITNESS MY HAND AND OFFICIAL SEAL.
MY COMMISSION EXPIRES:____________________________

NOTARY PUBLIC
MY COMMISSION EXPIRES:____________________________

OWNER CERTIFICATE

IN WITNESS WHEREOF, WEST MOUNTAIN DEVELOPMENT, LLC HAS CAUSED HIS/HER NAME TO BE HERE UNDER SUBSCRIBED THIS ______ DAY OF ________, 20__.

WEST MOUNTAIN DEVELOPMENT, LLC.
A COLORADO LIMITED LIABILITY COMPANY,
____

PRESIDENT, CLARK LIPSCOMB

STATE OF COLORADO)]
)SS.
COUNTY OF __________)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____DAY OF ____, 2025, BY _____________ AS PRESIDENT ON BEHALF OF WEST MOUNTAIN DEVELOPMENT, LLC. A COLORADO LIMITED LIABILITY COMPANY.
WITNESS MY HAND AND OFFICIAL SEAL
____
NOTARY PUBLIC
MY COMMISSION EXPIRES:___________________

LEGAL DESCRIPTION

A PARCEL OF LAND LOCATED IN SECTION 28 & 29, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO.

SHEET INDEX

OWNER
CLARK LIPSCOMB
WEST MOUNTAIN DEVELOPMENT, LLC.
PO BOX 30
WINTER PARK, CO 80482
(970) 726-8600

ENGINEER
MARTIN METSKER
TERRACINA DESIGN
10200 EAST GIRARD AVENUE
SUITE A-314
DENVER, CO 80231
(303) 632-8867

PLANNER
LAYLA ROSALES
TERRACINA DESIGN
10200 EAST GIRARD AVENUE
SUITE A-314
DENVER, CO 80231
(303) 632-8867

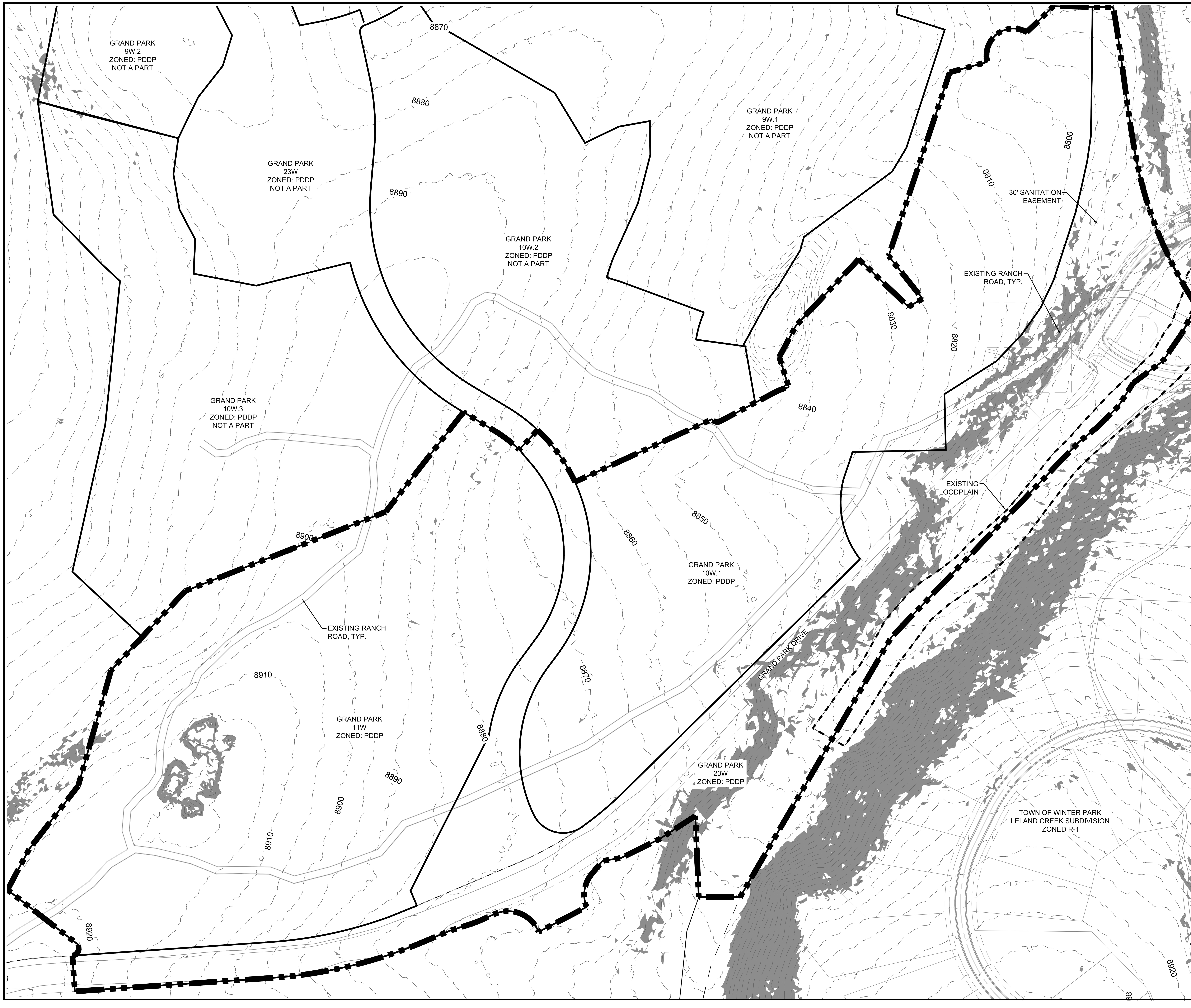
COVER SHEET
DECEMBER 18, 2025
SHEET 1

FINAL PLANNED DEVELOPMENT PLAN

WEST MOUNTAIN FILING 1

PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



LEGEND

FPDP BOUNDARY
PLANNING AREA BOUNDARY
10' CONTOURS
30% OR GREATER SLOPES

Scale: 1"= 100'-0"

0 50 100 200

SITE ANALYSIS

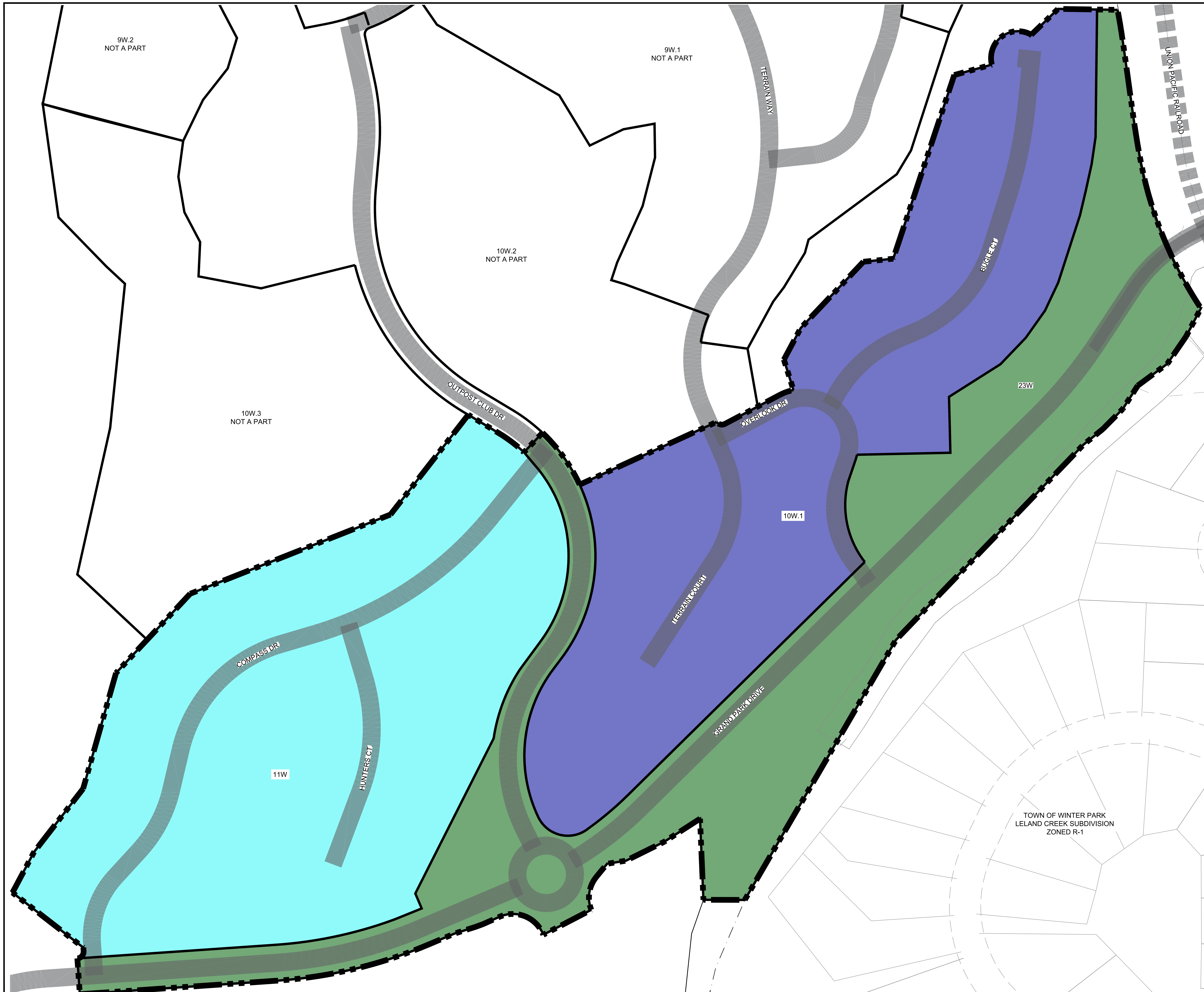
DECEMBER 18, 2025
SHEET 2

FINAL PLANNED DEVELOPMENT PLAN

WEST MOUNTAIN FILING 1

PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



LEGEND

- FPDP BOUNDARY
- PLANNING AREA BOUNDARY
- ROADWAY
- 10W.1
- 11W
- 23W

Land Use		PDDP Units	FPDP Units
Residential			
10W	10W.1	174	38
	10W.2 NOT A PART		(4)
	10W.3 NOT A PART		(70)
Subtotal		174	112
11W	11W	41	41
	*Total	389	265

Planning Area		PDDP Acres	FPDP Acres
10W	10W.1	40.8	17.5
	10W.2 NOT A PART		(11.5)
	10W.3 NOT A PART		(13.7)
Subtotal		40.8	42.7
11W		16.1	19.3
Subtotal		56.9	62.0
23W			16.7
	*Total		53.5

* EXCLUDES 10W.2 & 10W.3

Scale: 1"= 200'-0"

0 100 200 400

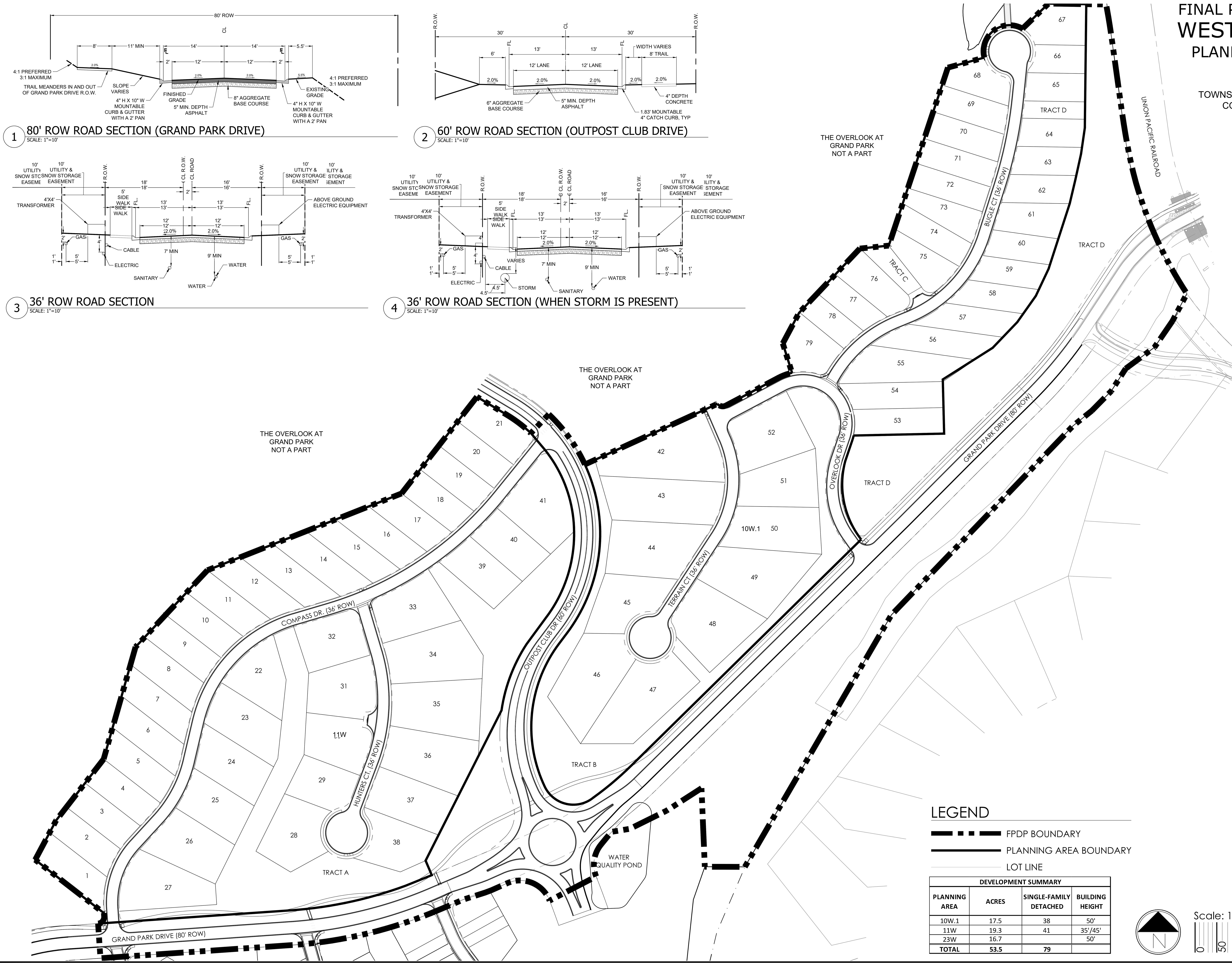
LAND USE PLAN

DECEMBER 18, 2025

SHEET 3

FINAL PLANNED DEVELOPMENT PLAN
WEST MOUNTAIN FILING 1
PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



1 80' ROW ROAD SECTION (GRAND PARK DRIVE)
SCALE: 1"=10'

2 60' ROW ROAD SECTION (OUTPOST CLUB DRIVE)
SCALE: 1"=10'

3 36' ROW ROAD SECTION
SCALE: 1"=10'

4 36' ROW ROAD SECTION (WHEN STORM IS PRESENT)
SCALE: 1"=10'

LEGEND

FPDP BOUNDARY
PLANNING AREA BOUNDARY
LOT LINE

DEVELOPMENT SUMMARY			
PLANNING AREA	ACRES	SINGLE-FAMILY DETACHED	BUILDING HEIGHT
10W.1	17.5	38	50'
11W	19.3	41	35'/45'
23W	16.7		50'
TOTAL	53.5	79	

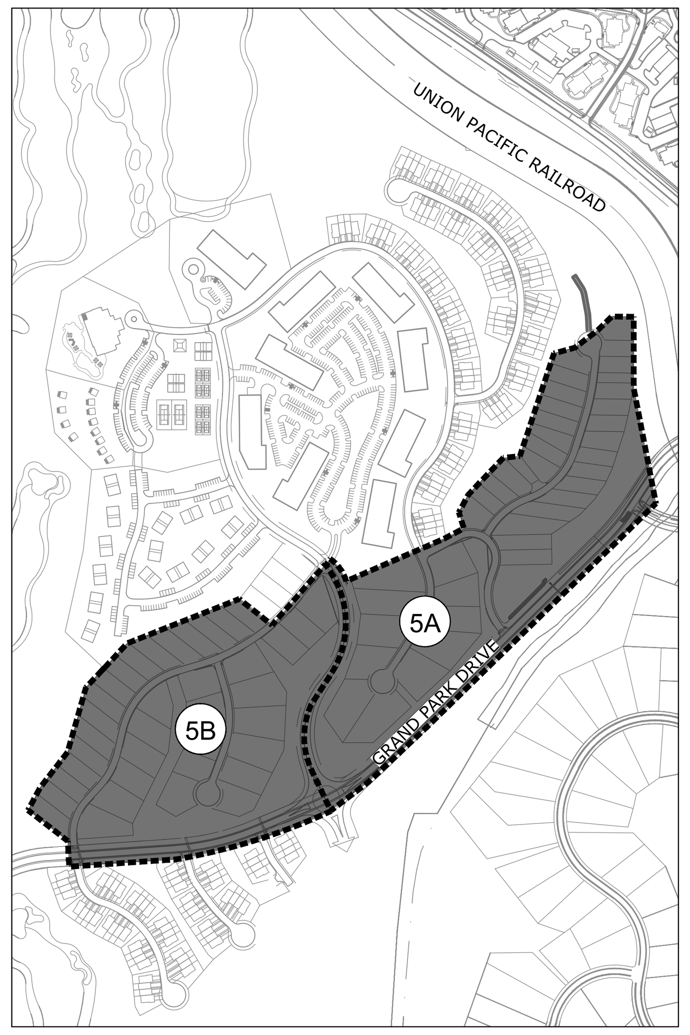
N

Scale: 1"= 100'-0"
0 50 100 200

OVERALL SITE PLAN
DECEMBER 18, 2025
SHEET 4

FINAL PLANNED DEVELOPMENT PLAN
WEST MOUNTAIN FILING 1
PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



KEY MAP

LEGEND

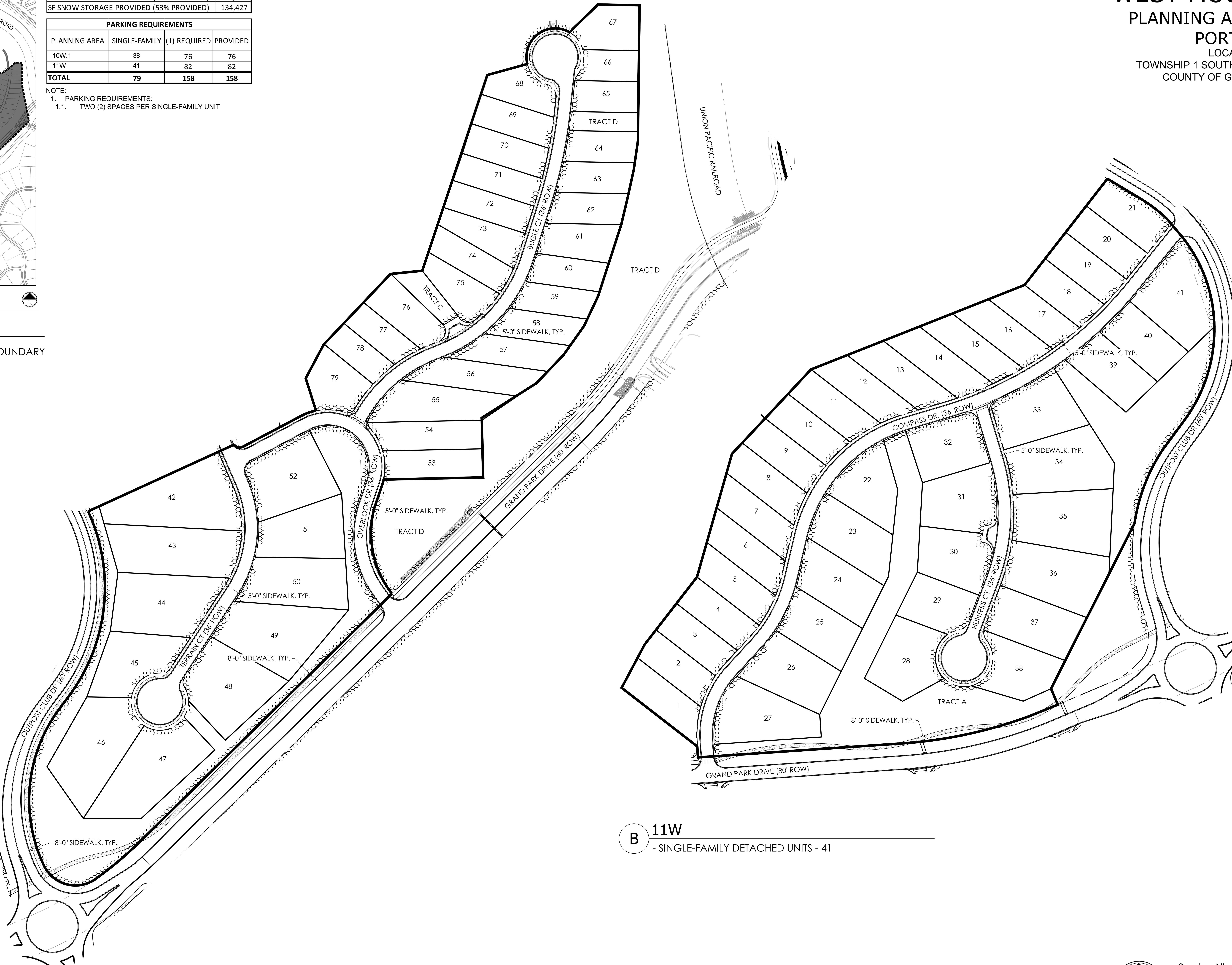
- PLANNING AREA BOUNDARY
- LOT LINE
- SNOW STORAGE

SNOW STORAGE REQUIREMENTS	
SF PAVED SURFACE	253,739
SF SNOW STORAGE REQUIRED (33% REQUIRED)	83,734
SF SNOW STORAGE PROVIDED (53% PROVIDED)	134,427

PARKING REQUIREMENTS

PLANNING AREA	SINGLE-FAMILY	(1) REQUIRED	PROVIDED
10W.1	38	76	76
11W	41	82	82
TOTAL	**79**	**158**	**158**

NOTE:
1. PARKING REQUIREMENTS:
   1.1. TWO (2) SPACES PER SINGLE-FAMILY UNIT



A 10W.1
- SINGLE FAMILY DETACHED UNITS - 38

B 11W
- SINGLE-FAMILY DETACHED UNITS - 41

Scale: 1"= 100'-0"
0 50 100 200

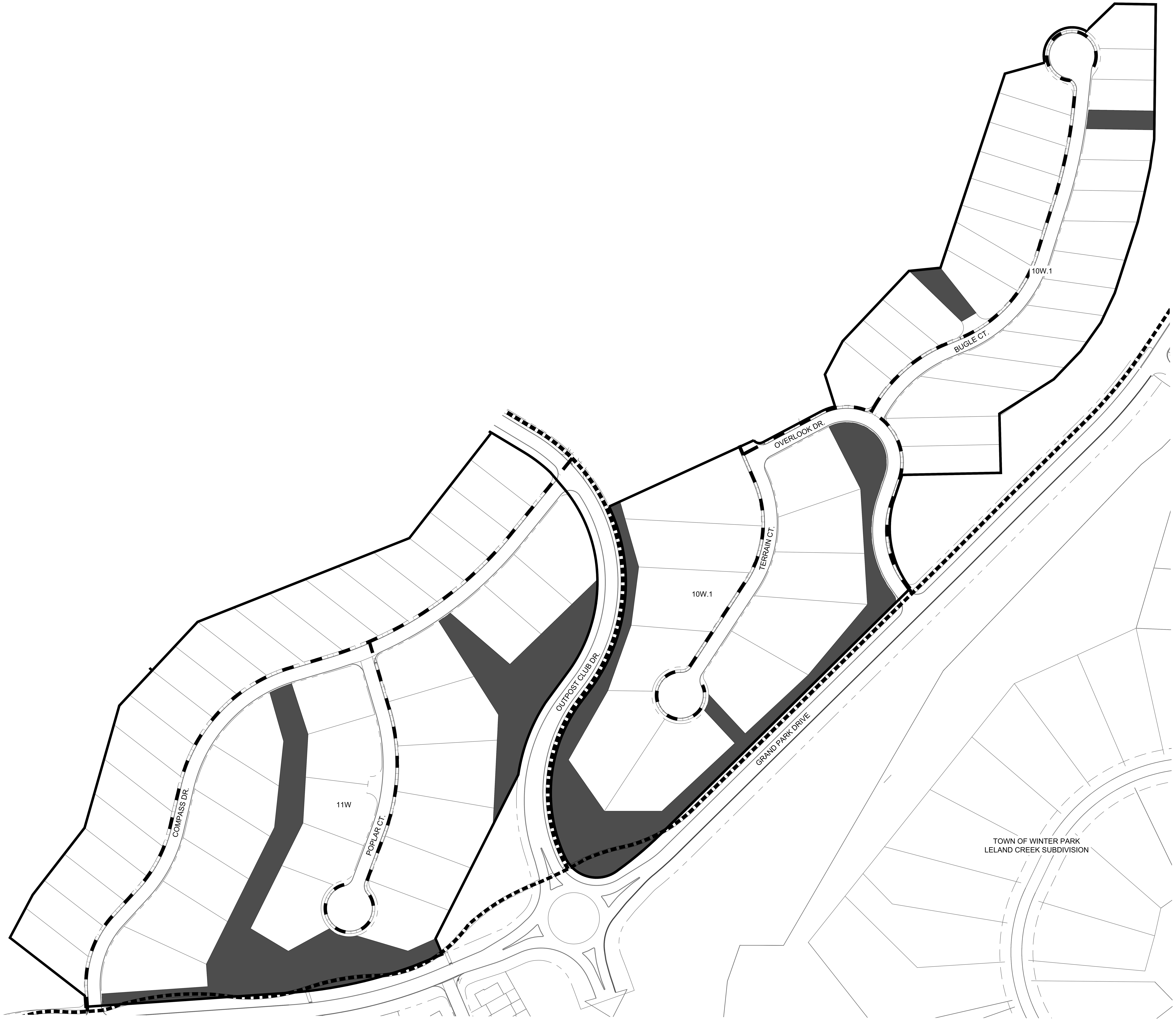
SITE PLAN
DECEMBER 18, 2025
SHEET 5

FINAL PLANNED DEVELOPMENT PLAN

WEST MOUNTAIN FILING 1

PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



LEGEND

PLANNING AREA BOUNDARY

8' SIDEWALK

5' SIDEWALK

OPEN SPACE

OPEN SPACE REQUIREMENTS			
PLANNING AREA	ACRES	*OPEN SPACE REQUIRED	OPEN SPACE PROVIDED
10W.1	17.5	2.6	2.6
11W	19.3	2.9	2.9

* OPEN SPACE REQUIREMENTS ARE 15% OF PLANNING AREA

N

Scale: 1"= 100'-0"

0 50 100 200

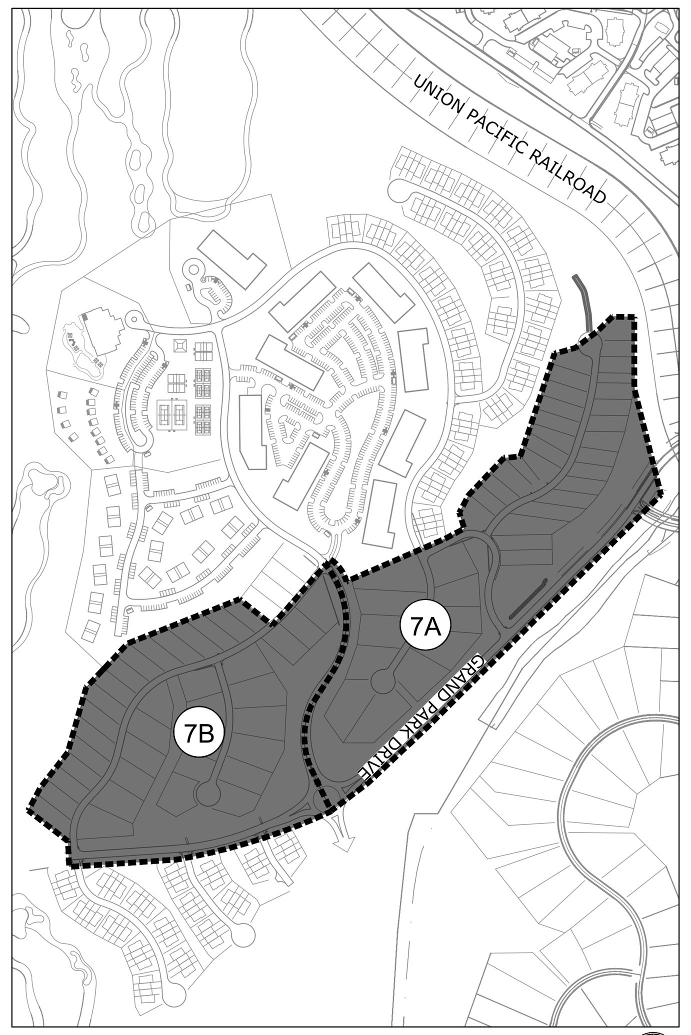
OPEN SPACE

DECEMBER 18, 2025

SHEET 6

FINAL PLANNED DEVELOPMENT PLAN
WEST MOUNTAIN FILING 1
PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



KEY MAP

EROSION CONTROL

BEST MANAGEMENT PRACTICES WILL BE INSTALLED AND MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION

NATIVE GRASS MIX

COMMON NAME	BOTANICAL NAME	% OF MIX	APPLICATION RATE
MANCHAR SMOOTH BROME	BROMUS INERMIS LEYSS	20%	10.0
POTOMAC ORCHARD	DACTYLIS GLOMERATA L.	20%	10.0
PUBESCENT WHEATGRASS	AGROPYRON TRICHOPHORUM	20%	10.0
PERENNIAL RYE	LOLIUM PERENNE L.	11%	5.5
REUBENS CANADA BLUE	POA COMPRESSA	10%	5.0
ANNUAL RYE	LOLIUM MULTIFLORUM LAM.	10%	5.0
TIMOTHY	PHLEUM PRATENSE	5%	2.5
CICER MILKVETCH	ASTRAGALUS CICER L.	2%	1.0
ALSIKE CLOVER	TRIFOLIUM HYBRIDUM	2%	1.0
TOTAL			50.0 LBS/PLS/ACRE

NOTE: ALL DISTURBED AREAS THAT ARE NOT PAVED SURFACE WILL BE SEEDED WITH NATIVE GRASS MIX SHOWN ABOVE.

1. SEED APPLICATION: DRILL SEED 0.25"-0.5" INTO THE SOIL. IN AREAS NOT ACCESSIBLE TO A DRILL HAND BROADCAST AT DOUBLE THE ABOVE RATE AND RAKE 0.25"-0.5" INTO THE SOIL. ON SLOPES STEEPER THAT 2:1 HYDROSEED AT DOUBLE THE RATE.
2. SOIL AMENDMENTS: PREPARE SOIL WITH SAND BASED GRANULAR HUMATE AT THE RATE OF 435 LBS. PER ACRE.
3. FERTILIZATION APPLICATION: APPLY BIOSOL ALL NATURAL ORGANIC FERTILIZER AT THE RATE OF 1800 LBS. PER ACRE IN ALL SEEDING AREAS.
4. HYDROMULCH APPLICATION: HYDROMULCH SHALL CONSIST OF CELLULOSE FIBER MULCH AND MULCH TACKIFIER AND SHALL BE APPLIED AT THE RATES OF 2.000 LBS. PER ACRE AND 100 LBS. PER ACRE CONSECUTIVELY.

SYM	BOTANICAL NAME	COMMON NAME	SIZE	TYPE
	DECIDUOUS ORNAMENTAL TREES			
	POPULUS TREMULOIDES	ASPEN, QUAKING	6' HT	B&B
	MALUS SP.	CRAB APPLE	6' HT	B&B
	POPULUS ANGUSTIFOLIA	COTTONWOOD, NARROWLEAD	6' HT	B&B
	PRUNUS VIRINIANA 'CANADA RED'	CHOKEBERRY, CANADA RED	6' HT	B&B
	BOTANICAL NAME	**COMMON NAME**	**SIZE**	**TYPE**
	EVERGREEN TREES			
	PICEA PUNGENS	SPRUCE, BLUE	6-8' HT	B&B
	PICEA ENGELMANNII	SPRUCE, ENGELMAN	6-8' HT	B&B
	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	#5	CONT.
	PICEA ENGELMANII	ENGLEMAN SPRUCE	6' HT.	B&B
	PICEA PUNGENS	COLORADO BLUE SPRUCE	6' HT.	B&B
	PICEA PUNGENS 'BABY BLUE'	BABY BLUE SPUCE	6' HT.	B&B
	PICEA PUNGENS 'BABY BLUE EYES'	BABY BLUE EYES SPRUCE	6' HT.	B&B
	PICEA PUNGENS 'FAT ALBERT'	FAT ALBER SPRUCE	6' HT.	B&B
	PICEA PUNGENS 'HOOPSII'	HOOPSII SPRUCE	6' HT.	B&B
	PICEA PUNGENS 'PENDULA'	WEEPING BLUE SPRUCE	6' HT.	B&B
	PINUS ARISTATA	BRISTLECONE PINE	6' HT.	B&B
	PINUS CONTORTA LATIFOLIA	LODGEPOLE PINE	6' HT.	B&B
	PINUS FLEXILIS	LIMBER PINE	6' HT.	B&B
	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	6' HT.	B&B
	BOTANICAL NAME	**COMMON NAME**	**SPREAD**	**SPREAD**
	EVERGREEN SHRUBS			
	PICEA PUNGENS 'GLAUCA GLOBOSA'	SPRUCE, DWARF GLOBE GREEN	#5	CONT.
	PICEA PUNGENS 'SESTER DWARF'	SPRUCE, DWARF BLUE	#5	CONT.
	BOTANICAL NAME	**COMMON NAME**	**SIZE**	**TYPE**
	DECIDUOUS SHRUBS			
	RIBES ALPINUM	CURRANT, ALPINE	#5	CONT.
	RIBES AUREUM	CURRANT, YELLOW FLOWERING	#5	CONT.
	POTENTILLA FRUTICOSA 'JACKMANS'S VARIETY'	POTENTILLA, JACKMAN	#5	CONT.
	SYMPPHORICARPOS OREOPHILUS	SNOWBERRY, MOUNTAIN	#5	CONT.
	SPIRAEA SPLENDENS	SPIREA, MOUNTAIN	#5	CONT.
	SAMNUCUS RACEMOSA	ELDER, NATIVE RED-BERRIED	#5	CONT.
	AMELANCHIER ALNIFOLIA	SERVICEBERRY, SASKATOON	#5	CONT.

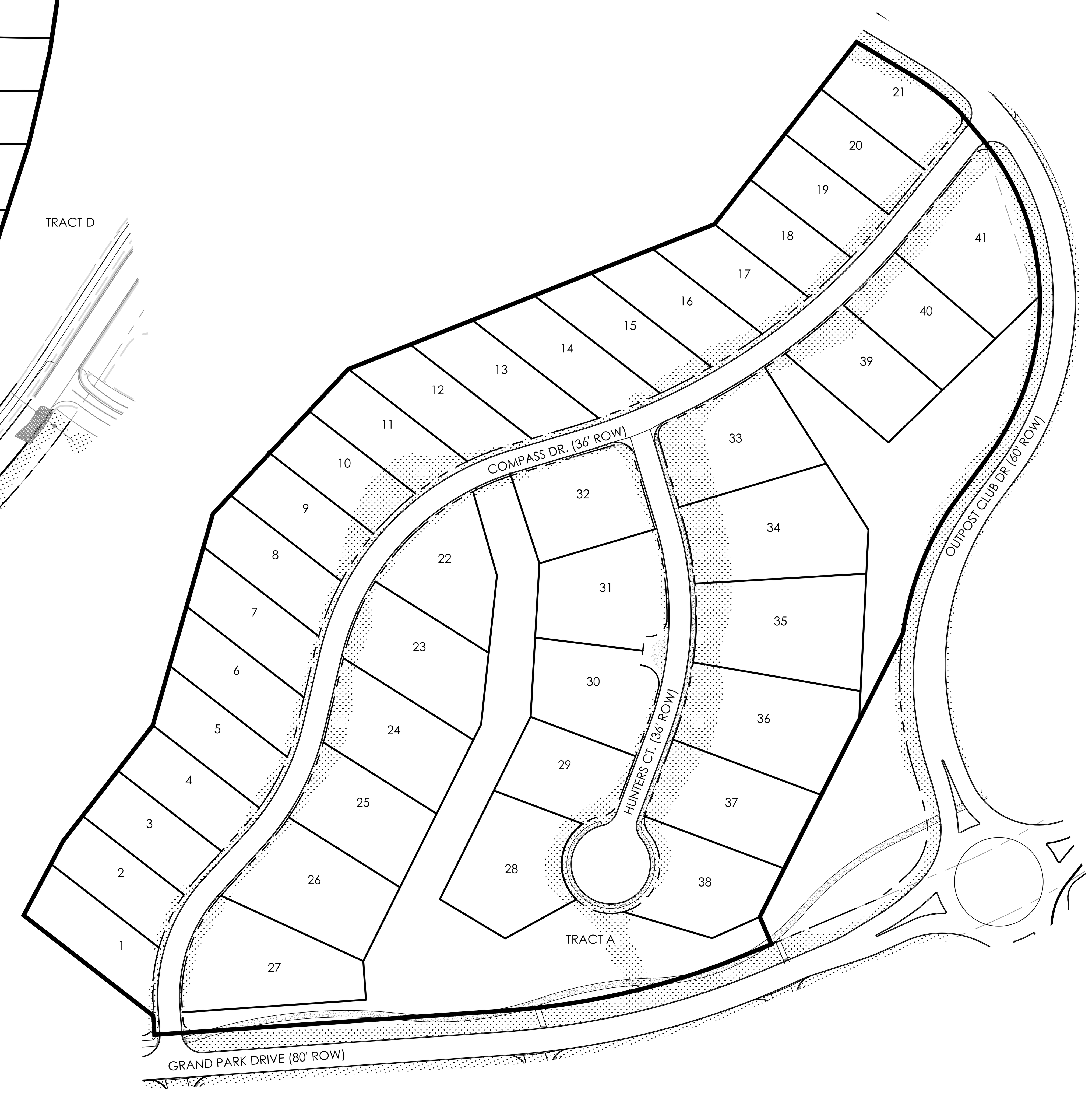
LEGEND

PLANNING AREA BOUNDARY

LOT LINE

LANDSCAPE AREA

A 10W.1



B 11W

Scale: 1"= 100'-0"

0 50 100 200

LANDSCAPE PLAN

DECEMBER 18, 2025

SHEET 7

FINAL PLAN DEVELOPMENT PLAN

THE OVERLOOK AT GRAND PARK

PLANNING AREAS 8WB, 9W.1, 9W.2 10W.2, 10W.3 AND A PORTION OF 23W

LOCATED IN SECTION 28 & 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO

LEGEND

I	PHASE ONE
II	PHASE TWO
III	PHASE THREE
	PHASE LINE
	PLANNING AREA

NOTE: PHASES DO NOT NEED TO BE DEVELOPED IN ANY SPECIFIC ORDER AND WILL BE DEVELOPED BASED ON INFRASTRUCTURE AND MARKET DEMAND

Scale: 1"= 100'-0"

0 50 100 200

PHASING PLAN

DECEMBER 18, 2025
SHEET 8

FINAL PLANNED DEVELOPMENT PLAN
WEST MOUNTAIN FILING 1
PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO

KEY MAP
SCALE: 1" = 3000'

N

0 120' 240'
1 inch = 120'

LEGEND

	PROJECT BOUNDARY
	RIGHT OF WAY (ROW)
	EASEMENT
	CENTERLINE
	LOT / TRACT / PARCEL BOUNDARY
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
	DRAINAGE SWALE
	SUBMITTAL AREA BOUNDARY
FP	FLOODPLAIN BOUNDARY
	EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
	CONCRETE
	MAINTENANCE ACCESS
	NOT A PART
C	COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
EA	EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3
L	LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
SD	SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3

NOTES:

1. BUILDING / LODGING LOCATIONS ARE CONCEPTUAL AND WILL BE FINALIZED WITH FINAL CDS
2. SEE SHEET 4 FOR CREEK LOCATIONS & NAMES. PONDS DRAINING WEST OF PROPERTY DRAIN TO ELK CREEK & EAST OF PROPERTY TO LELAND CREEK.
3. CONTOUR INTERVALS ARE 2' & 10'.

DECEMBER 18, 2025

FINAL PLANNED DEVELOPMENT PLAN
WEST MOUNTAIN FILING 1
PLANNING AREA 10W.1, 11W & A PORTION OF 23W

LOCATED IN SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO

DECEMBER 18, 2025
SHEET 10

PRELIMINARY CONSTRUCTION PLANS FOR
GRAND PARK - 8WB, 9W.1, 9W.2, 10W 10W.2, 10W.3 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

VICINITY MAP

0 1000' 2000'
1 inch = 1000'

SHEET INDEX

ENGINEERS STATEMENT

THESE CONSTRUCTION PLANS FOR GRAND PARK - 8WB, 9W, 10W.3, & 11W.2 WERE PREPARED BY ME UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF THESE STANDARDS.

BY: ____________________ ____________________
MARTIN METSKER DATE

TOWN OF FRASER APPROVAL BLOCK

THESE DESIGNS, PLANS, AND CONTRACT DOCUMENTS ARE REVIEWED FOR CONCEPT AND GENERAL CONFORMANCE TO THE TOWN'S MINIMUM STANDARDS ONLY, AND THE RESPONSIBILITY FOR DESIGN ADEQUACY SHALL REMAIN WITH THE ENGINEER OF RECORD. THIS REVIEW DOES NOT IMPLY RESPONSIBILITY BY EITHER THE TOWN OF FRASER OR THE TOWN'S ENGINEER FOR COMPLETENESS, ACCURACY OR CORRECTNESS OF CALCULATIONS. THE REVIEW DOES NOT IMPLY THAT QUANTITIES OF ITEMS INDICATED ON THE PLANS ARE THE FINAL QUANTITIES REQUIRED. THE REVIEW SHALL NOT BE CONSTRUED FOR ANY REASON AS ACCEPTANCE OF FINANCIAL RESPONSIBILITY BY THE TOWN OF FRASER OR ANY OF THE REVIEWING PARTIES FOR ADDITIONAL ITEMS AND ADDITIONAL QUANTITIES OF ITEMS SHOWN THAT MAY BE REQUIRED DURING THE CONSTRUCTION PHASE.

APPROVED FOR CONSTRUCTION WITHIN ONE YEAR OF THE EARLIEST OF THESE

BY: ____________________ ____________________
TOWN OF FRASER DATE

BY: ____________________ ____________________
TOWN OF FRASER DATE

BY: ____________________ ____________________
EAST GRAND F.P.D #4 DATE

CONTACT LIST

CURRENT LAND OWNER
GRAND PARK DEVELOPMENT COMPANY
P.O. BOX 30
WINTER PARK, COLORADO 80482
PHONE: 303.972.6633
CONTACT: CLARK LIPSCOMB

ENGINEER
TERRACINA DESIGN
10200 E. GIRARD AVE., SUITE A-314
DENVER, CO 80231
303-703-4444
CONTACT: MARTIN METSKER

GEOTECH
CTL THOMPSON, INC.
1790 AIRPORT ROAD, #2
POB 4928
BRECKENRIDGE, CO 80424
PHONE: 970-453-2047
CONTACT: GEORGE BENECKE III

TOWN OF FRASER
P.O. BOX 370
153 FRASER AVENUE
FRASER, CO 80442
PHONE: 970-726-5491, EXT. 205
CONTACT: PAUL JOHNSON

CONSULTING REVIEW ENGINEER
MERRICK & COMPANY
5250 HAHNS PEAK DR., SUITE 210
LOVELAND, CO 80538
PHONE: 970-744-3032
CONTACT: GREG STEED

EAST GRAND FIRE PROTECTION DISTRICT #4
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WINTER PARK, COLORADO 80482
PHONE: 970-726-5824
CONTACT: TODD HOLZWARTH

MOUNTAIN PARKS ELECTRIC
POB 170
GRANBY, CO 80446
PHONE: 970-887-3378
CONTACT: TODD CLAUSEN

XCEL ENERGY
PHONE: 970-262-4055
CONTACT: KATHLEEN JACOBY

CENTURY LINK
PHONE: 970-879-3661
CONTACT: ANATASIA KENNER

COMCAST
POB 785
GRANBY, CO 80446
PHONE: 970-887-2676
CONTACT: TONY HILDRET

UTILITY NOTIFICATION CENTER OF COLORADO
2801 S YOUNGFIELD ST, SUITE 301
GOLDEN, CO 80401
PHONE: 811

BASIS OF BEARING

THE WEST LINE OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 SOUTH, RANGE WEST OF THE SIXTH PRINCIPAL MERIDIAN WHICH WAS ASSUMED TO BEAR S00°14'02"E.

BENCHMARK STATEMENT

N.G.S. CONTROL POINT "N139" PID KK08971. THE STATION IS LOCATED 2.4 MILES BY ROAD, NORTH OF FRASER, BETWEEN THE RAILROAD AND U.S. HIGHWAY 40. NGVD 29 DATUM
ELEVATION = 8433.78

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
COVER

Know what's below. Call before you dig. 811

SHEET
1 OF 44

GENERAL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF ANY PROBLEMS OR POTENTIAL PROBLEMS IN CONFORMING TO THE DESIGN LINE AND GRADE FOR ANY ELEMENT OF THE CONSTRUCTION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF SITE CONDITIONS THAT DIFFER FROM THOSE SHOWN ON THE APPROVED PLANS.
2. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION OF PUBLIC IMPROVEMENTS SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE LATEST MUNICIPAL CODE, APPLICABLE TECHNICAL MANUALS, AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE TECHNICAL MANUAL OR ANY APPLICABLE STANDARDS, THE MORE STRINGENT STANDARD SHALL APPLY. ALL WORK SHALL BE INSPECTED AND APPROVED BY THE CONSTRUCTION INSPECTOR.
3. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR COMPLETENESS OR ACCURACY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXISTENCE AND/OR LOCATION OF ALL UNDERGROUND UTILITIES AND PARTICIPATE IN THE RESOLUTION OF ANY CONFLICTS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
4. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PERTINENT LOCATIONS AND ELEVATIONS, ESPECIALLY AT CONNECTION POINTS AND AT POTENTIAL UTILITY CONFLICTS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.
5. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE TOWN AND ALL UTILITY COMPANIES INVOLVED WITH REGARD TO RELOCATIONS OR ADJUSTMENTS OF EXISTING UTILITIES DURING CONSTRUCTION AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE.
6. CONTRACTOR SHALL PROVIDE A MINIMUM SEVENTY-TWO (72) HOURS NOTICE TO THE ON-SITE CONSTRUCTION INSPECTOR PRIOR TO MAKING ANY CONNECTIONS/TIE-INS TO EXISTING WATER, SANITARY SEWER, AND/OR STORM SEWER SYSTEMS PROVIDED THAT THE UTILITY TIE-IN DOES NOT DISRUPT SERVICE TO EXISTING WATER CUSTOMERS. ALL TOWN UTILITY TIE-INS MUST BE APPROVED BY THE WATER PROVIDER PRIOR TO COMMENCING WORK.
7. THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE APPROVED PLANS, ONE (1) COPY OF THE APPROPRIATE CRITERIA AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB ONSITE AT ALL TIMES.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY.
9. IF DURING THE CONSTRUCTION PROCESS CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION INSPECTOR IMMEDIATELY.
10. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD UNLESS SPECIFICALLY STATED OTHERWISE.
11. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH MUTCD TO THE APPROPRIATE RIGHT-OF-WAY AUTHORITY (TOWN, COUNTY OR STATE) FOR APPROVAL PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN OR AFFECTING THE RIGHT-OF-WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL TRAFFIC CONTROL DEVICES AS MAY BE REQUIRED BY THE CONSTRUCTION ACTIVITIES.
12. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETION OF THE INTENDED IMPROVEMENTS SHOWN ON THESE DRAWINGS OR AS DESIGNATED TO BE PROVIDED, INSTALLED, OR CONSTRUCTED UNLESS SPECIFICALLY NOTED OTHERWISE.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING AS-BUILT INFORMATION ON A SET OF RECORD DRAWINGS KEPT ON THE CONSTRUCTION SITE AND AVAILABLE TO THE CONSTRUCTION INSPECTOR AT ALL TIMES.
14. DIMENSIONS FOR LAYOUT AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWING. IF PERTINENT DIMENSIONS ARE NOT SHOWN, CONTACT THE CONSULTANT ENGINEER FOR CLARIFICATION AND ANNOTATE THE DIMENSION ON THE AS-BUILT RECORD DRAWINGS.
15. ALL INITIAL SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PER THE TEMPORARY EROSION & SEDIMENT CONTROL (TESC) PLAN PRIOR TO ANY EARTH-DISTURBING ACTIVITY. ALL EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED IN EFFECTIVE OPERATING CONDITION AT ALL TIMES. REMOVAL OF CONTROL MEASURES SHALL NOT OCCUR WITHOUT THE APPROVAL OF THE STORMWATER INSPECTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ROADWAYS FREE AND CLEAR OF ALL CONSTRUCTION DEBRIS AND DIRT TRACKED FROM THE SITE. THE CONTRACTOR SHALL ALSO COMPLY WITH ALL TERMS AND CONDITIONS OF THE COLORADO CONSTRUCTION GENERAL PERMIT FOR STORMWATER DISCHARGES.
16. NO PORTIONS OF THE PROPERTY ARE LOCATED WITHIN A DESIGNATED 100-YEAR FLOODPLAIN ZONE PER FEMA FIRM PANEL NO. 08049C0991C DATED MARCH 16, 2016.
17. BENCHMARK NOTE: CONTROL POINT "N139" PID KK08971. THE STATION IS LOCATED 2.4 MILES BY ROAD, NORTH OF FRASER, BETWEEN THE RAILROAD AND U.S. HIGHWAY 40. NGVD 29 DATUM ELEVATION = 8433.78
18. ALL UTILITIES ARE REVIEWED FOR AREA OF PLACEMENT (LOCATION) INCLUDING, IN EASEMENT/ROW, HORIZONTAL AND VERTICAL CLEARANCES, AND CONFLICTS WITH OTHER UTILITIES PER THE TRANSPORTATION DESIGN CRITERIA MANUAL, WATER SYSTEM DESIGN CRITERIA MANUAL, WASTEWATER DESIGN CRITERIA MANUAL, STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA MANUAL, AND ALL OTHER UTILITY OWNER AND OPERATOR CRITERIA.
19. FOR ALL UTILITY CUTS WITHIN RIGHT-OF-WAY, SEE FRASER MUNICIPAL CODE SECTION 14-5-210(C).
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE, PASSABLE ACCESS TO PRIVATE PROPERTIES ADJACENT TO THE WORK THROUGHOUT THE PERIOD OF CONSTRUCTION.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE JOB SITE CONDITIONS THROUGHOUT THE DURATION OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROTECTION OF PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED ONLY TO WORKING HOURS. THE CONTRACTOR SHALL DEFEND INDEMNIFY AND HOLD THE OWNER, THE ENGINEER AND THE GOVERNING JURISDICTION HARMLESS FOR ANY AND ALL LIABILITY, IN CONNECTION WITH THE PERFORMANCE OF WORK, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER OR THE GOVERNING JURISDICTION.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING NEARBY PUBLIC OR PRIVATE STREETS OF MUD AND DEBRIS, DUE TO CONSTRUCTION ACTIVITIES, ON A DAILY BASIS OR AS DIRECTED BY THE APPLICANT.

STORM SEWER NOTES:

1. LOCATION OF EXISTING STORM SEWER (INCLUDING CULVERTS) SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. STORM SEWER SHALL BE RCP IN ACCORDANCE WITH CDOT STANDARD M-603-2.
3. ALL CULVERTS SHALL HAVE END SECTIONS ON BOTH THE UPSTREAM AND DOWNSTREAM ENDS OF THE PIPE UNLESS OTHERWISE NOTED ON THE PLANS.
4. STORM SEWER RCP SHALL HAVE BEDDING AND BACKFILL IN ACCORDANCE WITH CDOT STANDARD M-603-2 AND TOWN OF FRASER ROAD STANDARDS.
5. PIPE LENGTHS FOR STORM SEWER ARE APPROXIMATE HORIZONTAL DISTANCES FROM END SECTION TO END SECTION. THEREFORE, DISTANCES SHOWN ON THE PLANS ARE APPROXIMATE AND COULD VARY. END SECTIONS ARE INCLUDED IN THE PIPE LENGTH SHOWN ON THE PLANS. FINAL LENGTH OF STORM SEWER SHALL BE SUFFICIENT TO PROVIDE THE ROAD SHOULDERS AND SIDE SLOPES TO NOT BE STEEPER THAN SHOWN ON THE TYPICAL ROAD SECTION.
6. DRIVEWAYS FOR ADJACENT PARCELS AND CULVERTS UNDER THE DRIVEWAYS SHALL BE DESIGNED IN THE FUTURE IN CONJUNCTION WITH DESIGNS FOR THE ADJACENT PARCELS.
7. ALL STORM DRAINAGE PIPES SHALL HAVE A MINIMUM COVER OF 24" UNLESS LOAD CALCULATIONS ARE PROVIDED. UNDER NO CIRCUMSTANCES WILL ANY PIPE HAVE LESS THAN 18" COVER FROM THE FINISH SURFACE TO THE OUTSIDE WALL OF THE PIPE.
8. ALL STORM DRAINAGE TRENCHES SHALL BE SLOPED OR BRACED AND SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKERS AND THE PROTECTION OF OTHER UTILITIES AND IN COMPLIANCE WITH ALL APPLICABLE STATE AND FEDERAL REQUIREMENTS. ALL EXCAVATION OPERATION SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. ALL MANHOLE RIM ELEVATIONS GIVEN ON THESE PLANS ARE TO BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL SET THE FINAL RIM ELEVATION BASED ON THE COMPLETED FINISH SURFACE.

STREET CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF ANY PROBLEMS OR POTENTIAL PROBLEMS IN CONFORMING TO THE DESIGN LINE AND GRADE FOR ANY ELEMENT OF THE CONSTRUCTION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROMPTLY NOTIFYING THE ENGINEER OF SITE CONDITIONS THAT DIFFER FROM THOSE SHOWN ON THE APPROVED PLANS.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE TOWN OF FRASER STREET AND ROADWAY MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS DATED JANUARY 2015.
3. ALL STREET CONSTRUCTION IS SUBJECT TO THE GENERAL NOTES ON THE COVER SHEET OF THESE PLANS AS WELL AS THE STREET CONSTRUCTION NOTES LISTED HEREIN.
4. WHERE PROPOSED PAVING ADJOINS EXISTING ASPHALT, THE EXISTING ASPHALT SHALL BE SAW CUT A MINIMUM DISTANCE OF 12" FROM THE EXISTING EDGE TO CREATE A CLEAN CONSTRUCTION JOINT. THE DEVELOPER SHALL BE REQUIRED TO REMOVE EXISTING PAVEMENT TO A DISTANCE WHERE A CLEAN CONSTRUCTION JOINT CAN BE MADE.
5. STREET SUBGRADES SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 12" AND RE-COMPACTED PRIOR TO SUB-BASE INSTALLATION. NO BASE MATERIAL SHALL BE LAID UNTIL THE SUBGRADE HAS BEEN INSPECTED AND APPROVED BY THE CONSTRUCTION INSPECTOR.
6. VALVE BOXES ARE TO BE BROUGHT UP TO GRADE AT THE TIME OF PAVEMENT PLACEMENT OR OVERLAY. VALVE BOX ADJUSTING RINGS ARE NOT ALLOWED.
7. ALL STREET CUTS FOR UTILITY CONNECTIONS SHALL BE BACKFILLED WITH FLOWABLE FILL, PERIMETER SHALL BE SAW CUT AND EDGE MILLED PER CDOT REQUIREMENTS.
8. LIFTS IN FILL AREAS SHALL NOT EXCEED 8 INCHES IN COMPACTED DEPTH. MAXIMUM SLOPES OF ALL CUTS & FILLS SHALL BE 3:1 UNLESS OTHERWISE NOTED. FILL SHALL NOT BE PLACED ON EXISTING TOPSOIL OR ORGANIC MATERIAL. TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED AND REMOVED FROM THE FILL AREA AND NOT USED IN THE FILL. FILL SHALL ONLY BE PLACED ON SUITABLE EXISTING SUBGRADE FREE OF ANY TOPSOIL AND/OR ORGANIC MATERIAL.
9. PAVING SHALL NOT START UNTIL SUBGRADE COMPACTION TESTS ARE TAKEN MEETING THE REQUIREMENTS OF THE PLANS AND SPECS AND FINAL PAVEMENT DESIGN.THE PAVEMENT SECTION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT. THE MINIMUM DEPTH OF ASPHALT SHALL BE 5-INCHES.
10. ASPHALT PAVING SHALL BE IN ACCORDANCE WITH THE TOWN OF FRASER ROAD STANDARDS FINAL ASPHALT THICKNESS AND BASE COURSE THICKNESS SHALL BE IN ACCORDANCE WITH THE SOIL'S ENGINEER'S REPORT.
11. ROADWAY BASE COURSE AND FILL AREA COMPACTION SHALL CONFORM TO THE TOWN OF FRASER ROAD STANDARDS. THE BASE COURSE AND COMPACTION SHALL ALSO CONFORM TO THE GENERAL NOTES.
12. AT COMPLETION OF CONSTRUCTION, AS PART OF THE PRELIMINARY ACCEPTANCE, THE TOWN WILL SELECT REPRESENTATIVE LOCATIONS TO TAKE ASPHALT CORINGS AS CONFIRMATION OF ASPHALT DEPTH AND CONSISTENCY OF THE ASPHALT SECTION. THE TOWN WILL CONTRACT DIRECTLY WITH A COMPANY TO PERFORM THIS WORK AND WILL BACK CHARGE THE DEVELOPER FOR THE COST.

SIGNAGE AND STRIPING NOTES:

1. ALL SIGNAGE AND STRIPING IS SUBJECT TO THE GENERAL NOTES ON THE COVER SHEET OF THESE PLANS AS WELL AS THE SIGNAGE AND STRIPING NOTES LISTED HERE.
2. ALL PAINT SHALL BE 15 MIL THICK UPON INSTALLATION AND 8MIL THICK WHEN DRY.
3. ALL PERMANENT LONGITUDINAL PAVEMENT STRIPING ON ASPHALT SURFACES (CENTERLINES, LANE LINES, BAY LINES, ETC.) SHALL BE INSTALLED USING AN APPROVED REFLECTIVE TRAFFIC PAINT OR PAVEMENT MARKING TAPE. REFLECTIVE BEADS SHALL BE APPLIED IN ACCORDANCE WITH CDOT'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND THE MANUFACTURER'S REQUIREMENTS. WHEN TAPE IS USED ON AN ASPHALT STREET, IT SHALL BE "ROLLED" INTO THE FINAL LIFT. ON CONCRETE SURFACES TAPE SHALL BE UTILIZED WITH A CONTRASTING BLACK EDGE AND GROOVED INTO THE PAVEMENT.
4. THERMO-PLASTIC APPLICATIONS SHALL BE AS SPECIFIED IN THE PLANS AND/OR PER TOWN CRITERIA.
5. ALL SURFACES THAT ACCEPT PAINT/THERMO-PLASTIC STRIPING OR PRE-FORMED MARKINGS SHALL BE FIRST SANDBLASTED AND THOROUGHLY CLEANED PRIOR TO INSTALLATION OF STRIPING OR MARKINGS.
6. ALL ARROW MARKINGS SHALL BE PRE-FORMED TAPE, THERMO-PLASTIC OR EPOXY-PAINTED.
7. STOP BARS SHALL BE 90 MIL THERMO-PLASTIC.
8. ALL ROADWAY SIGNAGE SHALL CONFORM TO THE MUTCD AND/OR THE TOWN'S CRITERIA.
9. ALL SIGNPOSTS SHALL UTILIZE BREAK AWAY ASSEMBLIES AND FASTENERS.

FIRE NOTES:

1. IT IS THE RESPONSIBILITY OF THE PROPERTY OWNER TO MAINTAIN DRIVE LANES FOR EMERGENCY VEHICLE INGRESS AND EGRESS, INCLUDING SNOW REMOVAL.
2. EMERGENCY VEHICLE ACCESS ROAD IS REQUIRED TO ALLOW ACCESS WITHIN 150' OF ALL EXTERIOR OF THE BUILDING BY AN APPROVED ROUTE.
3. FIRE APPARATUS ACCESS ROADS SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF FIRES APPARATUS AND SHALL BE PROVIDED WITH A SURFACE SO AS TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES. ACCESS ROAD SHALL BE EITHER CONCRETE, ASPHALT, OR OTHER APPROVED ALTERNATIVE MATERIAL ACCOMPANIED WITH AN ENGINEER'S STAMP STATING THE MATERIAL WILL SUPPORT A 75,000 POUND IMPOSED LOAD.
4. FIRE HYDRANT(S) ARE REQUIRED TO BE INSTALLED AND MADE SERVICEABLE PRIOR TO COMBUSTIBLE MATERIALS BEING BROUGHT ONTO THE SITE AND DURING THE TIME OF VERTICAL CONSTRUCTION.
5. "NO PARKING FIRE LANE" SIGNS ARE REQUIRED IN AREAS THAT MEET THE FOLLOWING CRITERIA AND IN AREAS DESIGNATED BY THE FIRE PREVENTION BUREAU. SIGNS SHALL BE POSTED ON BOTH SIDES OF FIRE DEPARTMENT ACCESS ROADWAYS, PUBLIC OR PRIVATE ROADWAYS AND DRIVEWAYS LESS THAN 26 FEET WIDE. SIGNS SHALL BE POSTED ON ONE SIDE ONLY OF FIRE DEPARTMENT ACCESS ROADWAYS, PUBLIC OR PRIVATE ROADWAYS OR DRIVEWAYS BETWEEN 26 FEET WIDE AND 32 FEET WIDE. NO SIGNAGE IS REQUIRED FOR ACCESS ROADWAY FIRE DEPARTMENT ACCESS ROADWAYS, PUBLIC OR PRIVATE ROADWAYS OR DRIVEWAYS EXCEEDING 32 FEET WIDE.
6. WHEN FIRE APPARATUS ACCESS ROADS OR A WATER SUPPLY FOR FIRE PROTECTION IS REQUIRED TO BE INSTALLED, SUCH PROTECTION SHALL BE INSTALLED AND MADE SERVICEABLE PRIOR TO COMBUSTIBLE MATERIALS BEING BROUGHT ONTO THE SITE AND THE BUILDING CONSTRUCTION GOING VERTICAL.

SANITARY CONSTRUCTION NOTES:

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE FRASER CONSTRUCTION STANDARDS AND MINIMUM DESIGN CRITERIA.
2. ALL MANHOLE RIM ELEVATIONS GIVEN ON THESE PLANS ARE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL SET THE FINAL RIM ELEVATION BASED ON THE COMPLETE FINISH SURFACE.
3. ALL SANITARY SEWER LINE TRENCHES SHALL BE SLOPED OR BRACED AND SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKERS AND PROTECTION OF OTHER UTILITIES, IN COMPLIANCE WITH ALL APPLICABLE STATE AND FEDERAL REQUIREMENTS. ALL EXCAVATION OPERATION SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. MINIMUM COVER FOR SANITARY SEWER SERVICE LINES SHALL BE 7 FEET AND THE MINIMUM SLOPE SHALL BE 2.0%.
5. ALL SANITARY SEWER SERVICE LINES SHALL BE CONSTRUCTED ALONG THE SHORTEST AND STRAIGHTEST ROUTE POSSIBLE.
6. SIZING/CAPACITY. THE SIZE AND SLOPE OF THE BUILDING SERVICE SEWER SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN, BUT IN NO EVENT SHALL THE DIAMETER BE LESS THAN FOUR (4) INCHES. MINIMUM GRADE AND SLOPES SHALL BE AS FOLLOWS: , 4" 2.0% NORMAL; 1.0% MINIMUM, 6" 1.00%, 8" 0.60%.
7. WHERE PARALLEL OR APPROXIMATELY PARALLEL TO A STRUCTURAL WALL, THE SERVICE LINE SHALL BE AT LEAST FIVE (5) FEET FROM THE WALL. PENETRATIONS THROUGH STRUCTURES SHALL BE AT RIGHT ANGLES, OR CLOSE THERETO, THROUGH PVC SLEEVES AND SHALL PROVIDE FLEXIBILITY SUCH THAT THE SERVICE LINE WILL NOT BE DAMAGED BY SETTLMENT OF THE STRUCTURES.
8. SEWER AND WATER SERVICE LINES SHALL HAVE TEN (10) FEET MINIMUM HORIZONTAL SEPARATION MEASURED FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE. WHERE THIS SEPARATION IS IMPRACTICAL, THE TOWN MAY PERMIT OTHER SEPARATION REQUIREMENTS IN ACCORDANCE WITH APPLICABLE STANDARDS. IF A WATER LINE PASSES WITHIN EIGHTEEN (18) INCHES VERTICAL DISTANCE ABOVE A SEWER MAIN OR SERVICE OR IF IT LIES WITHIN THE MINIMUM HORIZONTAL SEPARATION DISTANCE OF THE SEWER MAIN OR SERVICE, THE SEWER SERVICE IS TO BE MODIFIED TO HAVE "NO BELL" CONSTRUCTION PER ATTACHMENT A-23 – PIPE CROSSING DETAIL. IF A WATER LINE CROSSES UNDER A SEWER SERVICE, A TWENTY-FOOT LENGTH OF C900 PVC SHALL BE USED FOR THE GRAVITY SEWER LINE. SMITH-BLAIR 229, FULL CIRCLE COLLAR LEAK REPAIR CLAMPS, SHALL BE INSTALLED ON ALL SANITARY SEWER JOINTS WITHIN THE MINIMUM HORIZONTAL CLEARANCE REQUIREMENTS, AND NO WATER LINE PIPE JOINTS SHALL BE LOCATED WITHIN THE MINIMUM HORIZONTAL CLEARANCE REQUIREMENT.
9. THE MINIMUM COVER SHALL BE SEVEN (7) FEET FROM TOP OF SEWER SERVICE LINE TO FINISHED GRADE. SERVICE LINES WITH LESS THAN SEVEN (7) FEET OF COVER WILL BE CONSIDERED BY THE TOWN WITH INSTALLATION OF TWO (2) INCHES OF PIPELINE INSULATION INSTALLED FOR EVERY ONE (1) FOOT OF COVER LESS THAN SEVEN (7) FEET. THE TOWN SHALL REVIEW AND APPROVE ALL LOCATIONS WHERE PIPE DEPTHS ARE LESS THAN SEVEN (7) FEET. IN NO CASE SHALL A SANITARY SEWER SERVICE LINE HAVE A DEPTH LESS THAN FIVE (5) FEET. SERVICE LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS PER ATTACHMENT A-38 – SEWER MAIN AND SERVICE LINE BEDDING & BACKFILL DETAIL.
10. WYE TAP SADDLES SHALL BE INSTALLED FOR CONNECTION OF EACH SANITARY SEWER SERVICE LINE TO THE SANITARY SEWER MAIN LINE. PRE-INSTALLED WYE FITTINGS MAY BE ALLOWED ON NEW SANITARY SEWER MAIN LINE CONSTRUCTION, AS AN ALTERNATIVE TO SADDLES, FOR CONNECTION OF THE SANITARY SEWER SERVICE LINES TO THE SANITARY SEWER MAIN LINE WITH PRIOR WRITTEN APPROVAL BY THE TOWN.
11. WARNING TAPE SHALL BE INSTALLED IN THE TRENCH ABOVE THE SEWER LINE. THE WARNING TAPE SHALL BE INSTALLED CONTINUOUSLY ABOVE THE SEWER LINE, A DISTANCE OF THIRTY (30) INCHES ABOVE THE PIPE. THE WARNING TAPE SHALL BE THREE (3) INCHES WIDE, GREEN IN COLOR WITH THE LEGEND "CAUTION BURIED SEWER LINE BELOW" IN BLACK AND EXTEND CONTINUOUSLY IN THE TRENCH. IF ANY EXISTING WARNING TAPE IS DAMAGED IN CONSTRUCTION ACTIVITIES, A SPLICE SHALL BE MADE USING ADDITIONAL WARNING TAPE TIED TO EACH END TO PROVIDE A CONTINUOUS WARNING TAPE ALONG THE SEWER LINE. WARNING TAPE SHALL BE INSTALLED ON SEWER SERVICE LINES FROM THE TAP AT THE MAIN TO THE EDGE OF THE RIGHT-OF-WAY, EASEMENT AND/OR CLEANOUTS.
12. EACH SERVICE LINE IS TO HAVE A FOUR-INCH CLEANOUT INSTALLED WITHIN TWENTY (20) FEET OF THE BUILDING SERVED, PER ATTACHMENT A-42 – SEWER SERVICE LINE CONNECTION DETAIL, ATTACHMENT A-43 SEWER SERVICE LINE CLEANOUT DETAIL – UNPAVED LOCATION AND ATTACHMENT A-44 – SEWER CLEANOUT COLLAR DETAIL – PAVED LOCATION. CLEANOUTS ARE REQUIRED FOR ANY FORTY-FIVE-DEGREE BEND IN SERVICE LINE DIRECTION AND AT INTERVALS OF NO GREATER THAN NINETY (90) FEET.
13. CLEANOUTS LOCATED WITHIN PAVED AREAS SHALL BE RAISED TO FINAL GRADE WITH EITHER ASPHALT SURFACING INSTALLED ADJACENT TO THE CLEANOUT OR WITH A CONCRETE COLLAR. IF THE CLEANOUT IS SET AT FINAL GRADE DURING THE ASPHALT PAVING PROCESS, THE FOLLOWING PROCEDURE SHALL BE FOLLOWED:
   - 13.1. INSTALLATION OF THE BOTTOM LIFT OF ASPHALT SHALL BE PLACED OVER THE TOP OF THE CLEANOUT.
   - 13.2. THE CLEANOUT SHALL BE EXPOSED AND SET TO ITS FINAL GRADE AT ONE-HALF (½) INCH LOWER THAN THE GRADE OF THE FINAL ASPHALT SURFACE. ANY VOID CREATED IN THE BOTTOM LIFT OF ASPHALT BY EXPOSING AND RAISING THE CLEANOUT SHALL BE FILLED WITH COMPACTED HOT MIX ASPHALT PRIOR TO PLACEMENT OF THE OF THE TOP LIFT OF ASPHALT.
   - 13.3. INSTALLATION OF THE TOP LIFT OF ASPHALT SHALL BE PLACED AND COMPACTED, MAINTAINING THE REQUIRED VERTICAL DISTANCE FROM THE PAVEMENT SURFACE TO THE TOP OF THE CLEANOUT. THE CLEANOUT SHALL REMAIN VERTICAL AND PLUMB.
   - 13.4. IF A CONCRETE COLLAR IS THE SELECTED METHOD USED TO RAISE THE CLEANOUT TO FINAL GRADE, IT SHALL BE INSTALLED AFTER THE TOP LIFT OF ASPHALT IS PLACED AND IN ACCORDANCE WITH ATTACHMENT A-43 – SEWER SERVICE LINE CLEANOUT COLLAR DETAIL – UNPAVED LOCATION AND ATTACHMENT A-44 – SEWER CLEANOUT COLLAR DETAIL - PAVED LOCATION.
14. SEWER SERVICE PIPE SHALL BE PVC AND SHALL EITHER BE SDR 26 OR C900 PIPE. WHERE A DIFFERENT PIPE MATERIAL IS ENCOUNTERED AT THE CONNECTION POINT TO THE SANITARY SEWER MAIN, A FLEXIBLE COUPLER SHALL BE USED. THE FLEXIBLE COUPLER SHALL BE MADE OF AN ELASTOMERIC COMPOUND AND SHALL BE CONNECTED AT EACH END WITH A STAINLESS STEEL CLAMP. THE COUPLER SHALL BE LEAK-PROOF, ROOT-PROOF AND RESISTANT TO CHEMICALS, UV RAYS AND NORMAL SEWER GASSES.
15. THE COUPLER SHALL BE:
   - 15.1. FERNCO, PART NO. 1051-44
   - 15.2. US PIPE CORP., PART NO. 30552
   - 15.3. AN APPROVED EQUAL
16. WHEN PRE-APPROVED BY THE TOWN, WHERE SEWER SERVICE LINES OF TWO (2) DIFFERENT PIPE TYPES ARE BEING CONNECTED TOGETHER, THE WATERTIGHT CONNECTOR FITTING SHALL BE A MANUFACTURED FITTING SPECIFICALLY FOR CONNECTION OF THAT SIZE AND TYPE OF PIPE.
17. INTERCEPTORS. GREASE INTERCEPTORS SHALL CONFORM TO THE SPECIFICATIONS IN THE INTERNATIONAL PLUMBING CODE AS ADOPTED BY THE TOWN AND THIS CODE. GREASE INTERCEPTOR LAYOUT AND DETAIL SHALL BE SUBMITTED TO THE TOWN FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION OR INSTALLATION.
18. SEPARATORS. OIL AND SAND SEPARATORS SHALL CONFORM TO THE SPECIFICATIONS IN THE INTERNATIONAL PLUMBING CODE AS ADOPTED BY THE TOWN AND THIS CODE. OIL AND SAND SEPARATOR LAYOUT AND DETAIL SHALL BE SUBMITTED TO THE TOWN FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION OR INSTALLATION. (ORD.389 PART 1.1, 2012)

WATER CONSTRUCTION NOTES:

1. ALL WATER LINE CONSTRUCTION IS SUBJECT TO THE GENERAL NOTES ON THE COVER SHEET OF THESE PLANS AS WELL AS THE WATER LINE CONSTRUCTION NOTES LISTED HEREIN.
2. ALL WATER LINES SHALL BE BEDDED IN ACCORDANCE WITH TOWN STANDARDS.
3. DISTANCES FOR WATER LINES ARE HORIZONTAL DISTANCE FROM THE CENTER OF THE FITTING TO CENTER OF THE FITTING. THEREFORE, DISTANCES SHOWN ON THE PLANS ARE APPROXIMATE AND COULD VARY DUE TO VERTICAL ALIGNMENT AND FITTING DIMENSIONS.
4. WATER LINE TRENCHES SHALL BE SLOPED OR BRACED AND SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKERS AND THE PROTECTION OF OTHER UTILITIES, IN COMPLIANCE WITH ALL APPLICABLE STATE AND FEDERAL REQUIREMENTS. FOR ALL EXCAVATION OPERATIONS, SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. MAXIMUM DEFLECTION FOR WATER MAINS SHALL NOT EXCEED ONE-HALF OF THE MANUFACTURER'S MAXIMUM ALLOWABLE DEFLECTION OR 2.5 DEGREES, WHICHEVER IS LESS.
6. SERVICE CONNECTIONS SHALL BE INSTALLED PER ATTACHMENT A-34 – WATER SERVICE LINE AND CURB STOP AND ATTACHMENT A-35 – WATER METER ASSEMBLY INSTALLATION. NO CONNECTION BETWEEN THE WATER SYSTEM OF THE TOWN AND THE WATER FACILITIES OF THE OWNER MAY BE MADE EXCEPT IN A PUBLIC STREET ADEQUATE TO ACCOMMODATE THIS CONNECTION OR IN A LOCATION WHICH PROVIDES ADEQUATE ACCESS FOR TOWN PERSONNEL AND WHICH IS SUITABLE FOR BURIED PIPES.
7. WHERE PARALLEL OR APPROXIMATELY PARALLEL TO A STRUCTURAL WALL, THE SERVICE LINE SHALL BE AT LEAST FIVE (5) FEET FROM THE WALL. PENETRATIONS THROUGH STRUCTURES SHALL BE AT RIGHT ANGLES, OR CLOSE THERETO, THROUGH PVC SLEEVES, AND SHALL PROVIDE FLEXIBILITY SUCH THAT THE SERVICE LINE WILL NOT BE DAMAGED BY SETTLEMENT OF THE STRUCTURES.
8. THE WATER SERVICE SHALL BE LAID AT UNIFORM GRADE AND IN STRAIGHT ALIGNMENT. A REFERENCE MARK SHALL BE PLACED ON THE CURB ABOVE THE SERVICE LINE.
9. WATER AND SEWER SERVICE LINES SHALL HAVE TEN (10) FEET MINIMUM HORIZONTAL SEPARATION MEASURED FROM OUTSIDE EDGE OF PIPE TO OUTSIDE EDGE OF PIPE. WHERE THIS SEPARATION IS IMPRACTICAL, THE TOWN MAY PERMIT OTHER SEPARATION REQUIREMENTS IN ACCORDANCE WITH APPLICABLE STANDARDS. IF A WATER SERVICE LINE CROSSES A SEWER MAIN OR SEWER SERVICE, THE WATER LINE SHALL BE PROTECTED PER ATTACHMENT A-23 – PIPE CROSSING DETAIL.
10. THE MINIMUM COVER SHALL BE NINE (9) FEET FROM THE TOP OF THE WATER SERVICE LINE TO THE FINISHED GRADE. A MINIMUM OF SEVEN (7) FEET OF COVER WILL BE ALLOWED IF AT LEAST TWO (2) INCHES OF APPROVED PIPELINE INSULATION IS PROVIDED PER VERTICAL FOOT OF COVER LESS THAN NINE (9) FEET. THE INSULATION INSTALLATION SHALL BE IN ACCORDANCE WITH ATTACHMENT A-18 – WATER MAIN AND SERVICE LINE BEDDING AND BACKFILL DETAIL AND THE REQUIREMENTS OF SUBSECTION 14-3-260(B).
11. WARNING TAPE SHALL BE INSTALLED IN THE TRENCH CONTINUOUSLY ABOVE THE WATER LINE, A DISTANCE OF THIRTY (30) INCHES ABOVE THE PIPE. THE WARNING TAPE SHALL BE THREE (3) INCHES WIDE, BLUE IN COLOR WITH THE LEGEND "CAUTION BURIED WATER LINE BELOW" IN BLACK AND EXTEND CONTINUOUSLY IN THE TRENCH. IF ANY EXISTING WARNING TAPE IS DAMAGED IN CONSTRUCTION ACTIVITIES, A SPLICE SHALL BE MADE USING ADDITIONAL WARNING TAPE TIED TO EACH END TO PROVIDE A CONTINUOUS WARNING TAPE ALONG THE WATER LINE. WARNING TAPE SHALL BE INSTALLED ON WATER SERVICE LINES FROM THE TAP AT THE MAIN TO THE EDGE OF THE RIGHT-OF-WAY, EASEMENT AND/OR SHUT-OFF/CURB STOP.
12. CROSS-CONNECTIONS OF ANY TYPE THAT PERMIT A BACKFLOW CONDITION FROM ANY SOURCE OTHER THAN THE TOWN'S POTABLE WATER MAINS SHALL HAVE A TESTABLE BACKFLOW PREVENTION DEVICE IN PLACE OF THE TYPE COMMENSURATE WITH THE DEGREE OF HEALTH HAZARD POSED. EACH CROSS-CONNECTION MAY REQUIRE A DIFFERENT TYPE OF BACKFLOW PREVENTION DEVICE BASED ON THE DEGREE OF HAZARD POSED AS DETERMINED AND APPROVED BY THE TOWN.
13. EACH USER OF THE TOWN WATER SYSTEM SHALL INSTALL AND MAINTAIN TESTABLE BACKFLOW PREVENTION DEVICES ON POTENTIALLY HAZARDOUS SERVICE CONNECTIONS, AS REQUIRED BY ARTICLE 12 OF THE COLORADO PRIMARY DRINKING WATER REGULATIONS, (5 CCR 1003-1). ALL SERVICE CONNECTIONS WITHIN THE WATER SYSTEM MUST COMPLY WITH ARTICLE 12, COLORADO CROSS-CONNECTION CONTROL MANUAL AND THE INTERNATIONAL PLUMBING CODE, AS ADOPTED BY THE TOWN.
14. ANY HAZARDOUS CROSS-CONNECTION DISCOVERED SHALL BE CORRECTED IMMEDIATELY UPON NOTICE OR THE WATER SERVICE WILL BE SHUT OFF.
15. ALL NEW WATER SERVICE INSTALLATIONS WILL BE INSPECTED FOR COMPLIANCE WITH THESE BACKFLOW PREVENTION REQUIREMENTS.
16. ALL SERVICES SHALL BE EQUIPPED WITH A PRESSURE REDUCING VALVE (PRV). THE PRV SHALL BE INSTALLED UPSTREAM OF THE WATER METER AND BE SET FOR A DOWNSTREAM PRESSURE NOT EXCEEDING SEVENTY (70) PSIG.
17. WATER SERVICE PIPELINE. THE WATER SERVICE PIPELINE SHALL BE TYPE K, SOFT COPPER CONFORMING TO ASTM B88, UNLESS OTHERWISE SPECIFICALLY APPROVED BY THE TOWN. FITTINGS SHALL BE BRASS OR COPPER ALLOY. CONNECTIONS SHALL BE BY COMPRESSION TYPE FITTINGS. FLARED FITTINGS ARE PROHIBITED AND SHALL NOT BE ALLOWED. SOLDERED JOINTS SHALL NOT BE PERMITTED UNDERGROUND. SPLICE JOINTS ARE DISCOURAGED IN ALL WATER SERVICE LINE INSTALLATIONS.
18. THE TOWN MAY ALLOW THE USE OF POLYETHYLENE PIPE MEETING THE REQUIREMENTS FOR WATER SERVICE LINES AS PROVIDED BY THE INTERNATIONAL PLUMBING CODE AS ADOPTED BY THE TOWN. ALL USERS OF POLYETHYLENE PIPE FOR WATER SERVICES ARE ADVISED THAT THIS MATERIAL IS NOT CONDUCIVE TO LINE THAWING PROCEDURES IN THE EVENT THAT THE SERVICE LINE FREEZES.
19. CORPORATION STOPS. CORPORATION STOPS SHALL BE USED FOR THE CONNECTION OF SERVICES, TWO (2) INCHES AND SMALLER, TO THE WATER MAIN. CORPORATION STOPS SHALL BE BRASS AND CONFORM TO AWWA C800. THE INLET SHALL BE STANDARD AWWA CORPORATION STOP INLET THREAD, AND THE OUTLET SHALL BE FOR COMPRESSION TYPE "K" COPPER SERVICE PIPE. CORPORATION STOPS SHALL BE MUELLER H-15000, FORD F- 600, OR APPROVED EQUAL, PROVIDED WITH AN INSULATING COUPLING FOR POTABLE SERVICE.
20. CURB STOPS. CURB STOPS SHALL BE PLACED PER ATTACHMENT A-34 – WATER SERVICE LINE AND CURB STOP FOR ALL SERVICES TWO (2) INCHES AND SMALLER. CURB STOPS SHALL BE BRASS AND CONFORM TO AWWA C800. CONNECTIONS SHALL BE FOR COMPRESSION TYPE "K" COPPER SERVICE PIPE. CURB STOPS SHALL BE MUELLER H-15204, FORD B-22 OR APPROVED EQUAL. CURB STOP OPERATING NUT SHALL BE EXTENDED AS NECESSARY FOR THE OPERATOR EXTENSION TO BE LOCATED TWENTY-FOUR (24) INCHES TO THIRTY-SIX (36) INCHES FROM THE TOP OF THE STOP BOX. STOP BOXES SHALL HAVE THE BASE SECTION AND LID CONSTRUCTED OF CAST IRON WITH AN ADJUSTABLE STEEL UPPER SECTION. A BRONZE SPRING FRICTION RING ASSEMBLY SHALL PROVIDE A SEAL BETWEEN THE UPPER AND BASE SECTION AND PROVIDE ONE (1) FOOT OF ADJUSTMENT.
21. SERVICE SADDLES. SERVICE SADDLES SHALL BE USED FOR ALL WATER TAPS ON ANY PIPE OTHER THAN DIP (DUCTILE IRON PIPE). FOR DIP, THREE-QUARTER-INCH TAPS MAY BE MADE WITHOUT USING A SERVICE SADDLE ON SIX-INCH PIPE. THREE-QUARTER-INCH AND ONE-INCH-SIZE TAPS MAY BE MADE WITHOUT SERVICE SADDLES ON EIGHT-INCH SIZE OF PIPE OR LARGER. ALL OTHER DIP TAPS SHALL BE MADE WITH A DOUBLE STRAP BRONZE SADDLE, SMITH BLAIR NO. 357, ROCKWELL NO. 323 OR APPROVED EQUAL.

LEGEND

PROJECT BOUNDARY
RIGHT OF WAY (ROW)
EASEMENT
CENTERLINE
LOT / TRACT / PARCEL BOUNDARY
1 LOT NUMBER
< SWALE
4880 PROPOSED MAJOR CONTOUR (5 FT)
4879 PROPOSED MINOR CONTOUR (1 FT)
4880 PROPOSED MAJOR CONTOUR (5 FT)
4879 PROPOSED MINOR CONTOUR (1 FT)
EAST OF SITE - LELAND CREEK
WEST OF SITE - ELK CREEK
CONCRETE
MAINTENANCE ACCESS
RIPRAP
SOIL RIPRAP
WETLAND
WARPING
TOWNHOMES
CONDOS

STORM (FES, MH, & INLET)
SANITARY
WATER (HYDRANT, VALVE, BEND, MH)
RAW WATER (VALVE, BEND, ARV)
EX STORM (FES, MH, & INLET)
EX SANITARY
EX WATER (HYDRANT, VALVE, BEND, MH)
X EXISTING FENCE
D EXISTING STORM
W EXISTING WATER
> EXISTING SWALE
EXISTING SANITARY CLEAN OUT
W EXISTING WATER MANHOLE
W EXISTING WATER METER
EXISTING ELECTRIC POLE & GUY WIRE
DRAINAGE SWALE
FP FLOODPLAIN BOUNDARY
L LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
SD SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3
EA EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

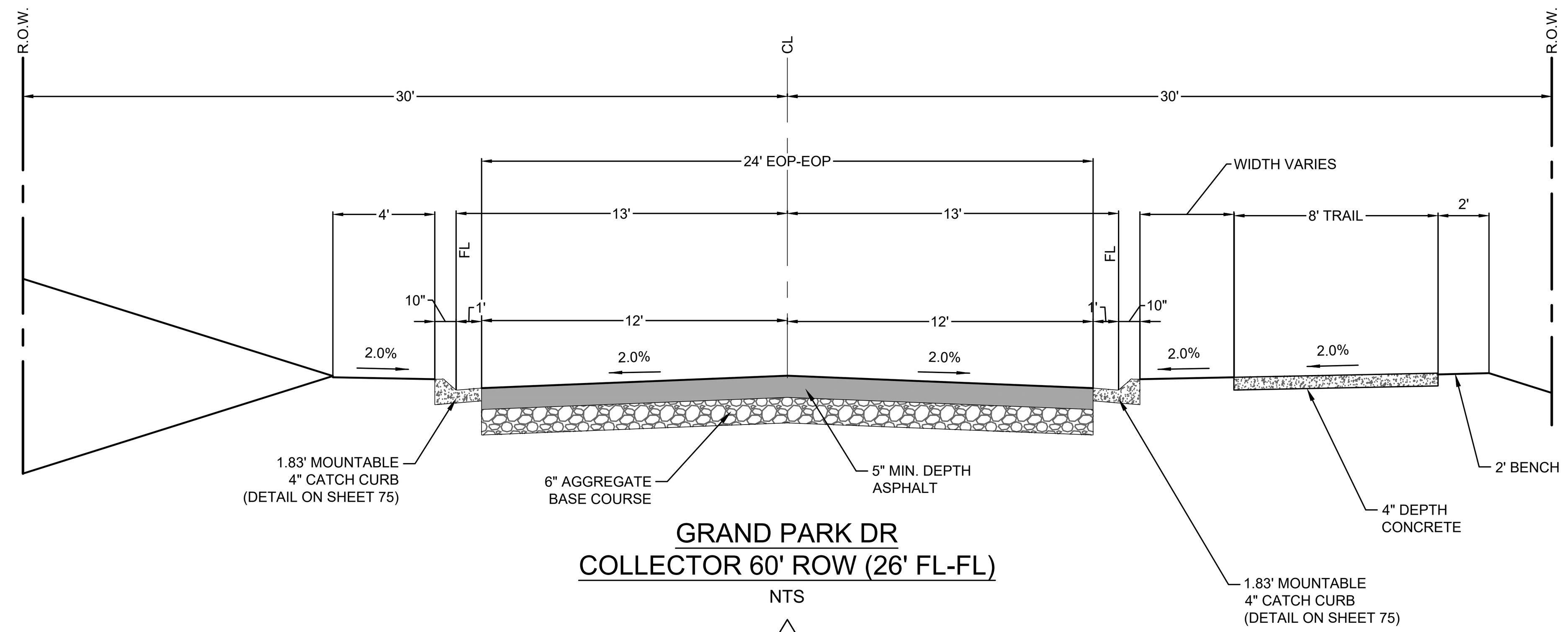
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GENERAL NOTES

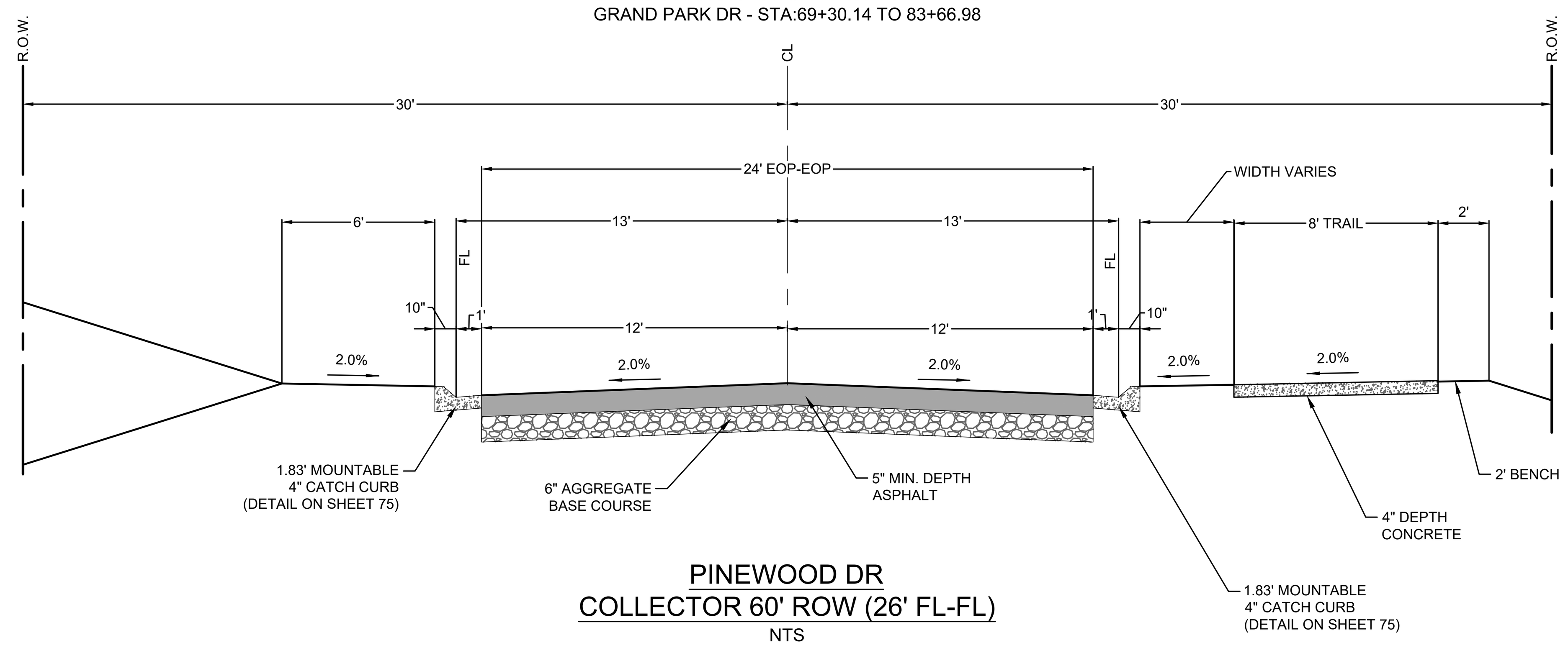
Know what's **below.** Call before you dig. 811

12/15/2025 8:17 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS   PRELIMINARY GENERAL NOTES - WM - F1.DWG   1



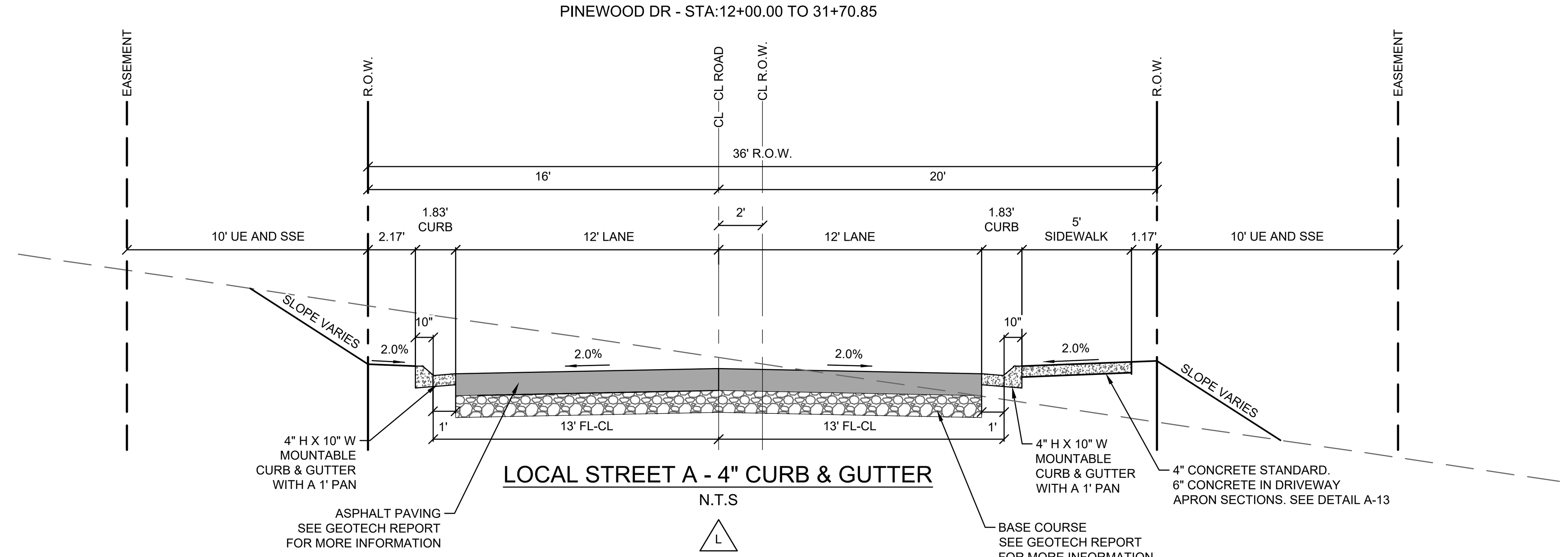
GRAND PARK DR
COLLECTOR 60' ROW (26' FL-FL)
NTS
C

GRAND PARK DR - STA:50+07.80 TO 64+77.13
GRAND PARK DR - STA:69+30.14 TO 83+66.98



PINEWOOD DR
COLLECTOR 60' ROW (26' FL-FL)
NTS
C

PINEWOOD DR - STA:12+00.00 TO 31+70.85



LOCAL STREET A - 4" CURB & GUTTER
N.T.S
L

COMPASS DR - STA:10+40.00 TO 26+82.41
POPLAR CT - STA:10+88.51 TO 15+85.97
ROAD B - STA:12+93.54 TO 39+52.31
ROAD C - STA:10+50.00 TO 22+53.15
WANDER RD - STA:10+25.00 TO 16+94.43
BUGLE CT - STA:10+50.00 TO 19+28.29

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Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

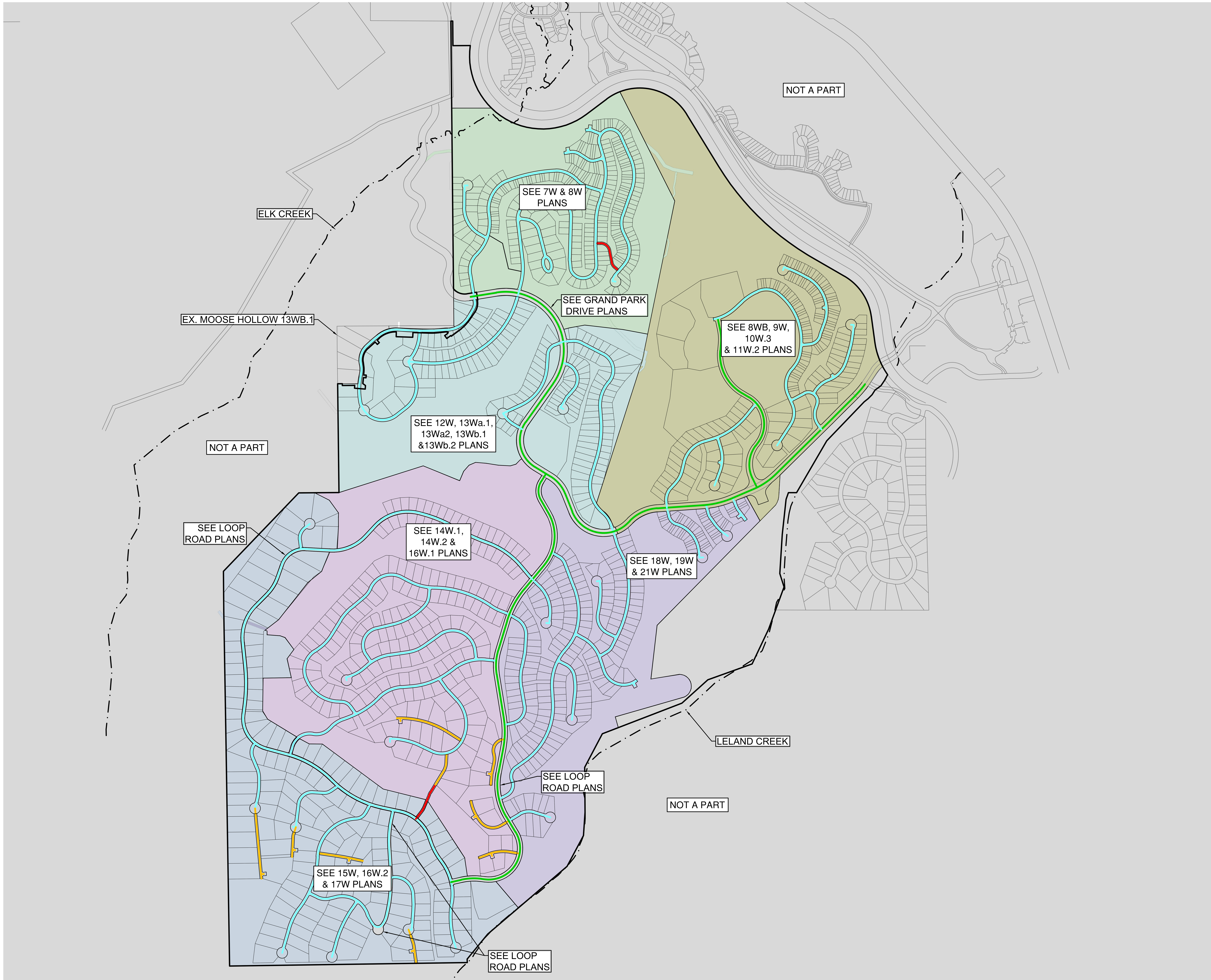
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
TYPICAL SECTIONS

Know what's below. Call before you dig.
811

SHEET
3 OF 44



LEGEND

- LOCAL STREET A - CURB & GUTTER
- COLLECTOR
- SHARED DRIVE
- EMERGENCY ACCESS

NOTES:

1. SEE SHEET 3 FOR TYPICAL SECTIONS.

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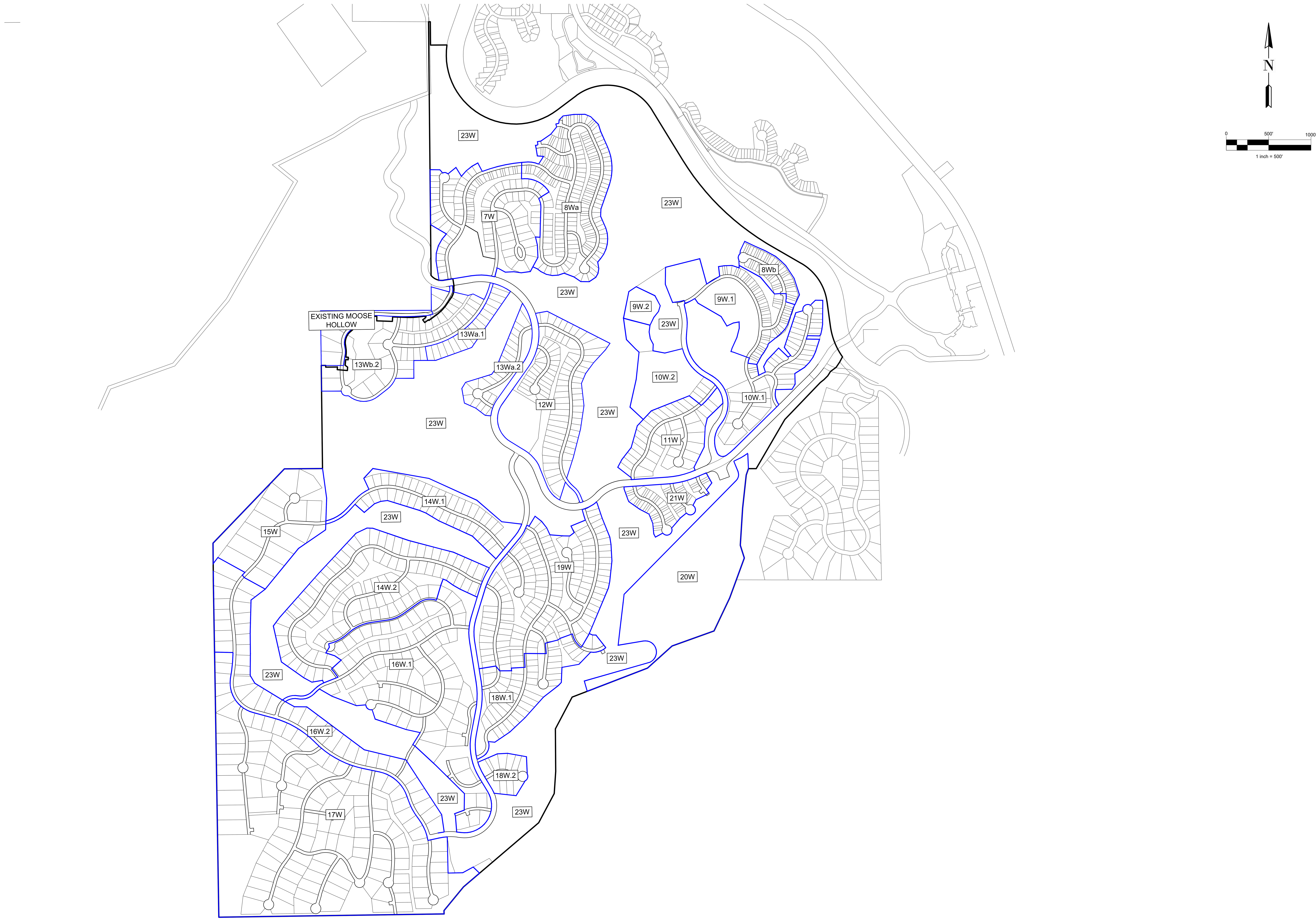
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
SUBMITTAL AREA & ROAD TYPE PLAN

Know what's below. Call before you dig.
811



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GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
PLANNING AREA MAP

SEE SHEET 7

KEY MAP

SCALE: 1" = 3000'

N

0 120' 240'

1 inch = 120'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 1 LOT NUMBER
- EXISTING FENCE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK / WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- WETLAND
- NOT A PART
- TOWNHOMES
- CONDOS
- C — COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
- L — LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
- SD — SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3
- EA — EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3

NOTES:

1. SEE SHEET 3 FOR TYP. SECTION & 4 FOR ROAD CLASSIFICATION.
2. BUILDING / LODGING LOCATIONS ARE CONCEPTUAL AND WILL BE FINALIZED WITH FINAL CDS.
3. DESIGN SPEED FOR LOCAL ROADS IS 20 MPH.
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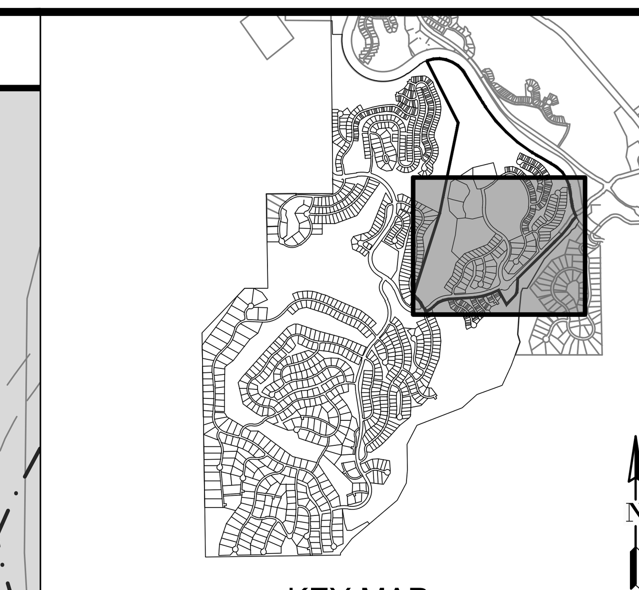
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
OVERALL SITE PLAN (1 OF 2)

Know what's below. Call before you dig. 811



KEY MAP
SCALE: 1" = 3000'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 1 LOT NUMBER
- X EXISTING FENCE
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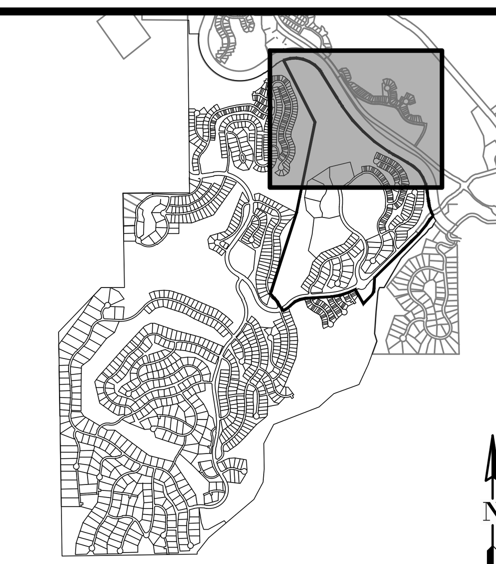
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
OVERALL SITE PLAN (2 OF 2)

Know what's below. Call before you dig. 811

SEE SHEET 9



KEY MAP

SCALE: 1" = 3000'

N

0 120' 240'

1 inch = 120'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK, WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- NOT A PART
- C: COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
- EA: EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3
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NOTES:

1. BUILDING / LODGING LOCATIONS ARE CONCEPTUAL AND WILL BE FINALIZED WITH FINAL CDS
2. SEE SHEET 4 FOR CREEK LOCATIONS & NAMES. PONDS DRAINING WEST OF PROPERTY DRAIN TO ELK CREEK & EAST OF PROPERTY TO LELAND CREEK.
3. CONTOUR INTERVALS ARE 2' & 10'.

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GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS

OVERALL GRADING PLAN (1 OF 2)

Know what's below. Call before you dig. 811

SEE SHEET 8

KEY MAP

SCALE: 1" = 3000'

0 120' 240'

1 inch = 120'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
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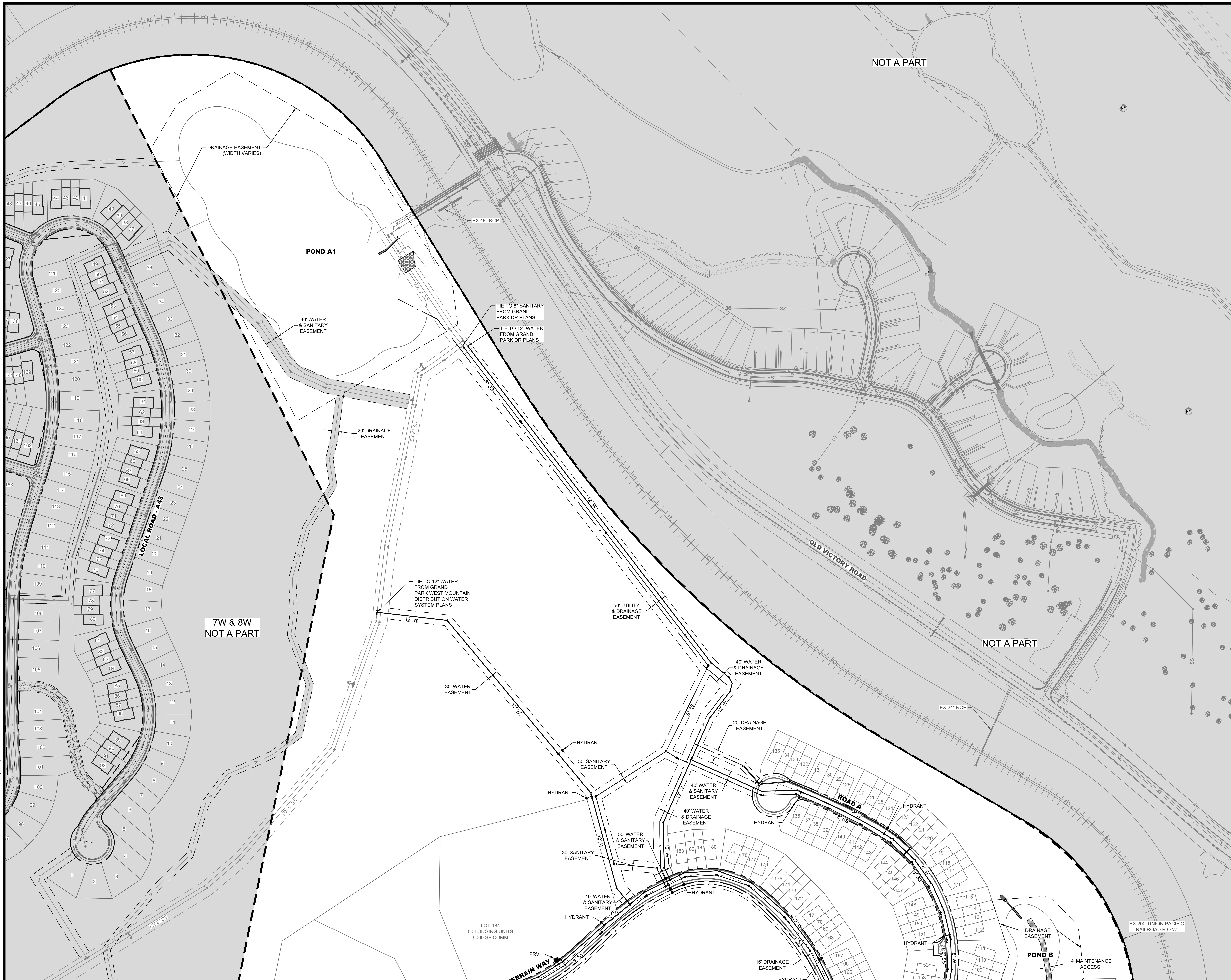
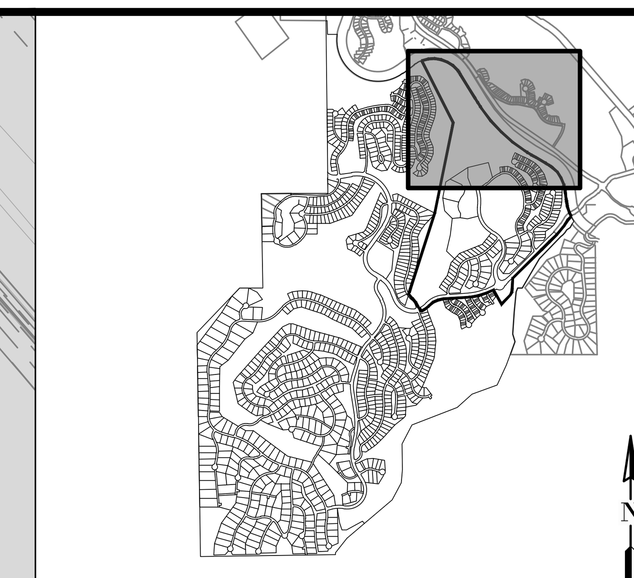
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
OVERALL GRADING PLAN (2 OF 2)



SEE SHEET 11



KEY MAP

SCALE: 1" = 3000'

N

0 120' 240'

1 inch = 120'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- STORM (FES, MH, & INLET)
- SANITARY
- WATER (HYDRANT, VALVE, BEND, MH)
- PRESSURE REDUCING VALVE (PRV)
- EXISTING FENCE
- EXISTING FIBER OPTIC
- EXISTING GAS
- EXISTING WATER
- EXISTING SWALE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
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- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- RIPRAP
- NOT A PART

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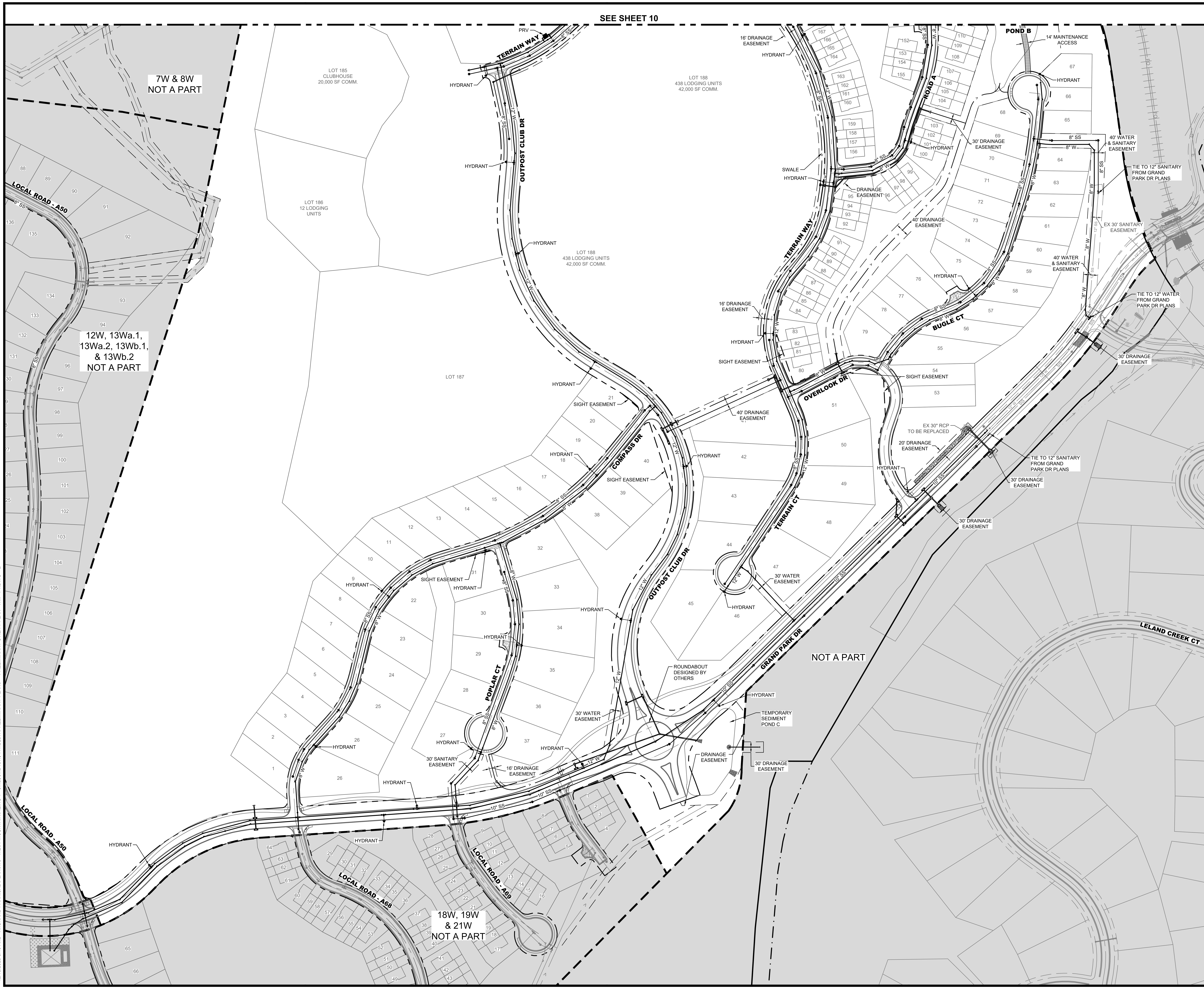
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
OVERALL UTILITY PLAN (1 OF 2)

Know what's below. Call before you dig. 811

SHEET 10 OF 44

12/18/2025 8:19 AM X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS PRELIMINARY UTILITY PLAN - WM - F1.DWG 1



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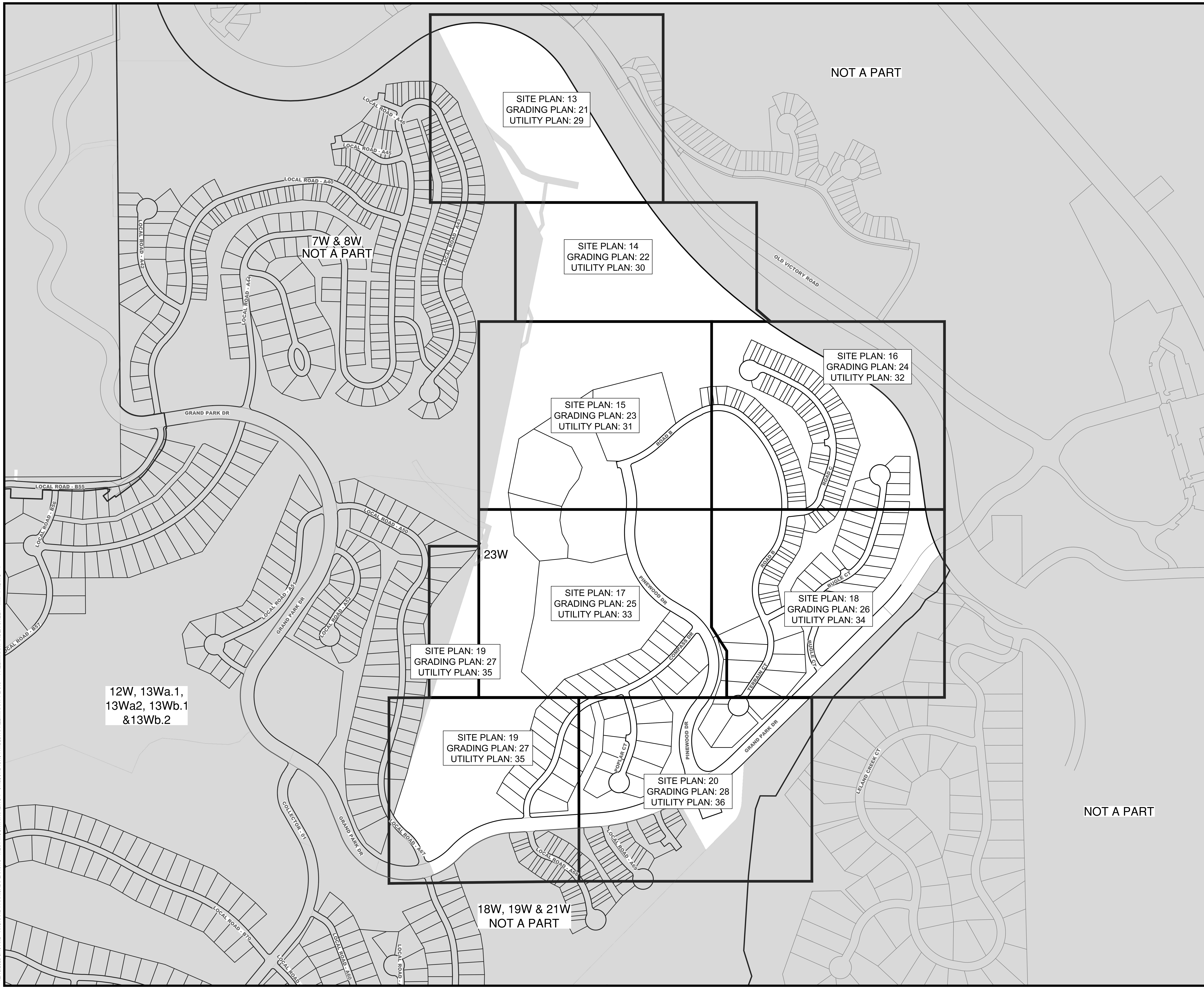
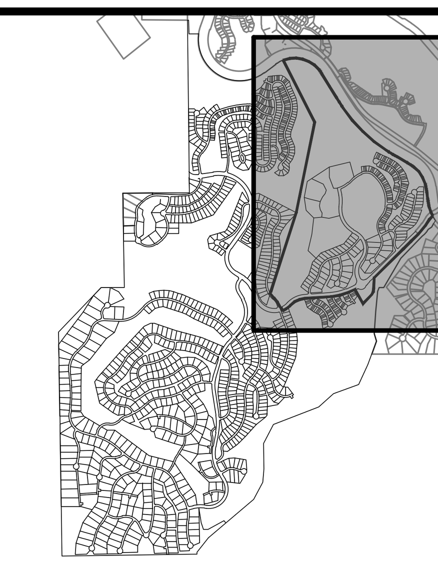
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS

OVERALL UTILITY PLAN (2 OF 2)

Know what's below. Call before you dig. 811





KEY MAP

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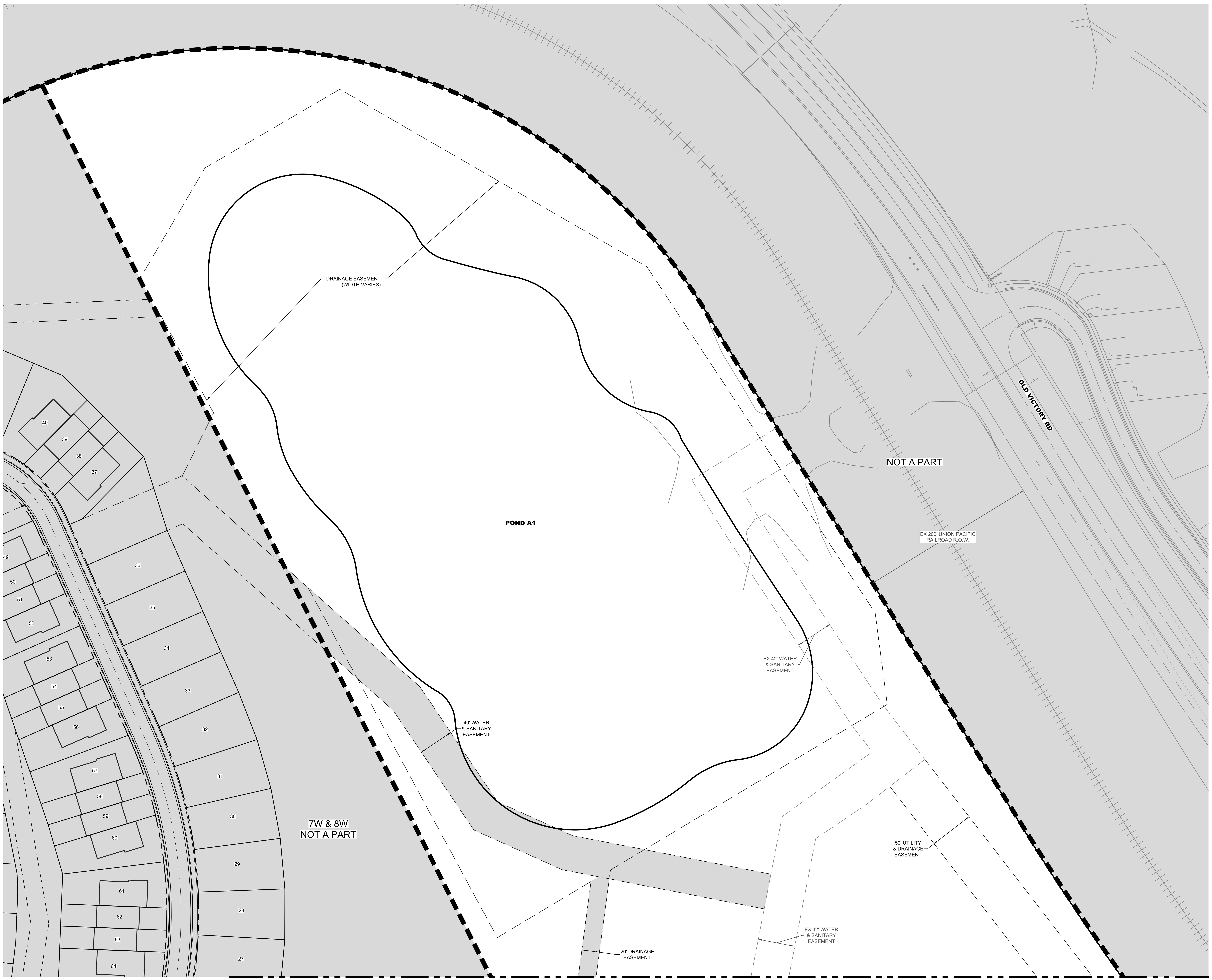
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
INDEX SHEET

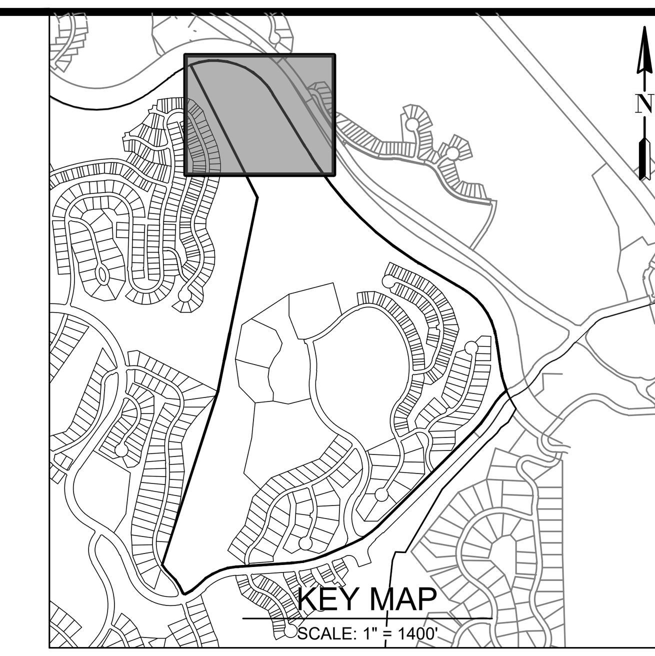
Know what's below. Call before you dig. 811

SHEET
12 OF 44

12/15/2025 8:19 AM X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS PRELIMINARY INDEX SHEET - WM - F1.DWG 1



SEE SHEET 14



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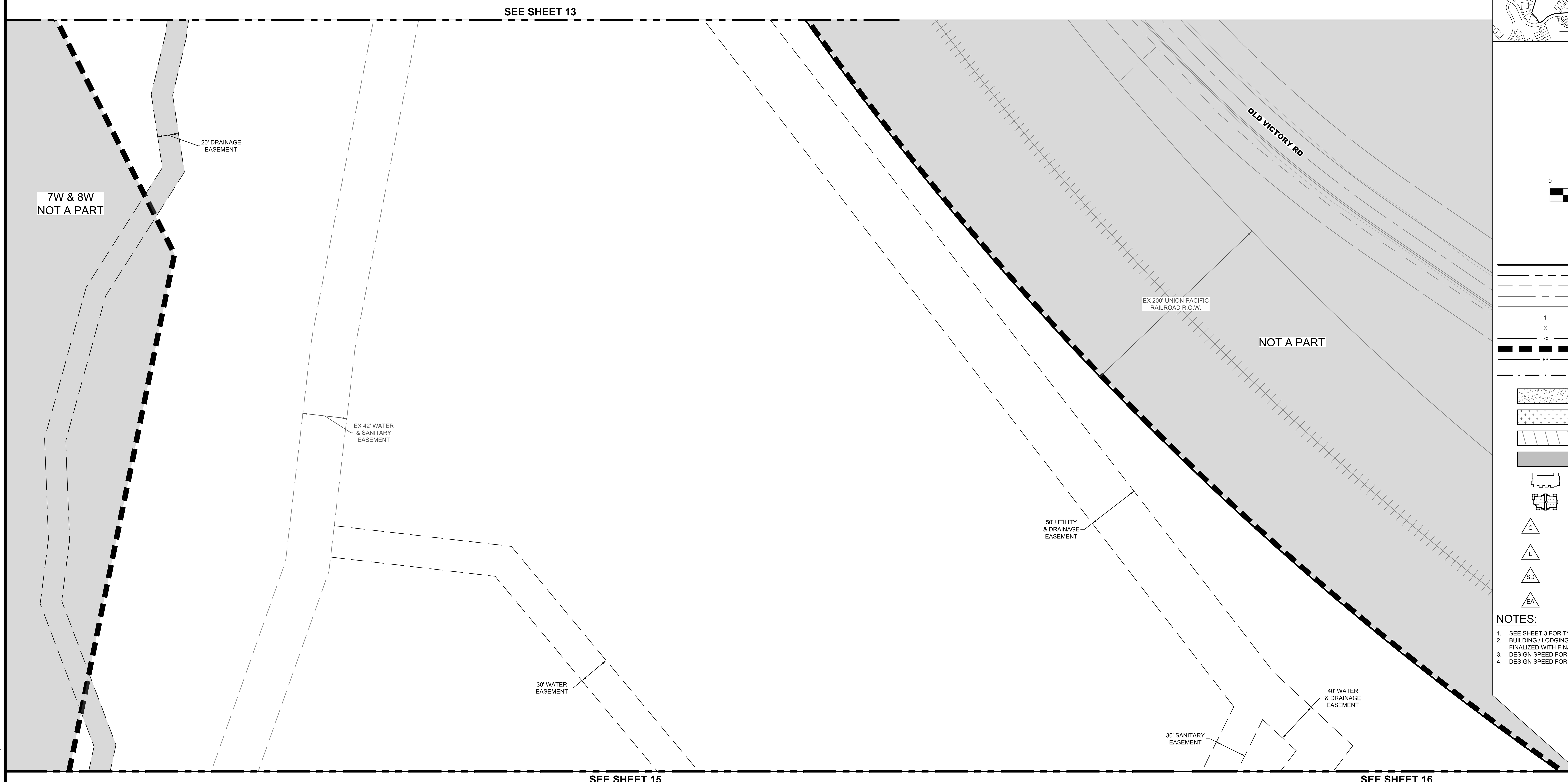
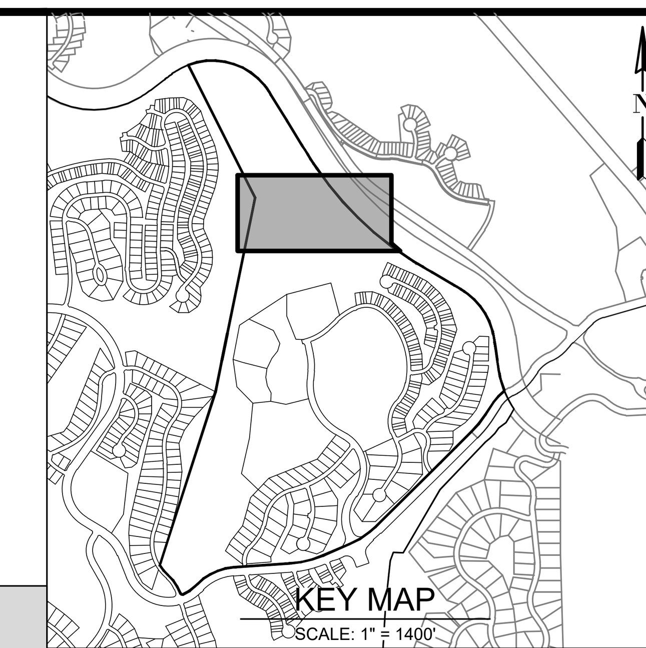
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (1 OF 8)

Know what's below. Call before you dig. 811





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PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (2 OF 8)

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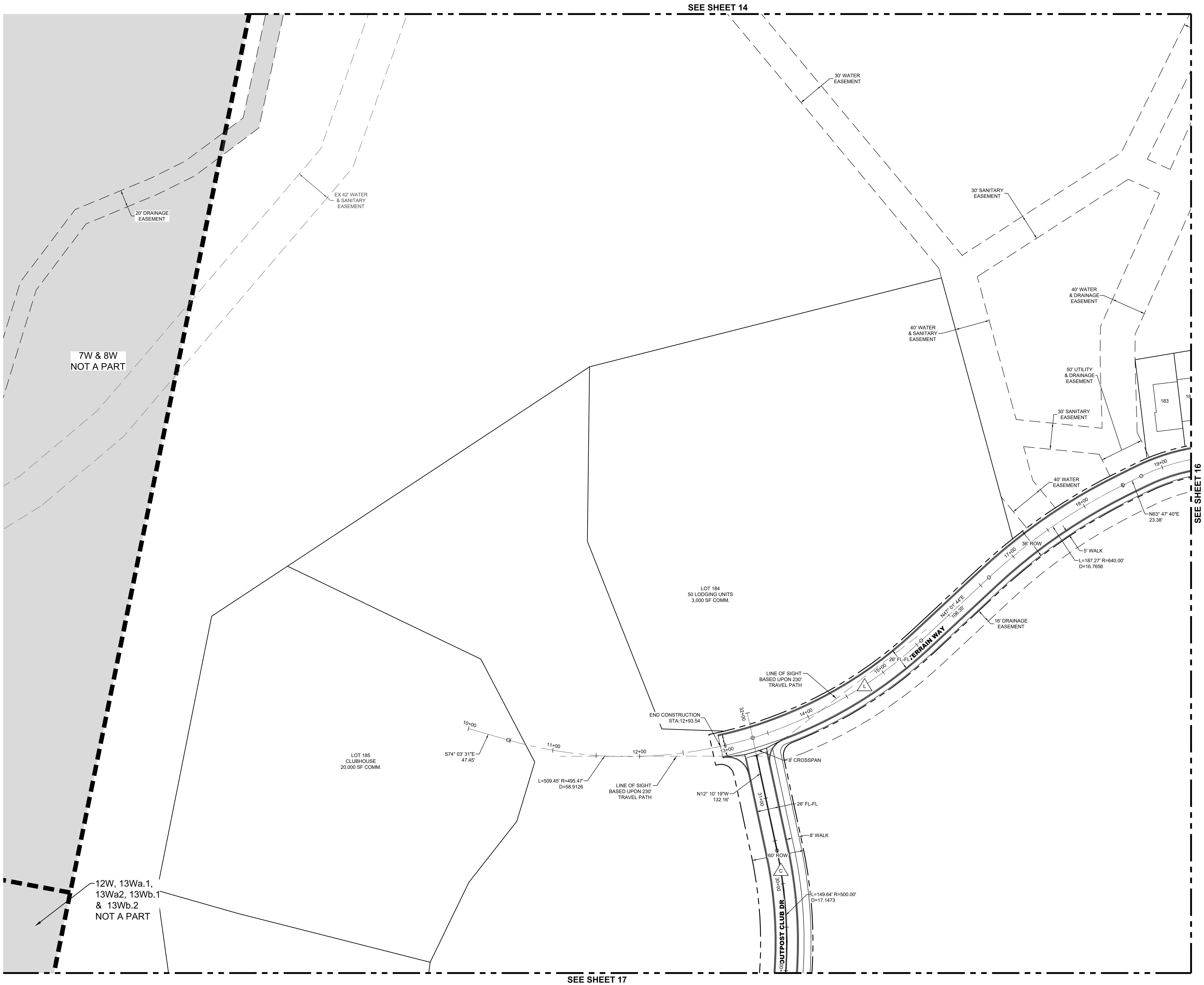
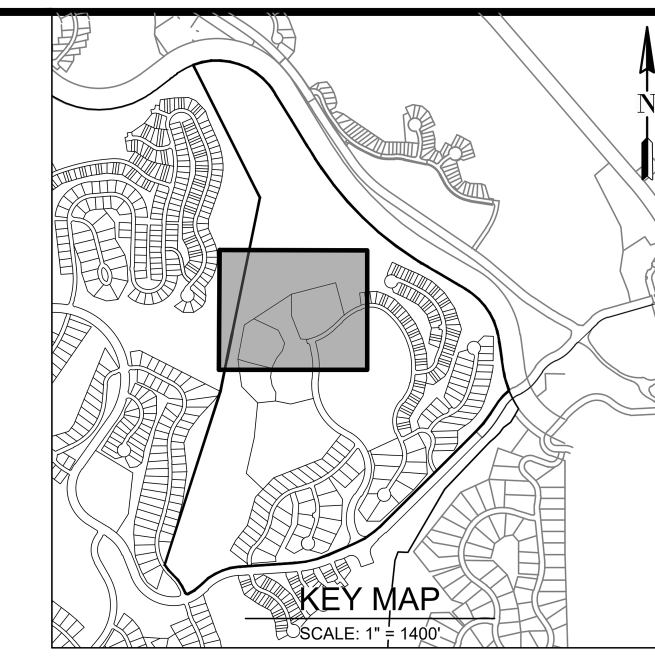
12/18/2025 8:19 AM. X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED SITE PLAN - WM - F1.DWG 2





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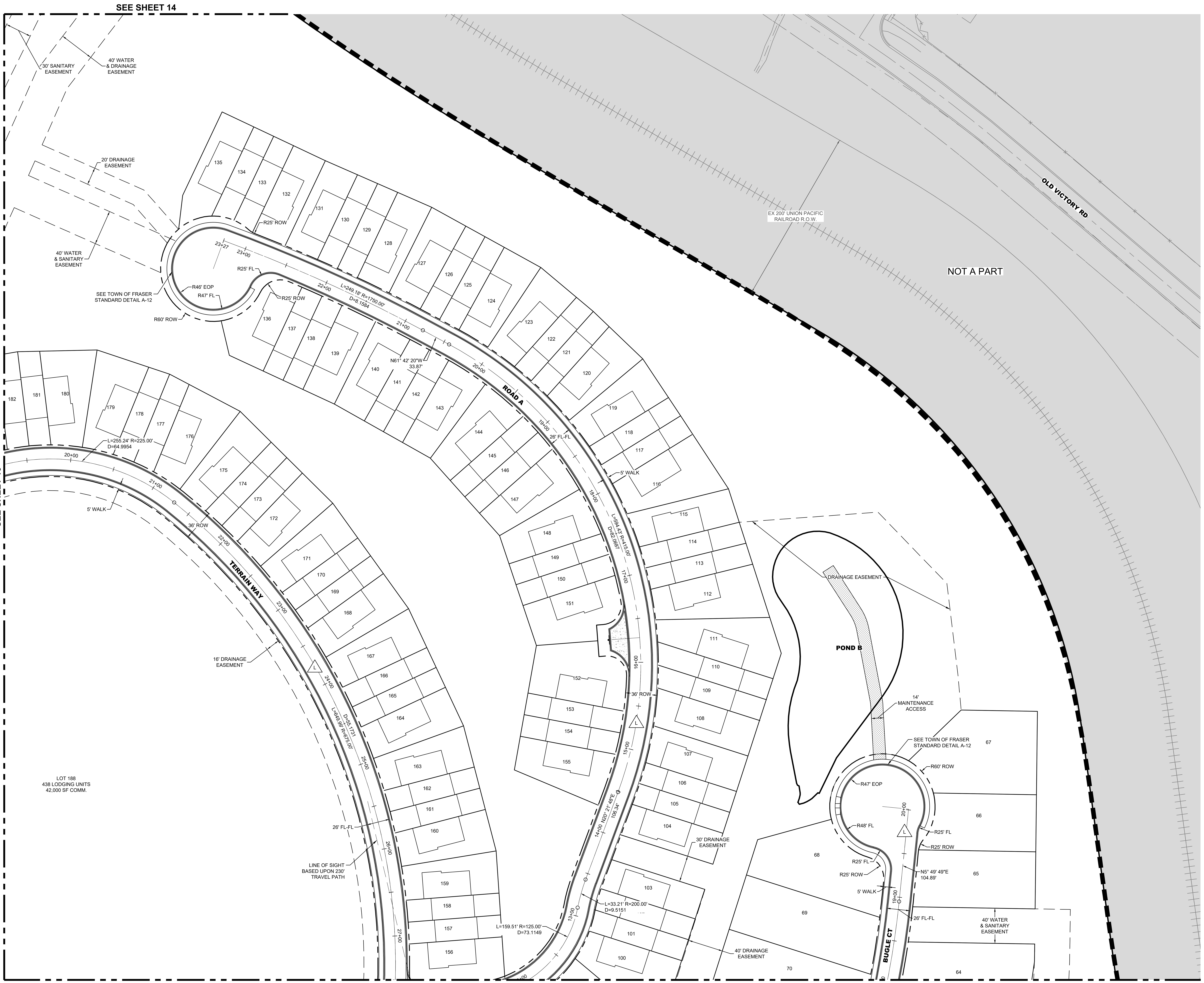
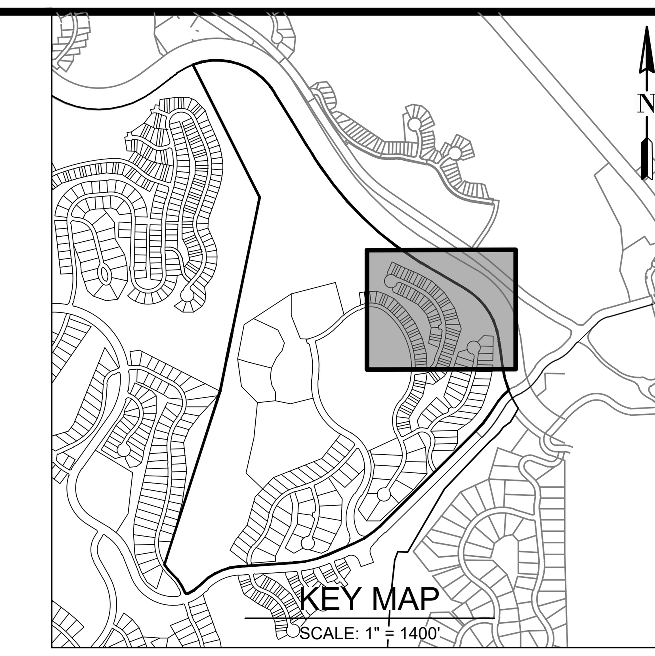
PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (3 OF 8)

12/18/2025 8:20 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED SITE PLAN - WM - F1.DWG 3





N

0 50' 100'

1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 1 LOT NUMBER
- EXISTING FENCE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK, WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- WETLAND
- NOT A PART
- TOWNHOMES
- CONDOS
- C — COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
- L — LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
- SD — SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3
- EA — EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3

NOTES:

1. SEE SHEET 3 FOR TYP. SECTION & 4 FOR ROAD CLASSIFICATION.
2. BUILDING / LODGING LOCATIONS ARE CONCEPTUAL AND WILL BE FINALIZED WITH FINAL CDS.
3. DESIGN SPEED FOR LOCAL ROADS IS 20 MPH.
4. DESIGN SPEED FOR COLLECTOR ROADS IS 30 MPH.

terracina design
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Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

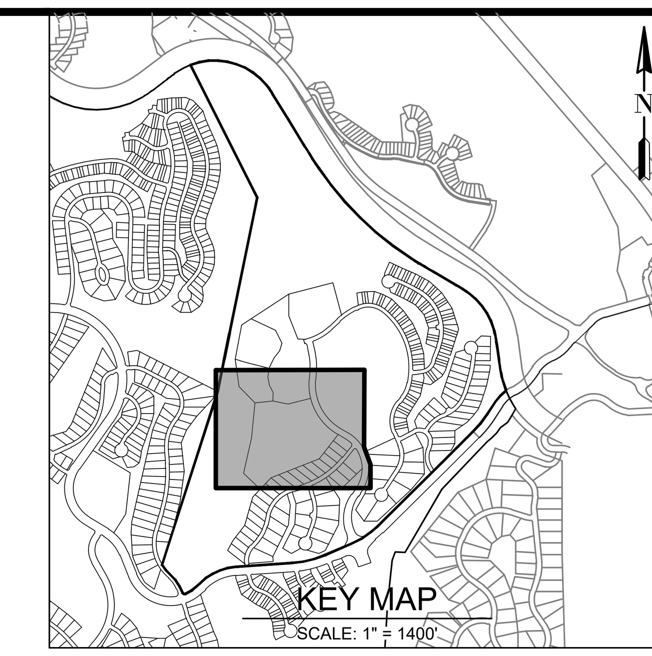
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (4 OF 8)

Know what's below. Call before you dig. 811



N

0 50' 100'

1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- LOT NUMBER
- EXISTING FENCE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- WETLAND
- NOT A PART
- TOWNHOMES
- CONDOS
- C: COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
- L: LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
- SD: SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3
- EA: EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3

NOTES:

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2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

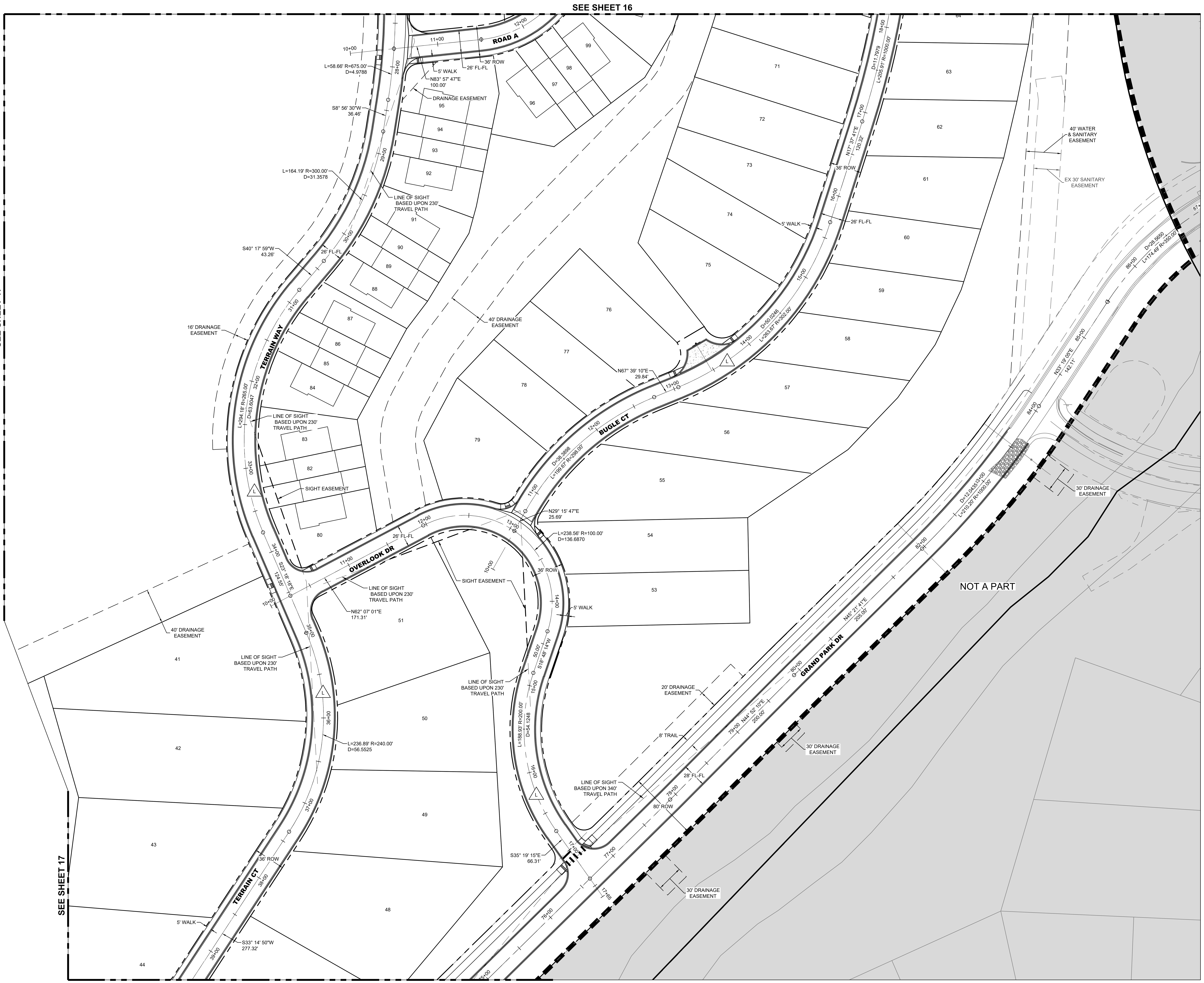
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.2, 11W & PORTIONS OF 23W

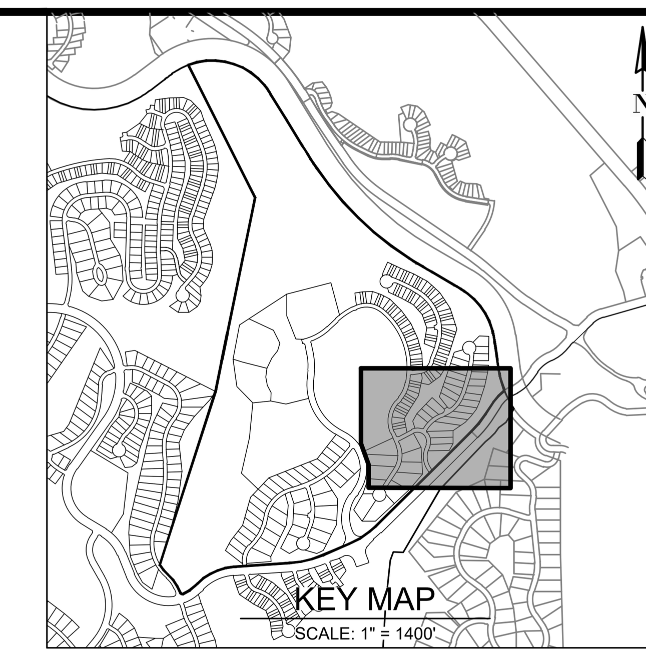
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (5 OF 8)

Know what's below. Call before you dig. 811

12/18/2025 8:20 AM X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED SITE PLAN - WM - F1.DWG 5





N

0 50' 100'

1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 1 LOT NUMBER
- EXISTING FENCE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- WETLAND
- NOT A PART
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- L LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
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NOTES:

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2	2ND SUBMITTAL	12/18/2025	MJG

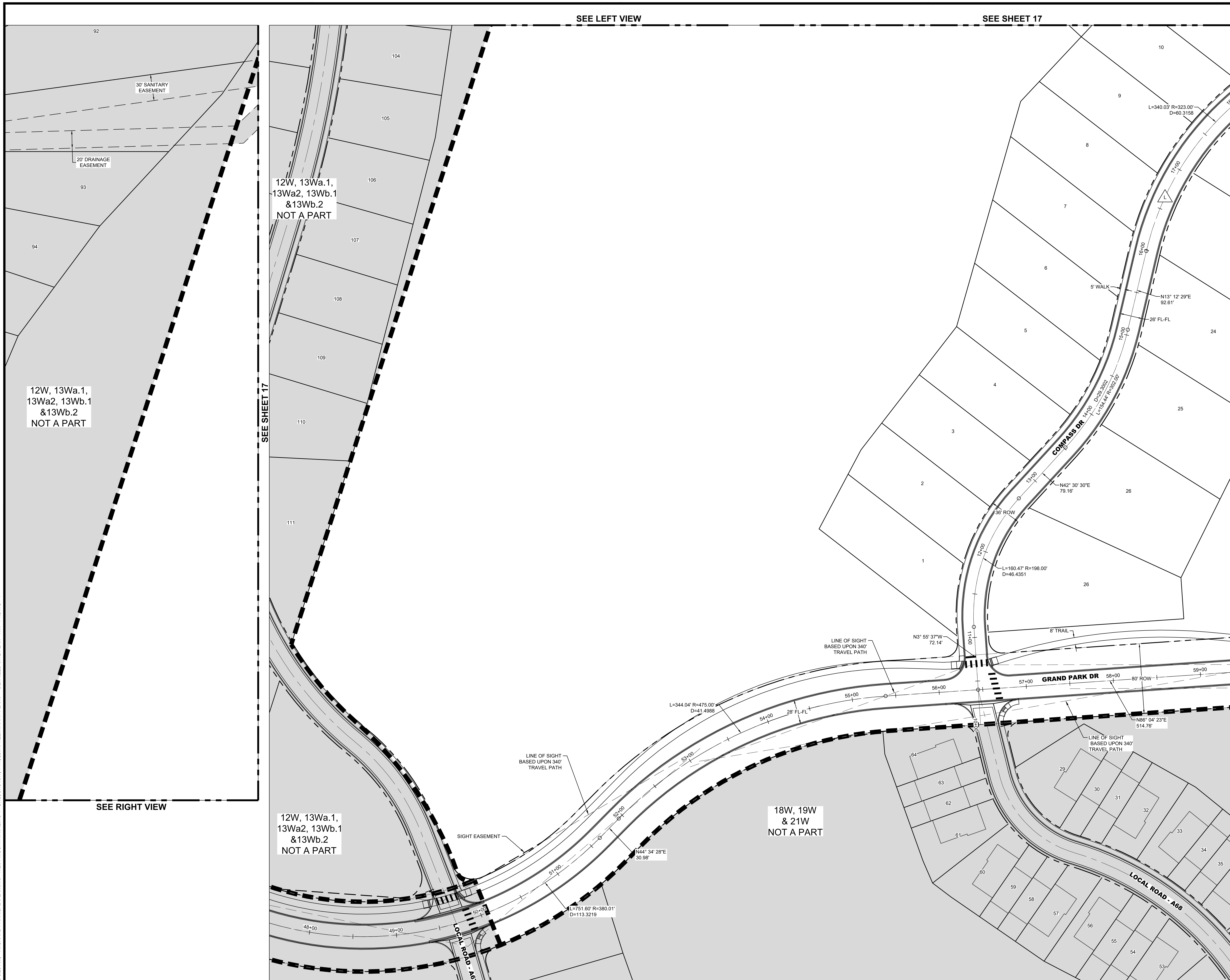
NOT FOR CONSTRUCTION

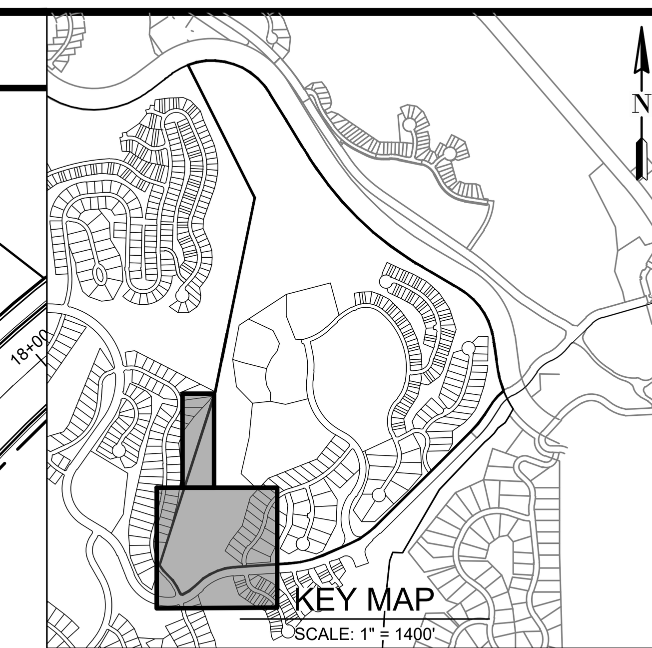
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (6 OF 8)

12/18/2025 8:20 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED SITE PLAN - WM - F1.DWG 6





N

0 50' 100'

1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- LOT NUMBER
- EXISTING FENCE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- WETLAND
- NOT A PART
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- CONDOS
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2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (7 OF 8)

Know what's below. Call before you dig. 811

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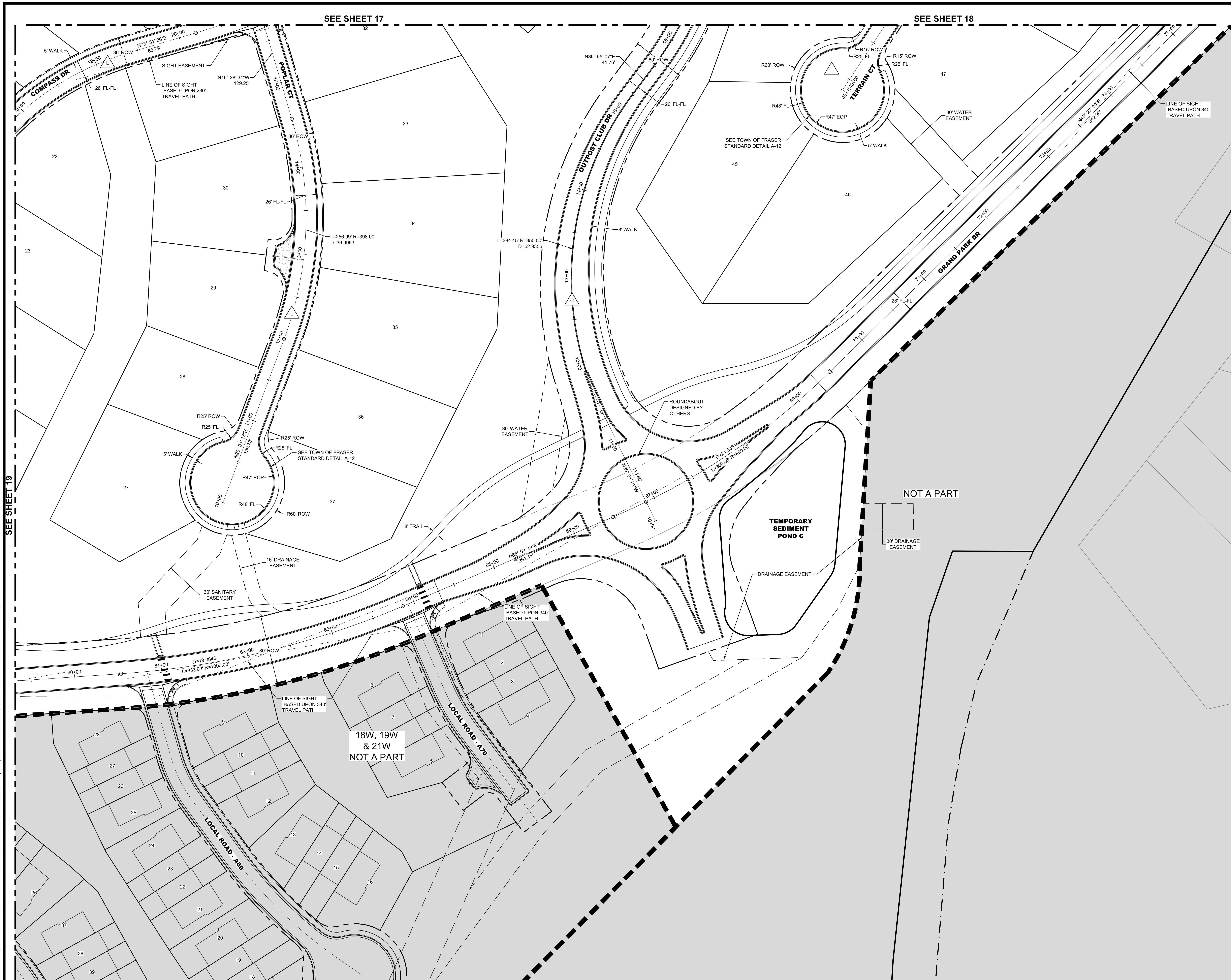

KEY MAP
SCALE: 1" = 1400'

N

0 50' 100'
1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- LOT NUMBER
- EXISTING FENCE
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- WETLAND
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2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

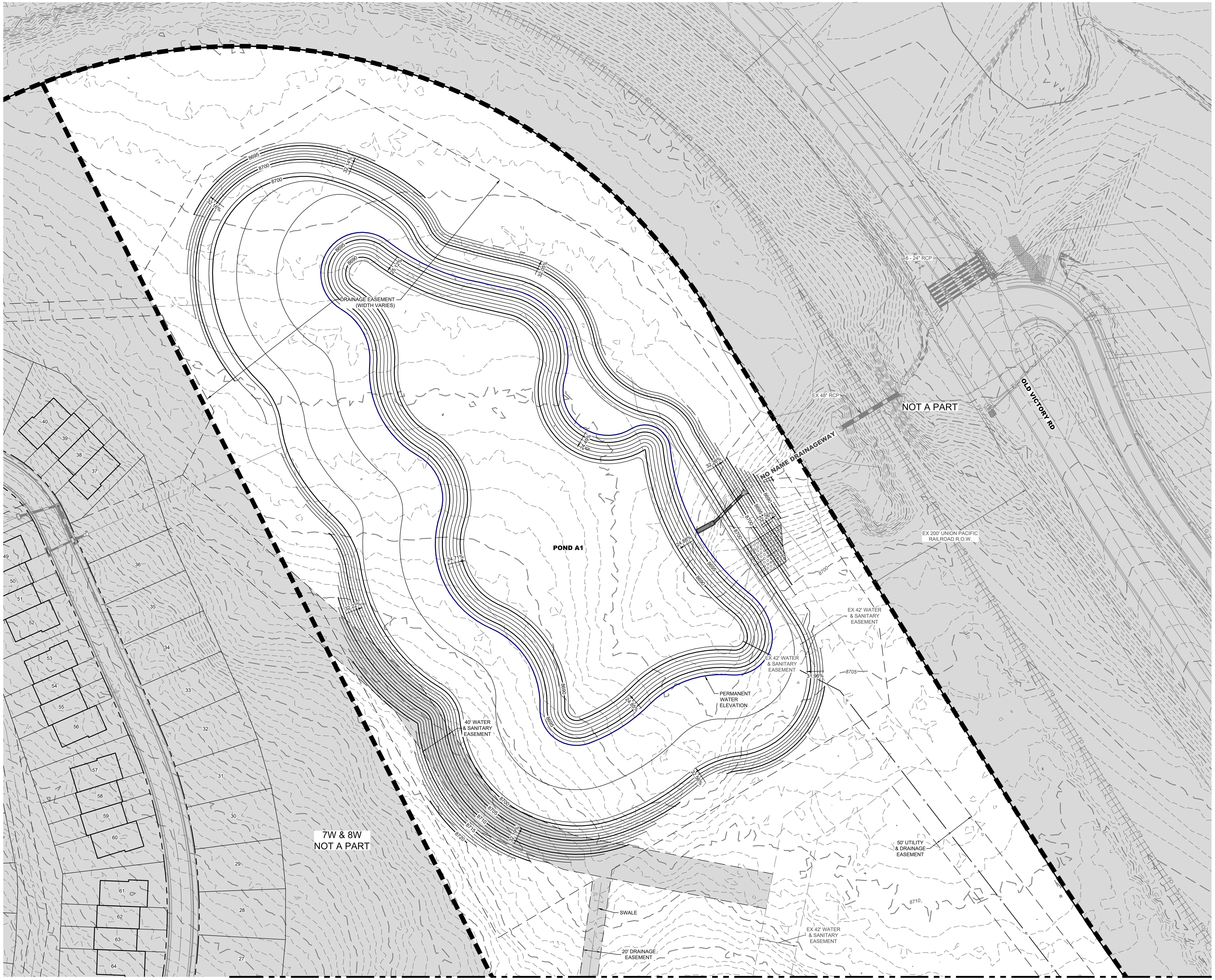
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

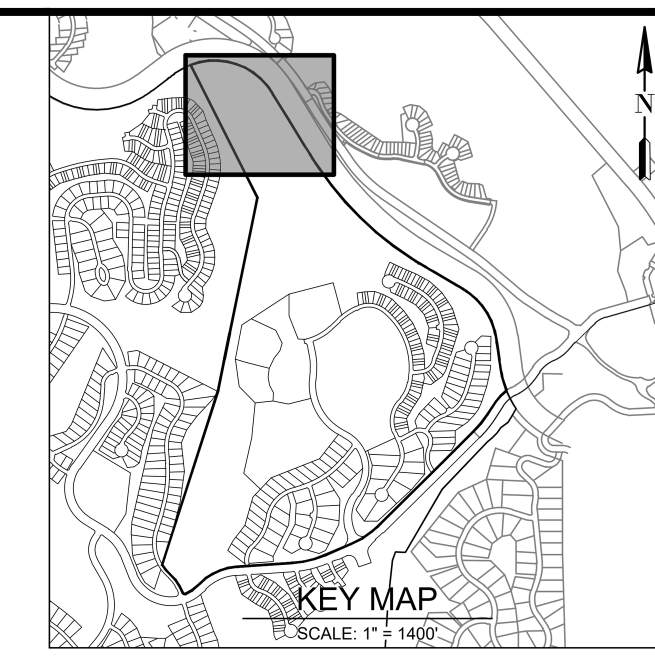
PRELIMINARY CONSTRUCTION PLANS
SITE PLAN (8 OF 8)

Know what's below. Call before you dig. 811

12/18/2025 8:20 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED SITE PLAN - WM - F1.DWG 8



SEE SHEET 22



N

0 50' 100'
1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- < DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK / WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- NOT A PART
- C: COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
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NOTES:

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2. SEE SHEET 4 FOR CREEK LOCATIONS & NAMES. PONDS DRAINING WEST OF PROPERTY DRAIN TO ELK CREEK & EAST OF PROPERTY TO LELAND CREEK.
3. CONTOUR INTERVALS ARE 1' & 5'.

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#	REVISION DESCRIPTION	DATE	BY
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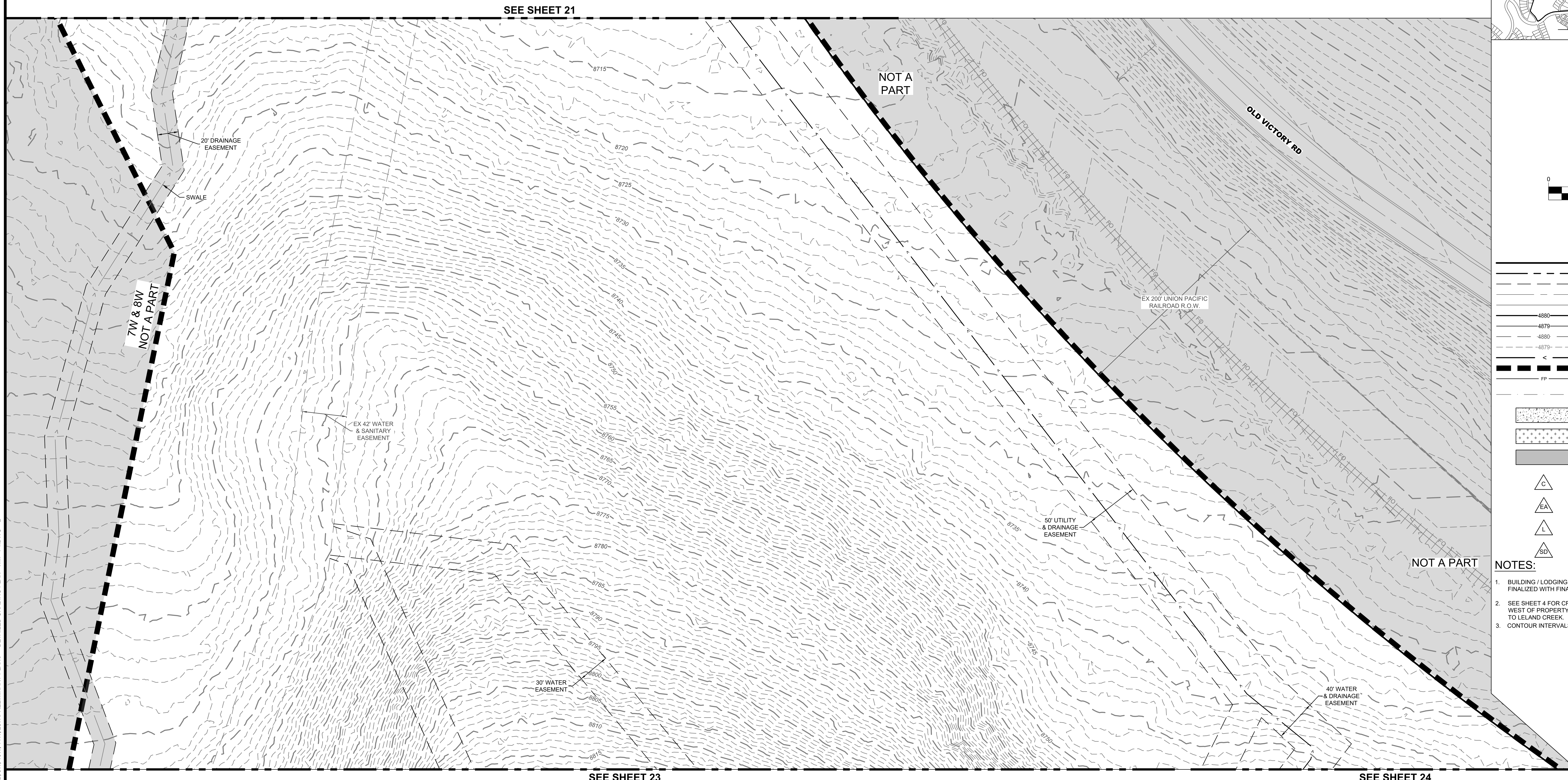
2	2ND SUBMITTAL	12/18/2025	MJG

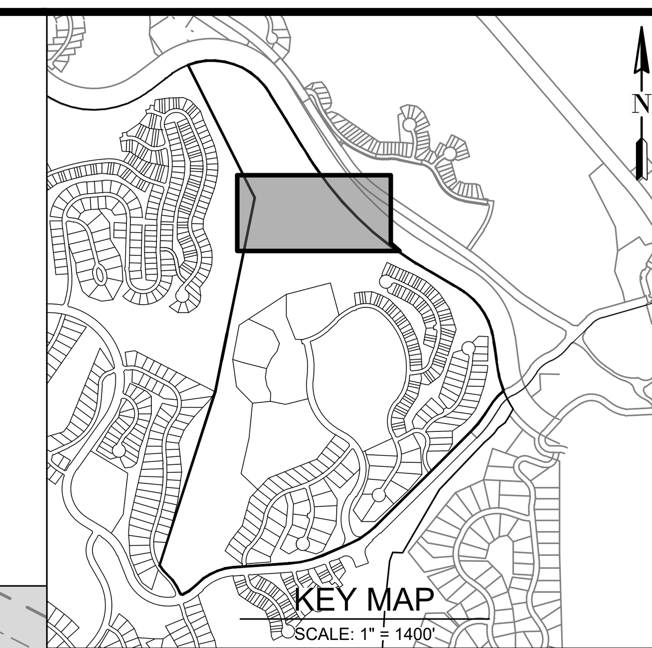
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (1 OF 8)

12/15/2025 8:20 AM X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED GRADING PLAN - WM - F1.DWG 1





N

0 50' 100'

1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- < DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
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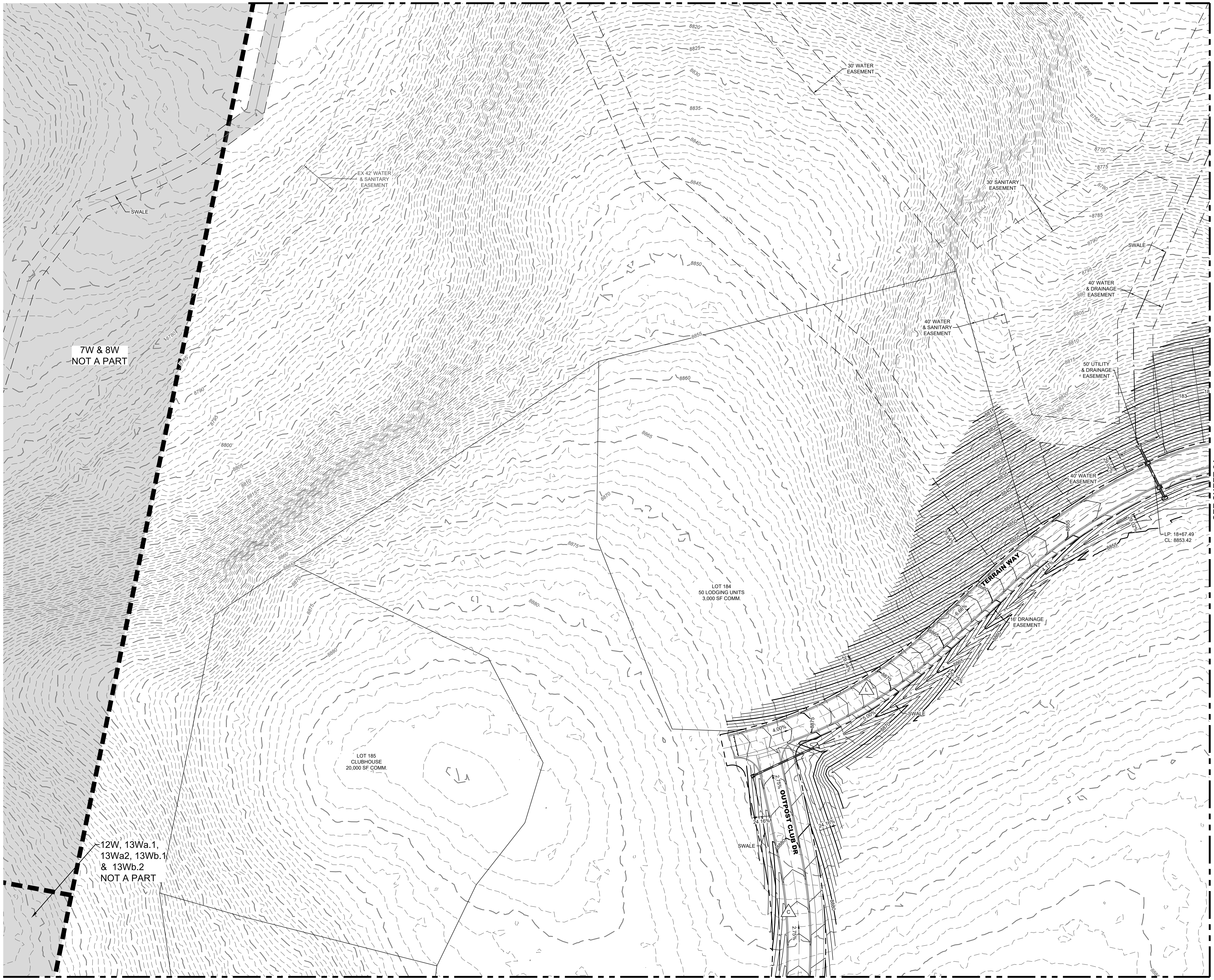
2	2ND SUBMITTAL	12/18/2025	MJG

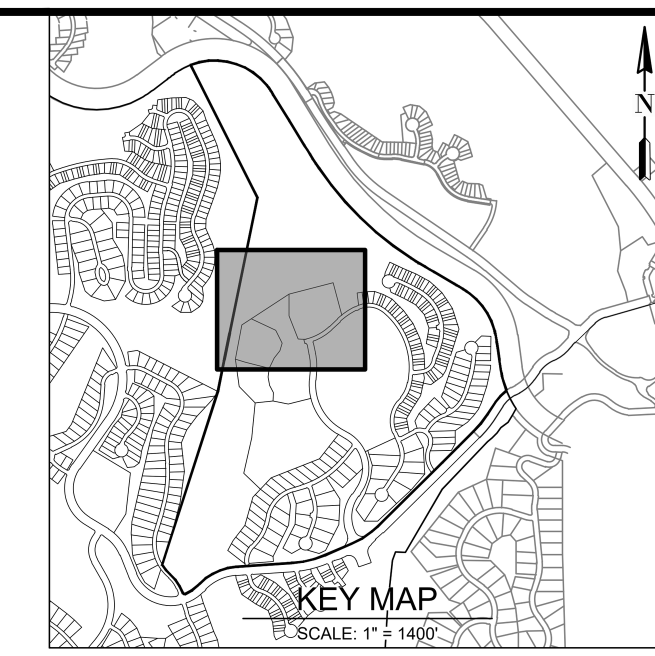
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (2 OF 8)





0 50' 100'
1 inch = 50'

LEGEND

	PROJECT BOUNDARY
	RIGHT OF WAY (ROW)
	EASEMENT
	CENTERLINE
	LOT / TRACT / PARCEL BOUNDARY
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
<	DRAINAGE SWALE
	SUBMITTAL AREA BOUNDARY
FP	FLOODPLAIN BOUNDARY
	EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
	CONCRETE
	MAINTENANCE ACCESS
	NOT A PART
C	COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
EA	EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3
L	LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
SD	SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3

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2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

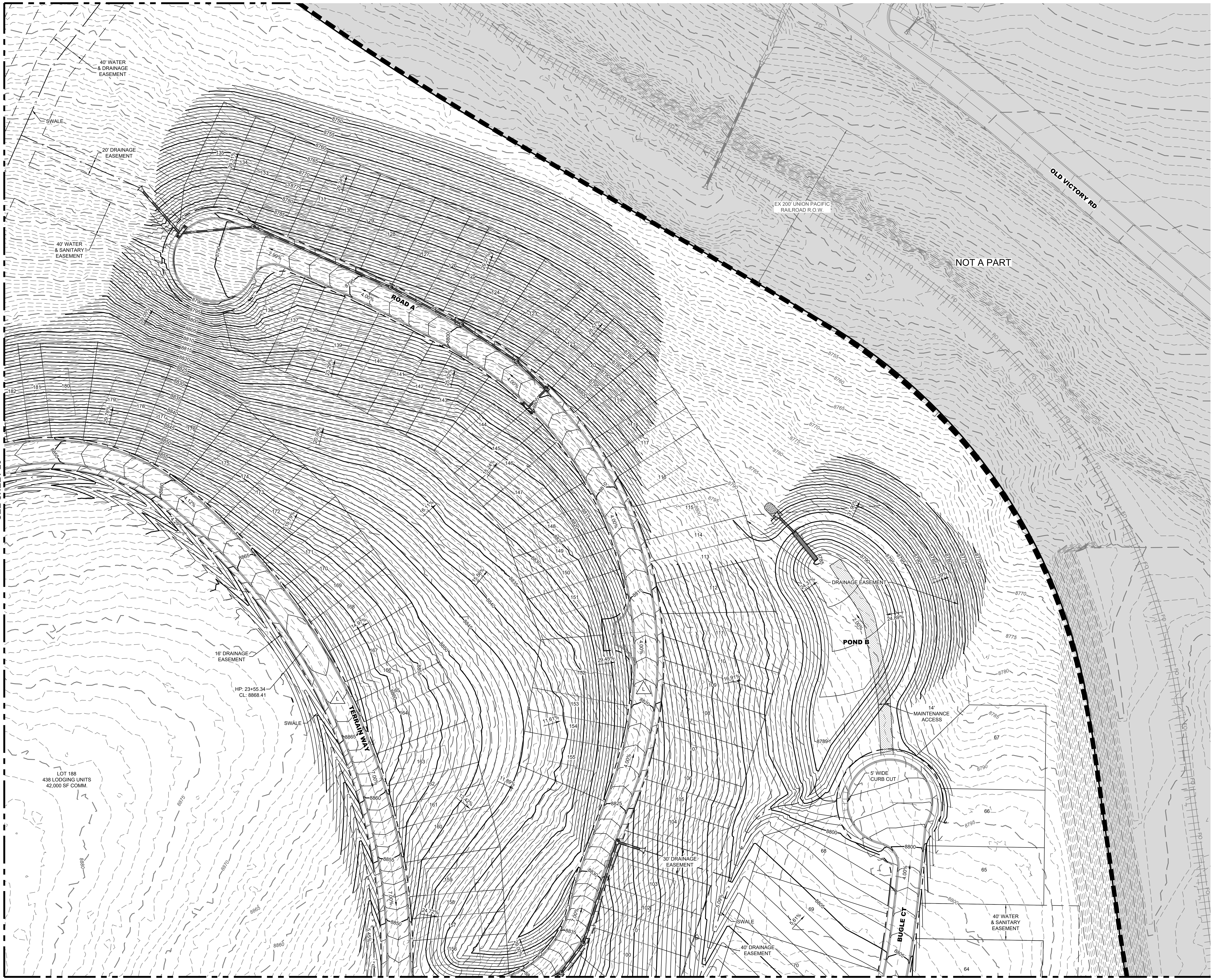
PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (3 OF 8)

Know what's **below.** **Call** before you dig.
811

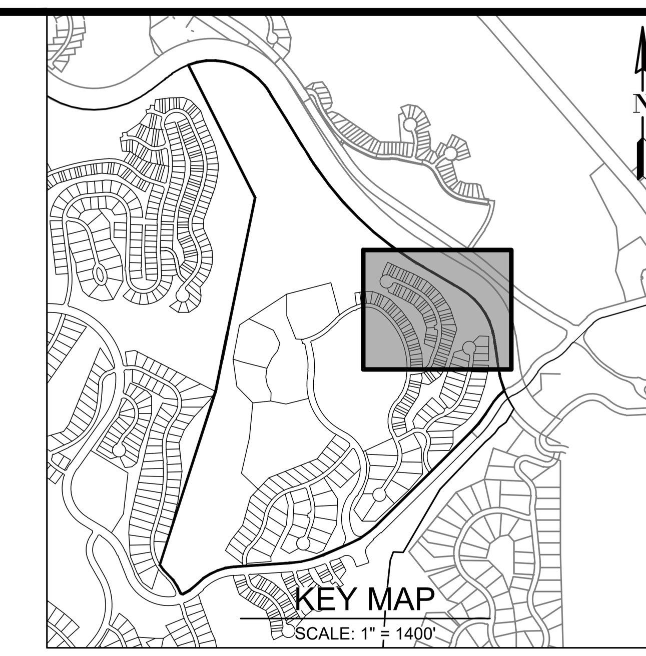
12/15/2025 8:20 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED GRADING PLAN - WM - F1.DWG 3

SEE SHEET 22

SEE SHEET 23



SEE SHEET 26



N

0 50' 100'
1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK
- WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- NOT A PART
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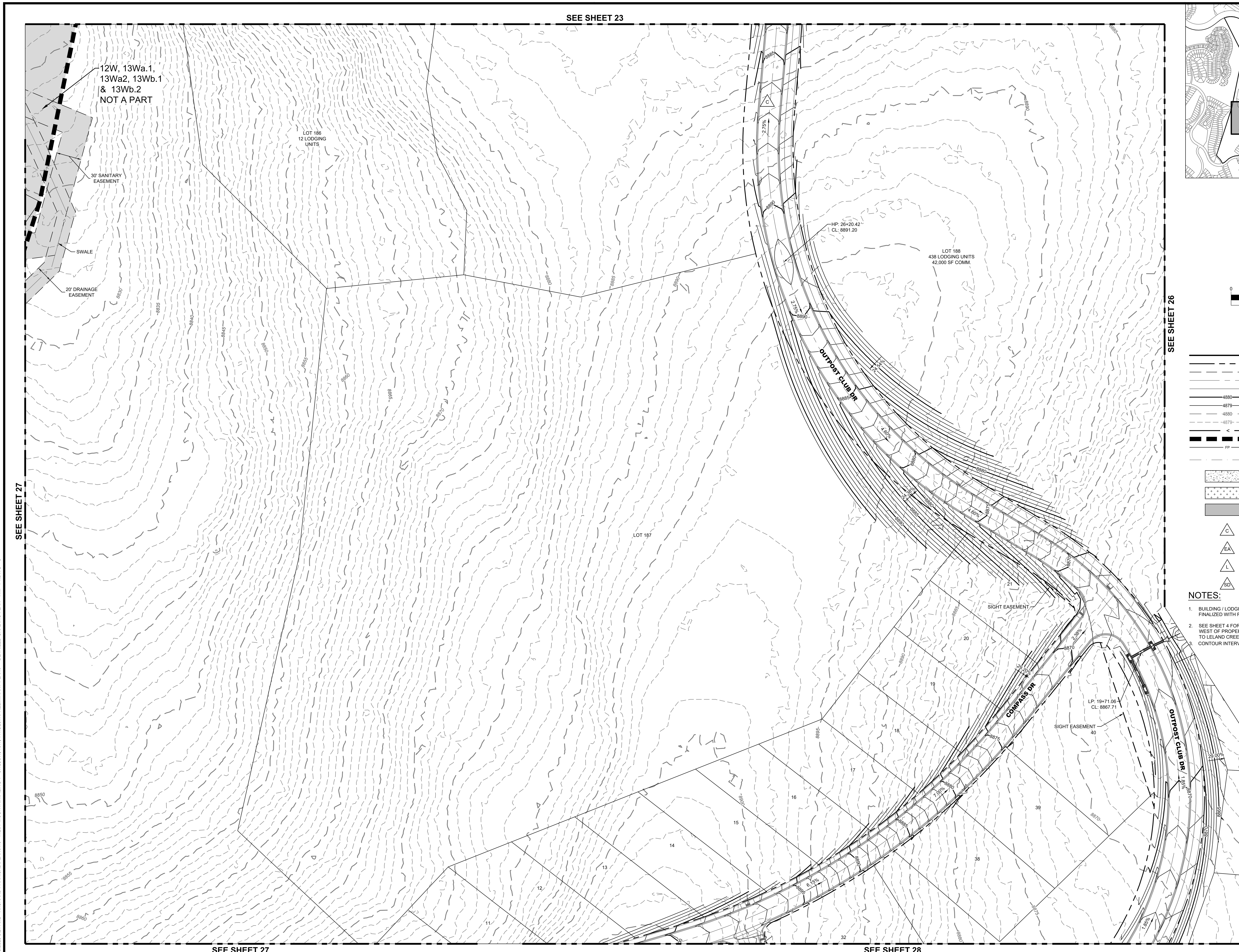
NOT FOR CONSTRUCTION

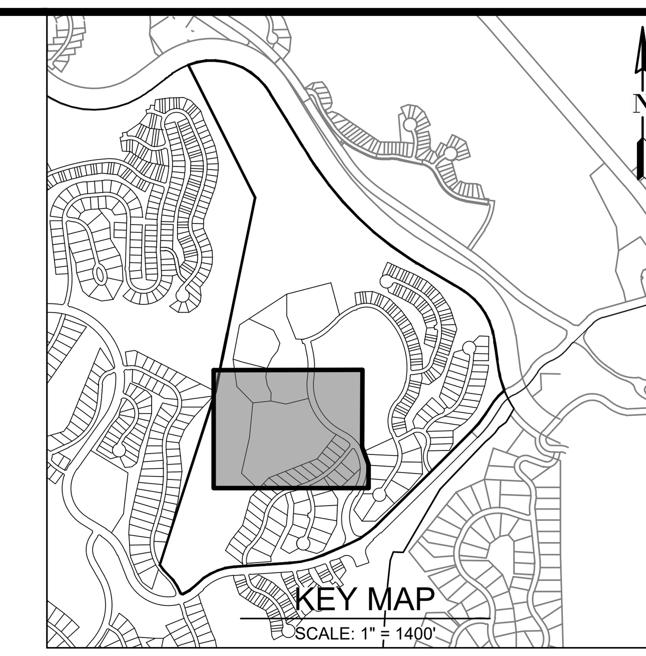
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (4 OF 8)

Know what's below. Call before you dig. 811





N

0 50' 100'
1 inch = 50'

LEGEND

(line)	PROJECT BOUNDARY
(line)	RIGHT OF WAY (ROW)
(line)	EASEMENT
(line)	CENTERLINE
(line)	LOT / TRACT / PARCEL BOUNDARY
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
<	DRAINAGE SWALE
(line)	SUBMITTAL AREA BOUNDARY
FP	FLOODPLAIN BOUNDARY
(line)	EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
(hatch)	CONCRETE
(hatch)	MAINTENANCE ACCESS
(hatch)	NOT A PART
C	COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
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3. CONTOUR INTERVALS ARE 1' & 5'.

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10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

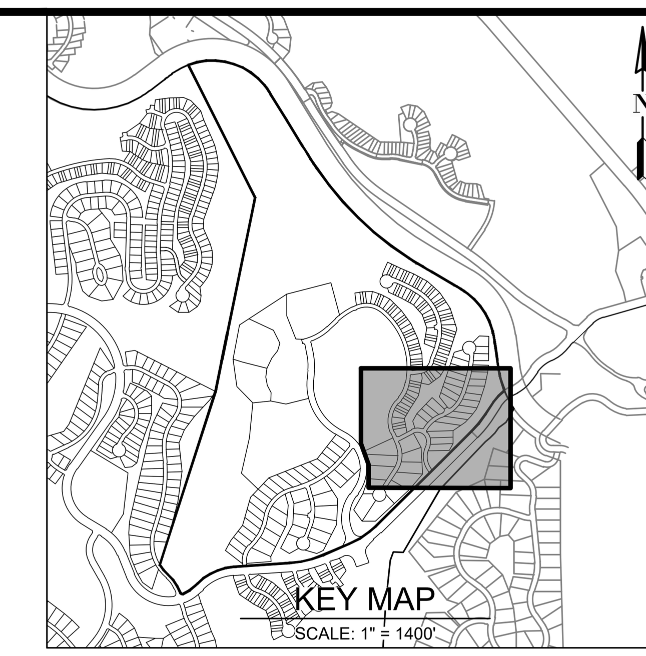
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (5 OF 8)

Know what's below. Call before you dig. 811

12/15/2025 8:21 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED GRADING PLAN - WM - F1.DWG 5



N

0 50' 100'

1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
- EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
- CONCRETE
- MAINTENANCE ACCESS
- NOT A PART
- C COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
- EA EMERGENCY ACCESS (30' EASEMENT, 24' EOP-EOP) SEE SHEET 3
- L LOCAL STREET TYPE "A" CURB & GUTTER (36' ROW, 26' FL-FL) SEE SHEET 3
- SD SHARED DRIVE (30' EASEMENT, 20' FL-FL) SEE SHEET 3

NOTES:

1. BUILDING / LODGING LOCATIONS ARE CONCEPTUAL AND WILL BE FINALIZED WITH FINAL CDS
2. SEE SHEET 4 FOR CREEK LOCATIONS & NAMES. PONDS DRAINING WEST OF PROPERTY DRAIN TO ELK CREEK & EAST OF PROPERTY TO LELAND CREEK.
3. CONTOUR INTERVALS ARE 1' & 5'.

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NOT FOR CONSTRUCTION

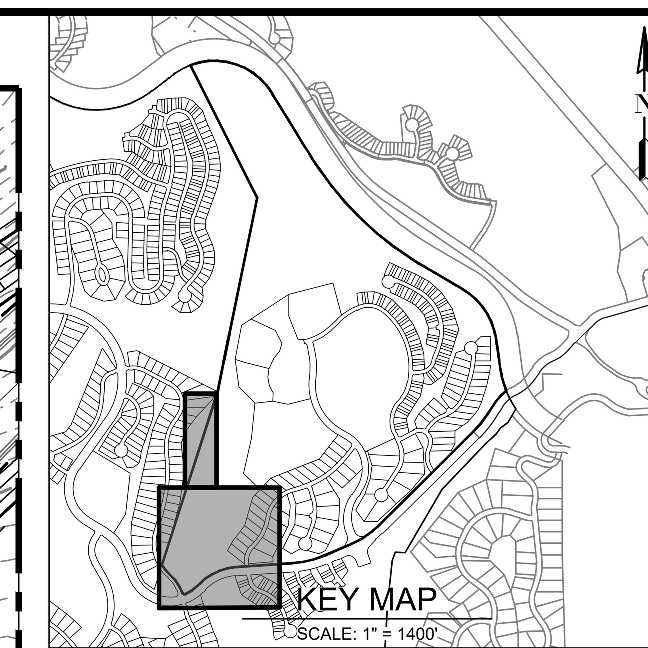
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS GRADING PLAN (6 OF 8)

Know what's below. Call before you dig. 811

12/15/2025 8:21 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED GRADING PLAN - WM - F1.DWG 6



N

0 50' 100'
1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- EASEMENT
- CENTERLINE
- LOT / TRACT / PARCEL BOUNDARY
- 4880 PROPOSED MAJOR CONTOUR
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- 4880 PROPOSED MAJOR CONTOUR
- 4879 PROPOSED MINOR CONTOUR
- DRAINAGE SWALE
- SUBMITTAL AREA BOUNDARY
- FP FLOODPLAIN BOUNDARY
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- CONCRETE
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- NOT A PART
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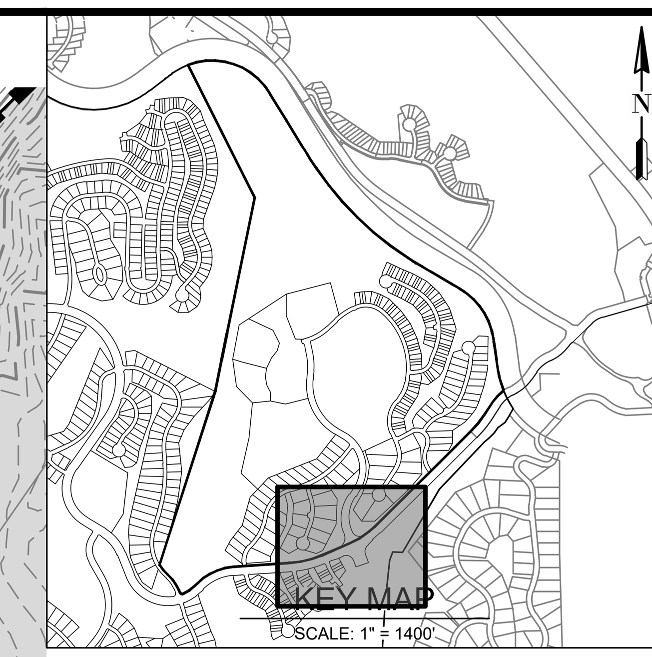
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (7 OF 8)

Know what's below. Call before you dig. 811

SHEET 27 OF 44



N

0 50' 100'
1 inch = 50'

LEGEND

—	PROJECT BOUNDARY
—	RIGHT OF WAY (ROW)
—	EASEMENT
—	CENTERLINE
—	LOT / TRACT / PARCEL BOUNDARY
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
4880	PROPOSED MAJOR CONTOUR
4879	PROPOSED MINOR CONTOUR
<	DRAINAGE SWALE
—	SUBMITTAL AREA BOUNDARY
FP	FLOODPLAIN BOUNDARY
—	EAST OF SITE - LELAND CREEK WEST OF SITE - ELK CREEK
	CONCRETE
	MAINTENANCE ACCESS
	NOT A PART
C	COLLECTOR CURB & GUTTER (60' ROW, 26' FL-FL) SEE SHEET 3
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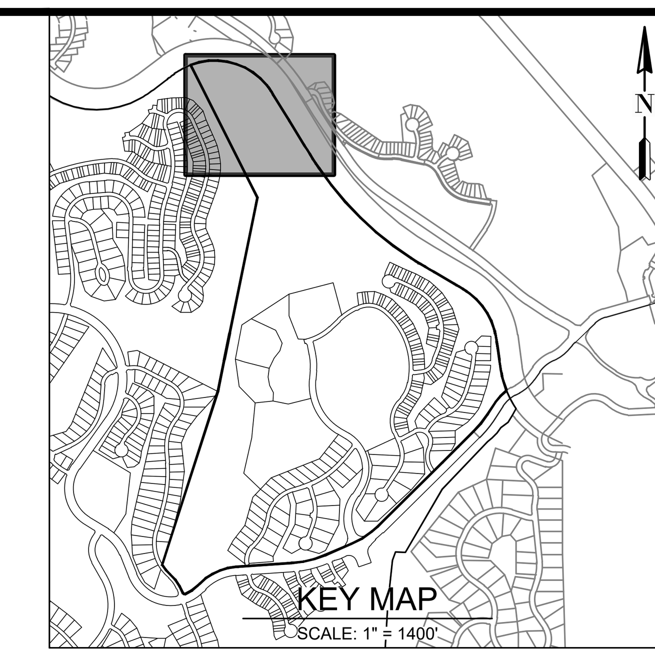
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
GRADING PLAN (8 OF 8)

Know what's below. Call before you dig. 811

SEE SHEET 30



N

0 50' 100'

1 inch = 50'

LEGEND

PROJECT BOUNDARY
RIGHT OF WAY (ROW)
STORM (FES, MH, & INLET)
SANITARY
WATER (HYDRANT, VALVE, BEND, MH)
PRESSURE REDUCING VALVE (PRV)
EXISTING FENCE
EXISTING FIBER OPTIC
EXISTING GAS
EXISTING WATER
EXISTING SWALE
DRAINAGE SWALE
SUBMITTAL AREA BOUNDARY
FLOODPLAIN BOUNDARY
EAST OF SITE - LELAND CREEK
WEST OF SITE - ELK CREEK
CONCRETE
MAINTENANCE ACCESS
RIPRAP
NOT A PART

terracina design
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#	REVISION DESCRIPTION	DATE	BY
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2	2ND SUBMITTAL	12/18/2025	MJG

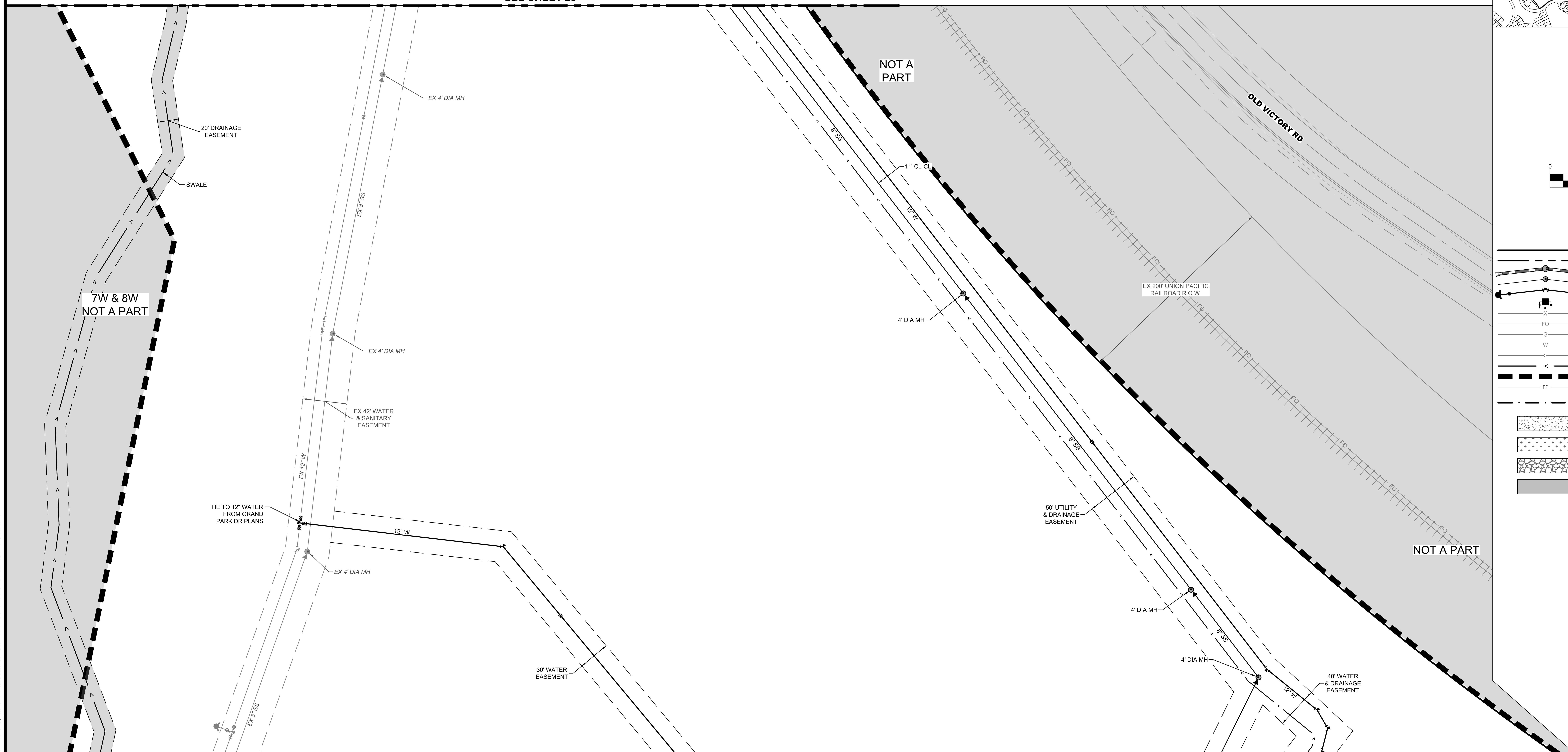
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

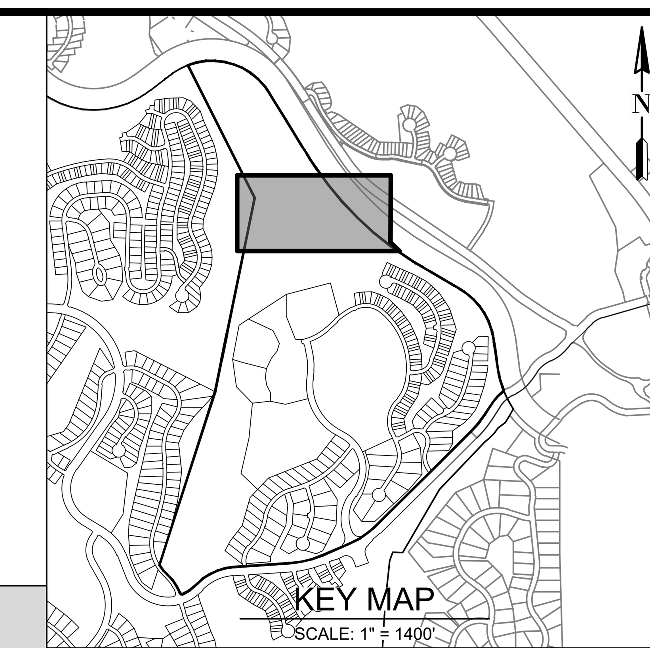
PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (1 OF 8)

Know what's below. Call before you dig. 811

SEE SHEET 29



SEE SHEET 31
SEE SHEET 32



N

0 50' 100'

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LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- STORM (FES, MH, & INLET)
- SANITARY
- WATER (HYDRANT, VALVE, BEND, MH)
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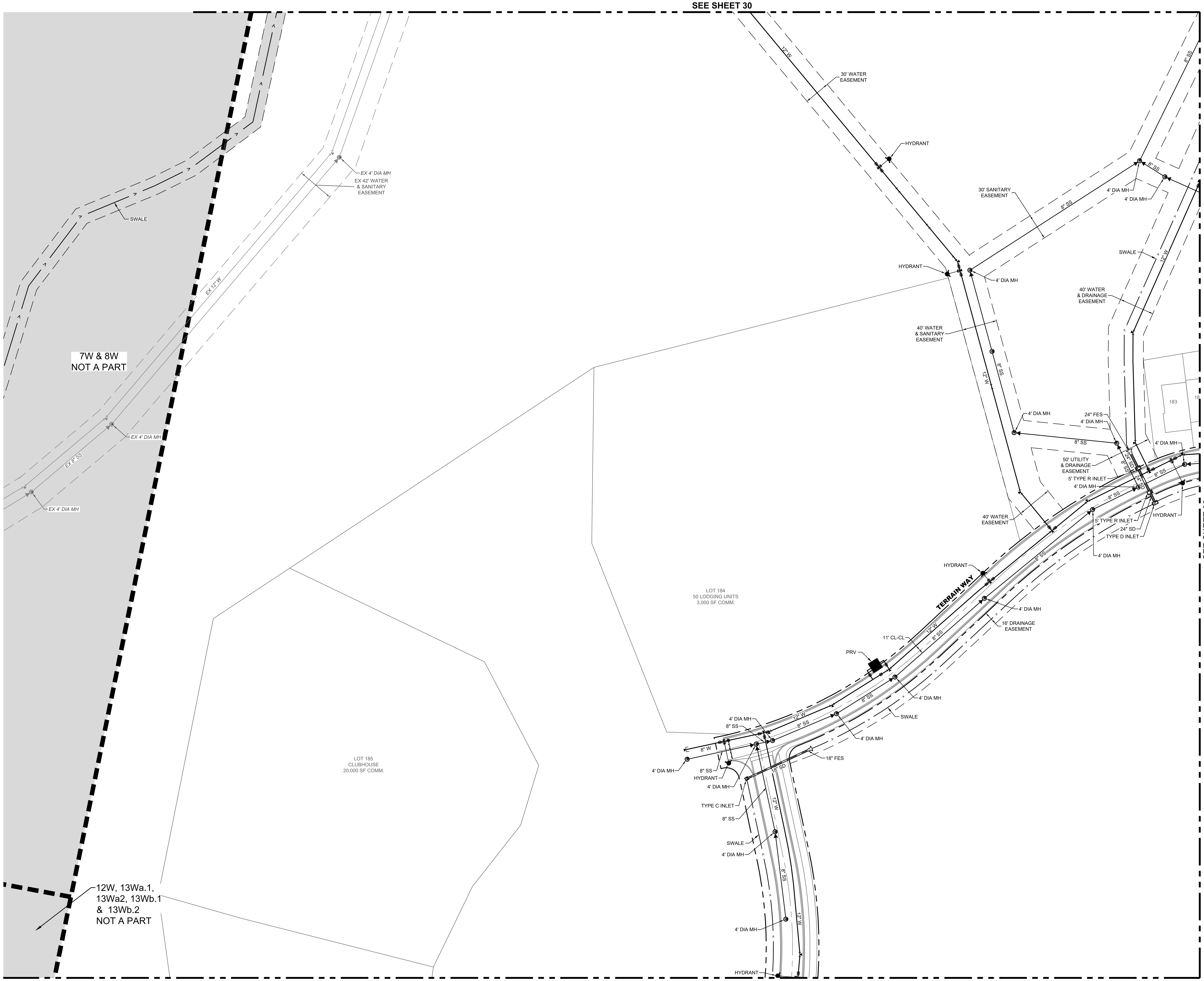
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS

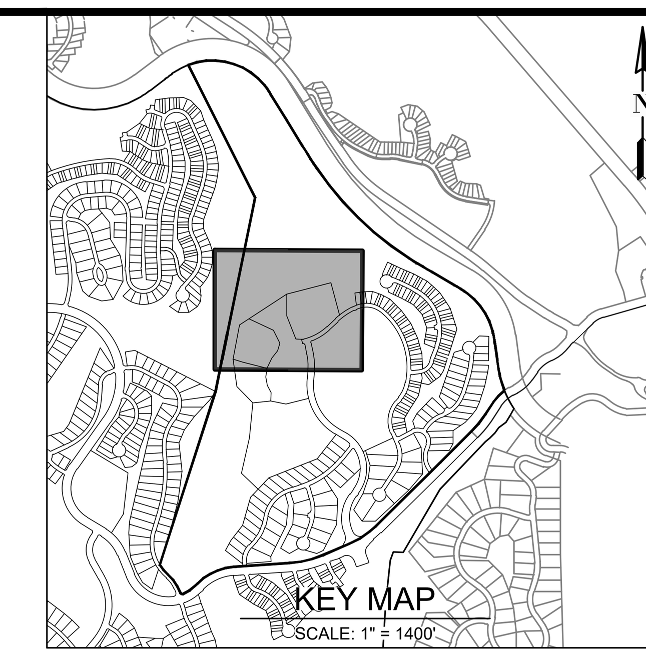
UTILITY PLAN (2 OF 8)

SEE SHEET 30



SEE SHEET 32

SEE SHEET 33



KEY MAP
SCALE: 1" = 1400'

N

0 50' 100'
1 inch = 50'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY (ROW)
- STORM (FES, MH, & INLET)
- SANITARY
- WATER (HYDRANT, VALVE, BEND, MH)
- PRESSURE REDUCING VALVE (PRV)
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NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

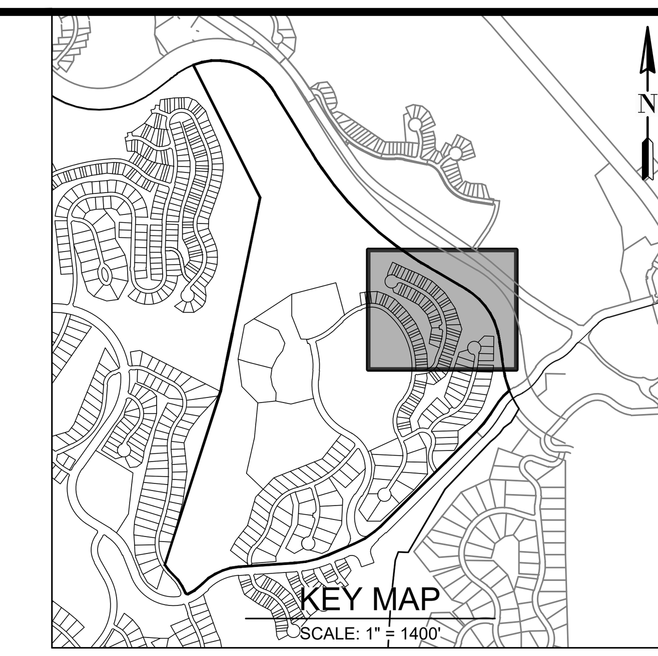
PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (3 OF 8)

12/18/2025 8:22 AM X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS DETAILED UTILITY PLAN - WM - F1.DWG 3

SEE SHEET 30

SEE SHEET 31

SEE SHEET 34



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LEGEND

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GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

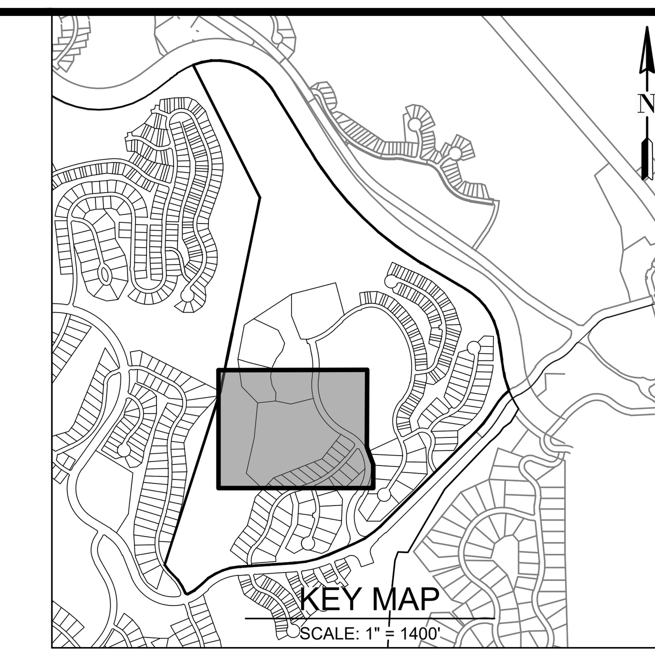
PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (4 OF 8)

Know what's below. Call before you dig. 811

SHEET
32 OF 44

SEE SHEET 31

SEE SHEET 34
SEE SHEET 35
SEE SHEET 36



N

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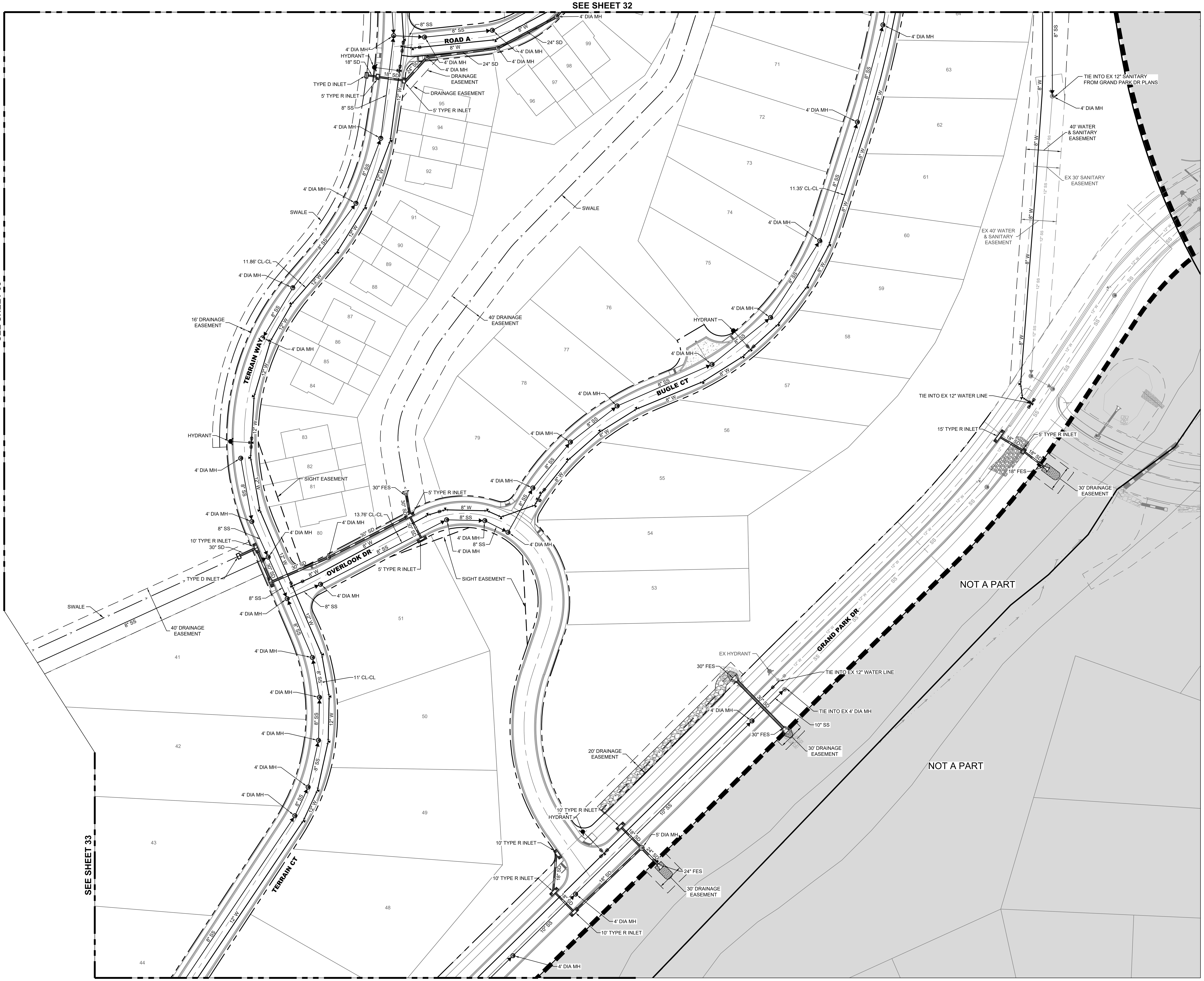
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (5 OF 8)

Know what's below. Call before you dig. 811

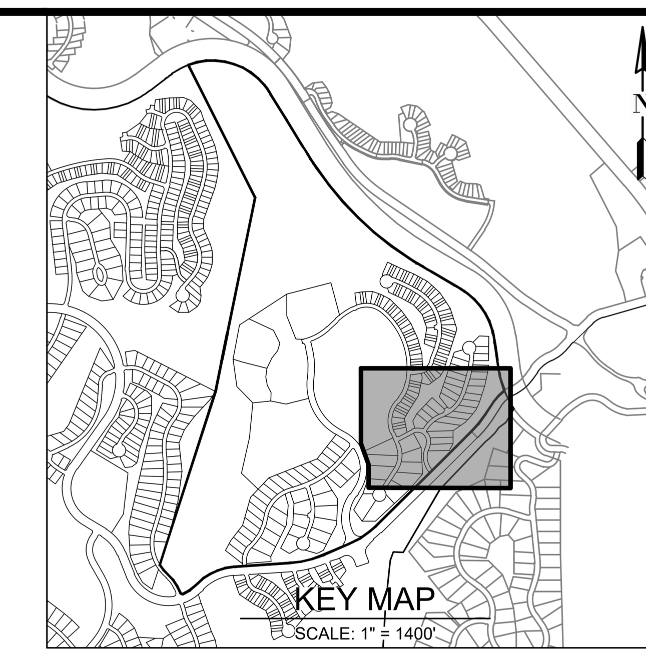
SEE SHEET 32



SEE SHEET 33

SEE SHEET 33

SEE SHEET 36



N

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LEGEND

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GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W

TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (6 OF 8)

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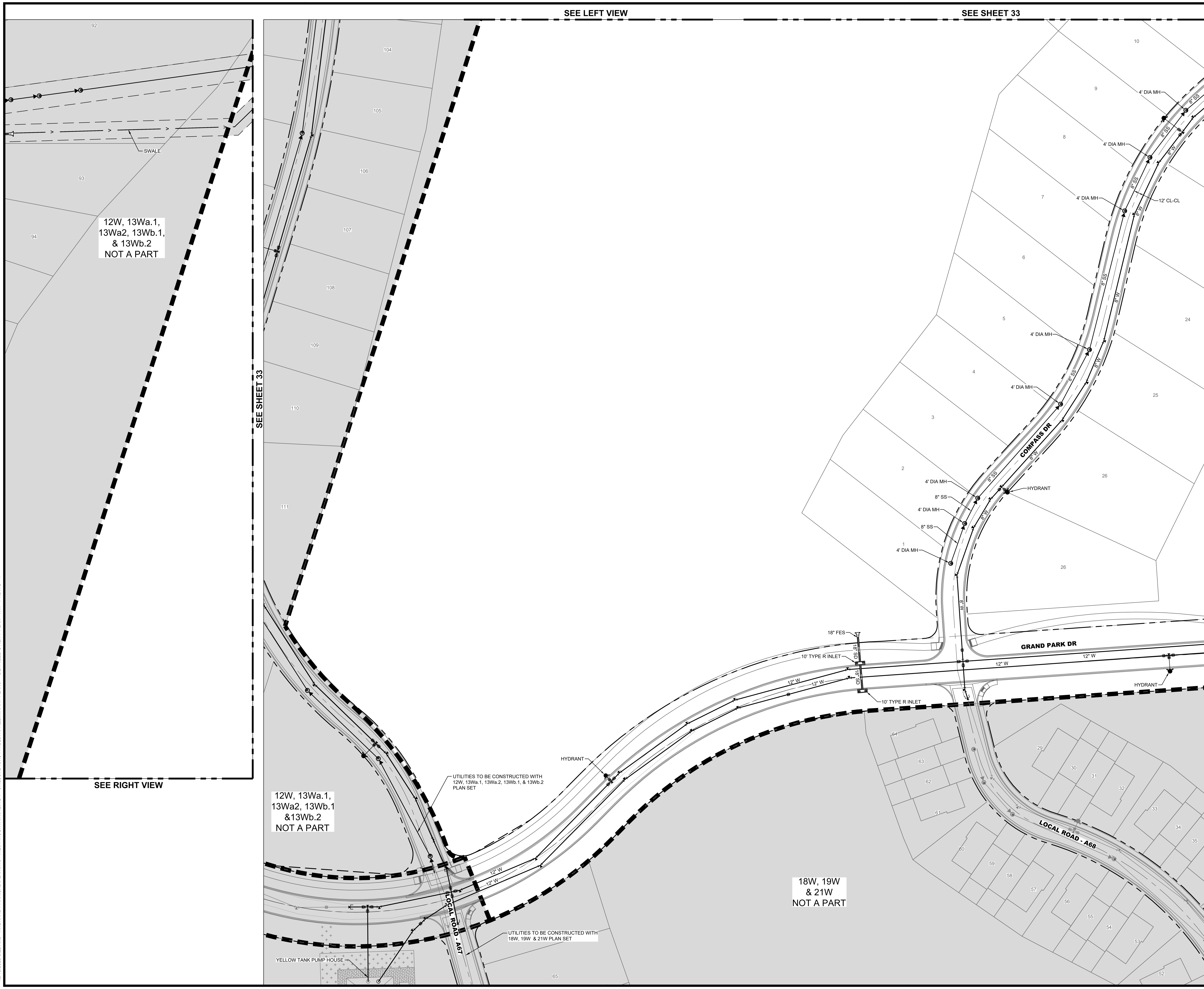

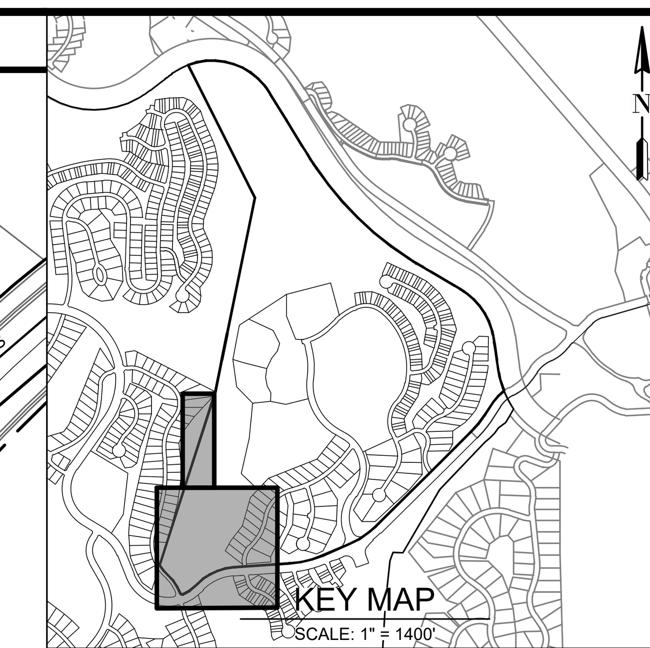

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TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (7 OF 8)

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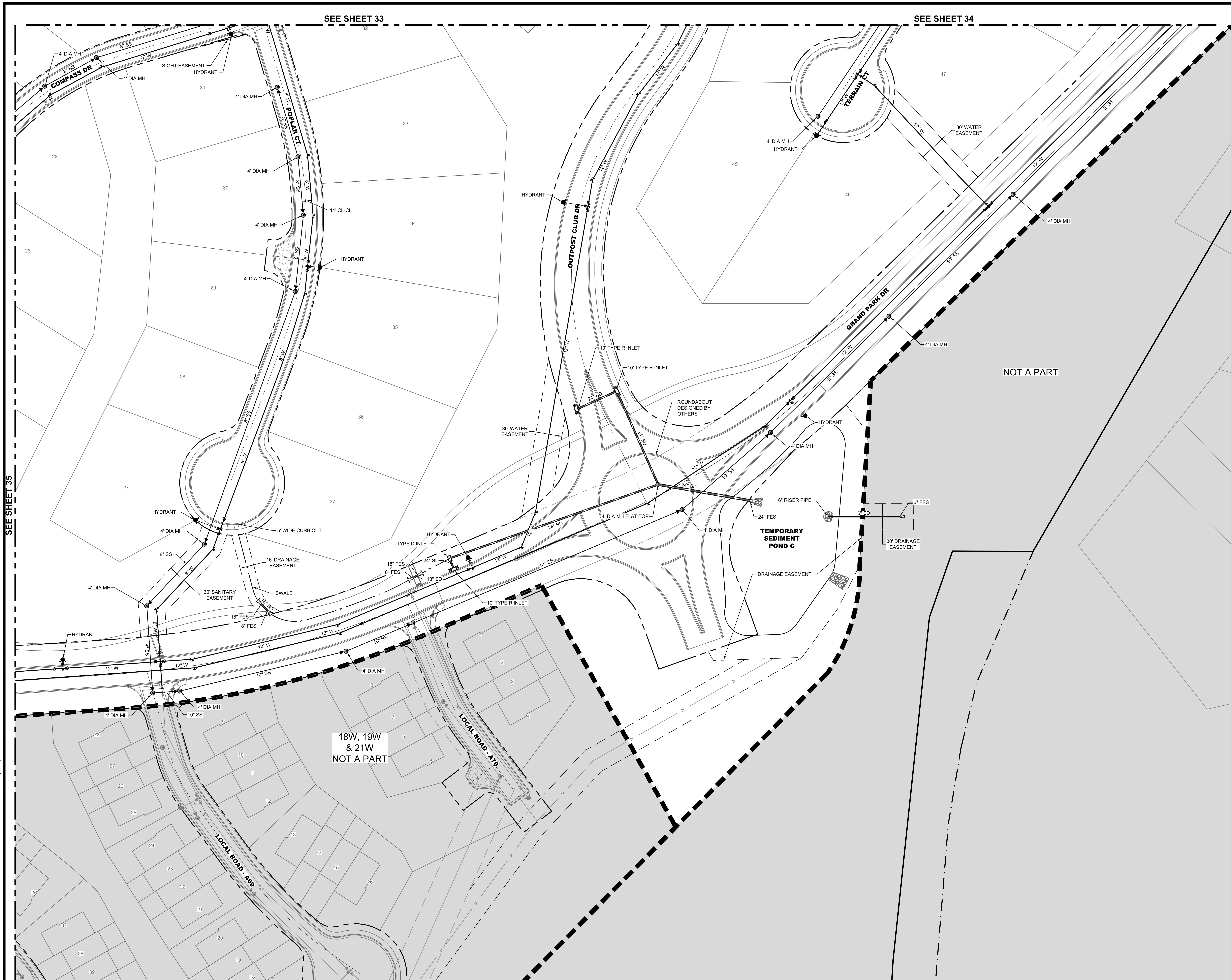

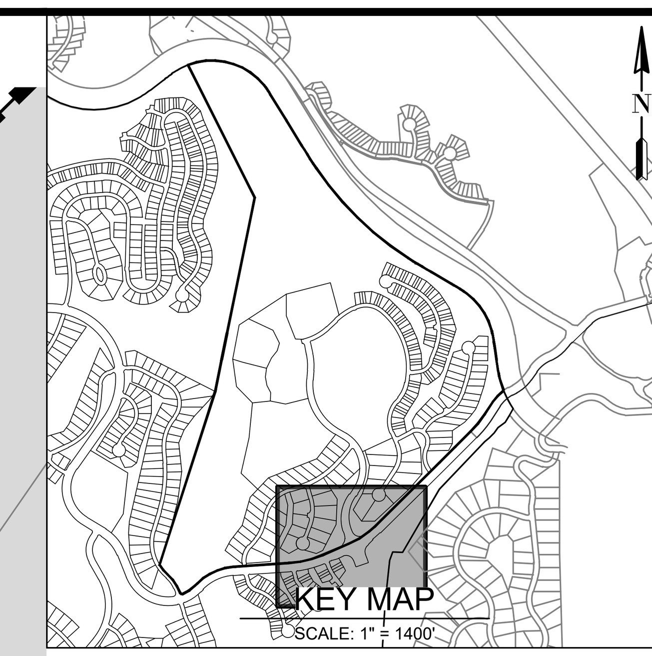

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TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
UTILITY PLAN (8 OF 8)

Know what's below. Call before you dig. 811

SHEET 36 OF 44

Description

Photograph TS/PS -1. Equipment used to drill seed. Photo courtesy of Douglas County.

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparing a seedbed, selecting an appropriate seed mixture, using proper planting techniques, and protecting the seeded area with mulch, geotextiles, or other appropriate measures.

Appropriate Uses

When the soil surface is disturbed and will remain inactive for an extended period (typically determined by local government requirements), proactive stabilization measures, including planting a temporary seed mix, should be implemented. If the inactive period is short-lived (on the order of two weeks), techniques such as surface roughening may be appropriate. For longer periods of inactivity of up to one year, temporary seeding and mulching can provide effective erosion control. Permanent seeding should be used on finished areas that have not been otherwise stabilized.

The USDCM Volume 2 *Revegetation* Chapter contains suggested annual grains and native seed mixes to use for temporary seeding. Alternatively, local governments may have their own seed mixes and timelines for seeding. Check jurisdictional requirements for seeding and temporary stabilization.

Design and Installation

Effective seeding requires proper seedbed preparation, selecting an appropriate seed mixture, using appropriate seeding equipment to ensure proper coverage and density, and protecting seeded areas with mulch or fabric until plants are established.

The USDCM Volume 2 *Revegetation* Chapter contains detailed seed mixes, soil preparation practices, and seeding and mulching recommendations that should be referenced to supplement this Fact Sheet.

Drill seeding is the preferred seeding method. Hydroseeding is not recommended except in areas where steep slopes prevent use of drill seeding equipment, and even in these instances it is preferable to hand seed and mulch. Some jurisdictions do not allow hydroseeding or hydromulching.

Temporary and Permanent Seeding	
Functions	
Erosion Control	Yes
Sediment Control	No
Site/Material Management	No

Seedbed Preparation

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil and compaction, resulting in poor quality subsoils at the ground surface that

have low nutrient value, little organic matter content, few soil microorganisms, rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be salvaged during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content, biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. If present, at a minimum of the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately respread across areas that will be revegetated.

Where topsoil is not available, subsoils should be amended to provide an appropriate plant-growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, rip or rototill the upper 12 inches of the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placing a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth. Topsoil should not be placed when either the salvaged topsoil or receiving ground are frozen or snow covered.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Refer to MHFD's Topsoil Management Guidance for detailed information on topsoil assessment, design, and construction.

Temporary Vegetation

To provide temporary vegetative cover on disturbed areas which will not be paved, built upon, or fully landscaped or worked for an extended period (typically 30 days or more), plant an annual grass appropriate for the time of planting and mulch the planted areas. Temporary grain seed mixes suitable for the Denver metropolitan area are listed in Table TS/PS-1. Native temporary seed mixes are provided in USDCM Volume 2, Chapter 13, Appendix A. These are to be considered only as general recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

Permanent Revegetation

To provide vegetative cover on disturbed areas that have reached final grade, a perennial grass mix should be established. Permanent seeding should be performed promptly (typically within 14 days) after reaching final grade. Each site will have different characteristics and a landscape professional or the local jurisdiction should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific recommendation, one of the perennial grass mixes appropriate for site conditions and growth season listed in seed mix tables in the USDCM Volume 2 *Revegetation* Chapter can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment. These are to be considered only as general

recommendations when specific design guidance for a particular site is not available. Local governments typically specify seed mixes appropriate for their jurisdiction.

If desired for wildlife habitat or landscape diversity, shrubs such as rubber rabbitbrush (*Chrysothamnus nauseosus*), fourwing saltbush (*Atriplex canescens*) and skunkbrush sumac (*Rhus trilobata*) could be added to the upland seed mixes at 0.25, 0.5 and 1 pound PLS/acre, respectively. In riparian zones, planting root stock of such species as American plum (*Prunus americana*), woods rose (*Rosa woodsii*), plains cottonwood (*Populus sargentii*), and willow (*Salix spp.*) may be considered. On non-topsoiled upland sites, a legume such as Ladak alfalfa at 1 pound PLS/acre can be included as a source of nitrogen for perennial grasses.

Timing of seeding is an important aspect of the revegetation process. For upland and riparian areas on the Colorado Front Range, the suitable timing for seeding is from October through May. The most favorable time to plant non-irrigated areas is during the fall, so that seed can take advantage of winter and spring moisture. Seed should not be planted if the soil is frozen, snow covered, or wet.

Seeding dates for the highest success probability of perennial species along the Front Range are generally in the spring from April through early May and in the fall after the first of September until the ground freezes. If the area is irrigated, seeding may occur in summer months, as well. See Table TS/PS-2 for appropriate seeding dates.

Table TS/PS-1. Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
1. Oats	Cool	35 - 50	1 - 2
2. Spring wheat	Cool	25 - 35	1 - 2
3. Spring barley	Cool	25 - 35	1 - 2
4. Annual ryegrass	Cool	10 - 15	½
5. Millet	Warm	3 - 15	½ - ¾
6. Winter wheat	Cool	20–35	1 - 2
7. Winter barley	Cool	20–35	1 - 2
8. Winter rye	Cool	20–35	1 - 2
9. Triticale	Cool	25–40	1 - 2

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

[b] See Table TS/PS-2 for seeding dates. Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

[c] Seeding rates should be doubled if seed is broadcast, or increased by 50 percent if done using a Brillion Drill or by hydraulic seeding.

Table TS/PS-2. Seeding Dates for Annual and Perennial Grasses

	Annual Grasses (Numbers in table reference species in Table TS/PS-1)		Perennial Grasses	
Seeding Dates	**Warm**	**Cool**	**Warm**	**Cool**
January 1–March 15			✓	✓
March 16–April 30		1,2,3	✓	✓
May 1–May 15			✓	
May 16–June 30	5			
July 1–July 15	5			
July 16–August 31				
September 1–September 30		6, 7, 8, 9		
October 1–December 31			✓	✓

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the USDCM Volume 2 *Revegetation* Chapter and Volume 3 Mulching BMP Fact Sheet (EC-04) for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

If a temporary annual seed was planted, the area should be reseeded with the desired perennial mix when there will be no further work in the area. To minimize competition between annual and perennial species, the annual mix needs time to mature and die before seeding the perennial mix. To increase success of the perennial mix, it should be seeded during the appropriate seeding dates the second year after the temporary annual mix was seeded. Alternatively, if this timeline is not feasible, the annual mix seed heads should be removed and then the area seeded with the perennial mix.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

terracina design
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NOT FOR CONSTRUCTION

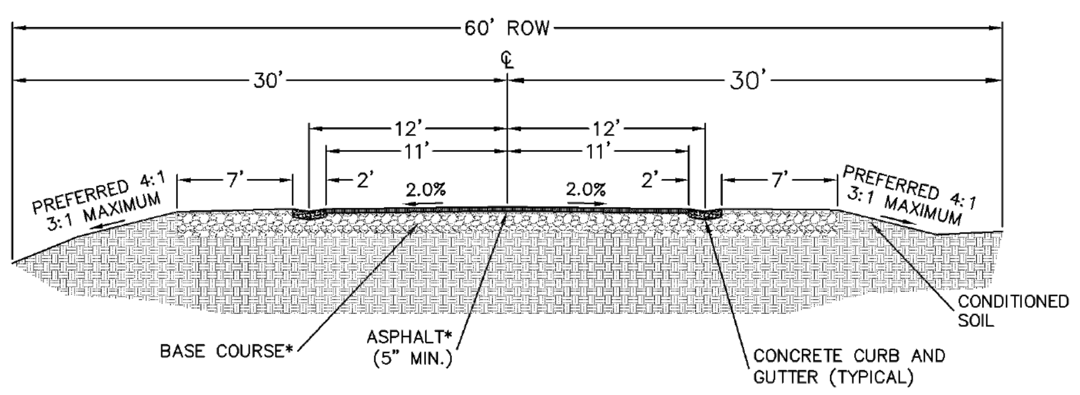
GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
EROSION CONTROL DETAIL

Know what's below. Call before you dig. 811

SHEET 37 OF 44

12/18/2025 8:22 AM X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 2 - 23W\PRELIMINARY CDS DETAILS - F2.DWG F1



COLLECTOR STREET CROSS SECTION

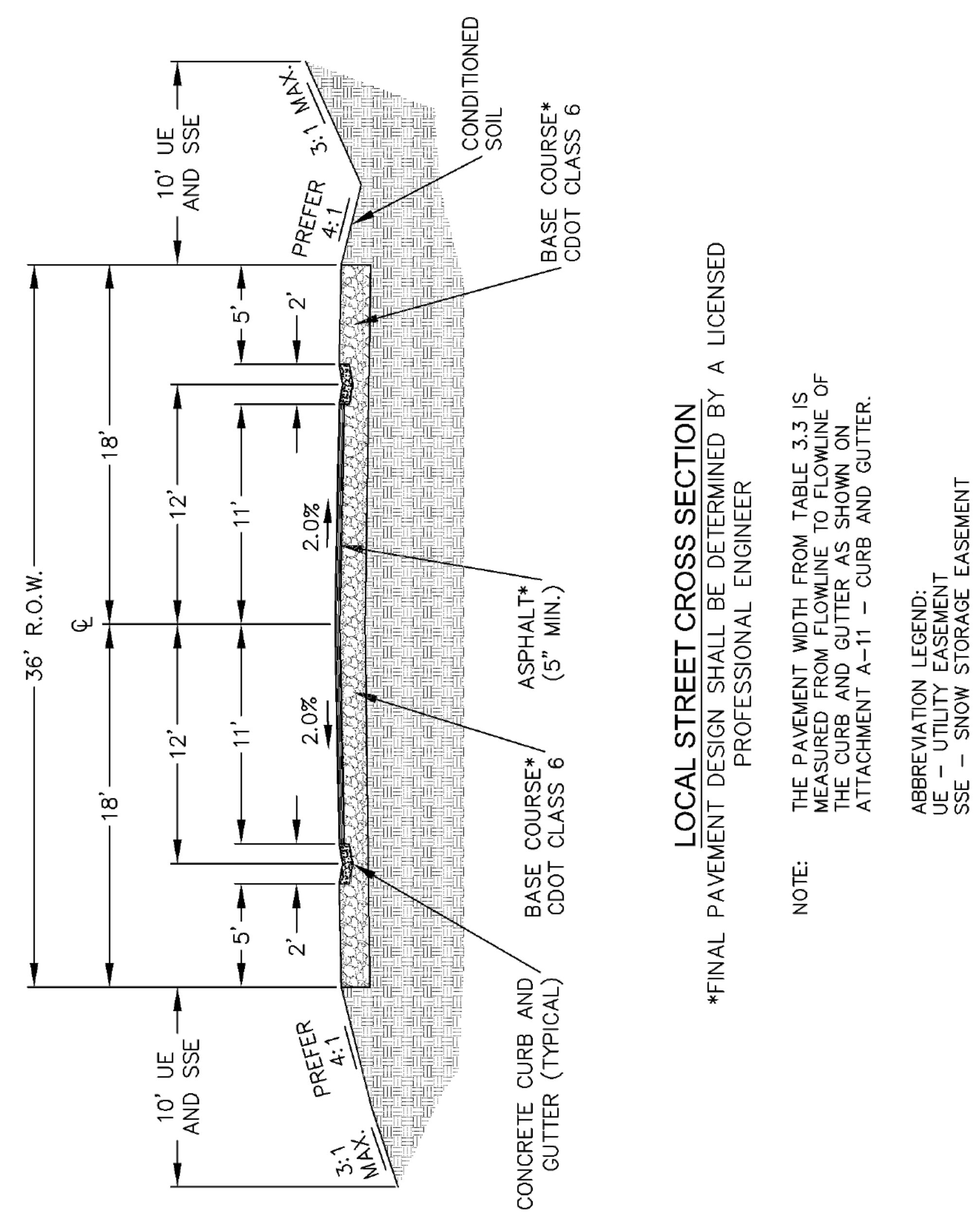
*FINAL PAVEMENT DESIGN & BASE COURSE THICKNESS SHALL BE DETERMINED BY A LICENSED PROFESSIONAL ENGINEER

NOTE: THE PAVEMENT WIDTH FROM TABLE 3.3 IS MEASURED FROM FLOWLINE TO FLOWLINE OF THE CURB AND GUTTER AS SHOWN ON ATTACHMENT A-11 – CURB AND GUTTER.

Cross-Section for Collector Street

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-7 — Revised January 2015



Cross-Section for Local Street

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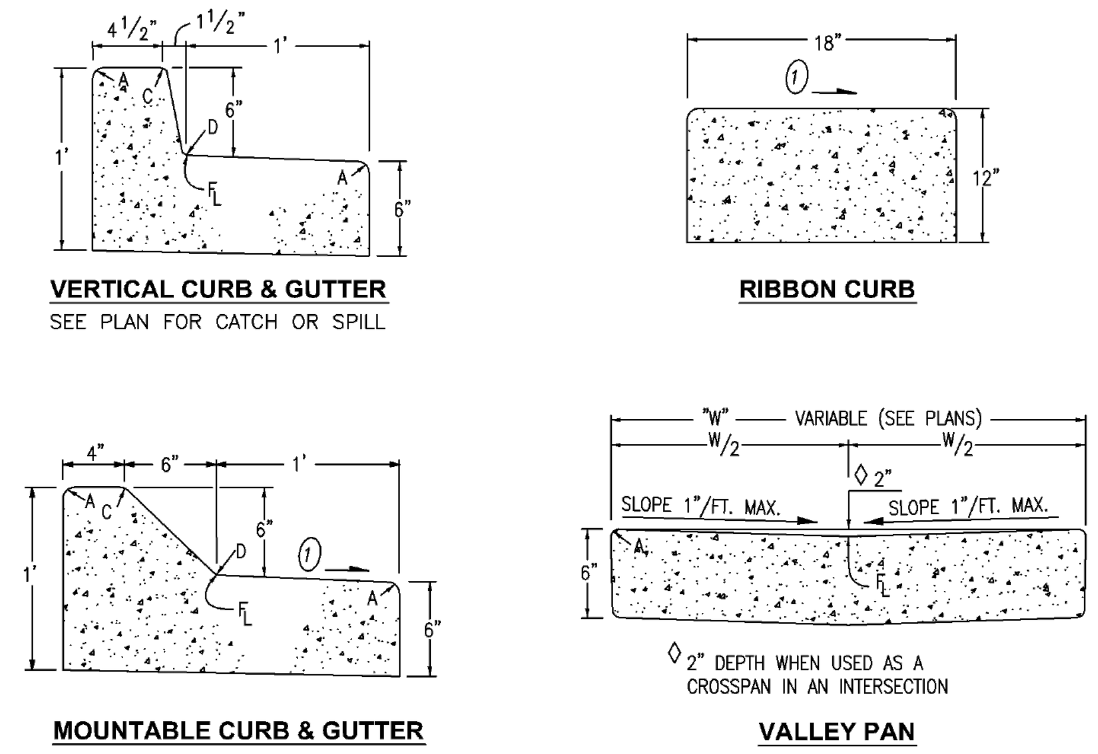
Town of Fraser
Attachment A-8 — Revised January 2015



LEGEND FOR RADII
A = 1/4" to 1/2"
B = 1"
C = 1 1/2"
D = 1 1/2" to 2"

GENERAL NOTES

1. ON CURVES 3 DEGREES OR SHARPER, CURBS AND/OR GUTTERS ARE TO BE PLACED ON THE ARC OF THE CURVE UNLESS OTHERWISE NOTED ON THE PLANS. A MAXIMUM CHORD LENGTH OF 10 FEET MAY BE USED WHEN THE DEGREE OF CURVE IS LESS THEN 3 DEGREES.
2. CONCRETE SHALL BE 4000 PSI FIBERMESH.
3. PROFILE GRADE OF CURBS AND GUTTERS SHALL BE LOCATED AT THE FLOW LINE.

▲ EXPANSION JOINTS SHALL BE INSTALLED WHEN ABUTTING EXISTING CONCRETE OR FIXED STRUCTURE. EXPANSION JOINT MATERIAL SHALL BE ½ IN. THICK AND SHALL EXTEND THE FULL DEPTH OF CONTACT SURFACE. EXPANDING JOINT SHALL BE PLACED EVERY ONE HUNDRED (100) FEET MEASURED ALONG THE SIDEWALK AND AT ALL CHANGES IN DIRECTION.

(1) GUTTER CROSS SLOPES SHALL BE ½ IN./FT. WHEN DRAINING AWAY FROM CURB AND 1IN./FT. WHEN DRAINING TOWARD CURB.

Curb and Gutter

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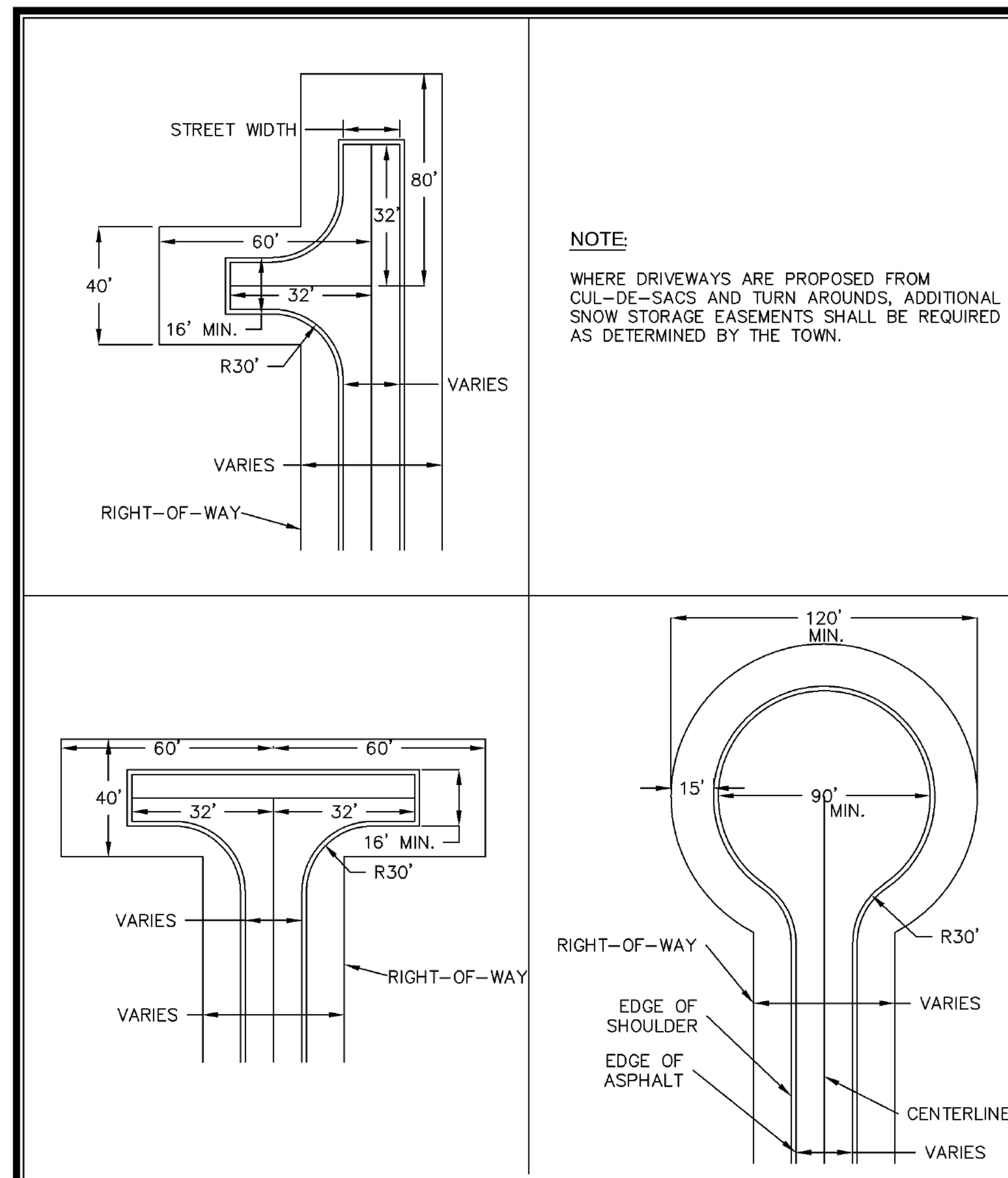
Town of Fraser
Attachment A-11 — Revised January 2015



NOTE: WHERE DRIVEWAYS ARE PROPOSED FROM CUL-DE-SACS AND TURN AROUNDS, ADDITIONAL SNOW STORAGE EASEMENTS SHALL BE REQUIRED AS DETERMINED BY THE TOWN.

Cul-De-Sac and Turnarounds for Streets

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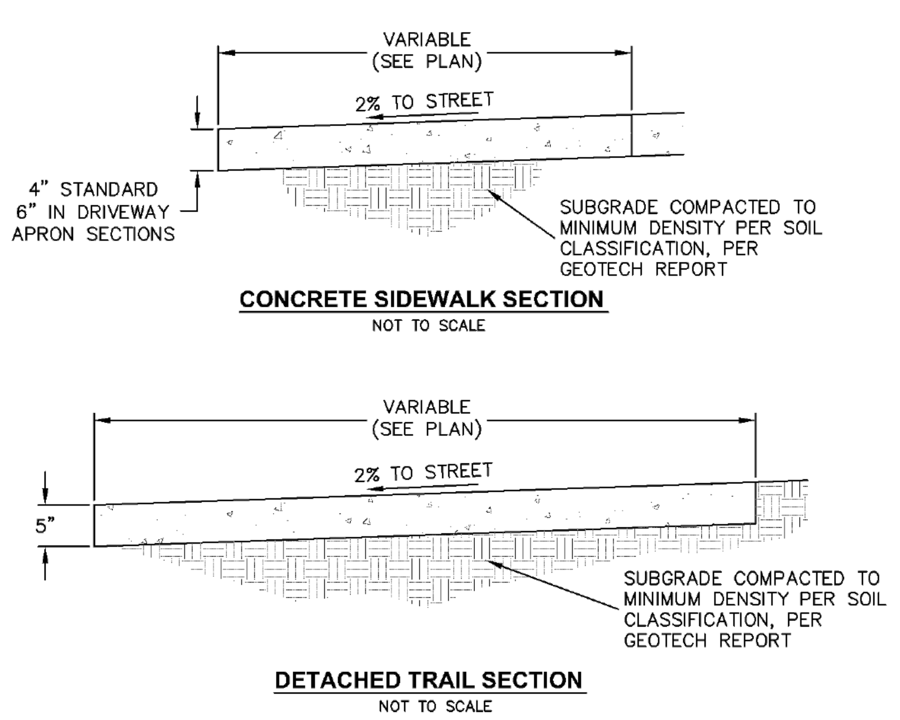
Town of Fraser
Attachment A-12 — Revised January 2015



TRAIL SURFACING SHALL BE CONSTRUCTED OF EITHER CONCRETE OR ASPHALT. ALTERNATE SURFACE MATERIAL MAY BE CONSIDERED BY THE TOWN.

GENERAL NOTES

EXPANSION JOINTS SHALL BE INSTALLED WHEN ABUTTING EXISTING CONCRETE OR FIXED STRUCTURE. EXPANSION JOINT MATERIAL SHALL BE 1/2 IN. THICK AND SHALL EXTEND THE FULL DEPTH OF CONTACT SURFACE. EXPANSION JOINT SHALL BE PLACED EVERY ONE HUNDRED (100) FEET MEASURED ALONG THE SIDEWALK (OR CONCRETE TRAIL) AND AT ALL CHANGES IN DIRECTION.

Sidewalks and Trails

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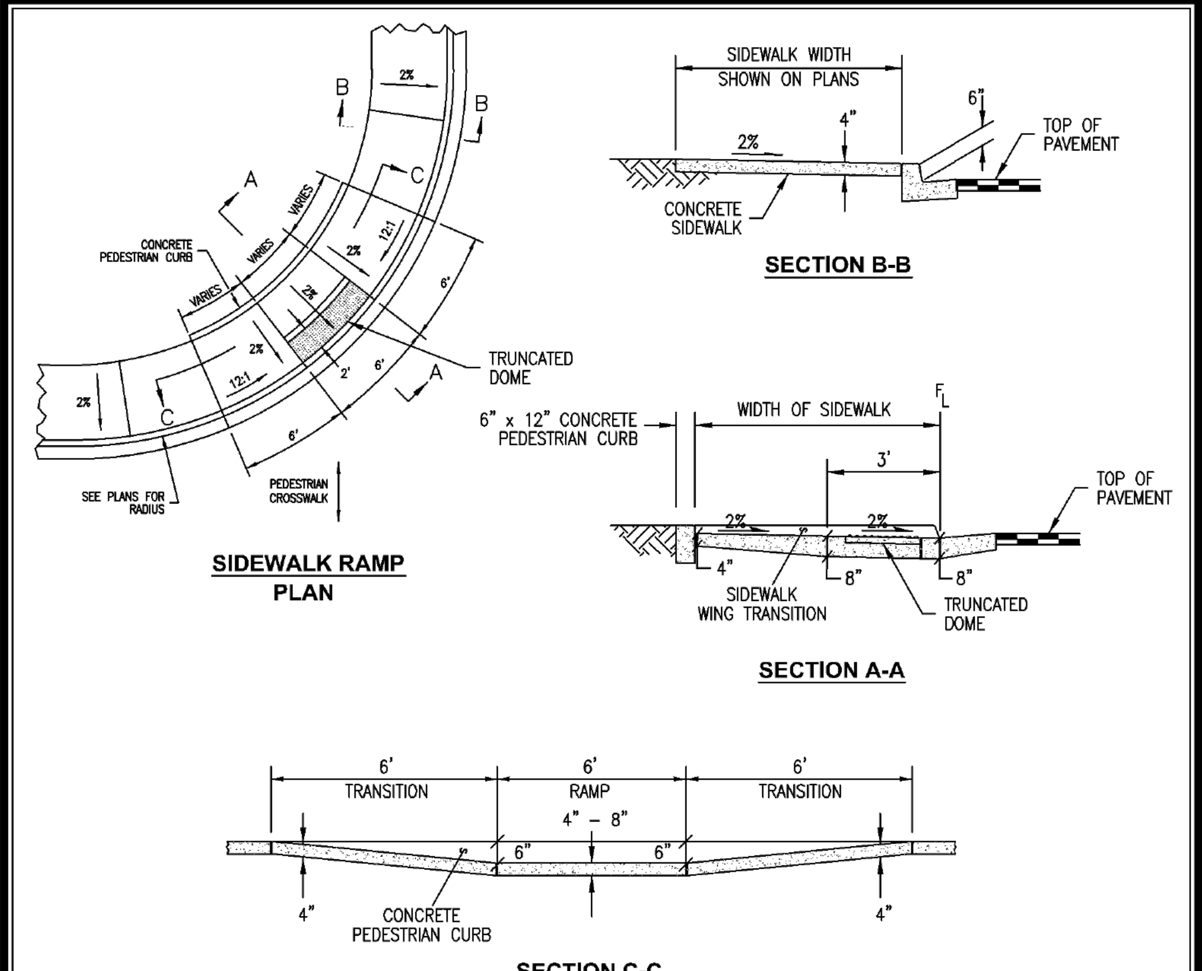
Town of Fraser
Attachment A-13 — Revised January 2015



GENERAL NOTES

1. AVOID PLACING DRAINAGE STRUCTURES, TRAFFIC SIGNAL EQUIPMENT, JUNCTION BOXES, FIRE HYDRANTS, OR OTHER OBSTRUCTIONS IN FRONT OF RAMP ACCESS AREAS.
2. CONSTRUCTION OF THE CONCRETE PEDESTRIAN CURB TO BE INCLUDED IN THE COST OF THE CURB RAMP.
3. TRUNCATED DOME SECTION SHALL BE CAST-IN-PLACE COLORED CONCRETE, CORE 10 STEEL, OR VITRIFIED POLYMER MEETING THE REQUIREMENTS AND DETAIL OF THE ADA REGULATIONS.

Handicap Ramps

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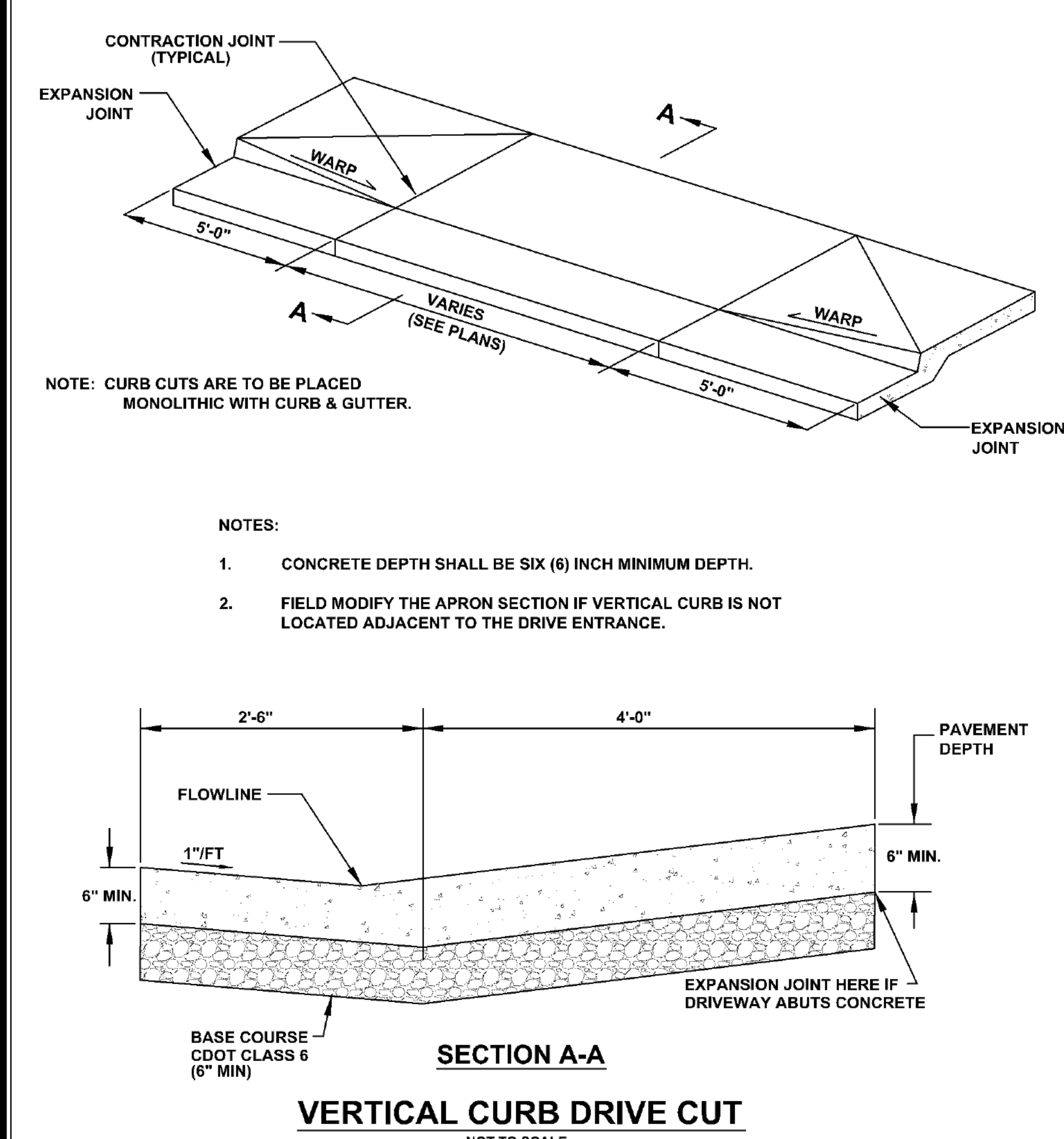
Town of Fraser
Attachment A-14 — Revised January 2015



NOTES:

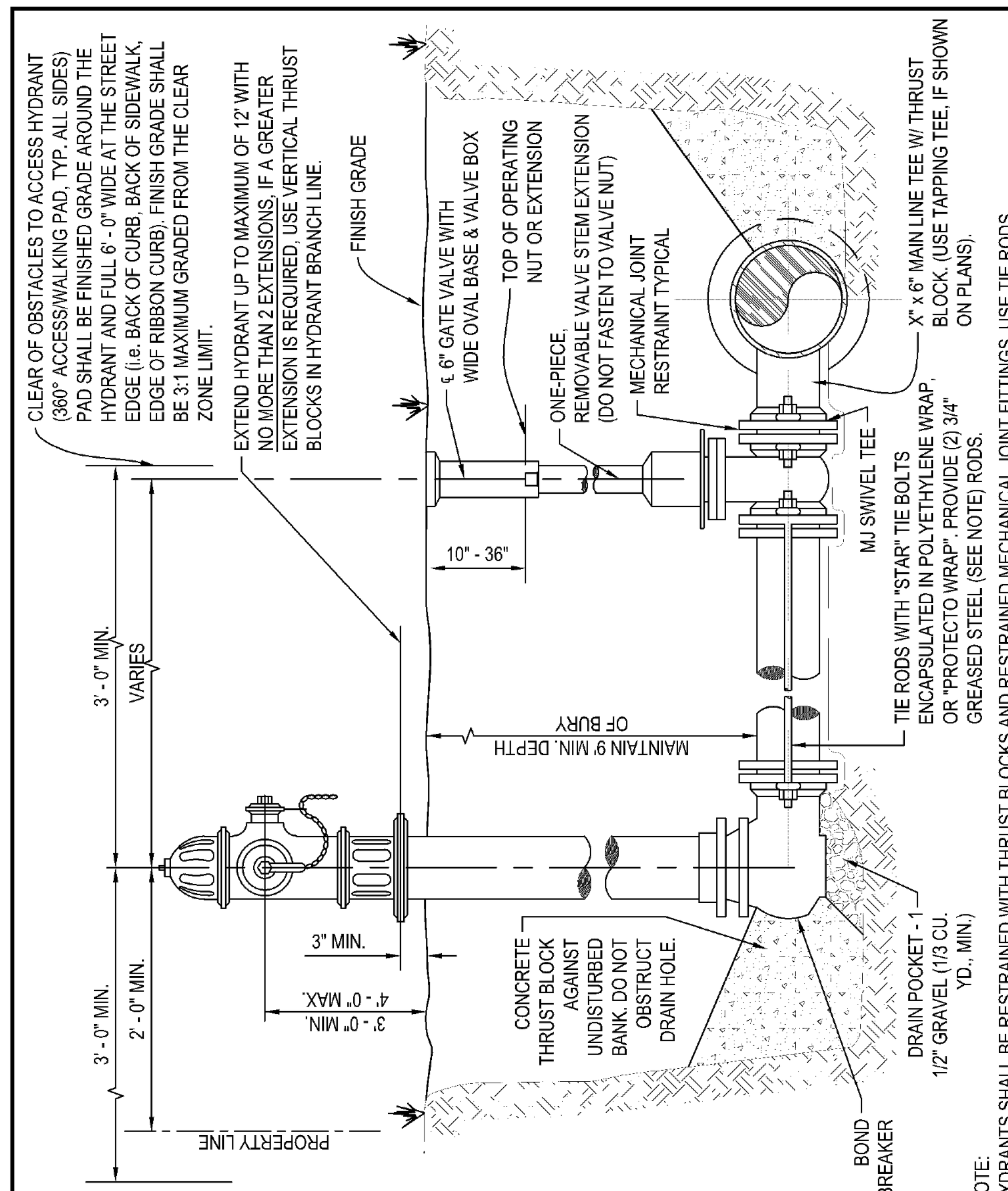
1. CONCRETE DEPTH SHALL BE SIX (6) INCH MINIMUM DEPTH.
2. FIELD MODIFY THE APRON SECTION IF VERTICAL CURB IS NOT LOCATED ADJACENT TO THE DRIVE ENTRANCE.

VERTICAL CURB DRIVE CUT
NOT TO SCALE

Drive Cuts

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-15 — Revised January 2015



Fire Hydrant Detail

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Town of Fraser
Attachment A-16 — Revised October 2024

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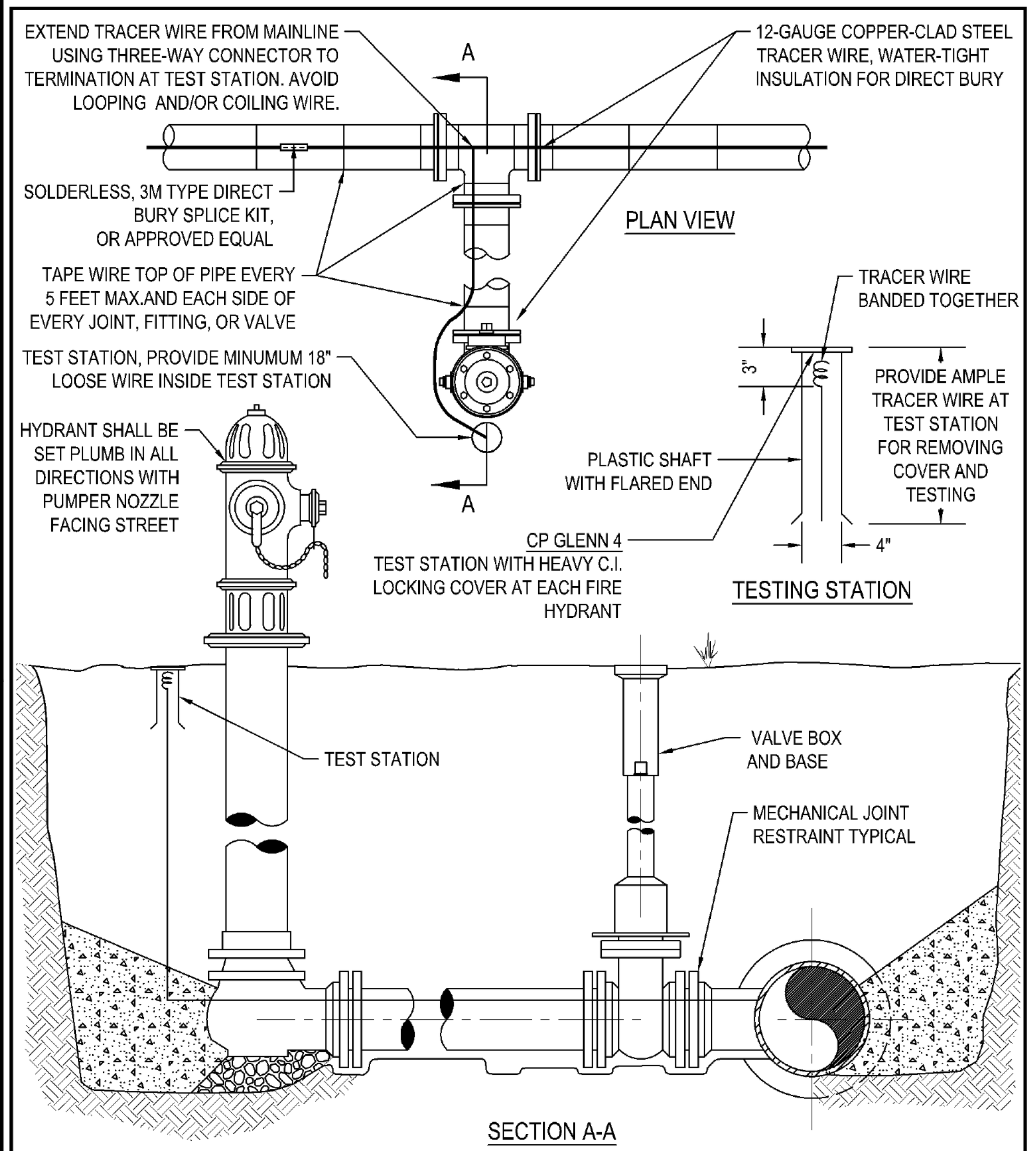
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
DETAILS (1 OF 7)

Know what's below. Call before you dig. 811



Tracer Wire Detail

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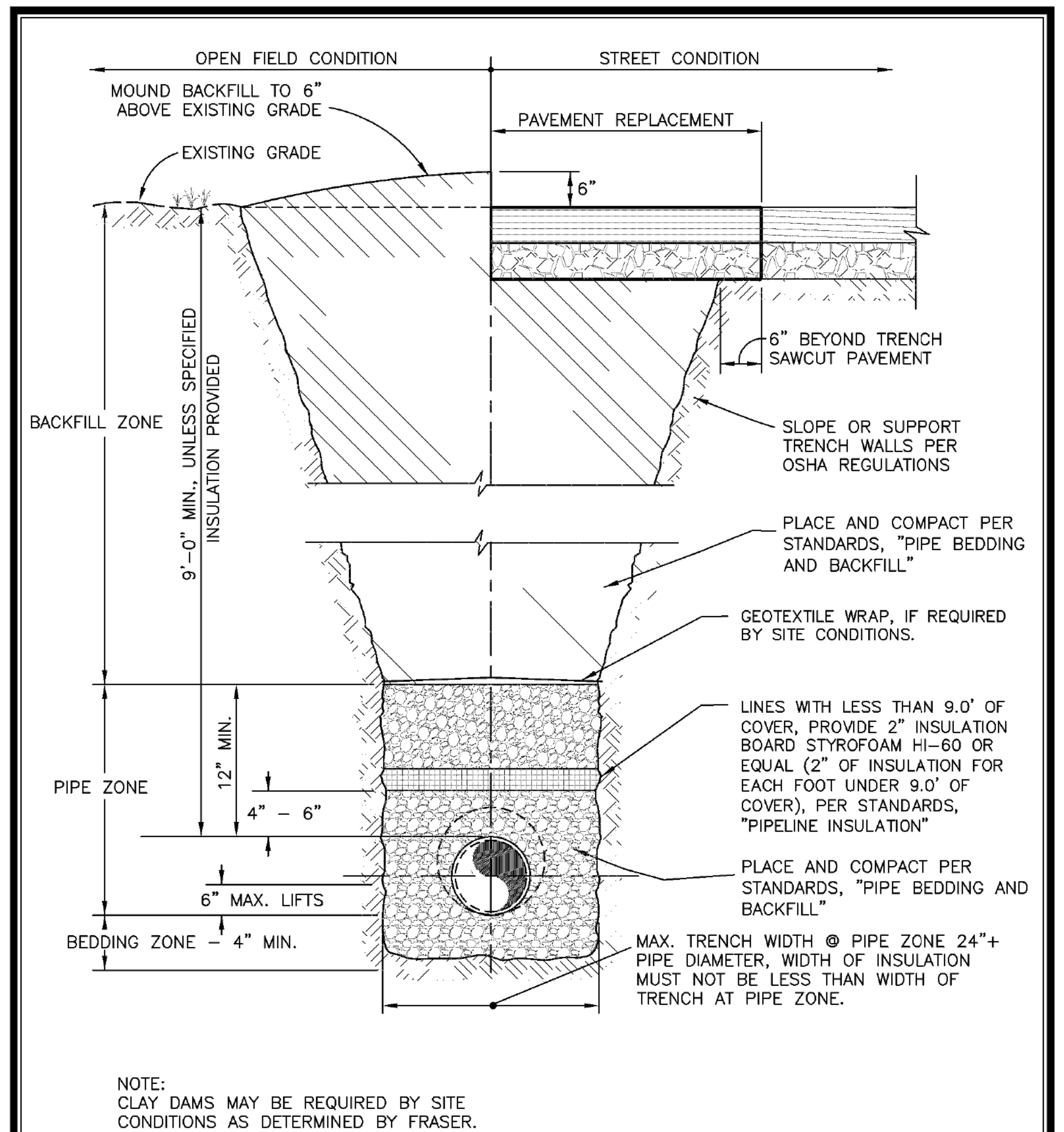
Town of Fraser
Attachment A-17 — **Revised October 2024**



Water Main and Service Line Bedding and Backfill Detail

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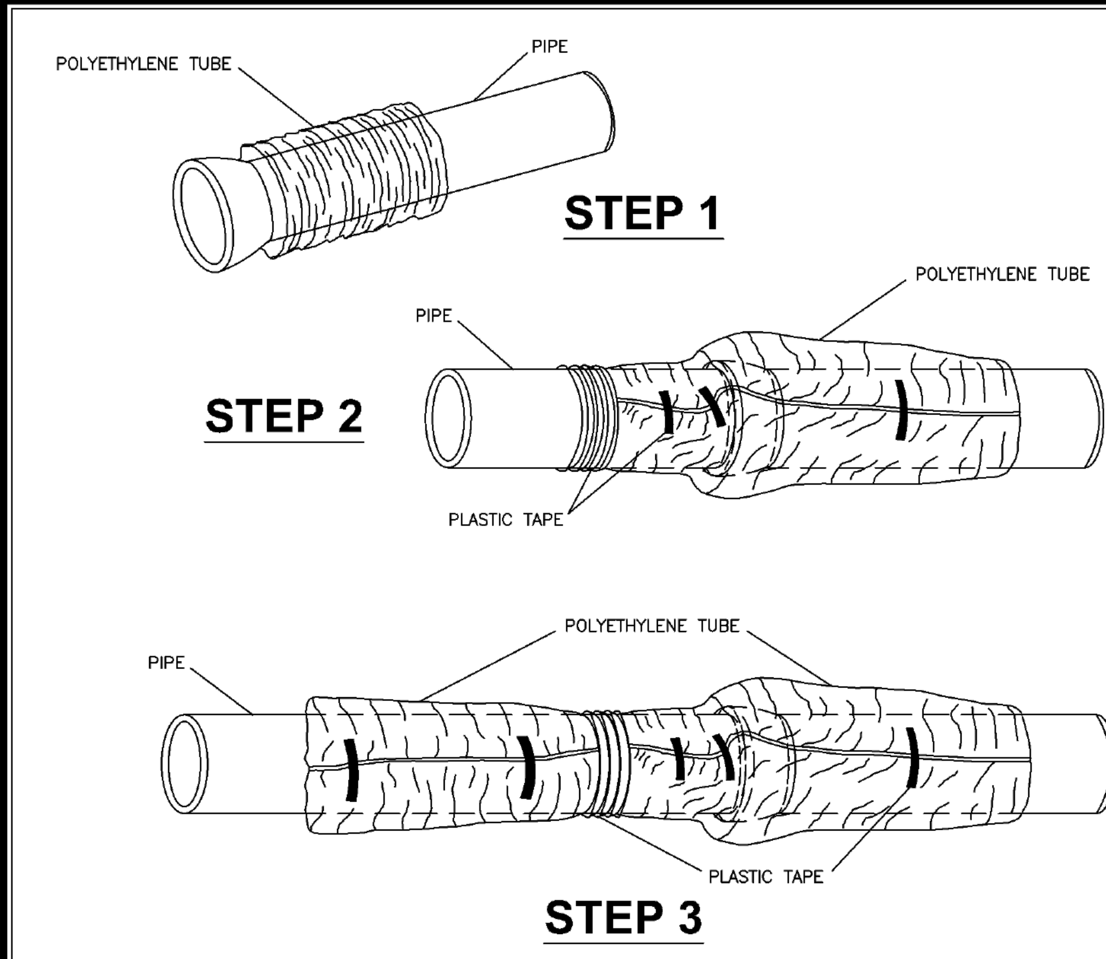
Town of Fraser
Attachment A-18 — **Revised January 2015**



FIELD INSTALLATION-POLYETHYLENE WRAP

STEP-1 PLACE TUBE OF POLYETHYLENE MATERIAL AROUND PIPE PRIOR TO LOWERING PIPE INTO TRENCH.

STEP-2 PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH THREE CIRCUMFERENTIAL TURNS OF TWO-INCH WIDE PLASTIC TAPE TO HOLD PLASTIC TUBE AROUND SPIGOT END.

STEP-3 ADJACENT TUBE OVERLAPS FIRST TUBE AND IS SECURED WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE WILL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED INTO AN OVERLAP ON TOP OF THE PIPE AND HELD IN PLACE BY MEANS OF PIECES OF THE PLASTIC TAPE AT APPROXIMATELY THREE TO FIVE FOOT INTERVALS.

Polyethylene Wrap Detail

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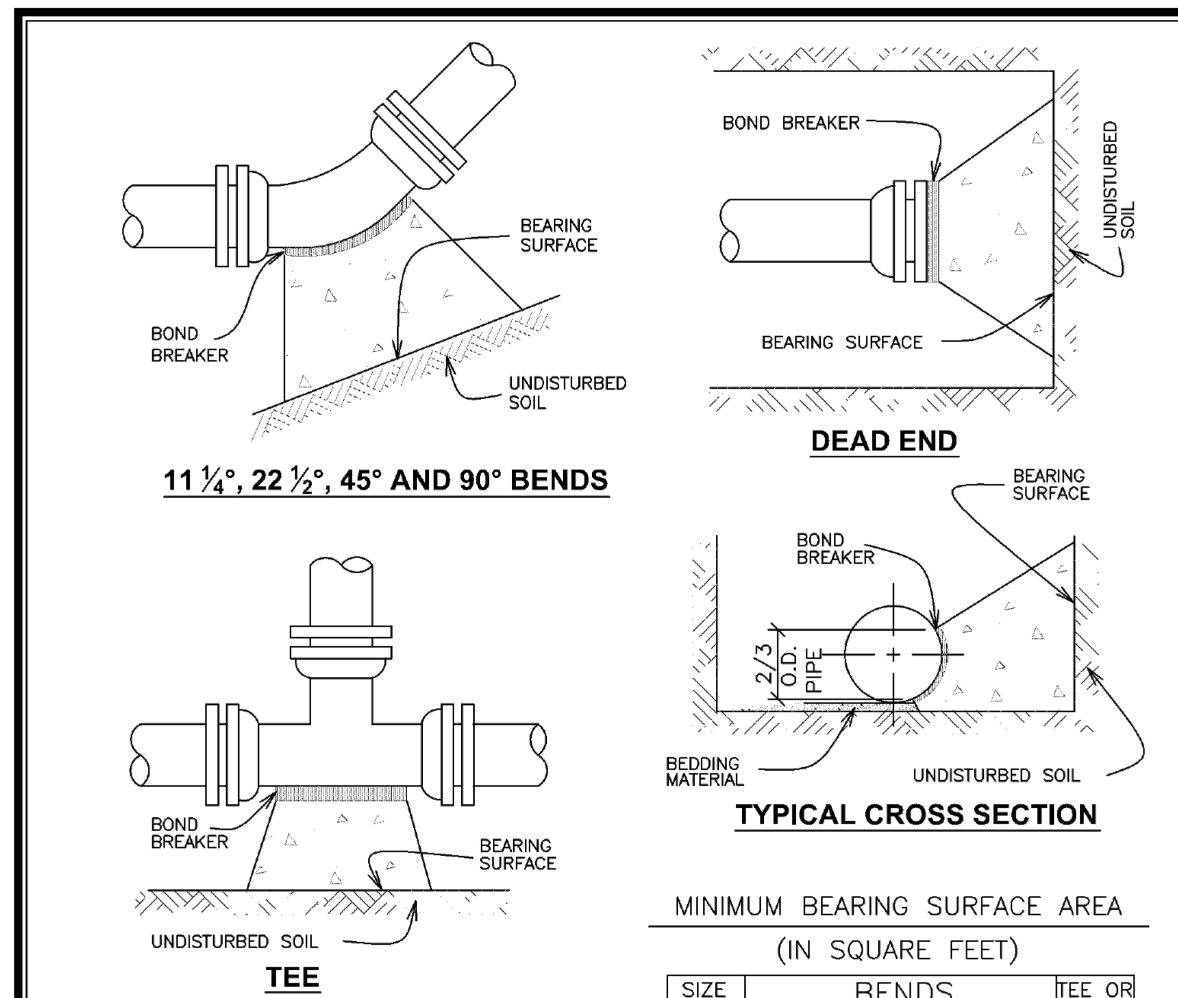
Town of Fraser
Attachment A-19 — **Revised January 2015**



MINIMUM BEARING SURFACE AREA
(IN SQUARE FEET)

SIZE OF PIPE	BENDS 11¼°	22½°	45°	90°	TEE OR DEAD END
6"	1.00	1.25	2.25	5.70	3.00
8"	1.00	2.00	4.00	10.20	5.25
10"	1.75	3.25	6.50	15.60	8.25
12"	2.25	4.50	8.75	22.40	11.25
14"	3.00	6.00	11.75	30.50	15.25
16"	3.75	7.50	14.50	33.70	19.00
18"	4.50	8.75	17.00	42.70	22.00
20"	5.00	10.00	19.50	52.70	25.00

NOTES:

1. BEARING SURFACES SHOWN IN CHART ARE MINIMUM.
2. BASED ON 150 PSI INTERNAL PIPE PRESSURE PLUS WATER HAMMER.
   4",6",8" AND 12" WATER HAMMER = 110 P.S.I.
   16",20" AND 24" WATER HAMMER = 70 P.S.I.
3. BASED ON UNDISTURBED SOIL 3,000 PSF BEARING CAPACITY AND VERTICAL BEARING SURFACES.
4. FOR HORIZONTAL PIPE FORCES.

Concrete Thrustblocks

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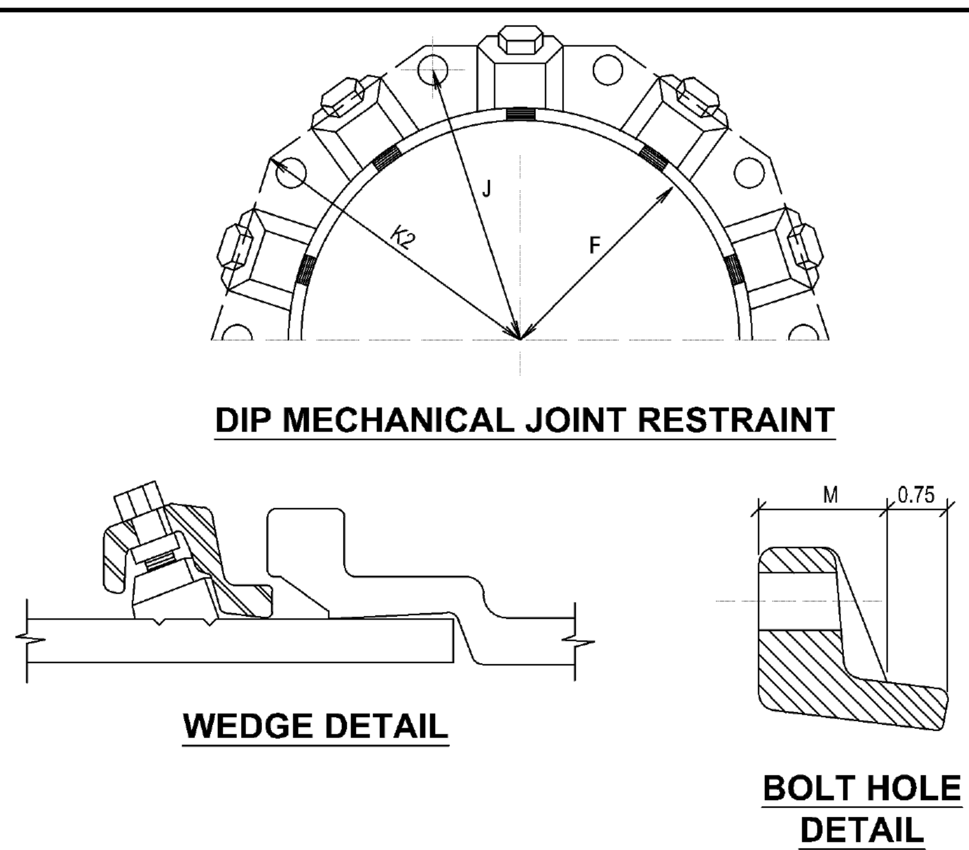
Town of Fraser
Attachment A-20 — **Revised January 2015**



DIMENSIONS

	NOMINAL PIPE SIZE	NO. OF BOLTS	NO. OF WEDGES	K2 INCHES	J INCHES	F INCHES	M INCHES
DIP	6"	6	3	11.12	9.50	7.00	0.88
DIP	8"	6	4	13.37	11.75	9.15	1.00
DIP	10"	8	6	15.62	14.00	11.20	1.00
DIP	12"	8	8	17.88	16.25	13.30	1.25

DIP NOTES:

1. AS MANUFACTURED BY EBBA IRON INC. (SERIES 1100 AND BELL JOINT SERIES 1700)
2. DIMENSIONS FOR 16" AND 20" D.I. PIPE NOT SHOWN.
3. OTHER MECHANICAL JOINT RESTRAINT DEVICES MUST BE APPROVED BEFORE INSTALLATION.

C-900/905 NOTES:

1. AS MANUFACTURED BY SMITH BLAIR (BELL JOINT LEAK CLAMP 274), OR EBBA IRON INC. (SERIES 2000 AND BELL JOINT SERIES 1500)
2. DIMENSIONS FOR 16" AND 20" D.I. PIPE NOT SHOWN
3. OTHER MECHANICAL JOINT RESTRAINT DEVICES MUST BE APPROVED BEFORE INSTALLATION.

Mechanical Joint Restraint Details

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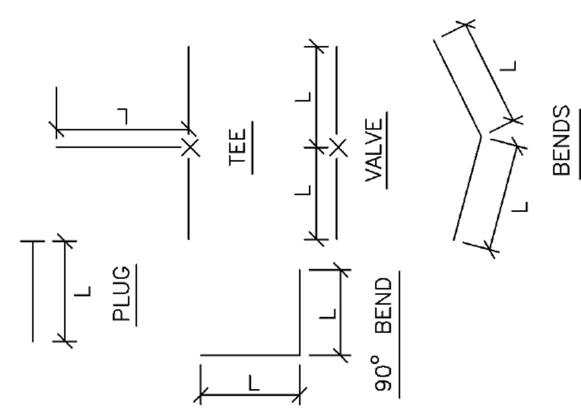
Town of Fraser
Attachment A-21 — **Revised October 2024**

LENGTH OF RESTRAINED PIPE

PIPE SIZE	6"	8"	10"	12"	14"	16"	18"	20"
FITTING	L	L	L	L	L	L	L	L
90° BEND TEE, PLUG	45'	60'	74'	86'	98'	108'	120'	132'
VALVE	—	—	—	—	—	108'	120'	132'
45° BEND	13'	18'	22'	25'	29'	32'	36'	39'
22½° BEND	4'	5'	6'	7'	8'	8'	9'	10'
11¼° BEND	—	1'	2'	2'	2'	2'	3'	3'

NOTES:

1.) LENGTH OF RESTRAINED PIPE MEASURED EACH WAY FROM VALVES AND BENDS.
2.) CLAMPS, RODS & MEGALUGS NOT ALLOWED FOR 24" & LARGER PIPES.
3.) D=DIAMETER, L=LENGTH, G=GRADE, M.S.=MILD STEEL, H.S.=HIGH STRENGTH.
4.) BASED ON 150 PSI INTERNAL PRESSURE.
5.) LENGTH REFERS TO THE AMOUNT OF PIPE WHICH MUST BE RESTRAINED TOGETHER AND IS NOT NECESSARILY THE LENGTH OF THE RODS.
6.) LENGTH OF RESTRAINED PIPE CHART IS ALSO FOR THE LENGTH OF JOINT RESTRAINT FOR MEGALUGS, OR OTHER RESTRAINT SYSTEMS.
7.) CROSSES MUST BE RESTRAINED IN ALL APPLICABLE DIRECTIONS.
8.) 12" AND SMALLER IN-LINE VALVES AND TEES SHALL HAVE A MECHANICAL JOINT RESTRAINT DEVICE ON EACH SIDE OF THE FITTING OR VALVE.
9.) IF A VALVE IS WITHIN DISTANCE "L" OF A FITTING, THE VALVE MUST BE TIED TO THAT FITTING.
10.) A SECOND VALVE WILL BE REQUIRED TO BE CLOSED WHEN EXCAVATING NEXT TO EXISTING VALVE.
11.) IF D.I.P. IS POLYETHYLENE WRAPPED, TIE RODS ARE TO BE ENCLOSED INSIDE THE WRAP.



Length of Restrained Pipe

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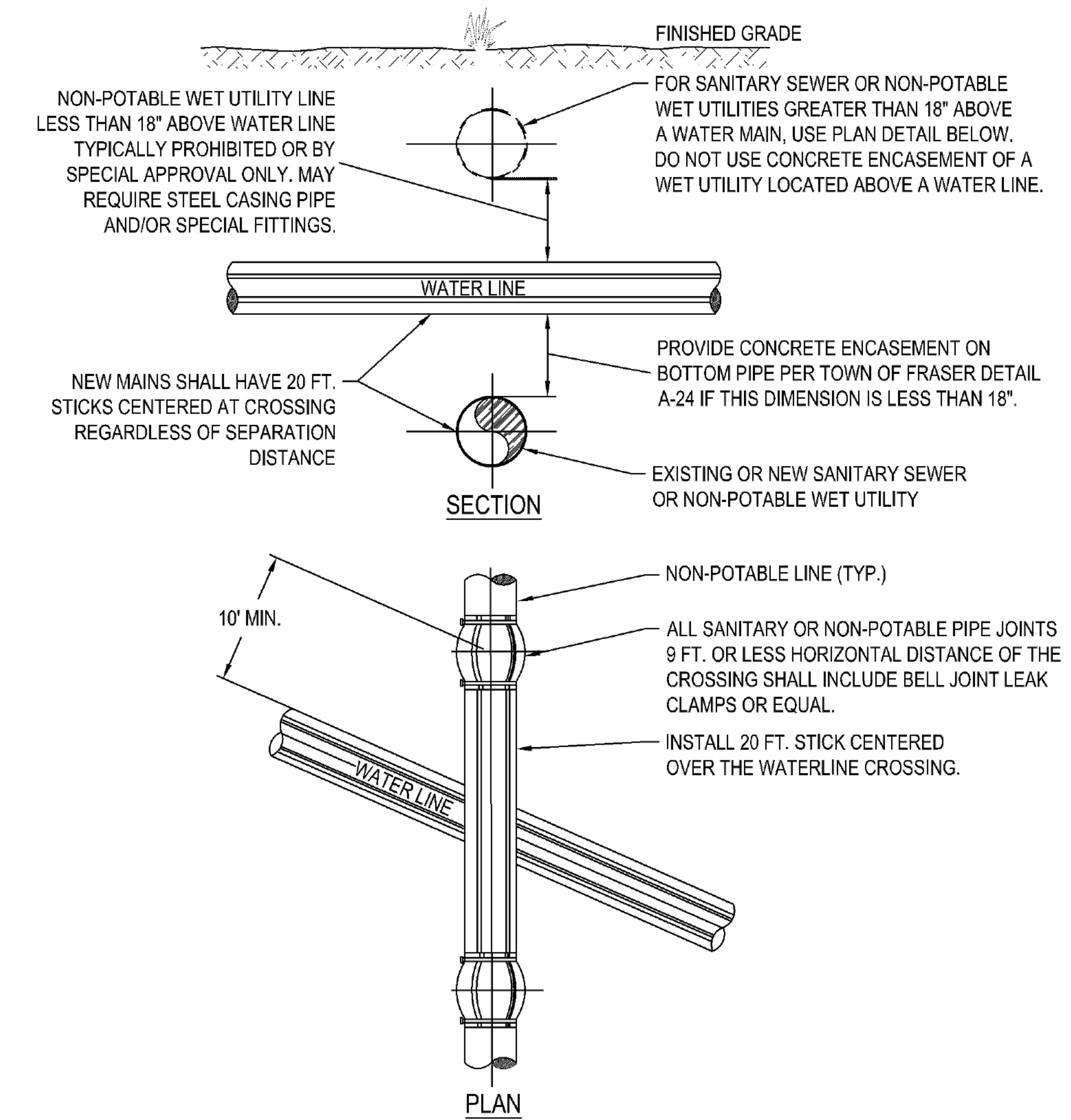
Town of Fraser
Attachment A-22 — **Revised January 2015**

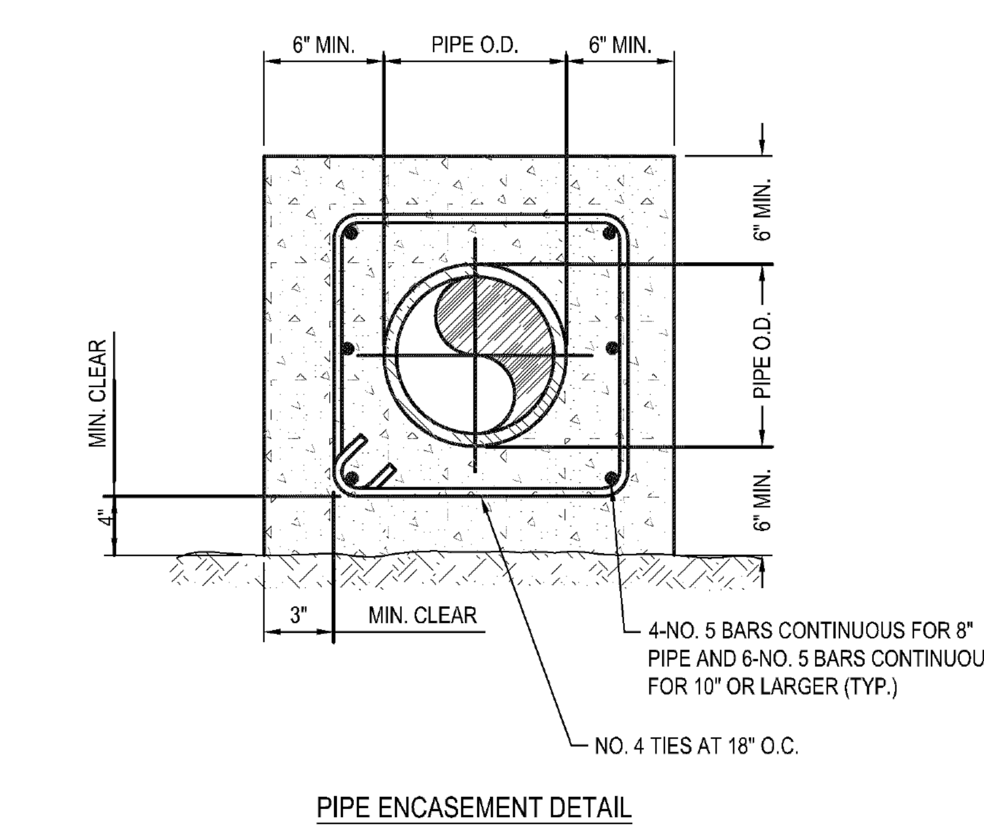


UTILITY ENCROACHMENT AND CROSSING PROTECTION METHODS VARY WIDELY DEPENDING ON NEW WATER VS. NEW SEWER INSTALLATION AND CROSSINGS VS PARALLEL ENCROACHMENTS. ALL WET UTILITY ENCROACHMENTS WITH POTABLE WATER MAINS SHOULD BE REVIEWED AND APPROVED BY THE TOWN PRIOR TO IMPLEMENTATION AND INSPECTED UPON COMPLETION.

Sewer Service Line Connection Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-23 — **Revised October 2024**



PIPE ENCASEMENT DETAIL

NOTE:

1. CONCRETE SHALL NOT BE LEANER THAN 1 CEMENT; 2-1/2 SAND; 5 STONE AND SHALL NOT HAVE LESS THAN 3,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. PLACE CONCRETE AGAINST EITHER SOLID FORMWORK OR UNDISTURBED SOIL.
3. USE ONLY IF SANITARY SEWER IS BELOW THE WATER LINE.
4. REINFORCEMENT REQUIRED ONLY WHERE ENCASEMENT PIPE REQUIRES BRIDGING CAPACITY OR IS UNDER A WATERWAY CROSSING. USE GR. 40 REINFORCING BARS.

Pipe Encasement Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

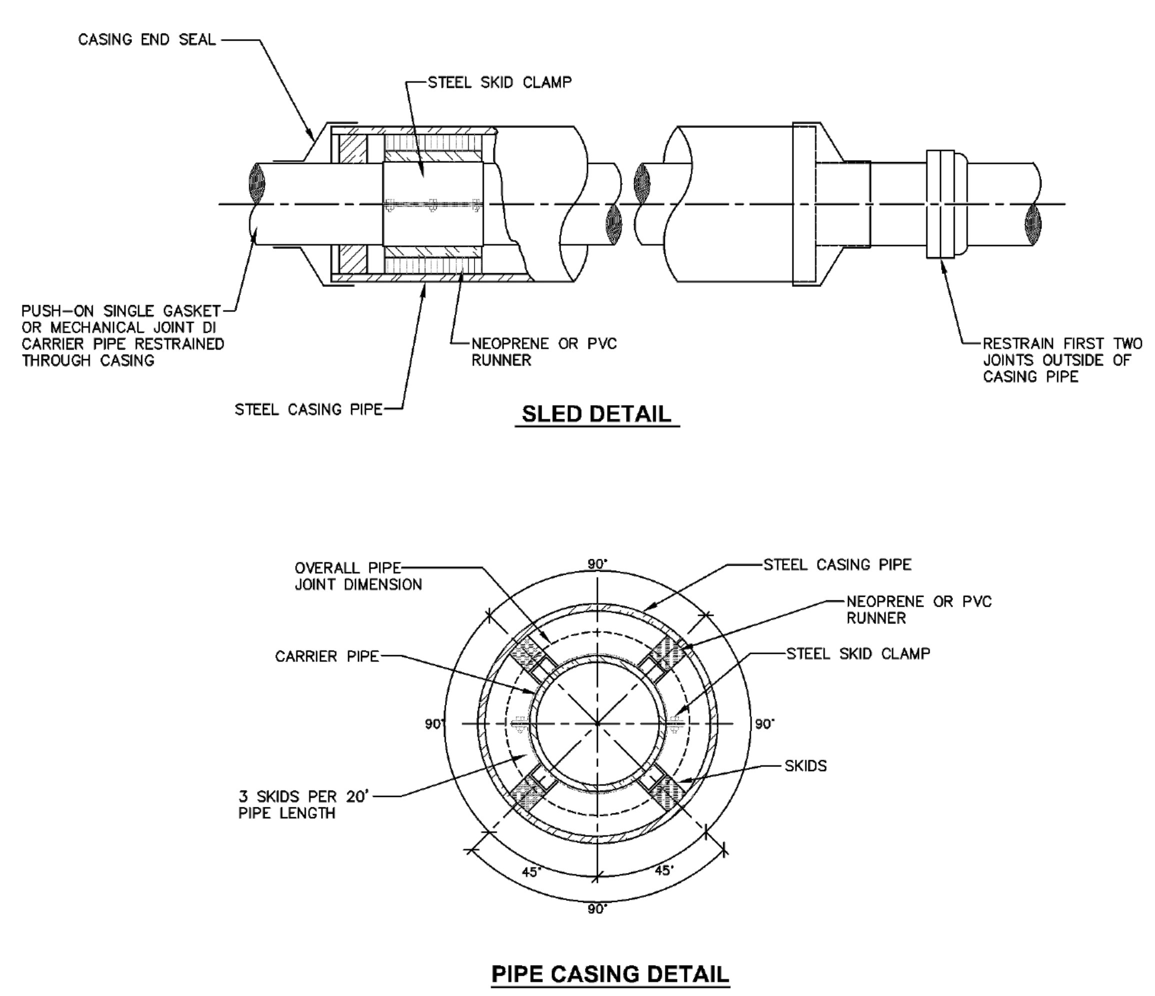
Town of Fraser
Attachment A-24 — **Revised October 2024**

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
DETAILS (2 OF 7)



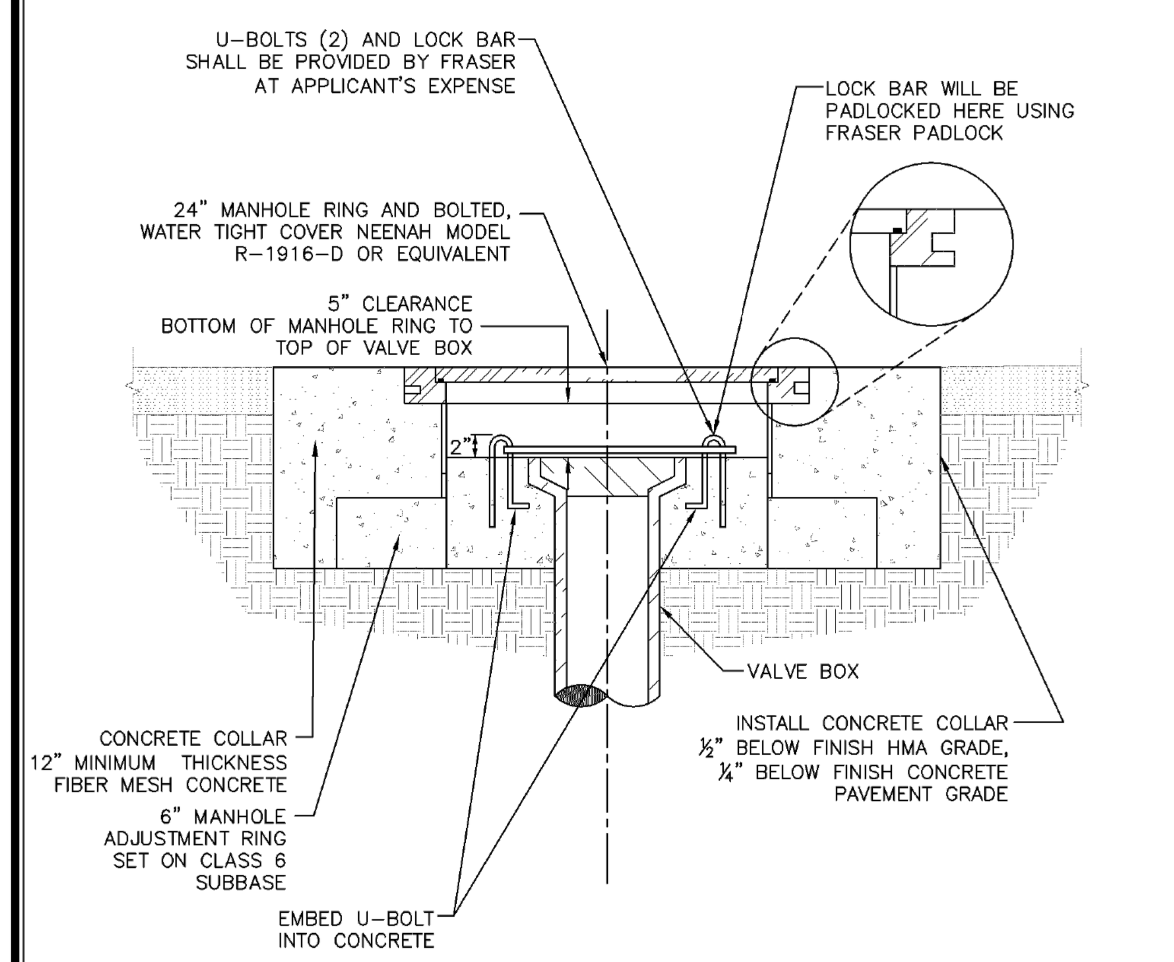
NOTE:

TRENCH LAID CASINGS SHALL BE DESIGNED AND INSTALLED TO CONDUIT STANDARDS.

Bore Casing Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

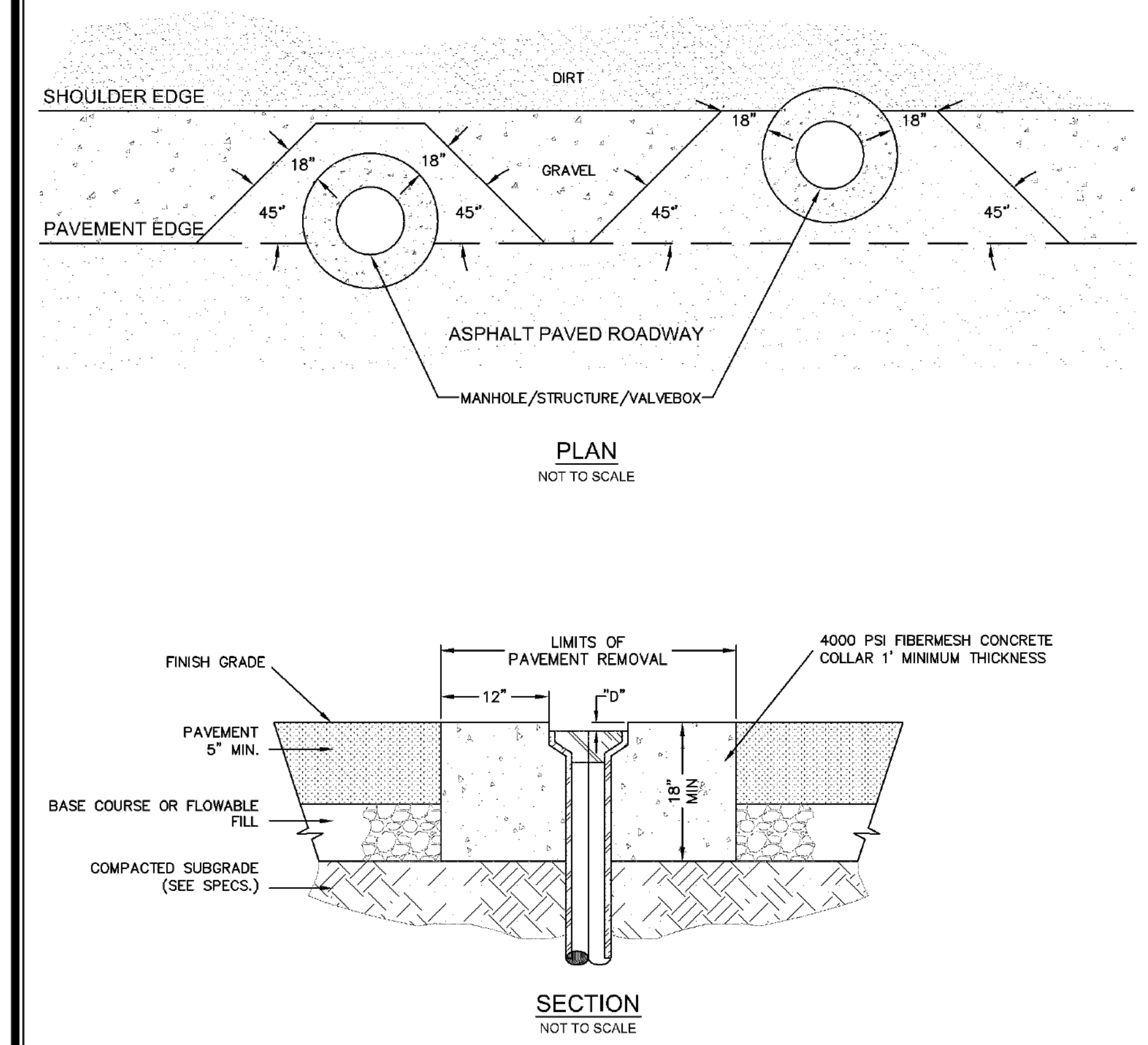
Town of Fraser
Attachment A-25 — Revised January 2015



Locking Valve Box Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-26 — Revised January 2015



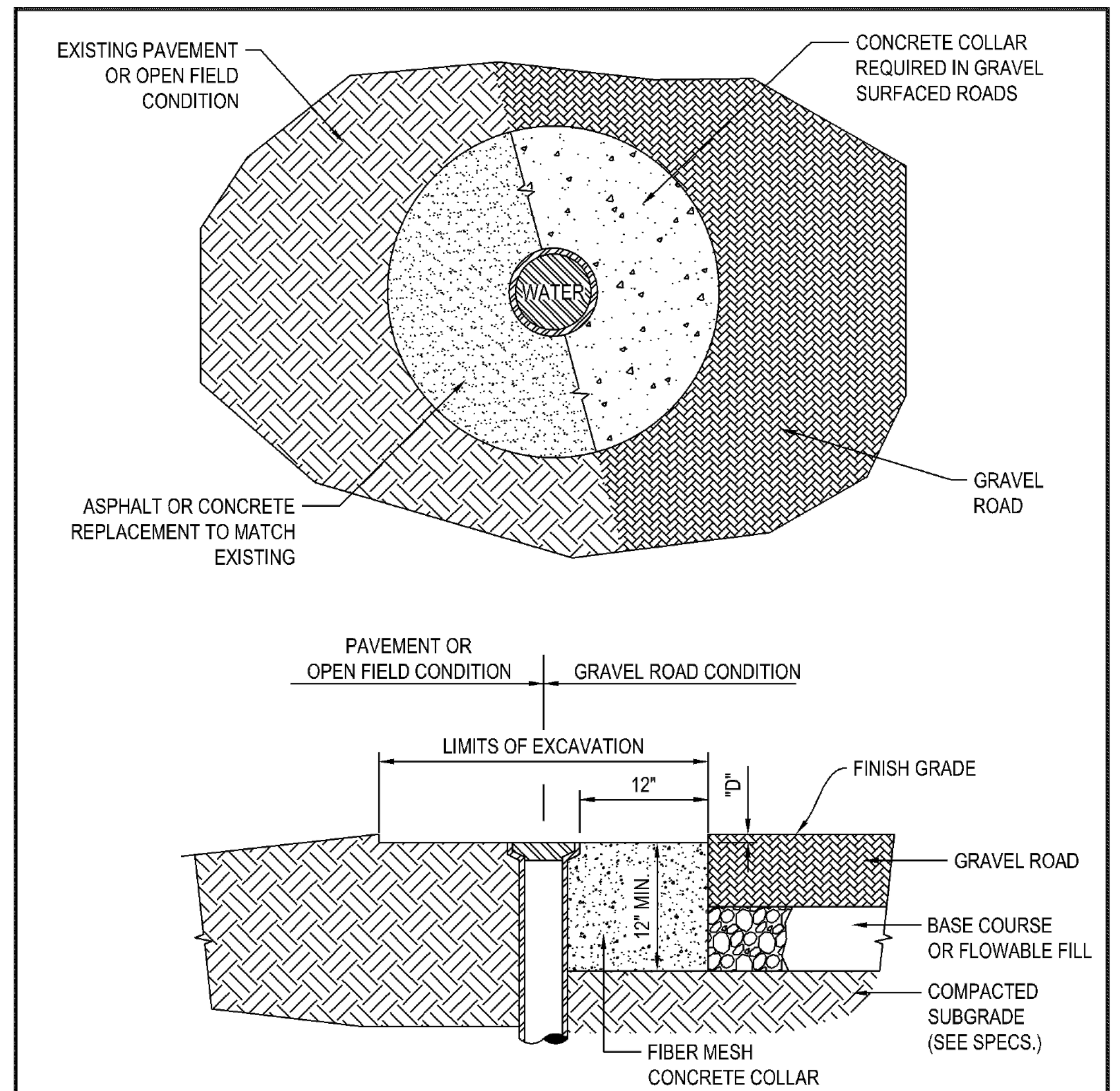
NOTES:

1. "D" = ½" FOR H.M.A. PAVEMENT OVERLAYS OR SURFACE TREATMENTS
2. "D" = ½" FOR H.M.A. PAVEMENT RECONSTRUCTION OR NEW CONSTRUCTION
3. "D" = ¼" FOR CONCRETE STREETS
4. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS
5. RING AND COVER TO MATCH SLOPE OF FINISHED STREET

Manhole/Structure/Valve Box Placement -Shoulder Area

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-27 — Revised January 2015

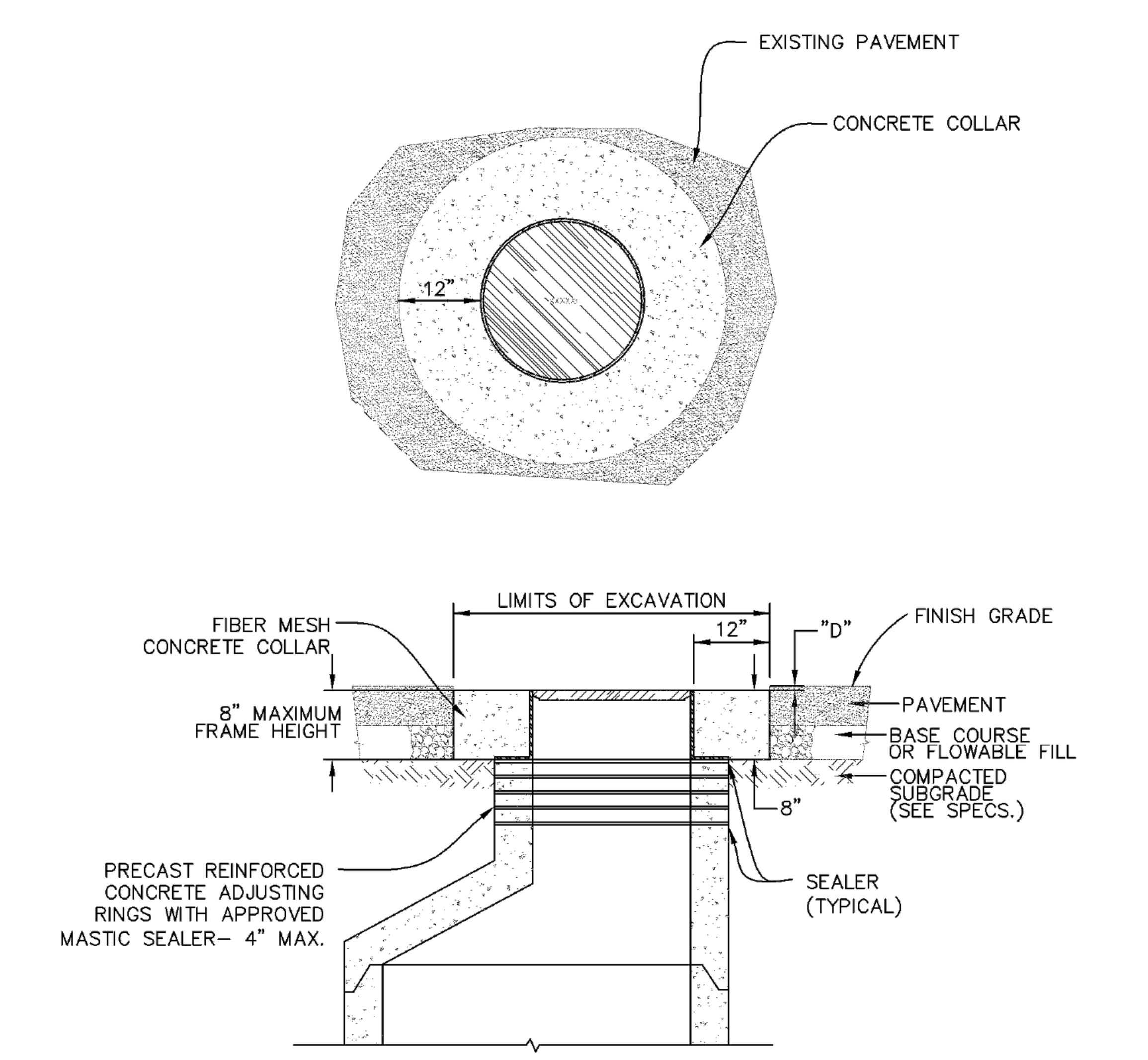


NOTES:
1. "D" = 1/2" FOR H.M.A. PAVEMENT OVERLAYS OR SURFACE TREATMENTS
2. "D" = 1/2" FOR H.M.A. PAVEMENT RECONSTRUCTION OR NEW CONSTRUCTION
3. "D" = 1/4" FOR CONCRETE STREETS
4. VALVE BOX MUST BE PLUMB AND CENTERED OVER THE VALVE NUT
5. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS
6. USE FIBER MESH CONCRETE. NO REINFORCEMENT REBAR.

Valve Box Concrete Collar Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-28 — Revised October 2024



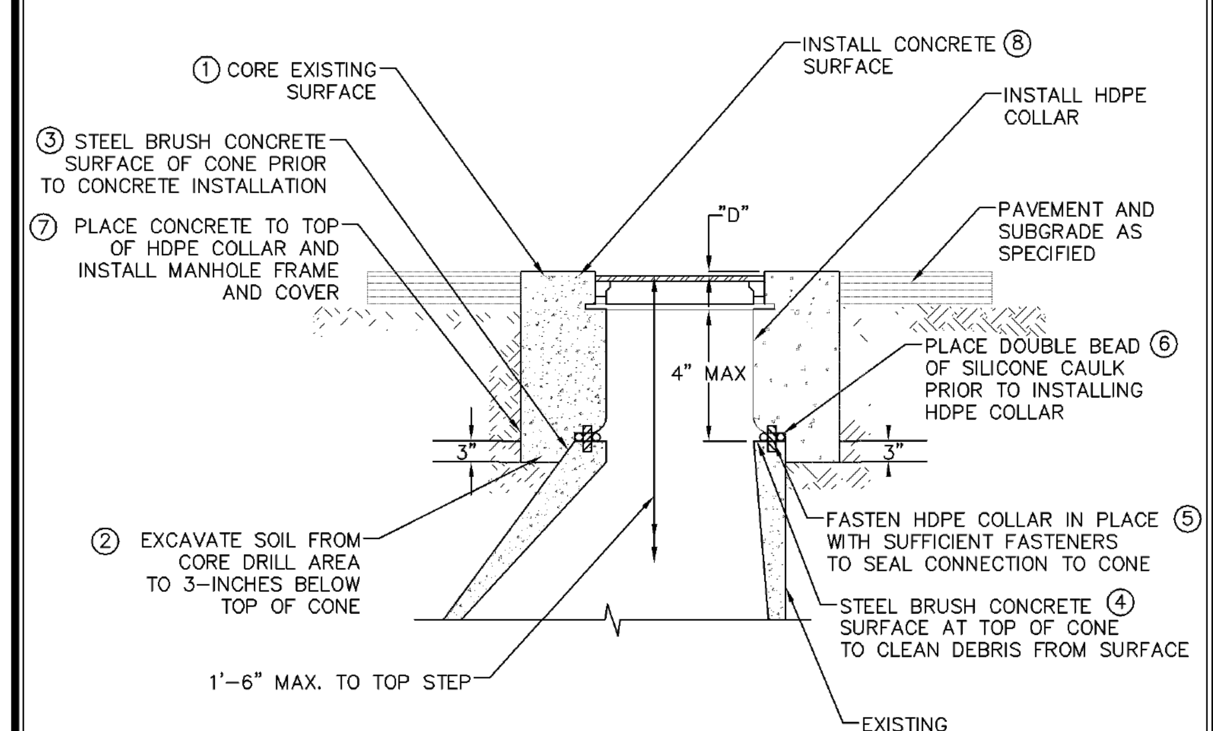
NOTES:

1. A SEALER SHALL BE USED BETWEEN ALL ADJUSTING RINGS AS REQUIRED
2. DROP-IN RISER RINGS NOT ALLOWED
3. SET AND TILT RING AND COVER TO MATCH SLOPE OF FINISHED STREET
4. "D" = ½" FOR H.M.A. PAVEMENT OVERLAYS OR SURFACE TREATMENTS
5. "D" = ½" FOR H.M.A. PAVEMENT RECONSTRUCTION OR NEW CONSTRUCTION
6. "D" = ¼" FOR CONCRETE STREETS
7. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS

Structure/Manhole Concrete Collar Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-29 — Revised January 2015



LEGEND

STEPS TO COMPLETE ADJUSTMENT

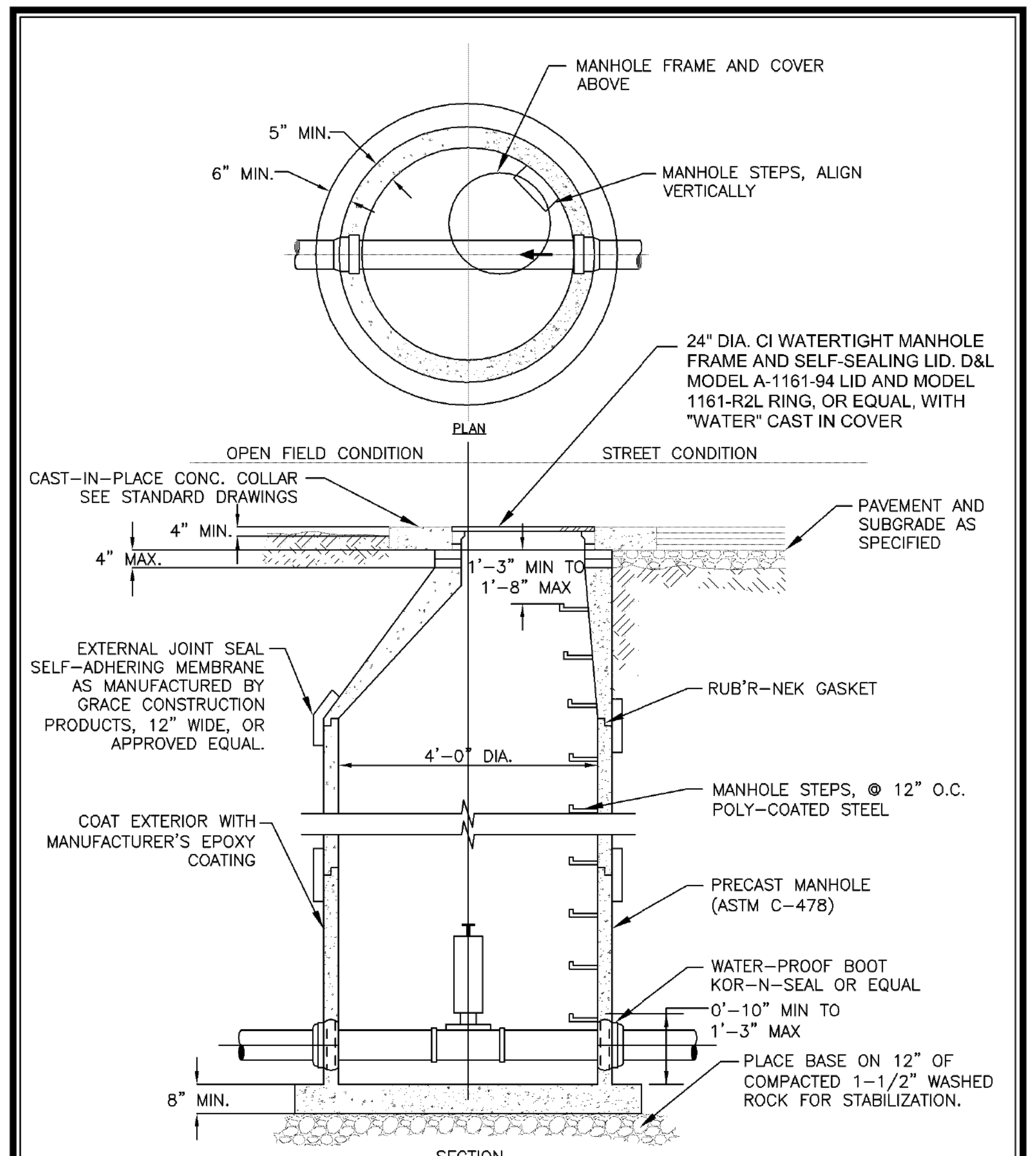
NOTES:

1. "D" = ½" FOR H.M.A. PAVEMENT OVERLAYS OR SURFACE TREATMENTS
2. "D" = ½" FOR H.M.A. PAVEMENT RECONSTRUCTION OR NEW CONSTRUCTION
3. "D" = ¼" FOR CONCRETE STREETS
4. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS
5. RING AND COVER TO MATCH SLOPE OF FINISHED STREET

Optional Manhole / Structure Adjustment Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

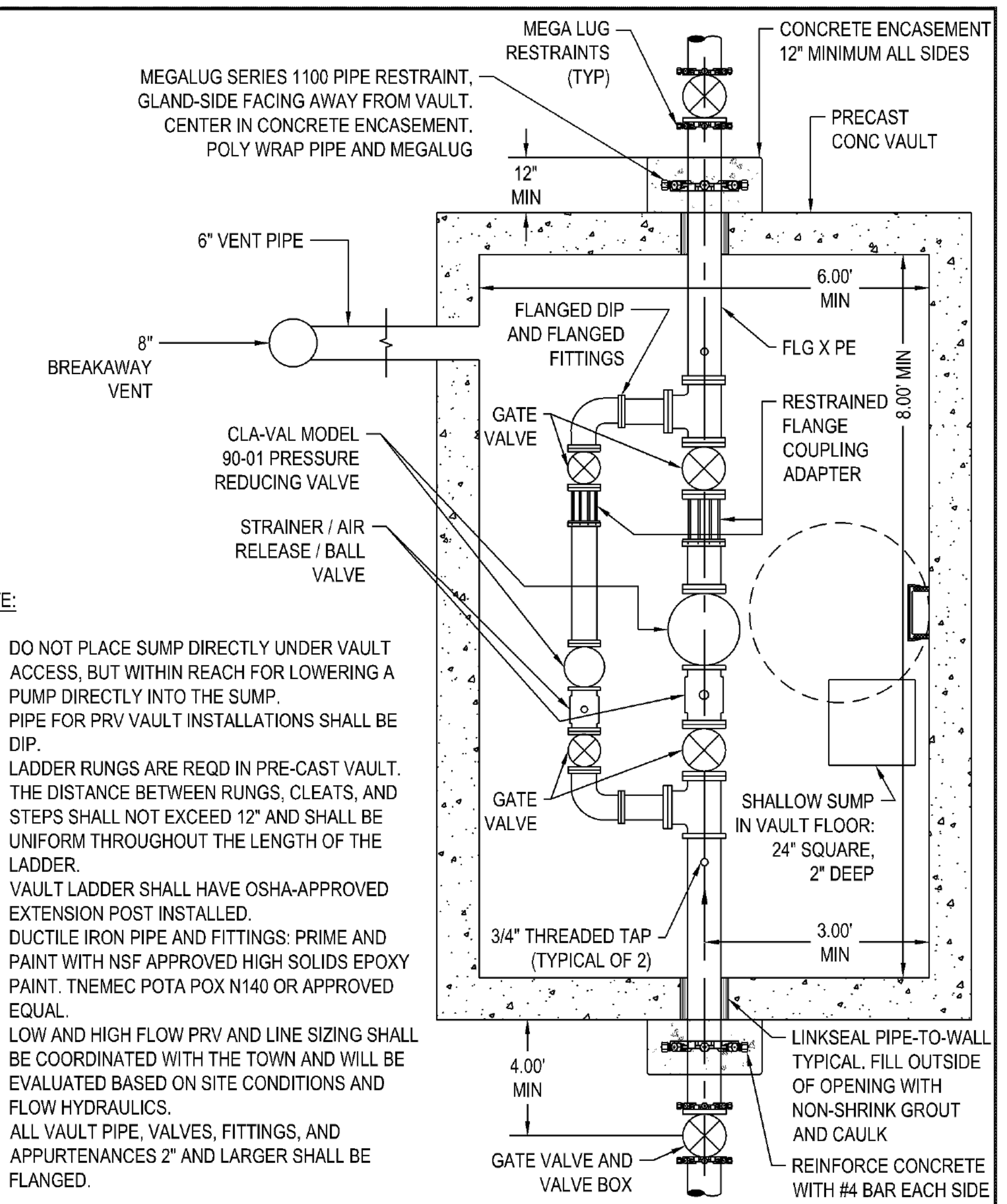
Town of Fraser
Attachment A-30 — Revised January 2015



Air Release Valve Structure

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-31 — Revised October 2024



NOTE:

1. DO NOT PLACE SUMP DIRECTLY UNDER VAULT ACCESS, BUT WITHIN REACH FOR LOWERING A PUMP DIRECTLY INTO THE SUMP.
2. PIPE FOR PRV VAULT INSTALLATIONS SHALL BE DIP.
3. LADDER RUNGS ARE REQD IN PRE-CAST VAULT. THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12" AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER.
4. VAULT LADDER SHALL HAVE OSHA-APPROVED EXTENSION POST INSTALLED.
5. DUCTILE IRON PIPE AND FITTINGS: PRIME AND PAINT WITH NSF APPROVED HIGH SOLIDS EPOXY PAINT. TNEMEC POTA POX N140 OR APPROVED EQUAL.
6. LOW AND HIGH FLOW PRV AND LINE SIZING SHALL BE COORDINATED WITH THE TOWN AND WILL BE EVALUATED BASED ON SITE CONDITIONS AND FLOW HYDRAULICS.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES 2" AND LARGER SHALL BE FLANGED.

Underground PRV Vault - Plan View

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-32 — Revised October 2024

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

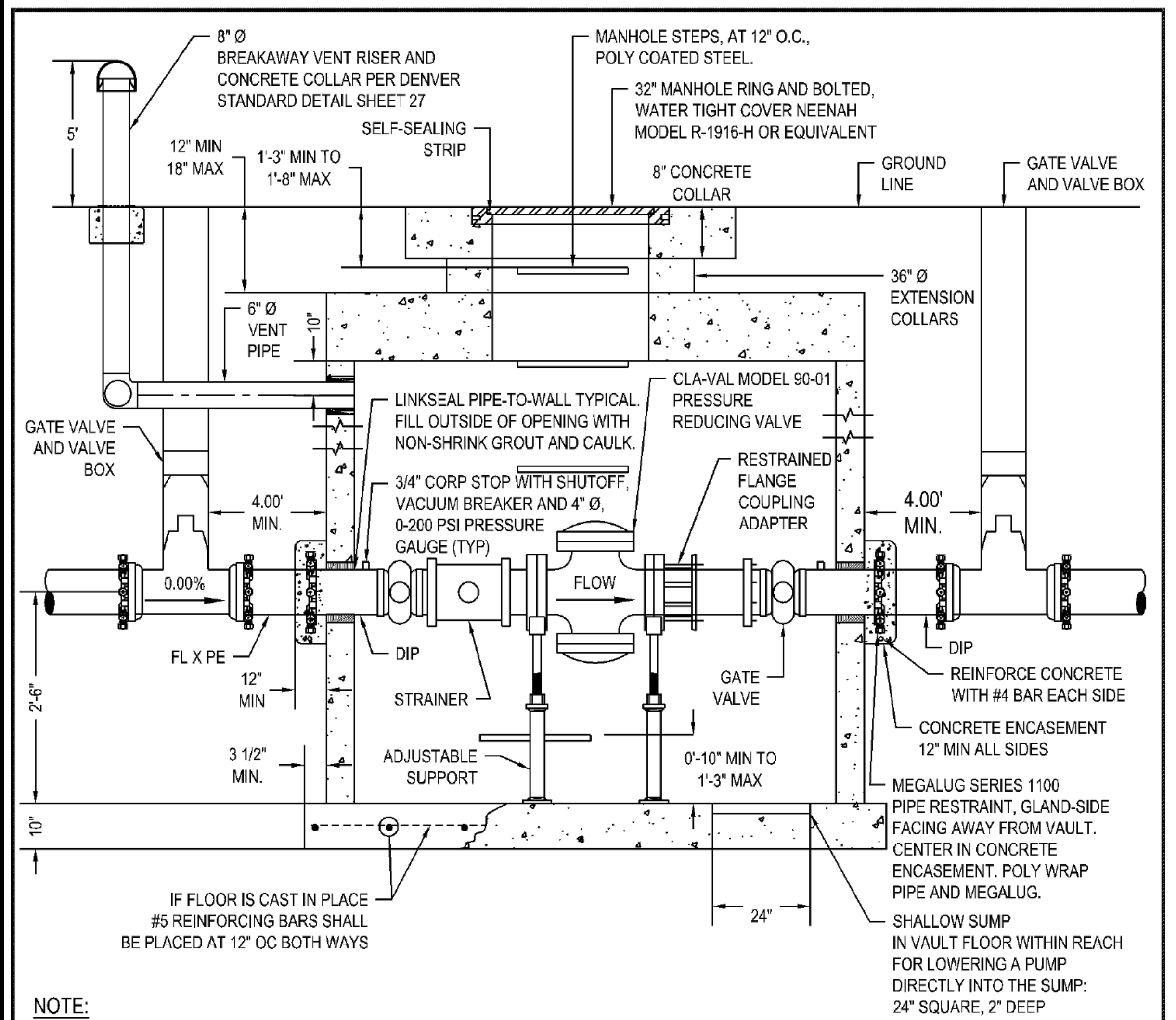
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
DETAILS (3 OF 7)

Know what's below. Call before you dig. 811

SHEET 40 OF 44

12/18/2025 8:23 AM, X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS PRELIMINARY DETAILS - WM - F1.DWG 3



NOTE:

1. SEE PLAN VIEW AND ADDITIONAL NOTES.
2. ALL PIPES WITHIN THE VAULT SHALL BE LEVEL.
3. VAULT STRUCTURE THICKNESS DIMENSIONS MAY VARY WITH SITE CONDITIONS. VAULT TO BE BUILT TO WITHSTAND A MINIMUM OF H20 TRAFFIC LOADING.
4. STRUCTURE TO BE WATER TIGHT.
5. APPLY EXTERNAL JOINT SEAL SELF ADHERING MEMBRANE AS MANUFACTURED BY GRACE CONSTRUCTION PRODUCTS 12" WIDE OR APPROVED EQUAL, TO ALL EXTERIOR JOINTS.
6. MANHOLE SHALL BE 32" MINIMUM AND SIZED TO ACCOMMODATE EQUIPMENT REMOVAL OR ALTERNATIVELY PROVIDE PROPERLY SIZED EQUIPMENT HATCH. 10" AND LARGER PIPE / VALVE SIZE REQUIRES VAULT ACCESS HATCH.

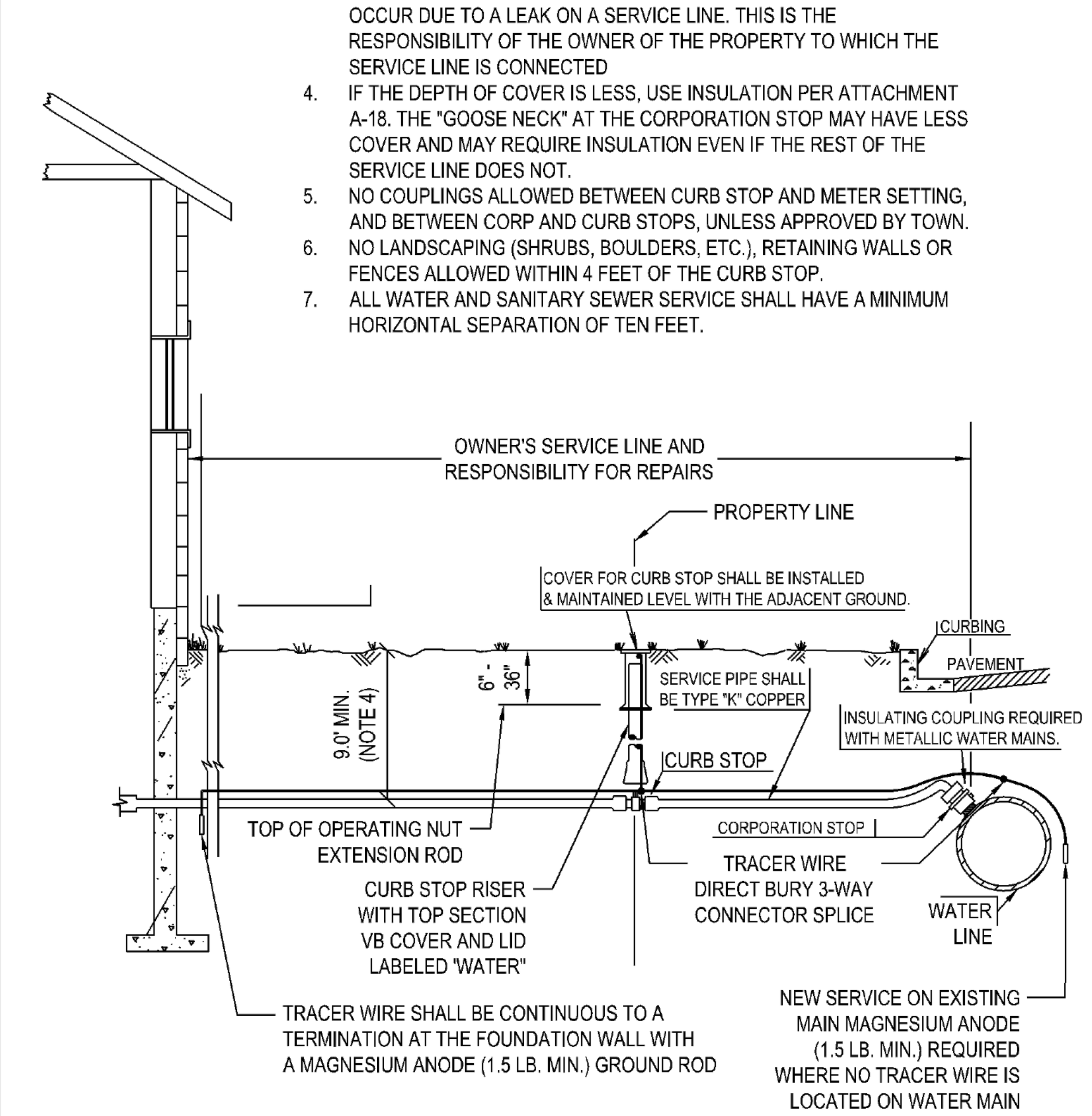
Underground PRV Vault - Section View

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-33 **Revised October 2024**

NOTES:

1. PLACEMENT OF CURB STOP IS TO BE ON THE PROPERTY/RIGHT-OF-WAY LINE (UNLESS OTHERWISE APPROVED).
2. OWNER'S RESPONSIBILITY FOR REPAIRS EXTENDS TO THE CORPORATION STOP AT THE WATER MAIN
3. TOWN OF FRASER IS NOT RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR DUE TO A LEAK ON A SERVICE LINE. THIS IS THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY TO WHICH THE SERVICE LINE IS CONNECTED
4. IF THE DEPTH OF COVER IS LESS, USE INSULATION PER ATTACHMENT A-18. THE "GOOSE NECK" AT THE CORPORATION STOP MAY HAVE LESS COVER AND MAY REQUIRE INSULATION EVEN IF THE REST OF THE SERVICE LINE DOES NOT.
5. NO COUPLINGS ALLOWED BETWEEN CURB STOP AND METER SETTING, AND BETWEEN CORP AND CURB STOPS, UNLESS APPROVED BY TOWN.
6. NO LANDSCAPING (SHRUBS, BOULDERS, ETC.), RETAINING WALLS OR FENCES ALLOWED WITHIN 4 FEET OF THE CURB STOP.
7. ALL WATER AND SANITARY SEWER SERVICE SHALL HAVE A MINIMUM HORIZONTAL SEPARATION OF TEN FEET.



Water Service Line and Curb Stop

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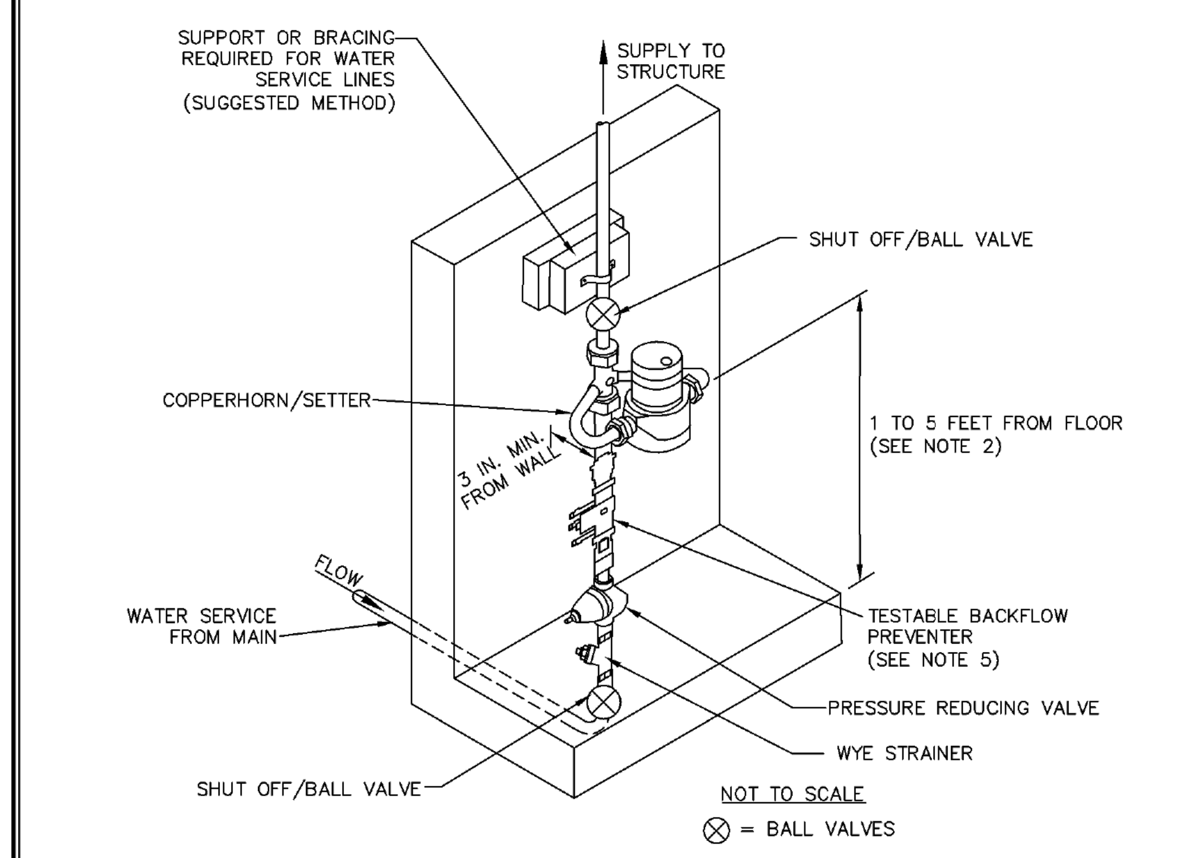
Town of Fraser
Attachment A-34 **Revised October 2024**



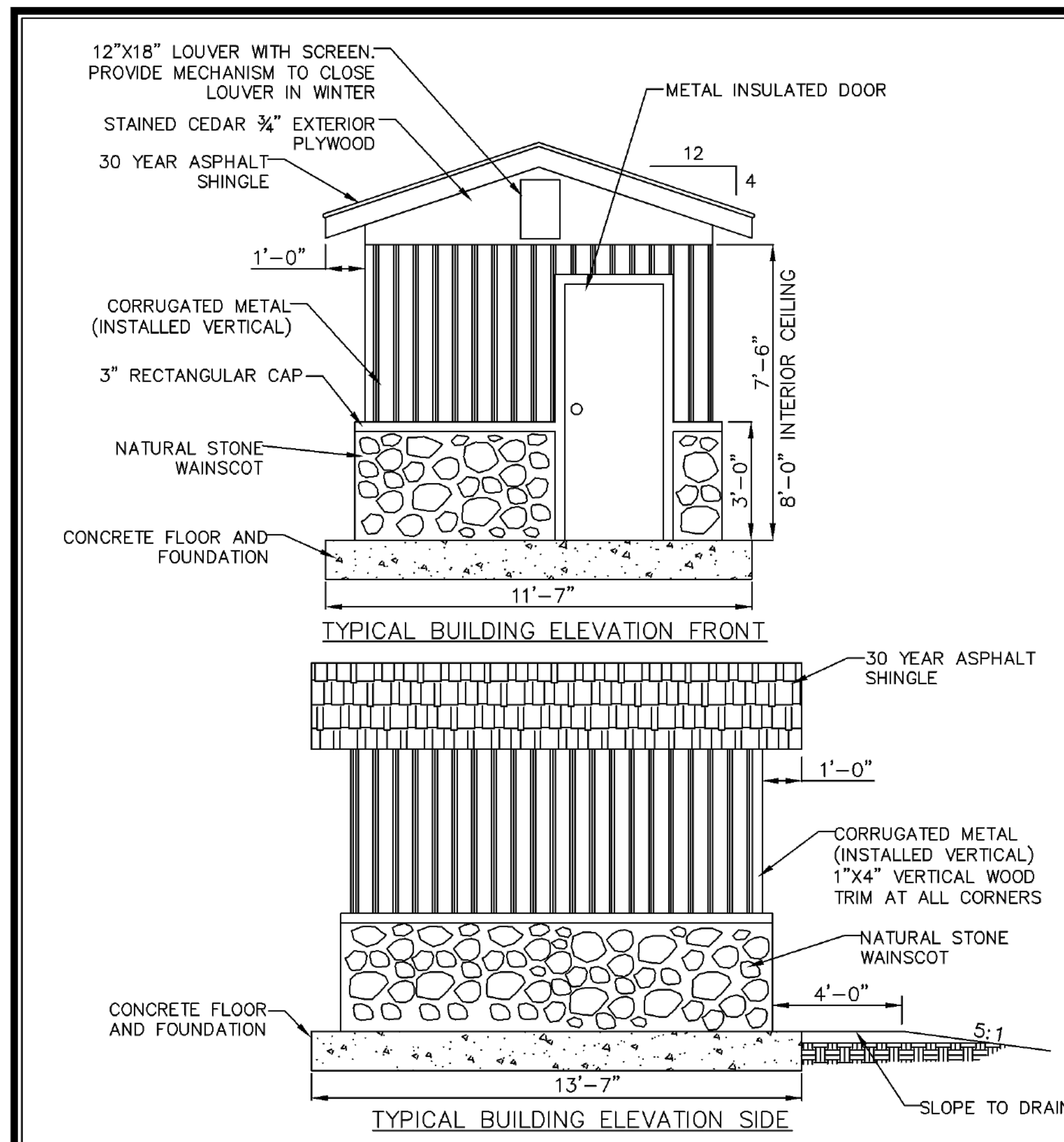
NOTES:

1. PROVIDE CLEAR AND UNOBSTRUCTED 4 FT. BY 4 FT. MINIMUM ACCESS TO THE METER ASSEMBLY.
2. ENTIRE METER ASSEMBLY SHALL NOT BE INSTALLED BELOW GRADE OR WHERE THE POTENTIAL FOR SUBMERSION EXISTS.
3. METER SHALL BE INSTALLED IN A HORIZONTAL POSITION WITH DISPLAY FACING UP.
4. WYE–STRAINER MUST BE INSTALLED IMMEDIATELY AFTER FIRST SHUT OFF VALVE.
5. BACKFLOW DEVICE TYPE SHALL BE DETERMINED BY HAZARD LEVEL AND CONFORM TO THE STANDARDS REFERENCED IN THE 2021 INTERNATIONAL PLUMBING CODE. ALL COMMERCIAL, INDUSTRIAL AND MIXED USE PROPERTIES SHALL HAVE A REDUCED PRESSURE ZONE BACKFLOW UNIT.
6. WATER METER SHALL BE OF A METRON–FARNIER DESIGN READABLE BY THE WATERSCOPE SYSTEM AND OF THE APPROPRIATE SIZE FOR ACCURATE MEASUREMENT OF FLOW.

Water Meter Assembly Installation

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND THE 2015 INTERNATIONAL PLUMBING CODE FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-35 **Revised October 2024**



NOTES:
1. INTERIOR WALLS AND CEILING SHALL BE 3/4" EXTERIOR PLYWOOD PAINTED WHITE.
2. ALL WALLS AND CEILING SHALL BE INSULATED WITH R–19 FIBERGLASS, 23".
3. FRAMING SHALL BE 2" X 6" – 24" O.C. WOOD FRAMING.

Water Well Meter House Elevations

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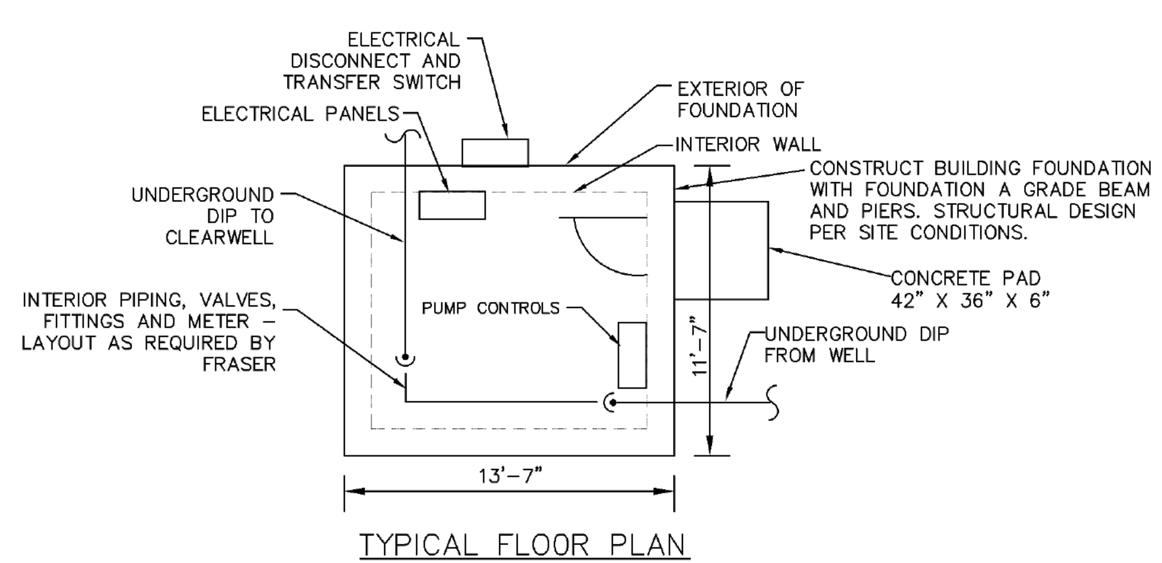
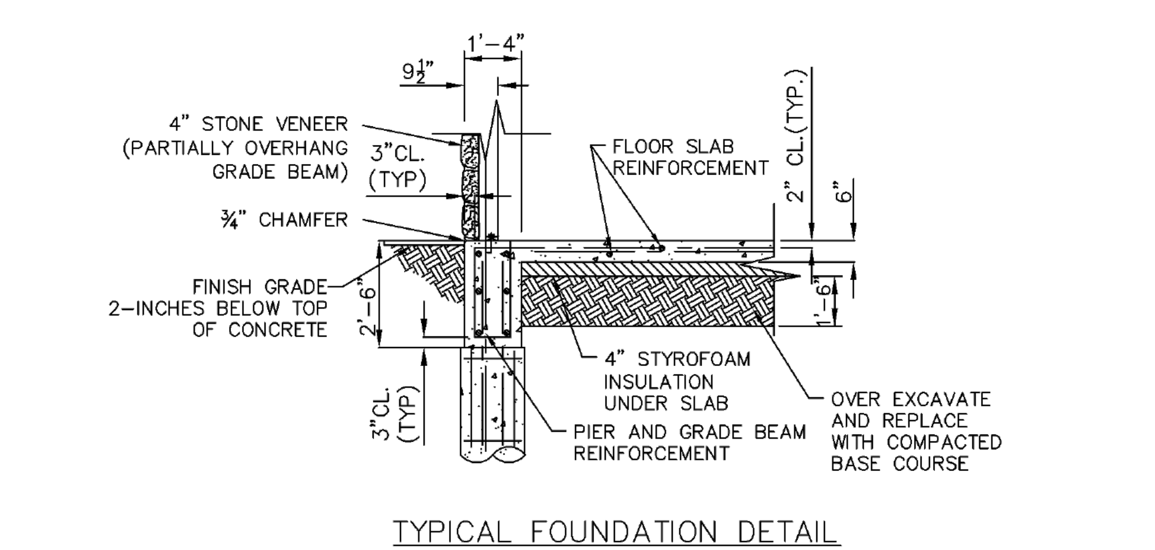
Town of Fraser
Attachment A-36 **Revised January 2015**



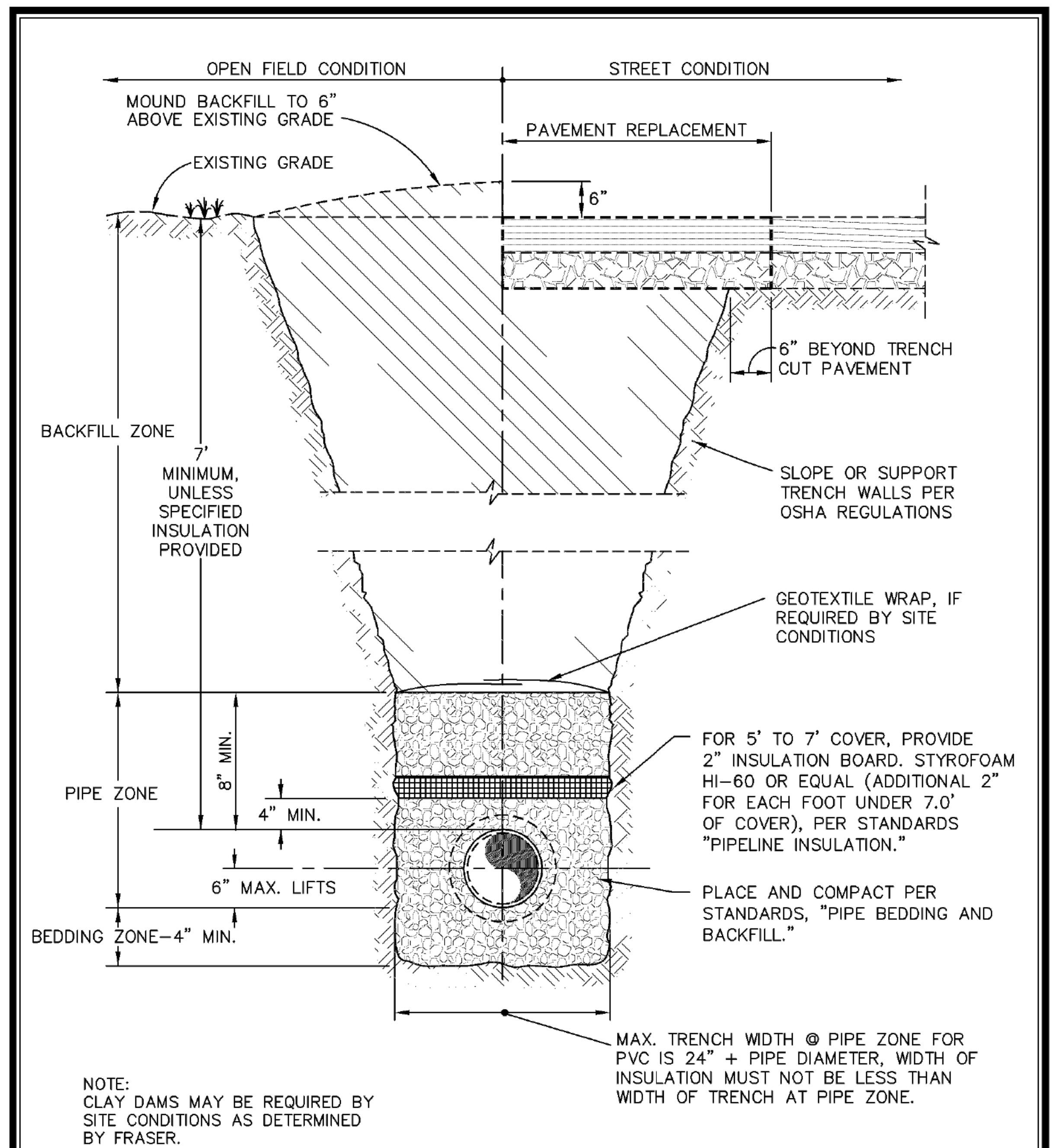


NOTES:
1. INTERIOR SHALL INCLUDE ONE FOUR BULB FLOURESCENT WITH LIGHT SWITCH, TWO SINGLE GANG OUTLETS, AND ONE 60" BASEBOARD HEATER WITH T–STAT; 120V.
2. INTERIOR COMPONENTS MAY BE REORIENTED TO FIT SITE, BUT SHALL BE ACCESSIBLE FROM ENTRY DOOR.

Water Well Meter House Floor Plan and Foundation

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-37 **Revised January 2015**



NOTE:
CLAY DAMS MAY BE REQUIRED BY SITE CONDITIONS AS DETERMINED BY FRASER.

Sewer Main and Service Line Bedding & Backfill Detail

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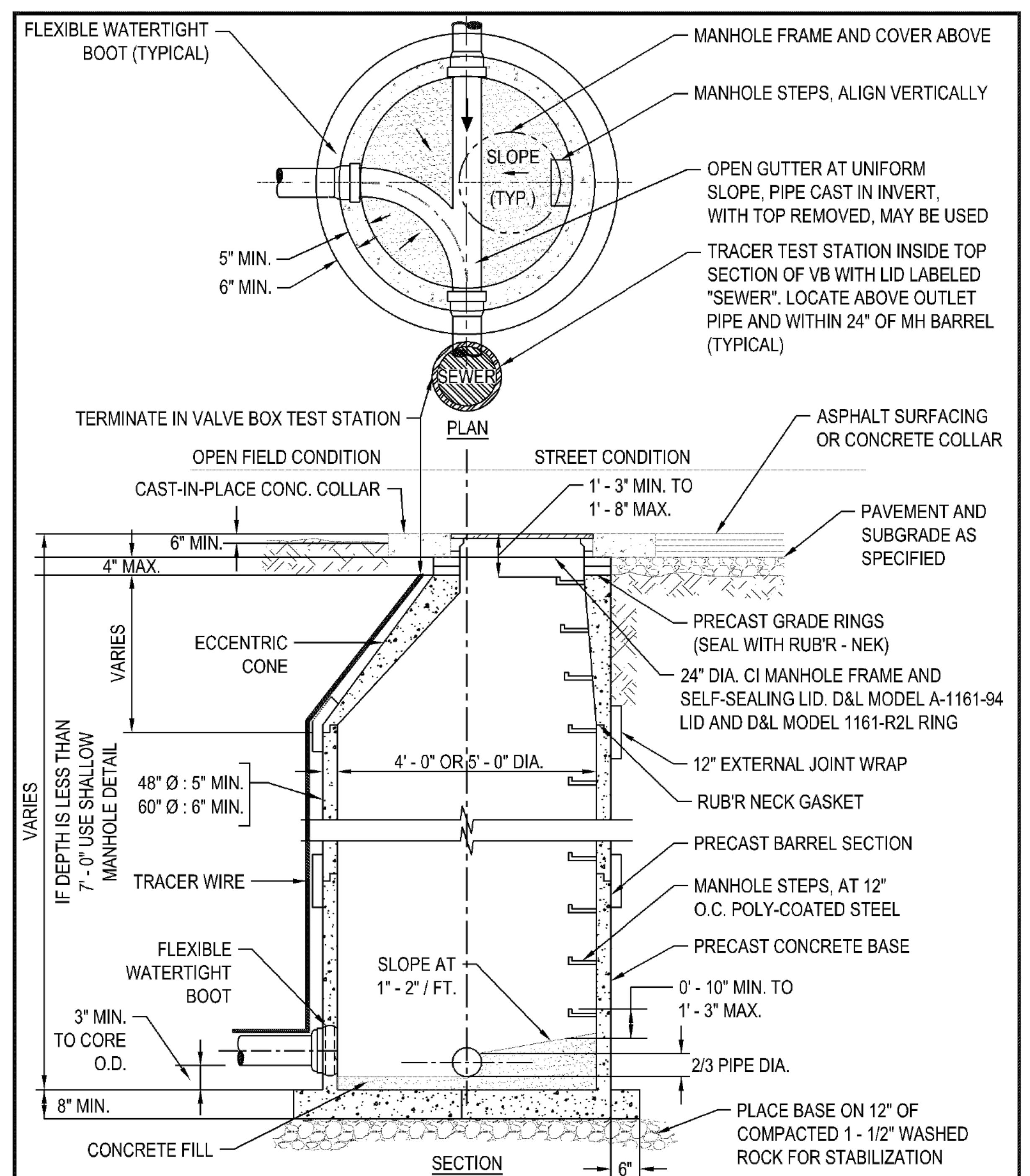
Town of Fraser
Attachment A-38 **Revised January 2015**



Standard Precast Concrete Manhole

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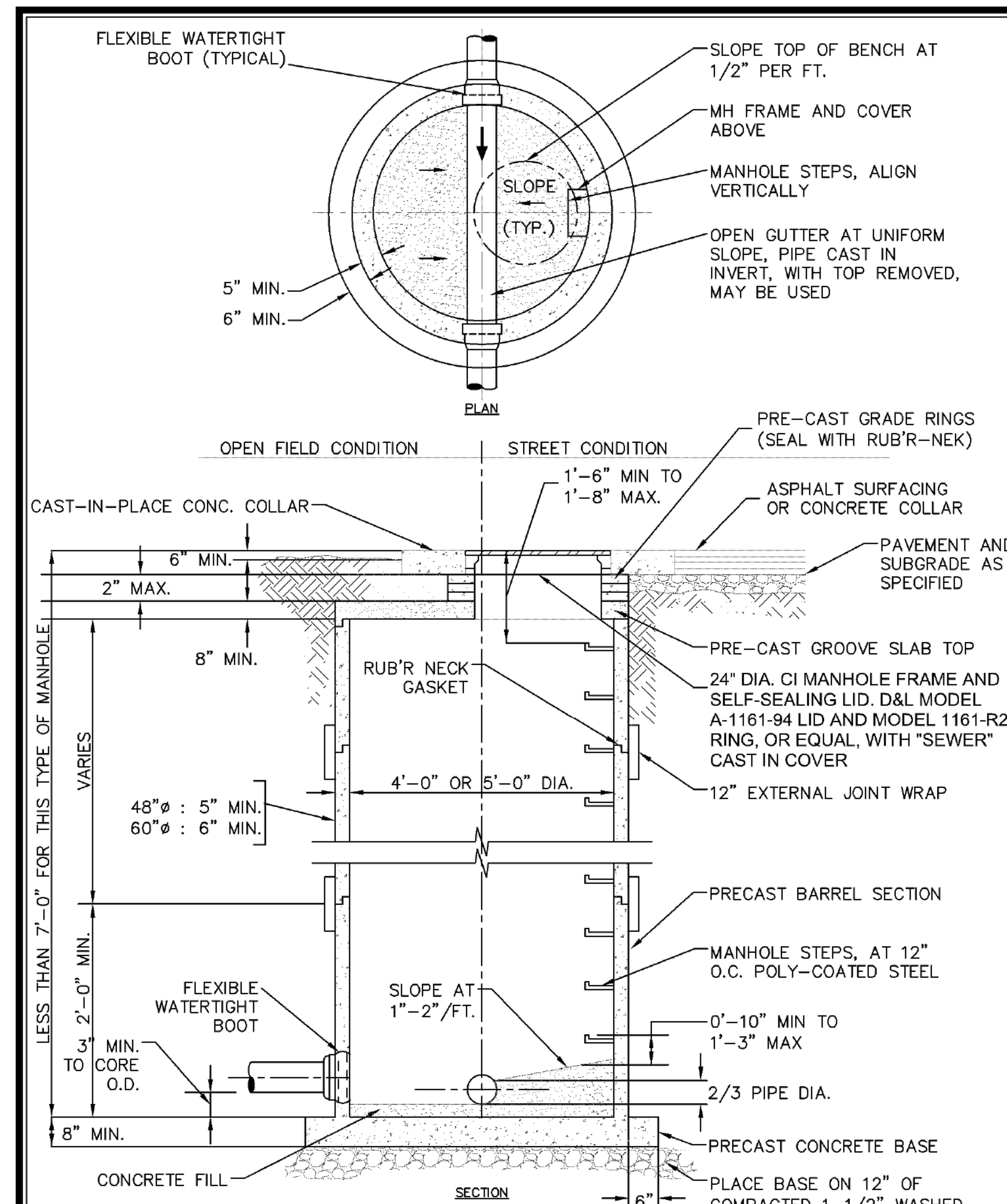
Town of Fraser
Attachment A-39 **Revised October 2024**



Shallow Precast Concrete Manhole

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-40 **Revised October 2024**

terracina design
10200 E. Girard Ave. A-314
Denver, CO 80231
ph: 303.632.8867

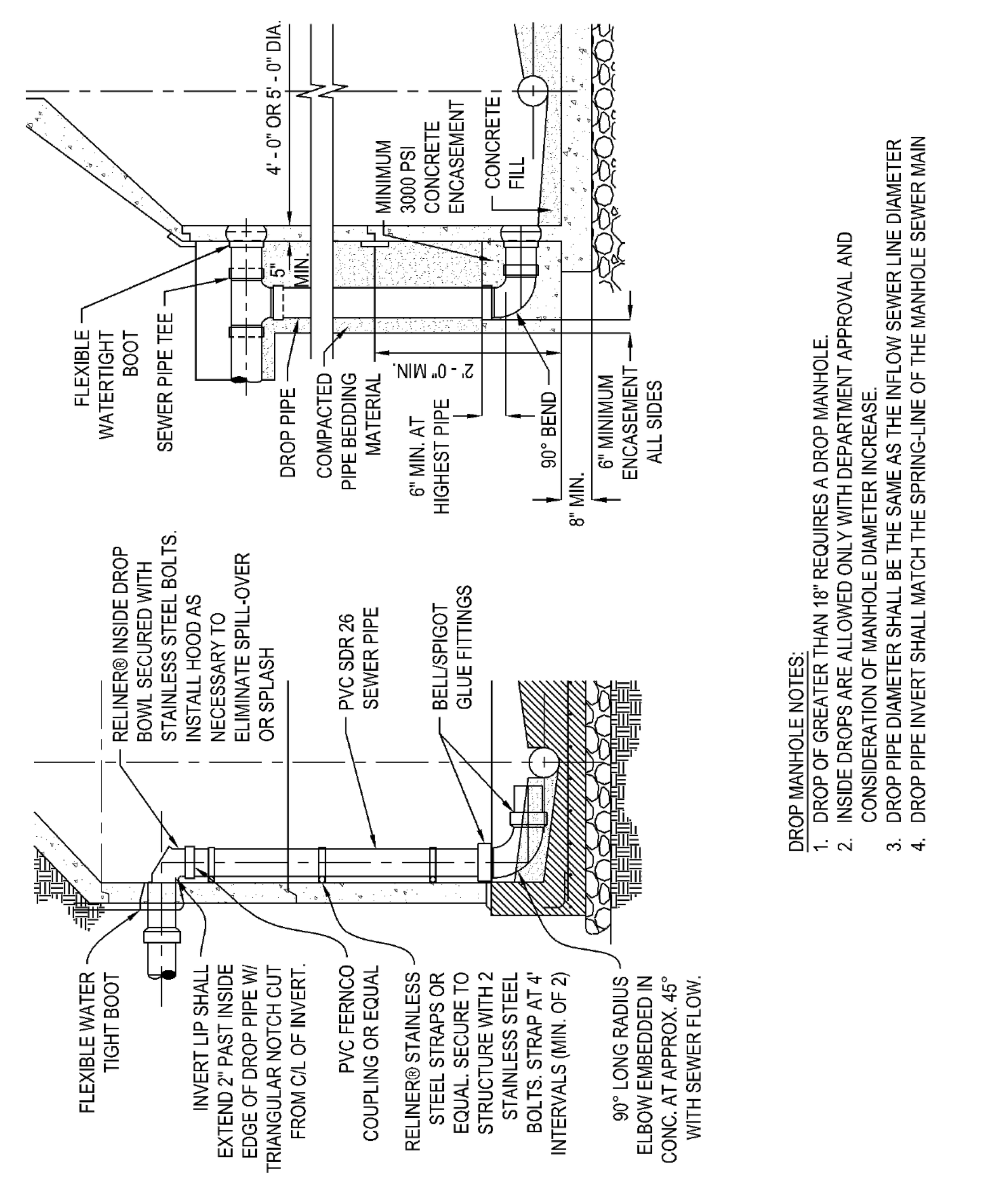
#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
DETAILS (4 OF 7)

Know what's below. Call before you dig. 811

SHEET
41 OF 44



Inside / Outside Drop Manhole

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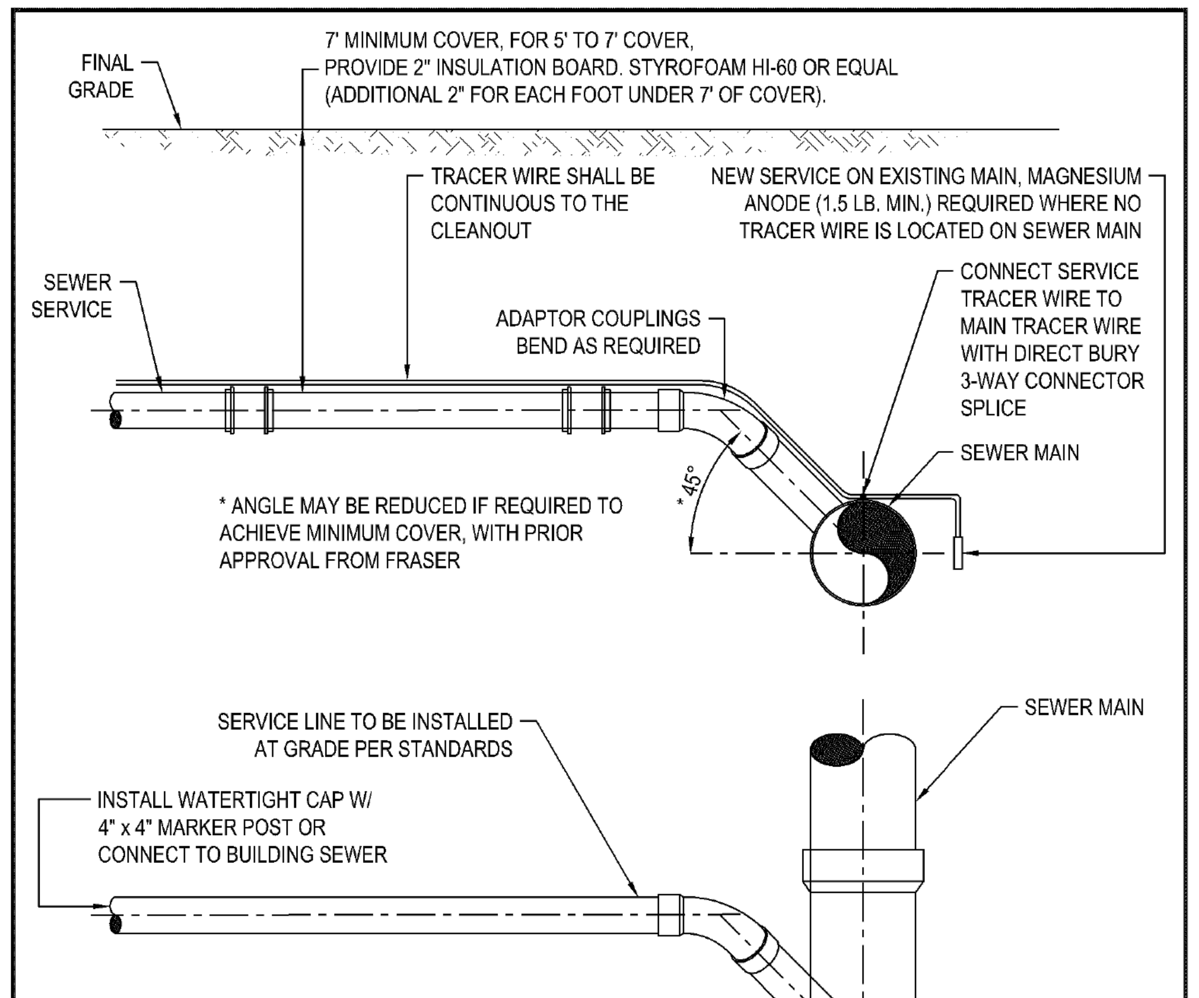
Town of Fraser
Attachment A-41 — Revised October 2024



GASKETED WYE FITTING REQUIRED AT NEW MAINS. WYE TAP SADDLES SHALL BE USED FOR CONNECTIONS TO EXISTING MAINS.

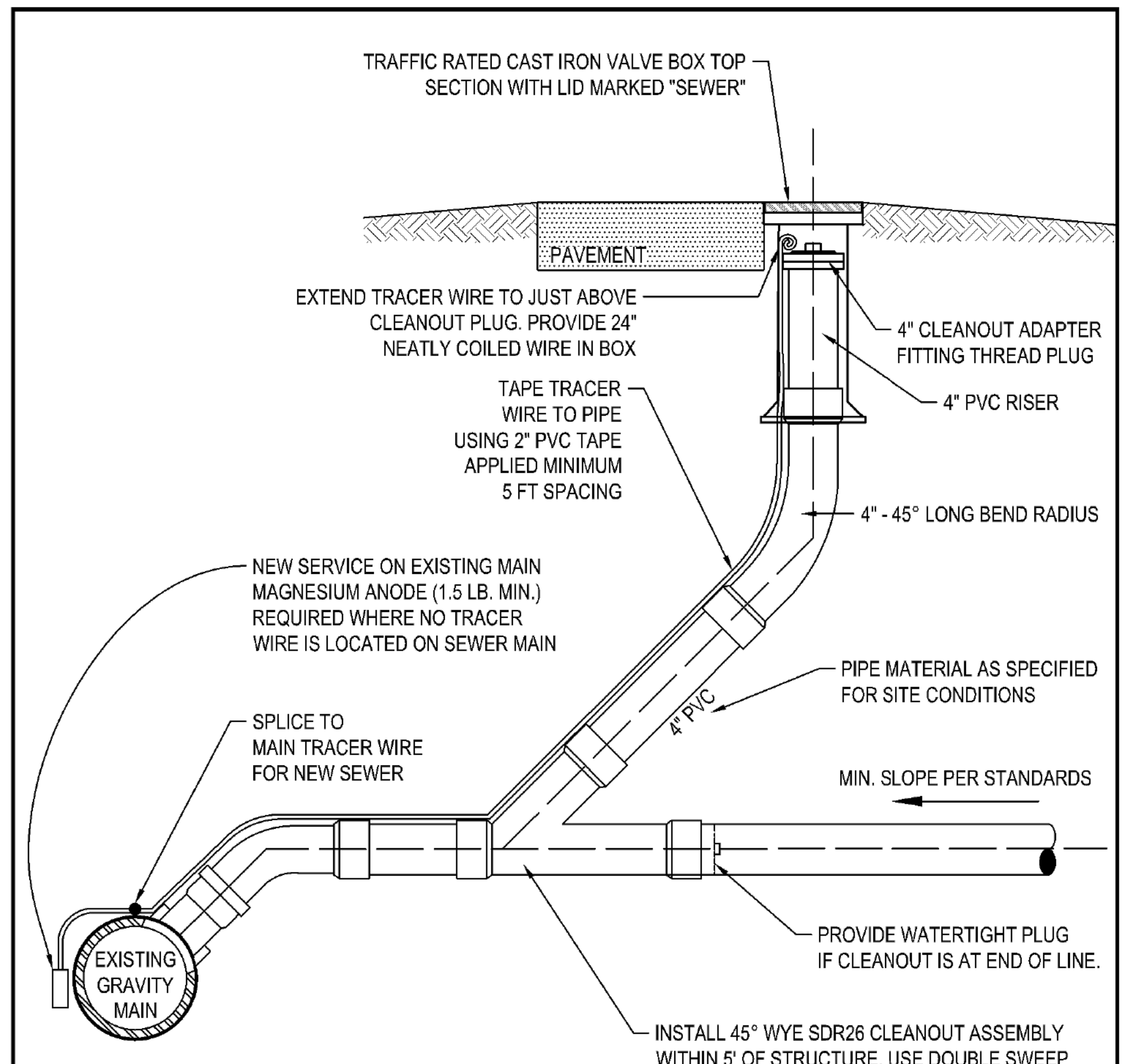
WYE TAP SADDLES SHALL BE A FLEXIBLE PRE-MANUFACTURED FORTY-FIVE DEGREE WYE, FERNCO MODEL TSW-4 WITH SLIP LOCK CLAMPS AND TSPK-46 PRESSURE KIT OR APPROVED EQUAL.

ALL SERVICE TAPS AND MAINS SHALL BE INSPECTED BY THE TOWN OF FRASER DURING INSTALLATION AND APPROVED BEFORE BACKFILL.

Sewer Service Line Connection Detail

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-42 — Revised October 2024



NOTE:
1. SEE ATTACHMENT A-44 FOR SEWER CLEANOUT PUBLIC PAVEMENT AREA COLLAR DETAIL
2. TWO-WAY CLEANOUT REQUIRED EVERY 90 FOOT SPACING IN SERVICE LINE BEFORE MAIN

Sewer Service Line Cleanout Detail

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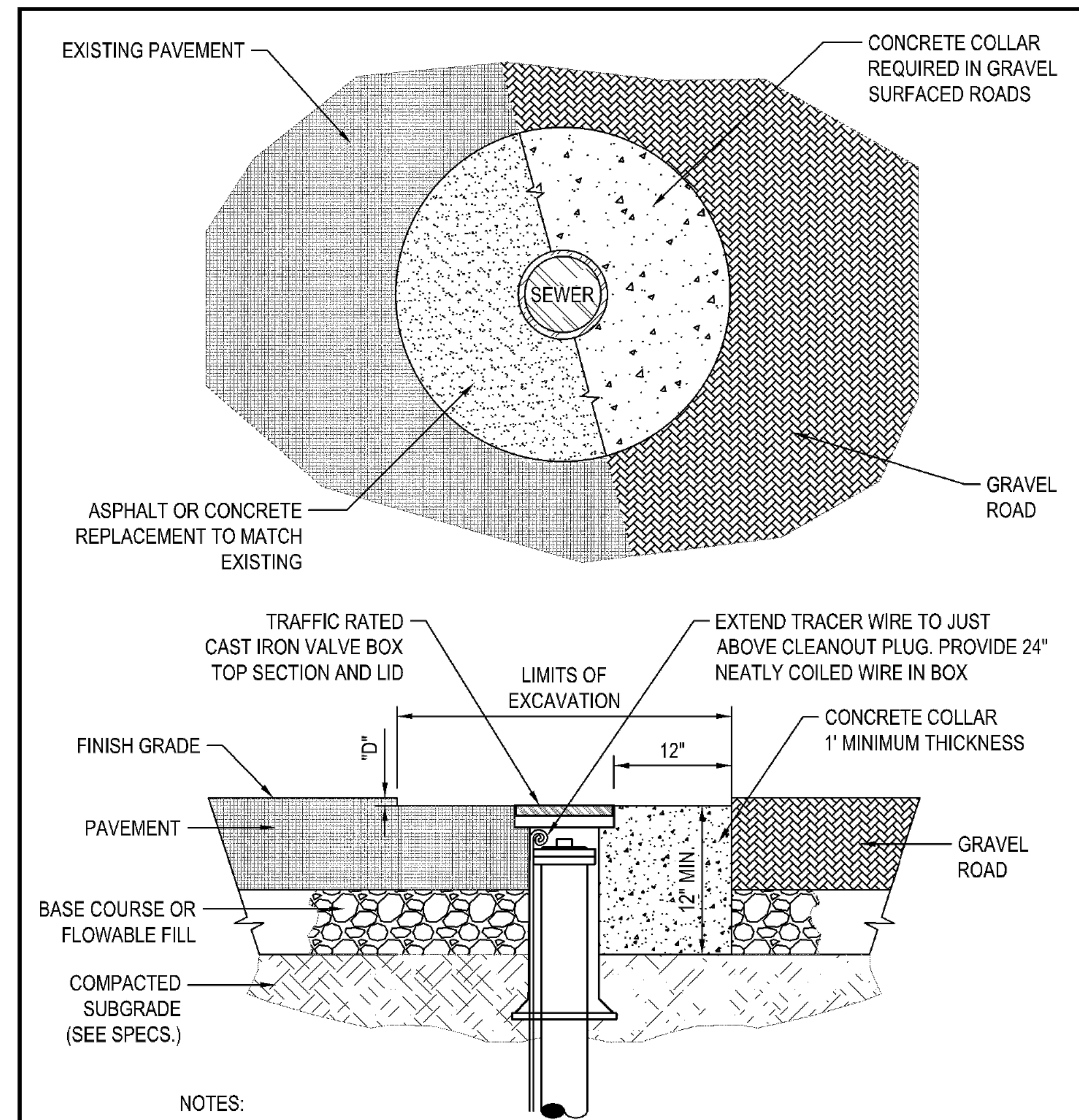
Town of Fraser
Attachment A-43 — Revised October 2024

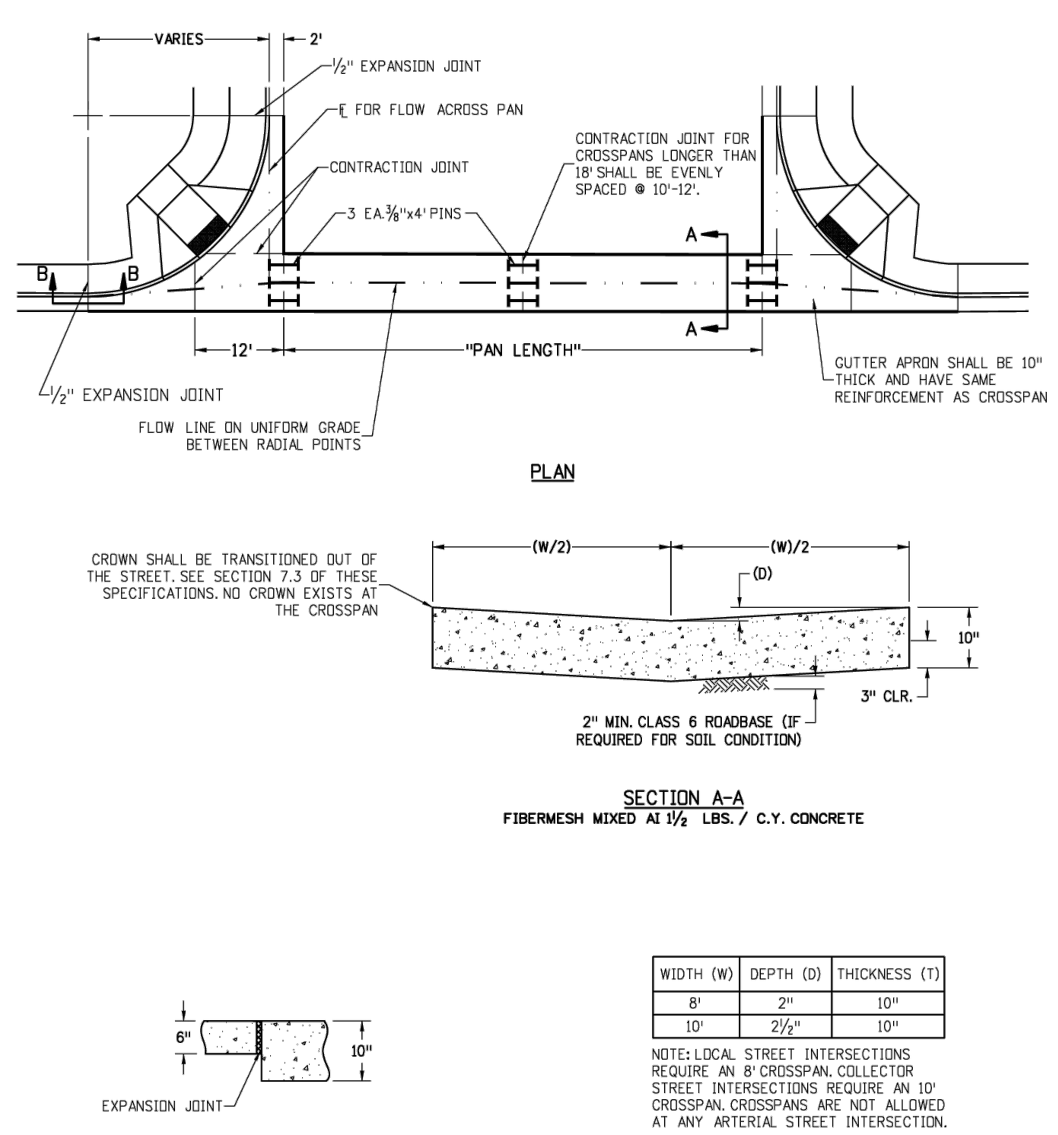


NOTES:
1. "D" = 1/2" FOR H.M.A. PAVEMENT OVERLAYS OR SURFACE TREATMENTS
2. "D" = 1/2" FOR H.M.A. PAVEMENT RECONSTRUCTION OR NEW CONSTRUCTION
3. "D" = 1/4" FOR CONCRETE STREETS
4. CLEANOUT MUST BE PLUMB
5. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS

Sewer Cleanout Collar Detail - Public Pavement Location

THESE DETAILS ARE PROVIDED FOR STANDARDIZATION PURPOSES ONLY. THIS DETAIL REPRESENTS MINIMUM DESIGN STANDARDS WHICH MAY REQUIRE UPGRADING FOR SPECIFIC APPLICATIONS. REFER TO TOWN OF FRASER MINIMUM DESIGN CRITERIA AND CONSTRUCTION STANDARDS FOR SPECIFIC MATERIAL AND INSTALLATION REQUIREMENTS.

Town of Fraser
Attachment A-44 — Revised October 2024

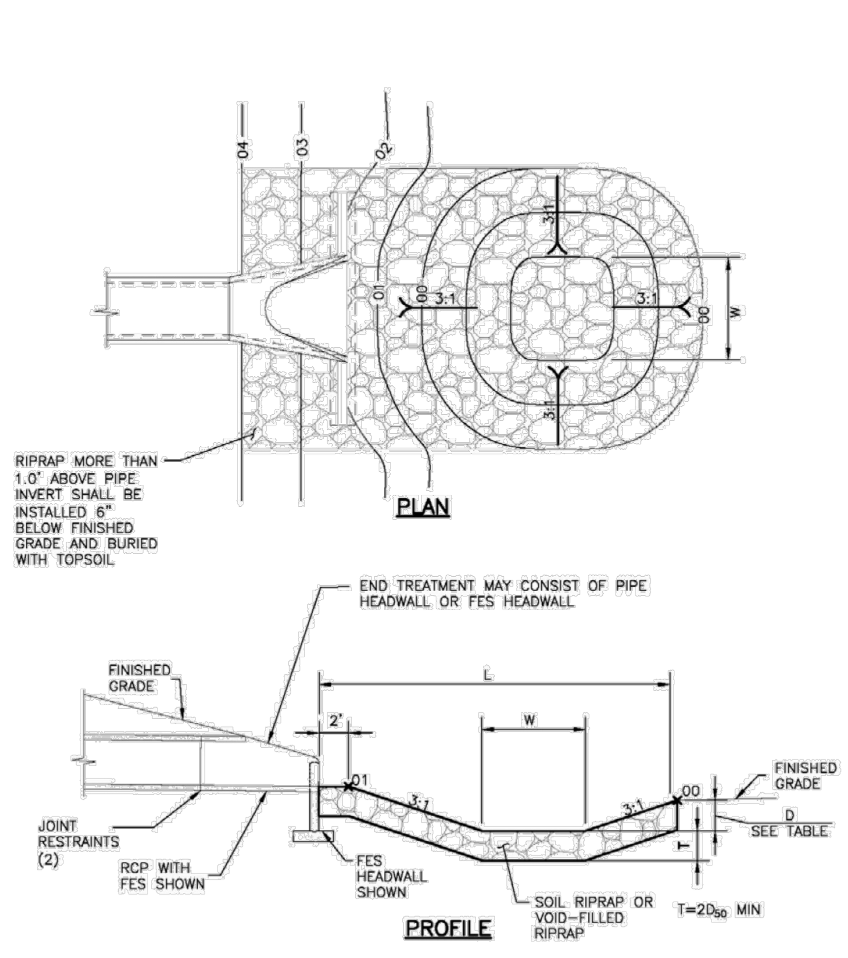


WIDTH (W)	DEPTH (D)	THICKNESS (T)
8'	2"	10"
10'	2½"	10"

NOTE: LOCAL STREET INTERSECTIONS REQUIRE AN 8' CROSSPAN. COLLECTOR STREET INTERSECTIONS REQUIRE AN 10' CROSSPAN. CROSSPANS ARE NOT ALLOWED AT ANY ARTERIAL STREET INTERSECTION.

CROSSPAN

Issued: 6/15/2022
Revised:
Standard Drawing No. SD.6



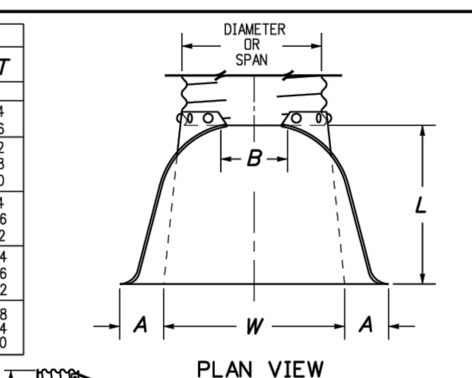
PIPE SIZE OR BOX HEIGHT	D	W*	L
18" – 24"	1'-0"	4'	15'
30" – 36"	1'-6"	6'	20'
42" – 48"	2'-0"	7'	24'
54" – 60"	2'-6"	8'	28'
66" – 72"	3'-0"	9'	32'

* IF OUTLET PIPE IS A BOX CULVERT WITH A WIDTH GREATER THAN W, THEN W = CULVERT WIDTH

Figure 9-37. Low tailwater riprap basin

PIPE DIA.	THICKNESS	A	B	H	L	W	T
		IN.					
12	0.064	6	6	6	21	24	34
18	0.064	8	10	6	31	36	46
21	0.064	9	12	6	36	42	52
24	0.064	10	13	6	41	48	58
30	0.079	12	16	8	51	60	70
36	0.079	14	19	9	60	72	94
42	0.109	16	22	11	69	84	106
48	0.109	18	27	12	78	90	112
54	0.109	18	30	12	84	102	124
60	0.109	18	33	12	87	114	136
66	0.109	18	36	12	87	120	142
72	0.109	18	39	12	87	126	148
78	0.109	18	42	12	87	132	154
84	0.109	18	45	12	87	138	160

FLEXIBLE ROUND PIPE

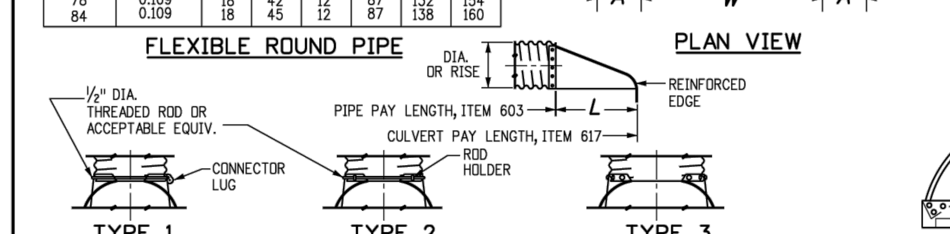


PIPE ARCH SPAN x RISE	THICKNESS	A (±1")	B (MAX.)	H (±1")	L (±1.5")	W (±2")	T
		IN.					
21 x 15	0.064	7	10	6	23	36	46
24 x 18	0.064	8	12	6	28	42	52
28 x 20	0.064	9	14	6	32	48	58
35 x 24	0.079	10	16	6	39	60	70
42 x 29	0.079	12	18	8	46	75	85
49 x 33	0.109	13	21	9	53	85	103
57 x 38	0.109	18	26	12	63	90	108
64 x 43	0.109	18	30	12	70	102	120
71 x 47	0.109	18	33	12	77	114	132

FLEXIBLE PIPE ARCH

GENERAL NOTES

1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL PIPE REQUIRED TO PROVIDE THE DESIGN LENGTH SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. THE INSIDE CONFIGURATION AND THE JOINT OF CONCRETE END SECTION AND PIPE SHALL MATCH.
5. END SECTIONS FOR CMP ARCH PIPE SHALL MATCH THE DIMENSIONS OF THE PIPE SHOWN ON THE PLANS.
6. GALVANIZED TOE PLATE AS SHOWN IS REQUIRED ON END SECTIONS FOR CORRUGATED STEEL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH ⅜ IN. GALVANIZED BOLTS, NUTS AND WASHERS.
7. GALVANIZED STEEL SHALL CONFORM TO AASHTO M 111, M 218 OR M 232.
8. CONCRETE PIPE JOINT FASTENERS, WHERE SHOWN ON PLANS, SHALL BE INSTALLED SO THAT A MINIMUM OF 15 LINEAR FEET OF THE OUTLET END OF THE PIPE ARE MECHANICALLY LOCKED TOGETHER. END SECTION LENGTHS WHEN USED, SHALL BE INCLUDED IN THE 15 LF REQUIREMENT.
9. CONNECTIONS OF METAL END SECTIONS TO PLASTIC PIPE SHALL BE APPROVED BY THE ENGINEER. PLASTIC END SECTIONS SHALL NOT BE USED.
10. THE END SECTION STYLE, EITHER REGULAR OR SAFETY, SHALL BE AS SHOWN ON THE PLANS.
11. AT THE OPTION OF THE CONTRACTOR AND APPROVAL OF THE CDOT PROJECT ENGINNER, REINFORCED CONCRETE END SECTIONS MAY BE MADE WITH SYNTHETIC FIBERS INSTEAD OF STEEL FOR PIPES 36 INCHES IN DIAMETER AND SMALLER, AND CONFORM TO AASHTO M 86 AND SUBSECTION 601.03.

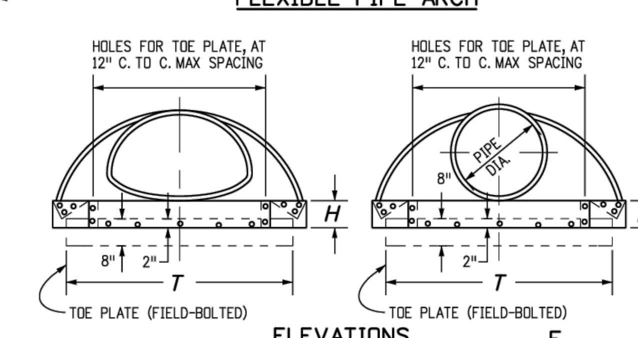


TYPE 1
FOR 18 IN. THRU 24 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

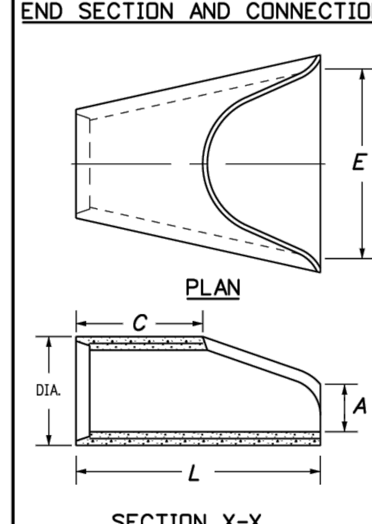
TYPE 2
FOR 30 IN. THRU 36 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

TYPE 3
FOR 42 IN. THRU 84 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS AND ALL SIZES WITH HELICAL CORRUGATIONS AND FOR ALL METAL PIPE ARCH CULVERTS. SHOP ATTACH A 24 IN. MIN. LENGTH OF ANNULAR PIPE WITH GALV. RIVETS OR BOLTS, SPOT WELDS, OR 2 IN. LONG SKIP WELDS ON 8 IN. CTRS. REPAIR BURNT GALVANIZING IN ACCORDANCE WITH SUBSECTION 707.09.

TYPICAL CONNECTIONS

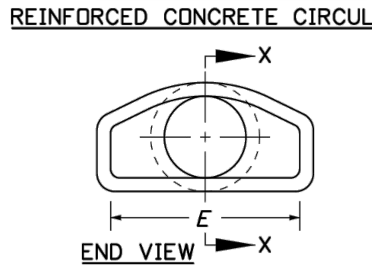


END SECTION AND CONNECTION DETAILS FOR ROUND AND ARCH METAL PIPES

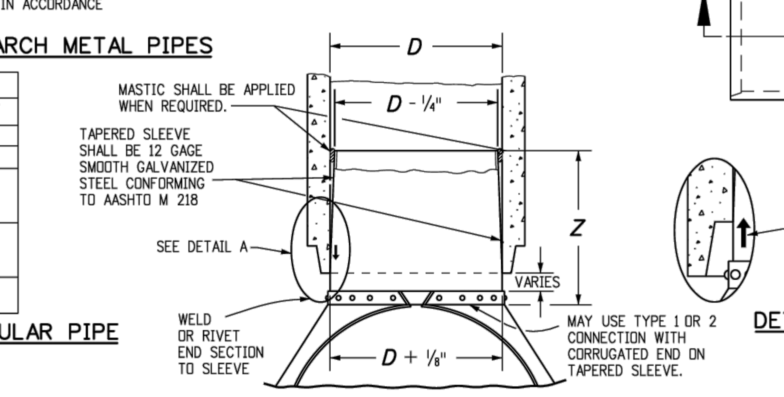


PIPE I.D.	A	C	L	E
	IN.			
18	10	48	78	36
24	10	48	78	48
30	14	36	96	60
36	18	36	96	72
42	24	36	96	78
48	28	24	96	84
54	30	36	96	90
60	36	36	96	96
72	34	20	96	108

REINFORCED CONCRETE CIRCULAR PIPE



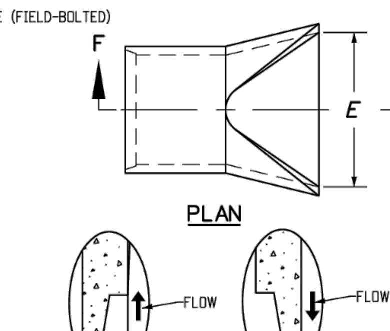
END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE

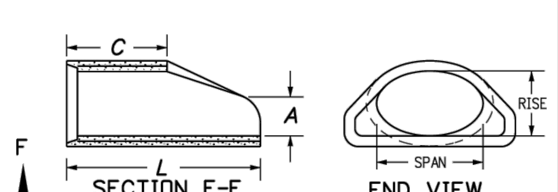


D	Z (MIN.)
IN.	
18 - 24	12
30 AND 36	16
42 AND LARGER	24

NOTE: METAL END SECTION SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING.

STEEL END SECTION FOR CONCRETE CIRCULAR PIPE
(ALTERNATIVE FOR CONCRETE END SECTION)



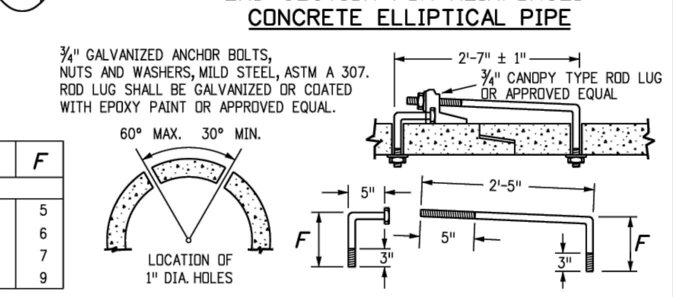


EQUIVALENT CIRCULAR DIA.	NOMINAL SPAN x RISE		A	C	L	E
	IN.					
24	30	19	9	33	72	48
30	38	24	10	18	72	60
36	45	29	12	24	84	72
42	53	34	16	36	96	78
48	60	38	21	36	96	84
54	68	43	26	36	96	90
60	76	48	30	36	96	96

END SECTION FOR REINFORCED CONCRETE ELLIPTICAL PIPE

¾" GALVANIZED ANCHOR BOLTS, NUTS AND WASHERS, MILD STEEL, ASTM A 307. ROD LUG SHALL BE GALVANIZED OR COATED WITH EPOXY PAINT OR APPROVED EQUAL.

PIPE DIAMETER	F
IN.	
18 - 30	5
36 - 42	6
48 - 60	7
72 - 84	9



CONCRETE JOINT FASTENER (TWO PER JOINT)

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CONCRETE AND METAL END SECTIONS
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO. M-603-10
Standard Sheet No. 1 of 1
Project Sheet Number:

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

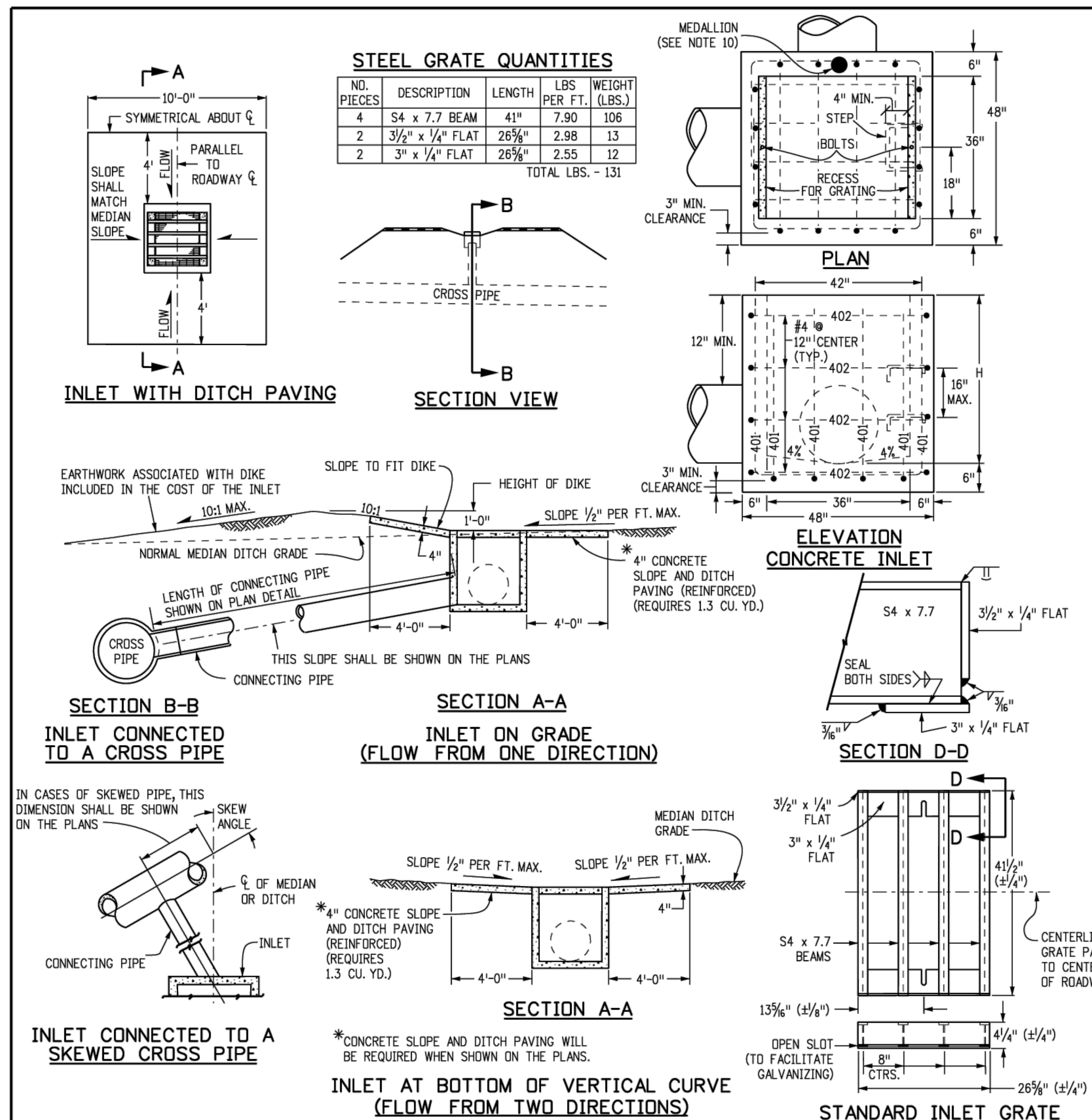
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
DETAILS (5 OF 7)

Know what's below. Call before you dig. 811

SHEET 42 OF 44

12/18/2025 8:23 AM. X:\GRAND PARK\CAD\PLANS\16 - WEST MOUNTAIN\FILING 1 - 8WB, 9W, 10W, 11W, 23W\PRELIMINARY PLANS PRELIMINARY DETAILS - WM - F1.DWG 5



STEEL GRATE QUANTITIES

NO. PIECES	DESCRIPTION	LENGTH	LBS PER FT.	WEIGHT (LBS.)
4	S4 x 7.7 BEAM	41"	7.90	106
2	3½" x ¼" FLAT	26⅝"	2.98	13
2	3" x ¼" FLAT	26⅝"	2.55	12

TOTAL LBS. - 131

GENERAL NOTES

1. INLET TYPE C IS NOT HS-20 RATED AND SHALL NOT BE PLACED IN PAVED ROADWAYS. THIS INLET SHALL BE USED ONLY OUTSIDE PAVED ROADWAYS.
2. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
3. REINFORCING BARS SHALL BE GRADE 60, EPOXY COATED, AND DEFORMED #4, AND SHALL HAVE A MIN. 2 INCH CLEARANCE. CUT OR BEND AROUND PIPES AS REQUIRED.
4. CONCRETE SLOPE AND DITCH PAVING SHALL BE IN ACCORDANCE WITH SECTION 507. REINFORCEMENT FOR CONCRETE SLOPE PAVING SHALL BE 6 X 6 - W1.4 X W1.4 OR 6 X 6 - W2.1 X W2.1.
5. STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED, AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
6. THE STANDARD INLET GRATES SHALL BE USED ON ALL TYPE C INLETS UNLESS CLOSE MESH INLET GRATES ARE SPECIFIED ON THE PLANS.
7. CLOSE MESH GRATES ARE RECOMMENDED WHERE FOOT TRAFFIC OR BICYCLE ROUTES ARE IN CLOSE PROXIMITY TO GRATE. THIS GRATE IS NOT ADA COMPLIANT OR BICYCLE FRIENDLY AND SHALL NOT BE PLACED DIRECTLY IN SIDEWALKS, CROSSWALKS OR BIKE PATHS.
8. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FEET - 6 INCHES AND SHALL CONFORM TO AASHTO M 199.
9. SEE STANDARD PLAN M-604-11, FOR REINFORCEMENT AROUND THE PIPE OPENING.
10. ALL INLETS SHALL HAVE A 4 INCH DIA. METAL MEDALLION WITH A "NO DUMPING DRAINS TO STREAM" MESSAGE ON IT. THE MEDALLION SHALL HAVE A FISH SYMBOL WITH A BLUE BACKGROUND. IT SHALL BE FIRMLY ATTACHED TO THE TOP OF THE INLET WITH A PERMANENT FASTENER.

QUANTITIES FOR ONE INLET

H	CONCRETE (CU. YDS.) ▼	STEEL (LBS.) ▼	NO. STEPS REQ'D.
2'-6"	1.0	76	0
3'-0"	1.1	81	0
3'-6"	1.2	97	0
4'-0"	1.3	102	1
4'-6"	1.5	117	2
5'-0"	1.6	123	2
5'-6"	1.7	138	2
6'-0"	1.9	143	3
6'-6"	2.0	159	3
7'-0"	2.1	164	3
7'-6"	2.2	180	4
8'-0"	2.4	185	4
8'-6"	2.5	200	4
9'-0"	2.6	206	5
9'-6"	2.8	221	5
10'-0"	2.9	236	6
11'-6"	3.3	252	6

▼ PIPE INSIDE DIAMETER SHALL BE 30 IN. OR LESS. CONCRETE AND STEEL QUANTITIES ARE FOR ONE ENTIRE INLET BEFORE DEDUCTION FOR VOLUME OCCUPIED BY PIPE. WEIGHT OF STEEL INCLUDES A RING FOR THE MAXIMUM PIPE DIAMETER.

BAR LIST FOR H = 2 FT.-6 IN. AND BENDING DIAGRAM

MARK	NO. REQ'D.	HEIGHT	LENGTH
401	2	2'-2½"	8'-0"
401	6	2'-7"	8'-8"
402	4	"U"	15'-4"

NO. 401

"U" INCREASE DIMENSION 6 IN. FOR EACH 6 IN. INCREASE OF "H" ABOVE 2 FT.-6 IN.

NO. 402

ADD ONE BAR FOR EACH FT. INCREASE OF "H" ABOVE 2 FT. - 6 IN.

402 BARS SHALL BE EQUALLY SPACED FROM EACH OTHER.

SLOT DETAIL IN 3½" x ¼" FLATS SAME AS IN STANDARD INLET GRATE

CLOSE MESH INLET GRATE

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INLET, TYPE C

STANDARD PLAN NO.
M-604-10
Standard Sheet No. 1 of 1

Issued by the Project Development Branch: July 31, 2019

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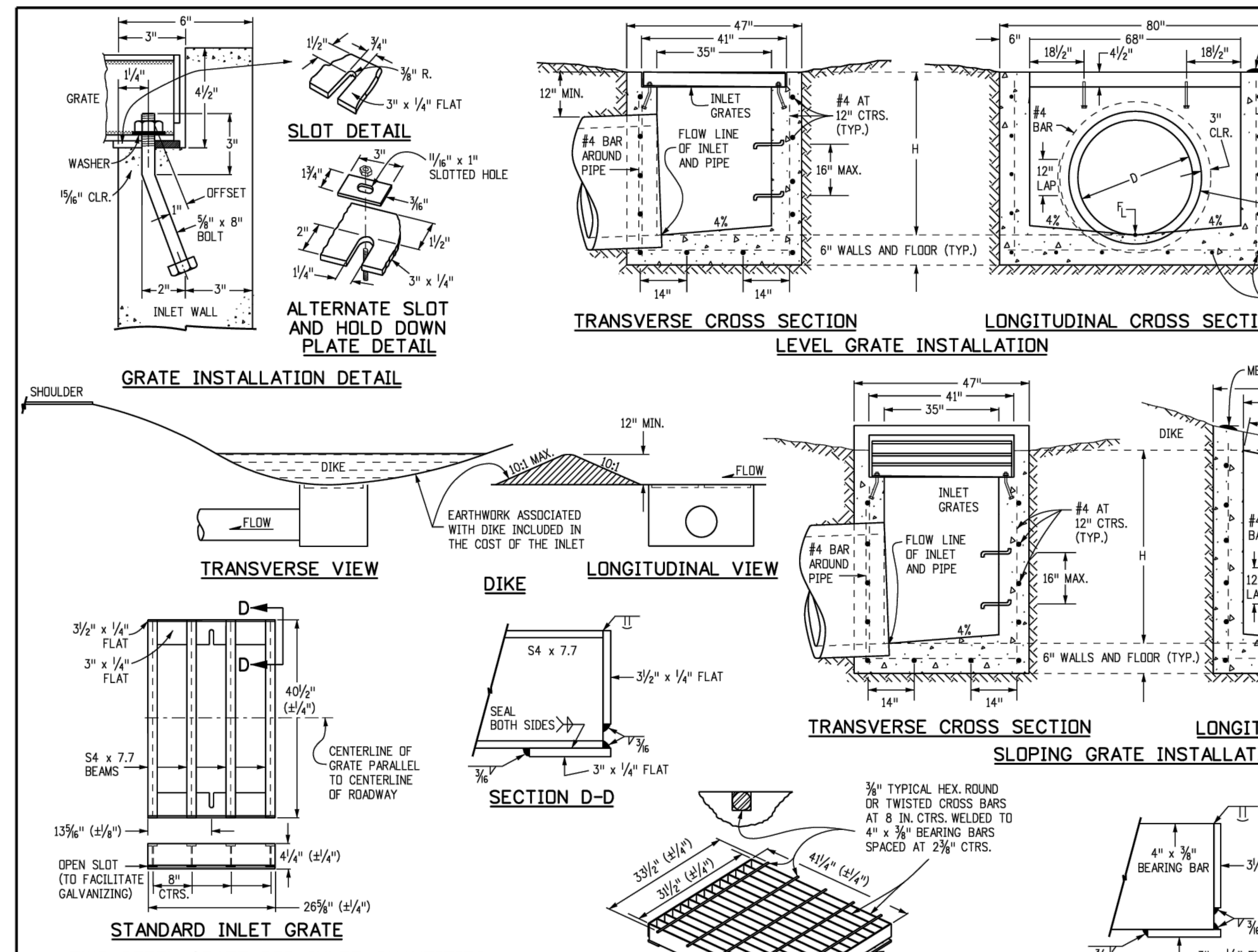

TWO STEEL GRATE PER INLET QUANTITIES

NO. PIECES	DESCRIPTION	LENGTH	LBS PER FT.	WEIGHT (LBS.)
8	S4 x 7.7 BEAM	40"	7.70	206
4	3½" x ¼" FLAT	26⅝"	2.98	26
4	3" x ¼" FLAT	26⅝"	2.55	24

TOTAL LBS. - 256

GENERAL NOTES

1. INLET TYPE D IS NOT HS-20 RATED AND SHALL NOT BE PLACED IN PAVED ROADWAYS. THIS INLET SHALL BE USED ONLY OUTSIDE PAVED ROADWAYS.
2. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
3. SEE PLANS FOR SIZE AND LOCATION OF PIPE.
4. STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
5. STANDARD INLET GRATES SHALL BE USED ON ALL TYPE D INLETS UNLESS CLOSE MESH GRATES ARE SPECIFIED ON THE PLANS.
6. CLOSE MESH GRATES ARE RECOMMENDED WHERE FOOT TRAFFIC OR BICYCLE ROUTES ARE IN CLOSE PROXIMITY TO GRATE. THIS GRATE IS NOT ADA COMPLIANT OR BICYCLE FRIENDLY AND SHALL NOT BE PLACED DIRECTLY IN SIDEWALKS, CROSSWALKS OR BIKE PATHS.
7. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FEET-6 INCHES AND SHALL CONFORM WITH AASHTO M 199.
8. REINFORCING BARS SHALL BE GRADE 60, EPOXY COATED, AND DEFORMED #4, AND SHALL HAVE A 2 INCH MIN. CLEARANCE. CUT OR BEND BARS AROUND PIPE AS REQUIRED.
9. ALL INLETS SHALL HAVE A 4 INCH DIA. METAL MEDALLION WITH A "NO DUMPING DRAINS TO STREAM" MESSAGE ON IT. THE MEDALLION SHALL HAVE A FISH SYMBOL WITH A BLUE BACKGROUND. IT SHALL BE FIRMLY ATTACHED TO THE INLET'S SURFACE WITH A PERMANENT FASTENER.

OUTLET PIPE INSIDE DIA. FT. - "D"	MIN. "H" FT.
1.5	3.0
2.0	3.5
2.5	4.0
3.0	4.5
3.5	5.0

"H" FT.	CONCRETE CU. YDS. ▼	STEEL LBS. ▼	CIRCULAR PIPE RANGE INSIDE DIA., IN. - "D"
3.0	1.5	127	18
3.5	1.7	149	18-24
4.0	1.9	157	18-30
4.5	2.0	179	18-36
5.0	2.2	187	18-42
5.5	2.4	208	18-42
6.0	2.6	215	18-42
6.5	2.8	236	18-42
7.0	2.9	243	18-42
7.5	3.1	264	18-42
8.0	3.3	271	18-42
8.5	3.5	292	18-42
9.0	3.6	299	18-42
9.5	3.8	320	18-42
10.0	4.0	327	18-42

▼ CONCRETE AND STEEL QUANTITIES ARE FOR ONE ENTIRE INLET BEFORE DEDUCTION FOR VOLUME OCCUPIED BY PIPE. WEIGHT OF STEEL INCLUDES A RING FOR THE MAXIMUM PIPE DIAMETER.

QUANTITIES FOR ONE INLET

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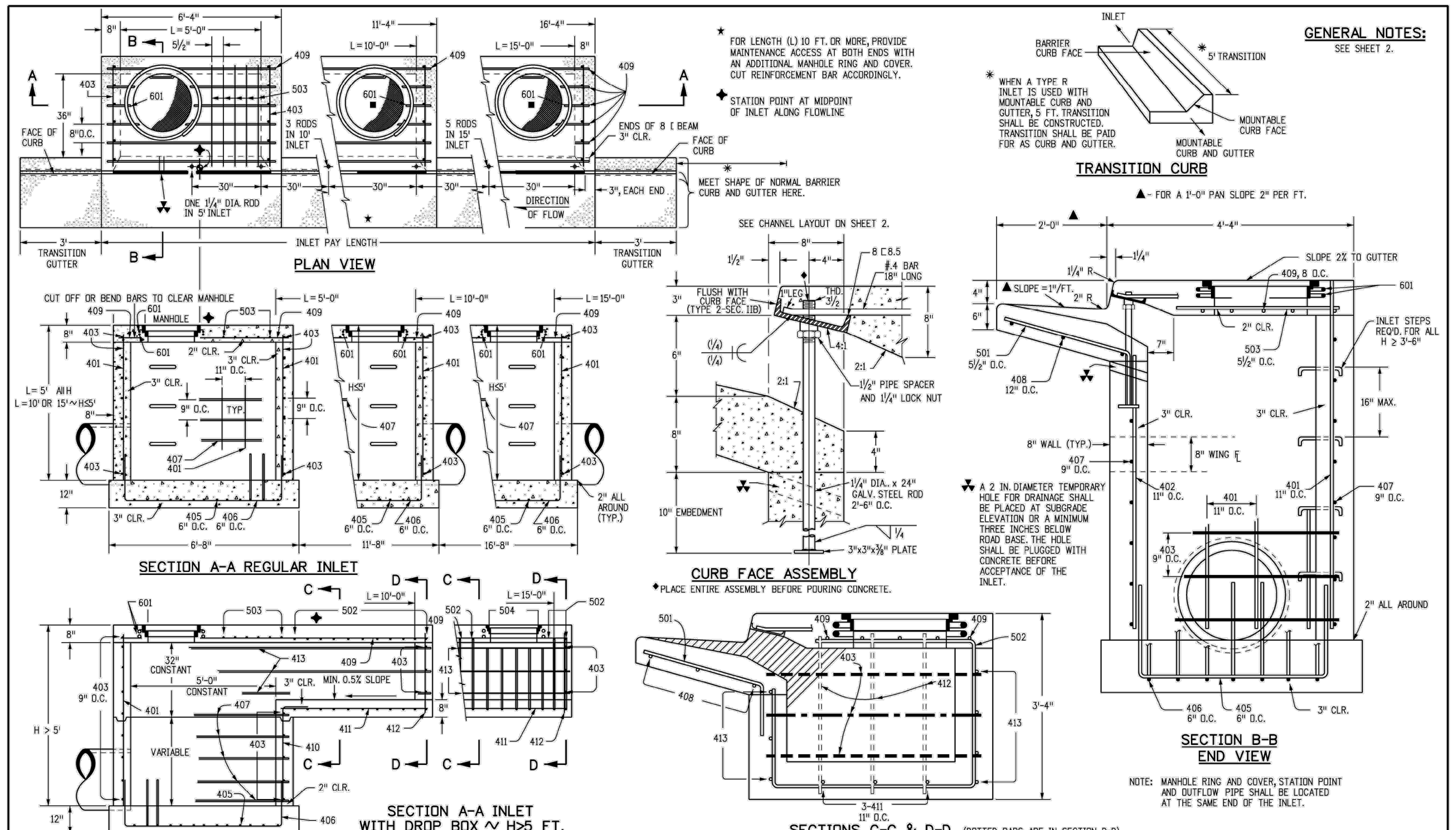
INLET, TYPE D

STANDARD PLAN NO.
M-604-11
Standard Sheet No. 1 of 1

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:



GENERAL NOTES:
SEE SHEET 2.

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CURB INLET TYPE R

STANDARD PLAN NO.
M-604-12
Standard Sheet No. 1 of 2

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

TABLE ONE ~ BAR LIST FOR CURB INLETS, TYPE "R"

MARK	BAR # OR SIZE	O.C. SPACING	TYPE	ALL INLETS L = 5 FT. NO. REQ'D.	ALL INLETS L = 5 FT. LENGTH	INLETS: H ≤ 5 FT. (REGULAR INLETS) L = 10 FT. NO. REQ'D.	L = 10 FT. LENGTH	L = 15 FT. NO. REQ'D.	L = 15 FT. LENGTH	INLETS: H > 5 FT. (DROP BOX INLETS) L = 10 FT. NO. REQ'D.	L = 10 FT. LENGTH	L = 15 FT. NO. REQ'D.	L = 15 FT. LENGTH
401	4	11"	II	15	*	21	*	26	*	11	*	11	*
402	4	11"	II	7	*	13	*	18	*	7	*	7	*
403	4	9"	II	*	4'-0"	*	4'-0"	*	4'-0"	*	4'-0"	*	4'-0"
405	4	6"	VI	11	6'-10"	21	6'-10"	31	6'-10"	11	6'-10"	11	6'-10"
406	4	6"	VIII	7	8'-10"	7	13'-10"	7	18'-10"	7	8'-10"	7	8'-10"
407	4	9"	II	*	5'-10"	*	10'-10"	*	15'-10"	*	5'-10"	*	5'-10"
408	4	12"	II	3	6'-10"	3	11'-10"	3	16'-0"	3	11'-10"	3	16'-0"
409	4	8"	II	6	5'-10"	6	10'-10"	6	15'-10"	6	10'-10"	6	15'-10"
410	4	11"	VII							3		3	*
411	4	11"	II							3	5'-2"	3	10-2"
412	4	11"	II							3	2'-9"	3	2'-9"
413	4	9"	II							7	10'-10"	7	15'-10"
501	5	5½"	IV	11	3'-4"	22	3'-4"	33	3'-4"	22	3'-4"	33	3'-4"
502	5	5½"	III							11	11'-5"	17	11'-5"
503	5	5½"	II	5	3'-6"	16	3'-6"	27	3'-6"	6	3'-6"	6	3'-6"
504	5	5½"	IX									5	8'-4"
601	6	2½"	V	2	8'-10"	2	8'-10"	2	8'-10"	2	8'-10"	4	8'-10"
■8[8.5				1	5'-10"	1	10'-10"	1	15'-10"	1	10'-10"	1	15'-10"
				2 BARS, 1 RODS	——	4 BARS, 3 RODS	——	8 BARS, 5 RODS	——	4 BARS, 3 RODS	——	8 BARS, 5 RODS	——

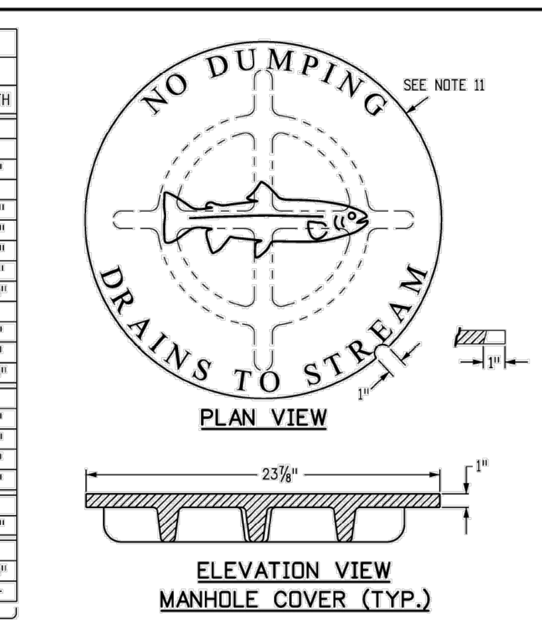
* VARIABLE REFER TO TABLE TWO.

■ INCLUDE #4, 18 IN. BARS (SEE CHANNEL LAYOUT).

TABLE TWO ~ BARS AND QUANTITIES VARIABLE WITH "H"

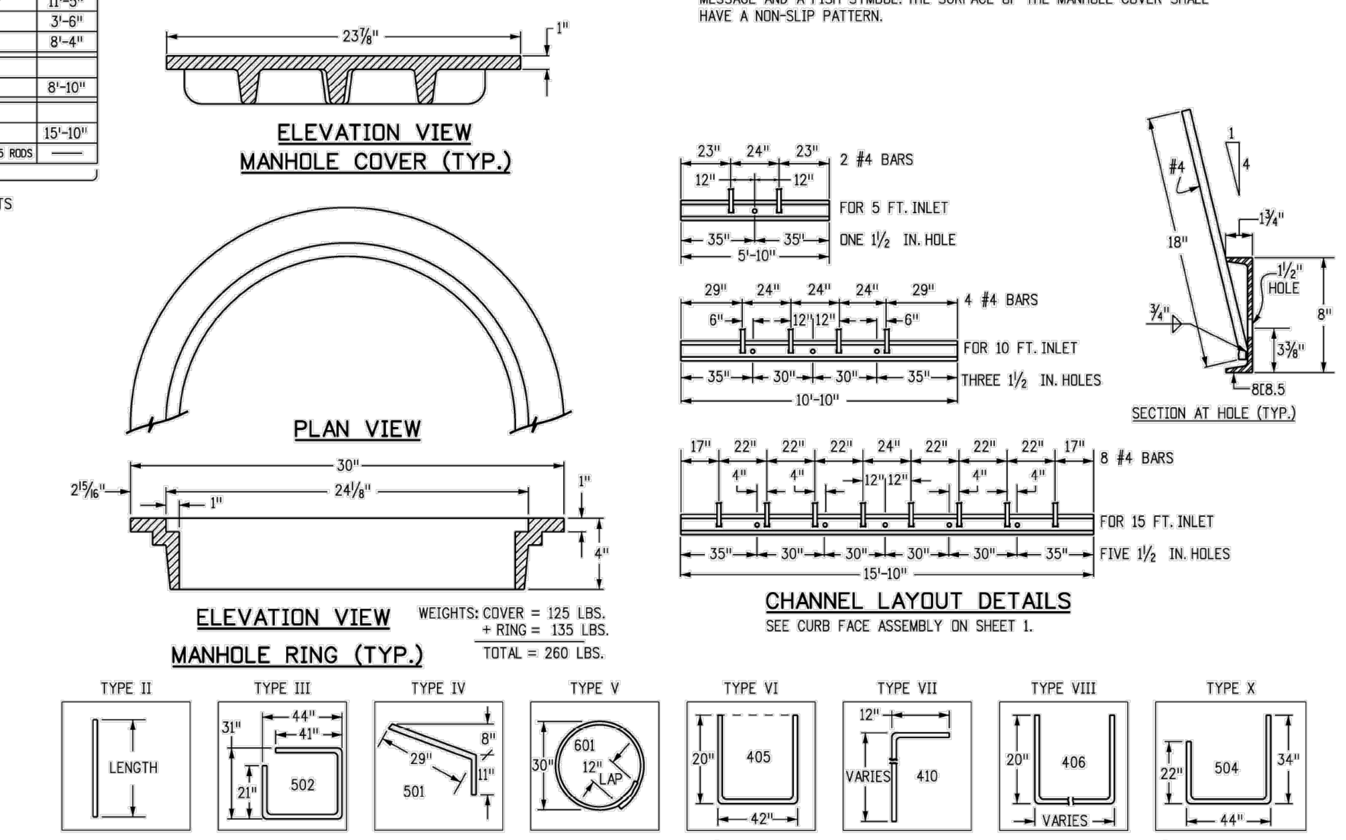
"H"	LENGTH 401	LENGTH 402	LENGTH 410	NO. REQ'D. REGULAR 403	NO. REQ'D. REGULAR 407	NO. REQ'D. DROP BOX 403	NO. REQ'D. DROP BOX 407	L = 5 FT. CONC. CU. YDS.	L = 5 FT. STEEL LBS.	L = 10 FT. CONC. CU. YDS.	L = 10 FT. STEEL LBS.	L = 15 FT. CONC. CU. YDS.	L = 15 FT. STEEL LBS.
3'-0"	2'-8"	1'-8"		10	7			3.2	285	5.3	497	7.4	706
3'-6"	3'-2"	2'-2"		10	7			3.4	305	5.7	528	7.9	747
4'-0"	3'-8"	2'-8"		12	9			3.7	326	6.0	559	8.4	786
4'-6"	4'-2"	3'-2"		12	9			3.9	334	6.4	571	8.8	803
5'-0"	4'-8"	3'-8"		14	11			4.1	354	6.7	602	9.3	844
5'-6"	5'-2"	4'-2"	3'-5"	16	13	15	6	4.4	375	6.0	607	7.4	850
6'-0"	5'-8"	4'-8"	3'-11"	16	13	16	6	4.6	382	6.2	616	7.6	860
6'-6"	6'-2"	5'-2"	4'-5"	18	15	18	8	4.8	402	6.4	637	7.8	880
7'-0"	6'-8"	5'-8"	4'-11"	20	17	19	10	5.0	423	6.6	654	8.0	897
7'-6"	7'-2"	6-2"	5'-5"	20	17	20	10	5.3	430	6.9	664	8.3	907
8'-0"	7'-8"	6'-8"	5'-11"	22	19	22	12	5.5	451	7.1	684	8.5	927
8'-6"	8'-2"	7'-2"	6'-5"	24	21	23	14	5.7	471	7.3	702	8.7	944
9'-0"	8'-8"	7'-8"	6'-11"	24	21	24	14	6.0	479	7.6	711	9.0	954
9'-6"	9'-2"	8'-2"	7'-5"	26	23	26	16	6.2	499	7.8	732	9.2	974
10'-0"	9'-8"	8'-8"	7'-11"	28	25	27	18	6.4	520	8.0	749	9.4	992
10'-6"	10'-2"	9'-2"	8'-5"	28	25	28	18	6.7	527	8.3	759	9.7	1001
11'-0"	10'-8"	9'-8"	8'-11"	30	27	30	20	6.9	547	8.5	779	9.9	1022

NOTES: FOR L = 5 FT., L = 10 FT., AND L = 15 FT.
REGULAR INLETS: TOTAL QUANTITIES NEEDED ARE OUTSIDE THE HEAVY BLACK LINE.
DROP BOX INLETS: TOTAL QUANTITIES NEEDED ARE INSIDE THE HEAVY BLACK LINE.
STEEL WEIGHTS DO NOT INCLUDE STRUCTURAL STEEL CHANNEL.



GENERAL NOTES

1. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
2. CONCRETE WALLS SHALL BE FORMED ON BOTH SIDES AND SHALL BE 8 INCHES THICK.
3. INLET STEPS SHALL BE IN CONFORMANCE WITH AASHTO M 199.
4. CURB FACE ASSEMBLY SHALL BE GALVANIZED AFTER WELDING.
5. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED ¾ OF A INCH. CURB AND GUTTER CORNERS SHALL BE FINISHED TO MATCH THE EXISTING CURB AND GUTTER BEYOND THE TRANSITION GUTTER.
6. REINFORCING BARS SHALL BE DEFORMED AND SHALL HAVE A 2 INCH MINIMUM CLEARANCE. ALL REINFORCING BARS SHALL BE GRADE 60 AND EPOXY COATED.
7. DIMENSIONS AND WEIGHTS OF TYPICAL MANHOLE RING AND COVER ARE NOMINAL.
8. MATERIAL FOR MANHOLE RINGS AND COVERS SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06.
9. SINCE PIPE ENTRIES INTO THE INLET ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK. QUANTITIES INCLUDE VOLUMES OCCUPIED BY PIPES.
10. STRUCTURAL STEEL SHALL BE GALVANIZED AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
11. ALL MANHOLE COVERS SHALL BE CAST WITH A "NO DUMPING DRAINS TO STREAM" MESSAGE AND A FISH SYMBOL. THE SURFACE OF THE MANHOLE COVER SHALL HAVE A NON-SLIP PATTERN.



BAR BENDING DIAGRAMS ~ (DIMENSIONS ARE OUT-TO-OUT OF BAR)

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Colorado Department of Transportation
2829 West Howard Place
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Project Development Branch JBK

CURB INLET TYPE R

STANDARD PLAN NO.
M-604-12
Standard Sheet No. 2 of 2

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

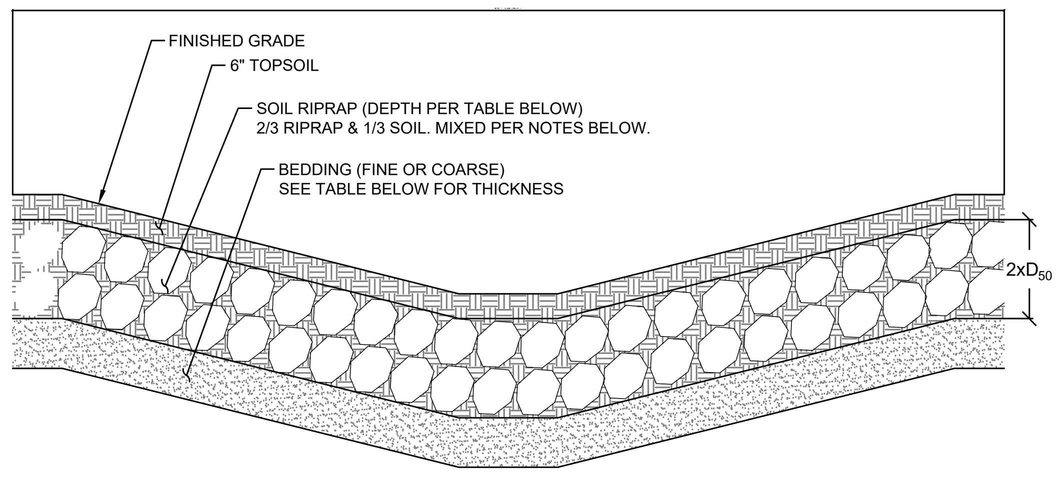
terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/18/2025	MJG

NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO
PRELIMINARY CONSTRUCTION PLANS
DETAILS (6 OF 7)

Know what's below. Call before you dig. 811



SOIL RIPRAP

NTS

NOTES:

1. WHERE "SOIL RIPRAP" IS DESIGNATED ON THE CONTRACT DRAWINGS, RIPRAP VOIDS ARE TO BE FILLED WITH NATIVE SOIL. THE RIPRAP SHALL BE PRE-MIXED WITH THE NATIVE SOIL AT THE FOLLIWING PROPORTIONS BY VOLUME: 65 PERCENT RIPRAP AND 35 PERCENT SOIL. THE SOIL USED FOR MIXING SHALL BE NATIVE TOPSOIL AND SHALL HAVE A MINIMUM FINES CONTENT OF 15 PERCENT. THE SOIL RIPRAP SHALL BE INSTALLED IN A MANNER THAT RESULTS IN A DENSE, INTERLOCKED LAYER OF RIPRAP WITH RIPRAP VOIDS FILLED COMPLETELY WITH SOIL. SEGREGATION OF MATERIALS SHALL BE AVOIDED AND IN NO CASE SHALL THE COMBINED MATERIAL CONSIST PRIMARILY OF SOIL; THE DENSITY AND INTERLOCKING NATURE OF RIPRAP IN THE MIXED MATERIAL SHALL ESSENTIALLY BE THE SAME AS IF THE RIPRAP WAS PLACED WITH WITHOUT SOIL.

2. WHERE SPECIFIED (TYPICALLY AS "BURIED SOIL RIPRAP"), A SURFACE LAYER OF TOPSOIL SHALL BE PLACED OVER THE SOIL RIPRAP ACCORDING TO THE THICKNESS SPECIFIED ON THE CONTRACT DRAWINGS. THE TOPSOIL SURFACE LAYER SHALL BE COMPACTED TO APPROXIMATELY 85% OF MAXIMUM DENSITY AND WITHIN TWO PERCENTAGE POINTS OF OPTIMUM MOISTURE IN ACCORDANCE WITH ASTM D698. TOPSOIL SHALL BE ADDED TO ANY AREAS THAT SETTLE.

THICKNESS REQUIREMENTS FOR GRANULAR BEDDING

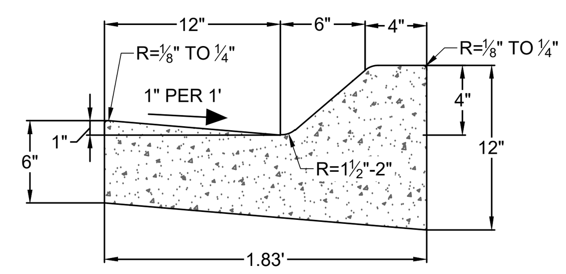
RIPRAP DESIGNATION	MINIMUM BEDDING THICKNESS (INCHES)		
	FINE-GRAINED SOILS [1]		COARSE-GRAINED SOILS [2]
	TYPE I (LOWER LAYER)	TYPE II (UPPER LAYER)	TYPE II
VL (D_{50} = 6 IN)	4	4	6
L (D_{50} = 9 IN)	4	4	6
M (D_{50} = 12 IN)	4	4	6
H (D_{50} = 18 IN)	4	6	8
VH (D_{50} = 24 IN)	4	6	8

NOTES:
1. MAY SUBSTITUTE ONE 12-INCH LAYER OF TYPE II BEDDING. THE SUBSTITUTION OF ONE LAYER OF TYPE II BEDDING SHALL NOT BE PERMITTED AT DROP STRUCTURES. THE USE OF A COMBINATION OF FILTER FABRIC AND TYPE II BEDDING AT DROP STRUCTURES IS ACCEPTABLE.
2. FIFTY PERCENT OR MORE BY WEIGHT RETAINED ON THE #40 SIEVE.

RIPRAP	D_{50}*	DEPTH D_{50}x2
TYPE VL	6"	12"
TYPE L	9"	18"
TYPE M	12"	24"
TYPE H	18"	36"
TYPE VH	24"	48"

*D_{50} = MEAN RIPRAP SIZE

* SUMMARY OF PAGES 8-76 THROUGH 8-78 OF MHFD CHAPTER 8 OPEN CHANNELS.

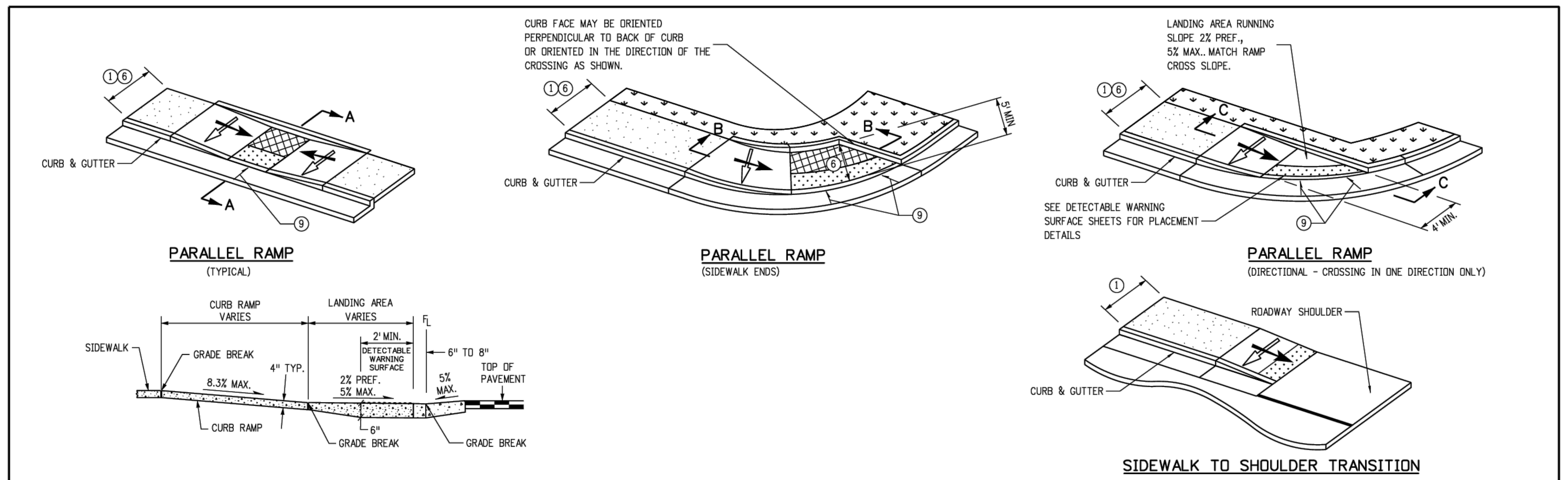


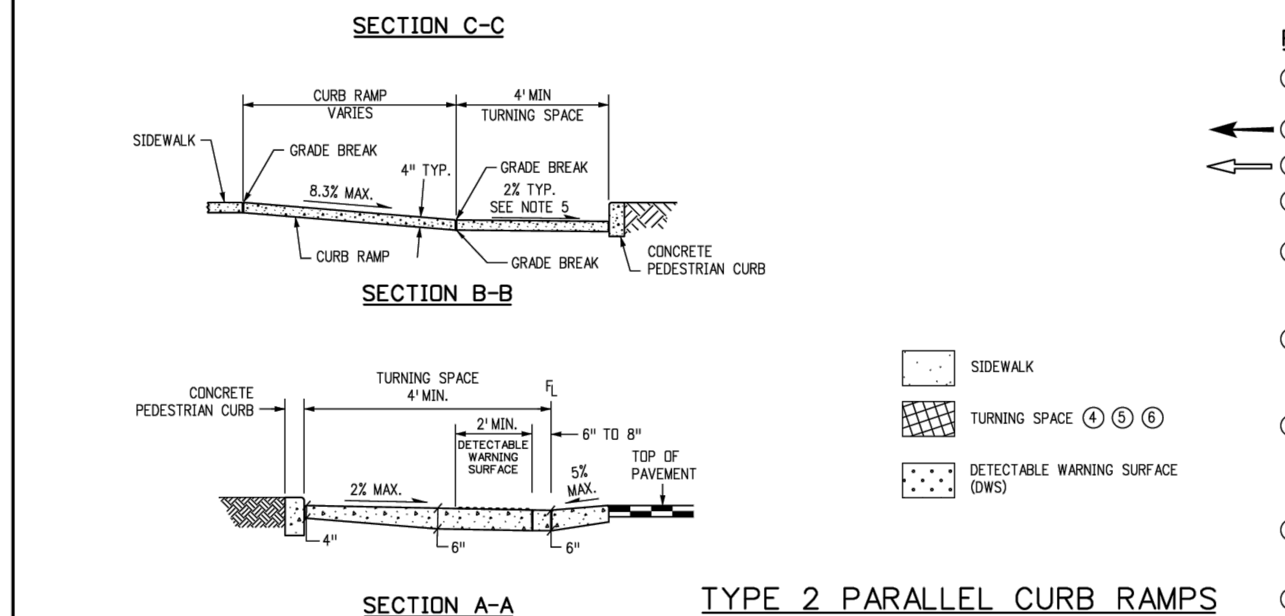
MODIFIED TOWN OF FRASER MOUNTABLE CATCH CURB

1. IF A SIDEWALK IS PLACED BEHIND THE CURB BUT IS NOT PLACED MONOLOTHICALLY, EXPANSION JOINT MATERIAL AND A SILICONE BASE SEALER MUST BE APPLIED BETWEEN THE SIDEWALK AND THE CURB.

2. GUTTER THICKNESS SHALL BE INCREASE TO MATCH CONCRETE PAVEMENT THICKENSSS.

3. TOWN OF FRASER ATTACHMENT A-11 HAS BEEN MODIFIED TO A 4" CURB HEIGHT AND A 2' PAN.





TYPE 2 PARALLEL CURB RAMPS

PARALLEL RAMP NOTES

1. RAMP WIDTH - PROVIDE A RAMP WIDTH EQUAL TO THE ADJOINING SIDEWALK, PROVIDE 4 FT. WIDTH MINIMUM. RAMPS SERVICING SHARED USE PATHS SHALL MATCH THE WIDTH OF THE PATH.
2. RAMP RUNNING SLOPE - 8.3% MAX.
3. RAMP CROSS SLOPE - 2.0% MAX.
4. TURNING SPACE RUNNING SLOPE - 2.0% MAX. TURNING SPACE RUNNING SLOPE IS MEASURED PERPENDICULAR TO THE BACK OF CURB.
5. TURNING SPACE CROSS SLOPE - 2.0% TYPICAL, AT CROSSINGS WITHOUT YIELD OR STOP CONTROL, OR WITH A SIGNAL WHERE VEHICLES CAN PROCEED THROUGH THE INTERSECTION WITHOUT SLOWING OR STOPPING, THE CROSS SLOPE OF THE TURNING SPACE MAY EQUAL THE HIGHWAY GRADE. AT MIDBLOCK PEDESTRIAN STREET CROSSINGS THE TURNING SPACE CROSS SLOPE MAY EQUAL THE HIGHWAY GRADE. TURNING SPACE CROSS SLOPE IS MEASURED IN THE DIRECTION OF THE RAMP RUN.
6. TURNING SPACE DIMENSIONS - PROVIDE A TURNING SPACE AT THE BOTTOM OF PARALLEL RAMPS WITH A WIDTH EQUAL TO THE WIDTH OF THE CURB RAMP. PROVIDE 4 FT. MINIMUM, MEASURED IN THE DIRECTION OF THE RAMP RUN. IF THE TURNING SPACE IS CONSTRAINED ON TWO SIDES, PROVIDE 5 FT. MEASURED IN THE DIRECTION OF PEDESTRIAN STREET CROSSING. THE TURNING SPACE MAY CONTAIN THE DETECTABLE WARNING SURFACE.
7. RAMP ALIGNMENT - RAMPS SHALL BE ALIGNED SO THE TURNING SPACE IS FULLY CONTAINED WITHIN THE CROSSWALK OR STREET CROSSING THEY SERVE. PROVIDE ONE RAMP FOR EACH STREET CROSSING DIRECTION. IN ALTERATIONS, WHERE EXISTING PHYSICAL CONSTRAINTS PREVENT PROVIDING ONE CURB RAMP FOR EACH CROSSING DIRECTION, A SINGLE DIAGONAL CURB RAMP (ON THE APEX OF A CORNER) SHALL BE PERMITTED TO SERVE BOTH PEDESTRIAN STREET CROSSINGS. DIAGONAL RAMPS ARE NOT ACCEPTABLE IN NEW CONSTRUCTION, OR FULL-DEPTH RECONSTRUCTION.
8. RAMP LENGTH - PARALLEL RAMP LENGTH IS DEPENDENT UPON THE RAMP SLOPE AND THE CHANGE OF ELEVATION FROM THE TURNING SPACE TO THE SIDEWALK. WHERE TERRAIN IS SLOPING A RAMP IS NOT REQUIRED TO CHASE GRADE MORE THAN 15 FT. REGARDLESS OF THE RESULTING RAMP SLOPE.
9. GUTTER COUNTER SLOPE - 5.0% MAX.

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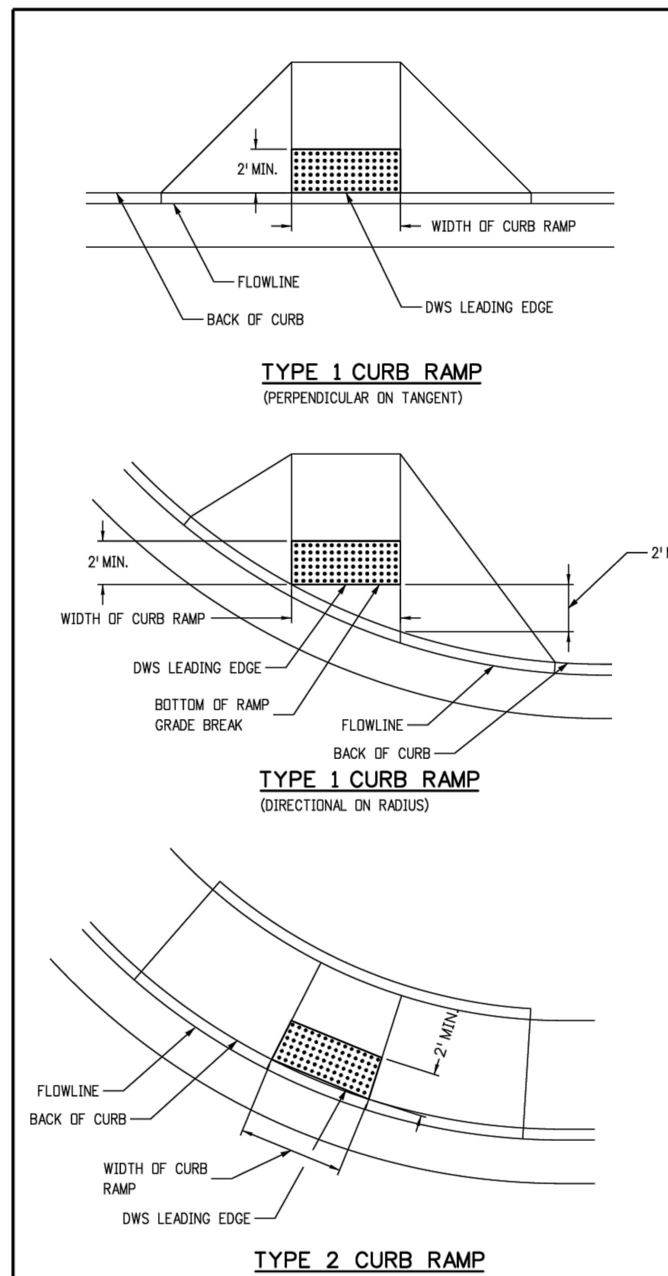
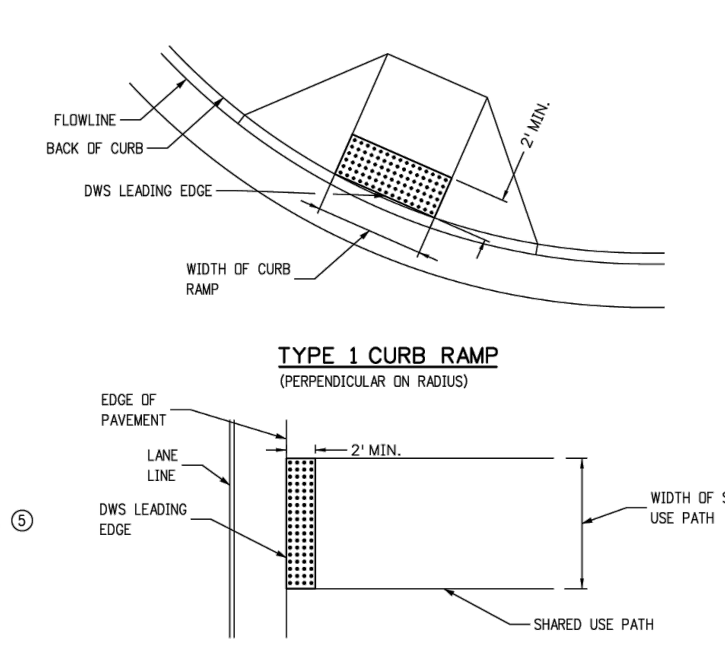
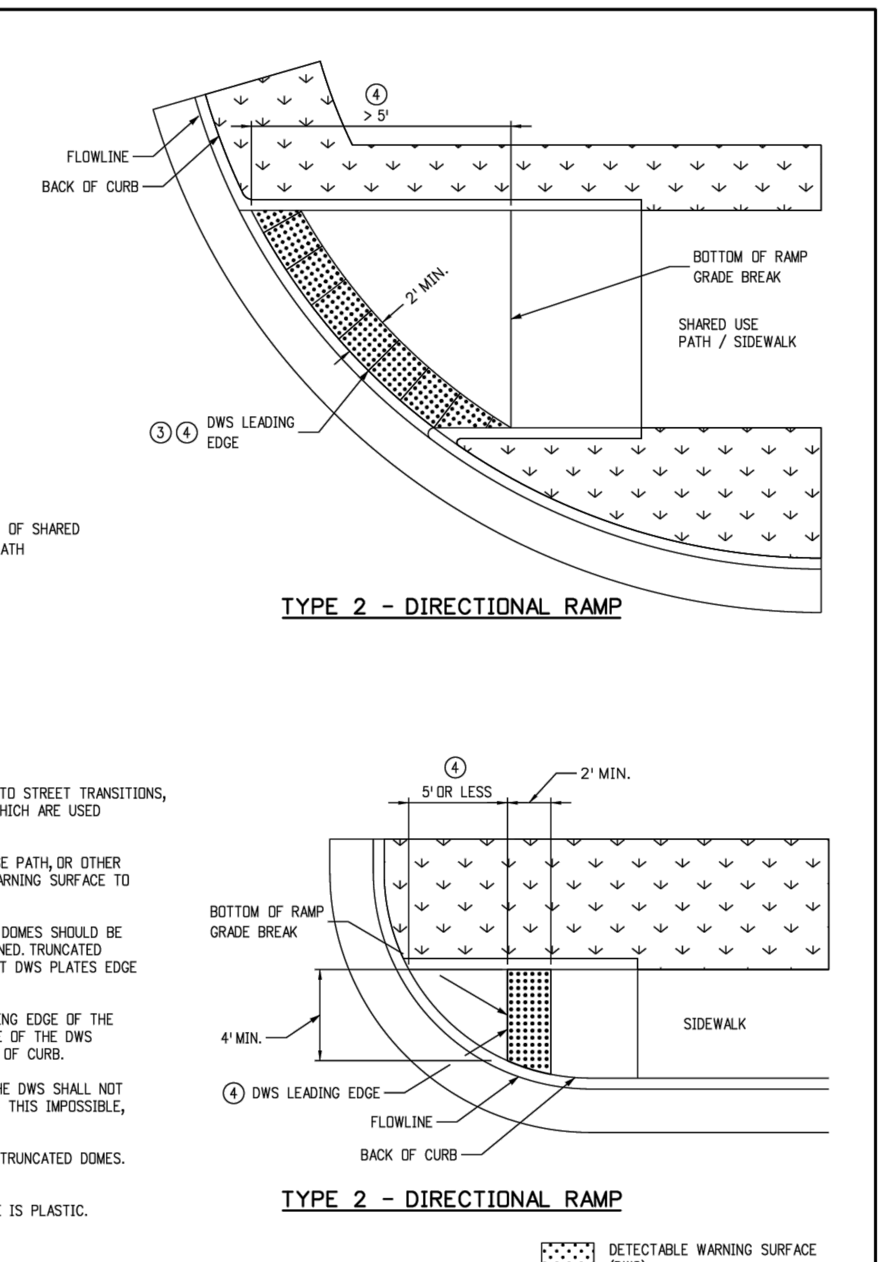




SHARED USE PATH CROSSING



DETECTABLE WARNING SURFACE NOTES:

1. DETECTABLE WARNING SURFACES (DWS) SHALL BE INSTALLED AT SIDEWALK, OR SHARED USE PATH, TO STREET TRANSITIONS, AND SHALL CONSIST OF TRUNCATED DOME SURFACES. ANY TRUNCATED DOME PANELS OR PAVERS WHICH ARE USED MUST BE ON THE CDOT APPROVED PRODUCTS LIST (APL).
2. THE DETECTABLE WARNING SURFACE SHALL SPAN THE FULL WIDTH OF THE CURB RAMP, SHARED USE PATH, OR OTHER ROADWAY ENTRANCE AS APPLICABLE. A GAP OF 2 INCHES FROM THE EDGE OF THE DETECTABLE WARNING SURFACE TO THE EDGE OF THE CURB RAMP OR SHARED USE PATH IS PERMITTED.
3. WHEN DETECTABLE WARNING SURFACES ARE PLACED ON A SLOPE GREATER THAN 5.0%, TRUNCATED DOMES SHOULD BE ALIGNED IN THE DIRECTION OF THE RAMP RUN; OTHERWISE DOMES ARE NOT REQUIRED TO BE ALIGNED. TRUNCATED DOMES SHALL BE IN A SQUARE GRID OR RADIAL PATTERN. WHEN PLACED RADIALLY, PLACE ADJACENT DWS PLATES EDGE TO EDGE. EDGES OF CUT PLATES SHALL BE STRAIGHT.
4. LOCATE ONE CORNER OF THE DWS LEADING EDGE AT THE BACK OF CURB. NO POINT ON THE LEADING EDGE OF THE DWS MAY BE MORE THAN 5 FT. FROM THE BACK OF CURB. WHEN ANY POINT OF THE LEADING EDGE OF THE DWS WILL BE GREATER THAN 5 FT. FROM THE BACK OF CURB, PLACE THE DWS RADIALLY AT THE BACK OF CURB.
5. WHERE PERPENDICULAR DIRECTIONAL RAMPS ABUT A WALKABLE SURFACE, THE LEADING EDGE OF THE DWS SHALL NOT BE PLACED FURTHER THAN 2 FEET FROM THE BACK OF CURB. IF THE RADIUS OF A CORNER MAKES THIS IMPOSSIBLE, ORIENT THE CURB RAMP PERPENDICULAR TO THE CURB AND GUTTER.
6. IF THE DETECTABLE WARNING SURFACE IS CUT, GRIND OFF THE REMAINING PORTION OF ANY CUT TRUNCATED DOMES. SEAL ALL CUT PANEL EDGES WITH AN APL SEALANT TO PREVENT WATER DAMAGE.
7. TRUNCATED DOME PLATES SHALL BE EMBEDED IN THE CONCRETE CURB RAMP WHILE THE CONCRETE IS PLASTIC.
8. DWS SHALL NOT BE PLACED OVER GRADE BREAKS.

DETECTABLE WARNING SURFACE PLACEMENT

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1	1ST SUBMITTAL	04/11/2025	MJG
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NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 11W & PORTIONS OF 23W
TOWN OF FRASER, COLORADO

PRELIMINARY CONSTRUCTION PLANS
DETAILS (7 OF 7)

Know what's below. Call before you dig. 811

SHEET 44 OF 44

PHASE II DRAINAGE REPORT
FOR
GRAND PARK – WEST MOUNTAIN -
PLANNING AREAS 8Wb, 9W.1, 9W.2, 10W.1, 10W.2, 11W &
Portions of 23W

PREPARED FOR:

GRAND PARK DEVELOPMENT COMPANY
P.O. BOX 30
WINTER PARK, COLORADO 80482
CONTACT: CLARK LIPSCOMB
PHONE: 970-726-8600

PREPARED BY:

TERRACINA DESIGN, LLC
10200 E. GIRARD AVENUE
BUILDING A, SUITE 314
DENVER, CO 80231
PHONE: 303-632-8867
CONTACT: MARTIN METSKER

DECEMBER 2025

Engineer's Statement:

This report was prepared by me, or under my direct supervision, in accordance per the Town of Fraser Storm Drainage Design and Technical Criteria which references the Grand County Storm Drainage Design and Technical Criteria Manual, dated August 1st, 2006, and it was designed to comply with the provisions thereof. I understand that Town of Fraser does not and will not assume liability for drainage facilities designed by others.

____

Martin Metsker, P.E.
Colorado Professional Engineer
License #41743

Owner/Developer's Statement:

I Grand Park Development Company hereby certify that the drainage facilities for planning areas 8Wb, 9W.1, 9W.2, 10W.1, 10W.2, 11W & portions of 23W, shall be constructed according to the design presented in this report. I understand that the Town of Fraser does not and will not assume liability for drainage facilities designed or reviewed by my engineer. I also understand that the Town of Fraser relies on the representations of others to establish that drainage facilities are designed and built in compliance with applicable guidelines, standards and specifications. Review by the Town of Fraser can therefore in no way limit or diminish any liability which I or any other party may have with respect to the design or construction of such facilities.

____

Grand Park Development Company

____

Printed Name

TABLE OF CONTENTS

APPENDICES

I. GENERAL LOCATION AND DESCRIPTION

A. Site Location

This Phase II Drainage Report provides recommendations for changes in the drainage patterns resulting from the future construction of the major infrastructure components for Grand Park – West Mountain – Planning Areas 8Wb, 9W.1, 9W.2, 10W.1, 10W.2, 11W, and portions of 23W in Fraser, CO, from here on known as the “Site”. The Site is currently undeveloped and future development will include multi-family, commercial, hospitality, open space, associated roadway and utility infrastructure. The intent of the report and the Site is to establish parameters for future development which will include 184 residential units, 248 lodging units, and about 123,584 square feet of commercial space.

The Site is approximately 189.3 acres and the inspected drainage area is 276.43 acres. The Site is bound to the west by Spring Meadow drainageway and open space, to the north and east by the Union Pacific Railroad, and to the south by Grand Park Drive. The Site is a part of the northwest quarter of Section 29 and northwest quarter of Section 32, Township 1 South, Range 75 West of the 6th Principal Meridian, Town of Fraser, County of Grand, State of Colorado. A vicinity map for the site can be found in Appendix A.

B. Description of Site

The Site is currently undeveloped with existing native vegetation, and the land uses according to the approved PD are residential, clubhouse and open space containing approximately 189.3 acres. The Site has naturally occurring slopes ranging from 1 to 45 percent, generally slopes from the south to the north towards Spring Meadow Drainage Basin. The soils within the Site include Cowdrey loam, Cumulic Cryaquolls, and Frisco-Peeler gravelly sandy loams, and the soil primarily consist of hydrologic soil groups B and C. A soils map has been provided and can be found in Appendix A.

The Site primarily lies in the Spring Meadow basin. The Site is adjacent to an existing floodplain, and lies within Zone X, “Areas determined to be outside the 0.2% annual chance floodplain,” as depicted on the FEMA Flood Insurance Rates Map 08049C0991C Effective January 2, 2008, found in Appendix A. The Site does lie near Leland Creek which is a major drainageway. The Site will not propose modifications or improvements to the floodplain. The Site drainage will not adversely impact the surrounding existing drainage infrastructure.

Historically, discharge from the Site sheet flows northeast to the existing culvert that conveyed runoff generated within Spring Meadow basin across the railroad. Ultimately all runoff generated within the Site will be conveyed to the northeast, across US40 and into the Fraser River.

The intent of this project is to construct the necessary roadways and utility infrastructure to begin development of planning areas 8Wb, 9W.1, 9W.2, 10W.1, 10W.2, and 11W. This report details the general drainage patterns that the planning areas will follow in the final developed conditions. Subsequent reports will be required detaining the final design of the individual planning areas.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Drainage Basins

The Site lies within Spring Meadow drainage basin. Runoff generated within the Site will generally follow historic drainage pattern. Runoff will generally be conveyed to the northeast to each basin's respective pond before being discharged towards an existing culvert that will convey the runoff across the railroad. The flows will then be conveyed into various existing ponds located in the meadow to the northwest. Flows then continue under US-40 and confluence into the Fraser River that will ultimately discharge into the Colorado River. Please see the Proposed Drainage Map found in Appendix E of this report for basins flow information.

The Site falls within Zone X, as shown on the Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) panel 08049C0991C. The development will have no effect on the Zone X designation where there are "Areas determined to be outside the 0.2% annual chance floodplain." The development will not have an effect on the Zone X designation and will remain the same. If improvements for the development require entering the floodplain, further evaluation of improvements taking place and disturbance of the floodplain will be described in subsequent reports. A FIRM map can be found in Appendix A.

There are no previous drainage studies associated with the Site; however, the "Storm Drainage Master Plan for Grand Park" by High country Engineering, dated February 2006 analyzed the runoff generated to the southwest of the railroad and the culvert capacities of all railroad crossings within West Mountain. This drainage report has been written as a standalone report that will conform to the culvert capacities established in this previously approved drainage report.

B. Sub-basin Description

Minor Drainage Basins for the Site have been delineated using the proposed site layout and grading. Grading within the planning areas represents general drainage patterns; however, final grading will take place at a later date and will be described in subsequent reports during the future development of the planning areas. Overall, the proposed drainage patterns for the sub-basins will generally follow the historic patterns prior to development. For sub-basins within the Site, runoff will drain towards low points in the future roadways and other design points. The developed minor basin will include overland flow and storm sewer collection systems which will direct stormwater to the detention basins (DBs) or to off-site facilities that can account for developed runoff from the Site.

Basin A in its fully developed conditions will consist of roadways, single-family housing, multi-family housing, commercial area, a golf course and a detention pond. Runoff generated within the basin will be captured by proposed storm infrastructure, then conveyed into the proposed DB pond to the north of the Site. This pond will outfall to the existing 48-inch storm infrastructure located under the Union Pacific Railroad and the discharged runoff will eventually be conveyed through Cozens Meadow.

Basin B in its fully developed conditions will include roadways, single and multi-family housing areas, a detention pond, and open space. All runoff generated within B basins will drain to the east to the proposed DB pond to the east of the Site. This DB outfalls to the north, where the runoff will be conveyed across the Union Pacific Railroad via a 24-inch existing culvert, and the flows will eventually be conveyed through Cozens Meadow.

Basin C includes roadways, single family housing areas, and open space. All runoff generated within the C basins will drain to the south to temporary sediment basin Pond C. In the fully developed conditions of West Mountain, this temporary sediment basin will be modified to be a detention pond that treats a much larger watershed area. Pond C will remain a temporary sediment basin until 15 acres or more of development drains to it. This temporary sediment basin was sized according to Table SB-1 in the Sediment Basin Section of the Mile High Flood District (MHFD) Storm Drainage Criteria Manual volume 3 (Ref. E). An exhibit has been included in Appendix C showing the methodology used to size this temporary sediment basin. Hydraulic calculations have been included for the stage-storage discharge relationship for the temporary sediment basin and these calculations can be found in Appendix C.

All D, E, and OS basins will drain to their respective design points and leave the site undetained. These basins will not receive treatment or be detained because DB ponds are not feasible within these basins due to existing site constraints.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

The Town of Fraser has adopted Grand County Strom Drainage Design and Technical Criteria Manual (Ref. A).

This Phase II Report is in accordance with Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A) and the Mile High Flood District (MHFD) Storm Drainage Criteria Manual (Ref. C, D and E). These manuals were used as a basis of design for the Site. The report will analyze the minor (5-year) and major (100-year) storm events. The 5-year storm was used for the minor storm event because there will be curb and gutter throughout the Site which is the criteria for the minor storm to be considered the 5-year storm event per Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A). All applicable figures, tables, and graphs from these manuals have been included in the Appendices.

The drainage design of the Site adheres to the requirements of Section 404 of the Clean Water Act, Section 106 of the National Historic Preservation Act of 1966 and the Endangered Species Act. Additionally, the drainage design conforms to all applicable local, state, and federal requirements for drainage design and stormwater discharge.

B. Development of Basic Data and Constraints

There are no previous drainage studies associated with the Site. The proposed drainage conditions discussed herein will have no adverse impact to surrounding developments or properties.

C. Hydrological Criteria

Some proposed minor drainage basins within the Site are greater than 90 acres; therefore, a routed hydrograph procedure is recommended to determine the flow rates for basin within the Site. Since HEC-HMS has historically been used to perform hydrologic calculations for the Site, this software was used to generate and route storm hydrographs for all basins within the Site. The sub-basins were delineated based on the existing and proposed topography developed for the pad sites. A proposed drainage map for the Site can be found in Appendix E.

The intensity-frequency curves used in the hydrologic calculations were taken from Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A) and storm events that were not provided by Grand County's drainage manual were supplemented by NOAA ATLAS 14 Point Precipitation Frequency Estimates, which can be found in Appendix A. All drainage infrastructure was analyzed and designed for both the minor (5-year) and major (100-year) storm events. The 5-year storm was used for the minor storm event because there will be curb and gutter throughout the Site which is the criteria for the minor storm to be considered the 5-year storm event per Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A). All applicable figures, tables, and graphs from these manuals have been included in the Appendices.

Within the HEC-HMS software, the SCS Curve Number Loss method was used, and the use of this method is well documented in the HEC-HMS Technical Reference Manual published by the USACE (Ref. I). The calculation of the curve number and initial abstraction were adjusted because the SCS Curve Number Loss Method assumes the soil will infiltrate to 20% of the maximum potential retention. It is well documented that this assumption decreases the models accuracy when applied to steep slopes, forested regions, or mountainous areas because the SCS Curve Number Loss Method was developed for relatively flat agricultural areas which allow significantly more infiltration. In order to adjust the Curve Number and Initial Abstraction, we used equations 1, 2, and 3 provided by Ajmal, et. al. (2020) (Ref. J), where lambda was equal to 0.05, or in other words 5% of the maximum potential retention will be used for infiltration before the excess precipitation produces runoff. All curve number and lag time calculations, HEC-HMS inputs, and HEC-HMS outputs can be found in Appendix B. A picture from the HEC-HMS basin model as well as a map showing all elements in the HEC-HMS model and their existing and proposed flow rates have been included in Appendix E.

The proposed detention ponds within basins A and B have been provided for water quality treatment and stormwater detention as defined in Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A). Because the HEC-HMS software was used for hydrologic calculations instead of the rational method, the modified FAA procedure was used to size the detention ponds, following section 10.2.2 of the Grand County Storm Drainage Design and Technical Criteria Manual (Ref. A). When sizing the required detention volume for the DBs, the 10-year storm event was used for the minor storm because section 10.2 of Grand County's Storm Drainage Design and Technical Criteria Manual specifies "For detention purposes, the minor storm event shall be the 10-year recurrence interval, and the major storm event shall be the 100-year recurrence interval." Results for the detention pond sizing can be found in Appendix C. The detention ponds will also restore developed stormwater flows to their historic conditions before releasing flows to the existing downstream storm infrastructure. Because flows will be restored to their historic conditions before release, no floodplain limits will be adversely impacted by the development of the Site, and downstream properties will not be negatively impacted by the developed stormwater.

D. Hydraulic Criteria

Hydraulic calculations for detention pond sizing were based on the modified FAA method. After calculating the required detention volume for the minor and major storms, the MHFD design spreadsheets were used to design each pond's outlet structure. Within this spreadsheet, zone 1 was the WQCV (calculated within the MHFD detention spreadsheet), zone 2 was the minor detention volume minus the WQCV, and zone 3 was the major detention volume. The total detention volume in the MHFD spreadsheet was user defined to equal the combined minor and major detention volumes from the modified FAA method. The modified FAA spreadsheets and associated MHFD detention spreadsheets for Ponds A and B can be found in Appendix C. A temporary sediment basin will be used to treat the runoff generated within the C basins before being discharged into Leland Creek. An exhibit as well as stage storage discharge tables for this temporary sediment basin can be found in Appendix C. The final detention pond outlet control design will be provided in ensuing reports.

Street and inlet capacity designs will be provided in subsequent reports and will be based on Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A), and design spreadsheets provided by the MHFD.

Swale velocity and capacity will be analyzed in a subsequent Phase III Drainage report using Hydraflow Express. Hydraflow Express uses the Manning's equation to compute flow at a known depth or a depth at a known flow.

E. Stormwater Quality Criteria

Water quality measures will be provided in subsequent reports that will include the designs of the proposed DB, forebay, and outlet structure for proposed detention Ponds A and B. The DB will have been designed to incorporate a structure that releases flows for the water quality capture volume (WQCV), minor (10-year) storm event, and the major (100-year) storm event. Please see the Proposed Drainage Map found in Appendix E of this report for basin flow information.

F. Variances from Criteria

No variances are being requested at this time.

IV. <u>DRAINAGE FACILITY DESIGN</u>

A. General Concepts

Low Impact Development (LID) practices and strategies have been applied to the comprehensive land planning and engineering design approach to managing stormwater runoff. The primary objective of these concepts is the preservation of the natural features of the property by arranging the development to minimize Site grading, impacts to existing vegetation and wetlands, as well as providing open space areas. The drainage design will generally maintain the historic drainage patterns and release rates for the Site. The detention ponds on Site have been located to minimize subsurface systems and control the developed discharge prior to entering the established waterways thus reducing the impact to the surrounding tributaries.

In the final developed condition, runoff will be designed to drain to sump locations, be captured by inlets, or sheet flow into grass lined swales that will be detailed in future reports. The runoff will then be conveyed via a subsurface system or via swales toward proposed or existing detention ponds that will have a final design in subsequent reports. These ponds will discharge via a pipe from an outlet structure *(to be designed and detailed in subsequent reports)* or overflow weirs to an existing culvert that will convey flows across the Union Pacific railroad.

B. Specific Details

<u>Sub-basin A</u>
Sub-basin A is 165.82 acres and in its final developed condition will be comprised of open space, paved area, single and multi-family lots, commercial area, a permanent pond and golf course areas. Runoff generated within the basin will drain north to a proposed detention pond located at Design Point A. After being detained, the pond will discharge flows to the north where flows will be captured by an existing forty-eight (48”) inch flared end section and conveyed across the Union Pacific railroad to the north to Grand Park meadow.

Pond A will be used as a permanent feature pond; however, the top 5 feet of the pond will be utilized as a DB. The portion of the pond being used as a DB has been designed to store 10.081 acre-feet, which is equal to the combined minor and major required detention volumes per the modified FAA method. The 100-year storm predeveloped peak flow is 183 cfs per the HEC-HMS hydrologic model, and the pond outlet structure will be designed in subsequent reports to release at 90% or less of the predeveloped peak flow. The detention basin design workbook (MHFD-Detention, Version 4.07, June 2025) was used for the preliminary design of detention Pond A. The modified FAA and MHFD detention spreadsheet output files for detention Pond A have been included in Appendix C. These are preliminary calculations and the final design of this pond and its outlet structure will be provided in a subsequent Phase III drainage report.

Sub-basin A1

Sub-basin A1 is 23.59 acres comprised of paved area, multi-family lots, commercial area, golf course, and open space. Runoff generated within the basin will drain northwest to Design Point A1 and sheet flow into the existing drainage channel leading to DB Pond A. After being detained, the pond will discharge flows to the north where flows will be captured by an existing forty-eight (48”) inch flared end section and conveyed across the Union Pacific railroad to the north to Grand Park meadow.

Sub-basin A2

Sub-basin A2 is 11.06 acres comprised of paved area, multi-family lots, commercial area and open space. Runoff generated within the basin will drain north to a sump type R inlet at Design Point A2. After being captured, the runoff will be conveyed to the west via proposed subsurface infrastructure, through a tract, until it is discharged into a swale at design point A2/3. This swale will convey the flows to DB Pond A. After being detained, the pond will discharge flows to the north where flows will be captured by an existing forty-eight (48”) inch flared end section and conveyed across the Union Pacific railroad to the north to Grand Park meadow.

Sub-basin A3

Sub-basin A3 is 5.95 acres comprised of paved area, multi-family lots, and open space. Runoff generated within the basin will drain north to a sump type R inlet at Design Point A3. After being captured, the runoff will be conveyed to the north via proposed subsurface infrastructure, through a tract, until it is discharged into a swale at design point A2/3. This swale will convey the flows to DB Pond A. After being detained, the pond will discharge flows to the north where flows will be captured by an existing forty-eight (48”) inch flared end section and conveyed across the Union Pacific railroad to the north to Grand Park meadow.

Sub-basin A4

Sub-basin A4 is 2.73 acres comprised of paved area, future single-family lots, and open space. Runoff generated within the basin will drain north to a set of on-grade type R inlet at Design Point A4. After being captured, the runoff will be conveyed to the north via proposed subsurface infrastructure, through a tract, until it is discharged into the existing channel within Basin A. This channel will convey the flows to DB Pond A. After being detained, the pond will discharge flows to the north where flows will be captured by an existing forty-eight (48”) inch flared end section and conveyed across the Union Pacific railroad to the north to Grand Park meadow.

Sub-basin B

Sub-basin B is 8.62 acres comprised of single and multi-family lots, and open space. The runoff generated in basin B will sheet flow into the drainage channel leading to DB Pond B at design point B. After being detained in DB Pond B, the runoff will be discharged to the north to design point OS3, where the runoff will be captured by an existing twenty-four (24”) inch culvert that will convey the runoff across the Union Pacific railroad to Cozen’s Meadow.

Pond B has been designed to store 2.295 acre-feet with a maximum depth of 9 feet which is equal to the combined minor and major required detention volumes per the modified FAA method. The 100-year storm predeveloped peak flow is 29.9 cfs per the HEC-HMS hydrologic model, and the pond outlet structure will be designed in subsequent reports to release at 90% or less of the predeveloped peak flow. The detention basin design workbook (MHFD-Detention, Version 4.07, June 2025) was used for the preliminary design of detention Pond B. The modified FAA and MHFD detention spreadsheet output files for detention Pond B have been included in Appendix C. These are preliminary calculations and the final design of this pond and its outlet structure will be provided in a subsequent Phase III drainage report.

Sub-basin B1

Sub-basin B1 is 10.33 acres comprised of roadways, single family lots, and open space. Runoff generated within the basin will drain northeast to a sump type R inlet at Design Point B1. After being captured, the runoff will be conveyed to the northeast to DB Pond B at design point B via proposed subsurface infrastructure and swales. After being detained in DB Pond B, the runoff will be discharged to the north to design point OS3, where the runoff will be captured by an existing twenty-four (24") inch culvert that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin B2

Sub-basin B2 is 8.97 acres comprised of roadways, single family lots, and open space. Runoff generated within the basin will drain northeast to a sump type R inlet at Design Point B2. After being captured, the runoff will be conveyed to the northeast to DB Pond B at design point B via proposed subsurface infrastructure and swales. After being detained in DB Pond B, the runoff will be discharged to the north to design point OS3, where the runoff will be captured by an existing twenty-four (24") inch culvert that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin B3

Sub-basin B3 is 8.47 acres comprised of roadways, multi-family lots, and open space. Runoff generated within the basin will drain northeast to a sump type R inlet at Design Point B3. After being captured, the runoff will be conveyed to the east to DB Pond B at design point B via proposed subsurface infrastructure and swales. After being detained in DB Pond B, the runoff will be discharged to the north to design point OS3, where the runoff will be captured by an existing twenty-four (24") inch culvert that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin B4

Sub-basin B4 is 1.05 acres comprised of roadways. Runoff generated within the basin will drain north to a sump type R inlet at Design Point B4. After being captured, the runoff will be conveyed to the north to DB Pond B at design point B via proposed subsurface infrastructure. After being detained in DB Pond B, the runoff will be discharged to the north to design point OS3, where the runoff will be captured by an existing twenty-four (24") inch culvert that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin C

Sub-basin C is 1.71 acres comprised of a temporary sediment basin and open space. Runoff generated within the basin will drain into the temporary sediment basin at Design Point C. After being held in temporary sediment basin Pond C, the runoff will be discharged to the east into Leland Creek. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow. This temporary sediment basin was sized according to Table SB-1 in the Sediment Basin Section of the Mile High Flood District (MHFD) Storm Drainage Criteria Manual volume 3 (Ref. E). An exhibit has been included in Appendix C showing the methodology used to size this temporary sediment basin. Hydraulic calculations have been included for the stage-storage discharge relationship for the temporary sediment basin and these calculations can be found in Appendix C.

In the fully developed conditions of West Mountain, temporary sediment basin Pond C will be modified to be a detention pond that treats a much larger watershed area. Pond C will remain a temporary sediment basin until 15 acres or more of development drains to it.

Sub-basin C1

Sub-basin C1 is 2.92 acres comprised of roadways, single family lots, and open space. Runoff generated within the basin will drain southeast to a curbcut at Design Point C1. After being captured, the runoff will be conveyed to the south to temporary sediment basin Pond C at design point C via proposed subsurface infrastructure and swales. After being held in temporary sediment basin Pond C, the runoff will be discharged to the east into Leland Creek. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin C2
Sub-basin C2 is 7.57 acres comprised of roadways, single family lots, and open space. Runoff generated within the basin will drain southeast to a set of on-grade type R inlets at Design Point C2. After being captured, the runoff will be conveyed to the south to temporary sediment basin Pond C at design point C via proposed subsurface infrastructure and swales. After being held in temporary sediment basin Pond C, the runoff will be discharged to the east into Leland Creek. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin D1
Sub-basin D1 is 6.77 acres comprised of roadways, single family lots, and open space. Runoff generated within the basin will drain east to a set of on-grade type R inlets at Design Point D1. After being captured, the runoff will be conveyed to the south to Leland Creek via proposed subsurface infrastructure. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin D2
Sub-basin D2 is 0.32 acres comprised of roadways. Runoff generated within the basin will drain east to an on-grade type R inlet at Design Point D2. After being captured, the runoff will be conveyed to the south to Leland Creek via proposed subsurface infrastructure. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin E1
Sub-basin E1 is 3.05 acres comprised of roadways, single-family lots, and open space. Runoff generated within the basin will drain south to a set of on-grade type R inlets at Design Point E1. After being captured, the runoff will be conveyed to the south to Leland Creek via proposed subsurface infrastructure. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin OS1
Sub-basin OS1 is 0.93 acres comprised of single-family lots and open space. Runoff generated within the basin will drain south to an proposed 30-inch culvert at Design Point OS1. After being captured, the runoff will be conveyed to the south to Leland Creek via proposed subsurface infrastructure. The runoff will be conveyed to the northeast via Leland Creek and existing storm infrastructure that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

Sub-basin OS2
Sub-basin OS2 is 2.42 acres comprised of single-family lots. Runoff generated within the basin will drain southeast to the back of lots where it will follow historic drainage patterns.

Sub-basin OS3
Sub-basin OS3 is 3.76 acres comprised of multi-family lots and open space. Runoff generated within the basin will drain north to design point OS3, where the runoff will be captured by an existing twenty-four (24") inch culvert that will convey the runoff across the Union Pacific railroad to Cozen's Meadow.

V. CONCLUSIONS

A. Compliance with Standards

The drainage design for the Site conforms to Grand County's Storm Drainage Design and Technical Criteria Manual (Ref. A) and the Mile High Flood District (MHFD) Storm Drainage Criteria Manual where applicable. The report outlines the required design and construction of offline water quality basins within each applicable sub-basin.

B. Drainage Concept

The HEC-HMS software was used to create and routed hydrograph method through the Site to determine the historic and developed runoff values for the minor drainage basins throughout the Site. These basins were delineated based on the natural Site topography and the developed Site plan. The proposed detention ponds will be designed in subsequent reports. Preliminary sizing calculations for the DBs have been added to Appendix C. The storm sewer system will be designed to capture the minor (5-year) and major (100-year) storm events. This report has been written as a standalone report.

VI. REFERENCES

A) Grand County Storm Drainage Design and Technical Criteria Manual, August 1st, 2006

B) Fraser Municipal Code, Chapter 14: Town of Fraser Design and Construction Standards, 2007, revised 2024.

C) MHFD (Mile High Flood District). 1969. Urban Storm Drainage Criteria Manual. Volume 1: Management, Hydrology and Hydraulics. Revised March 2024. https://mhfd.org/resources/criteria-manual.

D) MHFD. 1969. Urban Storm Drainage Criteria Manual. Volume 2: Structures, Storage and Recreation. Revised January 2016. https://mhfd.org/resources/criteria-manual.

E) MHFD. 1992. Urban Storm Drainage Criteria Manual. Volume 3: Stormwater Best Management Practices. Revised March 2024. https://mhfd.org/resources/criteria-manual.

F) National Flood Hazard Layer FIRMette Map – 08049C0991C Effective Date January 2, 2008

G) USDA NRCS Soil Maps – Updated May 7, 2025

H) Storm Drainage Master Plan For Grand Park, High Country Engineering, February 17, 2006

I) HEC-HMS Technical Reference Manual. U.S. Army Corps of Engineers, Hydrologic Engineering Center. 2025.

J) A Pragmatic Slope-Adjusted Curve Number Model to Reduce Uncertainty in Predicting Flood Runoff from Steep Watersheds. Ajmal, M. Wassem, M., Kim, D., & Kim, T. 2020.

K) Computer Programs:

AutoCAD Civil3D Hydraflow Express Extension by Autodesk Inc. April 2010.

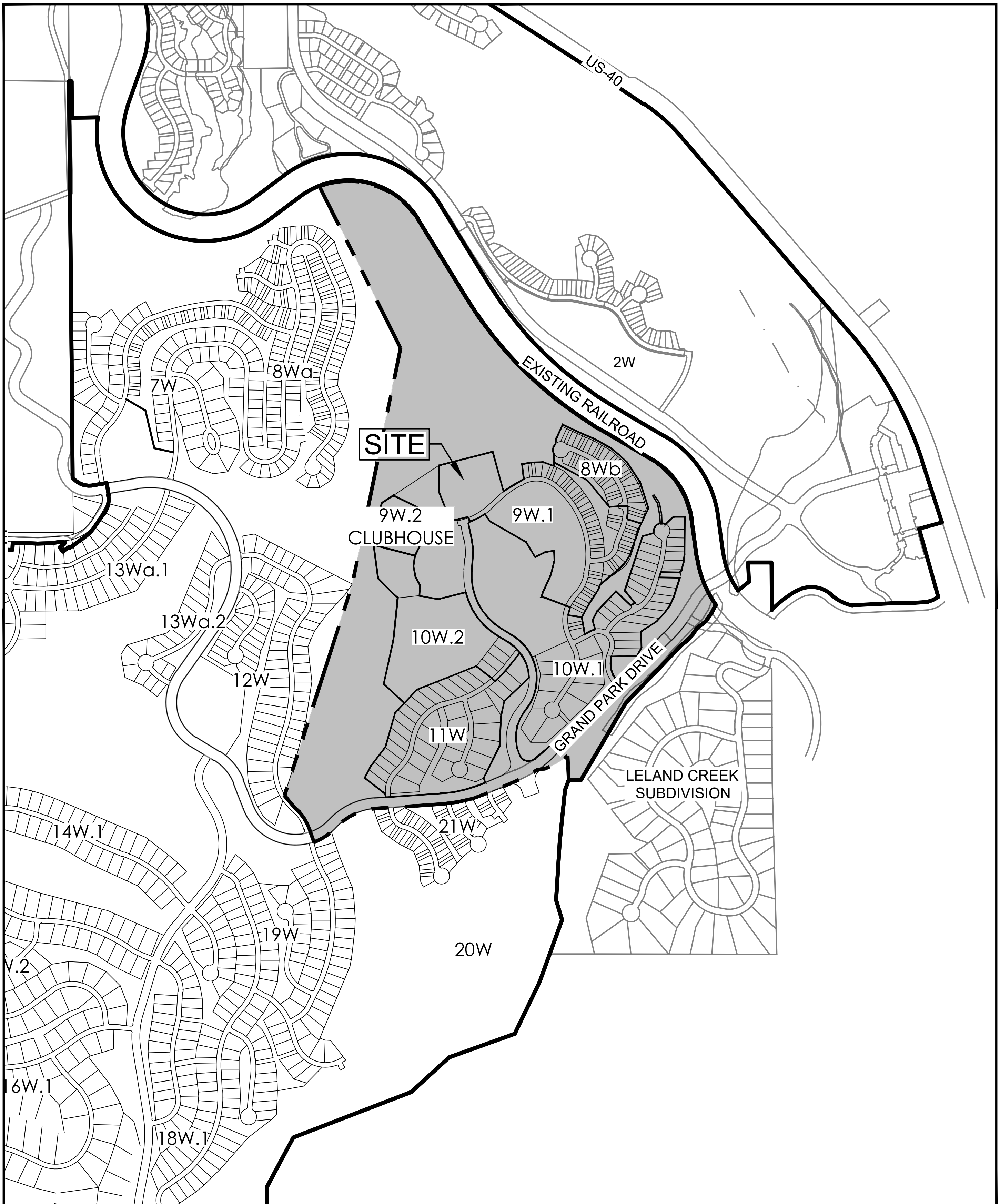
Detention Basin Design Workbook by MHFD, V.7, July 2022

Detention Volume by the Modified FAA Method by Urban Drainage and Flood Control District, v2.35, January 2015

Hydrologic Engineering Center – Hydrologic Modeling System by USACE, v.4.13, July 2025.

APPENDIX A
GENERAL MAPS

Vicinity Map
Soil Map
Firm Map
Precipitation Data



terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

WEST MOUTAIN 8Wb, 9W, 10W, & 11W
VICINITY MAP

TOWN OF FRASER, CO DATE: 12/15/2025

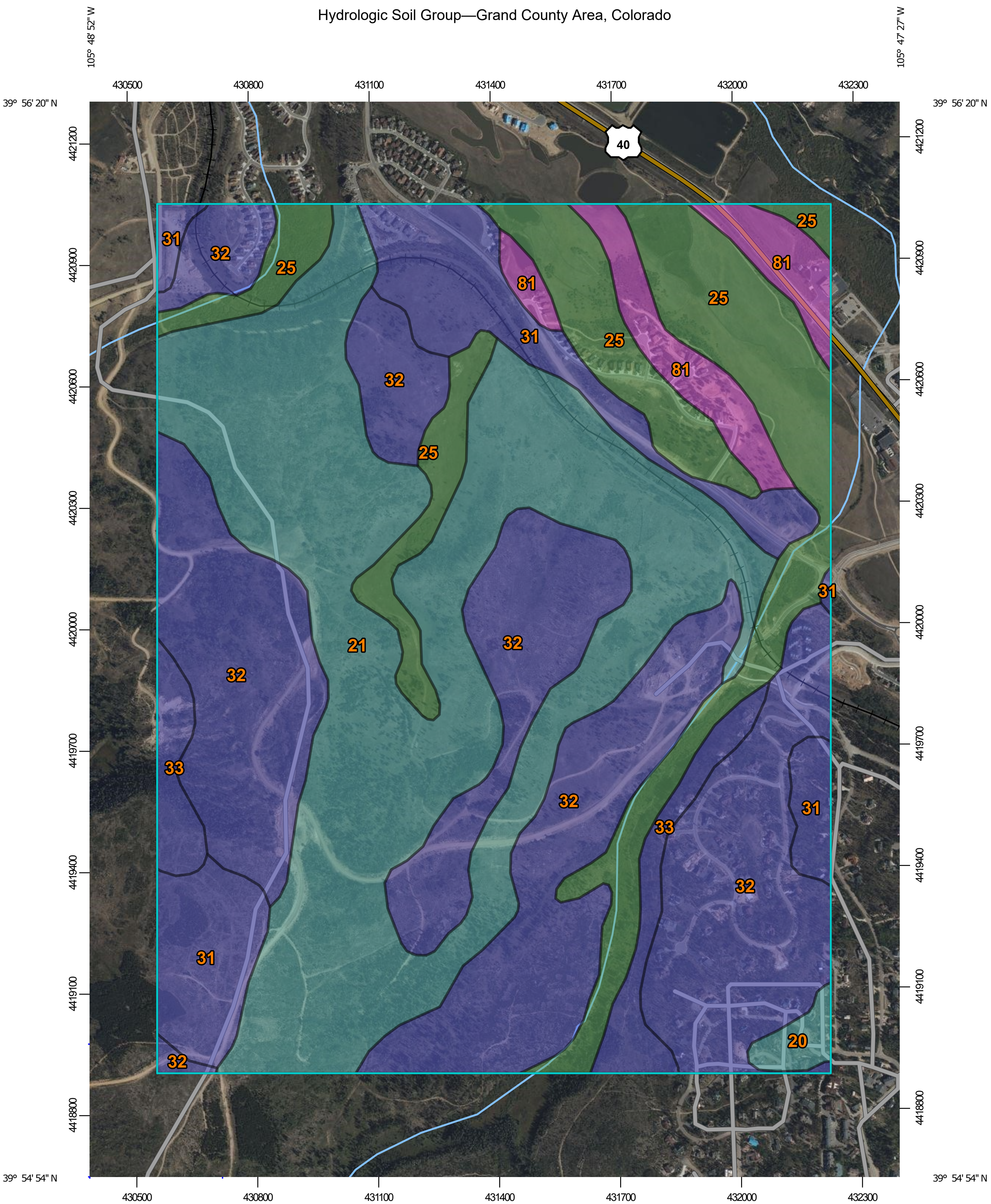
0 1000'

1" = 1000'

N

12/15/2025 1:36 PM ; X:\GRAND PARK\DOCUMENTS\REPORTS\DRAINAGE\16.1 - FILING 1 - 8WB, 9W, 10W, 11W\PHASE 2\A1 - MAPS (VIC-FEMA-SOILS)\VICINITY MAP - WM 8WB, 9W, 10W, & 11W.DWG;

Hydrologic Soil Group—Grand County Area, Colorado



Map Scale: 1:12,900 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

N

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:24,000.

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: Grand County Area, Colorado
Survey Area Data: Version 18, Aug 29, 2024

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

Date(s) aerial images were photographed: Aug 25, 2021—Sep 5, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
20	Cowdrey loam, 6 to 15 percent slopes	C	6.1	0.7%
21	Cowdrey loam, 15 to 45 percent slopes	C	288.8	32.4%
25	Cumulic Cryaquolls, nearly level	A/D	137.1	15.4%
31	Frisco-Peeler gravelly sandy loams, 2 to 6 percent slopes	B	81.8	9.2%
32	Frisco-Peeler gravelly sandy loams, 6 to 25 percent slopes	B	310.8	34.9%
33	Frisco-Peeler gravelly sandy loams, 25 to 65 percent slopes	B	28.9	3.2%
81	Tine gravelly sandy loam, 0 to 3 percent slopes	A	36.5	4.1%
Totals for Area of Interest			**890.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

12/2/2025 2:50 PM ; X:\GRAND PARK\DOCUMENTS\REPORTS\DRAINAGE\16.1 - FILING 1 - 8WB, 9W, 10W, 11W\PHASE 2\A1 - MAPS (VIC-FEMA-SOILS)\SITE SOIL MAP.DWG;

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Denver, CO 80231
ph: 303.632.8867

GRAND PARK - WEST MOUNTAIN - 8Wb, 9W, 10W, 11W

OVERALL BASIN SOILS MAP

DATE: 12/02/2025
CREATED BY: JNS
SHEET 1

NOTES TO USERS

use in administering the National Flood Insurance Program. It arily identify all areas subject to flooding, particularly from local ; of small size. The **community map repository** should be ssible updated or additional flood hazard information.

detailed information in areas where **Base Flood Elevations odways** have been determined, users are encouraged to consult es and Floodway Data and/or Summary of Stillwater Elevations within the Flood Insurance Study (FIS) report that accompanies rs should be aware that BFEs shown on the FIRM represent foot elevations. These BFEs are intended for flood insurance only and should not be used as the sole source of flood ation. Accordingly, flood elevation data presented in the FIS be utilized in conjunction with the FIRM for purposes of or floodplain management.

Flood Elevations shown on this map apply only landward American Vertical Datum of 1988 (NAVD 88). Users of this aware that coastal flood elevations are also provided in the llwater Elevations table in the Flood Insurance Study report on. Elevations shown in the Summary of Stillwater Elevations used for construction and/or floodplain management purposes igher than the elevations shown on this FIRM.

floodways were computed at cross sections and interpolated ections. The floodways were based on hydraulic considerations equirements of the National Flood Insurance Program. Floodway er pertinent floodway data are provided in the Flood Insurance this jurisdiction.

t in Special Flood Hazard Areas may be protected by **flood res.** Refer to Section 2.4 "Flood Protection Measures" of ance Study report for information on flood control structures n.

used in the preparation of this map was Universal Transverse zone 13. The **horizontal datum** was NAD83, GRS1980 nces in datum, spheroid, projection or UTM zones used in f FIRMs for adjacent jurisdictions may result in slight positional nap features across jurisdiction boundaries. These differences accuracy of this FIRM.

on this map are referenced to the North American Vertical . These flood elevations must be compared to structure and ns referenced to the same **vertical datum.** For information rsion between the National Geodetic Vertical Datum of 1929 American Vertical Datum of 1988, visit the National Geodetic at http://www.ngs.noaa.gov/ or contact the National Geodetic llowing address:

Services

Survey

Highway
20910-3282

elevation, description, and/or location information for **bench marks** map, please contact the Information Services Branch of the tic Survey at **(301) 713-3242,** or visit its website at aa.gov/.

ation shown on this FIRM was provided in digital format by the partment of Agriculture/ Service Center Agencies; produced from Quadrangles at a scale of 1:12,000, dated 2005 or later as a part of ultural Imagery Program.

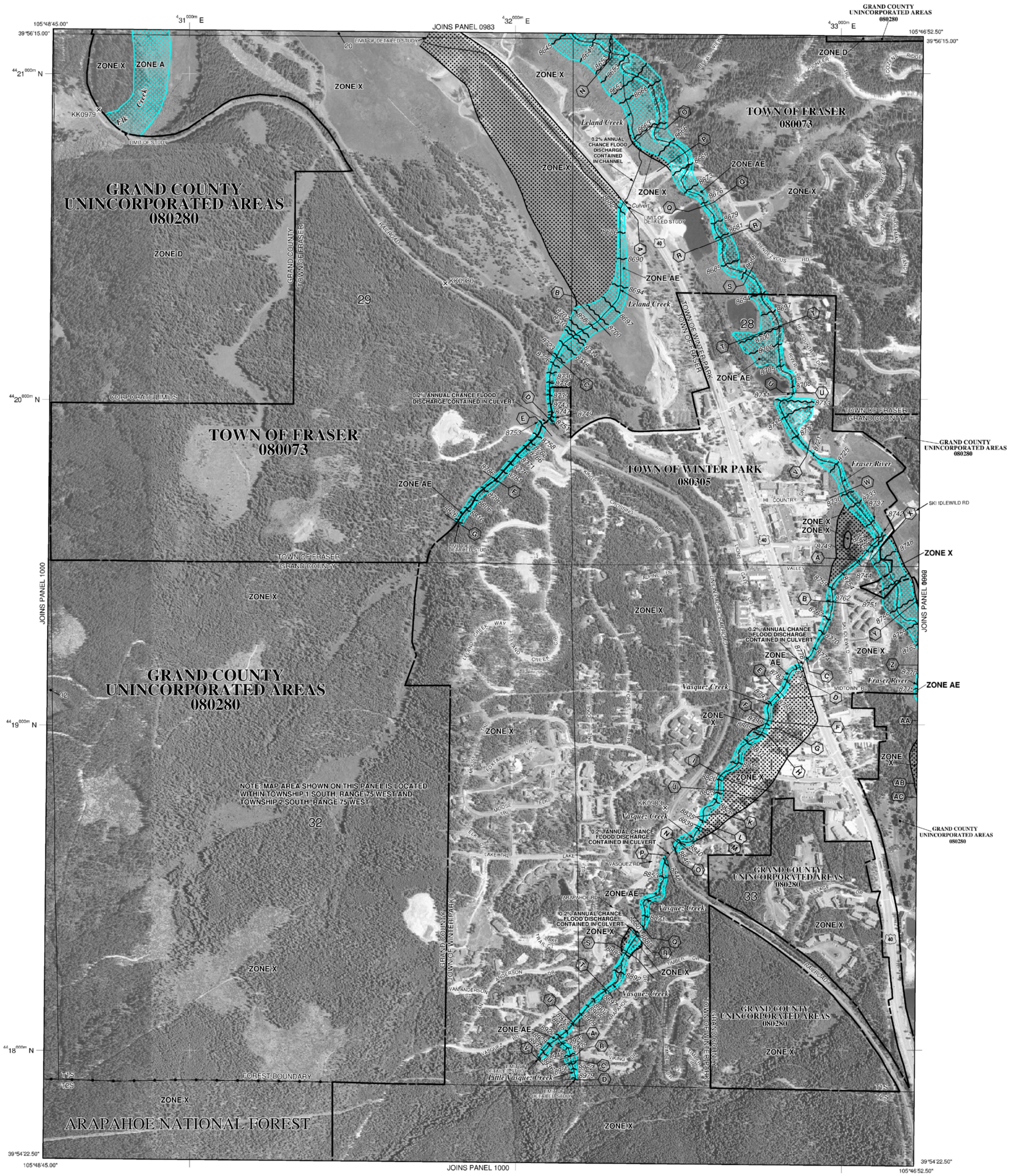
more detailed and up-to-date **stream channel configurations** n on the previous FIRM for this jurisdiction. The floodplains hat were transferred from the previous FIRM may have been nform to these new stream channel configurations. As a d Profiles and Floodway Data tables *in the Flood Insurance hich contains authoritative hydraulic data*) may reflect stream s that differ from what is shown on this map.

s shown on this map are based on the best data available blication. Because changes due to annexations or de-annexations rred after this map was published, map users should contact munity officials to verify current corporate limit locations.

he separately printed **Map Index** for an overview map of the the layout of map panels; community map repository addresses; Communities table containing National Flood Insurance Program community as well as a listing of the panels on which each ated.

MA Map Service Center at 1-800-358-9616 for information on ts associated with this FIRM. Available products may include d Letters of Map Change, *a Flood Insurance Study report,* sions of this map. The FEMA Map Service Center may also be at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

estions about this map or questions concerning the National Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) A website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 M	5000-foot grid ticks: New York State Plane coordinate system, east zone (FIPSZONE 3101), Transverse Mercator
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 2, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0991C

FIRM
FLOOD INSURANCE RATE MAP
GRAND COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 991 OF 1200
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GRAND COUNTY	080280	0991	C
FRASER, TOWN OF	080073	0991	C
WINTER PARK, TOWN OF	080305	0991	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 08049C0991C

EFFECTIVE DATE JANUARY 2, 2008

Federal Emergency Management Agency

NOAA Atlas 14, Volume 8, Version 2
Location name: Fraser, Colorado, USA*
Latitude: 39.9249°, Longitude: -105.8001°
Elevation: 8873.92 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.169** (0.130-0.219)	**0.202** (0.156-0.263)	**0.262** (0.201-0.342)	**0.317** (0.242-0.416)	**0.401** (0.300-0.559)	**0.472** (0.344-0.668)	**0.548** (0.387-0.800)	**0.632** (0.428-0.953)	**0.751** (0.490-1.17)	**0.848** (0.537-1.34)
10-min	**0.247** (0.191-0.321)	**0.296** (0.228-0.385)	**0.383** (0.294-0.500)	**0.464** (0.354-0.609)	**0.587** (0.439-0.819)	**0.691** (0.504-0.977)	**0.803** (0.566-1.17)	**0.925** (0.627-1.40)	**1.10** (0.717-1.72)	**1.24** (0.786-1.96)
15-min	**0.301** (0.233-0.392)	**0.360** (0.278-0.469)	**0.467** (0.359-0.610)	**0.566** (0.432-0.743)	**0.715** (0.536-0.999)	**0.842** (0.614-1.19)	**0.979** (0.690-1.43)	**1.13** (0.764-1.70)	**1.34** (0.875-2.09)	**1.51** (0.958-2.39)
30-min	**0.385** (0.297-0.500)	**0.460** (0.354-0.598)	**0.595** (0.457-0.778)	**0.720** (0.550-0.946)	**0.910** (0.681-1.27)	**1.07** (0.780-1.52)	**1.24** (0.877-1.81)	**1.43** (0.970-2.16)	**1.70** (1.11-2.65)	**1.92** (1.21-3.02)
60-min	**0.476** (0.367-0.618)	**0.559** (0.430-0.727)	**0.711** (0.546-0.929)	**0.855** (0.653-1.12)	**1.08** (0.807-1.50)	**1.26** (0.924-1.79)	**1.47** (1.04-2.15)	**1.70** (1.15-2.57)	**2.02** (1.32-3.16)	**2.29** (1.45-3.61)
2-hr	**0.567** (0.443-0.728)	**0.658** (0.513-0.846)	**0.827** (0.643-1.07)	**0.989** (0.764-1.28)	**1.24** (0.944-1.72)	**1.46** (1.08-2.05)	**1.70** (1.21-2.46)	**1.96** (1.35-2.94)	**2.35** (1.55-3.63)	**2.66** (1.70-4.15)
3-hr	**0.640** (0.503-0.817)	**0.728** (0.572-0.930)	**0.900** (0.704-1.15)	**1.07** (0.832-1.38)	**1.34** (1.03-1.85)	**1.58** (1.18-2.21)	**1.84** (1.33-2.66)	**2.14** (1.48-3.19)	**2.57** (1.71-3.96)	**2.93** (1.89-4.55)
6-hr	**0.805** (0.641-1.01)	**0.889** (0.707-1.12)	**1.07** (0.847-1.35)	**1.26** (0.991-1.60)	**1.58** (1.23-2.17)	**1.87** (1.42-2.61)	**2.21** (1.61-3.17)	**2.59** (1.82-3.84)	**3.16** (2.13-4.83)	**3.64** (2.36-5.59)
12-hr	**1.02** (0.825-1.27)	**1.11** (0.895-1.39)	**1.32** (1.06-1.65)	**1.55** (1.24-1.95)	**1.96** (1.56-2.69)	**2.34** (1.80-3.24)	**2.79** (2.07-3.98)	**3.31** (2.35-4.87)	**4.08** (2.79-6.20)	**4.75** (3.12-7.21)
24-hr	**1.25** (1.02-1.54)	**1.38** (1.12-1.70)	**1.66** (1.35-2.05)	**1.98** (1.60-2.46)	**2.52** (2.03-3.42)	**3.03** (2.36-4.14)	**3.62** (2.71-5.10)	**4.30** (3.09-6.26)	**5.32** (3.67-7.99)	**6.18** (4.10-9.29)
2-day	**1.46** (1.21-1.78)	**1.66** (1.37-2.02)	**2.07** (1.70-2.53)	**2.50** (2.04-3.07)	**3.21** (2.61-4.28)	**3.86** (3.03-5.20)	**4.60** (3.48-6.38)	**5.43** (3.94-7.80)	**6.68** (4.64-9.90)	**7.72** (5.18-11.5)
3-day	**1.62** (1.35-1.95)	**1.84** (1.53-2.22)	**2.29** (1.90-2.78)	**2.76** (2.28-3.37)	**3.55** (2.90-4.69)	**4.26** (3.37-5.69)	**5.06** (3.86-6.98)	**5.97** (4.36-8.52)	**7.32** (5.13-10.8)	**8.46** (5.71-12.5)
4-day	**1.76** (1.47-2.11)	**1.99** (1.66-2.38)	**2.46** (2.05-2.96)	**2.94** (2.44-3.57)	**3.75** (3.08-4.94)	**4.49** (3.57-5.97)	**5.33** (4.08-7.31)	**6.28** (4.60-8.90)	**7.68** (5.41-11.3)	**8.87** (6.01-13.1)
7-day	**2.14** (1.81-2.54)	**2.37** (2.00-2.82)	**2.85** (2.40-3.40)	**3.34** (2.80-4.01)	**4.17** (3.45-5.41)	**4.92** (3.95-6.46)	**5.77** (4.46-7.83)	**6.74** (4.99-9.47)	**8.18** (5.80-11.9)	**9.38** (6.42-13.7)
10-day	**2.47** (2.11-2.92)	**2.72** (2.31-3.21)	**3.21** (2.72-3.80)	**3.71** (3.13-4.42)	**4.53** (3.77-5.81)	**5.27** (4.25-6.86)	**6.11** (4.75-8.21)	**7.05** (5.24-9.82)	**8.45** (6.03-12.2)	**9.61** (6.62-14.0)
20-day	**3.39** (2.93-3.94)	**3.72** (3.21-4.34)	**4.33** (3.72-5.07)	**4.89** (4.18-5.76)	**5.75** (4.79-7.16)	**6.47** (5.25-8.21)	**7.26** (5.67-9.52)	**8.11** (6.07-11.1)	**9.32** (6.70-13.2)	**10.3** (7.18-14.8)
30-day	**4.15** (3.61-4.79)	**4.59** (3.99-5.31)	**5.34** (4.63-6.21)	**6.00** (5.16-7.01)	**6.94** (5.79-8.50)	**7.70** (6.27-9.63)	**8.49** (6.67-11.0)	**9.33** (7.01-12.6)	**10.5** (7.56-14.7)	**11.4** (7.97-16.2)
45-day	**5.13** (4.50-5.88)	**5.72** (5.01-6.56)	**6.69** (5.84-7.70)	**7.49** (6.50-8.69)	**8.61** (7.22-10.4)	**9.48** (7.76-11.7)	**10.4** (8.17-13.3)	**11.3** (8.49-15.0)	**12.4** (9.02-17.2)	**13.4** (9.41-18.9)
60-day	**5.98** (5.27-6.81)	**6.70** (5.90-7.64)	**7.87** (6.91-9.02)	**8.83** (7.71-10.2)	**10.1** (8.54-12.2)	**11.2** (9.16-13.7)	**12.2** (9.63-15.5)	**13.2** (9.98-17.4)	**14.5** (10.5-19.9)	**15.5** (11.0-21.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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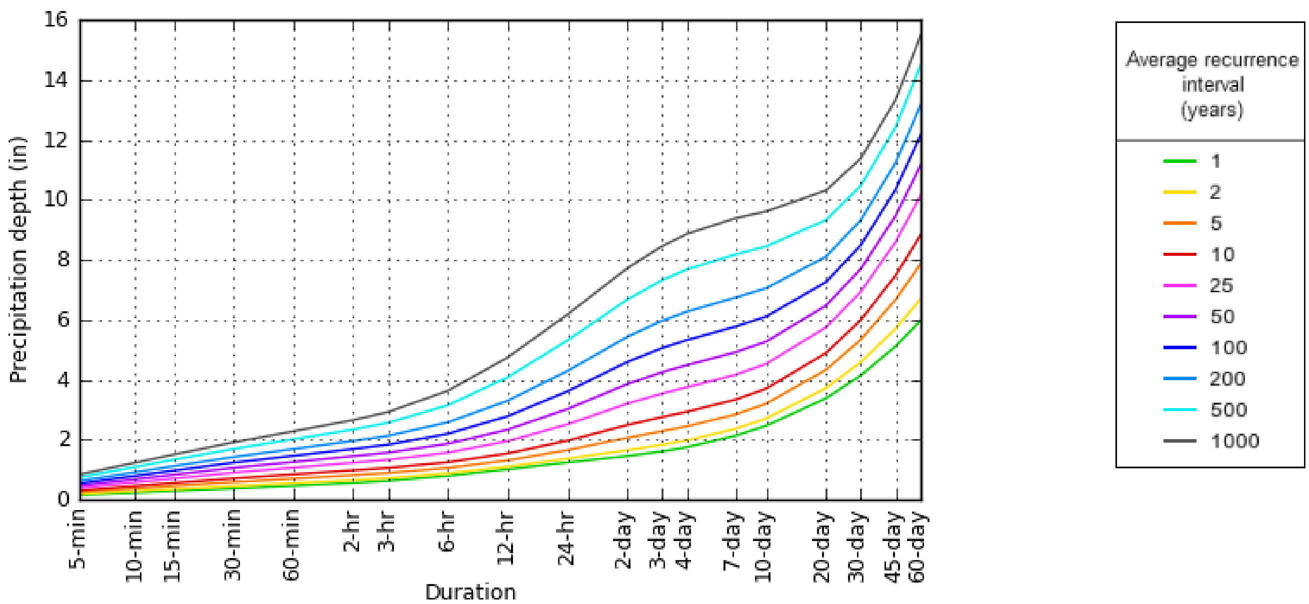
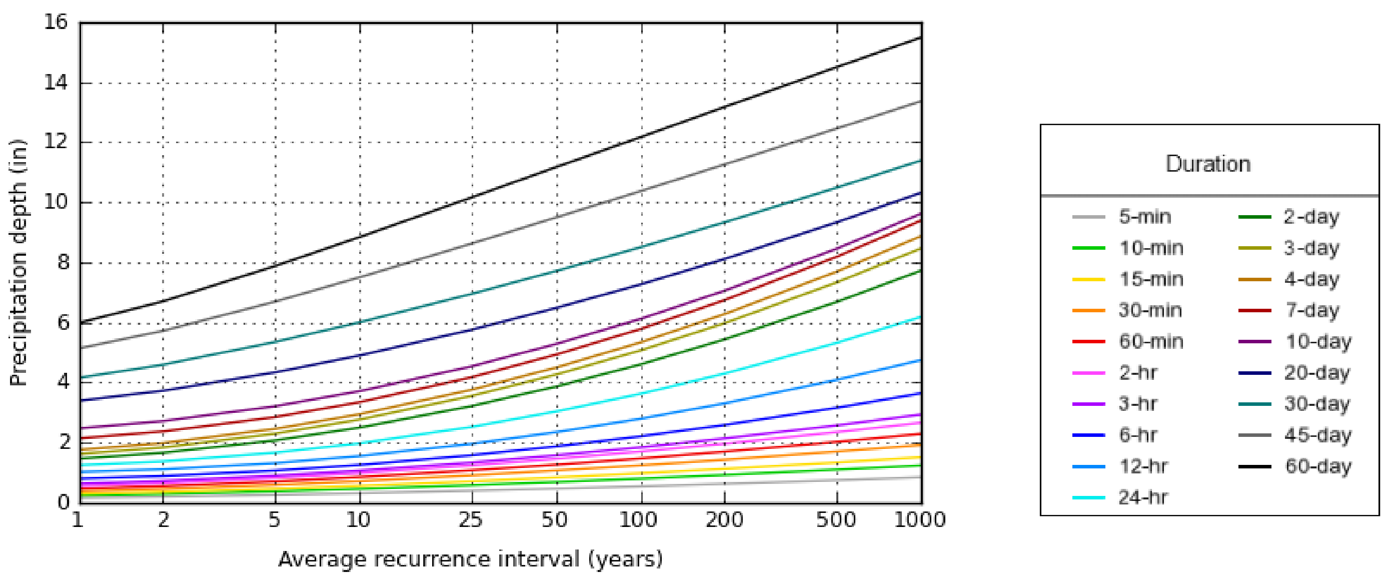
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 39.9249°, Longitude: -105.8001°





NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Tue Jun 28 20:11:21 2022

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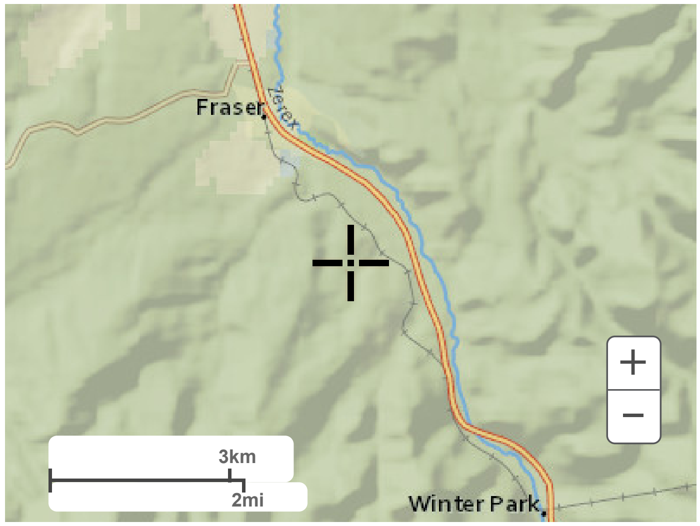
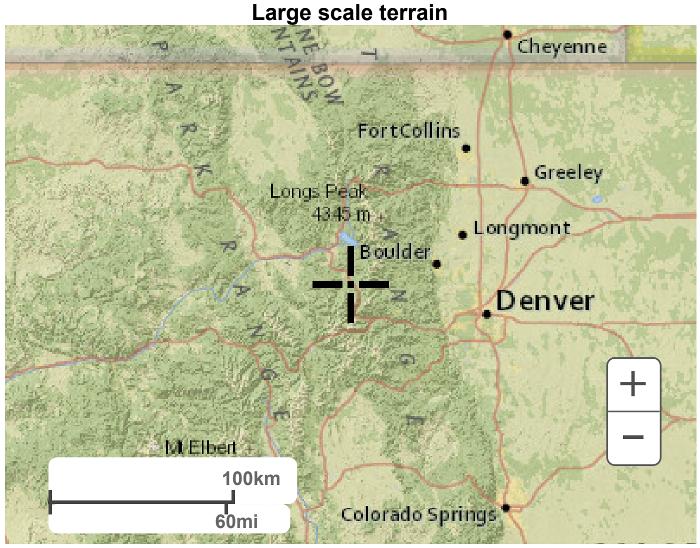
Maps & aerials

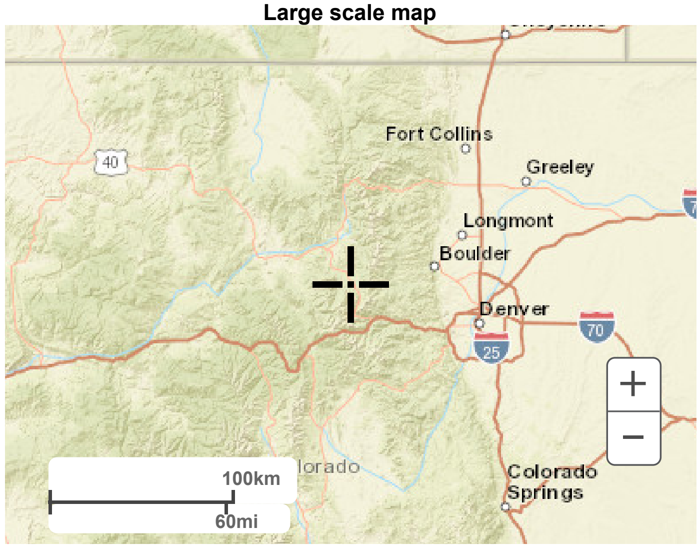
Small scale terrain



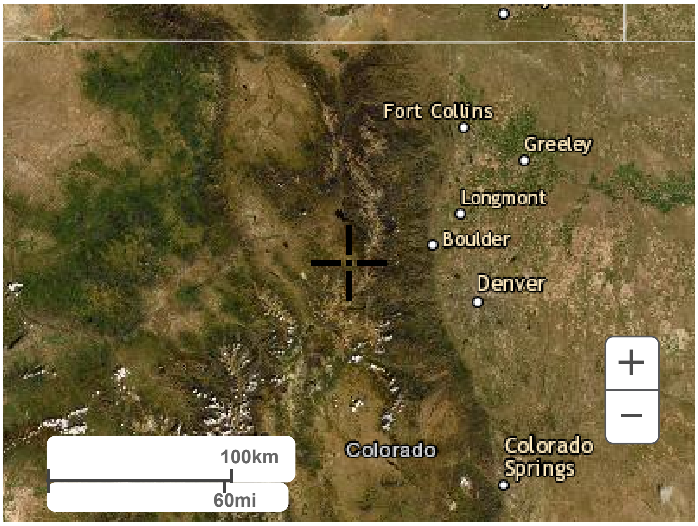
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

APPENDIX B

HYDROLOGIC CALCULATIONS

Existing Curve Number Calculation
Existing Curve Number Adjustment Calculations
Existing Lag Time Calculations
Existing Reach Time of Concentration Calculations

Proposed Curve Number Calculation
Proposed Curve Number Adjustment Calculations
Proposed Lag Time Calculations
Proposed Reach Time of Concentration Calculations
Proposed Pond Stage Storage Discharge Tables

HEC-HMS Flow Results
Pond A HEC-HMS Inflow Results
Pond B HEC-HMS Inflow Results

terracina design
10200 E. Girard Ave. A-314
Denver, CO 80231
ph. 303.632.8867

Project Name: West Mountain - Filing 1 - Existing
Prepared By: JNS

Curve Number Calculations

Curve Number calculations based on the CN Tables provided in the USACE HEC-HMS Technical Reference Manual and the section of this manual dedicated to the SCS Curve Number Loss Model

Land Use CN Values						
	Land Use					
HSG	Historic (Good Brush)	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density (1/4 acre lots)	MFH/SFH - High Density
A	30	98	76	89	61	77
B	48	98	85	92	75	85
C	65	98	89	94	83	90
D	73	98	91	95	87	92
C/D	69	98	90	94.5	85	91

Basin Id	Soil Type by Percent of Basin			Land Use by Percent of Basin						(Land Use CN Value)*(Soil Type by Percent of Basin)*(Land Use by Percent of Basin)							Sum of CN Values by Soil Number		Composite CN Value
	A	B	C/D	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density	Soil Type	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density			
A	0.0%	16.3%	83.7%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	65.57
										B	7.83	0.00	0.00	0.00	0.00	0.00	B	7.83	
										C/D	57.74	0.00	0.00	0.00	0.00	0.00	C/D	57.74	
A1	0.00%	54.76%	45.24%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	57.50
										B	26.29	0.00	0.00	0.00	0.00	0.00	B	26.29	
										C/D	31.21	0.00	0.00	0.00	0.00	0.00	C/D	31.21	
A2	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	48.00
										B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
A3	0.00%	33.27%	66.73%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	62.01
										B	15.97	0.00	0.00	0.00	0.00	0.00	B	15.97	
										C/D	46.04	0.00	0.00	0.00	0.00	0.00	C/D	46.04	
A4	0.00%	79.83%	20.17%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	52.24
										B	38.32	0.00	0.00	0.00	0.00	0.00	B	38.32	
										C/D	13.92	0.00	0.00	0.00	0.00	0.00	C/D	13.92	
B	0.00%	42.73%	57.27%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	60.03
										B	20.51	0.00	0.00	0.00	0.00	0.00	B	20.51	
										C/D	39.52	0.00	0.00	0.00	0.00	0.00	C/D	39.52	
B1	0.00%	46.47%	53.53%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	59.24
										B	22.31	0.00	0.00	0.00	0.00	0.00	B	22.31	
										C/D	36.94	0.00	0.00	0.00	0.00	0.00	C/D	36.94	
B2	0.00%	58.82%	41.18%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	56.65
										B	28.23	0.00	0.00	0.00	0.00	0.00	B	28.23	
										C/D	28.42	0.00	0.00	0.00	0.00	0.00	C/D	28.42	
B3	0.00%	46.27%	53.73%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	59.28
										B	22.21	0.00	0.00	0.00	0.00	0.00	B	22.21	
										C/D	37.08	0.00	0.00	0.00	0.00	0.00	C/D	37.08	
B4	0.00%	73.73%	26.27%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	53.52
										B	35.39	0.00	0.00	0.00	0.00	0.00	B	35.39	
										C/D	18.13	0.00	0.00	0.00	0.00	0.00	C/D	18.13	

terracina design
10200 E. Girard Ave. A-314
Denver, CO 80231
ph. 303.632.8867

Project Name: West Mountain - Filing 1 - Existing
Prepared By: JNS

Curve Number Calculations

Curve Number calculations based on the CN Tables provided in the USACE HEC-HMS Technical Reference Manual and the section of this manual dedicated to the SCS Curve Number Loss Model

Land Use CN Values						
	Land Use					
HSG	Historic (Good Brush)	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density (1/4 acre lots)	MFH/SFH - High Density
A	30	98	76	89	61	77
B	48	98	85	92	75	85
C	65	98	89	94	83	90
D	73	98	91	95	87	92
C/D	69	98	90	94.5	85	91

Basin Id	Soil Type by Percent of Basin			Land Use by Percent of Basin						(Land Use CN Value)*(Soil Type by Percent of Basin)*(Land Use by Percent of Basin)							Sum of CN Values by Soil Number		Composite CN Value
	A	B	C/D	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density	Soil Type	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density			
C	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	48.00
										B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
C1	0.00%	38.51%	61.49%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	60.91
										B	18.48	0.00	0.00	0.00	0.00	0.00	B	18.48	
										C/D	42.43	0.00	0.00	0.00	0.00	0.00	C/D	42.43	
C2	0.00%	66.77%	33.23%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	54.98
										B	32.05	0.00	0.00	0.00	0.00	0.00	B	32.05	
										C/D	22.93	0.00	0.00	0.00	0.00	0.00	C/D	22.93	
D1	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	48.00
										B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
D2	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	48.00
										B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
E1	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	48.00
										B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
OS1	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	48.00
										B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
OS2	0.00%	83.20%	16.80%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	51.53
										B	39.94	0.00	0.00	0.00	0.00	0.00	B	39.94	
										C/D	11.59	0.00	0.00	0.00	0.00	0.00	C/D	11.59	
OS3	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	69.00
										B	0.00	0.00	0.00	0.00	0.00	0.00	B	0.00	
										C/D	69.00	0.00	0.00	0.00	0.00	0.00	C/D	69.00	

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Project Name: West Mountain - Filing 1 - Existing
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Curve Number and Initial Abstraction Adjustment Calculations

Curve Number adjustment calculations based on the Calculations presented in "A Pragmatic Slope-Adjusted Curve Number Model to Reduce Uncertainty in Predicting Flood Runoff from Steep Watershed" by Ajmal, et .al., dated May 21, 2020

Sub-Basin Data		Default SCS Calculation (20% initial abstraction)			Adjusted SCS Calculations (5% initial abstraction		
Basin Id	Basin Area (mi^2)	CN	Maximum Potential Retention, S (in)	Initial Abstraction (in)	CN	Maximum Potential Retention, S (in)	Initial Abstraction (in)
A	0.259090	65.57	5.250	1.050	87.37	1.446	0.072
A1	0.036867	57.50	7.391	1.478	84.85	1.785	0.089
A2	0.017280	48.00	10.833	2.167	82.07	2.184	0.109
A3	0.009302	62.01	6.126	1.225	86.24	1.595	0.080
A4	0.004263	52.24	9.144	1.829	83.29	2.006	0.100
B	0.013471	60.03	6.659	1.332	85.62	1.679	0.084
B1	0.016134	59.24	6.880	1.376	85.38	1.712	0.086
B2	0.014022	56.65	7.653	1.531	84.60	1.821	0.091
B3	0.013228	59.28	6.868	1.374	85.40	1.710	0.086
B4	0.001638	53.52	8.686	1.737	83.67	1.952	0.098
C	0.002679	48.00	10.833	2.167	82.07	2.184	0.109
C1	0.004562	60.91	6.417	1.283	85.90	1.642	0.082
C2	0.011821	54.98	8.189	1.638	84.10	1.891	0.095
D1	0.010584	48.00	10.833	2.167	82.07	2.184	0.109
D2	0.000506	48.00	10.833	2.167	82.07	2.184	0.109
E1	0.004760	48.00	10.833	2.167	82.07	2.184	0.109
OS1	0.001447	48.00	10.833	2.167	82.07	2.184	0.109
OS2	0.003786	51.53	9.407	1.881	83.09	2.036	0.102
OS3	0.005881	69.00	4.493	0.899	88.48	1.302	0.065

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Lag Time Calculations (TLag)

100-year 24-hr Precipitation Depth (P_2)=	1.36

Sub-Basin Data		Initial or Overland Flow Time					Channelized Flow Time					Overall Flow Time		
Basin Id	Basin Area (Ac)	Roughness Coefficient	Length (ft)	Elev Change	Slope (%)	T_i (min)	Length (ft)	Elev Change	Slope (%)	Velocity (FPS)	T_t (min)	Comp. T_c	Lag Time	$Final\ T_{Lag}$ (min)
A	165.82	0.240	300	37	12.3	25.46	4425	203	4.6	3.46	21.3	46.8	28.1	28.1
A1	23.59	0.240	150	7	4.7	21.57	400	31	7.6	4.46	1.5	23.1	13.8	13.8
A2	11.06	0.240	300	14	4.7	37.56	630	24	3.8	3.15	3.3	40.9	24.5	24.5
A3	5.95	0.240	300	41	13.5	24.56	910	36	4.0	3.21	4.7	29.3	17.6	17.6
A4	2.73	0.240	300	40	13.3	24.70	545	23	4.2	3.31	2.7	27.4	16.5	16.5
B	8.62	0.240	150	13	8.3	17.11	990	49	4.9	3.59	4.6	21.7	13.0	13.0
B1	10.33	0.240	280	21	7.3	29.68	601	14	2.2	2.42	4.1	33.8	20.3	20.3
B2	8.97	0.240	300	16	5.3	35.61	427	33	7.7	4.49	1.6	37.2	22.3	22.3
B3	8.47	0.240	300	7	2.3	49.56	726	42	5.7	3.86	3.1	52.7	31.6	31.6
B4	1.05	0.240	30	1	2.3	7.86	1000	34	3.4	2.99	5.6	13.4	8.1	8.1
C	1.71	0.240	41	6	14.6	4.84	71	6	8.5	4.69	0.3	5.1	3.1	5.0
C1	2.92	0.240	155	10	6.5	19.46	422	5	1.1	1.67	4.2	23.7	14.2	14.2
C2	7.57	0.240	300	20	6.7	32.57	850	31	3.6	3.08	4.6	37.2	22.3	22.3
D1	6.77	0.240	300	17	5.7	34.75	480	41	8.5	4.72	1.7	36.5	21.9	21.9
D2	0.32	0.240	35	1	2.9	8.19	730	54	7.4	4.39	2.8	11.0	6.6	6.6
E1	3.05	0.240	300	41	13.7	24.44	370	29	7.8	4.52	1.4	25.8	15.5	15.5
OS1	0.93	0.240	200	15	7.5	22.46	110	24	21.8	7.54	0.2	22.7	13.6	13.6
OS2	2.42	0.240	100	10	9.5	11.74	93	15	16.1	6.48	0.2	12.0	7.2	7.2
OS3	3.76	0.240	200	32	15.8	16.69	213	39	18.1	6.86	0.5	17.2	10.3	10.3

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Reach Time of Concentration Calculations (Tc)

Element Information		Channelized Flow Path 1						Overall Flow Time
Element ID	**Notes**	**Length (ft)**	**Elev Change**	**Slope (%)**	**Paved?**	**Velocity (FPS)**	**T_c (min)**	**Comp. T_c (min)**
REACH-A1	A1 travel path after leaving basin A1	2640	139	5.27%	N	3.70	11.9	11.9
REACH-A2/3	A2 & A3 travel path after leaving basin A2 or A3	1675	91	5.43%	N	3.76	7.4	7.4
REACH-A4	A4 travel path after leaving basin A4 before A1-Outfall	1865	130	6.97%	N	4.26	7.3	7.3
SWALE B	Swale conveying B1 and B2 runoff to Pond B	990	50	5.05%	N	3.63	4.6	4.6

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Curve Number Calculations

Curve Number calculations based on the CN Tables provided in the USACE HEC-HMS Technical Reference Manual and the section of this manual dedicated to the SCS Curve Number Loss Model

Land Use CN Values						
HSG	Land Use					
	Historic (Good Brush)	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density (1/4 acre lots)	MFH/SFH - High Density
A	30	98	76	89	61	77
B	48	98	85	92	75	85
C	65	98	89	94	83	90
D	73	98	91	95	87	92
C/D	69	98	90	94.5	85	91

Basin Id	Soil Type by Percent of Basin			Land Use by Percent of Basin						(Land Use CN Value)*(Soil Type by Percent of Basin)*(Land Use by Percent of Basin)							Sum of CN Values by Soil Number		Composite CN Value
	A	B	C/D	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density	Soil Type	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density			
A	0.0%	16.3%	83.7%	64.32%	4.82%	0.00%	1.40%	23.54%	5.93%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	73.17
										B	5.04	0.77	0.00	0.21	2.88	0.82	B	9.72	
										C/D	37.14	3.95	0.00	1.11	16.74	4.51	C/D	63.45	
A1	0.00%	54.76%	45.24%	25.18%	0.00%	0.00%	21.95%	0.00%	52.87%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	81.29
										B	6.62	0.00	0.00	11.06	0.00	24.61	B	42.29	
										C/D	7.86	0.00	0.00	9.38	0.00	21.76	C/D	39.01	
A2	0.00%	100.00%	0.00%	3.52%	13.75%	0.00%	17.42%	0.00%	65.31%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	86.70
										B	1.69	13.48	0.00	16.02	0.00	55.51	B	86.70	
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
A3	0.00%	33.27%	66.73%	29.97%	14.75%	0.00%	0.00%	0.00%	55.28%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	82.24
										B	4.79	4.81	0.00	0.00	0.00	15.64	B	25.23	
										C/D	13.80	9.65	0.00	0.00	0.00	33.57	C/D	57.01	
A4	0.00%	79.83%	20.17%	81.94%	0.00%	0.00%	0.00%	18.06%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	56.71
										B	31.40	0.00	0.00	0.00	10.81	0.00	B	42.21	
										C/D	11.40	0.00	0.00	0.00	3.10	0.00	C/D	14.50	
B	0.00%	42.73%	57.27%	29.84%	0.00%	0.00%	0.00%	33.59%	36.57%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	77.37
										B	6.12	0.00	0.00	0.00	10.77	13.28	B	30.17	
										C/D	11.79	0.00	0.00	0.00	16.35	19.06	C/D	47.20	
B1	0.00%	46.47%	53.53%	24.02%	20.22%	0.00%	0.00%	55.76%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	78.85
										B	5.36	9.21	0.00	0.00	19.43	0.00	B	34.00	
										C/D	8.87	10.61	0.00	0.00	25.37	0.00	C/D	44.85	
B2	0.00%	58.82%	41.18%	6.26%	10.84%	0.00%	0.00%	28.53%	54.37%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	84.30
										B	1.77	6.25	0.00	0.00	12.59	27.18	B	47.78	
										C/D	1.78	4.38	0.00	0.00	9.99	20.37	C/D	36.52	
B3	0.00%	46.27%	53.73%	4.91%	9.35%	0.00%	0.00%	0.00%	85.74%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	87.72
										B	1.09	4.24	0.00	0.00	0.00	33.72	B	39.05	
										C/D	1.82	4.92	0.00	0.00	0.00	41.92	C/D	48.67	
B4	0.00%	73.73%	26.27%	16.61%	83.39%	0.00%	0.00%	0.00%	0.00%	A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	90.61
										B	5.88	60.25	0.00	0.00	0.00	0.00	B	66.13	
										C/D	3.01	21.47	0.00	0.00	0.00	0.00	C/D	24.48	

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Curve Number calculations based on the CN Tables provided in the USACE HEC-HMS Technical Reference Manual and the section of this manual dedicated to the SCS Curve Number Loss Model

Land Use CN Values						
	Land Use					
HSG	Historic (Good Brush)	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density (1/4 acre lots)	MFH/SFH - High Density
A	30	98	76	89	61	77
B	48	98	85	92	75	85
C	65	98	89	94	83	90
D	73	98	91	95	87	92
C/D	69	98	90	94.5	85	91

Basin Id	Soil Type by Percent of Basin			Land Use by Percent of Basin						(Land Use CN Value)*(Soil Type by Percent of Basin)*(Land Use by Percent of Basin)							Sum of CN Values by Soil Number		Composite CN Value
	A	B	C/D	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density	Soil Type	Historic	Paved Area	Gravel	Commercial	SFH - Rural/Medium Density	MFH/SFH - High Density			
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
C	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	B	48.00	0.00	0.00	0.00	0.00	0.00	B	48.00	48.00
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
C1	0.00%	38.51%	61.49%	18.61%	16.16%	0.00%	0.00%	65.22%	0.00%	B	3.44	6.10	0.00	0.00	18.84	0.00	B	28.38	80.11
										C/D	7.90	9.74	0.00	0.00	34.09	0.00	C/D	51.73	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
C2	0.00%	66.77%	33.23%	39.72%	22.85%	0.00%	0.00%	37.42%	0.00%	B	12.73	14.95	0.00	0.00	18.74	0.00	B	46.42	73.55
										C/D	9.11	7.44	0.00	0.00	10.57	0.00	C/D	27.12	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
D1	0.00%	100.00%	0.00%	32.51%	13.52%	0.00%	0.00%	53.98%	0.00%	B	15.60	13.24	0.00	0.00	40.48	0.00	B	69.33	69.33
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
D2	0.00%	100.00%	0.00%	17.23%	82.77%	0.00%	0.00%	0.00%	0.00%	B	8.27	81.12	0.00	0.00	0.00	0.00	B	89.39	89.39
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
E1	0.00%	100.00%	0.00%	40.92%	17.66%	0.00%	0.00%	41.42%	0.00%	B	19.64	17.31	0.00	0.00	31.06	0.00	B	68.01	68.01
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
OS1	0.00%	100.00%	0.00%	45.03%	0.00%	0.00%	0.00%	54.97%	0.00%	B	21.61	0.00	0.00	0.00	41.23	0.00	B	62.84	62.84
										C/D	0.00	0.00	0.00	0.00	0.00	0.00	C/D	0.00	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
OS2	0.00%	83.20%	16.80%	5.62%	0.00%	0.00%	0.00%	94.38%	0.00%	B	2.24	0.00	0.00	0.00	58.89	0.00	B	61.14	75.27
										C/D	0.65	0.00	0.00	0.00	13.48	0.00	C/D	14.13	
										A	0.00	0.00	0.00	0.00	0.00	0.00	A	0.00	
OS3	0.00%	0.00%	100.00%	68.33%	0.00%	0.00%	0.00%	0.00%	31.67%	B	0.00	0.00	0.00	0.00	0.00	0.00	B	0.00	75.97
										C/D	47.15	0.00	0.00	0.00	0.00	28.82	C/D	75.97	

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Sub-Basin Data		Default SCS Calculation (20% initial abstraction)			Adjusted SCS Calculations (5% initial abstraction		
Basin Id	Basin Area (mi^2)	CN	Maximum Potential Retention, S (in)	Initial Abstraction (in)	CN	Maximum Potential Retention, S (in)	Initial Abstraction (in)
A	0.259090	73.17	3.666	0.733	89.87	1.127	0.056
A1	0.036867	81.29	2.301	0.460	92.72	0.786	0.039
A2	0.017280	86.70	1.534	0.307	94.71	0.558	0.028
A3	0.009302	82.24	2.159	0.432	93.06	0.746	0.037
A4	0.004263	56.71	7.634	1.527	84.62	1.818	0.091
B	0.013471	77.37	2.925	0.585	91.32	0.950	0.048
B1	0.016134	78.85	2.683	0.537	91.84	0.888	0.044
B2	0.014022	84.30	1.863	0.373	93.81	0.659	0.033
B3	0.013228	87.72	1.400	0.280	95.09	0.516	0.026
B4	0.001638	90.61	1.036	0.207	96.21	0.394	0.020
C	0.002679	48.00	10.833	2.167	82.07	2.184	0.109
C1	0.004562	80.11	2.484	0.497	92.29	0.836	0.042
C2	0.011821	73.55	3.597	0.719	90.00	1.111	0.056
D1	0.010584	69.33	4.424	0.885	88.59	1.288	0.064
D2	0.000506	89.39	1.187	0.237	95.73	0.446	0.022
E1	0.004760	68.01	4.703	0.941	88.16	1.343	0.067
OS1	0.001447	62.84	5.913	1.183	86.50	1.561	0.078
OS2	0.003786	75.27	3.286	0.657	90.59	1.039	0.052
OS3	0.005881	75.97	3.164	0.633	90.83	1.009	0.050

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Project Name: West Mountain - Filing 1 - Proposed
Prepared By: JNS

Lag Time Calculations (TLag)

100-year 24-hr Precipitation Depth (P_2)= 1.36

Sub-Basin Data		Initial or Overland Flow Time					Channelized Flow Time					Overall Flow Time		
Basin Id	Basin Area (Ac)	Roughness Coefficient	Length (ft)	Elev Change	Slope (%)	T_i (min)	Length (ft)	Elev Change	Slope (%)	Velocity (FPS)	T_t (min)	Comp. T_c	Lag Time	$Final\ T_{Lag}$ (min)
A	165.82	0.240	300	37	12.3	25.46	4425	203	4.6	3.46	21.3	46.8	28.1	28.1
A1	23.59	0.240	150	7	4.7	21.57	400	31	7.6	4.46	1.5	23.1	13.8	13.8
A2	11.06	0.240	300	14	4.7	37.56	630	24	3.8	3.15	3.3	40.9	24.5	24.5
A3	5.95	0.240	300	41	13.5	24.56	910	36	4.0	3.21	4.7	29.3	17.6	17.6
A4	2.73	0.240	300	40	13.3	24.70	545	23	4.2	3.31	2.7	27.4	16.5	16.5
B	8.62	0.240	150	13	8.3	17.11	990	49	4.9	3.59	4.6	21.7	13.0	13.0
B1	10.33	0.240	280	21	7.3	29.68	601	14	2.2	2.42	4.1	33.8	20.3	20.3
B2	8.97	0.240	300	16	5.3	35.61	427	33	7.7	4.49	1.6	37.2	22.3	22.3
B3	8.47	0.240	300	7	2.3	49.56	726	42	5.7	3.86	3.1	52.7	31.6	31.6
B4	1.05	0.011	30	1	2.3	0.67	1000	34	3.4	2.99	5.6	6.2	3.7	5.0
C	1.71	0.240	41	6	14.6	4.84	71	6	8.5	4.69	0.3	5.1	3.1	5.0
C1	2.92	0.240	155	10	6.5	19.46	422	5	1.1	1.67	4.2	23.7	14.2	14.2
C2	7.57	0.240	300	20	6.7	32.57	850	31	3.6	3.08	4.6	37.2	22.3	22.3
D1	6.77	0.240	300	17	5.7	34.75	480	41	8.5	4.72	1.7	36.5	21.9	21.9
D2	0.32	0.011	35	1	2.9	0.70	730	54	7.4	4.39	2.8	3.5	2.1	5.0
E1	3.05	0.240	300	41	13.7	24.44	370	29	7.8	4.52	1.4	25.8	15.5	15.5
OS1	0.93	0.240	200	15	7.5	22.46	110	24	21.8	7.54	0.2	22.7	13.6	13.6
OS2	2.42	0.240	100	10	9.5	11.74	93	15	16.1	6.48	0.2	12.0	7.2	7.2
OS3	3.76	0.240	200	32	15.8	16.69	213	39	18.1	6.86	0.5	17.2	10.3	10.3

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Reach Time of Concentration Calculations (Tc)

Element Information		Channelized Flow Path 1						Overall Flow Time
Element ID	**Notes**	**Length (ft)**	**Elev Change**	**Slope (%)**	**Paved?**	**Velocity (FPS)**	**T_c (min)**	**Comp. T_c (min)**
REACH-A1	A1 travel path after leaving basin A1	2640	139	5.27%	N	3.70	11.9	11.9
REACH-A2/3	A2 & A3 travel path after leaving basin A2 or A3	1675	91	5.43%	N	3.76	7.4	7.4
REACH-A4	A4 travel path after leaving basin A4 before A1-Outfall	1865	130	6.97%	N	4.26	7.3	7.3
SWALE B	Swale conveying B1 and B2 runoff to Pond B	990.000	50	5.05%	N	3.63	4.6	4.6

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Project Name: West Mountain - Filing 1 - Proposed
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Pond Stage Storage Discharge Tables

Pond A Area-Elevation-Discharge Table

Stage (ft)	Elevation (ft)	Area (ft^2)	Discharge (cfs)
0	8697	133440	0
0.1	8697.1	140344	0.4
0.2	8697.2	147248	0.57
0.29	8697.29	153462	0.68
0.3	8697.3	154153	0.82
0.4	8697.4	161057	1.23
0.5	8697.5	167961	1.48
0.59	8697.59	174175	1.67
0.6	8697.6	174865	1.82
0.7	8697.7	181769	2.3
0.8	8697.8	188674	2.63
0.9	8697.9	195578	2.91
1	8698	202482	3.15
1.1	8698.1	208553	3.38
1.2	8698.2	214623	3.6
1.3	8698.3	220694	3.8
1.4	8698.4	226765	3.99
1.5	8698.5	232836	4.17
1.6	8698.6	238906	5.56
1.7	8698.7	244977	7.96
1.8	8698.8	251048	11.02
1.9	8698.9	257118	14.6
2	8699	263189	18.64
2.1	8699.1	266329	23.08
2.2	8699.2	269469	27.9
2.3	8699.3	272609	33.05
2.4	8699.4	275749	38.53
2.5	8699.5	278890	44.32
2.6	8699.6	282030	48.79
2.7	8699.7	285170	49.23
2.75	8699.75	286740	49.44
2.8	8699.8	288310	53.15
2.9	8699.9	291450	68.29
3	8700	294590	89.81
3.1	8700.1	295547	116.22
3.2	8700.2	296504	146.83
3.3	8700.3	297460	181.17
3.4	8700.4	298417	218.93
3.5	8700.5	299374	259.89
3.6	8700.6	300331	303.87
3.7	8700.7	301288	350.71
3.8	8700.8	302244	400.3
3.9	8700.9	303201	452.54
4	8701	304158	507.35
4.1	8701.1	305125	564.66
4.2	8701.2	306093	624.39
4.3	8701.3	307060	686.5
4.4	8701.4	308027	750.93
4.5	8701.5	308994	817.65
4.6	8701.6	309962	886.6
4.7	8701.7	310929	957.77
4.8	8701.8	311896	1031.11
4.9	8701.9	312864	1106.6
5	8702	313831	1184.21

Pond B Area-Elevation-Discharge Table

Stage (ft)	Elevation (ft)	Area (ft^2)	Discharge (cfs)
0	8786	9450	0
0.25	8786.25	9828	0.08
0.5	8786.5	10205	0.12
0.75	8786.75	10583	0.14
1	8787	10960	0.16
1.25	8787.25	11355	0.27
1.5	8787.5	11751	0.32
1.75	8787.75	12146	0.36
2	8788	12541	0.4
2.25	8788.25	12957	0.51
2.5	8788.5	13372	0.58
2.75	8788.75	13788	0.63
3	8789	14203	0.68
3.25	8789.25	14639	0.72
3.5	8789.5	15075	0.77
3.75	8789.75	15511	0.81
4	8790	15947	0.84
4.25	8790.25	16403	0.88
4.5	8790.5	16860	0.91
4.75	8790.75	17316	0.95
5	8791	17773	0.98
5.25	8791.25	17830	1.01
5.5	8791.5	17887	4.26
5.75	8791.75	17943	10.18
6	8792	18000	17.84
6.25	8792.25	18250	20.4
6.5	8792.5	18500	20.84
6.75	8792.75	18750	21.27
6.82	8792.82	18820	21.39
7	8793	19000	24.12
7.25	8793.25	20189	31.73
7.5	8793.5	21379	42.99
7.75	8793.75	22568	57.82
8	8794	23758	76.28
8.25	8794.25	24306	98.46
8.5	8794.5	24854	124.51
8.75	8794.75	25402	154.55
9	8795	25950	188.73

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Pond Stage Storage Discharge Tables

Pond C Area-Elevation-Discharge Table			
Stage (ft)	Elevation (ft)	Area (ft^2)	Discharge (cfs)
0	8869	12764	0.00
8869.25	8869.25	13315	0.00
8869.5	8869.5	13865	0.00
8869.75	8869.75	14416	0.00
8870	8870	14966	0.00
8870.25	8870.25	15542	0.00
8870.5	8870.5	16117	0.00
8870.58	8870.58	16301	0.00
8870.75	8870.75	16693	0.01
8870.91	8870.91	17061	0.02
8871	8871	17268	0.02
8871.24	8871.24	17844	0.04
8871.25	8871.25	17869	0.04
8871.5	8871.5	18469	0.06
8871.57	8871.57	18637	0.07
8871.75	8871.75	19070	0.09
8871.9	8871.9	19430	0.10
8872	8872	19670	0.12
8872.25	8872.25	20296	0.73
8872.5	8872.5	20921	1.47
8872.75	8872.75	21547	2.75
8873	8873	22173	4.74

OUTFALL ELEMENT

Project:	West Mountain - Filing 1
Prepared by:	JNS
Date:	11/25/2025

HEC-HMS Flow results

Existing Conditions			
Element	Area (Ac)	Q5 (CFS)	Q100 (CFS)
A	165.82	47.7	143.8
A_OUT	-	58.7	183.0
A1	23.59	6.8	26.4
A1_OUTFALL	-	7.0	27.2
A2	11.06	2.5	9.4
A2/3	-	4.2	15.8
A3	5.95	1.8	6.4
A4	2.73	0.6	2.1
B	8.62	3.7	14.6
B1	10.33	2.7	9.1
B2	8.97	2.3	7.7
B3	8.47	2.5	9.1
B4	1.05	0.3	1.1
C	1.71	0.4	1.3
C1	2.92	0.8	2.8
C2	7.57	2.1	8.3
DP_B2	-	5.0	16.8
D1	6.77	1.3	4.2
D2	0.32	0.1	0.3
E1	3.05	0.9	3.7
LELAND CREEK	-	5.3	17.4
OS1	0.93	0.3	1.4
OS2	2.42	0.7	2.9
OS2_OUT	-	0.7	2.9
OS3	3.76	1.9	7.2
OS3_OUT	-	11.1	33.7
POND_A	-	58.7	183.0
POND_B	-	9.9	30.3
POND_C	-	3.1	11.7
REACH-A1	-	7.0	26.6
REACH-A2/3	-	4.2	15.5
REACH-A4	-	0.6	2.1
SWALE B	-	5.0	16.7

Proposed Conditions			
Element	Area (Ac)	Q5 (CFS)	Q100 (CFS)
A	165.82	57.5	164.0
A_OUT	-	4.0	49.0
A1	23.59	13.5	41.3
A1_OUTFALL	-	13.9	43.1
A2	11.06	6.0	15.8
A2/3	-	8.9	24.2
A3	5.95	3.2	9.3
A4	2.73	0.7	2.7
B	8.62	4.4	14.1
B1	10.33	4.6	13.7
B2	8.97	4.6	12.7
B3	8.47	4.3	10.5
B4	1.05	1.3	3.5
C	1.71	0.6	2.6
C1	2.92	1.6	5.0
C2	7.57	2.8	8.6
DP_B2	-	9.2	26.2
D1	6.77	2.3	7.2
D2	0.32	0.4	1.1
E1	3.05	1.1	3.9
LELAND CREEK	-	3.7	12.0
OS1	0.93	0.3	1.1
OS2	2.42	1.5	5.3
OS2_OUT	-	1.5	5.3
OS3	3.76	2.1	7.0
OS3_OUT	-	2.2	22.7
POND_A	-	4.0	49.0
POND_B	-	0.9	21.0
POND_C	-	0.1	1.7
REACH-A1	-	13.7	42.6
REACH-A2/3	-	8.9	24.1
REACH-A4	-	0.7	2.7
SWALE B	-	9.2	26.2

Project: West Mountain - Filing 1
Prepared by: JNS
Date: 11/25/2025

Pond A HEC-HMS Flow results

Existing Conditions Inflow Time-Series Results

Peak Flow Rate (cfs)	Storm Return Interval (yr)					
	Q2	Q5	Q10	Q25	Q50	Q100
	28	58.7	76.2	103	135	183
Time (hr:min)	Storm Return Interval (yr)					
	Q2	Q5	Q10	Q25	Q50	Q100
0:00	0.0	0.0	0.0	0.0	0.0	0.0
0:05	0.0	0.0	0.0	0.0	0.0	0.0
0:10	0.0	0.0	0.0	0.0	0.1	0.1
0:15	0.1	0.2	0.4	0.7	1.1	1.5
0:20	1.0	1.9	3.0	5.0	7.0	9.3
0:25	3.4	6.2	9.4	15.3	20.9	27.6
0:30	8.0	14.5	21.6	34.5	46.8	61.3
0:35	14.9	27.0	39.7	61.9	83.3	108.6
0:40	21.7	39.1	56.6	86.2	115.2	150.4
0:45	26.1	47.8	68.0	99.7	132.2	174.6
0:50	28.0	53.5	74.1	102.5	134.9	183.0
0:55	27.7	56.8	76.2	97.4	127.1	179.8
1:00	26.3	58.7	76.1	88.7	114.8	171.2
1:05	23.9	58.7	73.7	77.5	99.4	157.7
1:10	21.4	57.5	70.3	67.3	85.6	144.1
1:15	19.0	54.7	65.3	57.9	73.1	129.6
1:20	16.3	49.0	57.7	48.7	61.2	112.1
1:25	13.5	41.3	48.3	39.6	49.5	92.5
1:30	10.7	33.2	38.6	31.1	38.9	73.4
1:35	8.3	25.8	29.9	24.0	29.9	56.7
1:40	6.3	19.6	22.7	18.2	22.7	43.0
1:45	4.7	14.6	17.0	13.6	17.0	32.1
1:50	3.5	11.0	12.8	10.3	12.8	24.2
1:55	2.7	8.3	9.7	7.8	9.8	18.4
2:00	2.1	6.3	7.4	5.9	7.4	14.0
2:05	1.6	4.8	5.6	4.5	5.6	10.6
2:10	1.2	3.7	4.2	3.4	4.3	8.1
2:15	0.9	2.8	3.2	2.6	3.3	6.1
2:20	0.7	2.1	2.5	2.0	2.5	4.7
2:25	0.5	1.6	1.9	1.5	1.9	3.6
2:30	0.4	1.2	1.4	1.2	1.5	2.8
2:35	0.3	0.9	1.1	0.9	1.1	2.1
2:40	0.2	0.7	0.8	0.6	0.8	1.5
2:45	0.2	0.5	0.6	0.4	0.5	1.1
2:50	0.1	0.4	0.4	0.3	0.3	0.7
2:55	0.1	0.3	0.3	0.2	0.2	0.5
3:00	0.1	0.2	0.2	0.1	0.2	0.4
3:05	0	0.1	0.1	0.1	0.1	0.2
3:10	0	0.1	0.1	0.1	0.1	0.2
3:15	0	0	0.1	0	0	0.1
3:20	0	0	0	0	0	0
3:25	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:35	0	0	0	0	0	0
3:40	0	0	0	0	0	0
3:45	0	0	0	0	0	0
3:50	0	0	0	0	0	0
3:55	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:05	0	0	0	0	0	0
4:10	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:20	0	0	0	0	0	0
4:25	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:35	0	0	0	0	0	0
4:40	0	0	0	0	0	0
4:45	0	0	0	0	0	0
4:50	0	0	0	0	0	0
4:55	0	0	0	0	0	0
5:00	0	0	0	0	0	0
5:05	0	0	0	0	0	0
5:10	0	0	0	0	0	0
5:15	0	0	0	0	0	0
5:20	0	0	0	0	0	0
5:25	0	0	0	0	0	0
5:30	0	0	0	0	0	0
5:35	0	0	0	0	0	0
5:40	0	0	0	0	0	0
5:45	0	0	0	0	0	0
5:50	0	0	0	0	0	0
5:55	0	0	0	0	0	0
6:00	0	0	0	0	0	0

Proposed Conditions Inflow Time-Series Results

Peak Flow Rate (cfs)	Storm Return Interval (yr)					
	Q2	Q5	Q10	Q25	Q50	Q100
	42	77.9	101	134	172	227
Time (hr:min)	Storm Return Interval (yr)					
	Q2	Q5	Q10	Q25	Q50	Q100
0:00	0.0	0.0	0.0	0.0	0.0	0.0
0:05	0.0	0.0	0.0	0.0	0.0	0.0
0:10	0.0	0.0	0.0	0.1	0.1	0.2
0:15	0.2	0.3	0.6	1.1	1.6	2.2
0:20	1.5	2.8	4.2	6.7	9.2	12.1
0:25	5.1	8.8	12.9	20.2	27.1	35.1
0:30	12.4	20.7	29.9	45.8	60.7	77.7
0:35	23.4	38.8	55.0	82.4	107.9	137.3
0:40	33.9	56.2	78.4	114.6	149.0	189.6
0:45	40.1	67.8	93.1	131.9	170.3	218.8
0:50	42.0	74.3	99.8	134.3	172.4	227.1
0:55	40.5	77.0	100.7	126.2	160.9	220.4
1:00	37.6	77.9	98.8	113.5	143.7	207.0
1:05	33.5	76.5	93.9	98.0	122.9	188.0
1:10	29.7	74.0	88.4	84.1	104.6	169.9
1:15	26.0	69.7	81.5	71.8	88.7	151.7
1:20	22.1	62.3	71.8	60.1	73.9	130.8
1:25	18.1	52.4	60.0	48.7	59.7	108.0
1:30	14.3	42.0	47.9	38.2	46.8	85.6
1:35	11.0	32.5	37.0	29.4	36.0	66.1
1:40	8.3	24.6	28.0	22.2	27.2	50.0
1:45	6.2	18.2	20.8	16.6	20.3	37.2
1:50	4.6	13.7	15.6	12.5	15.3	28.0
1:55	3.5	10.3	11.8	9.5	11.6	21.2
2:00	2.7	7.9	9.0	7.2	8.8	16.1
2:05	2.0	5.9	6.8	5.5	6.7	12.2
2:10	1.5	4.5	5.1	4.1	5.1	9.3
2:15	1.2	3.4	3.9	3.2	3.9	7.1
2:20	0.9	2.6	3.0	2.4	3.0	5.4
2:25	0.7	2.0	2.3	1.8	2.3	4.1
2:30	0.5	1.5	1.7	1.4	1.7	3.1
2:35	0.4	1.1	1.3	1.1	1.3	2.4
2:40	0.3	0.9	1	0.8	0.9	1.7
2:45	0.2	0.6	0.7	0.5	0.6	1.2
2:50	0.1	0.4	0.5	0.3	0.4	0.8
2:55	0.1	0.3	0.3	0.2	0.3	0.6
3:00	0.1	0.2	0.2	0.1	0.2	0.4
3:05	0	0.2	0.2	0.1	0.1	0.3
3:10	0	0.1	0.1	0.1	0.1	0.2
3:15	0	0.1	0.1	0	0	0.1
3:20	0	0	0	0	0	0
3:25	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:35	0	0	0	0	0	0
3:40	0	0	0	0	0	0
3:45	0	0	0	0	0	0
3:50	0	0	0	0	0	0
3:55	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:05	0	0	0	0	0	0
4:10	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:20	0	0	0	0	0	0
4:25	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:35	0	0	0	0	0	0
4:40	0	0	0	0	0	0
4:45	0	0	0	0	0	0
4:50	0	0	0	0	0	0
4:55	0	0	0	0	0	0
5:00	0	0	0	0	0	0
5:05	0	0	0	0	0	0
5:10	0	0	0	0	0	0
5:15	0	0	0	0	0	0
5:20	0	0	0	0	0	0
5:25	0	0	0	0	0	0
5:30	0	0	0	0	0	0
5:35	0	0	0	0	0	0
5:40	0	0	0	0	0	0
5:45	0	0	0	0	0	0
5:50	0	0	0	0	0	0
5:55	0	0	0	0	0	0
6:00	0	0	0	0	0	0

Project: West Mountain - Filing 1
Prepared by: JNS
Date: 11/25/2025

Pond B HEC-HMS Flow results

Existing Conditions Inflow Time-Series Results

Peak Flow Rate (cfs)	Storm Return Interval (yr)					
	Q2	Q5	Q10	Q25	Q50	Q100
	4.3	9.6	12.4	16.4	21.8	29.9
Time (hr:min)	**Storm Return Interval (yr)**					
	Q2	Q5	Q10	Q25	Q50	Q100
0:00	0.0	0.0	0.0	0.0	0.0	0.0
0:05	0.0	0.0	0.0	0.0	0.0	0.0
0:10	0.0	0.0	0.0	0.0	0.0	0.0
0:15	0.0	0.1	0.1	0.3	0.4	0.6
0:20	0.4	0.8	1.2	2.1	2.9	4.0
0:25	1.4	2.5	3.9	6.3	8.6	11.3
0:30	2.5	4.5	6.7	10.7	14.5	19.0
0:35	3.5	6.2	9.2	14.2	19.1	25.0
0:40	4.1	7.5	10.8	16.0	21.4	28.6
0:45	4.3	8.5	11.8	16.4	21.8	29.9
0:50	4.3	9.1	12.3	15.8	20.8	29.8
0:55	4.1	9.4	12.4	14.4	18.8	28.5
1:00	3.7	9.6	12.1	12.8	16.5	26.6
1:05	3.4	9.5	11.7	11.2	14.3	24.5
1:10	3.0	8.9	10.7	9.5	12.1	21.7
1:15	2.5	7.9	9.3	7.9	9.9	18.5
1:20	2.0	6.6	7.8	6.3	7.9	15.2
1:25	1.6	5.3	6.2	4.9	6.2	12.0
1:30	1.2	4.1	4.8	3.8	4.7	9.3
1:35	0.9	3.1	3.6	2.8	3.5	7.0
1:40	0.7	2.3	2.7	2.1	2.6	5.1
1:45	0.5	1.7	2.0	1.6	2.0	3.8
1:50	0.4	1.2	1.5	1.2	1.5	2.8
1:55	0.3	0.9	1.1	0.9	1.1	2.1
2:00	0.2	0.7	0.8	0.6	0.8	1.6
2:05	0.2	0.5	0.6	0.5	0.6	1.2
2:10	0.1	0.4	0.5	0.4	0.5	0.9
2:15	0.1	0.3	0.3	0.3	0.3	0.7
2:20	0.1	0.2	0.3	0.2	0.3	0.5
2:25	0.0	0.2	0.2	0.1	0.2	0.4
2:30	0	0.1	0.1	0.1	0.1	0.3
2:35	0	0.1	0.1	0.1	0.1	0.2
2:40	0	0.1	0.1	0.1	0.1	0.2
2:45	0	0.1	0.1	0	0.1	0.1
2:50	0	0	0	0	0	0.1
2:55	0	0	0	0	0	0.1
3:00	0	0	0	0	0	0
3:05	0	0	0	0	0	0
3:10	0	0	0	0	0	0
3:15	0	0	0	0	0	0
3:20	0	0	0	0	0	0
3:25	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:35	0	0	0	0	0	0
3:40	0	0	0	0	0	0
3:45	0	0	0	0	0	0
3:50	0	0	0	0	0	0
3:55	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:05	0	0	0	0	0	0
4:10	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:20	0	0	0	0	0	0
4:25	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:35	0	0	0	0	0	0
4:40	0	0	0	0	0	0
4:45	0	0	0	0	0	0
4:50	0	0	0	0	0	0
4:55	0	0	0	0	0	0
5:00	0	0	0	0	0	0
5:05	0	0	0	0	0	0
5:10	0	0	0	0	0	0
5:15	0	0	0	0	0	0
5:20	0	0	0	0	0	0
5:25	0	0	0	0	0	0
5:30	0	0	0	0	0	0
5:35	0	0	0	0	0	0
5:40	0	0	0	0	0	0
5:45	0	0	0	0	0	0
5:50	0	0	0	0	0	0
5:55	0	0	0	0	0	0
6:00	0	0	0	0	0	0

Proposed Conditions Inflow Time-Series Results

Peak Flow Rate (cfs)	Storm Return Interval (yr)					
	Q2	Q5	Q10	Q25	Q50	Q100
	9.5	17.2	21.8	28.1	35.4	46.1
Time (hr:min)	**Storm Return Interval (yr)**					
	Q2	Q5	Q10	Q25	Q50	Q100
0:00	0.0	0.0	0.0	0.0	0.0	0.0
0:05	0.0	0.0	0.0	0.0	0.0	0.0
0:10	0.0	0.1	0.1	0.2	0.3	0.4
0:15	0.3	0.5	0.8	1.2	1.7	2.2
0:20	1.6	2.6	3.7	5.6	7.3	9.2
0:25	3.7	5.9	8.3	12.2	15.8	19.9
0:30	5.8	9.2	12.8	18.8	24.2	30.3
0:35	7.8	12.5	17.1	24.5	31.3	39.3
0:40	9.1	14.9	20.0	27.5	35.0	44.5
0:45	9.5	16.4	21.5	28.1	35.4	46.1
0:50	9.3	17.1	21.8	26.7	33.5	45.1
0:55	8.7	17.2	21.4	24.1	30.0	42.3
1:00	7.9	16.9	20.4	21.0	25.9	38.6
1:05	6.9	16.2	19.0	18.0	22.0	34.7
1:10	6.0	14.8	17.1	15.1	18.3	30.2
1:15	5.0	13.0	14.8	12.4	15.0	25.6
1:20	4.1	10.9	12.3	9.9	11.9	20.9
1:25	3.2	8.8	9.8	7.8	9.3	16.6
1:30	2.5	6.9	7.6	6.0	7.2	12.8
1:35	1.9	5.2	5.8	4.5	5.4	9.6
1:40	1.4	3.9	4.3	3.3	4.0	7.1
1:45	1.1	2.9	3.2	2.5	3.0	5.3
1:50	0.8	2.1	2.4	1.9	2.2	3.9
1:55	0.6	1.6	1.8	1.4	1.7	2.9
2:00	0.4	1.2	1.3	1.1	1.3	2.2
2:05	0.3	0.9	1.0	0.8	1.0	1.7
2:10	0.3	0.7	0.8	0.6	0.7	1.2
2:15	0.2	0.5	0.6	0.4	0.5	0.9
2:20	0.1	0.4	0.4	0.3	0.4	0.7
2:25	0.1	0.3	0.3	0.2	0.3	0.5
2:30	0.1	0.2	0.2	0.2	0.2	0.4
2:35	0.1	0.2	0.2	0.1	0.2	0.3
2:40	0	0.1	0.1	0.1	0.1	0.2
2:45	0	0.1	0.1	0.1	0.1	0.2
2:50	0	0.1	0.1	0.1	0.1	0.1
2:55	0	0.1	0.1	0	0.1	0.1
3:00	0	0	0	0	0	0.1
3:05	0	0	0	0	0	0
3:10	0	0	0	0	0	0
3:15	0	0	0	0	0	0
3:20	0	0	0	0	0	0
3:25	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:35	0	0	0	0	0	0
3:40	0	0	0	0	0	0
3:45	0	0	0	0	0	0
3:50	0	0	0	0	0	0
3:55	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:05	0	0	0	0	0	0
4:10	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:20	0	0	0	0	0	0
4:25	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:35	0	0	0	0	0	0
4:40	0	0	0	0	0	0
4:45	0	0	0	0	0	0
4:50	0	0	0	0	0	0
4:55	0	0	0	0	0	0
5:00	0	0	0	0	0	0
5:05	0	0	0	0	0	0
5:10	0	0	0	0	0	0
5:15	0	0	0	0	0	0
5:20	0	0	0	0	0	0
5:25	0	0	0	0	0	0
5:30	0	0	0	0	0	0
5:35	0	0	0	0	0	0
5:40	0	0	0	0	0	0
5:45	0	0	0	0	0	0
5:50	0	0	0	0	0	0
5:55	0	0	0	0	0	0
6:00	0	0	0	0	0	0

APPENDIX C

DETENTION BASIN/
WATER QUALITY ENHANCEMENT BMP'S

Pond Percent Imperviousness Calculations

Pond A – FAA Method Detention Sizing
Pond A – MHFD-Detention_v4.07

Pond B – FAA Method Detention Sizing
Pond B – MHFD-Detention_v4.07

Temporary Sediment Pond C Exhibit
Temporary Sediment Pond C Stage-Storage Discharge Calculations

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph. 303.632.8867

Project Name: West Mountain - Filing 1
Prepared By: JNS

Pond Percent Impervious Calculations

Basin Id	Design Point	Basin Area (Ac)	Historic Flow Area	Paved Street, Roof, Drives, Walks Area	Single Family Lot Area	Single Family Lot Area	Multi-family Lots Area	Commercial Area	EDBs Area	Permanent Water Surface Area	Golf Course Area	Weighted % Impervious
			5%	95%	35%	55%	70%	90%	25%	100%	30%	
A	A	165.82	55.24	7.99		39.03	9.83	2.32	2.96	3.06	45.39	35.1%
A1	A1	23.59					12.47	5.18			5.94	64.3%
A2	A2	11.06	0.39	1.52			7.22	1.93				74.6%
A3	A3	5.95	1.78	0.88			3.29					54.2%
A4	A4	2.73	2.24			0.49						14.0%
Pond A		209.15	59.65	10.39		39.52	32.81	9.42	2.96	3.06	51.33	40.8%
B	B	8.62	1.64			2.90	3.15		0.93			47.7%
B1	B1	10.33	2.48	2.09	3.72	2.04						43.9%
B2	B2	8.97	0.56	0.97	2.56		4.88					58.7%
B3	B3	8.47	0.42	0.79			7.26					69.1%
B4	B4	1.05	0.17	0.87								80.0%
Pond B		37.44	5.27	4.73	6.28	4.93	15.29		0.93			55.0%
C	C	1.71	0.70						1.02			16.9%
C1	C1	2.92	0.54	0.47	1.90							39.1%
C2	C2	7.57	3.01	1.73	2.83							36.8%
Temp Sed Pond C		12.20	4.25	2.20	4.74				1.02			34.5%

DETENTION VOLUME BY THE MODIFIED FAA METHOD

Project: Grand Park - West Mountain

Basin ID: Pond A1

(For catchments less than 160 acres only. For larger catchments, use hydrograph routing method)

Warning: This worksheet is not intended for catchments larger than 160 acres.

Determination of MINOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	40.80	percent
Catchment Drainage Area WARNING->	A =	209.150	acres <-WARNING
Predevelopment NRCS Soil Group	Type =	D	A, B, C, or D
Return Period for Detention Control	T =	10	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	28	minutes
Allowable Unit Release Rate	q =	0.33	cfs/acre
One-hour Precipitation	P_1 =	1.01	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)\text{^}C_3$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.42	
Inflow Peak Runoff	Qp-in =	144.93	cfs
Allowable Peak Outflow Rate	Qp-out =	**68.60**	cfs
Mod. FAA Minor Storage Volume =		143,136	**cubic feet**
Mod. FAA Minor Storage Volume =		**3.286**	**acre-ft**

1 <- Enter Rainfall Duration Incremental Increase Value Here (e.g. 5 for 5-Minutes)

Determination of MAJOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	40.80	percent
Catchment Drainage Area	A =	209.150	acres
Predevelopment NRCS Soil Group	Type =	D	A, B, C, or D
Return Period for Detention Control	T =	100	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	28	minutes
Allowable Unit Release Rate	q =	0.79	cfs/acre
One-hour Precipitation	P_1 =	1.64	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)\text{^}C_3$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.58	
Inflow Peak Runoff	Qp-in =	324.99	cfs
Allowable Peak Outflow Rate	Qp-out =	**164.60**	cfs
Mod. FAA Major Storage Volume =		296,003	**cubic feet**
Mod. FAA Major Storage Volume =		**6.795**	**acre-ft**

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume acre-feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume acre-feet (output)	Storage Volume acre-feet (output)	Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume acre-feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume acre-feet (output)	Storage Volume acre-feet (output)
0	0.00	0.000	0.00	0.00	0.000	0.000	0	0.00	0.000	0.00	0.00	0.000	0.000
1	4.37	0.529	1.00	68.60	0.094	0.434	1	7.10	1.186	1.00	164.60	0.227	0.959
2	4.08	0.988	1.00	68.60	0.189	0.799	2	6.63	2.215	1.00	164.60	0.453	1.762
3	3.83	1.392	1.00	68.60	0.283	1.108	3	6.22	3.120	1.00	164.60	0.680	2.440
4	3.62	1.750	1.00	68.60	0.378	1.372	4	5.87	3.925	1.00	164.60	0.907	3.018
5	3.43	2.073	1.00	68.60	0.472	1.600	5	5.56	4.647	1.00	164.60	1.134	3.514
6	3.26	2.364	1.00	68.60	0.567	1.797	6	5.29	5.301	1.00	164.60	1.360	3.941
7	3.10	2.630	1.00	68.60	0.661	1.968	7	5.04	5.897	1.00	164.60	1.587	4.310
8	2.97	2.873	1.00	68.60	0.756	2.117	8	4.82	6.443	1.00	164.60	1.814	4.629
9	2.84	3.098	1.00	68.60	0.850	2.248	9	4.62	6.947	1.00	164.60	2.041	4.906
10	2.73	3.306	1.00	68.60	0.945	2.361	10	4.44	7.414	1.00	164.60	2.267	5.146
11	2.63	3.500	1.00	68.60	1.039	2.461	11	4.27	7.848	1.00	164.60	2.494	5.354
12	2.54	3.681	1.00	68.60	1.134	2.547	12	4.12	8.254	1.00	164.60	2.721	5.534
13	2.45	3.851	1.00	68.60	1.228	2.623	13	3.98	8.635	1.00	164.60	2.947	5.688
14	2.37	4.011	1.00	68.60	1.323	2.688	14	3.84	8.993	1.00	164.60	3.174	5.819
15	2.29	4.161	1.00	68.60	1.417	2.744	15	3.72	9.331	1.00	164.60	3.401	5.931
16	2.22	4.304	1.00	68.60	1.512	2.792	16	3.61	9.651	1.00	164.60	3.628	6.024
17	2.16	4.439	1.00	68.60	1.606	2.833	17	3.50	9.955	1.00	164.60	3.854	6.101
18	2.10	4.568	1.00	68.60	1.701	2.867	18	3.41	10.243	1.00	164.60	4.081	6.162
19	2.04	4.691	1.00	68.60	1.795	2.895	19	3.31	10.518	1.00	164.60	4.308	6.211
20	1.99	4.808	1.00	68.60	1.890	2.918	20	3.23	10.781	1.00	164.60	4.534	6.246
21	1.94	4.920	1.00	68.60	1.984	2.935	21	3.14	11.032	1.00	164.60	4.761	6.271
22	1.89	5.027	1.00	68.60	2.079	2.948	22	3.07	11.272	1.00	164.60	4.988	6.284
23	1.84	5.130	1.00	68.60	2.173	2.957	23	2.99	11.503	1.00	164.60	5.215	6.288
24	1.80	5.229	1.00	68.60	2.268	2.961	24	2.92	11.725	1.00	164.60	5.441	6.283
25	1.76	5.324	1.00	68.60	2.362	2.962	25	2.86	11.938	1.00	164.60	5.668	6.270
26	1.72	5.416	1.00	68.60	2.457	2.959	26	2.80	12.144	1.00	164.60	5.895	6.249
27	1.68	5.504	1.00	68.60	2.551	2.953	27	2.74	12.342	1.00	164.60	6.122	6.221
28	1.65	5.590	1.00	68.60	2.646	2.944	28	2.68	12.534	1.00	164.60	6.348	6.186
29	1.62	5.672	0.98	67.42	2.693	2.979	29	2.62	12.719	0.98	161.76	6.462	6.258
30	1.58	5.752	0.97	66.31	2.740	3.012	30	2.57	12.899	0.97	159.11	6.575	6.324
31	1.55	5.830	0.95	65.28	2.788	3.042	31	2.52	13.072	0.95	156.64	6.688	6.384
32	1.53	5.905	0.94	64.31	2.835	3.070	32	2.48	13.241	0.94	154.31	6.802	6.439
33	1.50	5.978	0.92	63.40	2.882	3.096	33	2.43	13.404	0.92	152.13	6.915	6.489
34	1.47	6.049	0.91	62.55	2.929	3.119	34	2.39	13.563	0.91	150.08	7.028	6.535
35	1.44	6.118	0.90	61.74	2.976	3.141	35	2.35	13.718	0.90	148.14	7.142	6.576
36	1.42	6.185	0.89	60.98	3.024	3.161	36	2.31	13.868	0.89	146.31	7.255	6.613
37	1.40	6.250	0.88	60.26	3.071	3.179	37	2.27	14.014	0.88	144.58	7.369	6.646
38	1.37	6.313	0.87	59.57	3.118	3.195	38	2.23	14.157	0.87	142.94	7.482	6.675
39	1.35	6.375	0.86	58.93	3.165	3.210	39	2.19	14.296	0.86	141.39	7.595	6.701
40	1.33	6.436	0.85	58.31	3.213	3.223	40	2.16	14.431	0.85	139.91	7.709	6.723
41	1.31	6.495	0.84	57.73	3.260	3.235	41	2.13	14.564	0.84	138.51	7.822	6.742
42	1.29	6.553	0.83	57.17	3.307	3.245	42	2.09	14.693	0.83	137.17	7.935	6.758
43	1.27	6.609	0.83	56.64	3.354	3.254	43	2.06	14.819	0.83	135.89	8.049	6.771
44	1.25	6.664	0.82	56.13	3.402	3.262	44	2.03	14.943	0.82	134.67	8.162	6.781
45	1.23	6.718	0.81	55.64	3.449	3.269	45	2.00	15.063	0.81	133.51	8.275	6.788
46	1.22	6.770	0.80	55.18	3.496	3.274	46	1.98	15.182	0.80	132.40	8.389	6.793
47	1.20	6.822	0.80	54.74	3.543	3.279	47	1.95	15.297	0.80	131.33	8.502	6.795
48	1.18	6.873	0.79	54.31	3.591	3.282	48	1.92	15.411	0.79	130.31	8.615	6.795
49	1.17	6.922	0.79	53.90	3.638	3.284	49	1.90	15.522	0.79	129.33	8.729	6.793
50	1.15	6.971	0.78	53.51	3.685	3.286	50	1.87	15.631	0.78	128.39	8.842	6.789
51	1.14	7.018	0.77	53.13	3.732	3.286	51	1.85	15.738	0.77	127.49	8.956	6.782
52	1.12	7.065	0.77	52.77	3.780	3.285	52	1.82	15.842	0.77	126.62	9.069	6.773
53	1.11	7.111	0.76	52.42	3.827	3.284	53	1.80	15.945	0.76	125.78	9.182	6.763
54	1.10	7.156	0.76	52.09	3.874	3.282	54	1.78	16.046	0.76	124.97	9.296	6.751
55	1.08	7.200	0.75	51.76	3.921	3.279	55	1.76	16.145	0.75	124.20	9.409	6.736
56	1.07	7.244	0.75	51.45	3.969	3.275	56	1.74	16.243	0.75	123.45	9.522	6.721
57	1.06	7.286	0.75	51.15	4.016	3.271	57	1.72	16.339	0.75	122.73	9.636	6.703
58	1.04	7.328	0.74	50.86	4.063	3.265	58	1.70	16.433	0.74	122.03	9.749	6.684
59	1.03	7.370	0.74	50.58	4.110	3.259	59	1.68	16.525	0.74	121.36	9.862	6.663
60	1.02	7.410	0.73	50.31	4.158	3.253	60	1.66	16.617	0.73	120.71	9.976	6.641

Mod. FAA Minor Storage Volume (cubic ft.) = 143,136

Mod. FAA Minor Storage Volume (acre-ft.) = 3.2860

Mod. FAA Major Storage Volume (cubic ft.) = 296,003

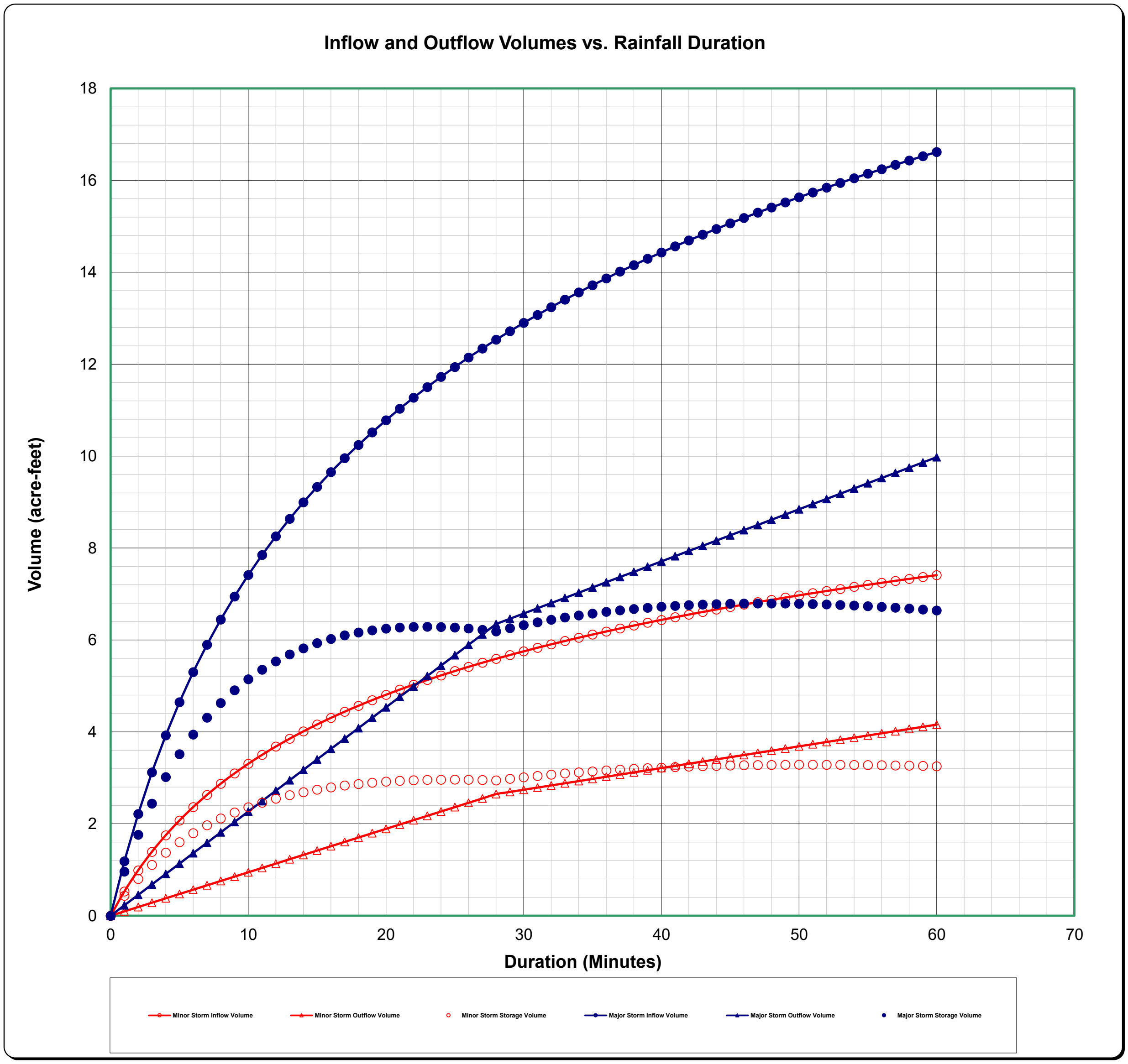
Mod. FAA Major Storage Volume (acre-ft.) = 6.7953

UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.35, Released January 2015

DETENTION VOLUME BY THE MODIFIED FAA METHOD

Project: Grand Park - West Mountain

Basin ID: Pond A1



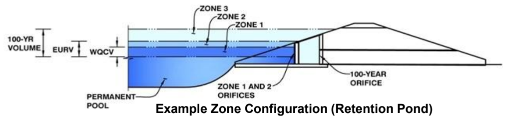
UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.35, Released January 2015

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: **Grand Park - West Mountain - Filing 1**

Basin ID: **Pond A**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	**EDB**	
Watershed Area =	209.15	acres
Watershed Length =	4,577	ft
Watershed Length to Centroid =	2,062	ft
Watershed Slope =	0.052	ft/ft
Watershed Imperviousness =	40.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	26.0%	percent
Percentage Hydrologic Soil Groups C/D =	74.0%	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) =	3.171	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	8.211	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.56 in.) =	2.970	acre-feet	0.56	inches
5-yr Runoff Volume (P1 = 0.88 in.) =	5.546	acre-feet	0.88	inches
10-yr Runoff Volume (P1 = 1.01 in.) =	6.703	acre-feet	1.01	inches
25-yr Runoff Volume (P1 = 1.08 in.) =	8.424	acre-feet	1.08	inches
50-yr Runoff Volume (P1 = 1.26 in.) =	11.263	acre-feet	1.26	inches
100-yr Runoff Volume (P1 = 1.64 in.) =	18.295	acre-feet	1.64	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	45.101	acre-feet		inches
Approximate 2-yr Detention Volume =	3.226	acre-feet		
Approximate 5-yr Detention Volume =	6.093	acre-feet		
Approximate 10-yr Detention Volume =	7.171	acre-feet		
Approximate 25-yr Detention Volume =	7.396	acre-feet		
Approximate 50-yr Detention Volume =	7.998	acre-feet		
Approximate 100-yr Detention Volume =	10.826	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	3.171	acre-feet
Zone 2 Volume (User Defined - Zone 1) =	0.115	acre-feet
Zone 3 Volume (User Defined - Zones 1 & 2) =	6.795	acre-feet
Total Detention Basin Volume =	10.081	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	

Total detention volume is less than 100-year volume.

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	--	--	--	133,440	3.063		
8698	--	1.00	--	--	--	202,482	4.648	167,961	3.856
8699	--	2.00	--	--	--	263,189	6.042	400,796	9.201
8700	--	3.00	--	--	--	294,590	6.763	679,686	15.603
8701	--	4.00	--	--	--	304,158	6.983	979,060	22.476
8702	--	5.00	--	--	--	313,831	7.205	1,288,054	29.570
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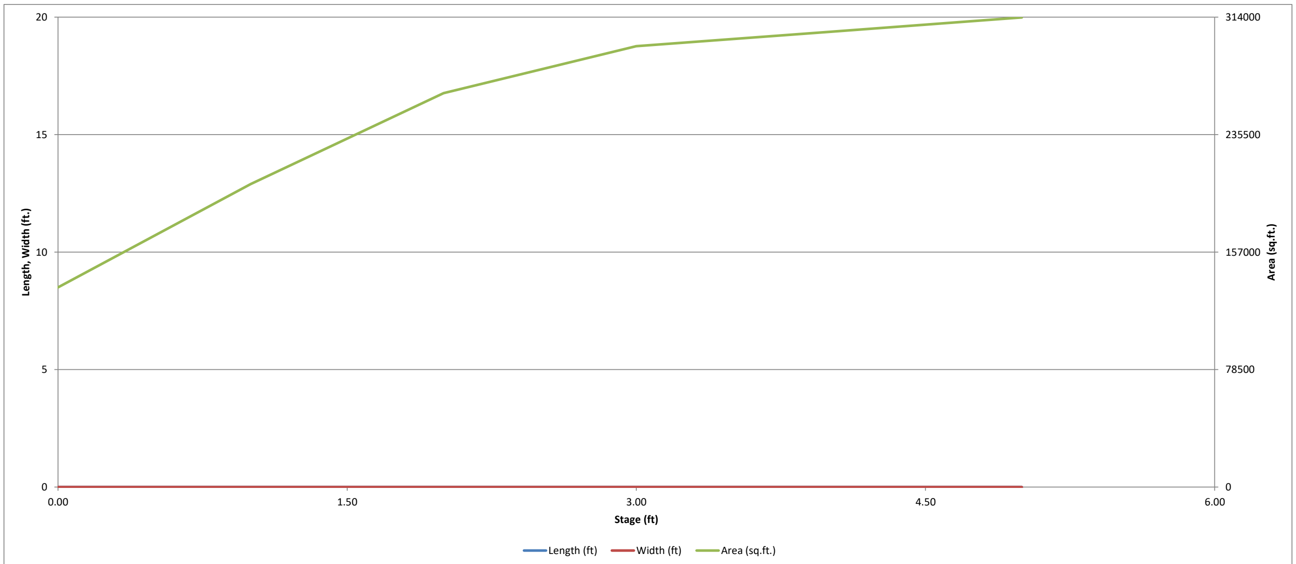
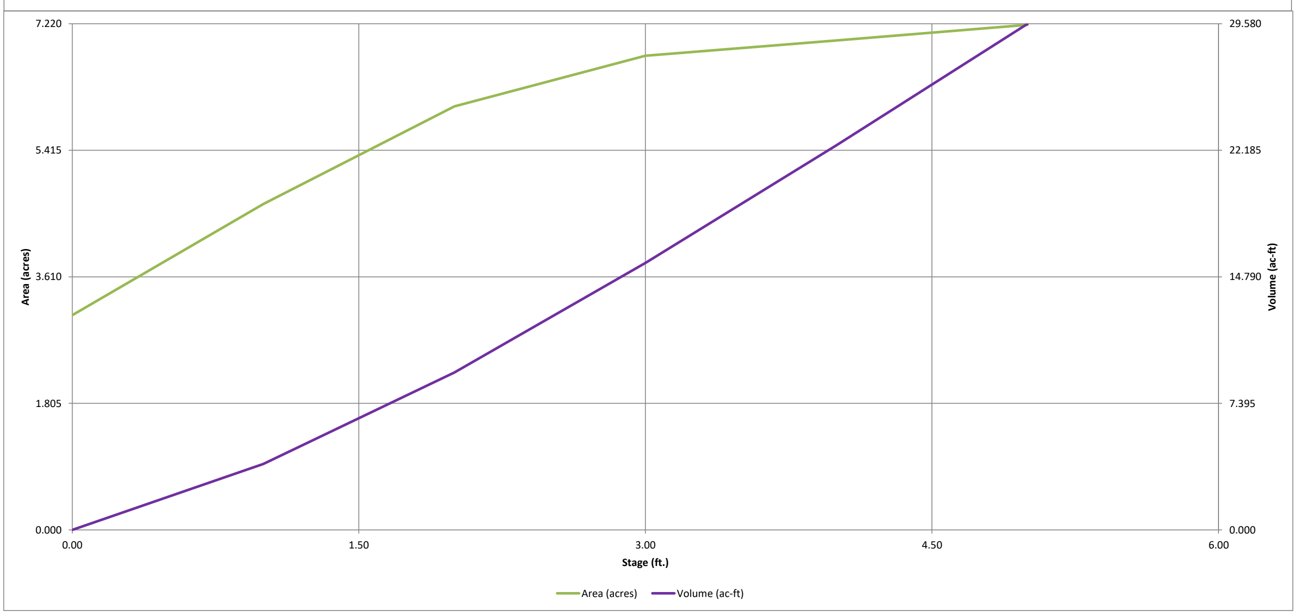
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



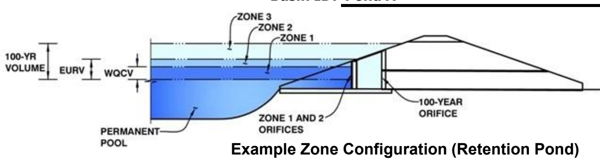


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Project: **Grand Park - West Mountain - Filing 1**

Basin ID: **Pond A**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.85	3.171	Orifice Plate
Zone 2 (User)	0.88	0.115	Orifice Plate
Zone 3 (User)	2.15	6.795	Weir&Pipe (Restrict)
Total (all zones)		10.081	

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

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

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

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

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	0.88	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	3.50	inches
Orifice Plate: Orifice Area per Row =	38.00	sq. inches (use rectangular openings)

Calculated Parameters for Plate

WQ Orifice Area per Row =	2.639E-01	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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	0.29	0.59					
Orifice Area (sq. inches)	38.00	38.00	38.00					

	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)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

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	
Overflow Weir Front Edge Height, Ho =	1.50	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	8.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	1.50	N/A	feet
Overflow Weir Slope Length =	4.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	5.20	N/A	
Overflow Grate Open Area w/o Debris =	22.27	N/A	ft^2
Overflow Grate Open Area w/ Debris =	11.14	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	4.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	36.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	21.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	4.28	N/A	ft^2
Outlet Orifice Centroid =	1.00	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.74	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	2.75	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	104.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.92	feet
Stage at Top of Freeboard =	4.67	feet
Basin Area at Top of Freeboard =	7.13	acres
Basin Volume at Top of Freeboard =	27.20	acre-ft

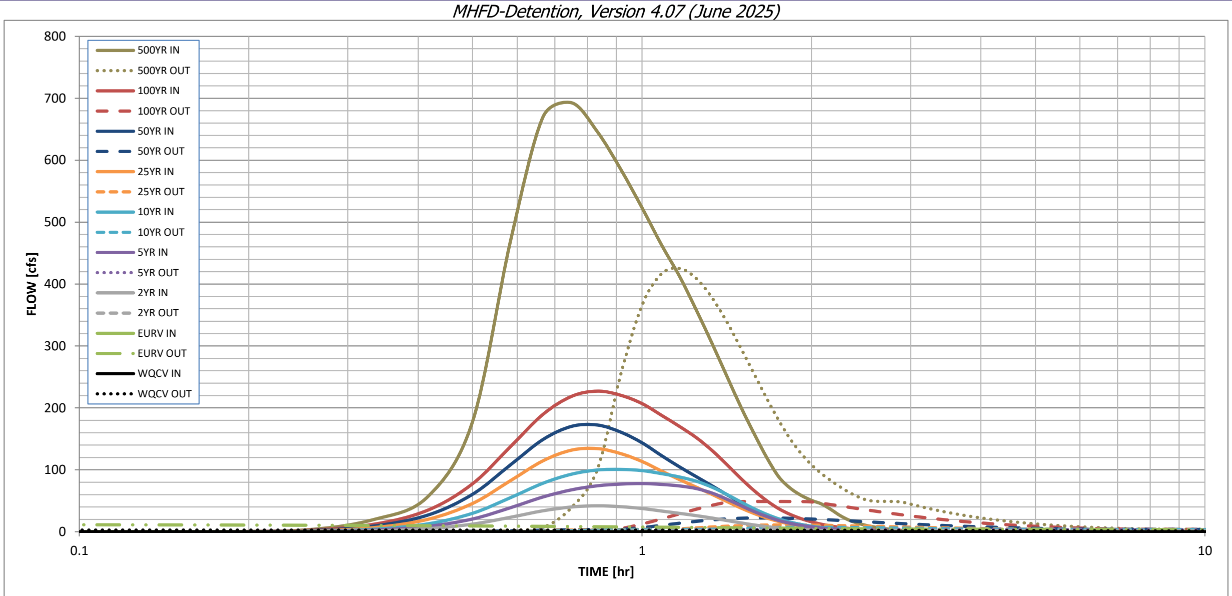
Routed Hydrograph Results

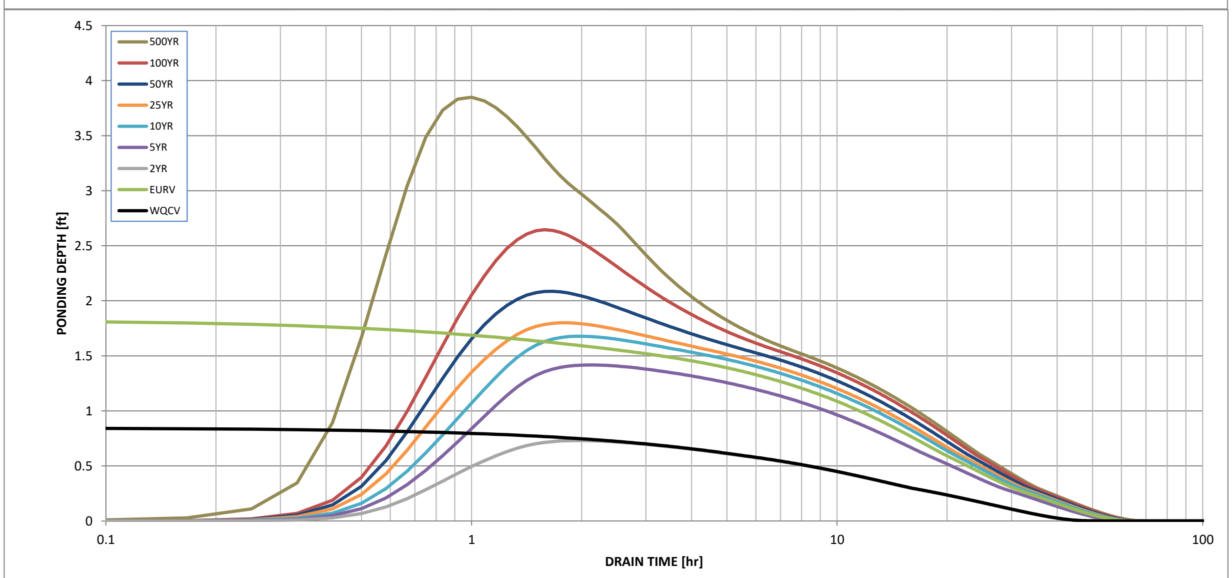
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

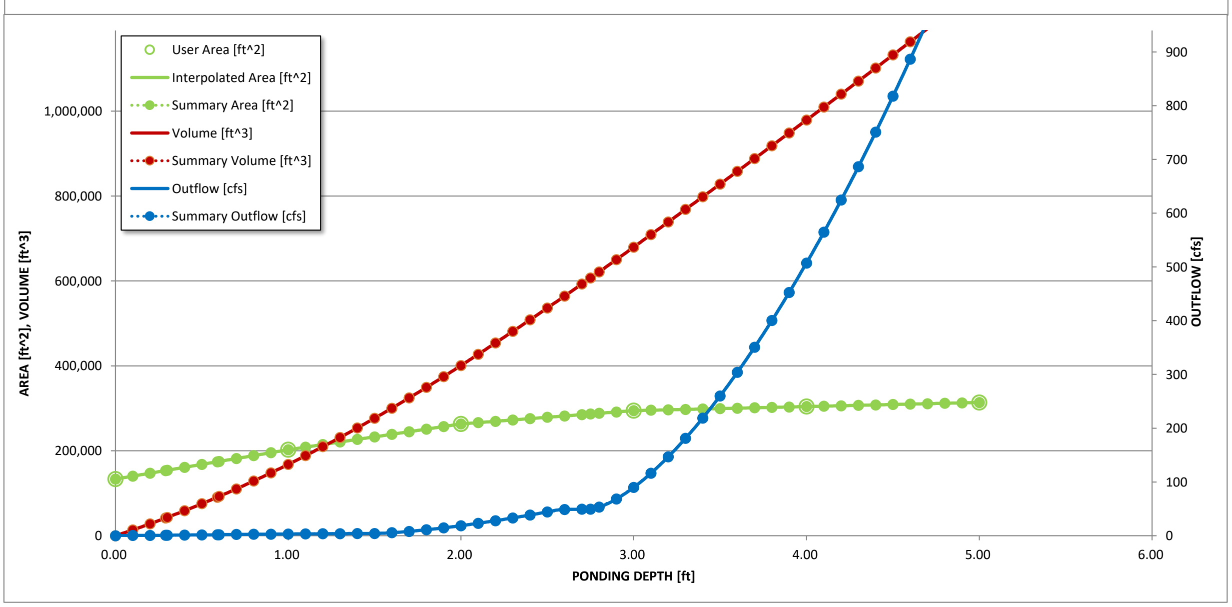
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.56	0.88	1.01	1.08	1.26	1.64	3.14
CUHP Runoff Volume (acre-ft) =	3.171	8.211	2.970	5.546	6.703	8.424	11.263	18.295	45.101
User Override Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.925	6.422	8.032	8.930	11.331	16.729	45.101
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.9	5.8	7.6	33.5	67.0	145.1	433.4
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A	28	58.7	76.2	102.5	134.9	183	
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.13	0.28	0.36	0.49	0.64	0.87	2.07
Peak Inflow Q (cfs) =	N/A	N/A	42.0	77.9	100.7	134.3	172.4	227.1	692.6
Peak Outflow Q (cfs) =	2.8	11.9	2.4	4.0	7.4	11.0	22.4	49.0	425.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.1	0.1	0.2	0.3	1.0
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	0.34	N/A	N/A	0.1	0.3	0.8	1.9	2.1
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) =	39	47	40	47	49	49	48	44	31
Time to Drain 99% of Inflow Volume (hours) =	**44**	54	44	53	56	56	56	55	46
Maximum Ponding Depth (ft) =	0.85	1.84	0.73	1.42	1.68	1.80	2.09	2.65	3.85
Area at Maximum Ponding Depth (acres) =	4.41	5.82	4.22	5.22	5.58	5.76	6.10	6.50	6.95
Maximum Volume Stored (acre-ft) =	3.176	8.252	2.659	5.879	7.283	8.020	9.687	13.216	21.362

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	USER	USER	USER	USER	USER	USER	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0	0.00	0.00	0.00	0.00	0.10	0.10	0.20	2.79
	0:15:00	0	0.00	0.20	0.30	0.60	1.10	1.60	2.20	19.68
	0:20:00	0	0.00	1.50	2.80	4.20	6.70	9.20	12.10	57.20
	0:25:00	0	0.00	5.10	8.80	12.90	20.20	27.10	35.10	178.42
	0:30:00	0	0.00	12.40	20.70	29.90	45.80	60.70	77.70	468.36
	0:35:00	0	0.00	23.40	38.80	55.00	82.40	107.90	137.30	669.78
	0:40:00	0	0.00	33.90	56.20	78.40	114.60	149.00	189.60	692.64
	0:45:00	0	0.00	40.10	67.80	93.10	131.90	170.30	218.80	645.66
	0:50:00	0	0.00	42.00	74.30	99.80	134.30	172.40	227.10	585.15
	0:55:00	0	0.00	40.50	77.00	100.70	126.20	160.90	220.40	523.14
	1:00:00	0	0.00	37.60	77.90	98.80	113.50	143.70	207.00	463.00
	1:05:00	0	0.00	33.50	76.50	93.90	98.00	122.90	188.00	411.93
	1:10:00	0	0.00	29.70	74.00	88.40	84.10	104.60	169.90	357.11
	1:15:00	0	0.00	26.00	69.70	81.50	71.80	88.70	151.70	302.96
	1:20:00	0	0.00	22.10	62.30	71.80	60.10	73.90	130.80	250.08
	1:25:00	0	0.00	18.10	52.40	60.00	48.70	59.70	108.00	200.59
	1:30:00	0	0.00	14.30	42.00	47.90	38.20	46.80	85.60	157.68
	1:35:00	0	0.00	11.00	32.50	37.00	29.40	36.00	66.10	119.43
	1:40:00	0	0.00	8.30	24.60	28.00	22.20	27.20	50.00	88.57
	1:45:00	0	0.00	6.20	18.20	20.80	16.60	20.30	37.20	70.49
	1:50:00	0	0.00	4.60	13.70	15.60	12.50	15.30	28.00	58.85
	1:55:00	0	0.00	3.50	10.30	11.80	9.50	11.60	21.20	50.77
	2:00:00	0	0.00	2.70	7.90	9.00	7.20	8.80	16.10	44.94
	2:05:00	0	0.00	2.00	5.90	6.80	5.50	6.70	12.20	35.88
	2:10:00	0	0.00	1.50	4.50	5.10	4.10	5.10	9.30	26.03
	2:15:00	0	0.00	1.20	3.40	3.90	3.20	3.90	7.10	18.74
	2:20:00	0	0.00	0.90	2.60	3.00	2.40	3.00	5.40	13.92
	2:25:00	0	0.00	0.70	2.00	2.30	1.80	2.30	4.10	10.36
	2:30:00	0	0.00	0.50	1.50	1.70	1.40	1.70	3.10	7.70
	2:35:00	0	0.00	0.40	1.10	1.30	1.10	1.30	2.40	5.65
	2:40:00	0	0.00	0.30	0.90	1.00	0.80	0.90	1.70	4.20
	2:45:00	0	0.00	0.20	0.60	0.70	0.50	0.60	1.20	3.00
	2:50:00	0	0.00	0.10	0.40	0.50	0.30	0.40	0.80	2.00
	2:55:00	0	0.00	0.10	0.30	0.30	0.20	0.30	0.60	1.20
	3:00:00	0	0.00	0.10	0.20	0.20	0.10	0.20	0.40	0.60
	3:05:00	0	0.00	0.00	0.20	0.20	0.10	0.10	0.30	0.20
	3:10:00	0	0.00	0.00	0.10	0.10	0.10	0.10	0.20	0.00
	3:15:00	0	0.00	0.00	0.10	0.10	0.00	0.00	0.10	0.00
	3:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Elevation [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
Orifice 1	0.00	8697.00	133440	3.063	0	0.000	0.00
	0.10	8697.10	140344	3.222	13689	0.314	0.40
	0.20	8697.20	147248	3.380	28069	0.644	0.57
Orifice 2	0.29	8697.29	153462	3.523	41601	0.955	0.68
	0.30	8697.30	154153	3.539	43139	0.990	0.82
	0.40	8697.40	161057	3.697	58899	1.352	1.23
	0.50	8697.50	167961	3.856	75350	1.730	1.48
Orifice 3	0.59	8697.59	174175	3.999	90746	2.083	1.67
	0.60	8697.60	174865	4.014	92491	2.123	1.82
	0.70	8697.70	181769	4.173	110323	2.533	2.30
	0.80	8697.80	188674	4.331	128845	2.958	2.63
	0.90	8697.90	195578	4.490	148058	3.399	2.91
	1.00	8698.00	202482	4.648	167961	3.856	3.15
	1.10	8698.10	208553	4.788	188513	4.328	3.38
	1.20	8698.20	214623	4.927	209671	4.813	3.60
	1.30	8698.30	220694	5.066	231437	5.313	3.80
	1.40	8698.40	226765	5.206	253810	5.827	3.99
Overflow Weir Rim Invert	1.50	8698.50	232836	5.345	276790	6.354	4.17
	1.60	8698.60	238906	5.485	300377	6.896	5.56
	1.70	8698.70	244977	5.624	324571	7.451	7.96
	1.80	8698.80	251048	5.763	349373	8.020	11.02
	1.90	8698.90	257118	5.903	374781	8.604	14.60
	2.00	8699.00	263189	6.042	400796	9.201	18.64
	2.10	8699.10	266329	6.114	427272	9.809	23.08
	2.20	8699.20	269469	6.186	454062	10.424	27.90
	2.30	8699.30	272609	6.258	481166	11.046	33.05
	2.40	8699.40	275749	6.330	508584	11.675	38.53
	2.50	8699.50	278890	6.402	536316	12.312	44.32
	2.60	8699.60	282030	6.475	564362	12.956	48.79
	2.70	8699.70	285170	6.547	592722	13.607	49.23
Spillway Invert Elevation	2.75	8699.75	286740	6.583	607020	13.935	49.44
	2.80	8699.80	288310	6.619	621396	14.265	53.15
	2.90	8699.90	291450	6.691	650384	14.931	68.29
	3.00	8700.00	294590	6.763	679686	15.603	89.81
	3.10	8700.10	295547	6.785	709193	16.281	116.22
	3.20	8700.20	296504	6.807	738795	16.960	146.83
	3.30	8700.30	297460	6.829	768493	17.642	181.17
	3.40	8700.40	298417	6.851	798287	18.326	218.93
	3.50	8700.50	299374	6.873	828177	19.012	259.89
	3.60	8700.60	300331	6.895	858162	19.701	303.87
	3.70	8700.70	301288	6.917	888243	20.391	350.71
	3.80	8700.80	302244	6.939	918420	21.084	400.30
	3.90	8700.90	303201	6.961	948692	21.779	452.54
	4.00	8701.00	304158	6.983	979060	22.476	507.35
	4.10	8701.10	305125	7.005	1009524	23.175	564.66
	4.20	8701.20	306093	7.027	1040085	23.877	624.39
	4.30	8701.30	307060	7.049	1070742	24.581	686.50
	4.40	8701.40	308027	7.071	1101497	25.287	750.93
	4.50	8701.50	308994	7.094	1132348	25.995	817.65
	4.60	8701.60	309962	7.116	1163296	26.706	886.60
	4.70	8701.70	310929	7.138	1194340	27.418	957.77
	4.80	8701.80	311896	7.160	1225482	28.133	1031.11
	4.90	8701.90	312864	7.182	1256720	28.850	1106.60
	5.00	8702.00	313831	7.205	1288054	29.570	1184.21

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on
Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION VOLUME BY THE MODIFIED FAA METHOD

Project: Grand Park - West Mountain

Basin ID: Pond B

(For catchments less than 160 acres only. For larger catchments, use hydrograph routing method)

(NOTE: for catchments larger than 90 acres, CUHP hydrograph and routing are recommended)

Determination of MINOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	55.00	percent
Catchment Drainage Area	A =	37.440	acres
Predevelopment NRCS Soil Group	Type =	D	A, B, C, or D
Return Period for Detention Control	T =	10	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	23	minutes
Allowable Unit Release Rate	q =	0.33	cfs/acre
One-hour Precipitation	P_1 =	1.01	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.48	
Inflow Peak Runoff	Qp-in =	33.13	cfs
Allowable Peak Outflow Rate	Qp-out =	**12.39**	cfs
Mod. FAA Minor Storage Volume =		35,195	**cubic feet**
Mod. FAA Minor Storage Volume =		**0.808**	**acre-ft**

1 <- Enter Rainfall Duration Incremental Increase Value Here (e.g. 5 for 5-Minutes)

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume acre-feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume acre-feet (output)	Storage Volume acre-feet (output)
0	0.00	0.000	0.00	0.00	0.000	0.000
1	4.37	0.108	1.00	12.39	0.017	0.091
2	4.08	0.202	1.00	12.39	0.034	0.168
3	3.83	0.285	1.00	12.39	0.051	0.233
4	3.62	0.358	1.00	12.39	0.068	0.290
5	3.43	0.424	1.00	12.39	0.085	0.339
6	3.26	0.484	1.00	12.39	0.102	0.381
7	3.10	0.538	1.00	12.39	0.119	0.418
8	2.97	0.588	1.00	12.39	0.137	0.451
9	2.84	0.634	1.00	12.39	0.154	0.480
10	2.73	0.676	1.00	12.39	0.171	0.506
11	2.63	0.716	1.00	12.39	0.188	0.528
12	2.54	0.753	1.00	12.39	0.205	0.548
13	2.45	0.788	1.00	12.39	0.222	0.566
14	2.37	0.821	1.00	12.39	0.239	0.582
15	2.29	0.851	1.00	12.39	0.256	0.595
16	2.22	0.881	1.00	12.39	0.273	0.607
17	2.16	0.908	1.00	12.39	0.290	0.618
18	2.10	0.935	1.00	12.39	0.307	0.627
19	2.04	0.960	1.00	12.39	0.324	0.635
20	1.99	0.984	1.00	12.39	0.341	0.642
21	1.94	1.007	1.00	12.39	0.358	0.648
22	1.89	1.028	1.00	12.39	0.376	0.653
23	1.84	1.050	1.00	12.39	0.393	0.657
24	1.80	1.070	0.98	12.13	0.401	0.669
25	1.76	1.089	0.96	11.90	0.410	0.680
26	1.72	1.108	0.94	11.68	0.418	0.690
27	1.68	1.126	0.93	11.47	0.427	0.699
28	1.65	1.144	0.91	11.29	0.435	0.708
29	1.62	1.160	0.90	11.11	0.444	0.717
30	1.58	1.177	0.88	10.95	0.452	0.724
31	1.55	1.193	0.87	10.79	0.461	0.732
32	1.53	1.208	0.86	10.65	0.469	0.739
33	1.50	1.223	0.85	10.51	0.478	0.745
34	1.47	1.237	0.84	10.39	0.486	0.751
35	1.44	1.252	0.83	10.27	0.495	0.757
36	1.42	1.265	0.82	10.16	0.504	0.762
37	1.40	1.279	0.81	10.05	0.512	0.767
38	1.37	1.292	0.80	9.95	0.521	0.771
39	1.35	1.304	0.79	9.85	0.529	0.775
40	1.33	1.317	0.79	9.76	0.538	0.779
41	1.31	1.329	0.78	9.67	0.546	0.783
42	1.29	1.341	0.77	9.59	0.555	0.786
43	1.27	1.352	0.77	9.51	0.563	0.789
44	1.25	1.363	0.76	9.44	0.572	0.791
45	1.23	1.374	0.76	9.36	0.580	0.794
46	1.22	1.385	0.75	9.29	0.589	0.796
47	1.20	1.396	0.74	9.23	0.597	0.798
48	1.18	1.406	0.74	9.17	0.606	0.800
49	1.17	1.416	0.73	9.10	0.615	0.802
50	1.15	1.426	0.73	9.05	0.623	0.803
51	1.14	1.436	0.73	8.99	0.632	0.804
52	1.12	1.445	0.72	8.94	0.640	0.805
53	1.11	1.455	0.72	8.89	0.649	0.806
54	1.10	1.464	0.71	8.84	0.657	0.807
55	1.08	1.473	0.71	8.79	0.666	0.807
56	1.07	1.482	0.71	8.74	0.674	0.808
57	1.06	1.491	0.70	8.70	0.683	0.808
58	1.04	1.499	0.70	8.65	0.691	0.808
59	1.03	1.508	0.69	8.61	0.700	0.808
60	1.02	1.516	0.69	8.57	0.708	0.808

Mod. FAA Minor Storage Volume (cubic ft.) = 35,195

Mod. FAA Minor Storage Volume (acre-ft.) = 0.8080

Determination of MAJOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	55.00	percent
Catchment Drainage Area	A =	37.440	acres
Predevelopment NRCS Soil Group	Type =	D	A, B, C, or D
Return Period for Detention Control	T =	100	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	23	minutes
Allowable Unit Release Rate	q =	0.80	cfs/acre
One-hour Precipitation	P_1 =	1.64	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.62	
Inflow Peak Runoff	Qp-in =	69.48	cfs
Allowable Peak Outflow Rate	Qp-out =	**29.91**	cfs
Mod. FAA Major Storage Volume =		64,777	**cubic feet**
Mod. FAA Major Storage Volume =		**1.487**	**acre-ft**

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume acre-feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume acre-feet (output)	Storage Volume acre-feet (output)
0	0.00	0.000	0.00	0.00	0.000	0.000
1	7.10	0.227	1.00	29.91	0.041	0.186
2	6.63	0.424	1.00	29.91	0.082	0.342
3	6.22	0.597	1.00	29.91	0.124	0.473
4	5.87	0.751	1.00	29.91	0.165	0.586
5	5.56	0.889	1.00	29.91	0.206	0.683
6	5.29	1.014	1.00	29.91	0.247	0.767
7	5.04	1.128	1.00	29.91	0.288	0.840
8	4.82	1.233	1.00	29.91	0.330	0.903
9	4.62	1.329	1.00	29.91	0.371	0.958
10	4.44	1.419	1.00	29.91	0.412	1.007
11	4.27	1.502	1.00	29.91	0.453	1.049
12	4.12	1.579	1.00	29.91	0.494	1.085
13	3.98	1.652	1.00	29.91	0.536	1.117
14	3.84	1.721	1.00	29.91	0.577	1.144
15	3.72	1.786	1.00	29.91	0.618	1.168
16	3.61	1.847	1.00	29.91	0.659	1.188
17	3.50	1.905	1.00	29.91	0.700	1.204
18	3.41	1.960	1.00	29.91	0.742	1.218
19	3.31	2.013	1.00	29.91	0.783	1.230
20	3.23	2.063	1.00	29.91	0.824	1.239
21	3.14	2.111	1.00	29.91	0.865	1.246
22	3.07	2.157	1.00	29.91	0.907	1.251
23	2.99	2.201	1.00	29.91	0.948	1.253
24	2.92	2.244	0.98	29.29	0.968	1.275
25	2.86	2.284	0.96	28.72	0.989	1.296
26	2.80	2.324	0.94	28.19	1.010	1.314
27	2.74	2.362	0.93	27.70	1.030	1.332
28	2.68	2.398	0.91	27.24	1.051	1.348
29	2.62	2.434	0.90	26.82	1.071	1.363
30	2.57	2.468	0.88	26.42	1.092	1.376
31	2.52	2.501	0.87	26.05	1.113	1.389
32	2.48	2.534	0.86	25.71	1.133	1.401
33	2.43	2.565	0.85	25.38	1.154	1.411
34	2.39	2.595	0.84	25.08	1.174	1.421
35	2.35	2.625	0.83	24.79	1.195	1.430
36	2.31	2.654	0.82	24.51	1.216	1.438
37	2.27	2.682	0.81	24.26	1.236	1.446
38	2.23	2.709	0.80	24.01	1.257	1.452
39	2.19	2.736	0.79	23.78	1.277	1.458
40	2.16	2.762	0.79	23.56	1.298	1.464
41	2.13	2.787	0.78	23.35	1.319	1.468
42	2.09	2.812	0.77	23.15	1.339	1.472
43	2.06	2.836	0.77	22.96	1.360	1.476
44	2.03	2.859	0.76	22.78	1.380	1.479
45	2.00	2.882	0.76	22.60	1.401	1.482
46	1.98	2.905	0.75	22.44	1.422	1.484
47	1.95	2.927	0.74	22.28	1.442	1.485
48	1.92	2.949	0.74	22.12	1.463	1.486
49	1.90	2.970	0.73	21.98	1.483	1.487
50	1.87	2.991	0.73	21.84	1.504	1.487
51	1.85	3.011	0.73	21.70	1.525	1.487
52	1.82	3.032	0.72	21.57	1.545	1.486
53	1.80	3.051	0.72	21.45	1.566	1.485
54	1.78	3.071	0.71	21.33	1.586	1.484
55	1.76	3.090	0.71	21.21	1.607	1.483
56	1.74	3.108	0.71	21.10	1.628	1.481
57	1.72	3.127	0.70	20.99	1.648	1.478
58	1.70	3.145	0.70	20.89	1.669	1.476
59	1.68	3.162	0.69	20.79	1.689	1.473
60	1.66	3.180	0.69	20.69	1.710	1.470

Mod. FAA Major Storage Volume (cubic ft.) = 64,777

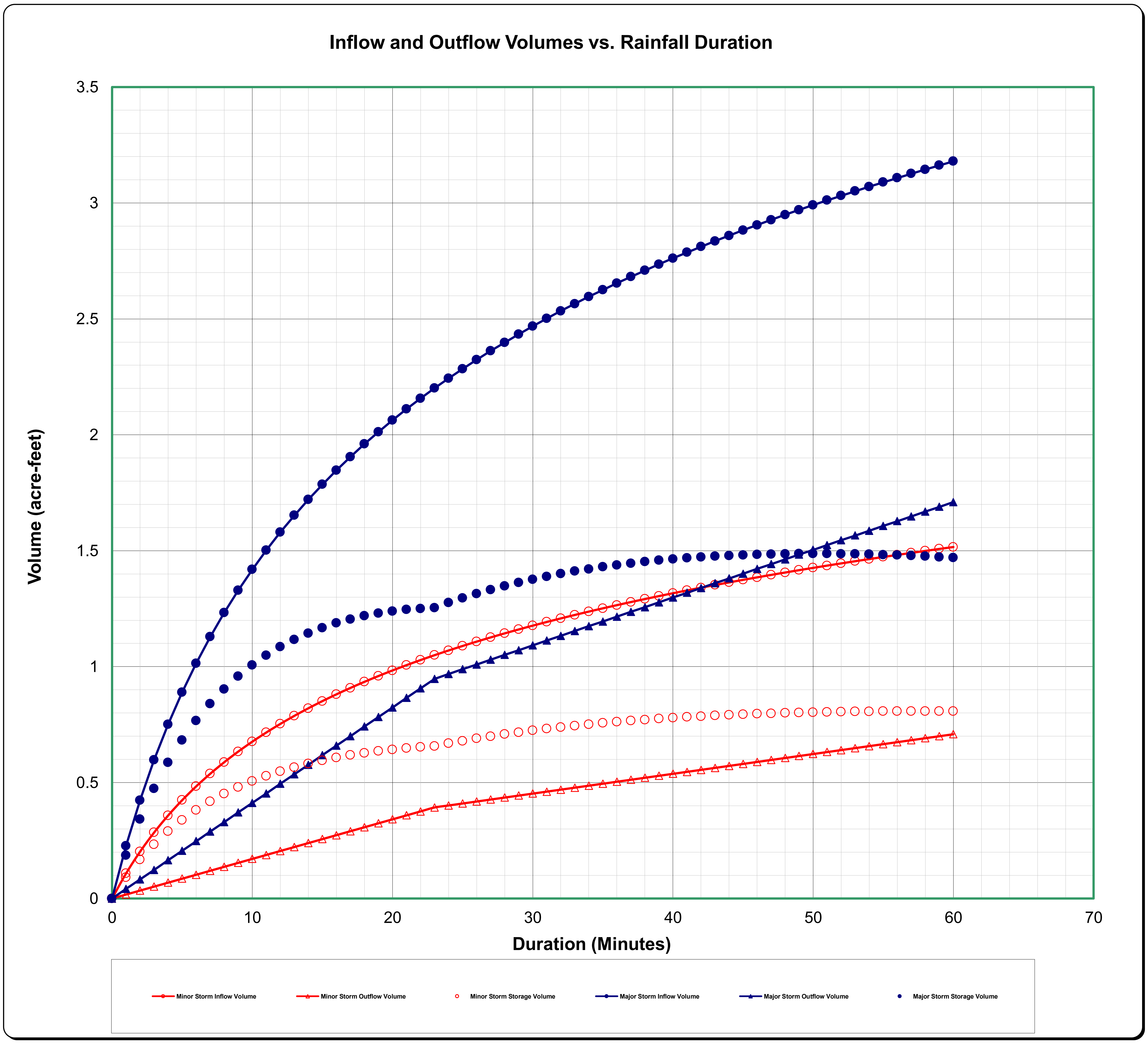
Mod. FAA Major Storage Volume (acre-ft.) = 1.4871

UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.35, Released January 2015

DETENTION VOLUME BY THE MODIFIED FAA METHOD

Project: Grand Park - West Mountain

Basin ID: Pond B



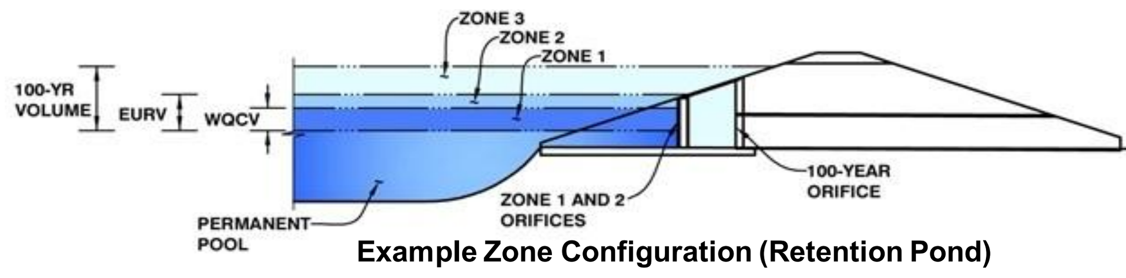
UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.35, Released January 2015

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: **Grand Park - Filing 1**

Basin ID: **Pond B**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	**EDB**	
Watershed Area =	37.44	acres
Watershed Length =	3,250	ft
Watershed Length to Centroid =	1,640	ft
Watershed Slope =	0.043	ft/ft
Watershed Imperviousness =	55.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	49.0%	percent
Percentage Hydrologic Soil Groups C/D =	51.0%	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) =	0.688	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	2.088	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.56 in.) =	0.780	acre-feet	0.56	inches
5-yr Runoff Volume (P1 = 0.88 in.) =	1.381	acre-feet	0.88	inches
10-yr Runoff Volume (P1 = 1.01 in.) =	1.644	acre-feet	1.01	inches
25-yr Runoff Volume (P1 = 1.08 in.) =	1.918	acre-feet	1.08	inches
50-yr Runoff Volume (P1 = 1.26 in.) =	2.449	acre-feet	1.26	inches
100-yr Runoff Volume (P1 = 1.64 in.) =	3.712	acre-feet	1.64	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	8.576	acre-feet		inches
Approximate 2-yr Detention Volume =	0.808	acre-feet		
Approximate 5-yr Detention Volume =	1.422	acre-feet		
Approximate 10-yr Detention Volume =	1.703	acre-feet		
Approximate 25-yr Detention Volume =	1.723	acre-feet		
Approximate 50-yr Detention Volume =	1.856	acre-feet		
Approximate 100-yr Detention Volume =	2.399	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.688	acre-feet
Zone 2 Volume (User Defined - Zone 1) =	0.120	acre-feet
Zone 3 Volume (User Defined - Zones 1 & 2) =	1.487	acre-feet
Total Detention Basin Volume =	2.295	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

Total detention volume is less than 100-year volume.

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	--	--	--	9,450	0.217		
8787	--	1.00	--	--	--	10,960	0.252	10,205	0.234
8788	--	2.00	--	--	--	12,541	0.288	21,955	0.504
8789	--	3.00	--	--	--	14,203	0.326	35,327	0.811
8790	--	4.00	--	--	--	15,947	0.366	50,402	1.157
8791	--	5.00	--	--	--	17,773	0.408	67,262	1.544
8792	--	6.00	--	--	--	18,000	0.413	85,149	1.955
8793	--	7.00	--	--	--	19,000	0.436	103,649	2.379
8794	--	8.00	--	--	--	23,758	0.545	125,028	2.870
8795	--	9.00	--	--	--	25,950	0.596	149,882	3.441
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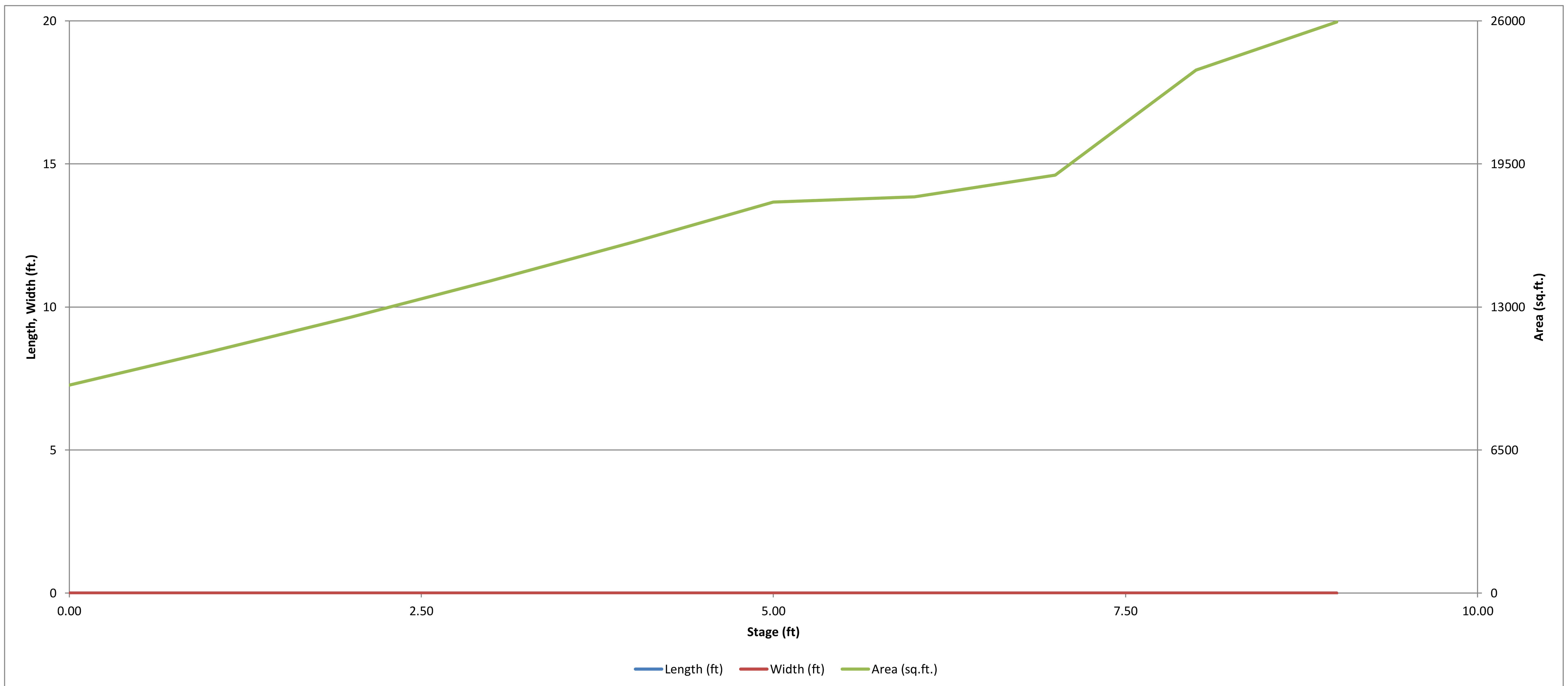
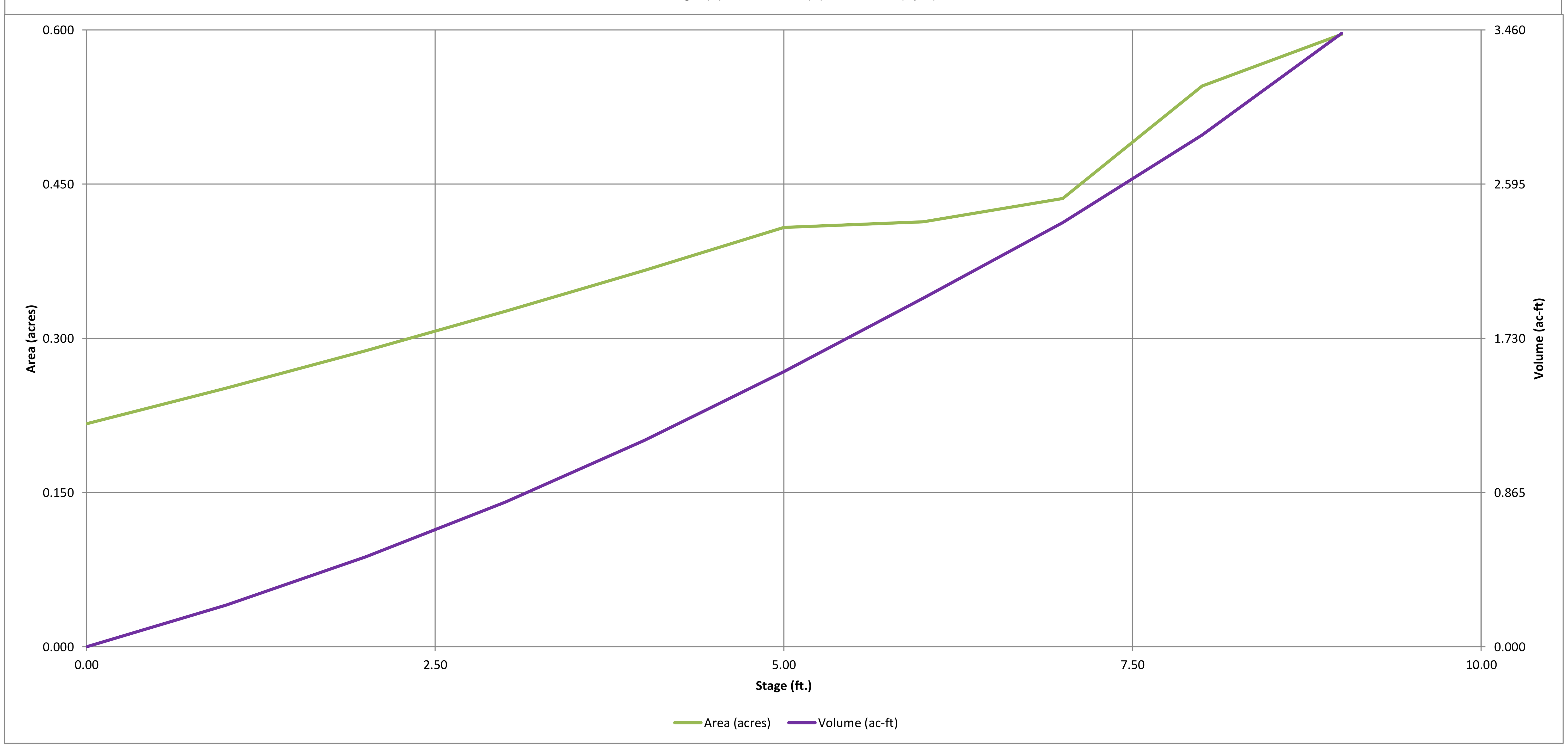
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



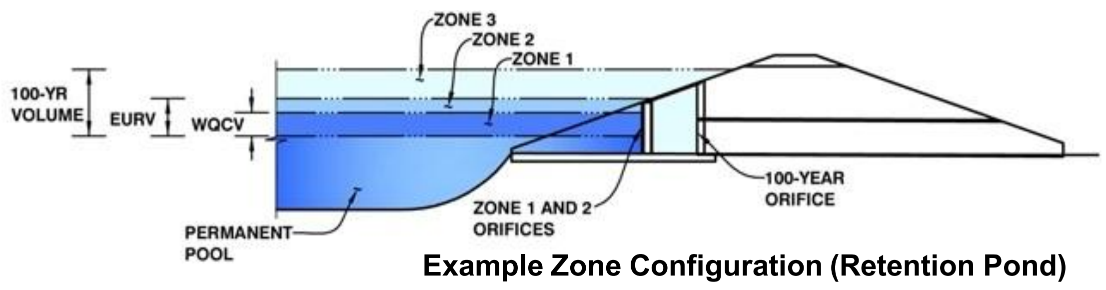


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Project: **Grand Park - Filing 1**

Basin ID: **Pond B**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.62	0.688	Orifice Plate
Zone 2 (User)	2.99	0.120	Orifice Plate
Zone 3 (User)	6.81	1.487	Weir&Pipe (Restrict)
Total (all zones)		2.295	

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

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

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

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

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	2.62	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	12.00	inches
Orifice Plate: Orifice Area per Row =	4.90	sq. inches (use rectangular openings)

Calculated Parameters for Plate

WQ Orifice Area per Row =	3.403E-02	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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	1.00	2.00					
Orifice Area (sq. inches)	4.90	4.90	4.90					

	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)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

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	
Overflow Weir Front Edge Height, Ho =	5.25	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	5.25	N/A	feet
Overflow Weir Slope Length =	4.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	6.30	N/A	
Overflow Grate Open Area w/o Debris =	11.14	N/A	ft^2
Overflow Grate Open Area w/ Debris =	5.57	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	18.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	1.77	N/A	ft^2
Outlet Orifice Centroid =	0.75	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.82	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	10.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	1.09	feet
Stage at Top of Freeboard =	8.91	feet
Basin Area at Top of Freeboard =	0.59	acres
Basin Volume at Top of Freeboard =	3.39	acre-ft

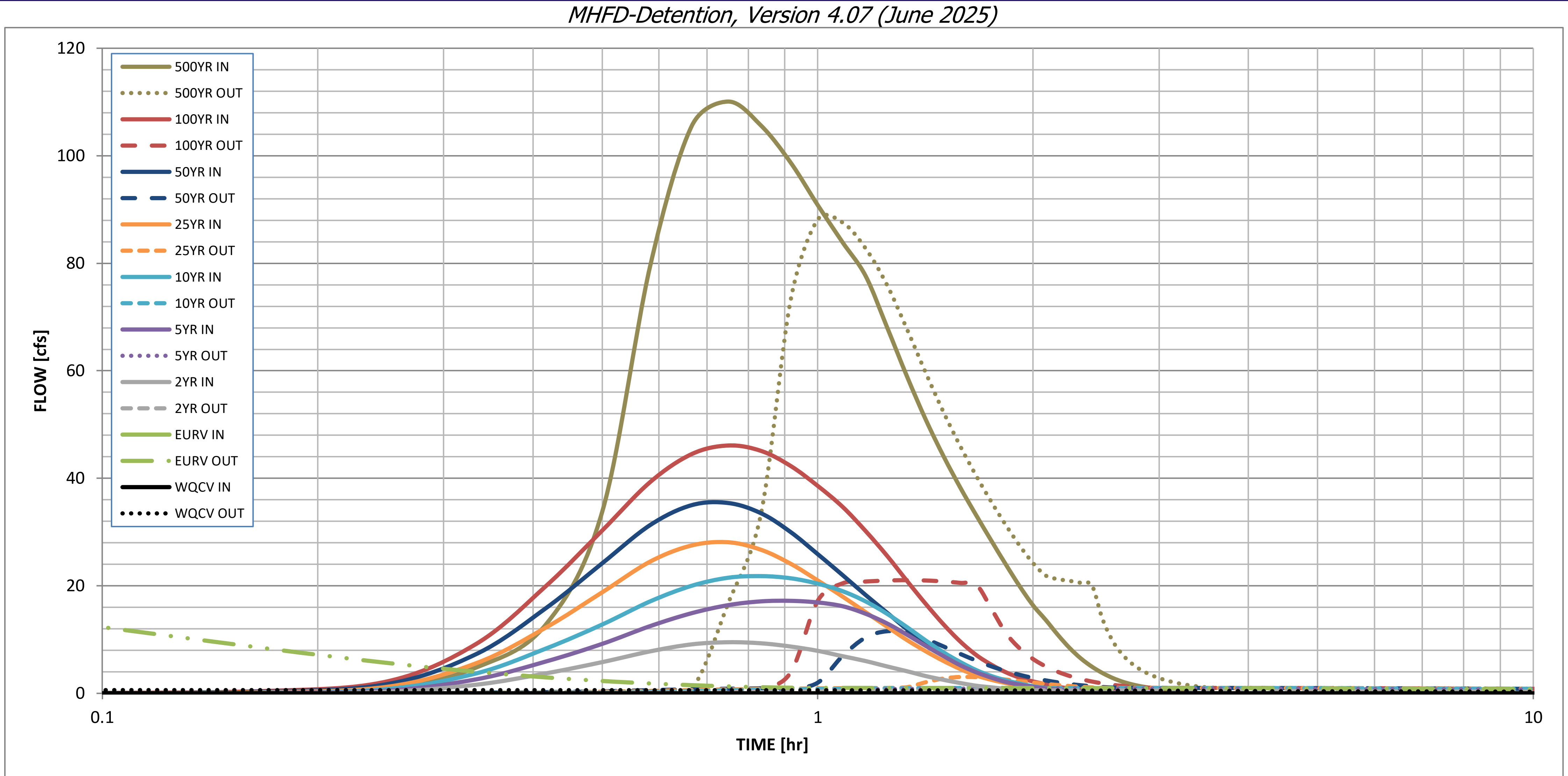
Routed Hydrograph Results

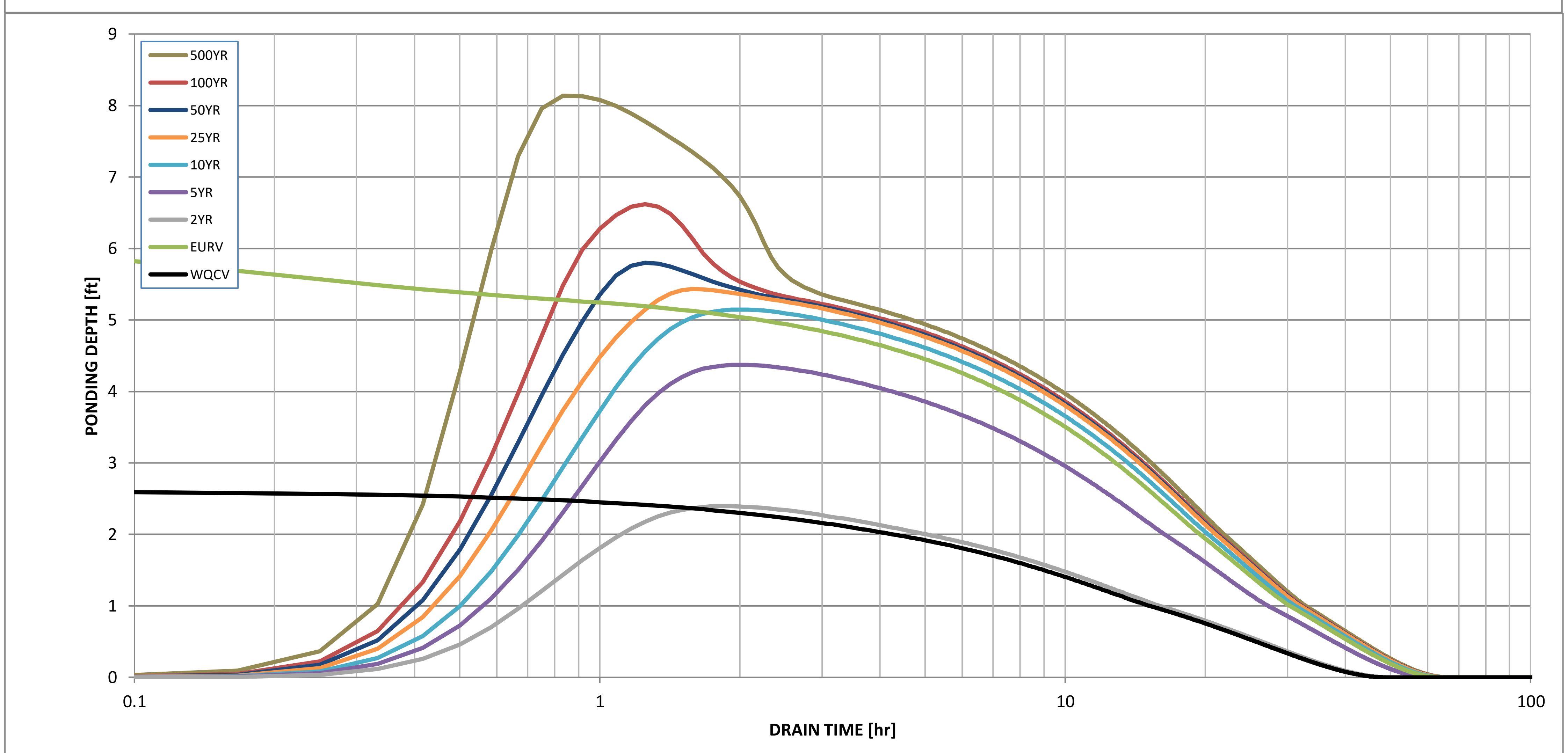
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

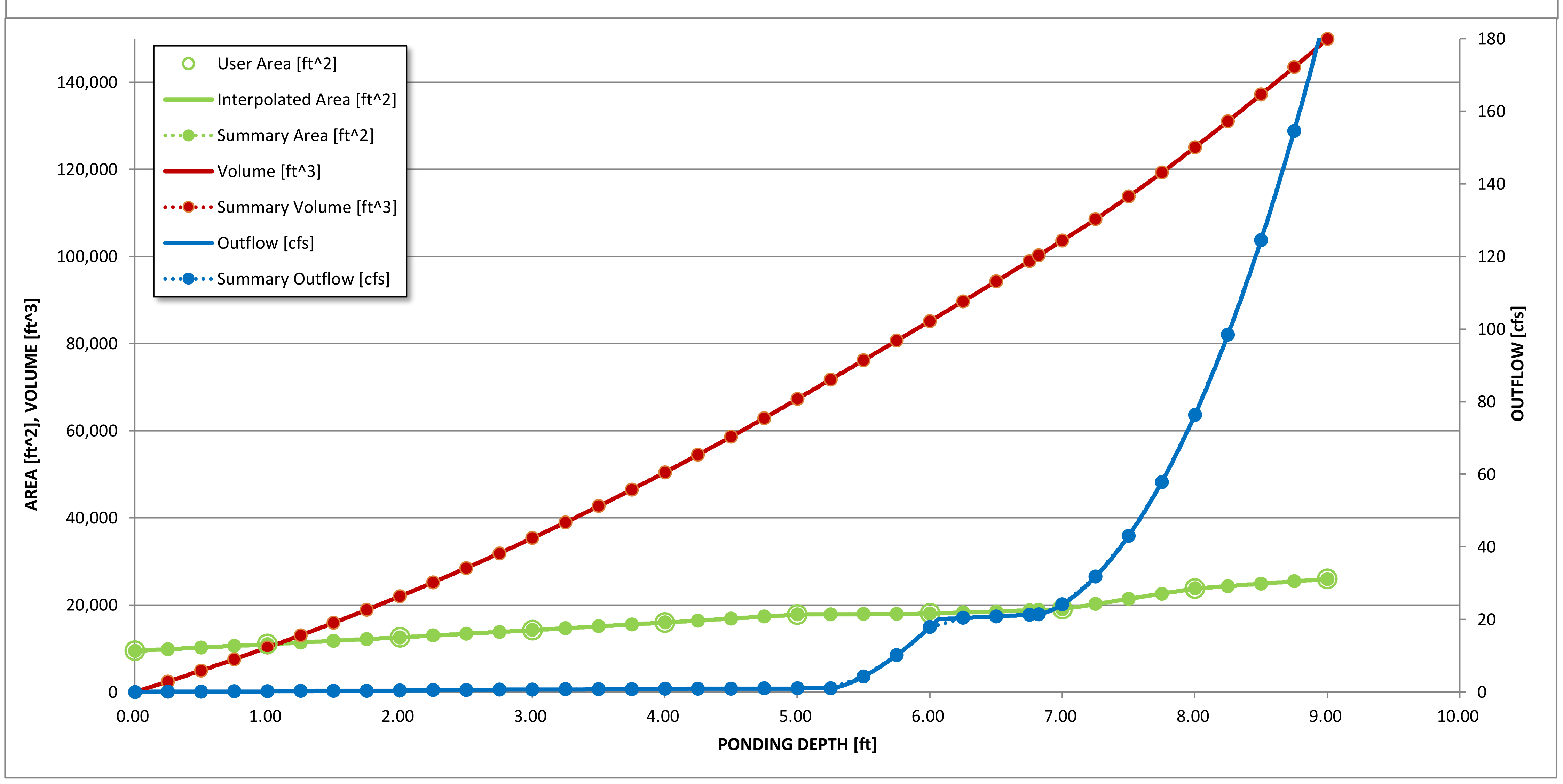
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.56	0.88	1.01	1.08	1.26	1.64	3.14
CUHP Runoff Volume (acre-ft) =	0.688	2.088	0.780	1.381	1.644	1.918	2.449	3.712	8.576
User Override Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.680	1.408	1.730	1.906	2.379	3.417	8.576
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	0.7	0.9	3.4	7.6	17.6	53.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A	4.3	9.6	12.4	16.4	21.8	29.9	
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.11	0.26	0.33	0.44	0.58	0.80	1.44
Peak Inflow Q (cfs) =	N/A	N/A	9.5	17.2	21.8	28.1	35.4	46.1	110.1
Peak Outflow Q (cfs) =	0.6	20.2	0.6	0.9	1.0	3.0	11.5	21.0	88.1
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.1	0.2	0.5	0.7	1.6
Structure Controlling Flow =	Plate	Outlet Plate 1	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	1.74	N/A	N/A	N/A	0.2	0.9	1.8	2.0
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) =	39	47	40	47	49	49	47	44	32
Time to Drain 99% of Inflow Volume (hours) =	**43**	54	44	53	56	56	55	53	46
Maximum Ponding Depth (ft) =	2.62	6.32	2.40	4.37	5.15	5.43	5.80	6.62	8.14
Area at Maximum Ponding Depth (acres) =	0.31	0.42	0.30	0.38	0.41	0.41	0.41	0.43	0.55
Maximum Volume Stored (acre-ft) =	0.690	2.088	0.619	1.295	1.601	1.720	1.868	2.211	2.942

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	USER	USER	USER	USER	USER	USER	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0	0.00	0.00	0.10	0.10	0.20	0.30	0.40	0.71
	0:15:00	0	0.00	0.30	0.50	0.80	1.20	1.70	2.20	4.81
	0:20:00	0	0.00	1.60	2.60	3.70	5.60	7.30	9.20	12.74
	0:25:00	0	0.00	3.70	5.90	8.30	12.20	15.80	19.90	33.82
	0:30:00	0	0.00	5.80	9.20	12.80	18.80	24.20	30.30	79.50
	0:35:00	0	0.00	7.80	12.50	17.10	24.50	31.30	39.30	105.52
	0:40:00	0	0.00	9.10	14.90	20.00	27.50	35.00	44.50	110.09
	0:45:00	0	0.00	9.50	16.40	21.50	28.10	35.40	46.10	105.63
	0:50:00	0	0.00	9.30	17.10	21.80	26.70	33.50	45.10	98.75
	0:55:00	0	0.00	8.70	17.20	21.40	24.10	30.00	42.30	90.85
	1:00:00	0	0.00	7.90	16.90	20.40	21.00	25.90	38.60	83.92
	1:05:00	0	0.00	6.90	16.20	19.00	18.00	22.00	34.70	77.67
	1:10:00	0	0.00	6.00	14.80	17.10	15.10	18.30	30.20	68.14
	1:15:00	0	0.00	5.00	13.00	14.80	12.40	15.00	25.60	58.94
	1:20:00	0	0.00	4.10	10.90	12.30	9.90	11.90	20.90	50.87
	1:25:00	0	0.00	3.20	8.80	9.80	7.80	9.30	16.60	44.08
	1:30:00	0	0.00	2.50	6.90	7.60	6.00	7.20	12.80	38.22
	1:35:00	0	0.00	1.90	5.20	5.80	4.50	5.40	9.60	33.07
	1:40:00	0	0.00	1.40	3.90	4.30	3.30	4.00	7.10	28.33
	1:45:00	0	0.00	1.10	2.90	3.20	2.50	3.00	5.30	23.92
	1:50:00	0	0.00	0.80	2.10	2.40	1.90	2.20	3.90	19.88
	1:55:00	0	0.00	0.60	1.60	1.80	1.40	1.70	2.90	16.37
	2:00:00	0	0.00	0.40	1.20	1.30	1.10	1.30	2.20	13.65
	2:05:00	0	0.00	0.30	0.90	1.00	0.80	1.00	1.70	10.87
	2:10:00	0	0.00	0.30	0.70	0.80	0.60	0.70	1.20	8.43
	2:15:00	0	0.00	0.20	0.50	0.60	0.40	0.50	0.90	6.47
	2:20:00	0	0.00	0.10	0.40	0.40	0.30	0.40	0.70	4.96
	2:25:00	0	0.00	0.10	0.30	0.30	0.20	0.30	0.50	3.78
	2:30:00	0	0.00	0.10	0.20	0.20	0.20	0.20	0.40	2.86
	2:35:00	0	0.00	0.10	0.20	0.20	0.10	0.20	0.30	2.16
	2:40:00	0	0.00	0.00	0.10	0.10	0.10	0.10	0.20	1.66
	2:45:00	0	0.00	0.00	0.10	0.10	0.10	0.10	0.20	1.29
	2:50:00	0	0.00	0.00	0.10	0.10	0.10	0.10	0.10	1.02
	2:55:00	0	0.00	0.00	0.10	0.10	0.00	0.10	0.10	0.79
	3:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.58
	3:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
	3:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
	3:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
	3:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
	3:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	3:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

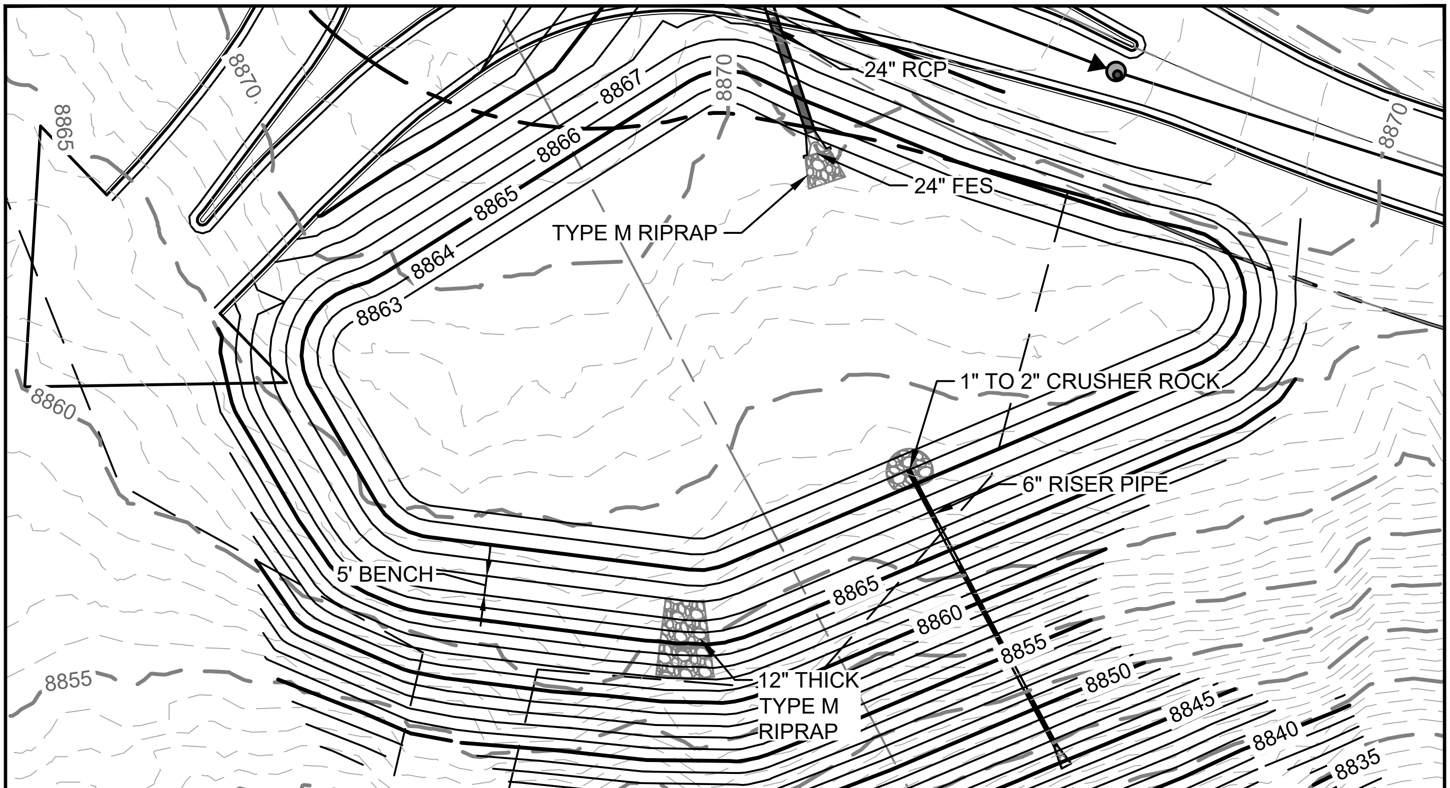
Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Elevation [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
Orifice 1	0.00	8786.00	9450	0.217	0	0.000	0.00
	0.25	8786.25	9828	0.226	2410	0.055	0.08
	0.50	8786.50	10205	0.234	4914	0.113	0.12
	0.75	8786.75	10583	0.243	7512	0.172	0.14
Orifice 2	1.00	8787.00	10960	0.252	10205	0.234	0.16
	1.25	8787.25	11355	0.261	12994	0.298	0.27
	1.50	8787.50	11751	0.270	15883	0.365	0.32
	1.75	8787.75	12146	0.279	18870	0.433	0.36
Orifice 3	2.00	8788.00	12541	0.288	21955	0.504	0.40
	2.25	8788.25	12957	0.297	25143	0.577	0.51
	2.50	8788.50	13372	0.307	28434	0.653	0.58
	2.75	8788.75	13788	0.317	31829	0.731	0.63
	3.00	8789.00	14203	0.326	35327	0.811	0.68
	3.25	8789.25	14639	0.336	38933	0.894	0.72
	3.50	8789.50	15075	0.346	42647	0.979	0.77
	3.75	8789.75	15511	0.356	46470	1.067	0.81
	4.00	8790.00	15947	0.366	50402	1.157	0.84
	4.25	8790.25	16403	0.377	54446	1.250	0.88
	4.50	8790.50	16860	0.387	58604	1.345	0.91
	4.75	8790.75	17316	0.398	62876	1.443	0.95
	5.00	8791.00	17773	0.408	67262	1.544	0.98
Overflow Weir Rim Elevation	5.25	8791.25	17830	0.409	71713	1.646	1.01
	5.50	8791.50	17887	0.411	76177	1.749	4.26
	5.75	8791.75	17943	0.412	80656	1.852	10.18
	6.00	8792.00	18000	0.413	85149	1.955	17.84
	6.25	8792.25	18250	0.419	89680	2.059	20.40
	6.50	8792.50	18500	0.425	94274	2.164	20.84
	6.75	8792.75	18750	0.430	98930	2.271	21.27
Spillway Invert	6.82	8792.82	18820	0.432	100245	2.301	21.39
	7.00	8793.00	19000	0.436	103649	2.379	24.12
	7.25	8793.25	20189	0.463	108548	2.492	31.73
	7.50	8793.50	21379	0.491	113744	2.611	42.99
	7.75	8793.75	22568	0.518	119237	2.737	57.82
	8.00	8794.00	23758	0.545	125028	2.870	76.28
	8.25	8794.25	24306	0.558	131036	3.008	98.46
	8.50	8794.50	24854	0.571	137181	3.149	124.51
	8.75	8794.75	25402	0.583	143463	3.293	154.55
	9.00	8795.00	25950	0.596	149882	3.441	188.73

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).



TEMP SED POND VOLUME CALCULATION PER MHFD DETAIL SC-7

Basins	Developed?	Area (AC)	Imperviousness	Additional Volume per Table SB-1 (CF/AC)	Volume Req. (CF)
C	Y	1.71	16.9%	1230	2103
C1	Y	2.92	39.1%	2030	5928
C2	Y	7.57	36.8%	2030	15367
Total Developed Area		12.2	-	3600	43920
				TOTAL REQUIRED VOLUME	67318

STAGE STORAGE TABLE

ELEV	AREA (sq. ft.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
8,863.00	15,310.80	N/A	N/A	0.00	N/A	0.00
8,864.00	17,546.28	1.00	16428.54	16428.54	16415.85	16415.85
8,865.00	19,887.36	1.00	18716.82	35145.36	18704.61	35120.46
8,866.00	22,334.08	1.00	21110.72	56256.09	21098.90	56219.36
8,867.00	24,886.35	1.00	23610.22	79866.30	23598.71	79818.07

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

WEST MOUNTAIN
FILING 1
TEMP SED POND EXHIBIT

TOWN OF FRASER DATE: 2025-12-01

0 50'
1" = 50'

N

12/1/2025 4:35 PM ; X:\GRAND PARK\DOCUMENTS\REPORTS\DRAINAGE\16.1 - FILING 1 - 8WB, 9W, 10W, 11W\PHASE 2\C - POND & WQ CALCS\TEMP SEDIMENT POND EXHIBIT.DWG;

Project Name: West Mountain - Filing 1 - Proposed
Prepared By: JNS

Temporary Sediment Basin - Pond C - Riser Pipe Stage-Storage Discharge Calculations

Pond C - Pond Volume Calculations							Cicular Orifice 1		Cicular Orifice 2		Cicular Orifice 3		Cicular Orifice 4		Cicular Orifice 5		Riser Pipe Opening		Spillway		Total Flow
							Cd =	0.6	Cd =	0.6	Cd =	0.6	Cd =	0.6	Cd =	0.6	Cd =	0.6			
							Diameter (in) =	1.5	Diameter (in) =	1.5	Diameter (in) =	1.5	Diameter (in) =	1.5	Diameter (in) =	1.5	Diameter (in) =	8			
							CL =	8870.62	CL =	8870.95	CL =	8871.28	CL =	8871.61	CL =	8871.94	CL =	8872.00	Cbcw =	3	
							FL =	8870.58	FL =	8870.91	FL =	8871.24	FL =	8871.57	FL =	8871.9	FL =	8872	Z =	3	
Elev	Notes	Area		Volume			A(sf) =	0.00616	A(sf) =	0.00616	A(sf) =	0.00616	A(sf) =	0.00616	A(sf) =	0.00616	A(sf) =	0.196349541	Invert =	8872	
				Incr.	Total	Total	H	Q	H	Q	H	Q	H	Q	H	Q	H	Q	H	Q	Q
		[SF]	[AC]	[CF]	[CF]	[AC-FT]	(ft)	(cfs)	(ft)	(cfs)	(ft)	(cfs)	(ft)	(cfs)	(ft)	(cfs)	(ft)	(cfs)	(ft)	(cfs)	(cfs)
8869.00		12764	0.2930	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8869.25		13315	0.3057	3260	3260	0.0748	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8869.50		13865	0.3183	3398	6657	0.1528	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8869.75		14416	0.3309	3535	10193	0.2340	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8870.00		14966	0.3436	3673	13865	0.3183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8870.25		15542	0.3568	3814	17679	0.4058	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8870.50		16117	0.3700	3957	21636	0.4967	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8870.58	Orifice 1	16301	0.3742	1297	22933	0.5265	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8870.75		16693	0.3832	2804	25737	0.5908	0.13	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
8870.91	Orifice 2	17061	0.3917	2700	28438	0.6528	0.29	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
8871.00		17268	0.3964	1545	29982	0.6883	0.38	0.02	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
8871.24	Orifice 3	17844	0.4096	4213	34196	0.7850	0.62	0.02	0.29	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
8871.25		17869	0.4102	179	34374	0.7891	0.63	0.02	0.30	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
8871.50		18469	0.4240	4542	38917	0.8934	0.88	0.03	0.55	0.02	0.22	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
8871.57	Orifice 4	18637	0.4278	1299	40215	0.9232	0.95	0.03	0.62	0.02	0.29	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
8871.75		19070	0.4378	3394	43609	1.0011	1.13	0.03	0.80	0.03	0.47	0.02	0.14	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.09
8871.90	Orifice 5	19430	0.4461	2887	46497	1.0674	1.28	0.03	0.95	0.03	0.62	0.02	0.29	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.10
8872.00	Riser Pipe Opening/Spillway Invert	19670	0.4516	1955	48452	1.1123	1.38	0.03	1.05	0.03	0.72	0.03	0.39	0.02	0.06	0.01	0.00	0.00	0.00	0.00	0.12
8872.25		20296	0.4659	4996	53447	1.2270	1.63	0.04	1.30	0.03	0.97	0.03	0.64	0.02	0.31	0.02	0.25	0.47	0.25	0.11	0.73
8872.50		20921	0.4803	5152	58599	1.3453	1.88	0.04	1.55	0.04	1.22	0.03	0.89	0.03	0.56	0.02	0.50	0.67	0.50	0.64	1.47
8872.75		21547	0.4947	5309	63908	1.4671	2.13	0.04	1.80	0.04	1.47	0.04	1.14	0.03	0.81	0.03	0.75	0.82	0.75	1.75	2.75
8873.00		22173	0.5090	5465	69372.93	1.5926	2.38	0.05	2.05	0.04	1.72	0.04	1.39	0.03	1.06	0.03	1.00	0.95	1.00	3.60	4.74

APPENDIX D
REFERENCES

Storm Drainage Master Plan for Grand Park by High Country Engineering, Inc. Dated February 17, 2006.

A Pragmatic Slope-Adjusted Curve Number Model to Reduce Uncertainty in Predicting Flood Runoff from Steep Watersheds. Ajmal, Wassem, Kim, & Kim. 2020.

Sediment Basin Details from MHFD's *Urban Storm Drainage Criteria Manual vol. 3*, 2010 (Revised March 2024), pp. 486-492.

Excerpt from High Country Engineering Final
Drainage Report for Town Center at Grand Park

An Employee Owned Company

EXCERPTS FROM

STORM DRAINAGE
MASTER PLAN

FOR

GRAND PARK

FRASER, COLORADO

October 10, 2005
Revised February 17, 2006

PREPARED FOR:

Cornerstone Winter Park Holdings, LLC

HCE JOB NO. 2052014.00

Prepared by:

Leslie A. Hope

Leslie A. Hope, P.E.
High Country Engineering, Inc.
14 Inverness Drive East, Suite F-120
Englewood, CO 80112

COLORADO REGISTERED PROFESSIONAL ENGINEER
LESLIE ANN HOPE
32981
2/17/06

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

TABLE OF CONTENTS

SECTION PAGE

LIST OF FIGURES

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

1.0 EXECUTIVE SUMMARY

The "Grand Park Storm Drainage Master Plan" was prepared for Cornerstone Winterpark Holdings LLC. The purpose of this report is to identify regional drainage facilities required to safely convey the developed storm events, up to the 100 year storm, to the historic receiving basins while improving the water quality of the developed flows prior to discharging to the receiving streams. These facilities will consist of regional detention ponds / water quality facilities to reduce the developed flow rates to historic rates and recommendations for proposed culverts and channels.

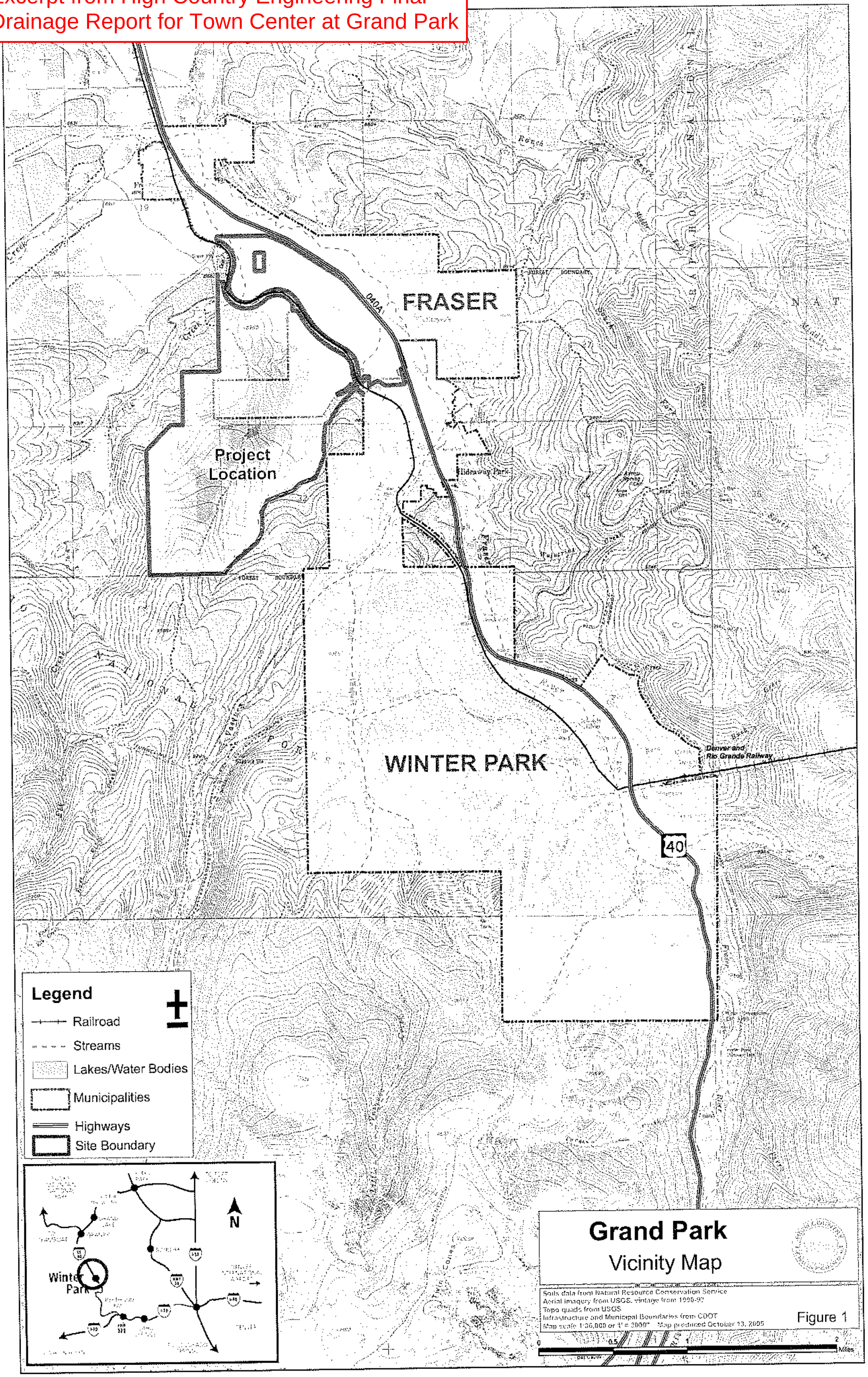
The results of this study are: identifying the historic and developed drainage basin boundaries, determining the respective 2 year and 100 year stormwater flow rates and volumes, determining sizing of the detention facilities to reduce the peak flow rates, and providing designs for water quality features to be incorporated in the regional facilities and proposed developments. Structural and non-structural water quality enhancement measures were incorporated based on the guidelines provided in the Urban Drainage Criteria Manual, Volume III.

The overall drainage of the Grand Park area has been divided into two major subareas: drainage to Elk Creek and drainage to Leland Creek; see Figure 1. The land generally flows from the south toward the Denver and Rio Grande Railroad and ultimate discharge to the Fraser River.

Under the existing conditions, the Denver and Rio Grande Railroad embankment attenuates stormwater flows prior to discharging to the Fraser Draw. There are three existing culverts located under the Denver and Rio Grande Railroad within the project limits: one on the east side for Elk Creek, one in the middle of the development for a no-name drainage way, and a third on the east side for Leland Creek. The Leland Creek and Fraser River are a part of a FEMA designated floodplain. This report does not address any potential FEMA CLOMR applications.

For proposed conditions, the existing culverts will be used to convey flows under the Railroad, from the regional detention ponds located south of the railroad to the plateau between US 40 and the Railroad. The plateau area contains wetland areas that will not be disturbed with the proposed development. At this time, no pipe borings under the railroad or US 40 are being proposed. Discharge from the development, in general, will be to the north toward the Fraser River. Conveyance of stormwater will be accommodated via a combination of storm drainage pipes, grass-lined swales, regional detention facilities, and potentially check dams and drop structures. Water quality enhancement features will be incorporated into the design of the swales and detention facilities. These facilities will be constructed to accommodate up to the 100 year developed flows.

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park



Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

2.0 INTRODUCTION

2.1 GENERAL

The Grand Park Storm Drainage Master Plan has been prepared to provide an overall guide to the management of stormwater associated with the proposed development of Grand Park and tributary drainage areas. This Master Plan is a dynamic document and should be revised periodically to reflect changes from conceptual to actual. The Master Drainage Plan presents the results of hydrologic and hydraulic analyses evaluating the effects of the proposed development on the historic runoff patterns, based on current available information. Grand County Storm Drainage Design Criteria and the Urban Drainage and Flood Control District criteria were utilized for the development of this report.

The Grand Park subdivision is located in Grand County, and is approximately 1,311-acres of land. Grand Park is located in Sections 20, 28, 29, 30, 31, 32, Township 1 South, Range 75 West of the Sixth Principal Meridian, Town of Fraser, Grand County, Colorado. The proposed development is a Planned Unit Development consisting of a wide range of single family, multi-family, commercial, lodging, and open space uses.

2.2 PURPOSE

The purpose of this study is to prepare a master drainage study for the Grand Park development area. The Master Plan includes:

1. Development and evaluation of the results of a hydrologic model for the basins.

2. Determine the sizes of major culverts, and detention structures.

3. Establish design criteria for water quality treatment and stormwater management.

2.3 MASTER PLAN – GENERAL

Due to the substantial size of Grand Park, long-term planning for the phased development of Grand Park is essential. Paramount to the planning is the phased development of the infrastructure necessary to serve Grand Park.

It was anticipated that the planning for infrastructure to service Grand Park would be done in three stages: 1. Master Plans, 2. Preliminary Plans, 3. Final Subdivision Platting.

1. Master Plans. The first stage of planning is to be comprised of the development and approval of the "Storm Drainage Master Plan" for Grand Park. The Master Plan is intended to serve as conceptual preliminary long-term planning and forecasting document, and may be updated, from time to time, as development actually occurs. It is anticipated that the Storm

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Drainage Master Plan would address the necessary regional storm drainage facilities for Grand Park.

2. Preliminary Plans. The second stage of planning is to consist of the development and approval of Preliminary Plans for the individual phases of Grand Park.

   In preparing Phased Preliminary Plans, if upstream development occurs prior to the construction of downstream storm drainage improvements, it is contemplated that the upstream property will cause to be constructed necessary downstream storm drainage improvements as reflected in this Storm Drainage Master Plan. As all property in Grand Park is developed, the property will be required to establish or set aside such land areas as may be necessary to accomplish upstream and downstream drainage and water quality mitigation, in general accordance with this Storm Drainage Master Plan.

   The precise boundaries of the basins are subject to modification as more accurate topographic information becomes available, or as the subject land is graded for final development. Lands located in one basin as reflected in the Proposed Drainage Basin Map (Figure 5) may be later graded to drain into a different basin, provided appropriate measures are taken to accommodate such modifications. The grading and basin utilization patterns of a particular parcel of land shall be set forth in the Phased Preliminary Plan(s) and Final plat(s) affecting the parcel of land.

   Each Phased Preliminary Plan shall set forth the development assumptions under which it was prepared (regarding land uses and densities) and will address: the impact of the development of the Phased Area on other Phase Areas already developed or approved; (2) the estimated timing of the improvements to be installed; and (3) phasing of improvements

3. Final Subdivision Platting. The third and final stage of planning is to be comprised of the development and approval of plats. The platting process shall be conducted consistent with the then-existing City ordinances, rules, regulations and guidelines for platting, amended, as appropriate, by any applicable Annexation Agreements affecting the land to be platted.

2.4 PROPOSED LAND USE

The land usage is outlined in the Grand Park Planned Unit Development Master Land Use Plan. A list of the land usage by area is presented in Table 1.

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Table 1. Master Plan Areas

Designation	Type	Density (Units per Acre)
1Wa	Multi-family Attached, Lodging Units, Commercial	7.6 units / acre
1Wb	Multi- Family Attached	6.8 units / acre
2W	Single Family, Multi-family Attached, Lodging Units, Commercial	7.6 units / acre
3Wa	Multi- Family Attached	13.1 units / acre
3Wb	Single Family, Multi-family Attached	4.7 units / acre
3Wc	Multi-family Attached, Commercial	5.2 units / acre
4W	Multi-family Attached, Commercial	9.3 units / acre
5W	Single Family, Multi-family Attached	4.5 units / acre
6W	Public Site	
7W	Single Family, Multi-family Attached	8.1 units / acre
8Wa	Single Family, Multi-family Attached	2.0 units / acre
8Wb	Multi- Family Attached	2.2 units / acre
9W	Single Family, Multi-family Attached, Lodging Units, Commercial	4.7 units / acre
10W	Single Family, Multi-family Attached, Lodging Units, Commercial	4.7 units / acre
11W	Single Family, Multi-family Attached, Lodging Units	2.6 units / acre
12W	Multi-family Attached, Lodging Units	3.5 units / acre
13Wa	Single family	1.4 units / acre
13Wb	Single family	0.6 units / acre
14W	Single family	1.5 units / acre
15W	Single family	0.5 units / acre
16W	Single family	1.0 units / acre
17W	Single family	0.5 units / acre
18W	Single family	2.5 units / acre
19W	Single Family, Multi-family Attached	3.1 units / acre
20W	Single Family, Multi-family Attached	2.1 units / acre
21W	Single Family, Multi-family Attached	5.1 units / acre

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3.0 HYDROLOGY / HYDRAULIC ANALYSIS

3.1 GENERAL

A hydrologic analysis was performed on the study area to define the peak runoff flows and volumes for the 2- and 100-year, 24 hour design storm frequencies. The peak flow information obtained from the analysis was used to evaluate existing drainage facilities, identify potential drainage problems, and to design drainage improvements.

The computer program HEC-HMS was used to determine runoff quantities for each basin. Runoff hydrographs were developed for each basin. The basin parameter required for HEC-HMS input include:

- Area,
- Flow length,
- Slope,
- Time of Concentration / Lag Time,
- Percent Impervious,
- Runoff coefficient
- Rainfall Hyetograph.

Appendix A provides the parameters used in the existing and proposed conditions in the HEC-HMS model.

3.2 DESIGN RAINFALL

Rainfall depths for each storm frequency were taken from the NOAA Atlas:

Table 2. Storm Duration Precipitation Depths

2 Year – 6 Hour	0.98 inch
2 Year – 24 Hour	1.32 inches
100 Year – 6 Hour	2.17 inches
100 Year – 24 Hour	2.98 inches

3.3 BASIN CHARACTERISTICS

The amount of impervious area within each basin was estimated for existing and future development conditions. These values are presented in Appendix A. Impervious percentages were calculated using values from Volume I of the Urban Drainage and Flood Control District Criteria Manual (2001). The soils types within the onsite and offsite drainage basins consist of:

Cowdrey Loam (15 – 45% slope)	Hydrologic Group: C
Cumilic Cryaquolis	Hydrologic Group: D

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Frisco Peeler Gravelly Sandy Loam (2 – 6%)	Hydrologic Group: B
Frisco Peeler Gravelly Sandy Loam (6 – 25%)	Hydrologic Group: B
Frisco Peeler Gravelly Sandy Loam (25 – 65%)	Hydrologic Group: B
Scott Cobbly Sandy Loam (15 – 65%)	Hydrologic Group: B
Tine Gravelly Sandy Loam (0 – 3%)	Hydrologic Group: A

The basin soil type is predominantly representative of Soils Group B in accordance with the National Resources Conservation Service (NRCS) soils classifications. See Figure 2 – Soils Survey.

3.4 CURVE NUMBER "CN"

The National Resources Conservation Service (SCS Method) was used in this study to approximate peak runoff. The curve number is based on the soils type, the land usage and the vegetative cover.

3.5 EXISTING FACILITIES

Denver and Rio Grande Culvert Crossing Analysis

Based on the results of field observations by High Country Engineering, Inc., three major culvert crossings under the Denver and Rio Grande Railroad were identified. These major crossings are Design Point 4 – Elk Creek, Design Point 6 – No name drainage, Design Point 9 – Leland Creek. A summary of their hydraulic properties is presented below.

Design Point	Description	2 yr – 24 hr Existing Flow (cfs)	100 yr – 24 hr Existing Flow (cfs)
4	Elk Creek at Railroad	2.4	39.6
6	No name drainage at Railroad	0.75	19.3
9	Leland Creek at Railroad	9.2	182
8	Elk Creek at US 40	6.9	145
7	No name drainage at US 40	2.9	50.5
11	Leland Creek at US 40	9.5	189

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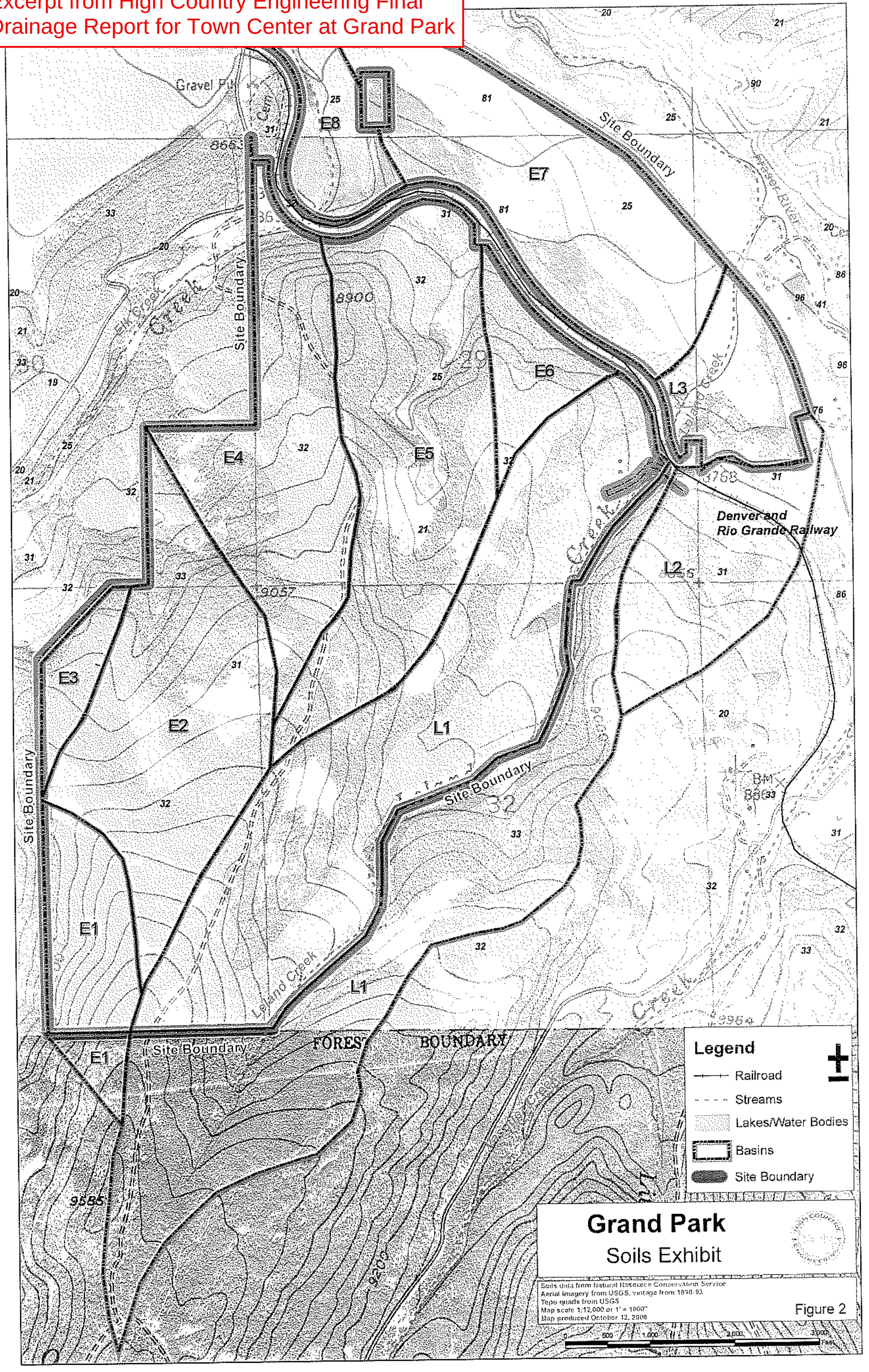

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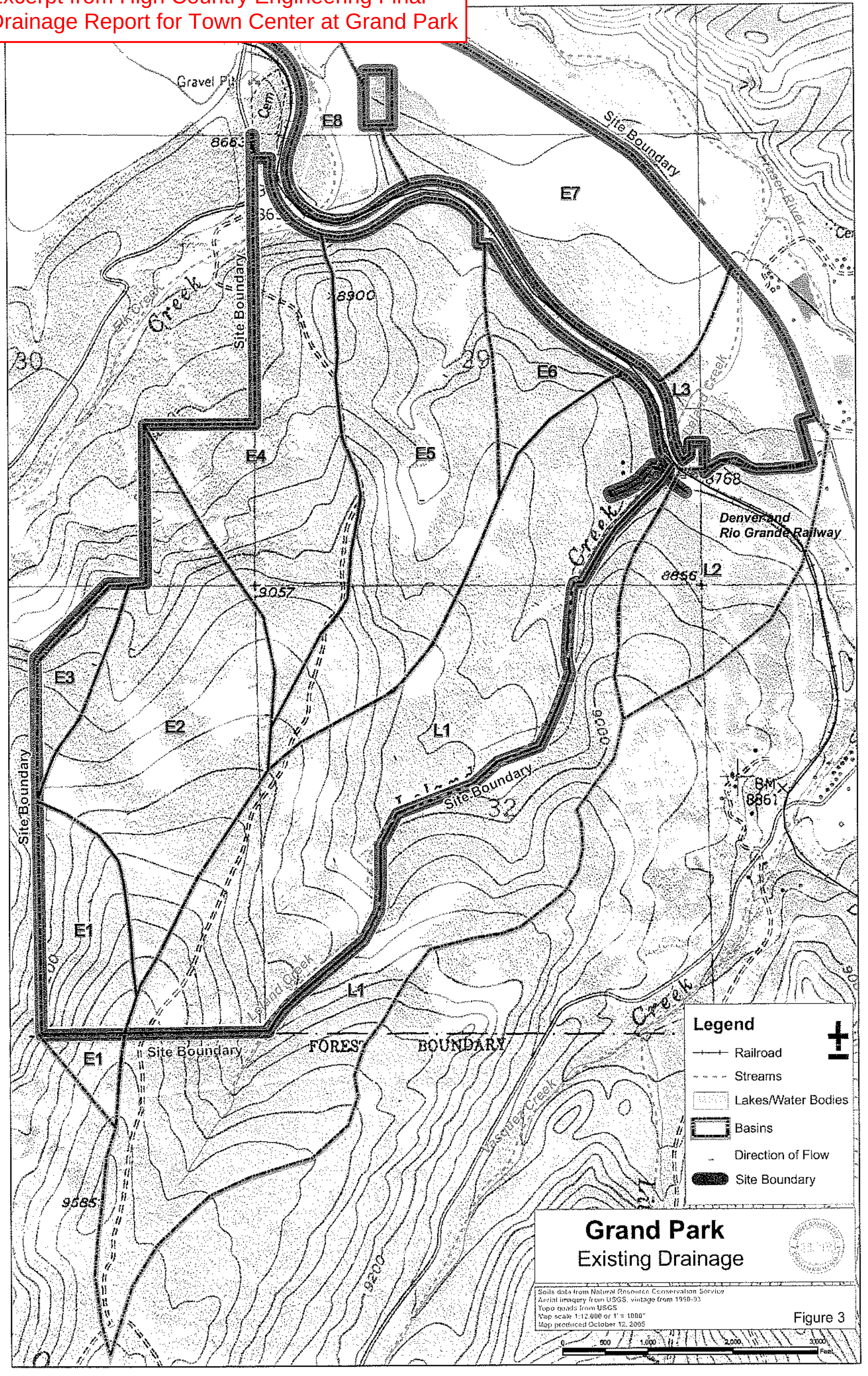

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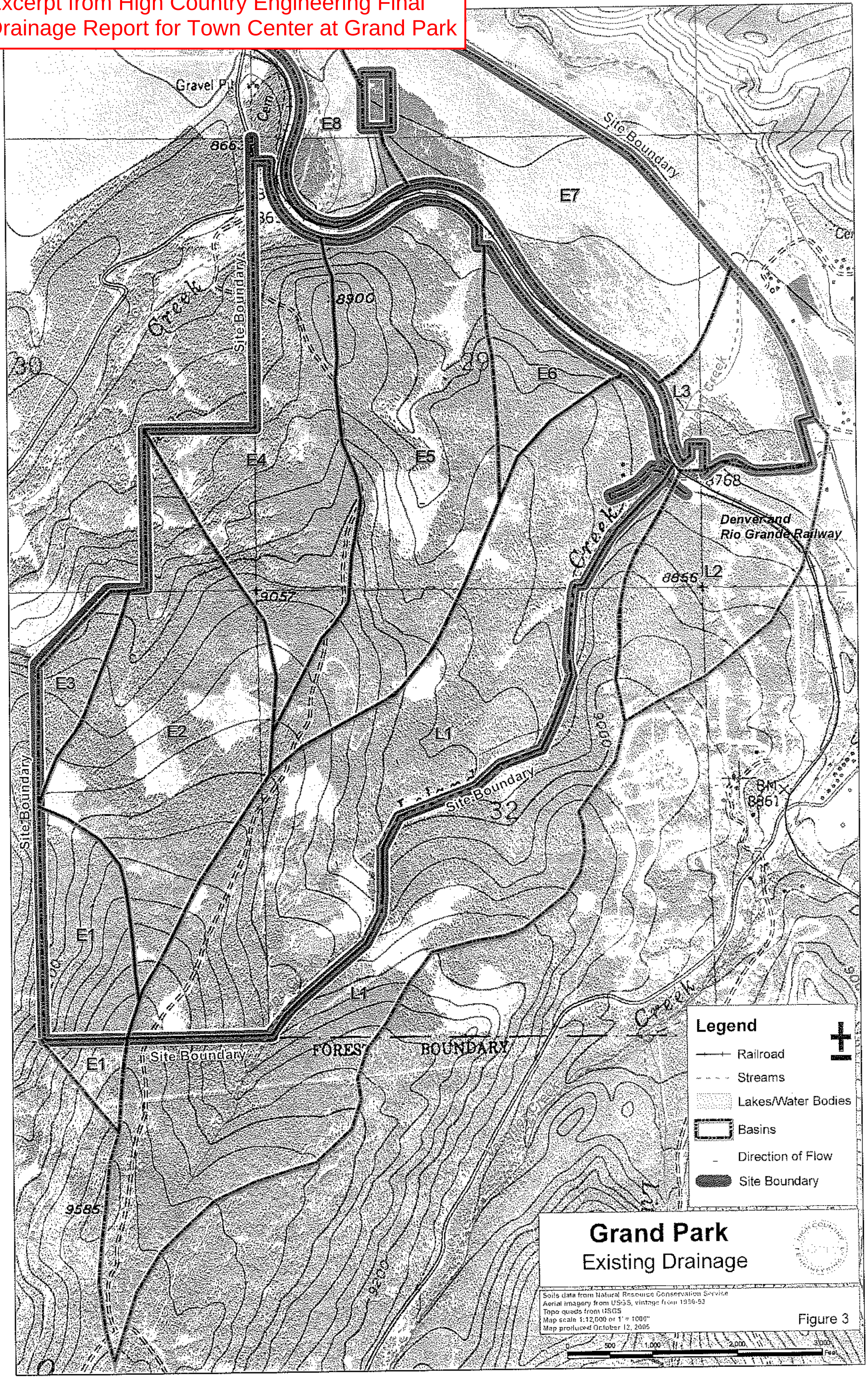

These culvert crossings are constructed with reinforced concrete pipe or corrugated metal pipe. The capacity of these culverts was determined using the top of the rail elevation and also at three feet below the top of rail (bottom of ballast elevation). Capacity analysis of the major stormwater culverts was performed using Autocad Hydrology, which utilizes the FHWA's HY-8 program. The software uses headwater elevation, tailwater elevation and pipe friction for capacity analysis. The results are shown in Table 3.

Table 3. Existing Culvert Capacities

Design Point	Size (ft)	Quantity	Invert	Max. Water Surface Elevation	Estimated Capacity (cfs)
Elk Creek	3.5	1	8634	8652.75	196
No name	4.0	1	8692.7	8698.8	56.5
Leland Creek	4.0	1	8760.0	8765.0	237.2

4.0 PROPOSED DRAINAGE IMPROVEMENTS

4.1 GENERAL

Proposed drainage improvements were developed for each drainage basin, utilizing Grand County Storm Drainage Criteria and Urban Drainage and Flood Control District's criteria.

This study did not attempt to forecast lot-specific drainage improvements, but limited itself to the overall stormwater management of each drainage basin.

The proposed drainage improvements were evaluated based on the stormwater routing results and consists of the following:

1. Grass-lined swales and stormwater conveyance channels,

2. Local and regional detention facilities,

3. Culvert crossings (reinforced concrete pipes and box culverts).

Grass-lined swales and channels will be used to convey flows to detention facilities. Storm runoff will be detained in detention facilities for all storm frequencies up to and including the 100-year event. The size and discharge from these detention facilities will be determined based on the capacities of downstream drainage facilities and land availability. Improved channels with drop structures and check dams will be sized to convey the peak 100 year discharges based on fully developed conditions or detained flows, as applicable. The 100 year detention volumes were

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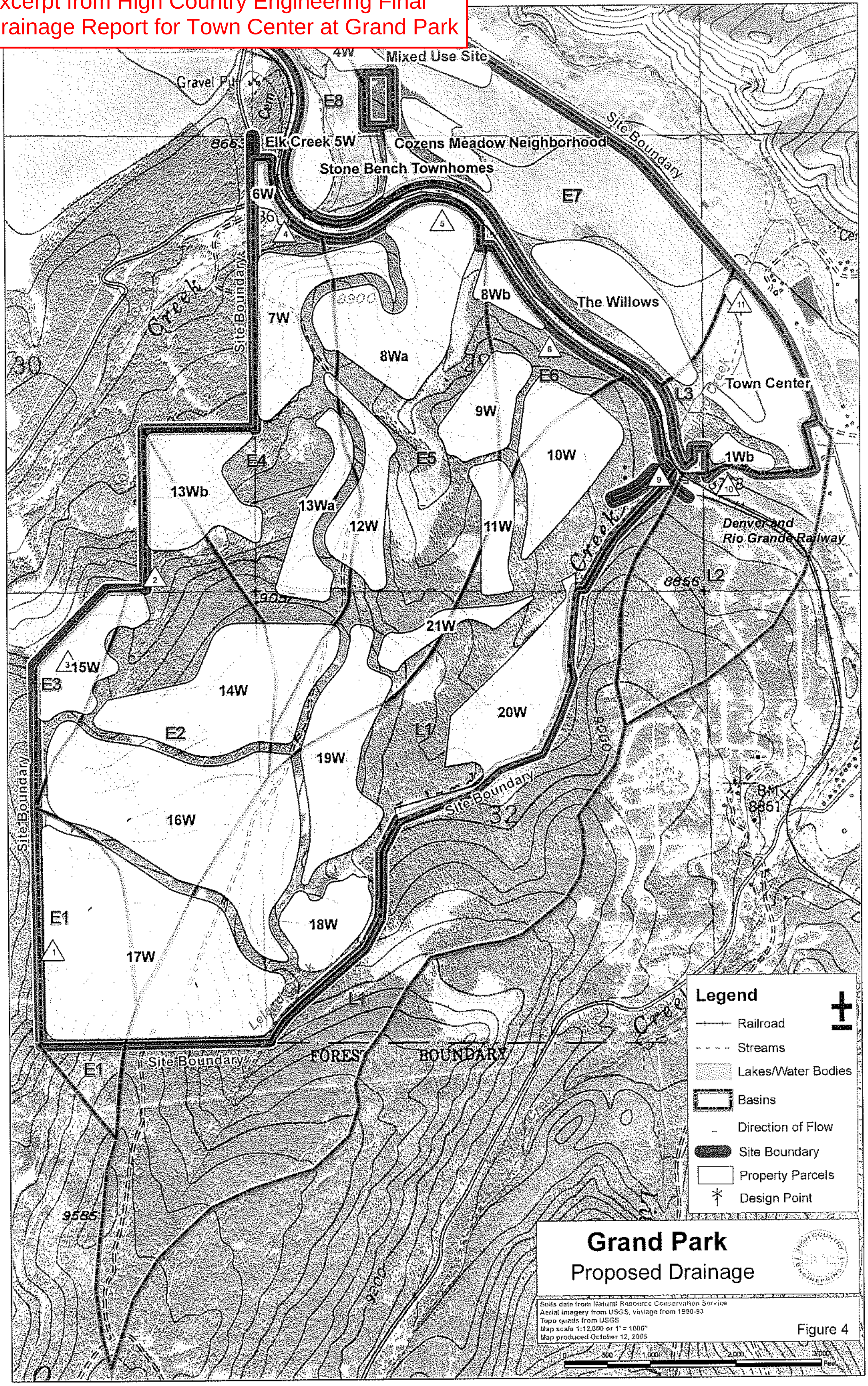

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calculated using both the SCS Tabular Method and the UDFCD's equation V=K*A. The results of the analysis are included in the Appendix.

The proposed channels will in general, be grass-lined trapezoidal type channels with a variable width bottom and side slopes typically designed at a maximum ratio of three (horizontal) to one (vertical) ratio. The longitudinal slope is adjusted to limit the velocities to a maximum of 5 feet per second during the 100 year event. Some of the large grass-lined channels are proposed to include grade control structures (drop structures) to reduce the amount of earthwork required to construct the channel. Of note, in areas where deep excavations would be required to construct a channel, utilization of storm drain pipe was also considered, to avoid excavating larger areas of land that would be taken up by the side-slopes of the channel excavations.

Below is a summary of developed flows prior to entering the proposed detention facilities:

Design Point	Description	2 yr – 24 hr Proposed Flow (cfs)	100 yr – 24 hr Proposed Flow (cfs)
4	Elk Creek at Railroad	6.2	104
6	No name drainage at Railroad	7.4	56.5
9	Leland Creek at Railroad	8.2	186
8	Elk Creek at US 40	44.1	371
7	No name drainage at US 40	90.4	389
11	Leland Creek at US 40	16.6	197

Water quality enhancement features will be incorporated into the swales, channels, and detention facilities to enhance the water quality resulting from the impacts of future urbanization, on the drainage basins.

1.1 DESIGN BASIS

Preliminary and final design of proposed facilities will be performed in accordance with Town of Fraser's and Grand County's requirements. Detention ponds will incorporate multi-level outlets to control 10-year and 100-year storm events, as well as less frequent events. The applicable Best Management (BMP) of Volume III of the UDFCD Criteria Manual will be used during final design to mitigate potential adverse water quality impacts resulting from development. Detention pond and cell layouts as well as configuration of outlet structures will be established during the Preliminary Design phase, at which time a design report will be prepared presenting development of design concepts. Design reports will include preliminary plans and profiles of channels, storm sewers and culverts.

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Railroad culvert capacities and US 40 capacities or historic discharge rates, which ever is less. Discharges from areas south of US 40 are proposed to be detained discharges to ensure that discharges to off-site areas are at or below historic discharge rates.

4.3 MINOR DRAINAGE SYSTEMS

Minor drainage systems will be designed and implemented in accordance with this study during the platting phase of development throughout Grand Park.

4.4 PHASING OF IMPROVEMENTS

Phasing of the stormwater management system will depend on the timing of various developments throughout Grand Park. Regional drainage facilities will be implemented as demand warrants. It is anticipated that each Phased Preliminary Plan to be prepared for Grand Park, will provide design and construction details concerning the drainage facilities to be constructed in such Phase Area, or which may need to be constructed outside of the Phase Area, as a result of the Phase Area development.

4.5 FEMA FIRM MAPPING

The proposed development is contained within the FEMA FIRM map, 080305 001A – Town of Winter Park, Colorado, (Effective Date November 15, 1985). The FIRM map provides 100 year water surface elevations for Leland Creek and the Fraser River. A portion of the site adjacent to US Highway 40 is contained within Zone B – areas subject to 500 year flooding. The remainder of the development is outside the 500 year flooding limits.

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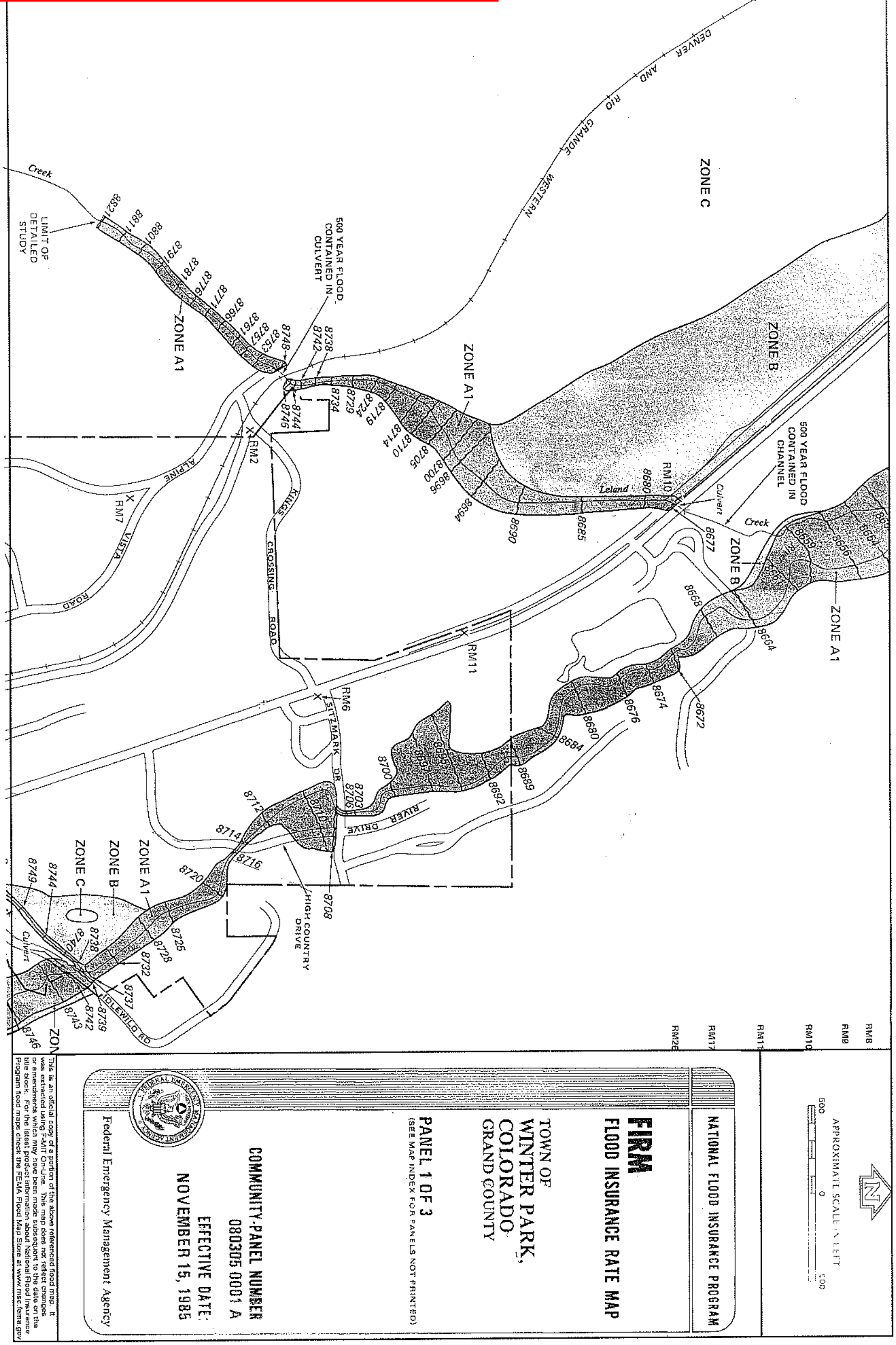

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5.0 REFERENCES

1. Soil Survey of Grand County Area, Colorado, U.S. Department of Agriculture, Natural Resource Conservation Service, Denver, Colorado.

2. Urban Storm Drainage Criteria Manual, Urban Drainage & Flood Control District (UD&FCD), prepared by Wright – McLaughlin Engineers, March 1969, Revised June 2001.

3. Grand County Storm Drainage Design and Criteria Manual.

4. NOAA Atlas No. 2, "Precipitation - Frequency Atlas of the Western United Stated, Volume III - Colorado", Miller, J. F., R. H. Frederick, R. J. Tracy, National Weather Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 1976.

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APPENDIX A – HYDROLOGIC INPUT

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Subbasin Area

HMS * Basin Model * Subbasin Global Editor

Sort Help

Basin Model ID: Grand Park Developed

Subbasin Name	Area (sq mi)
Basin E1	0.110
Basin E2	0.297
Basin E3	0.038
Basin E4	0.244
Basin E5	0.345
Basin E6	0.064
Basin E7	0.287
Basin E8	0.077
Basin L1	0.975
Basin L2	0.168
Basin L3	0.093

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Reach Parameters – Developed Conditions

HMS * Basin Model * Kinematic Wave Routing

Sort Help

Basin Model ID: Grand Park Developed

Reach Name	Cross Section Shape	Reach Length (ft)	Energy Slope (ft/ft)	Bottom Width or Diameter (ft)	Side Slope (xH:1V)	Manning's n	Min Num. Route Incs.
Reach-1	TRAPEZOID	2417	0.033	100	20	0.03	50
Reach-2	TRAPEZOID	2847	0.039	100	20	0.03	50
Reach-3	TRAPEZOID	3257	0.43	100	20	0.02	50
Reach-4	TRAPEZOID	4519	0.027	100	20	0.02	50
Reach-5	TRAPEZOID	610	0.0164	50	10	0.030	50

Reach Parameters – Existing Conditions

HMS * Basin Model * Kinematic Wave Routing

Sort Help

Basin Model ID: Grand Park

Reach Name	Cross Section Shape	Reach Length (ft)	Energy Slope (ft/ft)	Bottom Width or Diameter (ft)	Side Slope (xH:1V)	Manning's n	Min Num. Route Incs.
Reach-1	TRAPEZOID	2417	0.033	100	20	0.030	50
Reach-2	TRAPEZOID	2847	0.039	100	20	0.03	50
Reach-3	TRAPEZOID	3257	0.43	100	20	0.03	50
Reach-4	TRAPEZOID	4519	0.027	100	20	0.03	50
Reach-5	TRAPEZOID	610	0.0164	50	10	0.030	50

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Precipitation Frequency Data Output

NOAA Atlas 2
Colorado 39.90199?N 105.77495?W
Site-specific Estimates

Map	Precipitation (inches)	Precipitation Intensity (in/hr)
2-year 6-hour	0.98	0.16
2-year 24-hour	1.32	0.06
100-year 6-hour	2.17	0.36
100-year 24-hour	2.98	0.12

Hydrometeorological Design Studies Center - NOAA/National Weather Service
1325 East-West Highway - Silver Spring, MD 20910 - (301) 713-1669
Fri Oct 14 11:58:44 2005

Region 2

2-Year Rainfall

Y_2 = 2-yr 1-hr estimated value
X_1 = 0.98 = (6-hr)
X_2 = 1.32 = (24-hr)

$Y_2 = 0.011 + 0.942[(X_1)(X_1/X_2)]$
$= 0.011 + 0.942[0.98(0.98/1.32)]$
$= 0.696 = (1\text{-hr})$

2hr = 0.341(6-hr) + 0.659(1-hr) = 0.793
3hr = 0.569(6-hr) + 0.431(1-hr) = 0.858
12hr = 1.2 (from figure 17)

5min = 0.29(1-hr) = 0.202
10min = 0.45(1-hr) = 0.313
15min = 0.57(1-hr) = 0.397
30min = 0.79(1-hr) = 0.550

10-Year Rainfall

Y_{10} = 10-yr 1-hr estimated value
X_1 = 6-hr = 1.40
X_2 = 24-hr = 1.98

100-Year Rainfall

$Y_{100} = 0.494 + 0.755[(X_3)(X_3/X_4)]$
X_3 = 2.17 = (6-hr)
X_4 = 2.98 = (24-hr)

$Y_{100} = 0.494 + 0.755[(2.17)(2.17/2.98)]$
$= 1.687 = (1\text{-hr})$

2hr = 0.341(6-hr) + 0.659(1-hr) = 1.851
3hr = 0.569(6-hr) + 0.431(1-hr) = 1.962
12hr ≈ 2.5 (from figure 17)

5min = 0.29(1-hr) = 0.489
10min = 0.45(1-hr) = 0.759
15min = 0.57(1-hr) = 0.962
30min = 0.79(1-hr) = 1.333

Colorado

Discussion of Maps

Figures 20 through 43 present precipitation-frequency maps for Colorado for 6- and 24-hr durations. Figures 20 through 31 are for annual (or all-season) values for the 2-, 5-, 10-, 25-, 50, and 100-yr return periods. Figures 32 through 43 are for the May through October season and are for probabilities of 0.50, 0.20, 0.10, 0.04, 0.02, and 0.01 The isopluvial maps represent the 360- and 1,440-min durations for the partial-duration series. Data were tabulated for clock and observation-day intervals for the annual series and were adjusted by the empirical factors given in the ANALYSIS section.

Isoline interval. The isoline interval selected was designed to provide a reasonably complete description of the isopluvial pattern in various regions of the state The isoline interval over most of the state on maps for the 24-hr duration is 0 2 in. for precipitation-frequency values below 3.0 in., 0.4 in. between 3.0 in and 5.0 in, and 0.5 in at values greater than 5.0 in. However, in southwestern Colorado along the San Juan Mountains, the annual maps use an isoline interval of 0 2 in below precipitation-frequency values of 2 0 in., and 0 5 in for values over 2.0 in. On the maps for the 6-hr duration, the interval is 0 1 in. for precipitation-frequency values under 1.2 in. at the 2-yr and 0.50 and 0 20 probability level (on maps for the May through October season). At longer return periods (or lower probabilities), the upper limit of the 0.1-in isoline interval increases in order to maintain the isopluvial gradient and degree of detail. On all maps for the 6-hr duration, the isoline interval changes from 0 2 in. below 3 0 in. to 0.4 in. over 3.0-in. precipitation-frequency values. Dashed intermediate lines have been placed between widely separated isolines and in regions where a linear interpolation between the normal isopluvial interval would lead to erroneous interpolation "Lows" that close within the boundaries of a particular map have been hatched on the low-valued side of the isoline.

Importance of snow in precipitation-frequency values. The annual maps in this Atlas represent frequency values of precipitation regardless of type. For many hydrologic purposes, precipitation falling as rain must be treated in a different manner from that falling as snow. The contribution of snow amounts to precipitation-frequency values in Colorado and the Rocky Mountain States (roughly Montana, Wyoming, Colorado, New Mexico, and Utah) was investigated. In this area, there were about 50 stations per state having 10 to 15 yrs of observation of snowfall as part of the precipitation observing program. For each such station, two data series were formed as discussed under Interpretation of Results, Importance of Snow in Estimating Frequency Values.

A ratio was formed of the 2-yr 24-hr value for the series containing maximum annual events without regard to the type of precipitation and the 2-yr 24-hr value for the series with snow occurrences eliminated. A plot of this ratio vs latitude (fig. 15) shows that the ratio tends to be at a maximum in the latitude of Colorado and Utah. Over all of Colorado, the all-precipitation series tends to average about 10 percent higher than the series with snow eliminated. However, examination of the data shows that in the relatively flat areas east of a smoothed 6,000-ft contour the differences between the two series are minor With data from this area eliminated, the difference between the two series averages about 15 percent, with some individual differences as large as 40 to 50 percent. About half the stations have differences greater than 10 percent These differences indicate that frequency values computed from an annual series of rainfall amounts only would be different from those composed of all-precipitation values, and two separate sets of precipitation-frequency maps were needed.

Snowfall observations are made at only about 15 percent of the precipitation stations used in this study. For this reason, a rainfall-frequency study could not be made by direct methods. Since most snowfall occurs during the colder half of the year, a series containing only values for the May to October season was compared with the series that was based on rainfall only. The two series were in good agreement, except for a slight bias toward higher values for the May to October season This bias results from some large amounts in late October and early May occurring as snow and thus excluded from the rainfall-only series. The average difference is only about 4 percent, with no consistent preference toward higher elevations or particular geographic regions

Two sets of maps were prepared for Colorado. The first set consists of annual maps based on precipitation data from all months of the year without regard to the type of precipitation, rain, rain and snow mixed, all snow, hail, etc. The second series takes precipitation values from the months May to October. No attempt was made in this second series to differentiate between types of precipitation occurring within these months, but the investigations mentioned in the preceding paragraph indicate that these maps will approximate the values that would be obtained by using a data series made up of precipitation events that are exclusively rain. Since data for only part of the year were used, these maps have been labeled with the appropriate probabilities rather than with a return period in years (figs 32–43).

Table 11. *Equations for estimating 1-hr values in Colorado with statistical parameters for each equation*

Region of applicability*	Equation	Corr. coeff.	No. of stations	Mean of computed stn. values (inches)	Standard error of estimate (inches)
South Platte, Republican, Arkansas, and Cimarron River Basins (1)	$Y_2 = 0.218 + 0.709[(X_1)(X_1/X_2)]$	0.94	75	1.01	0.074
	$Y_{100} = 1.897 + 0.439[(X_3)(X_3/X_4)] - 0.008Z$	.84	75	2.68	.317
San Juan, Upper Rio Grande, Upper Colorado, and Gunnison River Basins and Green River Basin below confluence with the Yampa River (2)	$Y_2 = -0.011 + 0.942[(X_1)(X_1/X_2)]$	.95	86	0.72	.085
	$Y_{100} = 0.494 + 0.755[(X_3)(X_3/X_4)]$	.90	85	1.96	.290
Yampa and Green River Basins above confluence of Green and Yampa Rivers (3)	$Y_2 = 0.019 + 0.711[(X_1)(X_1/X_2)] + 0.001Z$	.82	98	0.40	.031
	$Y_{100} = 0.338 + 0.670[(X_3)(X_3/X_4)] + 0.001Z$	.80	79	1.04	.141
North Platte (4)	$Y_2 = 0.028 + 0.890[(X_1)(X_1/X_2)]$	.93	90	0.60	.062
	$Y_{100} = 0.671 + 0.757[(X_3)(X_3/X_4)] - 0.003Z$	.91	89	1.71	.236

* Numbers in parentheses refer to geographic regions shown in figure 19. See text for more complete description.

List of variables
Y_2 = 2-yr 1-hr estimated value
Y_{100} = 100-yr 1-hr estimated value
X_1 = 2-yr 6-hr value from precipitation-frequency maps
X_2 = 2-yr 24-hr value from precipitation-frequency maps
X_3 = 100-yr 6-hr value from precipitation-frequency maps
X_4 = 100-yr 24-hr value from precipitation-frequency maps
Z = point elevation in hundreds of feet

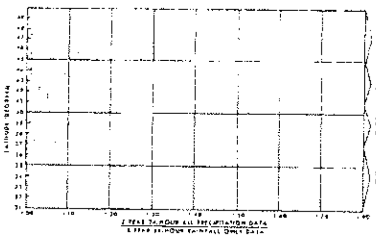

Figure 15. *Ratio of 2-yr 24-hr value for all data to 2-yr 24-hr value for rainfall only vs latitude.*

Table 12. *Adjustment factors to obtain n-min estimates from 1-hr values*

Duration (min)	5	10	15	30
Ratio to 1-hr	0.29	0.45	0.57	0.79

(Adopted from *U.S. Weather Bureau Technical Paper* No. 40, 1961.)

Procedures for Estimating Values for Durations Other Than 6 and 24 Hrs

The isopluvial maps in this Atlas are for 6- and 24-hr durations For many hydrologic purposes, values for other durations are necessary. Such values can be estimated using the 6- and 24-hr maps and the empirical methods outlined in the following sections The procedures detailed below for obtaining 1-, 2-, and 3-hr estimates were developed specifically for this Atlas The procedures for obtaining estimates for less than 1-hr duration and for 12-hr duration were adopted from *Weather Bureau Technical Paper* No 40 (U S. Weather Bureau 1961) only after investigation demonstrated their applicability to data from the area covered by this Atlas.

Procedures for estimating 1-hr (60-min) precipitation-frequency values. Multiple-regression screening techniques were used to develop equations for estimating 1-hr duration values Factors considered in the screening process were restricted to those that could be determined easily from the maps of this Atlas or from generally available topographic maps.

The 11 western states were separated into several geographic regions. The regions were chosen on the basis of meteorological and climatological homogeneity and are generally combinations of river basins separated by prominent divides. Four of these geographic regions are partially within Colorado. For convenience and use as an overlay on the precipitation-frequency maps, these regions are outlined on figure 19. The first Colorado region is part of the region that lies to the east of the Continental Divide and the crest of the Sangre de Cristo and Sacramento Mountains and is south of the divide separating the drainage basins of the North and South Platte Rivers. It consists of that portion of Colorado drained by the South Platte, Republican, Arkansas, and Cimarron Rivers (Region 1, fig. 19). The second region consists of the area drained by the San Juan, Upper Rio Grande, Upper Colorado, and Gunnison Rivers and by the Green River below its confluence with the Yampa River (Region 2, fig 19) This is part of a larger region that extends from southwestern Colorado, westward to the Wasatch Mountains of Utah, and southward through Arizona and the western half of New Mexico The third region is the mountainous portion of the area between the Continental Divide and the crest of the Cascade Range. The portion that lies within Colorado is the northwestern portion of the State that is drained by the Yampa River and the Green River above its confluence with the Yampa (Region 3, fig. 19). A small portion of Colorado drained by the North Platte is Region 4, figure 19 The larger region of which this is a part includes that portion of Wyoming and Montana east of the Continental Divide. Equations to provide estimates for the 1-hr duration for 2- and 100-yr return periods are shown in table 11 Also listed are the statistical parameters associated with each equation In these equations, the variable $[(X_1)(X_1/X_2)]$ or

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$[(X_3)(X_4/X_3)]$ can be regarded as the 6-hr value times the slope of the line connecting the 6- and 24-hr values for the appropriate return period.

As with any separation into regions, the boundary can only be regarded as the sharpest portion of a zone of transition between regions. These equations have been tested for boundary discontinuities by computing values using equations from both sides of the boundary. Differences were found to be mostly under 15 percent. However, it is suggested that when computing estimates along or within a few miles of a regional boundary computations be made using equations applicable to each region and that the average of such computations be adopted.

Estimates of 1-hr precipitation-frequency values for return periods between 2 and 100 yrs. The 1-hr values for the 2- and 100-yr return periods can be plotted on the nomogram of figure 6 to obtain values for return periods greater than 2 yrs or less than 100 yrs. Draw a straight line connecting the 2- and 100-yr values and read the desired return-period value from the nomogram.

Estimates for 2- and 3-hr (120- and 180-min) precipitation-frequency values. To obtain estimates of precipitation-frequency values for 2 or 3 hrs, plot the 1- and 6-hr values from the Atlas on the appropriate nomogram of figure 16. Draw a straight line connecting the 1- and 6-hr values, and read the 2- and 3-hr values from the nomogram. This nomogram is independent of return period. It was developed using data from the same regions used to develop the 1-hr equations.

The mathematical solution from the data used to develop figure 16 gives the following equations for estimating the 2- and 3-hr values:

For Region 1,	2-hr = 0.342 (6-hr) + 0.658 (1-hr)	(3)
figure 19	3-hr = 0.597 (6-hr) + 0.403 (1-hr)	(4)
For Region 2,	2-hr = 0.341 (6-hr) + 0.659 (1-hr)	(5)
figure 19	3-hr = 0.569 (6-hr) + 0.431 (1-hr)	(6)
For Regions 3	2-hr = 0.250 (6-hr) + 0.750 (1-hr)	(7)
and 4, figure 19	3-hr = 0.467 (6-hr) + 0.533 (1-hr)	(8)

Estimates for 12-hr (720-min) precipitation-frequency values. To obtain estimates for the 12-hr duration, plot values from the 6- and 24-hr maps on figure 17. Read the 12-hr estimates at the intersection of the line connecting these points with the 12-hr duration line of the nomogram.

Estimates for less than 1 hr. To obtain estimates for durations of less than 1 hr, apply the values in table 12 to the 1-hr value for the return period of interest.

	1-hr	2-hr	3-hr	6-hr	24-hr
2-yr	*0.71*	*0.83*	*0.91*	**1.05**	**1.58**
5-yr				**1.38**	**1.99**
10-yr				**1.59**	**2.27**
25-yr				**1.90**	**2.65**
50-yr				**2.19**	**2.95**
100-yr	*1.86*			**2.39**	**3.35**

Table 13. *Precipitation data for depth-frequency atlas computation point 106°00′ W., 39°00′ N.*

Illustration of Use of Precipitation-Frequency Maps, Diagrams, and Equations

To illustrate the use of these maps, values were read from figures 20 to 31 for the point at 39°00′ N. and 106°00′ W. These values are shown in boldface type in table 13. The values read from the maps should be plotted on the return-period diagram of figure 6 because (1) not all points are as easy to locate on a series of maps as are latitude-longitude intersections, (2) there may be some slight registration differences in printing, and (3) precise interpolation between isolines is difficult. This has been done for the 24-hr values in table 13 (fig. 18a) and a line of best fit has been drawn subjectively. On this nomogram, the line fits the data rather well. Had any points deviated noticeably from the line, the value would have been reread from the line and the new value substituted in table 13 and adopted in preference to the original readings.

The 2- and 100-yr 1-hr values for the point were computed from the equations applicable to Region 1, figure 19 (table 11), since the point is east of the Continental Divide. The 2-yr 1-hr value is estimated at 0.71 in. (2-yr 6- and 24-hr values from table 13), the estimated 100-yr 1-hr value is 1.86 in. (100-yr 6- and 24-hr values from table 13 and elevation of 9,500 ft). By plotting these 1-hr values on figure 6 and connecting them with a straight line, one can obtain estimates for return periods of 5, 10, 25, and 50 yrs.

The 2- and 3-hr values can be estimated by using the nomogram of figure 16 or equations (3) and (4). The 1- and 6-hr values for the desired return period are obtained as above. Plot these points on the nomogram of figure 16 and connect them with a straight line. Read the estimates for 2 or 3 hrs at the intersections of the connecting line and the 2- and 3-hr vertical lines. An example is shown in figure 18b for the 2-yr return period. The 2-yr 2-hr (0.83 in.) and 2-yr 3-hr (0.91 in.) values are in italics on table 13.

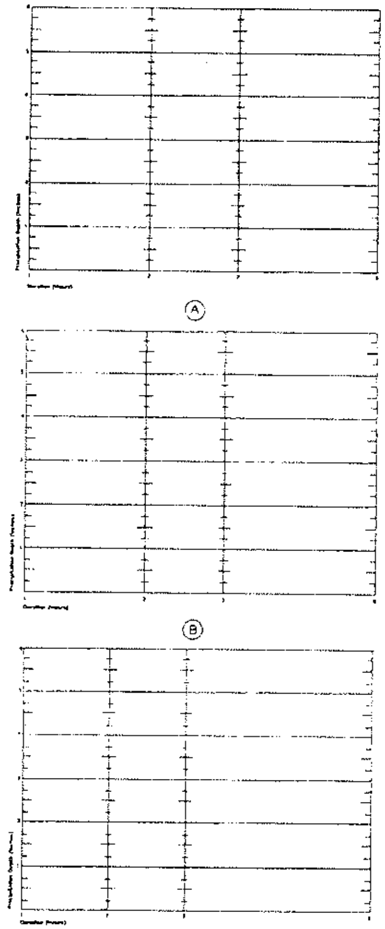

Figure 18. *Precipitation depth-duration diagram (1- to 6-hr)*
a. South Platte, Republican, Arkansas, and Cimarron River Basins (Region 1, fig. 19).
b. San Juan, Upper Rio Grande, Upper Colorado, and Gunnison River Basins and Green River Basin below its confluence with the Yampa River (Region 2, fig. 19).
c. Yampa and Green River Basins above confluence of Green and Yampa Rivers (Region 3, fig. 19) and North Platte Drainage (Region 4, fig. 19).

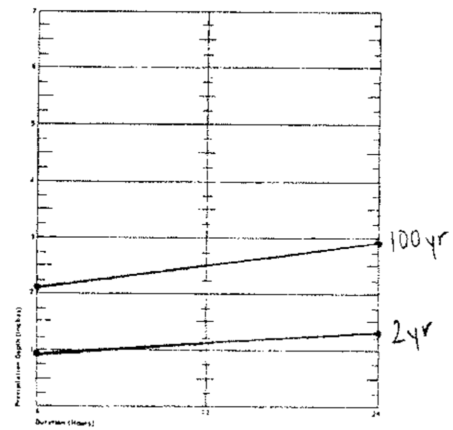

Figure 17. *Precipitation depth-duration diagram (6- to 24-hr)*

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100-Year Rainfall Data

HMS * Meteorologic Model

File Edit Help

Meteorologic Model: 100-Year

Subbasin List

Description:

Precipitation

Method : Frequency Storm

Exceedance Probability : 1 %

Series Type :

Max Intensity Duration : 5 Mins

Storm Duration : 24 Hr.

Peak Center : 50%

Storm Area (sq. mi.)

Duration	Precip Depth (in)
5 minutes	0.489
15 minutes	0.962
1 hour	1.687
2 hours	1.851
3 hours	1.962
6 hours	2.17
12 hours	2.5
24 hours	2.98

2-Year Rainfall Data

HMS * Meteorologic Model

File Edit Help

Meteorologic Model: 2-Year

Subbasin List

Description:

Precipitation

Method : Frequency Storm

Exceedance Probability : 1 %

Series Type :

Max Intensity Duration : 5 Mins

Storm Duration : 24 Hr.

Peak Center : 50%

Storm Area (sq. mi.)

Duration	Precip Depth (in)
5 minutes	0.202
15 minutes	0.397
1 hour	0.696
2 hours	0.793
3 hours	0.858
6 hours	0.98
12 hours	1.2
24 hours	1.32

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Grand Park - Existing Conditions
HCE Project No. 2052014.00
Soils Classification for Runoff Coefficient

Basin	Total Area (ac)	Total Area (mi^2)	Type B Area (ac)	Type C or D Area (ac)	Type A Area (ac)	Type B (%)	Type C or D (%)	Type A (%)	% Imperv. (Runoff Co.)	$C_{5 - Type B}$ (Table RO-5)	$C_{100 - Type B}$ (Table RO-5)	$C_{5 - Type C/D}$ (Table RO-5)	$C_{100 - Type C/D}$ (Table RO-5)	$C_{5 - Type A}$ (Table RO-5)	$C_{100 - Type A}$ (Table RO-5)	C_5 composite	C_{100} composite
E1	70.5	0.110	70.5	0.0	0.0	100%	0%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.088	0.362
E2	190.7	0.297	190.7	0.0	0.0	100%	0%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.088	0.362
E3	24.1	0.038	24.1	0.0	0.0	100%	0%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.088	0.362
E4	156.6	0.244	122.9	33.7	0.0	78%	22%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.104	0.393
E5	221.0	0.345	57.3	163.7	0.0	26%	74%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.143	0.470
E6	41.0	0.064	15.7	25.3	0.0	38%	62%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.134	0.452
E7	184.0	0.287	31.2	98.6	54.2	17%	54%	29%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.104	0.397
E8	49.5	0.077	11.8	36.5	1.1	24%	74%	2%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.141	0.466
L1	624.8	0.975	468.2	156.5	0.0	75%	25%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.107	0.399
L2	107.7	0.168	107.5	0.6	0.0	100%	1%	0%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.089	0.364
L3	59.4	0.093	24.2	34.1	1.0	41%	58%	2%	2%	0.088	0.362	0.162	0.508	0.008	0.216	0.129	0.444

Grand Park - Developed Conditions
HCE Project No. 2052014.00
Soils Classification for Runoff Coefficient

Basin	Total Area (ac)	Total Area (mi^2)	Type B Area (ac)	Type C or D Area (ac)	Type A Area (ac)	Type B (%)	Type C or D (%)	Type A (%)	% Imperv. (Runoff Co.)	$C_{5 - Type B}$ (Table RO-5)	$C_{100 - Type B}$ (Table RO-5)	$C_{5 - Type C/D}$ (Table RO-5)	$C_{100 - Type C/D}$ (Table RO-5)	$C_{5 - Type A}$ (Table RO-5)	$C_{100 - Type A}$ (Table RO-5)	C_5 composite	C_{100} composite
E1	70.5	0.110	70.5	0.0	0.0	100%	0%	0%	15%	0.170	0.420	0.240	0.540	0.100	0.280	0.170	0.420
E2	190.7	0.297	190.7	0.0	0.0	100%	0%	0%	15%	0.170	0.420	0.240	0.540	0.100	0.260	0.170	0.420
E3	24.1	0.038	24.1	0.0	0.0	100%	0%	0%	14%	0.165	0.415	0.235	0.545	0.095	0.275	0.165	0.415
E4	156.6	0.244	122.9	33.7	0.0	78%	22%	0%	26%	0.225	0.465	0.280	0.560	0.165	0.352	0.237	0.485
E5	221.0	0.345	57.3	163.7	0.0	26%	74%	0%	36%	0.275	0.485	0.335	0.570	0.225	0.390	0.319	0.548
E6	41.0	0.064	15.7	25.3	0.0	38%	62%	0%	41%	0.305	0.505	0.355	0.580	0.255	0.410	0.336	0.551
E7	184.0	0.287	31.2	98.6	54.2	17%	54%	29%	73%	0.525	0.640	0.555	0.695	0.475	0.585	0.526	0.653
E8	49.5	0.077	11.8	36.5	1.1	24%	74%	2%	32%	0.260	0.470	0.315	0.570	0.200	0.375	0.299	0.541
L1	624.8	0.975	468.2	156.5	0.0	75%	25%	0%	15%	0.170	0.420	0.240	0.540	0.100	0.280	0.188	0.450
L2	107.7	0.168	107.5	0.6	0.0	100%	1%	0%	2%	0.088	0.365	0.160	0.510	0.010	0.220	0.089	0.367
L3	59.4	0.093	24.2	34.1	1.0	41%	58%	2%	47%	0.340	0.513	0.380	0.595	0.285	0.455	0.362	0.559

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Soil Types by Basin			Cowdrey loam	Cumulic Cryaquolls	Frisco-Peeler Gravelly sandy loam	Frisco-Peeler Gravelly sandy loam	Frisco-Peeler Gravelly sandy loam	Scout cobbly Sandy loam	Tine Gravelly sandy loam	Outside Soil Study
Areas in Acres			15-45% Slope	nearly level	2-6%	6-25%	25-65%	15-65%	0-3%	
Basin	Basin_Area	Location	21	25	31	32	33	76	81	(blank)
E1	12.469	Offsite				0.525	0.067			11.843
	57.985	Onsite				48.938	9.044			
E1 Total	**70.454**					49.463	9.110			11.843
E2	190.678	Onsite			40.509	125.723	24.435			
E3	24.086	Onsite				19.076	4.999			
E4	156.640	Onsite	31.052	2.731	12.512	71.293	39.051			
E5	220.972	Onsite	145.454	18.265	18.729	38.518				
E6	41.025	Onsite	25.238	0.039	0.138	15.610				
E7	183.955	Onsite	2.184	96.375	31.168				54.228	
E8	49.483	Onsite	5.948	30.576	2.374	9.442			1.132	
L1	299.307	Offsite		29.642		47.194	90.185			132.257
	325.489	Onsite	113.384	13.492	0.065	198.542				
L1 Total	**624.797**		113.384	43.135	0.065	245.736	90.185			132.257
L2	107.729	Offsite		0.260	25.132	77.017	1.136	4.184		
L3	59.356	Onsite	0.951	33.190	12.712	2.490		9.024	0.988	

PARCELS BY BASIN

			Parcels/Land Use																									
Area in Acres			10W	11W	12W	13Wa	13Wb	14W	15W	16W	17W	18W	19W	1Wb	20W	21W	4W	6W	7W	8Wa	8Wb	9W	Cozans Meadow Neighborhood	Elk Creek 5W	Mixed Use Site	Stone Bench Townhomes	The Willows	To Ce
BASIN	BASIN_AREA	LOCATION	34.644	13.593	22.419	17.970	33.154	60.281	22.600	96.556	110.109	18.181	40.055	4.208	40.049	9.914	7.491	3.197	32.200	52.410	6.553	19.145	9.696	13.578	10.073	6.554	29.668	2
E1	12.469	Offsite																										
	57.985	Onsite									52.075																	
E1 Total	70.454										52.075																	
E2	190.678	Onsite					11.445	43.033	4.170	62.149	15.755																	
E3	24.086	Onsite							17.784	2.153																		
E4	156.640	Onsite			5.963	16.924	21.711	10.243										3.182	26.182	3.323								
E5	220.972	Onsite		4.758	16.457	1.047		7.016		0.922			14.705			6.070			6.020	49.084	1.019	12.525						
E6	41.025	Onsite	8.111	0.886																	5.535	6.621						
E7	183.955	Onsite															3.662						127.334		10.074	4.597	28.600	[illegible]
E8	49.483	Onsite															3.858							13.579		1.954		
L1	299.307	Offsite													0.019													
	325.489	Onsite	26.536	7.950						31.399	42.348	18.182	25.353		40.033	3.845												
L1 Total	624.797		26.536	7.950						31.399	42.348	18.182	25.353		40.052	3.845												
L2	107.729	Offsite																										[illegible]
L3	59.356	Onsite												4.208													1.070	[illegible]

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Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.
[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

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Table 2-2c.—Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3]*Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6]*Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

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Loss Rate – Developed Conditions

HMS * Basin Model * SCS Curve Number

Sort Help

Basin Model ID: Grand Park Developed

Subbasin Name	SCS Curve Number	Initial Abstraction (in)	Imperviousness (%)
Basin E6	80		2
Basin E5	82		2
Basin E4	73		2
Basin E3	65		2
Basin E2	65		2
Basin E1	65		2
Basin L2	60		2
Basin L1	68		2
Basin L3	83		2
Basin E8	80		2
Basin E7	89		2

Loss Rate – Existing Conditions

HMS * Basin Model * SCS Curve Number

Sort Help

Basin Model ID: Grand Park

Subbasin Name	SCS Curve Number	Initial Abstraction (in)	Imperviousness (%)
Basin E6	68		2
Basin E5	69.6		2
Basin E4	63		2
Basin E3	60		2
Basin E2	60		2
Basin E1	60		2
Basin L2	60		2
Basin L1	70		2
Basin L3	68		2
Basin E8	69		2
Basin E7	60		2

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Developed Conditions
HCE Project No. 2052014.00
% Imperviousness & Curve Number

Basin	Total Area (ac)	Composite % Imp.	Type B (%)	Type C or D (%)	Type A (%)	Type B CN	Type C or D CN	Type A CN	Composite CN
E1	70.5	15%	100%	0%	0%	65	78	50	65
E2	190.7	15%	100%	0%	0%	65	78	50	65
E3	24.1	14%	100%	0%	0%	65	78	50	65
E4	156.6	26%	78%	22%	0%	70	82	54	73
E5	221.0	36%	26%	74%	0%	74	85	60	82
E6	41.0	41%	38%	62%	0%	76	83	62	80
E7	184.0	73%	17%	54%	29%	89	92	82	89
E8	49.5	32%	24%	74%	2%	72	83	57	80
L1	624.8	15%	75%	25%	0%	65	78	50	68
L2	107.7	2%	100%	1%	0%	60	75	36	60
L3	59.4	47%	41%	58%	2%	80	85	72	83

Planning Area	Average % Imperv	Type B CN	Type C or D CN	Type A CN
10W	80	90	93	87
11W	65	85	91	77
12W	80	90	93	87
13Wa	30	72	83	57
13Wb	25	70	82	54
14W	25	70	82	54
15W	17	67	80	50
16W	15	65	78	50
17W	20	68	83	51
18W	25	70	82	54
19W	60	81	85	72
1Wb	75	89	92	82
20W	65	85	91	77
21W	65	85	91	77
4W	90	94	95	90
6W	90	94	95	90
7W	65	85	91	77
8Wa	65	85	91	77
8Wb	70	87	90	80
9W	80	90	93	87

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Time of Concentration

Sub-Basin Data			Overland Flow (t_i)					Travel Time (t_t)					Time of Concentration	
Designation	Area (acres)	C_5	Length (ft)	Δelev.	Slope (ft/ft)	Velocity (ft/s)	t_i (min)	Length (ft)	Δelev.	Slope (ft/ft)	Velocity (ft/s)	t_t (min)	t_c (min)	Lag Time(min)
E1	70.5	0.088	500	40	0.0800	2.8284	20.57	1800	380	0.2111	4.5947	6.53	27.10	16.26
E2	190.7	0.088	500	50	0.1000	3.1623	19.11	4800	650	0.1354	3.6799	21.74	40.85	24.51
E3	24.1	0.088	500	45	0.0900	3.0000	19.79	2000	160	0.0800	2.8284	11.79	31.57	18.94
E4	156.6	0.104	500	25	0.0500	2.2361	23.64	5300	480	0.0906	3.0094	29.35	53.00	31.80
E5	221.0	0.143	500	45	0.0900	3.0000	18.71	6800	550	0.0809	2.8440	39.85	58.56	35.14
E6	41.0	0.134	500	10	0.0200	1.4142	31.04	1600	160	0.1000	3.1623	8.43	39.47	23.68
E7	184.0	0.104	500	31	0.0620	2.4900	22.02	2400	40	0.0167	1.2910	30.98	53.00	31.80
E8	49.5	0.141	500	40	0.0800	2.8284	19.50	5700	110	0.0193	1.3892	68.39	87.88	52.73
L1	624.8	0.107	500	15	0.0300	1.7321	27.91	13000	1000	0.0769	2.7735	78.12	106.03	63.62
L2	107.7	0.089	500	15	0.0300	1.7321	28.41	2600	225	0.0865	2.9417	14.73	43.14	25.89
L3	59.4	0.129	500	40	0.0800	2.8284	19.73	2120	54	0.0255	1.5960	22.14	41.87	25.12

Grand Park - Developed Conditions
HCE Project No. 2052014.00
Time of Concentration

Sub-Basin Data			Overland Flow (t_i)					Travel Time (t_t)					Time of Concentration			
Designation	Area (acres)	C_5	Length (ft)	Δelev.	Slope (ft/ft)	Velocity (ft/s)	t_i (min)	Length (ft)	Δelev.	Slope (ft/ft)	Velocity (ft/s)	t_t (min)	t_c (min)	Urban Check	Lower t_c	Lag Time
E1	70.5	0.170	300	35	0.1167	3.4157	12.93	2000	385	0.1925	4.3875	7.60	20.53	22.78	20.53	12.32
E2	190.7	0.170	300	35	0.1167	3.4157	12.93	5000	665	0.1330	3.6469	22.85	35.78	39.44	35.78	21.47
E3	24.1	0.165	300	20	0.0667	2.5820	15.63	2200	185	0.0841	2.8998	12.64	28.28	23.89	23.89	14.33
E4	156.6	0.237	300	15	0.0500	2.2361	15.87	5500	490	0.0891	2.9848	30.71	46.58	42.22	42.22	25.33
E5	221.0	0.319	300	25	0.0833	2.8868	12.12	7000	570	0.0814	2.8536	40.88	53.01	50.56	50.56	30.33
E6	41.0	0.336	300	5	0.0167	1.2910	20.19	1800	165	0.0917	3.0277	9.91	30.10	21.67	21.67	13.00
E7	184.0	0.526	300	10	0.0333	1.8257	12.06	2600	61	0.0235	1.5317	28.29	40.35	26.11	26.11	15.67
E8	49.5	0.299	300	40	0.1333	3.6515	10.65	5900	110	0.0186	1.3654	72.02	82.67	44.44	44.44	26.67
L1	624.8	0.188	300	10	0.0333	1.8257	19.18	13200	1005	0.0761	2.7593	79.73	98.91	85.00	85.00	51.00
L2	107.7	0.089	300	9	0.0300	1.7321	22.01	2800	231	0.0825	2.8723	16.25	38.26	27.22	27.22	16.33
L3	59.4	0.362	300	24	0.0800	2.8284	11.62	2320	70	0.0302	1.7370	22.26	33.88	24.56	24.56	14.73

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Lag Time – Developed Conditions

HMS * Basin Model * SCS UH

Sort Help

Basin Model ID: Grand Park Developed

Time Units : Minutes

Subbasin Name	SCS Lag (min)
Basin E1	12
Basin E2	21
Basin E3	14
Basin E4	25
Basin E5	30
Basin E6	13
Basin E7	16
Basin E8	27
Basin L1	51
Basin L2	16
Basin L3	15

Lag Time – Existing Conditions

HMS * Basin Model * SCS UH

Sort Help

Basin Model ID: Grand Park

Time Units : Minutes

Subbasin Name	SCS Lag (min)
Basin E1	16
Basin E2	25
Basin E3	19
Basin E4	32
Basin E5	35
Basin E6	24
Basin E7	32
Basin E8	53
Basin L1	64
Basin L2	26
Basin L3	25

No Baseflow for All Basins

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

TABLE RO-3

Recommended Percentage Imperviousness Values

Land Use or Surface Characteristics	Percentage Imperviousness
Business:	
Commercial areas	95
Neighborhood areas	85
Residential:	
Single-family	*
Multi-unit (detached)	60
Multi-unit (attached)	75
Half-acre lot or larger	*
Apartments	80
Industrial:	
Light areas	80
Heavy areas	90
Parks, cemeteries	5
Playgrounds	10
Schools	50
Railroad yard areas	15
Undeveloped Areas:	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	0
Lawns, clayey soil	0

* See Figures RO-3 through RO-5 for percentage imperviousness.

Based in part on the data collected by the District since 1969, an empirical relationship between C and the percentage imperviousness for various storm return periods was developed. Thus, values for C can be determined using the following equations (Urbonas, Guo and Tucker 1990).

$$C_A = K_A + \left(1.31i^3 - 1.44i^2 + 1.135i - 0.12\right) \text{ for } C_A \geq 0, \text{ otherwise } C_A = 0 \qquad \text{(RO-6)}$$

$$C_{CD} = K_{CD} + \left(0.858i^3 - 0.786i^2 + 0.774i + 0.04\right) \qquad \text{(RO-7)}$$

$$C_B = (C_A + C_{CD})/2$$

in which:

i = % imperviousness/100 expressed as a decimal (see Table RO-3)

TABLE RO-5

Runoff Coefficients, *C*

Percentage Imperviousness	Type C and D NRCS Hydrologic Soil Groups					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0%	0.04	0.15	0.25	0.37	0.44	0.50
5%	0.08	0.18	0.28	0.39	0.46	0.52
10%	0.11	0.21	0.30	0.41	0.47	0.53
15%	0.14	0.24	0.32	0.43	0.49	0.54
20%	0.17	0.26	0.34	0.44	0.50	0.55
25%	0.20	0.28	0.36	0.46	0.51	0.56
30%	0.22	0.30	0.38	0.47	0.52	0.57
35%	0.25	0.33	0.40	0.48	0.53	0.57
40%	0.28	0.35	0.42	0.50	0.54	0.58
45%	0.31	0.37	0.44	0.51	0.55	0.59
50%	0.34	0.40	0.46	0.53	0.57	0.60
55%	0.37	0.43	0.48	0.55	0.58	0.62
60%	0.41	0.46	0.51	0.57	0.60	0.63
65%	0.45	0.49	0.54	0.59	0.62	0.65
70%	0.49	0.53	0.57	0.62	0.65	0.68
75%	0.54	0.58	0.62	0.66	0.68	0.71
80%	0.60	0.63	0.66	0.70	0.72	0.74
85%	0.66	0.68	0.71	0.75	0.77	0.79
90%	0.73	0.75	0.77	0.80	0.82	0.83
95%	0.80	0.82	0.84	0.87	0.88	0.89
100%	0.89	0.90	0.92	0.94	0.95	0.96
	Type B NRCS Hydrologic Soils Group					
0%	0.02	0.08	0.15	0.25	0.30	0.35
5%	0.04	0.10	0.19	0.28	0.33	0.38
10%	0.06	0.14	0.22	0.31	0.36	0.40
15%	0.08	0.17	0.25	0.33	0.38	0.42
20%	0.12	0.20	0.27	0.35	0.40	0.44
25%	0.15	0.22	0.30	0.37	0.41	0.46
30%	0.18	0.25	0.32	0.39	0.43	0.47
35%	0.20	0.27	0.34	0.41	0.44	0.48
40%	0.23	0.30	0.36	0.42	0.46	0.50
45%	0.26	0.32	0.38	0.44	0.48	0.51
50%	0.29	0.35	0.40	0.46	0.49	0.52
55%	0.33	0.38	0.43	0.48	0.51	0.54
60%	0.37	0.41	0.46	0.51	0.54	0.56
65%	0.41	0.45	0.49	0.54	0.57	0.59
70%	0.45	0.49	0.53	0.58	0.60	0.62
75%	0.51	0.54	0.58	0.62	0.64	0.66
80%	0.57	0.59	0.63	0.66	0.68	0.70
85%	0.63	0.66	0.69	0.72	0.73	0.75
90%	0.71	0.73	0.75	0.78	0.80	0.81
95%	0.79	0.81	0.83	0.85	0.87	0.88
100%	0.89	0.90	0.92	0.94	0.95	0.96

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

TABLE RO-5 (CONTINUED)

Runoff Coefficients, *C*

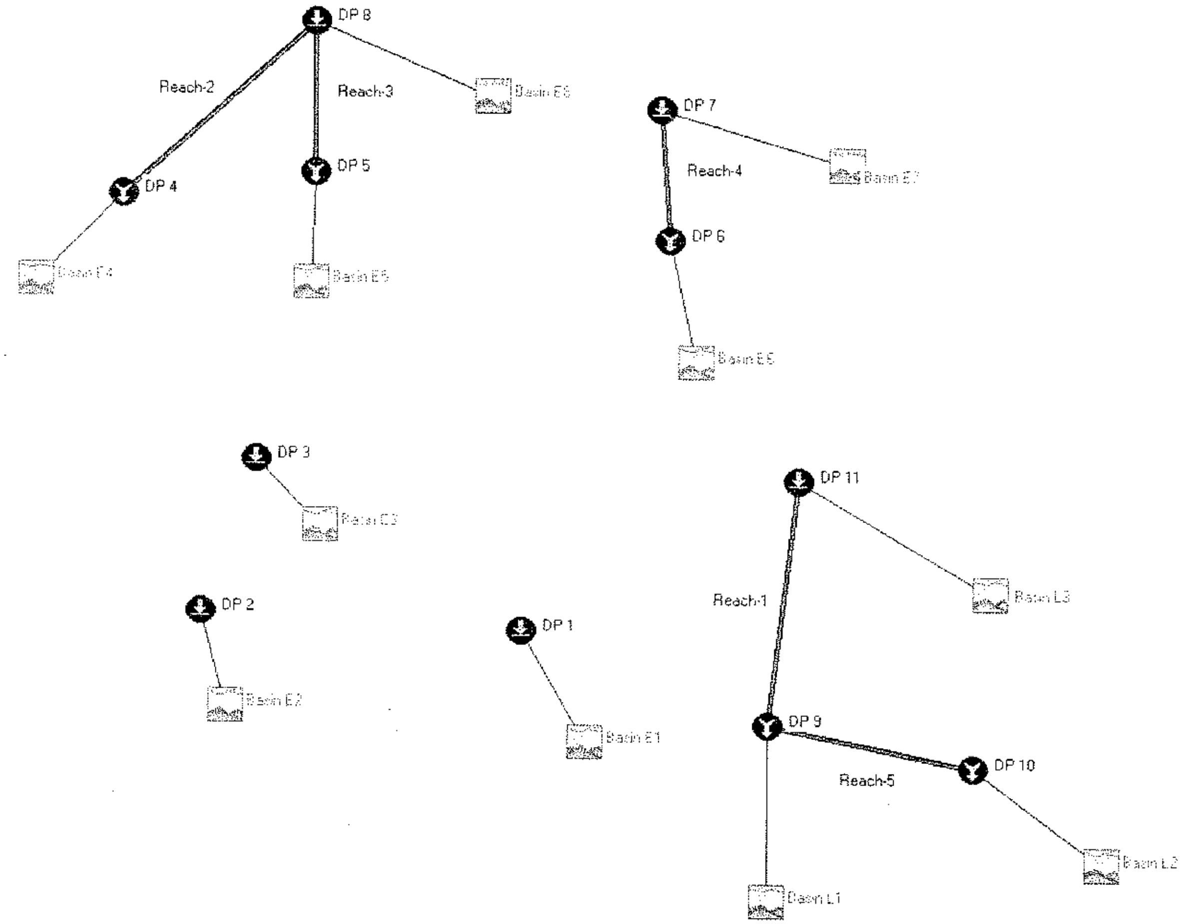
Percentage Imperviousness	Type A NRCS Hydrologic Soils Group					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0%	0.00	0.00	0.05	0.12	0.16	0.20
5%	0.00	0.02	0.10	0.16	0.20	0.24
10%	0.00	0.06	0.14	0.20	0.24	0.28
15%	0.02	0.10	0.17	0.23	0.27	0.30
20%	0.06	0.13	0.20	0.26	0.30	0.33
25%	0.09	0.16	0.23	0.29	0.32	0.35
30%	0.13	0.19	0.25	0.31	0.34	0.37
35%	0.16	0.22	0.28	0.33	0.36	0.39
40%	0.19	0.25	0.30	0.35	0.38	0.41
45%	0.22	0.27	0.33	0.37	0.40	0.43
50%	0.25	0.30	0.35	0.40	0.42	0.45
55%	0.29	0.33	0.38	0.42	0.45	0.47
60%	0.33	0.37	0.41	0.45	0.47	0.50
65%	0.37	0.41	0.45	0.49	0.51	0.53
70%	0.42	0.45	0.49	0.53	0.54	0.56
75%	0.47	0.50	0.54	0.57	0.59	0.61
80%	0.54	0.56	0.60	0.63	0.64	0.66
85%	0.61	0.63	0.66	0.69	0.70	0.72
90%	0.69	0.71	0.73	0.76	0.77	0.79
95%	0.78	0.80	0.82	0.84	0.85	0.86
100%	0.89	0.90	0.92	0.94	0.95	0.96

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

APPENDIX B– HYDROLOGIC OUTPUT

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park Master Drainage Plan



J:\sdskproj\205\2014\Documents\Master Drainage Plan\Grand Park Master Drainage Plan.doc

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

ummary of Results

100-yr Existing Conditions

Hydrologic Element	Discharge Peak	Time of Peak	Volume (ac	Drainage Area
Basin E6	19.324		2.2342	0.064
DP 6	19.324		2.2342	0.064
Reach-4	19.148		2.1672	0.064
Basin E7	33.958		5.6703	0.287
DP 7	50.463		7.8376	0.351
Basin E4	39.604		6.0580	0.244
DP 4	39.604		6.0580	0.244
Reach-2	39.456		5.9452	0.244
Basin E5	93.513		13.188	0.345
DP 5	93.513		13.188	0.345
Reach-3	93.055		13.103	0.345
Basin E8	14.739		2.8117	0.077
DP 8	144.80		21.860	0.666
Basin E3	5.9553		0.75839	0.038
DP 3	5.9553		0.75839	0.038
Basin E2	40.212		5.8967	0.297
DP 2	40.212		5.8967	0.297
Basin E1	18.510		2.1992	0.110
DP 1	18.510		2.1992	0.110
Basin L2	22.406		3.3349	0.168
DP 10	22.406		3.3349	0.168
Reach-5	22.211		3.3140	0.168
Basin L1	172.59		37.471	0.975
DP 9	182.22		40.785	1.143
Reach-1	182.13		40.424	1.143
Basin L3	27.551		3.2445	0.093
DP 11	189.24		43.668	1.236

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

mmary of Results

2-yr Existing Conditions

Hydrologic Element	Discharge Peak	Time of Peak	Volume (ac	Drainage Area
Basin E6	0.74542		0.18222	0.064
DP 6	0.74542		0.18222	0.064
Reach-4	0.73971		0.17154	0.064
Basin E7	2.8198		0.40225	0.287
DP 7	2.8510		0.57379	0.351
Basin E4	2.3979		0.38328	0.244
DP 4	2.3979		0.38328	0.244
Reach-2	2.3772		0.37110	0.244
Basin E5	3.9164		1.2088	0.345
DP 5	3.9164		1.2088	0.345
Reach-3	3.9070		1.1925	0.345
Basin E8	0.65430		0.24698	0.077
DP 8	6.9324		1.8106	0.666
Basin E3	0.49955			0.038
DP 3	0.49955			0.038
Basin E2	3.3527		0.41665	0.297
DP 2	3.3527		0.41665	0.297
Basin E1	1.5772		0.15453	0.110
DP 1	1.5772		0.15453	0.110
Basin L2	1.8632		0.23569	0.168
DP 10	1.8632		0.23569	0.168
Reach-5	1.8544		0.23475	0.168
Basin L1	8.6585		3.5367	0.975
DP 9	9.1755		3.7714	1.143
Reach-1	9.1722		3.7080	1.143
Basin L3	1.0660		0.26461	0.093
DP 11	9.5213		3.9726	1.236

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

mmary of Results

Project : Grand Park   Run Name : Run 2

100-year Developed Conditions

Hydrologic Element	Discharge Peak	Time of Peak	Volume (ac	Drainage Area
Basin E6	58.514		4.3100	0.064
DP 6	58.514		4.3100	0.064
Reach-4	58.266		4.1881	0.064
Basin E7	369.67		28.966	0.287
DP 7	389.07		33.154	0.351
Basin E4	104.03		11.402	0.244
DP 4	104.03		11.402	0.244
Reach-2	103.96		11.289	0.244
Basin E5	224.62		25.350	0.345
DP 5	224.62		25.350	0.345
Reach-3	222.28		25.248	0.345
Basin E8	48.024		5.1549	0.077
DP 8	371.66		41.692	0.666
Basin E3	11.596		1.0982	0.038
DP 3	11.596		1.0982	0.038
Basin E2	74.579		8.5401	0.297
DP 2	74.579		8.5401	0.297
Basin E1	36.219		3.1821	0.110
DP 1	36.219		3.1821	0.110
Basin L2	28.249		3.3581	0.168
DP 10	28.249		3.3581	0.168
Reach-5	27.823		3.3345	0.168
Basin L1	176.12		33.408	0.975
DP 9	186.02		36.743	1.143
Reach-1	185.60		36.398	1.143
Basin L3	94.340		7.2045	0.093
DP 11	196.72		43.602	1.236

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

mmary of Results

Project : Grand Park Run Name : Run 4

2-year Developed Conditions

Hydrologic Element	Discharge Peak	Time of Peak	Volume (ac	Drainage Area
Basin E6	7.4256		0.76401	0.064
DP 6	7.4256		0.76401	0.064
Reach-4	7.2605		0.78619	0.064
Basin E7	90.356		7.8460	0.287
DP 7	90.390		8.6321	0.351
Basin E4	6.2238		1.3307	0.244
DP 4	6.2238		1.3307	0.244
Reach-2	6.1836		1.2996	0.244
Basin E5	34.032		4.9823	0.345
DP 5	34.032		4.9823	0.345
Reach-3	33.888		4.9611	0.345
Basin E8	6.1455		0.91482	0.077
DP 8	44.126		7.1755	0.666
Basin E3	0.57987			0.038
DP 3	0.57987			0.038
Basin E2	3.7038		0.57448	0.297
DP 2	3.7038		0.57448	0.297
Basin E1	1.8115		0.21388	0.110
DP 1	1.8115		0.21388	0.110
Basin L2	2.4079		0.23600	0.168
DP 10	2.4079		0.23600	0.168
Reach-5	2.3886		0.23524	0.168
Basin L1	7.4891		2.7233	0.975
DP 9	8.2402		2.9585	1.143
Reach-1	8.2230		2.9043	1.143
Basin L3	15.280		1.4853	0.093
DP 11	16.616		4.3897	1.236

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Detention Calculations – AutoCAD Hydrology Method

Design Point 4 – Elk Creek at Railroad

Detention Basin Storage

InFlow File:

Pond Name:

Rainfall Distribution		Type II	
Rainfall Frequency		100 years	
Drainage Area	ac	156.8000	Select
Peak Inflow, qi	cfs	104.0000	
Peak Outflow, qo	cfs	39.6000	
Runoff Flow	in	0.8600	

Runoff Volume	acft	11.2366
Storage Volume	acft	3.7181
Maximum Storage Elevation	ft	0.0000

New | Load | Save | Pond | SS Curve

Data Input | HydroGraph | Output | OK | Cancel | Help

Design Point 6 – Unknown Drainage Culvert at Railroad

Detention Basin Storage

InFlow File:

Pond Name:

Rainfall Distribution		Type II	
Rainfall Frequency		100 years	
Drainage Area	ac	41.0000	Select
Peak Inflow, qi	cfs	58.5000	
Peak Outflow, qo	cfs	19.3000	
Runoff Flow	in	1.2500	

Runoff Volume	acft	4.2706
Storage Volume	acft	1.5368
Maximum Storage Elevation	ft	0.0000

New | Load | Save | Pond | SS Curve

Data Input | HydroGraph | Output | OK | Cancel | Help

Basin file saved successfully.

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Design Point 9 – Leland Creek at Railroad

Detention Basin Storage

InFlow File:

Pond Name:

Rainfall Distribution		Type II
Rainfall Frequency		100 years
Drainage Area	ac	732.5000
Peak Inflow, qi	cfs	186.0200
Peak Outflow, qo	cfs	148.8000
Runoff Flow	in	0.5900

Runoff Volume	acft	36.0123
Storage Volume	acft	6.3375
Maximum Storage Elevation	ft	0.0000

New | Load | Save | Pond | SS Curve

Data Input | HydroGraph | Output | OK | Cancel | Help

Design Point 8 – Elk Creek at US 40 Boundary

Detention Basin Storage

InFlow File:

Pond Name:

Rainfall Distribution		Type II
Rainfall Frequency		100 years
Drainage Area	ac	427.1000
Peak Inflow, qi	cfs	371.6600
Peak Outflow, qo	cfs	144.8000
Runoff Flow	in	1.1300

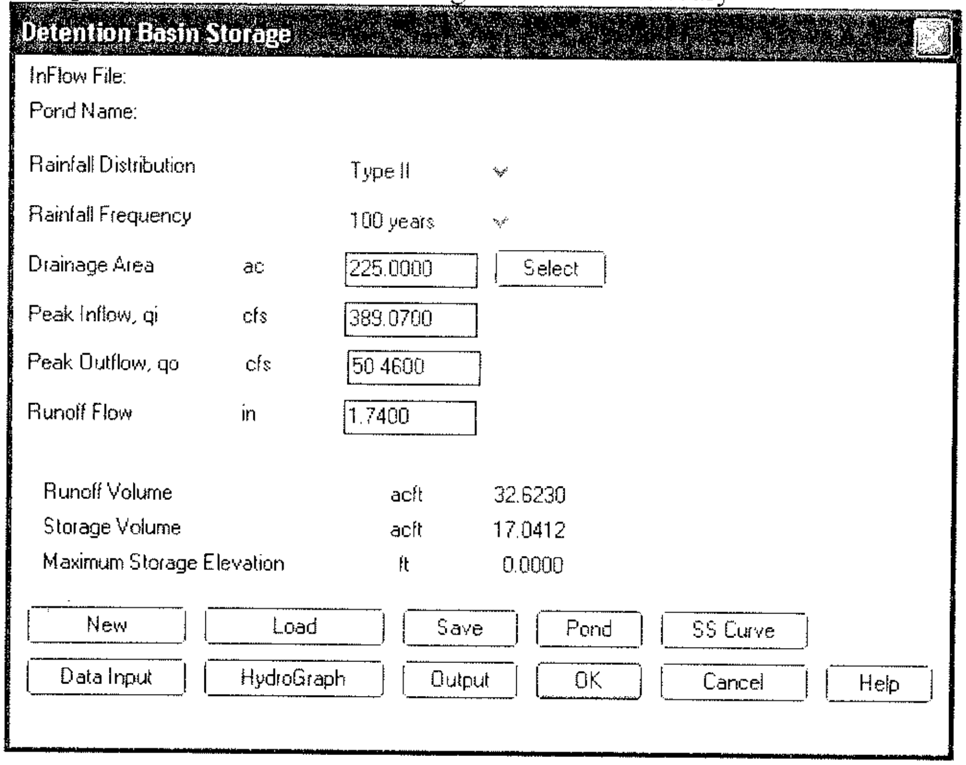
Runoff Volume	acft	40.2161
Storage Volume	acft	13.1208
Maximum Storage Elevation	ft	0.0000

New | Load | Save | Pond | SS Curve

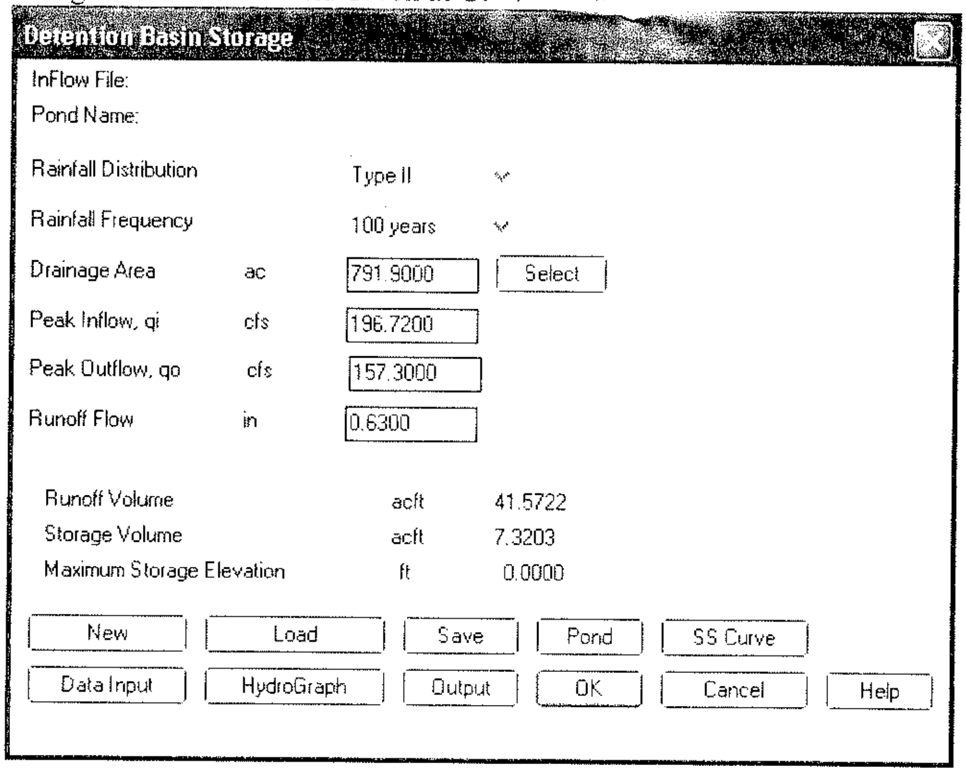
Data Input | HydroGraph | Output | OK | Cancel | Help

Basin file saved successfully.

Design Point 7 – Unknown Drainage at US 40 Boundary



Design Point [illegible] – Leland Creek at US 40 Boundary



Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Detention Volumes and Release Rates

Design Point 4 - Elk Creek at Railroad

Basin	Area (acres)	% Imperviousness	Type B	Type C
E4	156.6	26%	78%	22%

UDCFD Volume 2, Section3.2.2 Empirical Equations for Sizing On-site Detention Storage Volumes

$$V_i = K_i{*}A$$

$$K_{100} = \frac{(1.78I - 0.002I^2 - 3.56)}{900}$$

$$K_{10} = \frac{(0.95I - 1.90)}{1000}$$

I =	26.00	total ratio
Area =	156.6	acres

K_{100} = 0.046
K_{10} = 0.023

V_{100} = 7.198 acre-feet
V_{10} = 3.570 acre-feet

UDCFD Volume 2, Section 3.2.1 Allowable Release Rates

From Table SO-1 Maximum Allowable Unit Flow Release Rates:

	Soil Group B	C & D
10 year Flow	0.305	0.365
100 year Flow	0.460	0.560

10 yr Release Rate = 49.83 cfs
100 yr Release Rate = 75.48 cfs

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Detention Volumes and Release Rates

Design Point 6 - Unknown Drainage Culvert

Basin	Area (acres)	% Imperviousness	Type B	Type C
E6	41	41%	38%	62%

UDCFD Volume 2, Section3.2.2 Empirical Equations for Sizing On-site Detention Storage Volumes

$$V_i = K_i{}^*A$$

$$K_{100} = \frac{(1.78I - 0.002I^2 - 3.56)}{900}$$

$$K_{10} = \frac{(0.95I - 1.90)}{1000}$$

I =	41.00	total ratio
Area =	41	acres

K_{100} = 0.073
K_{10} = 0.037

V_{100} = 3.009 acre-feet
V_{10} = 1.519 acre-feet

UDCFD Volume 2, Section 3.2.1 Allowable Release Rates

From Table SO-1 Maximum Allowable Unit Flow Release Rates:

	Soil Group B	C & D
10 year Flow	0.365	0.425
100 year Flow	0.500	0.580

10 yr Release Rate =	16.49	cfs
100 yr Release Rate =	22.53	cfs

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Detention Volumes and Release Rates

Design Point 9 - Leland Creek at Railroad

Basin	Area (acres)	% Imperviousness	A*I	(A*I)/ΣA	Type B	Type C
L1	624.8	15%	93.72	12.79%	75%	25%
L2	107.7	2%	2.1546	0.29%	100%	0%
Total	732.5			13.09%		

UDCFD Volume 2, Section3.2.2 Empirical Equations for Sizing On-site Detention Storage Volumes

$$V_i = K_i * A$$

$$K_{100} = \frac{(1.78I - 0.002I^2 - 3.56)}{900}$$

$$K_{10} = \frac{(0.95I - 1.90)}{1000}$$

I =	13.09	total ratio
Area =	732.5	acres

K_{100} = 0.022
K_{10} = 0.011

V_{100} = 15.785 acre-feet
V_{10} = 7.716 acre-feet

UDCFD Volume 2, Section 3.2.1 Allowable Release Rates

From Table SO-1 Maximum Allowable Unit Flow Release Rates:

	Soil Group B	C & D
10 year Flow	0.230	0.310
100 year Flow	0.410	0.535

10 yr Release Rate =	180.94	cfs
100 yr Release Rate =	319.78	cfs

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Detention Volumes and Release Rates

Design Point 8 - Elk Creek at US 40 Boundary

Basin	Area (acres)	% Imperviousness	A*I	(A*I)/ΣA	Type B	Type C	Type A
E4	156.6	26%	40.7264	9.54%	78%	22%	0.00%
E5	221.0	36%	79.5492	18.62%	26%	.74%	0.00%
E8	49.5	32%	15.84	3.71%	24%	74%	2%
Total	427.1			28.16%			

UDCFD Volume 2, Section3.2.2 Empirical Equations for Sizing On-site Detention Storage Volumes

$V_i = K_i{*}A$

$$K_{100} = \frac{(1.78I - 0.002I^2 - 3.56)}{900}$$

$$K_{10} = \frac{(0.95I - 1.90)}{1000}$$

I = 28.16 total ratio
Area = 427.1 acres

$K_{100} =$ 0.050
$K_{10} =$ 0.025

$V_{100} =$ **21.346** **acre-feet**
$V_{10} =$ **10.615** **acre-feet**

UDCFD Volume 2, Section 3.2.1 Allowable Release Rates

From Table SO-1 Maximum Allowable Unit Flow Release Rates:

	Soil Group B	C & D	A
10 year Flow	0.325	0.385	0.260
100 year Flow	0.475	0.570	0.375

10 yr Release Rate = 152.75 cfs
100 yr Release Rate = 224.96 cfs

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Detention Volumes and Release Rates

Design Point 7 - Unknown Drainage at US 40 Boundary

Basin	Area (acres)	% Imperviousness	A*I	(A*I)/ΣA	Type B	Type C	Type A
E6	41.0	41%	16.8182	7.48%	38%	62%	0%
E7	184.0	73%	134.2835	59.69%	17%	54%	29%
Total	225.0			67.17%			

UDCFD Volume 2, Section3.2.2 Empirical Equations for Sizing On-site Detention Storage Volumes

$V_i = K_i{*}A$

$$K_{100} = \frac{(1.78I - 0.002I^2 - 3.56)}{900}$$

$$K_{10} = \frac{(0.95I - 1.90)}{1000}$$

I =	67.17	total ratio
Area =	225.0	acres

$K_{100} =$ 0.119
$K_{10} =$ 0.062

$V_{100} =$ **26.739** **acre-feet**
$V_{10} =$ **13.927** **acre-feet**

UDCFD Volume 2, Section 3.2.1 Allowable Release Rates

From Table SO-1 Maximum Allowable Unit Flow Release Rates:

	Soil Group B	C & D	A
10 year Flow	0.510	0.555	0.470
100 year Flow	0.605	0.665	0.545

10 yr Release Rate = 118.15 cfs
100 yr Release Rate = 140.30 cfs

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Grand Park - Existing Conditions
HCE Project No. 2052014.00
Detention Volumes and Release Rates

Design Point 11 - Leland Creek at US 40 Boundary

Basin	Area (acres)	% Imperviousness	A*I	(A*I)/ΣA	Type B	Type C	Type A
L1	624.8	15%	93.72	11.84%	75%	25%	0.00%
L2	107.7	2%	2.1546	0.27%	100%	0%	0.00%
L3	59.4	47%	27.89727	3.52%	41%	58%	2%
Total	791.9			15.63%			

UDCFD Volume 2, Section3.2.2 Empirical Equations for Sizing On-site Detention Storage Volumes

$V_i = K_i*A$

$$K_{100} = \frac{(1.78I - 0.002I^2 - 3.56)}{900}$$

$$K_{10} = \frac{(0.95I - 1.90)}{1000}$$

I =	15.63	total ratio
Area =	791.9	acres

K_{100} = 0.026
K_{10} = 0.013

V_{100} = 20.917 acre-feet
V_{10} = 10.254 acre-feet

UDCFD Volume 2, Section 3.2.1 Allowable Release Rates

From Table SO-1 Maximum Allowable Unit Flow Release Rates:

	Soil Group B	C & D	A
10 year Flow	0.250	0.240	0.170
100 year Flow	0.420	0.540	0.300

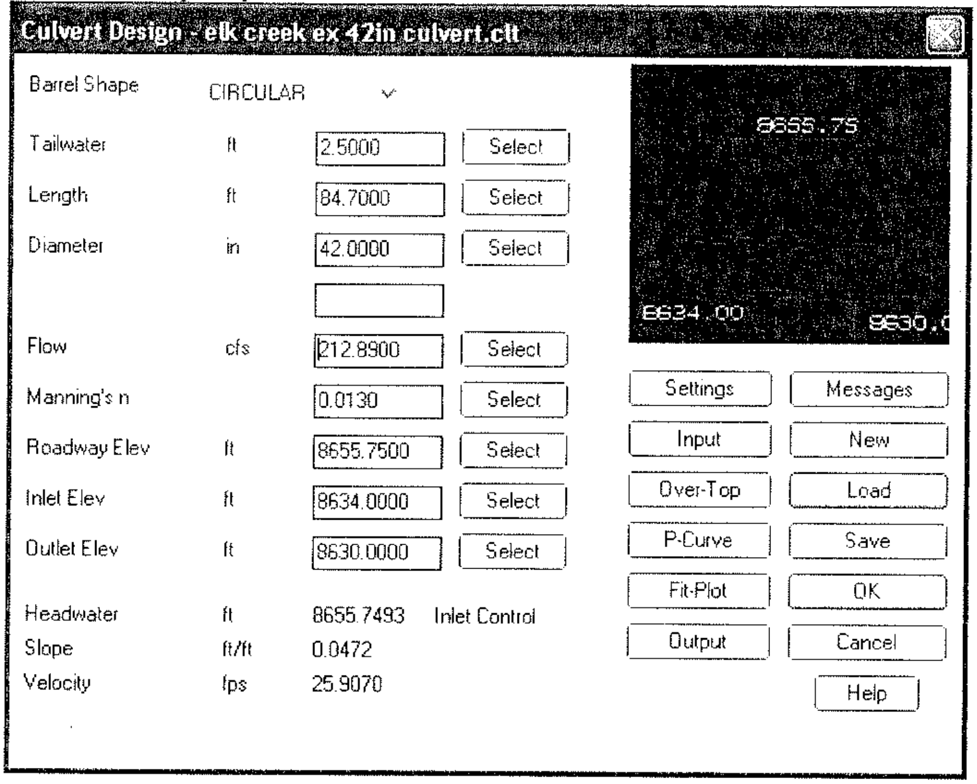
10 yr Release Rate = 195.91 cfs
100 yr Release Rate = 355.23 cfs

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

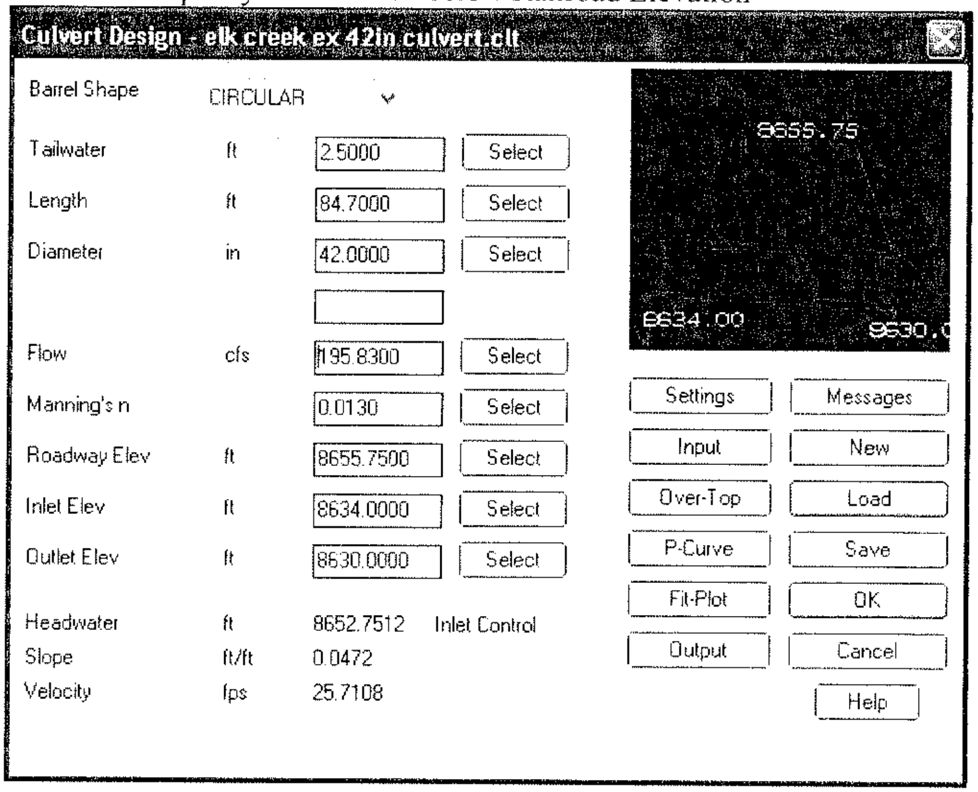
APPENDIX C – CULVERT CALCULATIONS

Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Elk Creek Capacity – Flow at Railroad Elevation



Elk Creek Capacity – Flow at 3' below Railroad Elevation



Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

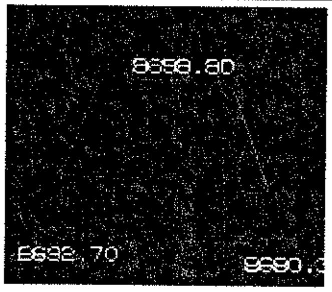
Unknown Drainage Capacity – Flow at Railroad Elevation

Culvert Design - unknown drainage culvert.clt

Barrel Shape: CIRCULAR

Tailwater	ft	3.0000	Select
Length	ft	89.2400	Select
Diameter	in	48.0000	Select
Flow	cfs	121.1000	Select
Manning's n		0.0240	Select
Roadway Elev	ft	8698.8000	Select
Inlet Elev	ft	8692.7000	Select
Outlet Elev	ft	8680.3200	Select

Headwater	ft	8698.7988	Inlet Control
Slope	ft/ft	0.1387	
Velocity	fps	22.0371	



Settings | Messages | Input | New | Over-Top | Load | P-Curve | Save | Fit-Plot | OK | Output | Cancel | Help

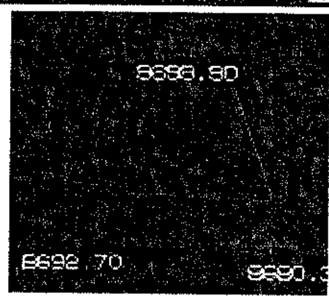
Unknown Drainage Capacity – Flow at 3' below Railroad Elevation

Culvert Design - unknown drainage culvert.clt

Barrel Shape: CIRCULAR

Tailwater	ft	3.0000	Select
Length	ft	89.2400	Select
Diameter	in	48.0000	Select
Flow	cfs	56.4500	Select
Manning's n		0.0240	Select
Roadway Elev	ft	8698.8000	Select
Inlet Elev	ft	8692.7000	Select
Outlet Elev	ft	8680.3200	Select

Headwater	ft	8695.8045	Inlet Control
Slope	ft/ft	0.1387	
Velocity	fps	17.8792	



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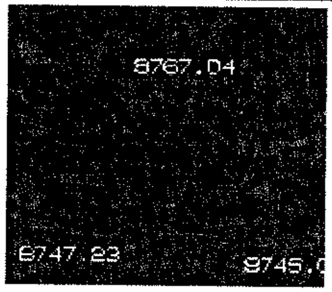
Excerpt from High Country Engineering Final Drainage Report for Town Center at Grand Park

Leland Creek Capacity – Flow at Railroad Elevation

Culvert Design - leland creek ex 48in culvert.clt

Barrel Shape		CIRCULAR	
Tailwater	ft	3.0000	Select
Length	ft	85.4000	Select
Diameter	in	48.0000	Select
Flow	cfs	261.0900	Select
Manning's n		0.0130	Select
Roadway Elev	ft	8767.0400	Select
Inlet Elev	ft	8747.2300	Select
Outlet Elev	ft	8745.0400	Select
Headwater	ft	8767.0396	Inlet Control
Slope	ft/ft	0.0256	
Velocity	fps	20.7769	



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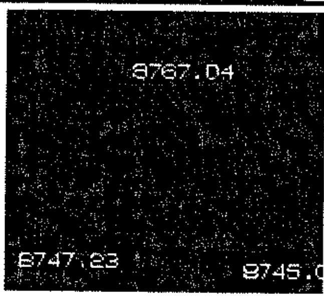
Leland Creek Capacity – Flow at 3' below Railroad Elevation

Culvert Design - leland creek ex 48in culvert.clt

Barrel Shape		CIRCULAR	
Tailwater	ft	3.0000	Select
Length	ft	85.4000	Select
Diameter	in	48.0000	Select
Flow	cfs	237.2000	Select
Manning's n		0.0130	Select
Roadway Elev	ft	8767.0400	Select
Inlet Elev	ft	8747.2300	Select
Outlet Elev	ft	8745.0400	Select
Headwater	ft	8764.0393	Inlet Control
Slope	ft/ft	0.0256	
Velocity	fps	18.8758	



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water

MDPI

Article

A Pragmatic Slope-Adjusted Curve Number Model to Reduce Uncertainty in Predicting Flood Runoff from Steep Watersheds

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Abstract: The applicability of the curve number (CN) model to estimate runoff has been a conundrum for years, among other reasons, because it presumes an uncertain fixed initial abstraction coefficient ($\lambda = 0.2$), and because choosing the most suitable watershed CN values is still debated across the globe. Furthermore, the model is widely applied beyond its originally intended purpose. Accordingly, there is a need for more case-specific adjustments of the CN values, especially in steep-slope watersheds with diverse natural environments. This study scrutinized the λ and watershed slope factor effect in estimating runoff. Our proposed slope-adjusted CN ($CN_{II\alpha}$) model used data from 1779 rainstorm–runoff events from 39 watersheds on the Korean Peninsula (1402 for calibration and 377 for validation), with an average slope varying between 7.50% and 53.53%. To capture the agreement between the observed and estimated runoff, the original CN model and its seven variants were evaluated using the root mean square error (RMSE), Nash–Sutcliffe efficiency (NSE), percent bias (PB), and 1:1 plot. The overall lower RMSE, higher NSE, better PB values, and encouraging 1:1 plot demonstrated good agreement between the observed and estimated runoff by one of the proposed variants of the CN model. This plausible goodness-of-fit was possibly due to setting $\lambda = 0.01$ instead of 0.2 or 0.05 and practically sound slope-adjusted CN values to our proposed modifications. For more realistic results, the effects of rainfall and other runoff-producing factors must be incorporated in CN value estimation to accurately reflect the watershed conditions.

Keywords: initial abstraction coefficient; slope-adjusted curve number; rainfall; precise runoff; model accuracy

1. Introduction

There is plethora of process-based hydrological models, but they require extensive data, which is a limitation in ungauged watersheds. These process-based models are broadly used to estimate and/or predict hydrologic processes across landscapes and to assess the corresponding impacts of land use/cover changes [1]. Rainfall-runoff modeling is among the most fundamental concepts in hydrology, providing a starting point to estimate flood peaks and design structures. The rainfall-runoff process is a dynamic and complex hydrological phenomenon affected by different physical factors and their interactions [2]. Due to the non-linear relationship between rainfall and runoff, the development of a robust model to predict runoff in ungauged watersheds is difficult and time-consuming [3]. The least complex model that reliably meets the anticipated application is often preferable [4]. The advantages of the Natural Resources Conservation Service (NRCS) curve number (CN) [1] model are its simplicity, predictability, and dependence on only one parameter. The CN model has well-documented data, has been globally tested, and has a rich literature. The CN is a function of soil permeability/infiltration capacity, land use/cover, and other runoff-producing conditions of a watershed; it quantifies direct runoff, requiring only the cumulative rainfall depth and the watershed's CN [5]. The initial abstraction coefficient (λ) and the CN in the CN model are vital to accurately estimate runoff from a watershed [6].

1.1. The CN Model Framework

The CN model is structured to quantify runoff depth (Q) using the cumulative rainstorm depth (P) and maximum potential water retention amount (S), a measure of the ability of a watershed to abstract and retain storm precipitation. Here, P, S, and Q are measured in millimeters.

$$Q = \frac{(P - \lambda S)^2}{P + (1 - \lambda)S} \text{ for } P \geq \lambda S Q = 0 \text{ otherwise} \tag{1}$$

The initial abstraction is the rainstorm depth required before runoff begins. Originally, it was taken as $I_a = \lambda S = 0.2S$; here, S (mm) is related to CN via

$$CN = 100\left(\frac{x}{x + S}\right) \text{ or } S = x\left(\frac{100}{CN} - 1\right) \text{ for } x = 254 \text{ mm (or 10 in)} \tag{2}$$

The dimensionless CN varies from 0 to 100 [5]. Handbook tables for CN selection are based on soil types and land use/land cover. The threshold of λ = 0.2 is being actively debated across the globe for its inconsistent watershed runoff estimation because λ = 0.05 has been found to be much more representative [2]. Nevertheless, essentially all handbook CN table values correspond to λ = 0.2. The corresponding *S* for λ = 0.05 is different from that for λ= 0.2 and, hence, the resulted runoff values are different. The adjustment of CN from λ = 0.2 to λ = 0.05 has recently been adopted by the Task Group on Curve Number Hydrology [5], which recommends a new relation as $S_{0.05} = 1.42S_{0.2}$, and leads to

$$CN_{0.05} = \frac{100}{1.42 - 0.0042CN_{0.2}} \tag{3}$$

Several studies have shown considerable differences between handbook-tabulated CN values based on land cover/use and those estimated from watershed observations of rainfall–runoff events [2,5,7–10]. The differences are more prominent with smaller CN values and land types not clearly described in the CN tables [5]. Different studies have evidenced runoff prediction from different biomes using λ < 0.2 values [2,10–16], suggesting λ in the range of 0.01 to 0.05.

1.2. Effect of Slope on CN and Runoff Estimation

There is no handbook convention but, intuitively, higher-sloped watersheds should have higher CN values. Several CN-based models have documented positive slope-adjustment techniques [10,17–24]. However, some mild negative relationships for limited data are also available [5]. Steep slopes generally give a higher potential for runoff [25], but the impact of slope steepness on runoff generation is a debatable topic. Researchers from different biomes have reported increases in runoff that were attributed to a decrease in infiltration, less detention storage and ponding depth, and high flow velocity [10,19–22,25,26]. Some researchers have captured reduced runoff generation per unit of slope length from steep-slope watersheds with pronounced decreasing storm duration, which might be due to thinning and/or disruption of the crust, differential soil cracking, formation of rills, and more ponding depth [27–33]. However, other studies [34,35] found insignificant effects of slope steepness on runoff. These discrepancies are possibly due to contradiction in experimental settings, as well as land cover and use differences.

To accurately estimate runoff, the CN values found in handbook tables are more effective for rain-fed agricultural watersheds, are less efficient for semi-arid watersheds, and are least successful for forested watersheds [36]. The CN model has a spotty and inconsistent performance history for some forested watersheds (i.e., those in which infiltration potential usually exceeds the rainfall intensities), and for frequent, low-volume, and low-intensity rainfalls. Some researchers found notable problems associated with the tabulated CN values for heavy land cover and humid, forested watersheds, suggesting that the model is inapplicable for runoff estimation in such watersheds [2,9]. For many years, the CN values obtained from handbook tables have been problematic and may need case-specific adjustment when applied in regions with more complex natural environments. The accuracy of the CN value is vital in runoff estimation [37]. The objective of this study was to frame a practically sound slope-adjusted CN equation that could follow the CN theoretical limits (0, 100) and enhance the runoff prediction capability of the CN model from rainstorm events in steep-sloped watersheds.

2. Materials and Methods

2.1. Study Area Description and Climate

South Korea is typical of regions largely influenced by complicated geographical features. Its precipitation patterns have diverse seasonal and regional variability [38]. The elevation (area) of the watersheds included in this study vary from 26 m (42.32 km^2) to 911 m (879.10 km^2) above mean sea level. The average slope of the watershed ranges between 7.50% and 53.53%. The majority of the land cover (about 70.50%) is upland forests, followed by 20.26% agricultural land, urban areas (5.22%), grassland (1.56%), and other land cover distribution (2.45%). The dominant soil types are loam and sandy loam, with some fractions of silt loam. The location of watersheds is shown in Figure 1, and other details can be found in [10].

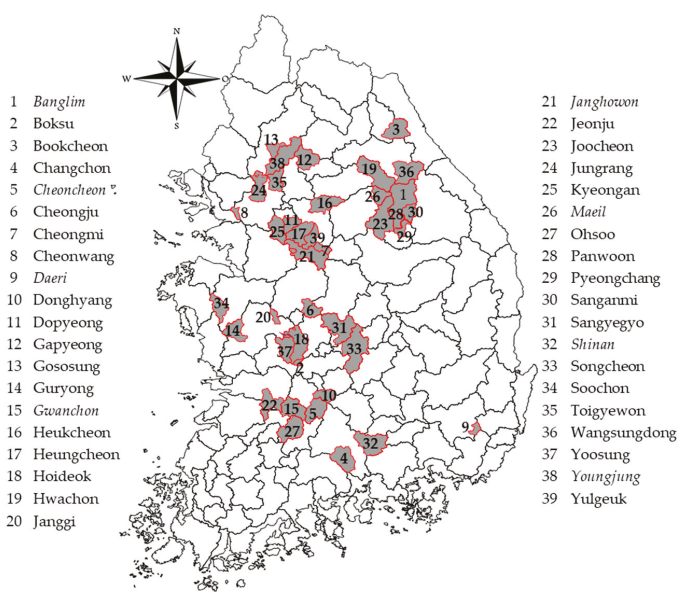

Figure 1. Location of watersheds in the study area. The watersheds in italics were used for validation.

The climatic patterns over the study area are quite variable due to the Asian monsoon. Winter is extremely dry and cold, and summer is warm and moist with frequent heavy rainstorms [38]. The mean annual precipitation (from 1970 to 2000) ranged between 1000 and 1800 mm from the central to the southern regions. Approximately 50% to 60% of this precipitation falls at a high intensity and short duration from July to September [10].

2.2. Data Collection and Interpretation

Continuous rainfall and discharge data (from 2005 to 2012) for this study were collected from the Hydrological Survey Center (HSC) of South Korea. The straight-line hydrograph approach was used to separate direct runoff from the total discharge [10]. For any rain event, the prior five days' cumulative rainfall (P_5) was used to identify the watershed antecedent moisture [10,20,22,39]. The watershed weighted curve number (CN_{II}) corresponding to the normal conditions were derived from the documented tables on the basis of land use/cover and soil types. The CN_I (CN_{III}) for dry (wet) conditions were adjusted as recommended by Mishra et al. [40].

2.3. Slope-Adjusted Curve Number Considerations and Development

Although the CN model is extensively used for predicting runoff from ungauged watersheds, one study found considerable uncertainties when tabulated CN values were applied to estimate runoff from 10 mountainous, forested watersheds in the eastern United States [9]. Similarly, another study [41] observed substantial change in the watershed CN values, ranging from 55 to 70. Moreover, the use of hydrologic soil group D (and its corresponding CN) for forested, mountainous watersheds is incompatible with the National Engineering Handbook [42] guidelines. Although very limited attention has been given to incorporate slope factors in the existing CN models [43], one study reported that adjusting handbook CN values for slope factors significantly enhanced the predicted runoff [26]. To better capture the watershed response in runoff prediction, a slope-adjusted CN is required for steep-slope, mountainous watersheds [10].

Assuming that the handbook CN value is appropriate for a 5% slope [10,17,19,20,22,23], it needs to be adjusted for steep-slope watersheds. To improve the runoff prediction capability of the CN model, the slope-adjusted CN suggested by Sharpley and Williams [17] is generally expressed as

$$CN_{II\alpha} = a(CN_{III} - CN_{II})(1 - be^{-c\times\alpha}) + CN_{II} \quad (4)$$

where $CN_{II\alpha}$ is the slope-adjusted CN for the antecedent runoff condition representing the watershed normal moisture (ARC-II), CN_{II} and CN_{III} are the handbook CN values obtained from watershed characteristics for ARC-II and ARC-III (wet condition), and α is the watershed average soil slope (m/m). The approach of Sharpley and Williams [17] has three empirical parameters—a, b, and c—with optimized values of 1/3, 2, and 13.86, respectively. Their adjusted relationship leads to

$$CN_{II\alpha} = \left(\frac{CN_{III} - CN_{II}}{3}\right)(1 - 2e^{-13.86\alpha}) + CN_{II} \quad (5)$$

Retaining the assumption of Sharpley and Williams [17] for CN_{II} values applicable to a 5% average slope, another study [23] developed the following relationship to adjust CN values for other slopes:

$$S_{II\alpha} = S_{II}\left(1.1 - \frac{\alpha}{\alpha + e^{(3.7+0.02117\alpha)}}\right) \quad (6)$$

where S_{II} and $S_{II\alpha}$ are the S values for normal moisture condition and slope-adjusted normal moisture conditions, respectively, and α is the watershed mean slope in percentage. The slope-adjusted CN can be obtained from the above equation using the general S and CN interrelationship as it is found in Equation (2). According to Huang et al. [19], the approach in Sharpley and Williams [17] has not been intensively verified in the field. Hence, they adopted a simplified approach for the $CN_{II\alpha}$ determination on the basis of their experiments for soil slopes ranging between 0.14 and 1.40, and proposed the following relationship:

$$CN_{II\alpha} = CN_{II}\left(\frac{322.79+15.63\alpha}{\alpha+323.52}\right) \tag{7}$$

However, this relationship is unstable because it does not follow the CN theoretical limits.

An investigation by Garg et al. [26] showed that the differences between the tabulated CN values and those calculated from the approach in Huang et al. [19] were very small when compared to that of Sharpley and Williams [17]. This is why the approach in Huang et al. [19] depicted modest improvement in estimating large as well as small runoff events and produced results very close to the original CN model with handbook CN values. Any underestimation of the runoff events using the approach in Huang et al. [19] can be attributed to the empirically selected numerical constants of Equation (7), and needs validation using the measured rainfall-runoff data.

In another study, Ajmal et al. [10] developed a slope-adjusted average CN relationship using data from 39 mountainous watersheds. They calibrated the $CN_{II\alpha}$ using 1402 measured rainfall-runoff events from 31 watersheds and validated this with 377 rainfall–runoff events from the remaining eight watersheds. This is represented as

$$CN_{II\alpha} = CN_{II}\left[\frac{1.9274\alpha+2.13273}{\alpha+2.1791}\right] \tag{8}$$

The above relationship was derived on the basis of data from watersheds with an average slope between 7.50% and 53.53%, where, besides other typical watershed geophysical characteristics, most of the area (approximately 70.50%) was covered with upland forests. However, their approach was also inconsistent with the CN theoretical limits on the basis of the presumption that the CN tables were originally developed with a 5% average slope in their experimental plots [10,17,19]. Knowing CN_{II}, CN_{III}, and α as the mean slope of a watershed, the proposed slope-adjusted CN ($CN_{II\alpha}$) in its general form is presented as

$$CN_{II\alpha} = \left(\frac{CN_{III} - CN_{II}}{2}\right)\left[1 - e^{-b\times(\alpha-0.05)}\right] + CN_{II} \tag{9}$$

2.4. Steps of Slope-Adjusted CN Parameter Optimization

1. Data pertaining to 39 watersheds in which 1779 rainstorms events occurred provided the known values of the rainstorm events, P; the observed runoff, Q_o; and the optimized CNs for each watershed. The least squares nonlinear orthogonal distance regression objective function in Origin Pro 9.6 software produced the optimized CN values from the following equation.

$$\sum_{i=1}^{n}(Q_o - Q_e)^2 = \sum\left\{Q_o - \left[\frac{\left(P - 0.2\times\left(\frac{25400}{CN} - 254\right)\right)^2}{P+0.8\times\left(\frac{25400}{CN} - 254\right)}\right]\right\}^2 = \text{Minimum} \tag{10}$$

2. To optimize parameter b in Equation (9), the CNs obtained for the 39 watersheds from Equation (10) were divided into two sets, those of 31 watersheds (1402 rainstorm–runoff events) for calibration and those of 8 watersheds (377 rainstorm-runoff events) for validation. For calibration, the optimized CNs in step 1 were set as the target values challenging the right side of Equation (9) using the nonlinear regression least squares Levenberg–Marquardt algorithm in SPSS v.25 software. To take into account the individual watersheds' effects on parameter b optimization, the leave-one-out (LOOV) technique was adopted. The average of 31 calibrations repetitions was the value of b = 7.125. This led to recasting the proposed $CN_{II\alpha}$ as

$$CN_{II\alpha} = \left(\frac{CN_{III} - CN_{II}}{2}\right)\left[1 - e^{-7.125\times(\alpha-0.05)}\right] + CN_{II} \tag{11}$$

This can also be represented as

$$CN_{II\alpha} = \left(0.5 - 0.714e^{-7.125\alpha}\right)\left(CN_{III} - CN_{II}\right) + CN_{II} \tag{12}$$

Introducing the CN_{III} conversion from CN_{II} after a suggestion in Mishra et al. [40] gives

$$CN_{III} = \frac{CN_{II}}{0.430 + 0.0057CN_{II}} \tag{13}$$

Imputing Equation (13) into Equation (11) and simplifying it, the proposed relationship can be recast as

$$CN_{II\alpha} = \left[\frac{CN_{II}(50 - 0.5CN_{II})}{CN_{II} + 75.43}\right] \times \left[1 - e^{-7.125(\alpha - 0.05)}\right] + CN_{II} \tag{14}$$

This proposed $CN_{II\alpha}$ relationship has twofold advantages over the previous three suggested relationships. The proposed model has only one parameter to be optimized compared to three in Sharpley and Williams [17] and Williams and Izaurralde [23], and two in Huang et al. [19], if the suggested parameter values are not applicable. Our proposed $CN_{II\alpha}$ works within the theoretical limits (i.e., 0 to 100), unlike that in Huang et al. [19], which loses its effectiveness after CN_{II} = 94.27 using the highest average slope of their watersheds. Similarly, the adjustment in Williams and Izaurralde [23] and Ajmal et al. [10] also fails to follow the CN theoretical limits. The different variants of the CN model are shown in Table 1.

Table 1. Models and their descriptions.

	Parameters		
Model Identity	**λ**	**CN ($CN_{II\alpha}$)**	**Model Expression**
M1	0.20	*NEH-4 Tables	Equations (1) and (2)
M2	0.05	NEH-4 Tables	Equations (1)–(3)
M3	0.20	Sharpley and Williams [17]	Equations (1), (2) and (5)
M4	0.20	Huang et al. [19]	Equations (1), (2) and (7)
M5	0.20	Ajmal et al. [10]	Equations (1), (2) and (8)
M6	0.20	Proposed	Equations (1), (2) and (12)
M7	0.05	Proposed	Equations (1)–(3) and (12)
M8	0.01	Proposed	Equations (1), (2) and (12)

*NEH-4: National Engineering Handbook Section-4 [42].

3. Statistical Analysis for Model Performance Evaluation

This study estimated the agreement between a series of observed and estimated runoffs using the root mean square error (RMSE), Nash–Sutcliffe efficiency (NSE), percent bias (PB) [34], and/or graphical assessments augmented with model performance ratings [44]. Mathematically, these indicators are

$$RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(Q_{oi} - Q_{ei}\right)^2} \tag{15}$$

$$NSE = 1 - \left[\frac{\sum_{I=1}^{n}\left(Q_{oi} - Q_{ei}\right)^2}{\sum_{I=1}^{n}\left(Q_{oi} - \overline{Q}_{o}\right)^2}\right] \tag{16}$$

$$PB = \left[\frac{\sum_{I=1}^{n}\left(Q_{oi} - Q_{ei}\right)}{\sum_{I=1}^{n} Q_{oi}}\right] \times 100 \tag{17}$$

where Q_{oi} and Q_{ei} are the observed and estimated runoff values for rainstorm events 1 to n, and $\overline{Q_O}$ is the mean observed runoff in each watershed. The RMSE (0 to ∞) values closer to zero depict more appropriateness of the model to estimate runoff. The NSE (−∞ to 1) illustrates how well a plot of observed vs. estimated runoff fits a 1:1 line (i.e., a perfect fit) [39]. The PB (optimum = 0) describes the average tendency of estimated values to be larger or smaller than their observed ones. Positive (negative) values indicate underestimation (overestimation) bias [44]. It is notable that perfect agreement of the estimated vs. observed data does not essentially indicate a perfect model, because observed data could have uncertainties [39]. However, we are confident about the good quality of the data used in this study. Performance evaluation of different statistical indicators and their suggested ratings [44,45] are given Table 2.

Table 2. Statistical indicators and associated performance ratings [44,45].

Performance Rating	NSE [44]	NSE [45]	PB (%)
Very good	0.75 < NSE ≤ 1.00	0.90 < NSE ≤ 1.00	−10 < PB < +10
Good	0.65 < NSE ≤ 0.75	0.80 ≤ NSE ≤ 0.90	±10 ≤ PB < ±15
Satisfactory	0.50 < NSE ≤ 0.65	0.65 ≤ NSE < 0.80	±15 ≤ PB < ±25
Unsatisfactory	NSE ≤ 0.50	NSE ≤ 0.65	PB ≥ ±25

4. Results and Discussion

The performance evaluation of the existing models (M1–M5) and our proposed approach (M6–M8) was accomplished in two steps. First, the basic statistics of the observed runoff were compared to the models' estimated runoff both for the calibration and validation watersheds. In the second step, commonly used statistical indicators were used to check the model's predictive credibility [20,34,44] in conjunction with a 1:1 plot graphical judgement between the observed and modeled runoff values [46].

4.1. Models' Analysis Based on Descriptive Statistics

The basic descriptive statistics (Table 3) favor the M8 model using the $CN_{II\alpha}$ and lower λ = 0.01 followed by the M6 and M5 models. However, the M6 model was preferred over the M5 due to its practically sound $CN_{II\alpha}$ to follow the CN theoretical bounds (0–100). In estimating runoff, the M2 model was not plausibly different from the M1 model. Therefore, lowering λ from 0.2 to 0.05, along with its corresponding CN adjustment using Equation (3), produced only modest changes in the estimated runoff values. Nonetheless, using λ = 0.05 and retaining handbook CN values without adjustment can improve the model's runoff predictive capability, which is not shown in the assessment but is reflected in the comparison of the M6 and M7 models. The majority of the existing CN model variants underestimated the runoff in different watersheds. Nevertheless, it can be inferred that the watershed CN was not the only important parameter; selecting the proper λ also played a crucial role in estimating accurate runoff. Additionally, the prominent response of CNs to the rainstorm depth was vital in runoff depth estimation [1].

Table 3. Summary statistic of rainfall (P), observed runoff (Q_o), and modeled runoff (M1–M8) in the calibration and validation watersheds.

Calibration Watersheds (1402 Rainstorm–Runoff Events)						
Parameter/Model	**Mean**	**Minimum**	**First Quartile (Q1)**	**Median**	**Third Quartile (Q3)**	**Maximum**
P	80.96	12.10	39.92	59.09	98.27	519.68
Q_o	**38.60**	**0.17**	**8.23**	**19.61**	**49.04**	**348.46**
M1	25.57	0.00	1.49	6.13	27.03	415.63
M2	23.56	0.00	1.14	7.26	25.79	**383.27**
M3	28.79	0.00	1.30	7.95	32.94	436.28
M4	26.06	0.00	1.52	6.31	28.33	419.65
M5	30.06	0.00	1.35	8.83	35.39	443.28
M6	30.26	0.00	1.23	9.38	35.34	445.73
M7	28.98	0.00	2.54	10.77	34.57	417.11
M8	**39.67**	**0.53**	**7.93**	**20.13**	**49.30**	458.55

Table 3. *Cont.*

Validation Watersheds (377 Rainstorm–Runoff Events)						
P	75.22	20.52	40.97	57.05	86.95	376.86
Q_o	**35.03**	**0.24**	**8.30**	**19.10**	**43.20**	**364.38**
M1	22.04	0.00	1.48	6.35	20.35	294.27
M2	19.85	0.00	0.85	5.55	19.93	265.59
M3	24.75	0.00	1.52	6.27	25.99	309.31
M4	22.49	0.00	1.39	6.63	21.48	296.26
M5	26.48	0.00	2.03	7.87	30.12	309.72
M6	26.07	0.00	1.71	6.66	29.04	314.48
M7	24.98	0.00	2.10	9.43	26.71	293.91
M8	**34.77**	**0.87**	**7.70**	**17.91**	**40.12**	**325.07**

Note: The highlighted values show the good agreement between the observed and the estimated runoff.

4.2. Model Performance Evaluation in Watersheds Used for Calibration

We evaluated the runoff predictability performance of the existing CN models (M1 to M5) and the proposed variants (M6 to M8) for the calibration watersheds (Figure 2). Because of minimal difference in the $CN_{II\alpha}$ values proposed by Williams and Izaurralde [23] and Sharpley and Williams [17], we compared only the latter with the other approaches. As mentioned earlier, the RMSE can vary from 0 to ∞, and a value close to zero indicates a nearly perfect fit [15,20,34]. On the basis of the RMSE (mean, median) values, the M2 (23.90, 21.91) and M3 (24.30, 21.90) models exhibited similar but improved runoff estimation compared to the M1 (26.49, 24.02) model. The mean value for all of the statistical indicators is shown on each box plot through connected lines. The M2 model's enhanced runoff estimation could be attributed to the lower $\lambda = 0.05$ [2], whereas the M3 model's improved predictability could be ascribed to $CN_{Ii\alpha}$, which was comparatively higher than the tabulated CN [17]. The M4 model (26.08, 23.78) showed almost no improvement compared to the M1 model. Comparatively better runoff prediction was found for the M5 model (23.53, 21.15), and that of the M6 model (23.23, 20.79) was almost equal in the calibration watersheds. However, the runoff predictive capabilities of the M7 model (21.06, 19.29) and M8 model (18.59, 16.87) were better, as was also evident from their overall RMSE values (Figure 2a). It can be inferred that setting a lower λ and a comparatively higher $CN_{Ii\alpha}$, as was the case in model M8, possibly reduces the infiltration and surface water retention capacity.

Following the model performance ratings shown in Table 2 and the box plot statistics (Figure 2b), the NSE (mean, median) for the M1 model (0.58, 0.63) and the M4 model (0.59, 0.64) were the smallest among the eight variants of the CN model. It must be kept in mind that the Gusosung watershed statistics were excluded, meaning the mean and median values were calculated for the remaining 30 calibration watersheds. In that particular watershed, only the M8 model showed a reasonable runoff prediction, whereas the rest of the models' performance indicators ratings were unsatisfactory. The M3 model (0.64, 0.68) results showed modest improvement, followed by the M2 (0.66, 0.71) and M5 (0.66, 0.71) models. However, the M6 (0.67, 0.72) and M7 (0.74, 0.77) models exhibited significantly improved results compared to the M1 model. In addition, the M8 model (0.80, 0.82) outperformed all the other models in the majority of the watersheds. The best performance of the M8 model is also evident from Figure 2b, followed by the M7 and M6 models, in that order. The lack of effectiveness of the M1 and M4 models could be attributed to the fixed and higher $\lambda = 0.2$ and inconsistent watershed tabulated CN values [10,15]. Similarly, on the basis of the PB performance ratings (Table 2), the accuracy runoff predictability of the different CN model variants is shown in Figure 2c. Using PB (mean, median), the order for accurately estimating runoff was M8 (−2.43, 0.67) > M7 (19.47, 18.06) > M6 (22.37, 22.51) > M5 (23.22, 21.93) > M3 (25.93, 24.46) > M2 (31.86, 31.26) > M4 (32.93, 32.41) > M1 (34.19, 33.14). In addition, Figure 2c shows that the PB values obtained from the M8 model in estimating runoff in the study area, except for two watersheds, were rated either very good, good, or at least satisfactory.

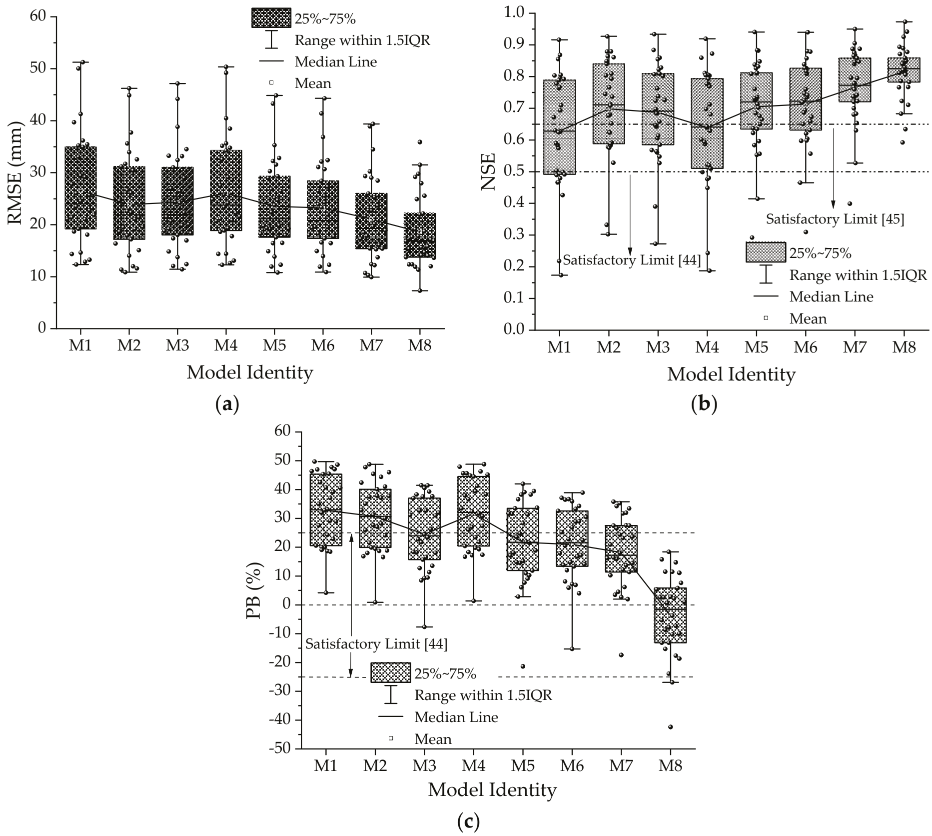

Figure 2. (**a**) Root mean square error (RMSE), (**b**) Nash–Sutcliffe efficiency (NSE), and (**c**) percent bias (PB) for eight variants of the CN model using data of 30 out of 31 calibration watersheds.

4.3. Models' Performance Evaluation in Watersheds Used for Validation

The performance of the CN model variants in the validation watersheds using the RMSE, NSE, and PB is shown in Figure 3. The superior performance of the M8 model is evident, whereas the least efficient was the M1 model with its RMSE, NSE, and PB (mean, median) values of (24.56, 22.73), (0.57, 0.60), and (36.73, 33.18), respectively. The corresponding best runoff prediction by the M8 model was recorded with RMSE (17.25, 16.07), NSE (0.80, 0.78), and PB (−0.35, −3.35). Similarly, the higher PB positive values by the M1 model in the majority of the watersheds indicated underestimation and were in the unsatisfactory range, as found by other researchers [10,20,34,44]. Nevertheless, the M8 model overestimated runoff in the majority of the watersheds, but, was within the acceptable performance range. In addition, among the remaining six variants of the CN model, the M7 model predicted more accurate runoff, followed by the M5, M6, M2, M3, and M4 models, in that order. On the basis of the PB values (Figure 3), the M8 model predicted runoff well in all the watersheds except one.

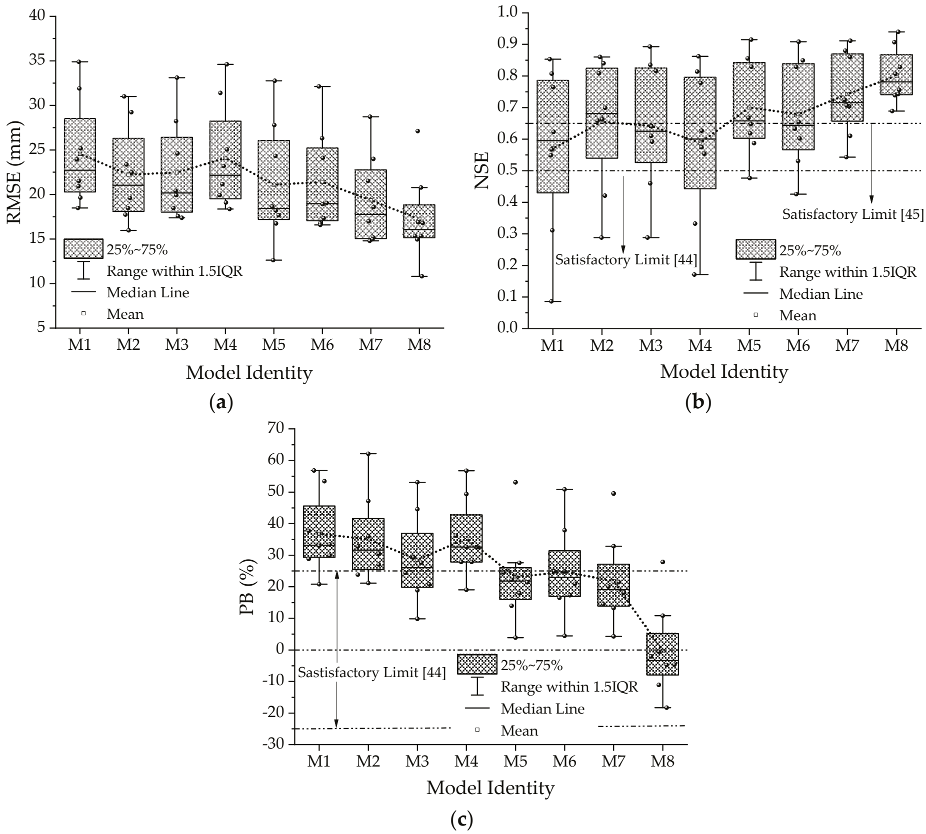

Figure 3. (**a**) RMSE, (**b**) NSE, and (**c**) PB for eight variants of the CN model using data of eight validation watersheds.

4.4. Overall Performance of Models and Comparison Based on 1:1 Plot

Table 4 summarizes the credibility of the eight variants of the CN model in estimating runoff from rainstorm events in different watersheds. It is obvious that the M8 model exhibited more accurate results for a very good performance rating based on NSE (PB) in 30 (19) out of 39 watersheds. The corresponding goodness-of-fit ratting for the M1 model was found only in 14 (1) watershed(s). Applying the model evaluation criteria recommended by Ritter and Muñoz-Carpena [45], the M1 and M4 model predictions were "satisfactorily" to "very good" in only 43.6% of the watersheds, followed by the M3, M5, M2, M6, and M7 models with their corresponding values of 53.9%, 61.5%, 64.1%, 66.7%, and 84.6% of the watersheds, respectively. The more plausible model for efficiently predicting runoff was M8 in 92.3% (36 out of 39) watersheds. It is notable that the majority of the runoff was underestimated by the M1 model, as has also been reported for rangeland and cropland in Montana and Wyoming [47], Mississippi [48], the Loess Plateau of China [19], India [20,22,26,43], South Korea [10,15], and Poland [49]. After M8, the M7 and M6 models predicted runoff more coincident with the observed values. The M4 model's inferior performance could possibly be linked to very little difference in the $CN_{II\alpha}$ and the handbook CN values ($CN_{II\alpha}$–CN), which varied in the range of 0.73 to 1.46. The corresponding CN differences for the M3, M5, and M6 models were in the range of 1.37 to 6.52, 0.73 to 11.28, and 1.15 to 9.48, respectively. It is notable that the M6 and M8 models used the same $CN_{II\alpha}$ values. The M8 model's outperformance in predicting runoff was probably because of its lower λ = 0.01, as suggested for Korean steep-slope watersheds [10], and its comparatively higher $CN_{II\alpha}$ values.

Table 4. Performance of the CN model and its variants in 39 watersheds in the study area.

	M1	M2	M3	M4	M5	M6	M7	M8
Performance Criteria				**NSE [44]**				
0.75 < NSE ≤ 1.00	14	15	14	14	14	14	20	30
0.65 < NSE ≤ 0.75	3	10	7	3	10	12	13	6
0.50 < NSE ≤ 0.65	10	9	13	13	11	9	4	2
NSE ≤ 0.50	12	5	5	9	4	4	2	1
				NSE [45]				
0.90 < NSE ≤ 1.00	1	1	1	1	2	2	3	5
0.80 ≤ NSE ≤ 0.90	6	12	12	8	11	11	11	20
0.65 ≤ NSE < 0.80	10	12	8	8	11	13	19	11
NSE ≤ 0.65	22	14	18	22	15	13	6	3
				PB (%)				
−10 < PB < +10	1	1	5	1	5	6	6	19
±10 ≤ PB < ±15	0	0	3	0	6	5	8	9
±15 ≤ PB < ±25	10	11	12	10	13	12	12	7
PB ≥ ±25	28	27	19	28	15	16	13	4

We further compared the different CN model variants on the basis of cumulative observed and estimated runoff from the 39 watersheds using the 1:1 plot and the coefficient of determination, R^2. The moderately high R^2 value supported better runoff prediction capability of the M2 model compared to the M1 model. However, deviation of the observed–estimated runoff best-fit-regression line from the 1:1 plot shows that both the M1 and M2 models underestimated the majority of the runoff events (Figure 4). Although the M2 model R^2 value was comparatively high, the runoff predictability of the M1, M2, and M4 models was almost indistinguishable. Nevertheless, the closeness of data points around the 1:1 plot and the higher R^2 values of the M5 through M8 models favored these models for comparatively better runoff prediction. The best agreement between the observed and estimated runoff was evidenced by applying the M8 model, as shown in Figure 4. It should be noted that the R^2 statistics used for model evaluation could mislead practitioners. These statistics are oversensitive to extremely high values and insensitive to additive and proportional differences between model predictions and measured data [44]. The overall promising results of the M8 model support its suitability for runoff prediction in the steep-slope watersheds. Therefore, the original CN model and the majority of its variants discussed here do not well represent complex watershed characteristics, and thus the abstraction coefficient, the CN values from watershed, and the CN model itself need to be revised for general application. A very recent and comprehensive review by the NRCS Task Group on Curve Number Hydrology [5] also suggested changes to update the handbook and its associated procedures on the basis of lessons learned from global experiences and additional data analyses. To avoid jumps in runoff estimation, the CN model could be made to be more robust by not fixing the initial abstraction coefficient and considering the effect of rainfall as well as the spatial and temporal variability while estimating the watershed CN values.

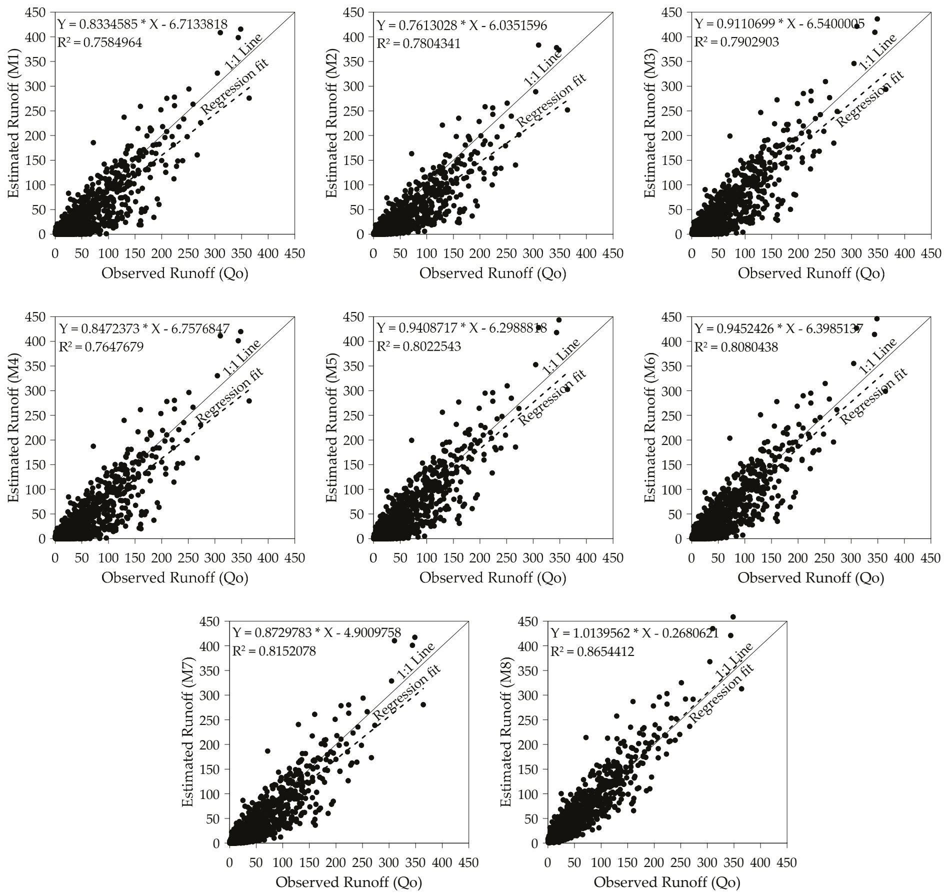

Figure 4. Observed and estimated runoff comparison for eight variants of the CN model using cumulative data of all 39 watersheds.

There is an evidence that the CN tables that were documented a few decades back that were based on soils and land use/cover are often wide of the mark and not supported by real ground data or by critical analyses [10,15,50]. The original CN model response demonstrated in different studies is very sensitive in selecting the watershed-representative CN. Moreover, the runoff response from some watersheds were found to be very erratic, leading to great discrepancies between the modeled data and reality [50]. Like our findings, various studies have reported underestimated runoff in the steep-slope watersheds using the original CN methodology [10,17–23], and slope adjustment for CN was proposed to capture the watershed response in predicting runoff [10,17–19,21–24]. Application of the suggested approach by Sharpley and Williams [17] was criticized for being tested with very limited data in the field [19]. To support the findings of Williams et al. [18], two other slope-adjusted CN approaches were developed by Ajmal et al. [10] and Sharpley and Williams [17], but they were not structurally sound due to incapability to follow the CN theoretical limits. Because of the plausible response in replicating the watershed runoff, the slope-adjusted CN approach proposed in this study was not only structurally sound in terms of following the theoretical bounds of the CN, but also in supporting its application for better runoff prediction. However, the model results could be further improved by introducing the effects of spatial variability in CN for the soil–cover complex along watersheds [51,52].

5. Conclusions and Practical Implications

The CN model is being updated continuously on the basis of new measured rainfall–runoff data and innovation in research. When handbook CN values are used, the inconsistent runoff prediction capability of this model has led researchers to adjust the CN values using the effect of rainfall magnitudes [2,5] and watershed slope [10,17–19,24,26]. However, some researchers agree that the handbook CN values are fit for runoff estimation from watersheds with a maximum 5% average slope. Hence, there is a room for further refinement in determining CN values. This study investigated and proposed a practically sound slope-adjusted CN ($CN_{II\alpha}$) approach to improve the runoff prediction capability of the CN model in steep-slope watersheds in order to reduce possible uncertainties. The proposed $CN_{II\alpha}$ not only followed the theoretical limits (0, 100) [17], but in addition, unlike other existing $CN_{II\alpha}$ approaches [10,19,23], it provided a promising runoff prediction capability in the study area. The use of $\lambda = 0.05$ in place of $\lambda = 0.2$ and their adjusted $CN_{0.05}$ values modestly improved the CN model runoff predictability, but not well enough for runoff estimation from steep-slope watersheds. On the basis of different performance indicators, we found that the proposed $CN_{II\alpha}$ had a positive impact on the CN model runoff prediction. Users of the CN model should know the limitations in its procedures and assumptions because the model produces diverse responses when applied to different land types and watersheds [5]. Assuming a fixed λ value and its associated three fixed values of initial abstraction for dry, normal, and wet conditions are among the major limitations of the original CN model and variants used in this study. The model needs an overhaul for various compelling reasons to circumvent the fixed λ value, as well as unjustified sudden jumps in CN values and its associated estimated runoff. In this era of cutting-edge technology, researchers of different biomes have introduced new parameters in the model to improve its runoff prediction capability. However, inculcating new parameters has increased the model complexity and restricted its application in ungauged watersheds. The CN methodology must be overhauled using experiences from the modern hydrologic engineering without losing the simplicity rule.

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Description

A sediment basin is a temporary pond built on a construction site to capture eroded or disturbed soil transported in storm runoff prior to discharge from the site. Sediment basins are designed to capture site runoff and slowly release it to allow time for settling of sediment prior to discharge. Sediment basins are often constructed in locations that will later be modified to serve as post-construction stormwater basins.

Photograph SB-1. Sediment basin at the toe of a slope. Photo courtesy of WWE.

Appropriate Uses

Most large construction sites (typically greater than 2 acres) will require one or more sediment basins for effective management of construction site runoff. On linear construction projects, sediment basins may be impractical; instead, sediment traps or other combinations of BMPs may be more appropriate.

Sediment basins should not be used as stand-alone sediment controls. Erosion and other sediment controls should also be implemented upstream.

When feasible, the sediment basin should be installed in the same location where a permanent post-construction detention pond will be located.

Design and Installation

The design procedure for a sediment basin includes these steps:

- **Basin Storage Volume**: Provide a storage volume of at least 3,600 cubic feet per acre of drainage area. To the extent practical, undisturbed and/or off-site areas should be diverted around sediment basins to prevent "clean" runoff from mixing with runoff from disturbed areas. For undisturbed areas (both on-site and off-site) that cannot be diverted around the sediment basin, provide a minimum of 500 ft^3/acre of storage for undeveloped (but stable) off-site areas in addition to the 3,600 ft^3/acre for disturbed areas. For stable, developed areas that cannot be diverted around the sediment basin, storage volume requirements are summarized in Table SB-1.

- **Basin Geometry:** Design basin with a minimum length-to-width ratio of 2:1 (L:W). If this cannot be achieved because of site space constraints, baffling may be required to extend the effective distance between the inflow point(s) and the outlet to minimize short-circuiting.

- **Dam Embankment**: It is recommended that embankment slopes be 4:1 (H:V) or flatter and no steeper than 3:1 (H:V) in any location.

Sediment Basins	
Functions	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

- **Inflow Structure**: For concentrated flow entering the basin, provide energy dissipation at the point of inflow.

Table SB-1. Additional Volume Requirements for Undisturbed and Developed Tributary Areas Draining through Sediment Basins

Imperviousness (%)	Additional Storage Volume (ft^3) Per Acre of Tributary Area
Undeveloped	500
10	800
20	1230
30	1600
40	2030
50	2470
60	2980
70	3560
80	4360
90	5300
100	6460

- **Outlet Works**: The outlet pipe shall extend through the embankment at a minimum slope of 0.5 percent. Outlet works can be designed using one of the following approaches:
    - **Riser Pipe (Simplified Detail):** Detail SB-1 provides a simplified design for basins treating no more than 15 acres.
    - **Orifice Plate or Riser Pipe**: Follow the design criteria for Full Spectrum Detention outlets in the EDB Fact Sheet provided in Chapter 4 of this manual for sizing of outlet perforations with an emptying time of approximately 72 hours. In lieu of the trash rack, pack uniformly sized 1½ - to 2-inch gravel in front of the plate or surrounding the riser pipe. This gravel will need to be cleaned out frequently during the construction period as sediment accumulates within it. The gravel pack will need to be removed and disposed of following construction to reclaim the basin for use as a permanent detention facility. If the basin will be used as a permanent extended detention basin for the site, a trash rack will need to be installed once contributing drainage areas have been stabilized and the gravel pack and accumulated sediment have been removed.
    - **Floating Skimmer**: If a floating skimmer is used, install it using manufacturer's recommendations. Illustration SB-1 provides an illustration of a Faircloth Skimmer Floating Outlet™, one of the more commonly used floating skimmer outlets. A skimmer should be designed to release the design volume in no less than 48 hours. The use of a floating skimmer outlet can increase the sediment capture efficiency of a basin significantly. A floating outlet continually decants cleanest water off the surface of the pond and releases cleaner water than would discharge from a perforated riser pipe or plate.

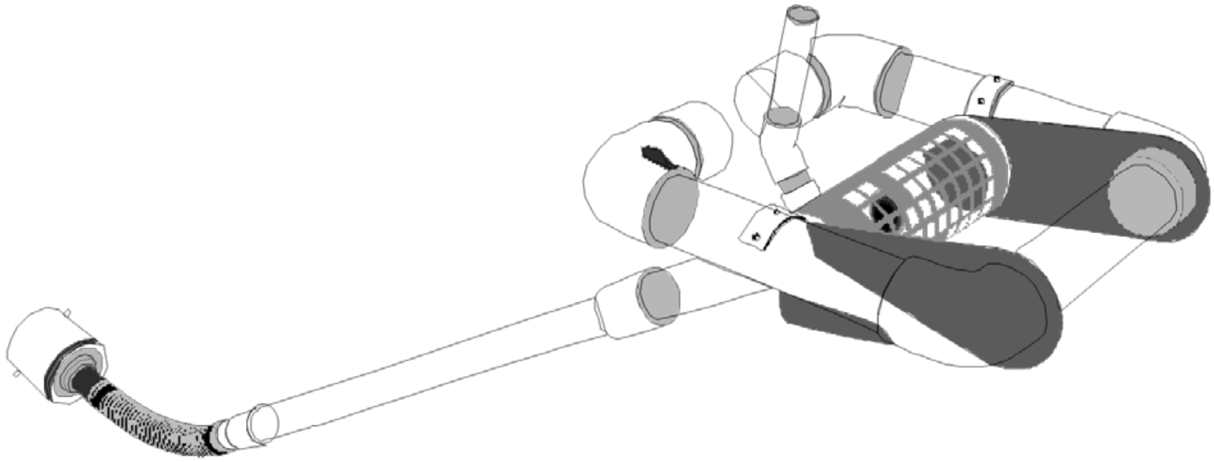


Illustration SB-1. Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

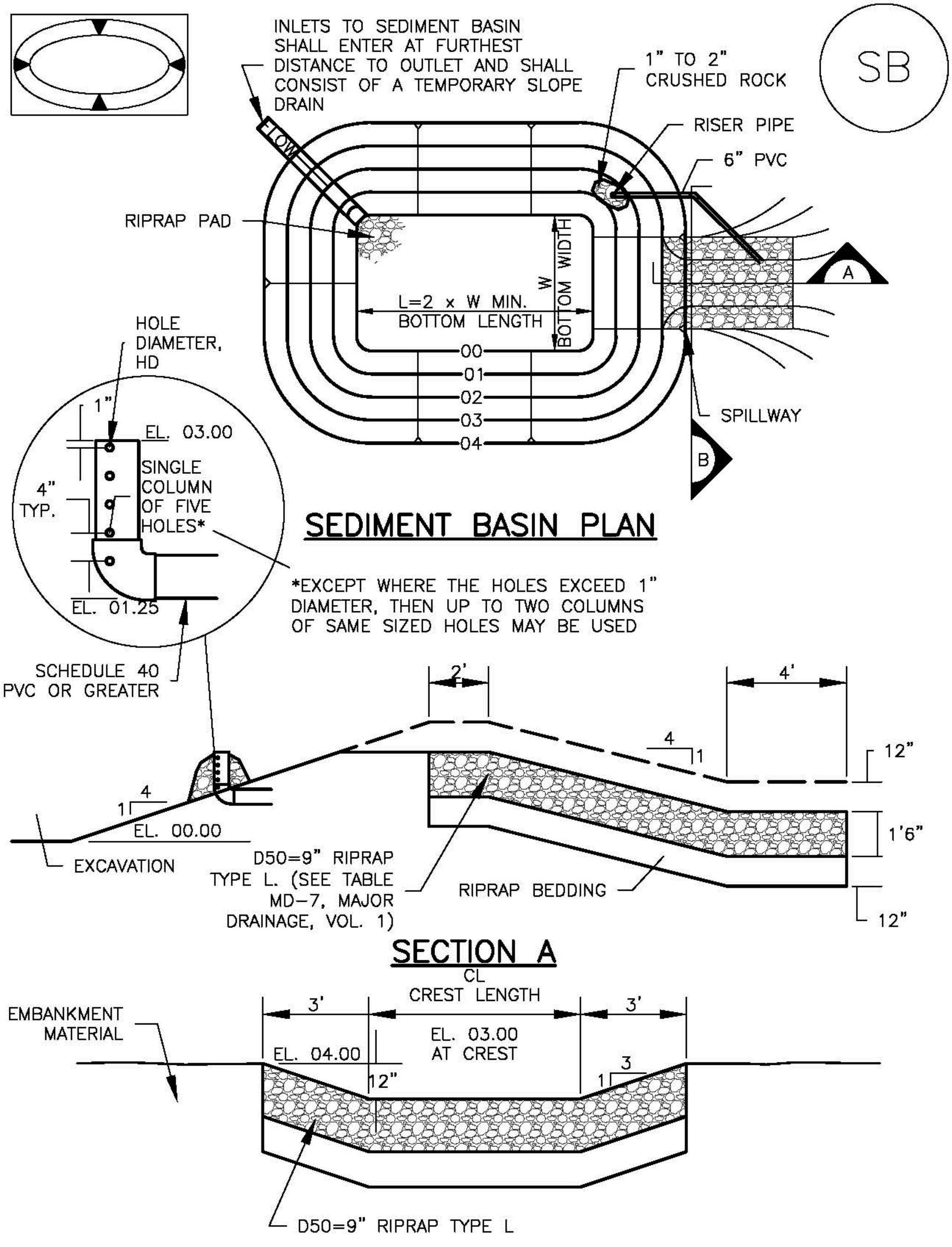
- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
  - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
  - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.

Maintenance and Removal

Maintenance activities include the following:

- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.



SB
INLETS TO SEDIMENT BASIN SHALL ENTER AT FURTHEST DISTANCE TO OUTLET AND SHALL CONSIST OF A TEMPORARY SLOPE DRAIN
FLOW
1" TO 2" CRUSHED ROCK
RISER PIPE
6" PVC
RIPRAP PAD
W BOTTOM WIDTH
L=2 x W MIN. BOTTOM LENGTH
A
00
01
02
03
04
SPILLWAY
B
HOLE DIAMETER, HD
1"
EL. 03.00
SINGLE COLUMN OF FIVE HOLES*
4" TYP.
EL. 01.25
SEDIMENT BASIN PLAN
*EXCEPT WHERE THE HOLES EXCEED 1" DIAMETER, THEN UP TO TWO COLUMNS OF SAME SIZED HOLES MAY BE USED
SCHEDULE 40 PVC OR GREATER
2'
4'
4
1
12"
1'6"
EL. 00.00
EXCAVATION
D50=9" RIPRAP TYPE L. (SEE TABLE MD-7, MAJOR DRAINAGE, VOL. 1)
RIPRAP BEDDING
SECTION A
CL
CREST LENGTH
3'
3'
EMBANKMENT MATERIAL
EL. 04.00
EL. 03.00 AT CREST
3
1
D50=9" RIPRAP TYPE L

TABLE SB–1. SIZING INFORMATION FOR STANDARD SEDIMENT BASIN			
Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 1/2	2	9/32
2	21	3	13/16
3	28	5	1/2
4	33 1/2	6	9/16
5	38 1/2	8	21/32
6	43	9	21/32
7	47 1/4	11	25/32
8	51	12	27/32
9	55	13	7/8
10	58 1/4	15	15/16
11	61	16	31/32
12	64	18	1
13	67 1/2	19	1 1/16
14	70 1/2	21	1 1/8
15	73 1/4	22	1 3/16

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - –LOCATION OF SEDIMENT BASIN.
   - –TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
   - –FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
   - –FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.

2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.

3. SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND–DISTURBING ACTIVITY THAT RELIES ON ON BASINS AS AS A STORMWATER CONTROL.

4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.

5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.

6. PIPE SCH 40 OR GREATER SHALL BE USED.

7. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).

5. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.

6. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

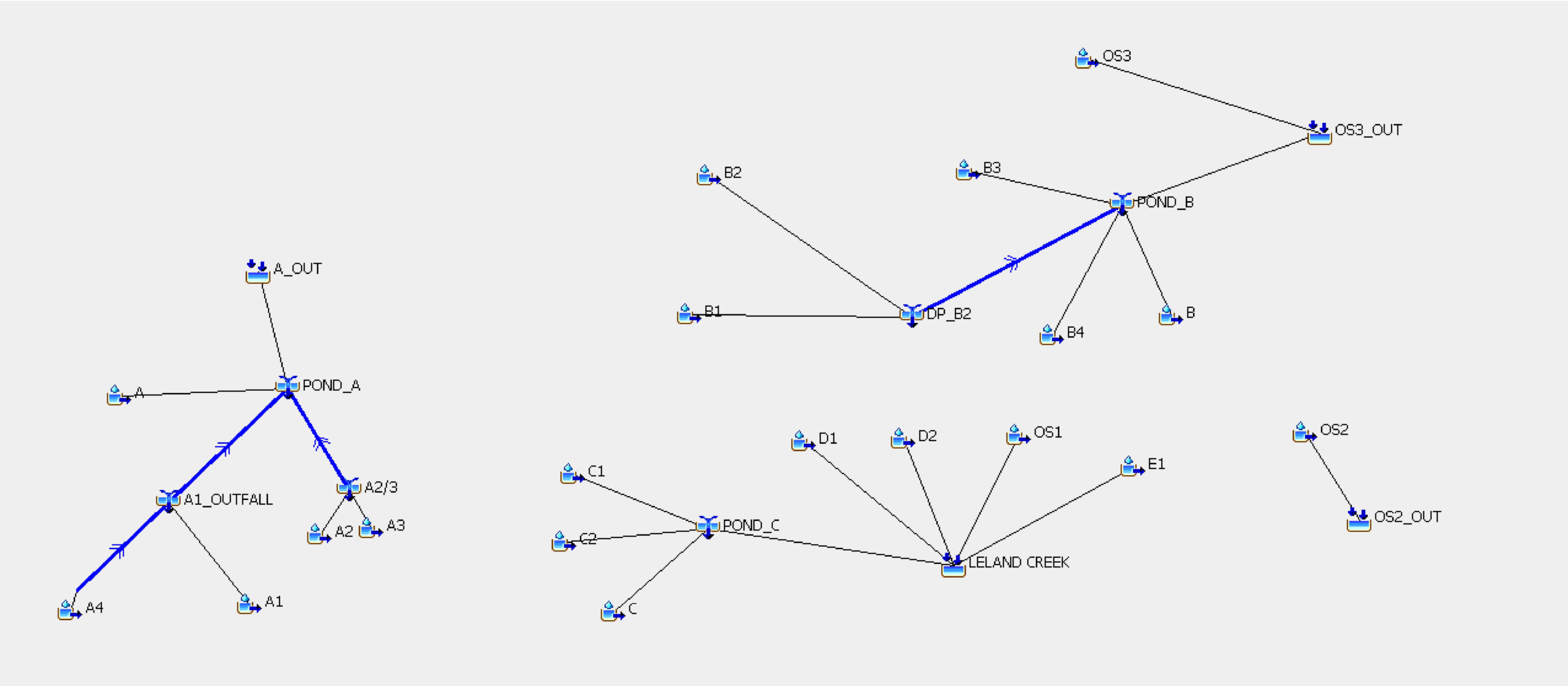
(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

APPENDIX E
DRAINAGE MAPS

HEC-HMS Basin Model Map

Proposed Drainage Map



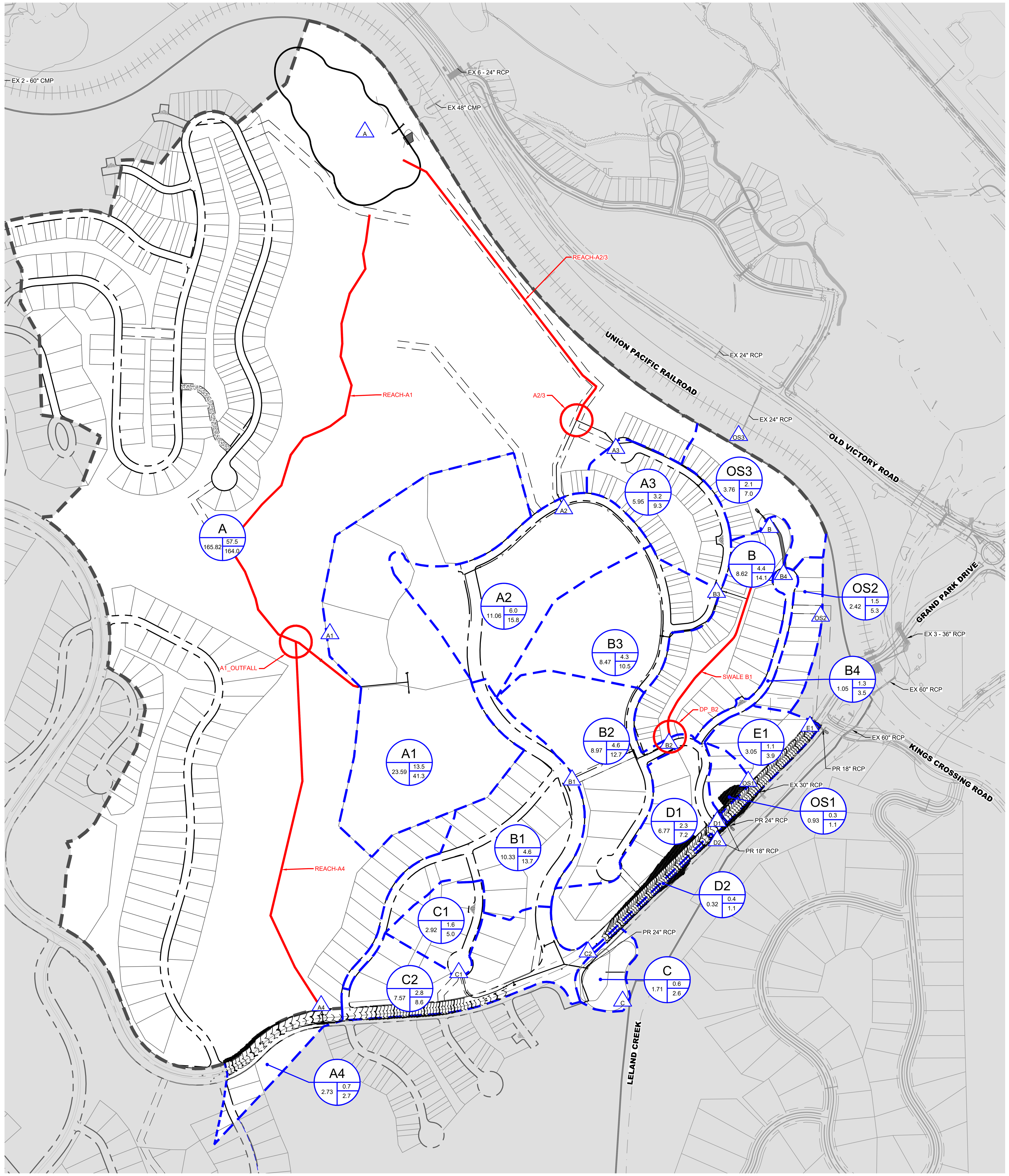
OS3
OS3_OUT
B2
B3
POND_B
A_OUT
B1
DP_B2
B
B4
POND_A
A
D1
D2
OS1
OS2
E1
C1
A2/3
A1_OUTFALL
POND_C
OS2_OUT
A2
A3
C2
LELAND CREEK
A4
A1
C

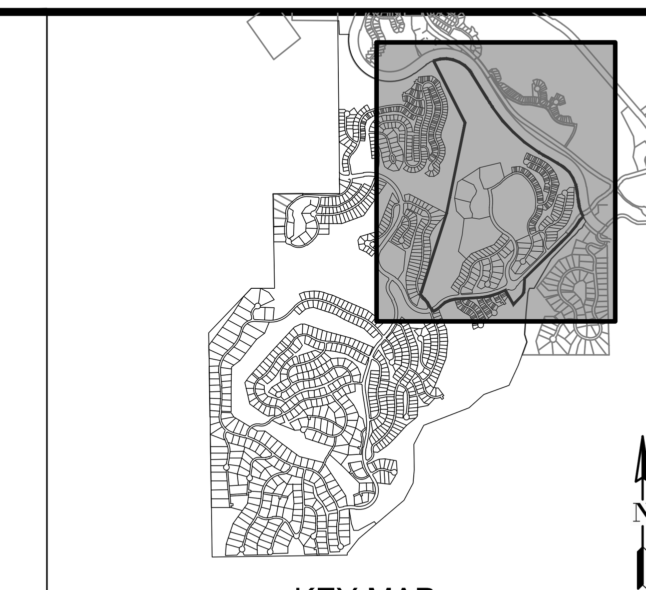
Existing Conditions

Element	Area (Ac)	Q5 (CFS)	Q100 (CFS)
A	165.82	47.7	143.8
A_OUT	-	58.7	183.0
A1	23.59	6.8	26.4
A1_OUTFALL	-	7.0	27.2
A2	11.06	2.5	9.4
A2/3	-	4.2	15.8
A3	5.95	1.8	6.4
A4	2.73	0.6	2.1
B	8.62	3.7	14.6
B1	10.33	2.7	9.1
B2	8.97	2.3	7.7
B3	8.47	2.5	9.1
B4	1.05	0.3	1.1
C	1.71	0.4	1.3
C1	2.92	0.8	2.8
C2	7.57	2.1	8.3
DP_B2	-	5.0	16.8
D1	6.77	1.3	4.2
D2	0.32	0.1	0.3
E1	3.05	0.9	3.7
LELAND CREEK	-	5.3	17.4
OS1	0.93	0.3	1.4
OS2	2.42	0.7	2.9
OS2_OUT	-	0.7	2.9
OS3	3.76	1.9	7.2
OS3_OUT	-	11.1	33.7
POND_A	-	58.7	183.0
POND_B	-	9.9	30.3
POND_C	-	3.1	11.7
REACH-A1	-	7.0	26.6
REACH-A2/3	-	4.2	15.5
REACH-A4	-	0.6	2.1
SWALE B	-	5.0	16.7

Proposed Conditions

Element	Area (Ac)	Q5 (CFS)	Q100 (CFS)
A	165.82	57.5	164.0
A_OUT	-	4.0	49.0
A1	23.59	13.5	41.3
A1_OUTFALL	-	13.9	43.1
A2	11.06	6.0	15.8
A2/3	-	8.9	24.2
A3	5.95	3.2	9.3
A4	2.73	0.7	2.7
B	8.62	4.4	14.1
B1	10.33	4.6	13.7
B2	8.97	4.6	12.7
B3	8.47	4.3	10.5
B4	1.05	1.3	3.5
C	1.71	0.6	2.6
C1	2.92	1.6	5.0
C2	7.57	2.8	8.6
DP_B2	-	9.2	26.2
D1	6.77	2.3	7.2
D2	0.32	0.4	1.1
E1	3.05	1.1	3.9
LELAND CREEK	-	3.7	12.0
OS1	0.93	0.3	1.1
OS2	2.42	1.5	5.3
OS2_OUT	-	1.5	5.3
OS3	3.76	2.1	7.0
OS3_OUT	-	2.2	22.7
POND_A	-	4.0	49.0
POND_B	-	0.9	21.0
POND_C	-	0.1	1.7
REACH-A1	-	13.7	42.6
REACH-A2/3	-	8.9	24.1
REACH-A4	-	0.7	2.7
SWALE B	-	9.2	26.2





KEY MAP
SCALE: 1" = 3000'

N

0 250' 500'
1 inch = 250'

LEGEND

- PROPOSED MAJOR CONTOUR (4900)
- PROPOSED MINOR CONTOUR (4885)
- PROPOSED MAJOR CONTOUR (4900)
- PROPOSED MINOR CONTOUR (4885)
- PROPOSED DRAINAGE BASIN MAJOR
- PROPOSED DRAINAGE BASIN MINOR
- EXISTING DRAINAGE BASIN MAJOR
- EXISTING DRAINAGE BASIN MINOR
- NOT A PART
- STORM (FES, MH, & INLET) — EXISTING / PROPOSED
- EX-1 / PR-1 — AREA X.XX (AC), 0.XX, 0.XX — BASIN DESIGNATION; MINOR RUNOFF (CFS); MAJOR RUNOFF (CFS)
- DIRECTIONAL FLOW ARROW
- EX-1 / PR-1 — DESIGN POINT
- EMERGENCY OVERFLOW ROUTE
- REACH
- JUNCTION

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Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	XX/XX/XXXX	MJG

NOT FOR CONSTRUCTION

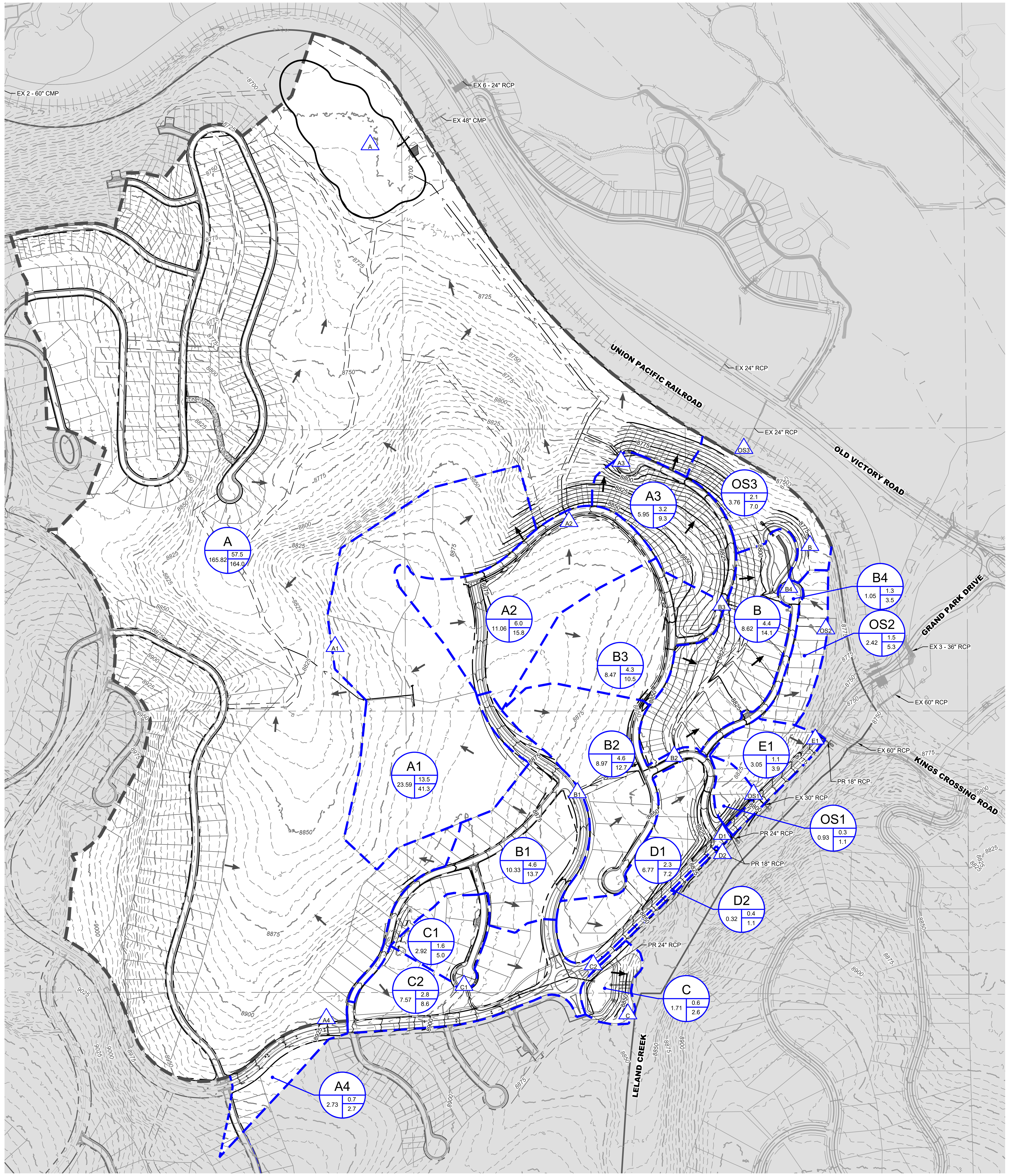
GRAND PARK - 8WB, 9W, 10W.3, & 11W.2
TOWN OF FRASER, COLORADO

PHASE II DRAINAGE REPORT
HEC-HMS DRAINAGE MAP

Know what's below. Call before you dig. 811

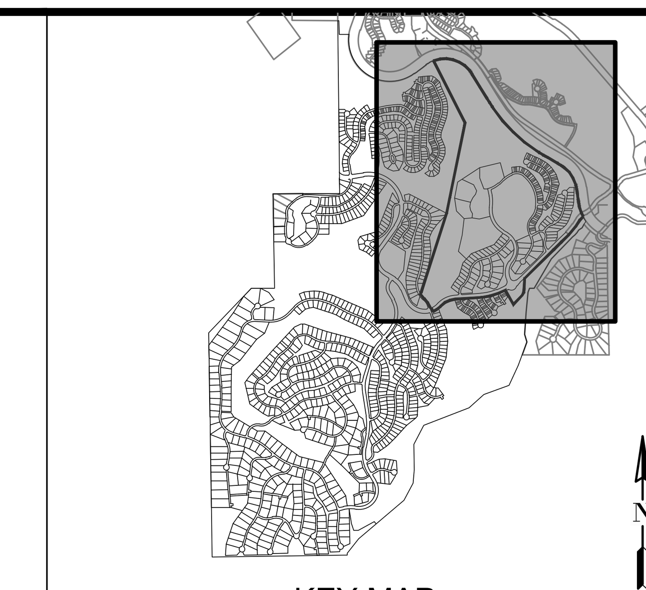
Existing Conditions

Element	Area (Ac)	Q5 (CFS)	Q100 (CFS)
A	165.82	47.7	143.8
A1	23.59	6.8	26.4
A2	11.06	2.5	9.4
A3	5.95	1.8	6.4
A4	2.73	0.6	2.1
B	8.62	3.7	14.6
B1	10.33	2.7	9.1
B2	8.97	2.3	7.7
B3	8.47	2.5	9.1
B4	1.05	0.3	1.1
C	1.71	0.4	1.3
C1	2.92	0.8	2.8
C2	7.57	2.1	8.3
D1	6.77	1.3	4.2
D2	0.32	0.1	0.3
E1	3.05	0.9	3.7
OS1	0.93	0.3	1.4
OS2	2.42	0.7	2.9
OS3	3.76	1.9	7.2



Proposed Conditions

Element	Area (Ac)	Q5 (CFS)	Q100 (CFS)
A	165.82	57.5	164.0
A1	23.59	13.5	41.3
A2	11.06	6.0	15.8
A3	5.95	3.2	9.3
A4	2.73	0.7	2.7
B	8.62	4.4	14.1
B1	10.33	4.6	13.7
B2	8.97	4.6	12.7
B3	8.47	4.3	10.5
B4	1.05	1.3	3.5
C	1.71	0.6	2.6
C1	2.92	1.6	5.0
C2	7.57	2.8	8.6
D1	6.77	2.3	7.2
D2	0.32	0.4	1.1
E1	3.05	1.1	3.9
OS1	0.93	0.3	1.1
OS2	2.42	1.5	5.3
OS3	3.76	2.1	7.0



KEY MAP
SCALE: 1" = 3000'

N

0 250' 500'
1 inch = 250'

LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED DRAINAGE BASIN MAJOR
- PROPOSED DRAINAGE BASIN MINOR
- EXISTING DRAINAGE BASIN MAJOR
- EXISTING DRAINAGE BASIN MINOR
- NOT A PART
- STORM (FES, MH, & INLET) — EXISTING / PROPOSED
- BASIN DESIGNATION (EX-1 / PR-1)
- MINOR RUNOFF (CFS)
- MAJOR RUNOFF (CFS)
- DIRECTIONAL FLOW ARROW
- DESIGN POINT
- EMERGENCY OVERFLOW ROUTE

terracina design
10200 E. Girard Ave, A-314
Denver, CO 80231
ph: 303.632.8867

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	04/11/2025	MJG
2	2ND SUBMITTAL	12/17/2025	MJG

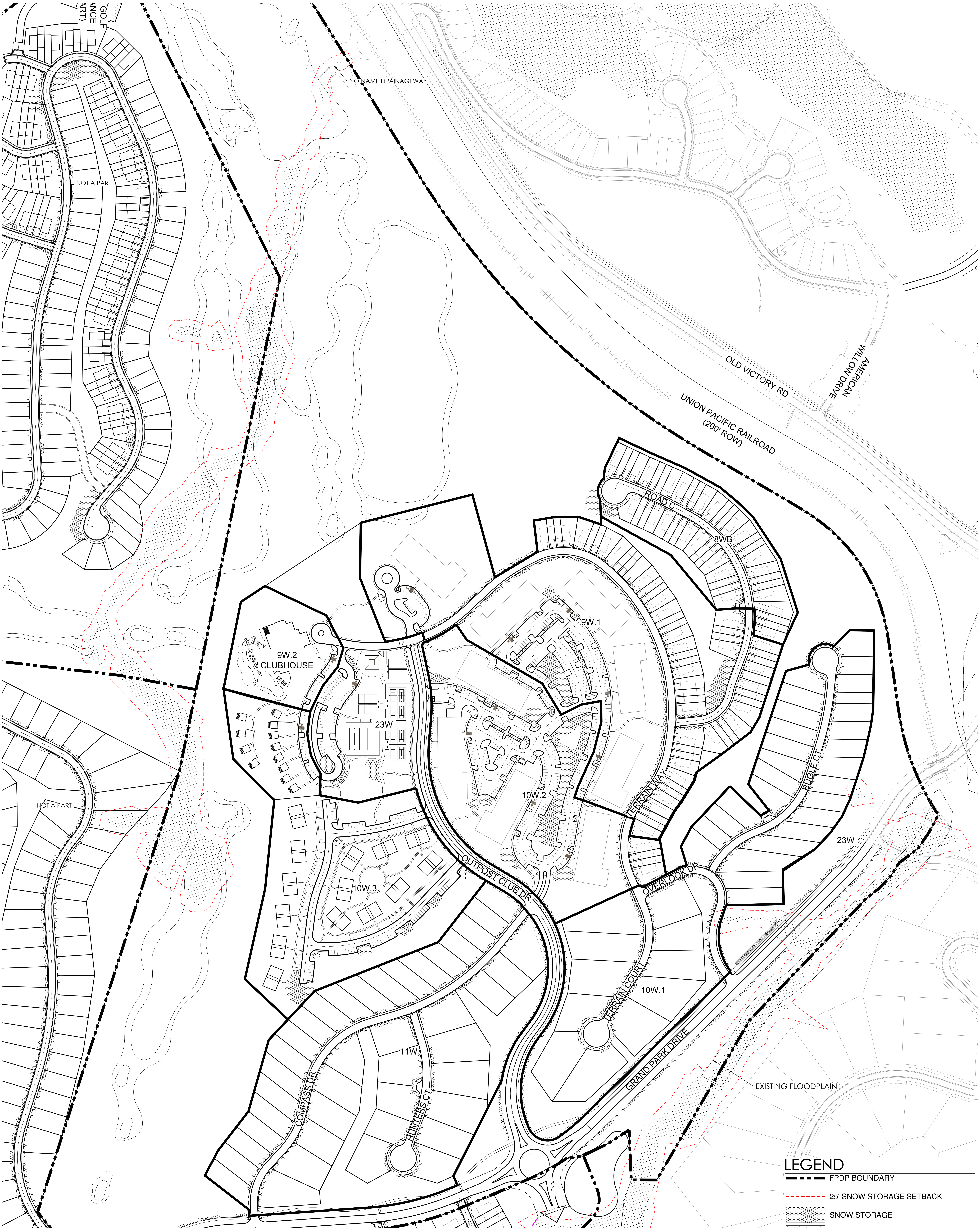
NOT FOR CONSTRUCTION

GRAND PARK - 8WB, 9W, 10W.3, & 11W.2
TOWN OF FRASER, COLORADO

PHASE II DRAINAGE REPORT
PROPOSED DRAINAGE MAP

Know what's below. Call before you dig. 811

12/15/2025 12:59 PM, X:\GRAND PARK\DOCUMENTS\REPORTS\DRAINAGE\16.1 - FILING 1 - 8WB, 9W, 10W, 11W\PHASE 2\E - DRAINAGE MAPS PROPOSED DRAINAGE MAP.DWG 1



PLANNING AREAS 8WB, 9W.1, 9W.2, 10W.1, 10W.2, 10W.3 & 11W WETLAND EXHIBIT

DECEMBER 18, 2025

WEST MOUNTAIN

FRASER, CO

terracina design

URBAN PLANNING | CIVIL ENGINEERING | LANDSCAPE ARCHITECTURE

Scale: 1"= 100'-0"

0 50 100 200

GRAND PARK WEST

Buildout Intersection and Roadway Assessment

Prepared for:

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FELSBURG HOLT & ULLEVIG
connecting & enhancing communities

FHU Reference No. 125152-01

January 2026

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I. INTRODUCTION

I.A Overview

This report provides an assessment of roadway and intersection conditions associated with completion of development within the western portion of the Grand Park development in Fraser, Colorado and is intended to supplement the prior traffic studies approved by the Town of Fraser for the Grand Park Development. Prepared to address items raised by the Town of Fraser, this report further analyzes the transportation needs associated with buildout of the site, including intersection laneage and traffic control and road classification. Buildout of this site will likely require decades, and individual planning areas within the site will be developed progressively over time.

The residential and commercial site generated traffic volumes estimated in this study are based on trip rates derived from national data from general U.S. suburban and urban neighborhoods as recorded in ITE's Trip Generation Manual (11th Edition). Inherent in these data is the assumption of consistent high levels of full time residential occupancy, likely in the 90-100 percent range. However, data published in the Draft *Town of Fraser Comprehensive Plan* (available online as of January 2026), drawing from the US Census Bureau 2022 Five-Year American Community Survey, indicates that this assumption does not reflect actual conditions in Fraser. According to the Census data, only approximately 39 percent of homes in Fraser are occupied year-round, while approximately 58 percent are classified as seasonal or vacation homes. As a result, actual residential occupancy — and corresponding daily and peak-hour traffic generation — is substantially lower than what would occur under a full-time occupancy scenario.

If these published occupancy rates were applied, residential-based traffic trips could be reduced by as much as 40 to 60 percent on an annual average basis, with higher volumes occurring only during limited peak holiday and winter weekend periods. Consequently, the trip generation and intersection volumes presented in this study should be understood as highly conservative, representing a theoretical maximum condition rather than typical or even frequent operating conditions. It is important that roadway infrastructure not be overbuilt to accommodate a 100 percent occupancy scenario that is inconsistent with documented resort-market statistics, as doing so could introduce urban-scale roadway elements into a rural resort environment. Nonetheless, the conservative nature of this analysis provides long-term assurance that the transportation system would remain adequate even under a hypothetical future scenario in which Fraser evolves into a fully year-round, suburban community.

This assessment provides an understanding of overall needs at buildout that can be phased and constructed over time as needed to serve individual portions of the development. Separate conformance analyses may be required as individual planning areas within the site are developed to ensure that each provides the infrastructure necessary to accommodate transportation needs.

I.B Prior Traffic Studies

The proposed development of the study area was previously evaluated in the following transportation studies:

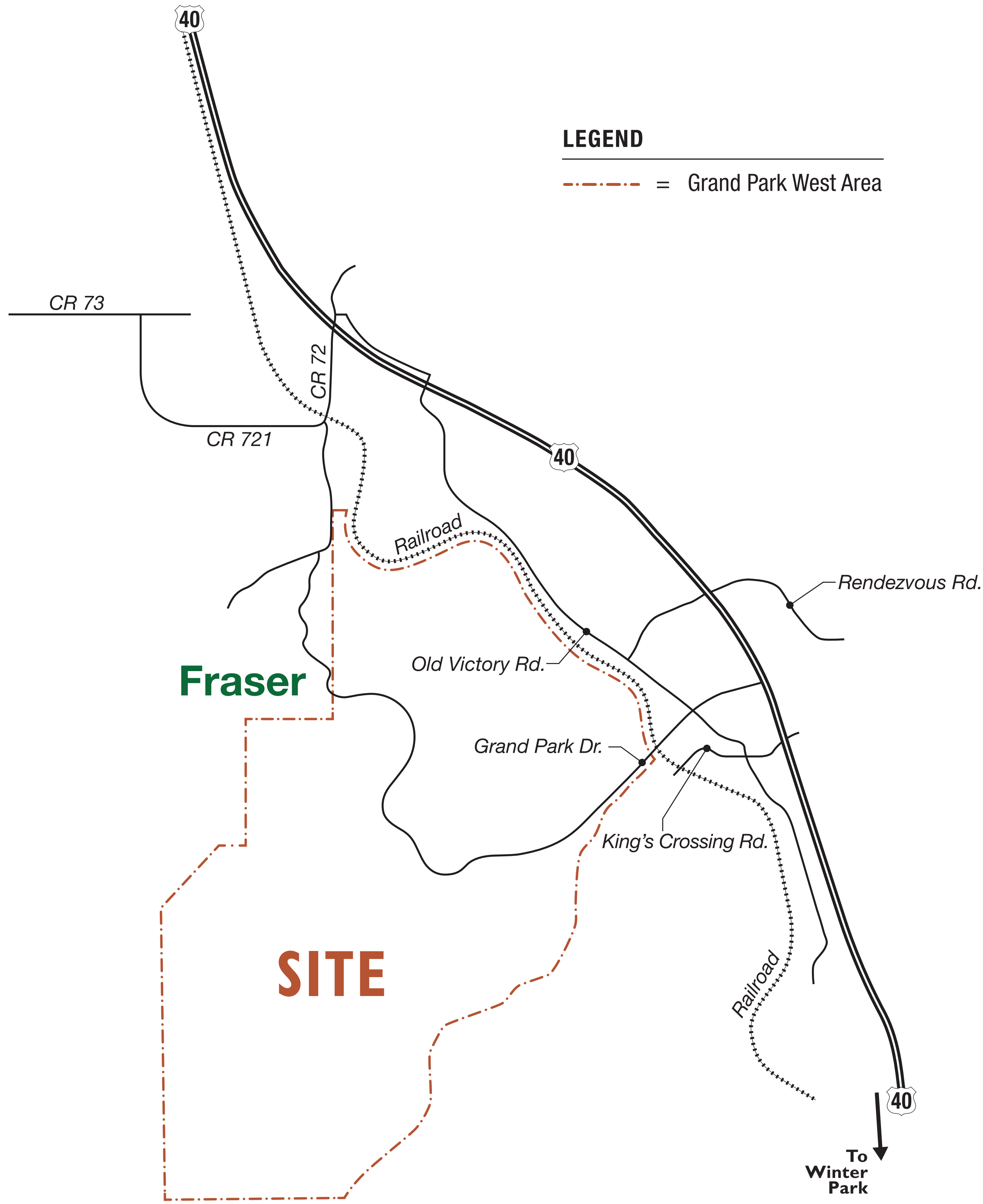
- **2004 RENDEzVOUS Traffic Impact Analysis (Master TIA).** For the study area, the Master TIA evaluated potential impacts of the development. This study addressed anticipated site access to US Highway 40 (US 40) and included traffic volume projections for roadways and intersections throughout the study area.

- **2013 Grand Park Traffic Impact Analysis**. This report was developed to address updates to proposed access to US 40 and the associated access permitting process through the Colorado Department of Transportation (CDOT). This study evaluated similar land use types and magnitudes to the Master TIA.
- **CDOT US Highway 40 Study**. In 2020, CDOT completed a study of US 40 addressing anticipated development-related growth throughout the Fraser River valley. The study incorporated development densities for all of Grand Park West and addressed impacts to intersections along US 40.

Taken together, these studies provide a reliable assessment of projected transportation conditions associated with development of Grand Park at large and Grand Park West as a portion. Over time, the infrastructure measures identified in the studies have been implemented alongside development of Grand Park as documentation has demonstrated consistency of each part with the Master TIA.

I.C Site Location and Study Area Boundaries

The Grand Park Community is located in the Upper Fraser Valley of Colorado to the west of US Highway 40 (US 40). Shown on **Figure 1**, The proposed development site lies within the portion of the Grand Park Community west of the Union Pacific Railroad (UPRR) line. The site covers approximately 1,018 Acres and proposed development types include a mix of residential, lodging/resort and commercial retail.



LEGEND

= Grand Park West Area

NOTE: Drawing Not to Scale

FELSBURG HOLT & ULLEVIG

FIGURE 1

Vicinity Map

At buildout, Grand Park West is expected to include 1,527 residential dwellings, 630 lodgings and 65,000 square feet of commercial development.

The site plan is depicted on **Figure 2**. As shown and also on **Figure 1**, vehicular access to and through the site would be provided via Grand Park Drive, which passes under the UPRR tracks via a recently constructed underpass, then extends east to provide direct access to Old Victory Road, American Willow Drive and US 40. At the northwest end of the site, Grand Park Drive extends north to connect with County Road (CR) 72, which extends farther north to CR 721, eventually also connecting under the UPRR tracks to US 40.

FELSBURG HOLT & ULLEVIG

NOTE: Drawing Not to Scale

FIGURE 2

Grand Park West Overall Site Plan

II. CONDITIONS WITHOUT DEVELOPMENT

This assessment includes a review of background (without development of Grand Park West) conditions at the time of buildout of surrounding development without any development complete within Grand Park West.

II.A Land Use and Roadway Network

Key land use activity in the vicinity of Grand Park West includes the following:

- Grand Park (East): The portion of Grand Park located east of the UPRR tracks is partially developed with commercial and residential uses including the Village at Grand Park mixed use development and Willows, Cozens Meadow, Cozens Pointe Condominiums, Elk Creek Condominiums, Elk Creek and Meadows residential neighborhoods.
- Byers Peak Ranch: The Byers Peak Ranch (BPR) development site is located on acreage north of the site and also west of the UPRR tracks. At buildout, the BPR site is expected to include nearly 1,900 dwelling and lodging units plus commercial and recreational uses. At the time of this assessment, development activity was centered on the northeastern portion of the site with the vast majority of the site yet to be developed.

The roadway network within Grand Park West as envisioned in **Figure 2** is currently incomplete, though rough unpaved roadway alignments were present at the time of this assessment. It is anticipated that Grand Park Drive through the site will serve only Grand Park West traffic as it would not provide efficient connectivity through and beyond the site.

II.B Traffic Volumes

Four intersections have been identified for analysis in this assessment, listed as follows:

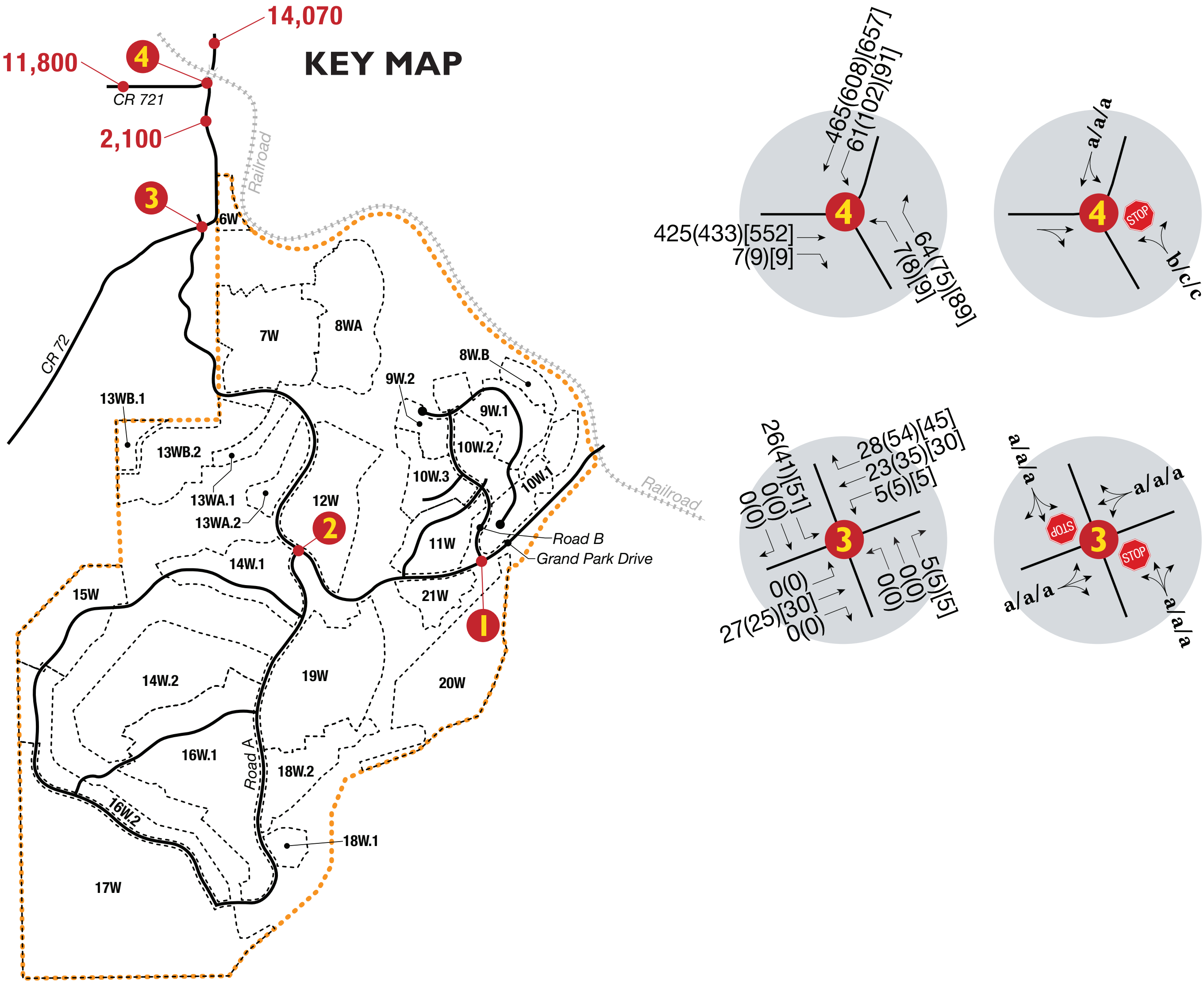
To be constructed with Grand Park West development:

1. Grand Park Dr/Road B
2. Grand Park Dr/Road A

Currently in place:

3. Grand Park Dr/CR 72
4. CR 72/CR 721

For the purposes of projecting background traffic volumes, it was assumed that Byers Peak Ranch would be complete when buildout of Grand Park West is reached. Because intersections 1 and 2 would not exist apart from development of Grand Park West and are not expected to serve external traffic, background traffic volumes were only projected for intersections 3 and 4. **Figure 3** depicts buildout daily and peak hour background traffic volumes. Peak hours evaluated include the weekday midday and PM peak hours and the Saturday peak hour, consistent with the *Byers Peak Ranch Traffic Impact Study* completed in May of 2025. Long term future traffic volumes included in this TIS were also used to inform background projections for intersections 3 and 4.



LEGEND

XXX(XXX)[XXX]	=	Midday(PM)[Saturday] Peak Hour Traffic Volumes
XXXX	=	Daily Traffic Volumes (Weekday)
x/x/x	=	Midday/AM/PM Peak Hour Unsignalized Movement Level of Service
STOP	=	Stop Sign

NORTH

FELSBURG HOLT & ULLEVIG

NOTE: Drawing Not to Scale

FIGURE 3
Grand Park West
Buildout Background Traffic Conditions

II.C Traffic Operations

Background traffic operations within the study area were evaluated according to techniques documented in the Highway Capacity Manual, 6th Edition, and executed using Trafficware's Synchro v.11 software. Operations were evaluated using the existing traffic volumes and intersection geometry. Level of Service (LOS) is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. LOS is described by a letter designation ranging from A to F, with LOS A representing almost free-flow travel, while LOS F represents congested conditions. For signalized intersections, LOS is reported as an average for the entire intersection.

As shown on **Figure 3**, all movements at intersections 3 and 4 are expected to operate at LOS C or better in the background condition. **Appendix A** provides the background condition LOS worksheets.

III. PROPOSED DEVELOPMENT

III.A Land Use

The plan for development of Grand Park West consists of 20 planning areas, enumerated 6W through 22W. **Figure 4** depicts the planning area layout throughout Grand Park West. Proposed commercial development lies primarily within the easternmost portion of the site in Planning Areas 8W through 11W. Proposed Single Family Detached homes are concentrated farther west. **Table 1** provides a summary of planning areas and proposed land use totals.

Table 1. Grand Park West Land Use Plan

Planning Area	Residential Units			Lodging Units	Commercial 1,000 Square Feet (KSF)
	Single Family Detached	Single Family Attached	Multifamily		
6W					
7W	78	28	72		
8Wa	95	104			
8Wb		44			
9W.1		56		250	6
9W.2					20
10W.1	38				
10W.2		4		238	39
10W.3			70	12	
11W	41				
12W	80			130	
13Wa.1	16				
13Wa.2	21				
13Wb.1	5				
13Wb.2	47				
14W.1	40				
14W.2	95				
15W	15				
16W.1	79				
16W.2	38				
17W	130				
18W	56				
19W	129				
20W	82				
21W		64			
TOTALS	1085	300	142	630	65

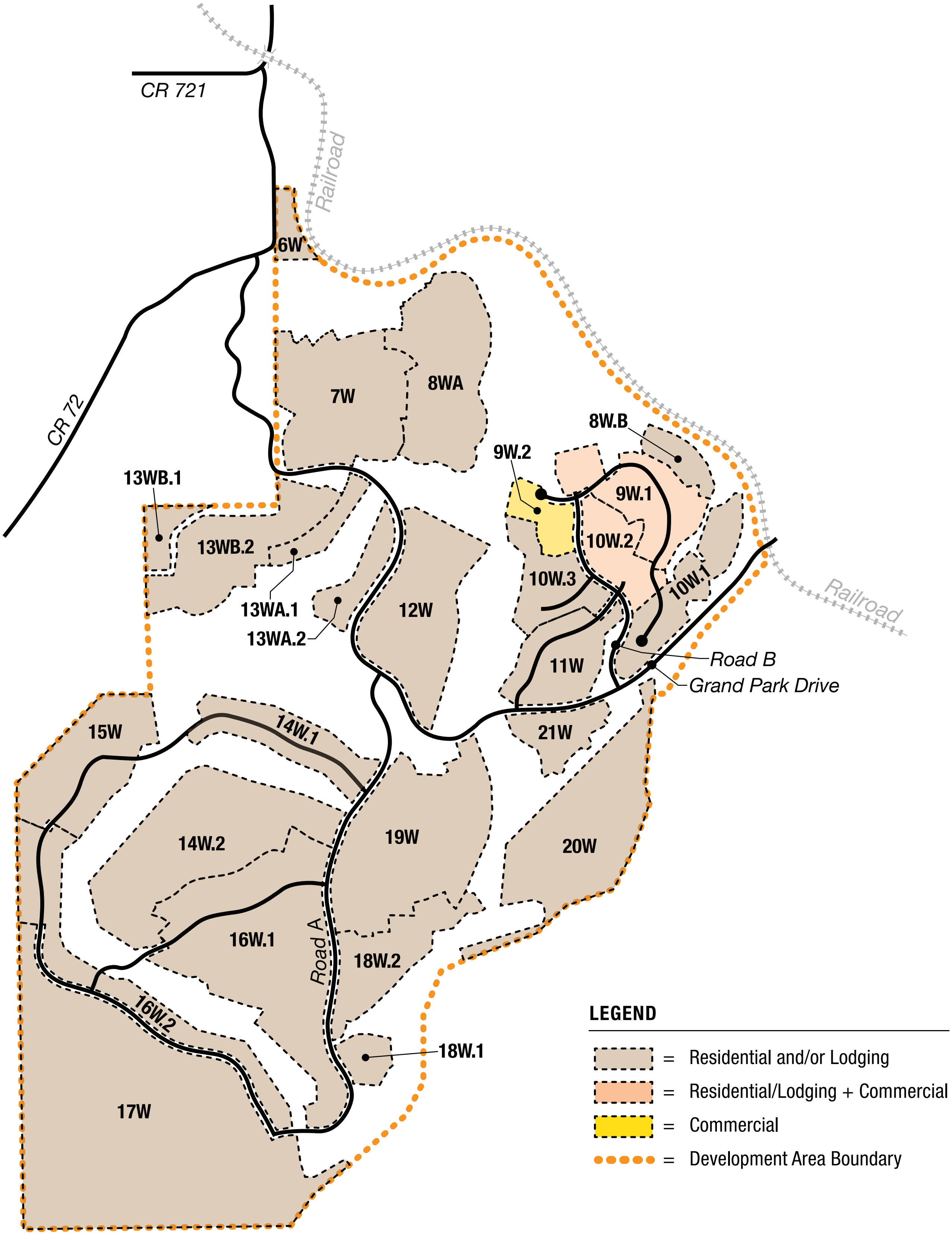


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FIGURE 4
Grand Park West Land Use Plan and Roadway Network

Grand Park West - REPORT JAN_25 125152-01 1/9/26

III.B Trip Generation

The proposed development of Grand Park West would generate additional vehicle-trips along the surrounding roadway network. Trip generation estimates were completed using trip generation information from the Institute of *Transportation Engineers Trip Generation Manual (11th Edition).*

The residential and commercial site generated traffic volumes estimated in this study are based on trip rates derived from national data from general U.S. suburban and urban neighborhoods as recorded in ITE's Trip Generation Manual. Inherent in these data is the assumption of consistent high levels of full time residential occupancy, likely in the 90-100 percent range. However, data published in the Draft *Town of Fraser Comprehensive Plan* (available online as of January 2026), drawing from the US Census Bureau 2022 Five-Year American Community Survey, indicates that this assumption does not reflect actual conditions in Fraser. According to the Census data, only approximately 39 percent of homes in Fraser are occupied year-round, while approximately 58 percent are classified as seasonal or vacation homes. As a result, actual residential occupancy — and corresponding daily and peak-hour traffic generation — is typically substantially lower than what would occur under a full-time occupancy scenario.

If these published occupancy rates were applied, residential-based traffic trips could be reduced by as much as 40 to 60 percent on an annual average basis, with higher volumes occurring only during limited peak holiday and winter weekend periods. Consequently, the trip generation and intersection volumes presented in this study should be understood as conservative, representing a theoretical maximum condition rather than typical or even frequent operating conditions. It is important that roadway infrastructure not be overbuilt to accommodate a 100 percent occupancy scenario that is inconsistent with documented resort-market statistics, as doing so could introduce urban-scale roadway elements into a rural resort environment. Nonetheless, the conservative nature of this analysis provides long-term assurance that the transportation system would remain adequate even under a hypothetical future scenario in which Fraser evolves into a fully year-round, suburban community.

Table 2 provides a summary of estimated daily, weekday midday, weekday PM peak hour and Saturday peak hour vehicle-trip estimates.

Table 2. Grand Park West Estimated Trip Generation

Planning Area	Estimated Vehicle-Trips									
	Daily	Midday Peak Hour			PM Peak Hour			Saturday Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
7W	1423	38	36	74	78	48	126	62	56	118
8Wa	1645	46	45	91	91	57	148	75	71	146
8Wb	317	7	7	14	15	10	25	12	13	25
9W.1	2728	129	90	219	114	106	220	136	115	251
9W.2	1089	72	66	138	66	66	132	67	64	131
10W.1	358	12	11	23	22	13	35	19	16	35
10W.2	4055	235	187	422	201	198	399	228	201	429
10W.3	568	13	11	24	27	16	43	20	18	38
11W	349	12	11	23	22	13	35	18	16	34
12W	1793	76	56	132	86	66	152	93	75	168
13Wa.1	151	5	5	10	9	6	15	8	7	15

Planning Area	Estimated Vehicle-Trips									
	Daily	Midday Peak Hour			PM Peak Hour			Saturday Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
13Wa.2	198	7	6	13	13	7	20	10	9	19
13Wb.1	47	2	1	3	3	2	5	3	2	5
13Wb.2	443	15	14	29	28	16	44	23	20	43
14W.1	377	12	12	24	24	14	38	20	17	37
14W.2	896	29	29	58	56	33	89	47	40	87
15W	141	5	4	9	9	5	14	8	6	14
16W.1	745	25	23	48	47	27	74	40	33	73
16W.2	358	13	11	24	22	14	36	19	16	35
17W	1226	41	38	79	76	46	122	64	55	119
18W	528	17	17	34	33	20	53	27	23	50
19W	1217	41	38	79	77	44	121	64	54	118
20W	773	26	24	50	49	28	77	41	35	76
21W	461	10	10	20	21	15	36	17	19	36
TOTALS	21,886	888	752	1,640	1,189	870	2,059	1,121	981	2,102

As shown, the proposed development of Grand Park West is estimated to generate approximately 22,000 vehicle-trips per day and up to 2,100 peak hour vehicle-trips. Upon buildout, it is likely that a portion of the estimated vehicle-trips will remain internal to Grand Park West. However, internal trips are not accounted for in this analysis as these trips would likely make use of the primary road network within Grand Park West. **Appendix B** provides a comparison of these trip generation estimates with the estimates included in the *Master TIA*.

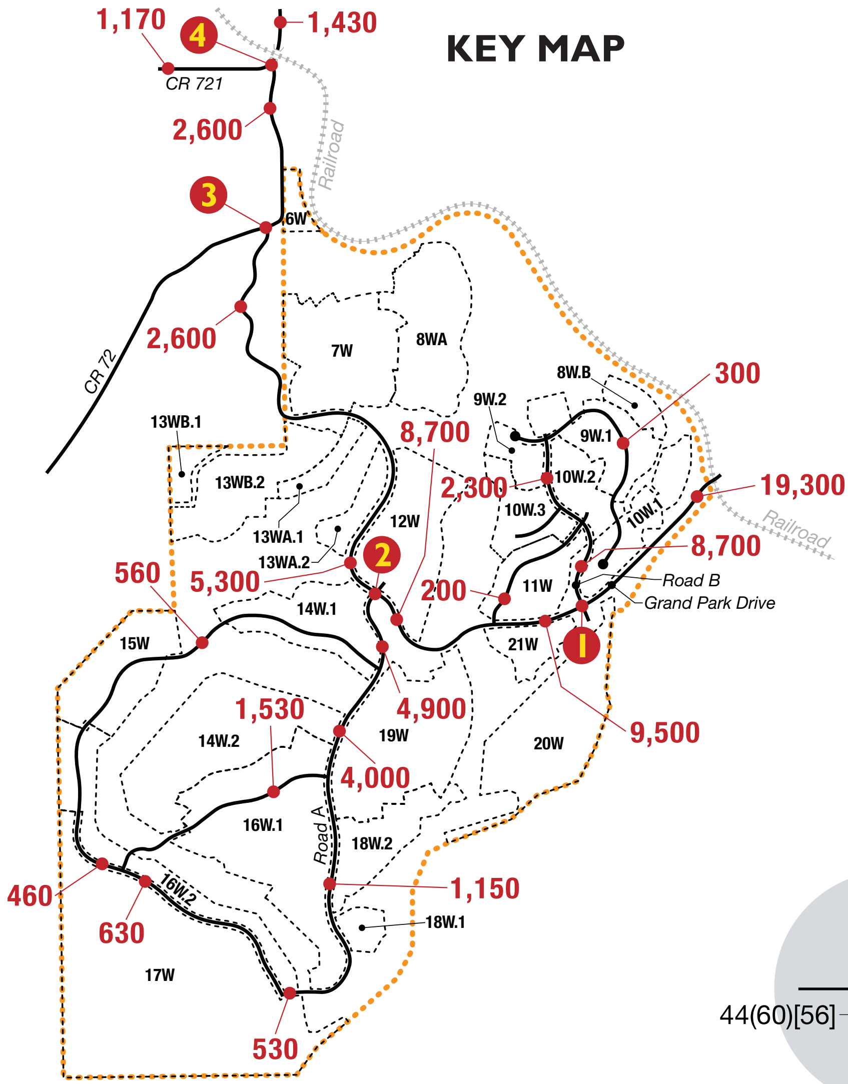
Table 3 provides a summary of trip generation rates utilized in the analysis from the Institute of Transportation Engineers *Trip Generation Manual* (11th Edition). Land Use Codes (LUC) were selected to best represent planned development types within Grand Park West.

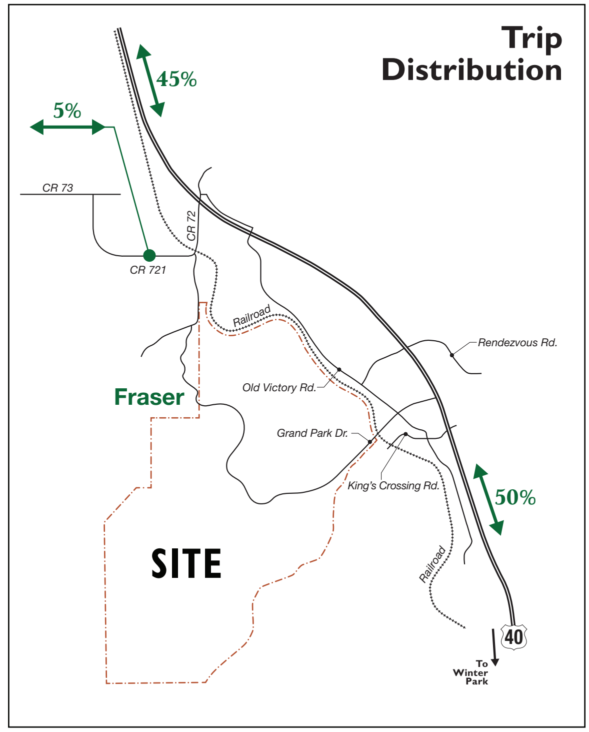
Table 3. Trip Generation Rates *Trip Generation* (11th Edition)

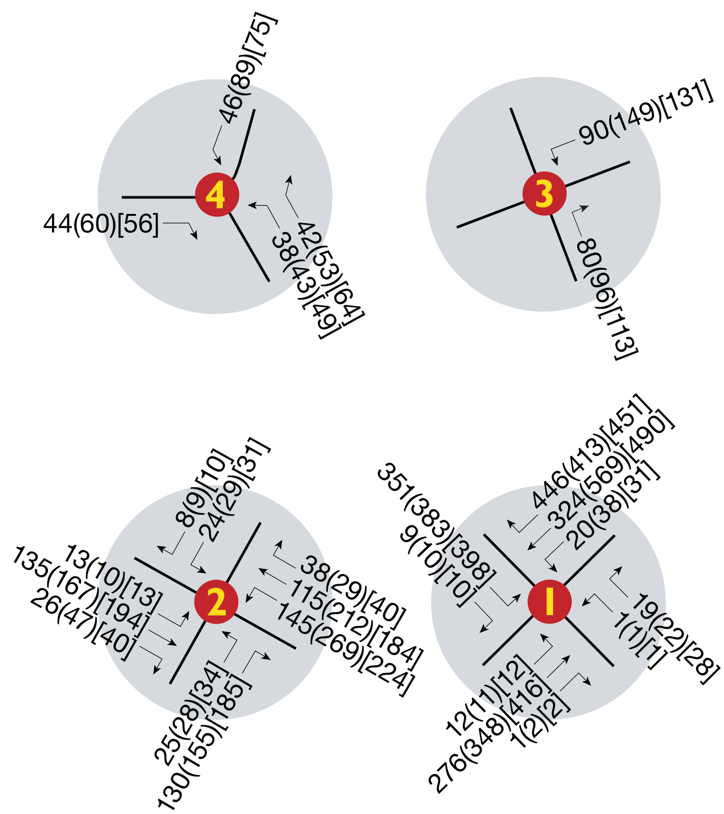
Land Use Type	Trip Generation Rates										
	Variable	ITE LUC	Daily	Midday Peak Hour			PM Peak Hour			Saturday Peak Hour		
				IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Single-Family Detached	# Units	210	9.43	50%	50%	0.61	63%	37%	0.94	54%	46%	0.92
Single Family Attached	# Units	215	7.20	52%	48%	0.32	59%	41%	0.57	48%	52%	0.57
Multi-Family	# Units	220	6.74	52%	48%	0.23	63%	37%	0.51	50%	50%	0.41
Lodging	# Rooms	310	7.99	62%	38%	0.64	51%	49%	0.59	56%	44%	0.72
Commercial	1,000 SF	822	54.45	52%	48%	6.9	50%	50%	6.59	51%	49%	6.57

III.C Trip Assignment

The estimated site vehicle-trips were assigned to the study intersections using the site trip distribution assumptions shown on **Figure 5**. As shown, at site buildout it is assumed that generated trips will be equally split between north and south directions in the Fraser Valley. 50 percent of site trips would utilize US 40 south and 50 percent would travel to and from the north on US 40 (45 percent) or CR 721 (5 percent). **Figure 5** provides the assignment of site generated traffic volumes to the study intersections and roadways.







LEGEND

XXX(XXX)[XXX] = Midday(PM)[Saturday] Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes (Weekday)

XX% = Site Trip Distribution

NORTH

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NOTE: Drawing Not to Scale

FIGURE 5

Grand Park West Site Generated Traffic and Trip Distribution

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V. BUILDOUT CONDITIONS

V.A Traffic Volumes

The site generated vehicle-trips on **Figure 5** were added to the background traffic volumes shown on **Figure 3** to arrive at the total buildout traffic volumes shown on **Figure 6**. As shown, Grand Park Drive is projected to carry the highest daily and peak hour traffic volumes – varying from 2,600 vpd on its northwest end to 19,300 vpd on its east end.

V.B Traffic Operations

Figure 6 provides the results of LOS analyses of projected buildout conditions at the study intersections. The results are summarized below by intersection along with buildout recommendations:

1. **Grand Park Dr/Road B**: Accessing PA's 8-11, Road B is projected to carry a maximum of 8,700 vehicles per day (vpd). Operational analyses of this intersection began with the assumption of a traditional two-way stop controlled intersection with free eastbound and westbound movements along Grand Park Drive and stop control along the southbound Road B approach. In this configuration, the southbound approach movement would operate at LOS F during peak hours with volume-to-capacity (v/c) ratio exceeding 1.0 and queue lengths up to 600 feet.

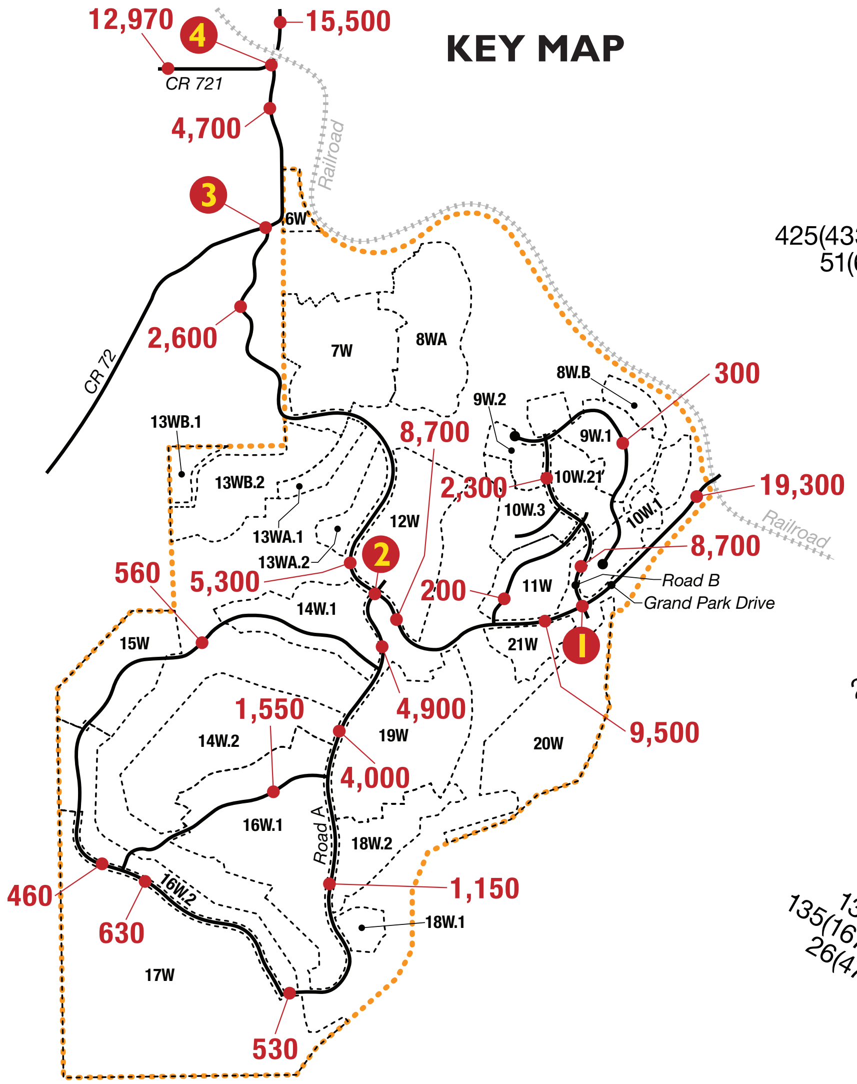
   Considering this substandard result, additional traffic control options were evaluated. While buildout traffic volumes at the intersection may satisfy signal warrant criteria, installation of a traffic signal at this location is not preferred given the mountainous development context. Therefore, a modern roundabout option was tested for operational benefit with the result that intersection movements could be improved to LOS C or better with a single lane roundabout. Roundabout traffic control is recommended at this intersection and is incorporated into current site plans.

2. **Grand Park Dr/Road A**: Road A would serve PA's 14-19 and is projected to carry up to 4,900 vpd. Under stop sign control, movements through the intersection would operate at LOS C or better with v/c below 0.5 and a 75 ft or less queue length along the Road A approach. A westbound left-turn lane approximately 50 feet long is recommended to minimize interference with through traffic along Grand Park Drive.

3. **Grand Park Dr/CR 72**: Movements through this intersection would operate at LOS B or better under stop sign control, an acceptable LOS. It is recommended that stop sign control be provided along the Grand Park Drive approach to the intersection.

4. **CR 72/CR 721**: The stop-sign controlled northwest-bound left turn through this existing intersection is expected to operate at LOS F during the weekday PM and Saturday peak hours. The v/c ratio is 0.91 and the projected queue length is 125 feet. To address the LOS F condition at the time of buildout, it is recommended that the north-west bound approach be widened to provide a 125 ft. right-turn lane to help optimize operations. Based on a brief threshold analysis, it appears that the need for this widening would be triggered once development in the area reaches approximately 80 percent of full buildout levels.

Figure 6 depicts buildout traffic operations. **Appendix C** provides LOS worksheets.



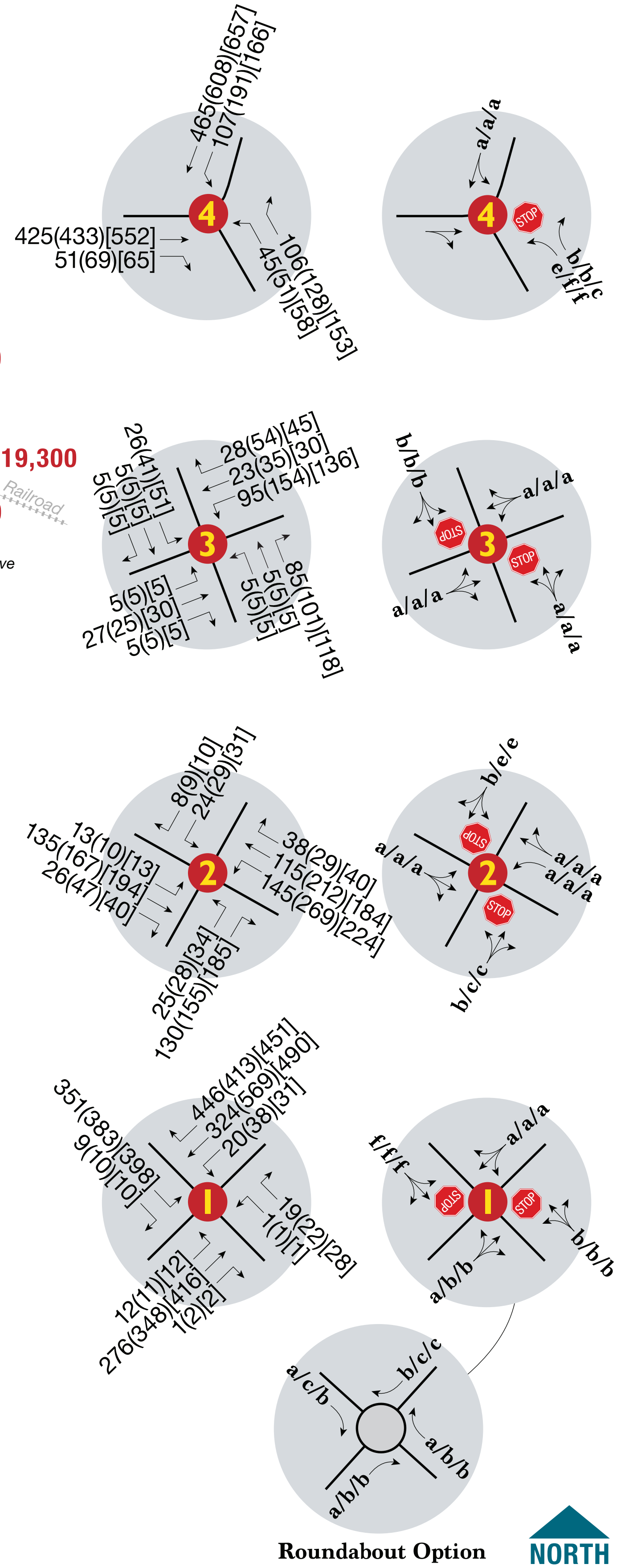
LEGEND

XXX(XXX)[XXX] = Midday(PM)[Saturday] Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes (Weekday)

x/x = Midday(PM)[Saturday] Peak Hour Unsignalized Movement Level of Service

STOP = Stop Sign



NOTE: Drawing Not to Scale

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FIGURE 6
Grand Park West
Buildout Total Traffic Conditions

V.C Road Classification

Applicable standards

A road classification system designates each roadway within a given network as a arterial, collector or local road based on the intended function of each. This hierarchy is routinely implemented for effective movement within and between developed communities. The Town of Fraser provides guidance on its expectations for road classification in its *Design Criteria and Construction Standards* document. Therein it is stated that, "The Town's streets and roads are classified according to function and ADT's (Average Daily Traffic)."

The Standards further state the following regarding road classification and function:

*"The **arterial street** and road system links towns and other large traffic generators with minimal interference to through traffic movements and higher design speeds. and;*

***Collector streets** and roads provide a link between arterial streets and roads and local streets. More moderate speeds are typical on collector streets and roads. and;*

***Local streets** primarily provide access from collector and arterial streets and roads to adjacent neighborhoods and other developments. A local street is a street whose primary function is to provide access to residences, businesses or abutting property rather than to serve through traffic."*

As to ADT, the Town of Fraser standards establish a minimum volume of 601 vpd for arterials, 401-600 for collectors and less than 401 for local roads. The Fraser standards do not specify an assumed occupancy % for the residential density to be constructed and, as noted previously, residential site trip estimates were prepared based on typical suburban US neighborhood occupancy for this study which is greater than the occupancy level reported in the draft Fraser comprehensive plan and occupancy levels reported for vacation rentals which is more typically around 50%. The traffic trips reflected in this study are likely overstated for this reason. Therefore, daily traffic volumes throughout the site are unlikely to attain sustained levels near the values shown in this report.

Classification Recommendations

Based on a review of the projected ADT levels for the primary road network throughout the site, nearly all primary roadways in Grand Park West (Grand Park Drive, Road B, etc.) would be categorized as arterials. Exceptions may be found in the lower southwest corner of the site, where projected ADT is below 600 vpd along a number of streets. However, road classification should not be determined based solely on ADT.

Based on an assessment of the anticipated future function of each road and the overall network at buildout, it is recommended that Grand Park Drive be categorized as a arterial road through the site given its longer continuity.

Portions of connecting roads Road B and Road A should be categorized as collector roadways as these convey traffic from the arterial to local roads; the portion of Road A from Grand Park Drive to the south edge of the site and the portion of Road B from Grand Park Drive north to PA 9W.1.

The remainder of roadways within the site should be classified as local. Of note, the east-west roadway through PA 16W.1 is projected to carry up to 1,550 vehicles per day under a full occupancy scenario. The role of this roadway within the Grand Park network is consistent with that of a local roadway and homes are planned to front onto this roadway. However, given the potential for higher traffic volumes at times, it is recommended that the roadway maintain a curvilinear alignment and neighborhood scale as depicted on the current site plan.

VI. TRANSIT

VI.A Transit Vision and Role in Grand Park West

Transit is envisioned as a core mobility system for Grand Park West rather than a supplemental or mitigation-only element. Given the scale of the development, its resort-oriented land use mix, and its strategic location between the Town of Fraser, the Town of Winter Park, and the Winter Park Ski Area, transit will play a primary role in daily travel, visitor movement, and peak winter transportation demand. Of note, the traffic volume estimates included in this report assumed no reduction to vehicle-trips associated with the provision of a transit system – such a reduction could be expected with the transit system envisioned herein.

Grand Park West is planned as a transit-served resort community, where residents, visitors, and employees can reliably move between residential neighborhoods, lodging, commercial destinations, recreational amenities, medical services, and regional attractions without dependence on private automobiles.

VI.B Regional Transit Integration – The Lift Transportation System

Transit service within Grand Park West should be provided through an expansion of The Lift Transportation System, operated by the Town of Winter Park. The Lift currently serves as the primary regional transit provider for the Upper Fraser Valley and is well-positioned to extend service westward into Grand Park West.

Expanding The Lift system into Grand Park West would:

- Provide direct, fare-free (or low-fare) connections to:
  - Town of Fraser
  - Town of Winter Park
  - Winter Park Ski Area
- support Fraser's commercial growth and sales tax base,
- improve access to employment, medical services and recreation, and
- reduce winter peak traffic volumes along US 40

This approach would leverage an existing, proven transit system rather than introducing a new standalone shuttle network.

VI.C Internal Transit Network Structure

Primary Spine Route – Grand Park Drive

The primary internal transit corridor within Grand Park West would be Grand Park Drive, which functions as the main internal collector roadway and connects all major land use areas.

The spine route would:

- Run the full length of Grand Park Drive
- Serve all major residential neighborhoods, lodging areas, commercial districts, and community amenities
- Provide direct connections to regional Lift routes serving Fraser, Winter Park, and the Ski Area

Neighborhood Loop Routes

To ensure full community coverage, neighborhood loop routes are envisioned to serve residential areas, club amenities, and lower-density neighborhoods located away from Grand Park Drive.

Neighborhood loops would:

- Operate with smaller shuttle vehicles,
- provide frequent, short-distance service,
- be timed to connect with the spine route, and
- minimize walking distances in winter conditions

This two-tier system ensures complete transit coverage throughout the project, including residential neighborhoods, lodging, commercial areas, and club facilities.

VI.D Transit Stop Locations and Spacing

Stop Spacing

Figure 7 provides conceptual locations for future transit stops within Grand Park West. Transit stops should be provided throughout Grand Park West with spacing appropriate for a resort community:

- Residential neighborhoods: approximately every 600–1,000 feet,
- commercial, lodging, and mixed-use areas: approximately every 800–1,200 feet, and
- major destinations: direct stop access regardless of spacing.

This spacing reflects:

- Winter weather conditions,
- visitor travel patterns,
- the need to carry skis, groceries, and equipment, and
- industry standards in mountain resort communities

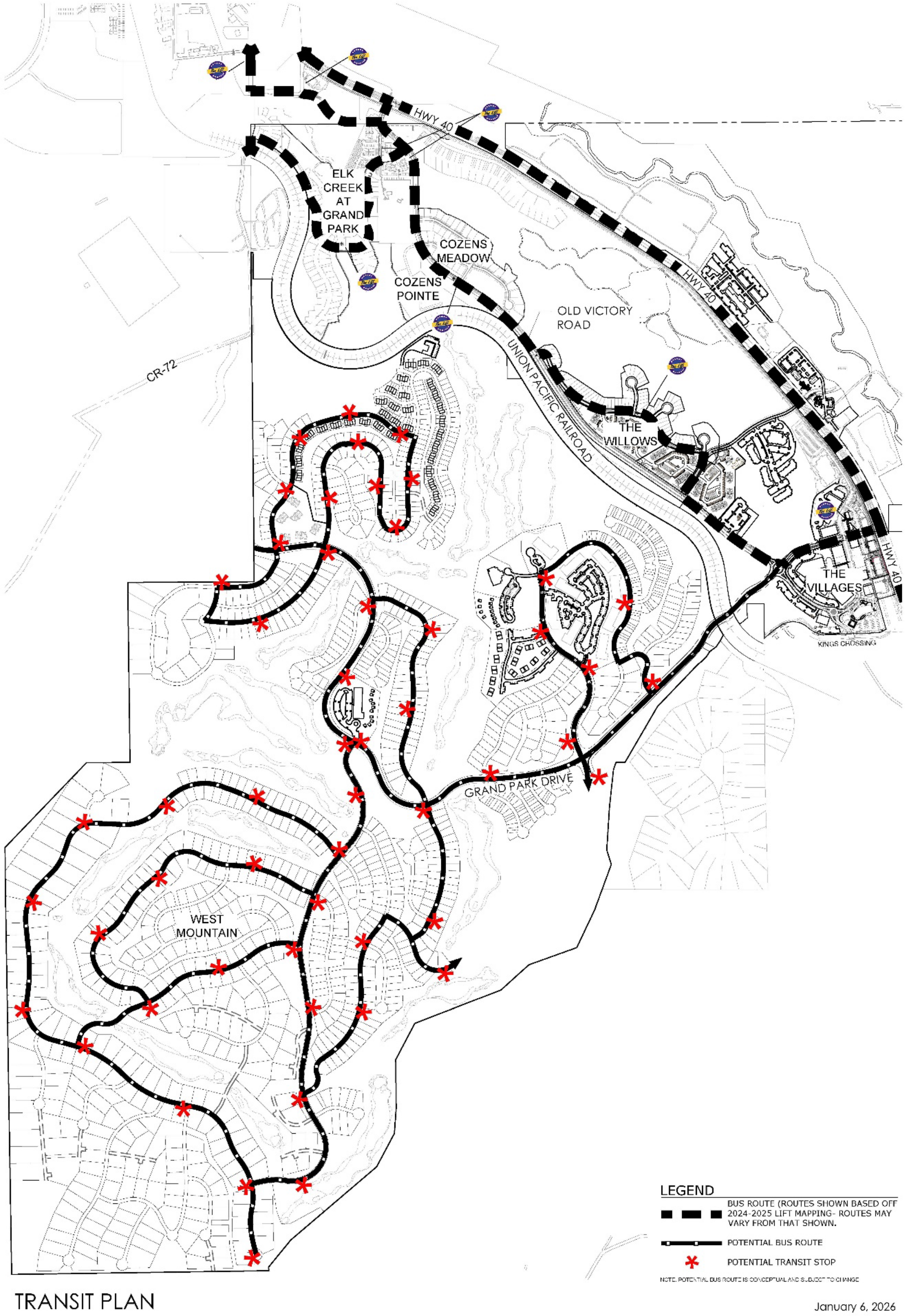
Key Transit Destinations

Transit stops should be located to directly serve the following destinations:

Within Grand Park West

- All residential planning areas,
- lodging and resort accommodations,
- commercial districts,
- private club and community amenities, and
- trailheads and open-space access points

Figure 7. Potential Future Transit Stops



Regional Destinations

- Grand Park Community Recreation Center
- Middle Park Medical / Fraser Hospital
- Foundry Bowl and Cinema
- Fraser commercial corridor and Safeway grocery store
- Town of Winter Park core
- Winter Park Ski Area base areas

Service Frequency and Seasonal Operations

Transit service should scale with seasonal demand and occupancy:

Peak Winter Season (Weekends & Holidays)

- Spine route: every 10–15 minutes
- Neighborhood loops: every 20–30 minutes

Regular Winter Weekdays

- Spine route: every 15–20 minutes
- Neighborhood loops: approximately every 30 minutes

Summer and Shoulder Seasons

- Spine route: every 20–30 minutes
- Neighborhood loops: reduced frequency or on-demand service

Off-Season

- Limited service, event-based service, or microtransit as demand warrants

Transit Implementation Thresholds

Transit implementation should be tied to occupancy, ridership, and seasonal demand, rather than unit count alone. This approach reflects the resort-oriented nature of Grand Park West and avoids premature infrastructure commitments.

Example thresholds include:

- Initiation of service with completion of first residences, or opening of first lodging and commercial areas
- Increased frequency as seasonal occupancy increases
- Expanded service hours and routes based on demonstrated ridership

VI.E Long-Term Ski Area Connectivity Opportunity

Grand Park West is uniquely positioned to potentially provide future lift-based access to the Winter Park Ski Area, specifically via a gondola connection to the Wild Spur Express lift and the Vasquez Ridge area.

A future gondola connection could:

- Substantially reduce winter peak traffic on US Highway 40,
- reduce parking demand at the Winter Park Ski Area,
- improve the visitor experience,
- provide the Town of Fraser with direct access to one of the region's largest recreational draws, and
- strengthen Fraser's identity as a resort destination.

This opportunity represents a long-term, transformative transportation strategy that complements transit investment and supports regional mobility goals. Roadway infrastructure within Grand Park West should be designed to remain compatible with this potential future connection.

VII. SUMMARY

This Buildout Intersection and Roadway Assessment and Transportation analysis provides insight into the expected travel patterns and traffic impacts associated with development of Grand Park West. Proposed development levels would include 1,527 residential units, 620 lodgings and 65 thousand square feet (KSF) of commercial development. Traffic impacts associated with the proposed development were previously addressed in the RENDEzVOUS Master Traffic Impact Analysis and other studies. The proposed land uses are consistent with prior studies. It is estimated that the proposed buildout of Grand Park West would generate more than 20,000 daily vehicle-trips and up to 2,000 vph during peak hours based on the conservative assumption of high residential occupancy rates.

If more locally accurate occupancy rates were applied to trip generation calculations, residential-based traffic trips could be reduced by as much as 40 to 60 percent on an annual average basis, with higher volumes occurring only during limited peak holiday and winter weekend periods. Consequently, the trip generation and intersection volumes presented in this study should be understood as highly conservative, representing a theoretical maximum condition rather than typical or even frequent operating conditions. It is important that roadway infrastructure not be overbuilt to accommodate a 100 percent occupancy scenario that is inconsistent with documented resort-market statistics, as doing so could introduce urban-scale roadway elements into a rural resort environment. Nonetheless, the conservative nature of this analysis provides long-term assurance that the transportation system would remain adequate even under a hypothetical future scenario in which Fraser evolves into a fully year-round, suburban community.

Findings and recommendations are described below by subject area:

Trip Generation Compliance

The current proposed development of Grand Park West is largely consistent with prior land use expectations and analyses such as those contained within the *Master TIA* and 2013 Grand Park TIA. Vehicle-trip generation estimates have increased, but primarily due to the use of the most current trip generation rates rather than appreciable difference in site land use expectations.

Traffic Operations

Four study intersections were addressed per request from the Town of Fraser. Traffic control and lane geometry recommendations follow:

1. **Grand Park Dr/Road B**: A modern roundabout option was tested for operational benefit with the result that intersection movements could be improved to LOS C or better with a single lane roundabout. Roundabout traffic control is recommended at this intersection.

2. **Grand Park Dr/Road A**: A westbound left-turn lane approximately 50 feet long is recommended to minimize interference with through traffic along Grand Park Drive.

3. **Grand Park Dr/CR 72**: Movements through this intersection would operate at LOS B or better under stop sign control, an acceptable LOS. It is recommended that stop sign control be provided along the Grand Park Drive approach to the intersection.

4. **CR 72/CR 721**: To address the LOS F condition at the time of buildout, it is recommended that the north-west bound approach be widened to provide a 125 ft. right-turn lane to help optimize operations. This widening would likely be needed when area buildout reaches approximately 80 percent of anticipated levels.

Road Classification

Grand Park Drive is categorized as a arterial road through the site, consistent with is classification. Portions of connecting roads Road B and Road A should be categorized as collector roadways as these convey traffic from the arterial to local roads; the portion of Road A from Grand Park Drive to the south edge of the site (approximately 1 mile in length through PA's 14W, 19W, 16W and 18W) and the portion of Road B from Grand Park Drive north to PA 9W.1. The remainder of roadways within the site should be classified as local.

Based on information provided by the development team, it is our understanding that the roadways within the site had previously (at the Planned District Development (PDD) stage in 2005) been specified as outlined above. Design efforts since that time have proceeded based on these classifications.

The recommendations included in this assessment are associated with full buildout of Grand Park West and are not required to be fully implemented with development of individual filings and/or planning areas. As each Planning Area is submitted to the Town of Fraser for review, its conformance with this assessment and any needed improvements triggered would be evaluated in individual conformance analyses prepared to address Town requirements.

Appendix A. Level of Service Worksheets – Background Condition

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	27	5	5	23	28	5	5	5	26	5	5
Future Vol, veh/h	5	27	5	5	23	28	5	5	5	26	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	29	5	5	25	30	5	5	5	28	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	55	0	0	34	0	0	97	107	32	97	94	40
Stage 1	-	-	-	-	-	-	42	42	-	50	50	-
Stage 2	-	-	-	-	-	-	55	65	-	47	44	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1550	-	-	1578	-	-	885	783	1042	885	796	1031
Stage 1	-	-	-	-	-	-	972	860	-	963	853	-
Stage 2	-	-	-	-	-	-	957	841	-	967	858	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1550	-	-	1578	-	-	872	778	1042	872	791	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	872	778	-	872	791	-
Stage 1	-	-	-	-	-	-	969	857	-	960	850	-
Stage 2	-	-	-	-	-	-	943	838	-	953	855	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.7	9.1	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	884	1550	-	-	1578	-	-	878
HCM Lane V/C Ratio	0.018	0.004	-	-	0.003	-	-	0.045
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	9.3
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection						
Int Delay, s/veh	1.4					

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	7	64	425	7	61	465
Future Vol, veh/h	7	64	425	7	61	465
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	70	462	8	66	505

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1103	466	0	0	470	0
Stage 1	466	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	234	597	-	-	1092	-
Stage 1	632	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	214	597	-	-	1092	-
Mov Cap-2 Maneuver	214	-	-	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	483	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	13.4	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	507	1092	-
HCM Lane V/C Ratio	-	-	0.152	0.061	-
HCM Control Delay (s)	-	-	13.4	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.2	-

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	25	5	150	35	54	5	5	99	41	5	5
Future Vol, veh/h	5	25	5	150	35	54	5	5	99	41	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	27	5	163	38	59	5	5	108	45	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	32	0	0	439	463	30	490	436	68
Stage 1	-	-	-	-	-	-	40	40	-	394	394	-
Stage 2	-	-	-	-	-	-	399	423	-	96	42	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1496	-	-	1580	-	-	528	496	1044	489	514	995
Stage 1	-	-	-	-	-	-	975	862	-	631	605	-
Stage 2	-	-	-	-	-	-	627	588	-	911	860	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1580	-	-	476	440	1044	397	456	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	476	440	-	397	456	-
Stage 1	-	-	-	-	-	-	972	859	-	629	538	-
Stage 2	-	-	-	-	-	-	549	523	-	809	857	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	4.7	9.4	14.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	934	1496	-	-	1580	-	-	428
HCM Lane V/C Ratio	0.127	0.004	-	-	0.103	-	-	0.13
HCM Control Delay (s)	9.4	7.4	0	-	7.5	0	-	14.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.3	-	-	0.4

Intersection	
Int Delay, s/veh	1.8

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	8	75	433	9	102	608
Future Vol, veh/h	8	75	433	9	102	608
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	82	471	10	111	661

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1359	476	0	0	481	0
Stage 1	476	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	164	589	-	-	1082	-
Stage 1	625	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	137	589	-	-	1082	-
Mov Cap-2 Maneuver	137	-	-	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	339	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	15.1	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	447	1082	-
HCM Lane V/C Ratio	-	-	0.202	0.102	-
HCM Control Delay (s)	-	-	15.1	8.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.3	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	30	5	132	30	45	5	5	116	51	5	5
Future Vol, veh/h	5	30	5	132	30	45	5	5	116	51	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	33	5	143	33	49	5	5	126	55	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	82	0	0	38	0	0	395	414	36	455	392	58
Stage 1	-	-	-	-	-	-	46	46	-	344	344	-
Stage 2	-	-	-	-	-	-	349	368	-	111	48	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1515	-	-	1572	-	-	565	529	1037	515	544	1008
Stage 1	-	-	-	-	-	-	968	857	-	671	637	-
Stage 2	-	-	-	-	-	-	667	621	-	894	855	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1515	-	-	1572	-	-	515	477	1037	415	490	1008
Mov Cap-2 Maneuver	-	-	-	-	-	-	515	477	-	415	490	-
Stage 1	-	-	-	-	-	-	965	854	-	669	576	-
Stage 2	-	-	-	-	-	-	594	561	-	778	852	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	4.8	9.4	14.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	954	1515	-	-	1572	-	-	442
HCM Lane V/C Ratio	0.144	0.004	-	-	0.091	-	-	0.15
HCM Control Delay (s)	9.4	7.4	0	-	7.5	0	-	14.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0.3	-	-	0.5

Intersection	
Int Delay, s/veh	1.9

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	9	89	552	9	91	657
Future Vol, veh/h	9	89	552	9	91	657
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	97	600	10	99	714

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1517	605	0	0	610	0
Stage 1	605	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	131	498	-	-	969	-
Stage 1	545	-	-	-	-	-
Stage 2	392	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	109	498	-	-	969	-
Mov Cap-2 Maneuver	109	-	-	-	-	-
Stage 1	545	-	-	-	-	-
Stage 2	326	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	18.4	0	1.1
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	375	969	-
HCM Lane V/C Ratio	-	-	0.284	0.102	-
HCM Control Delay (s)	-	-	18.4	9.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.3	-

Appendix B. Trip Generation Conformance Review

ORIGINAL: April 22, 2025
UPDATED: September 22, 2025

Town of Fraser
153 Fraser Avenue
Fraser, CO 80442
Attn: Garrett Scott, Town Planner

RE: Grand Park West Traffic Consistency/Conformance Review
FHU Project No. 125152-01

Dear Mr. Scott:

West Mountain Development LLC requested that I provide an analysis of the West Mountain FPDP with regard to its compliance with the 2004 Traffic Impact Analysis as they prepare to develop the Western portion of the Grand Park development in Fraser, Colorado. The area, Grand Park West, encompasses approximately 1,020 Acres, lies west of the Union Pacific Railroad tracks and incorporates Grand Park Planning Areas 6W through 23W. The proposed development of Grand Park West, termed the "study area" in this letter, includes a mix of residential dwelling units, lodging and commercial development, with locations farther west within the portion more residential in nature. **Figure 1** provides the current development plan.

Per your request, this letter addresses whether the current development plan and associated transportation outcomes is consistent with previous development and traffic studies prepared for the area. The letter identifies prior traffic studies pertaining to the area, describes the current land use and transportation plan in light of prior plans, and provides a vehicle-trip trip generation comparison between the current and prior plans. After review we can confirm that the prior traffic studies provide a reliable assessment of projected transportation conditions associated with development of Grand Park and Grand Park West; and the current proposed land use and roadway network plan for Grand Park West is consistent with prior approved plans.

Prior Traffic Studies

The proposed development of the study area was previously evaluated in the following transportation studies:

- **2004 RENDEzVOUS Traffic Impact Analysis (Master TIA).** For the study area, the Master TIA evaluated potential impacts of development of 686 detached residential dwelling units, 887 attached residential dwelling units, 700 lodging units and 50 thousand square feet of commercial development. This study addressed anticipated site access to US Highway 40 (US 40) and included traffic volume projections for roadways and intersections throughout the study area. **Figure 2** depicts the development plan from this report.

- **2013 Grand Park Traffic Impact Analysis**. This report was developed to address updates to proposed access to US 40 and the associated access permitting process through the Colorado Department of Transportation (CDOT). This study evaluated similar land use types and magnitudes to the Master TIA, anticipating approximately 843 detached dwelling units, 658 attached units, 305 lodging units and 30 thousand square feet of commercial development within the study area.

- **CDOT US Highway 40 Study**. In 2020, CDOT completed a study of US 40 addressing anticipated development-related growth throughout the Fraser River valley. The study incorporated development expectations for Grand Park West and addressed impacts to intersections along US 40.

Figure 1. Current Grand Park West Development Plan

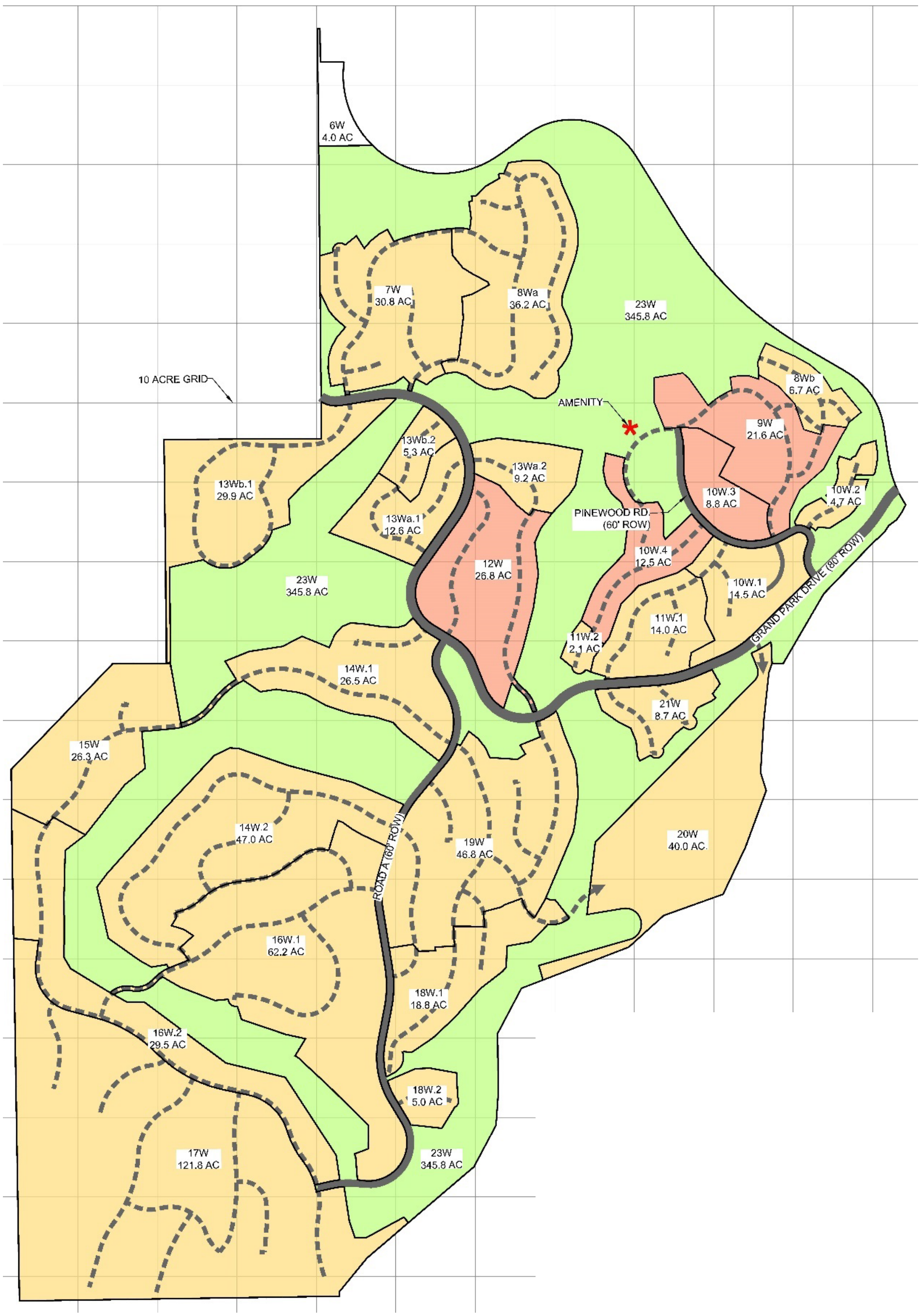
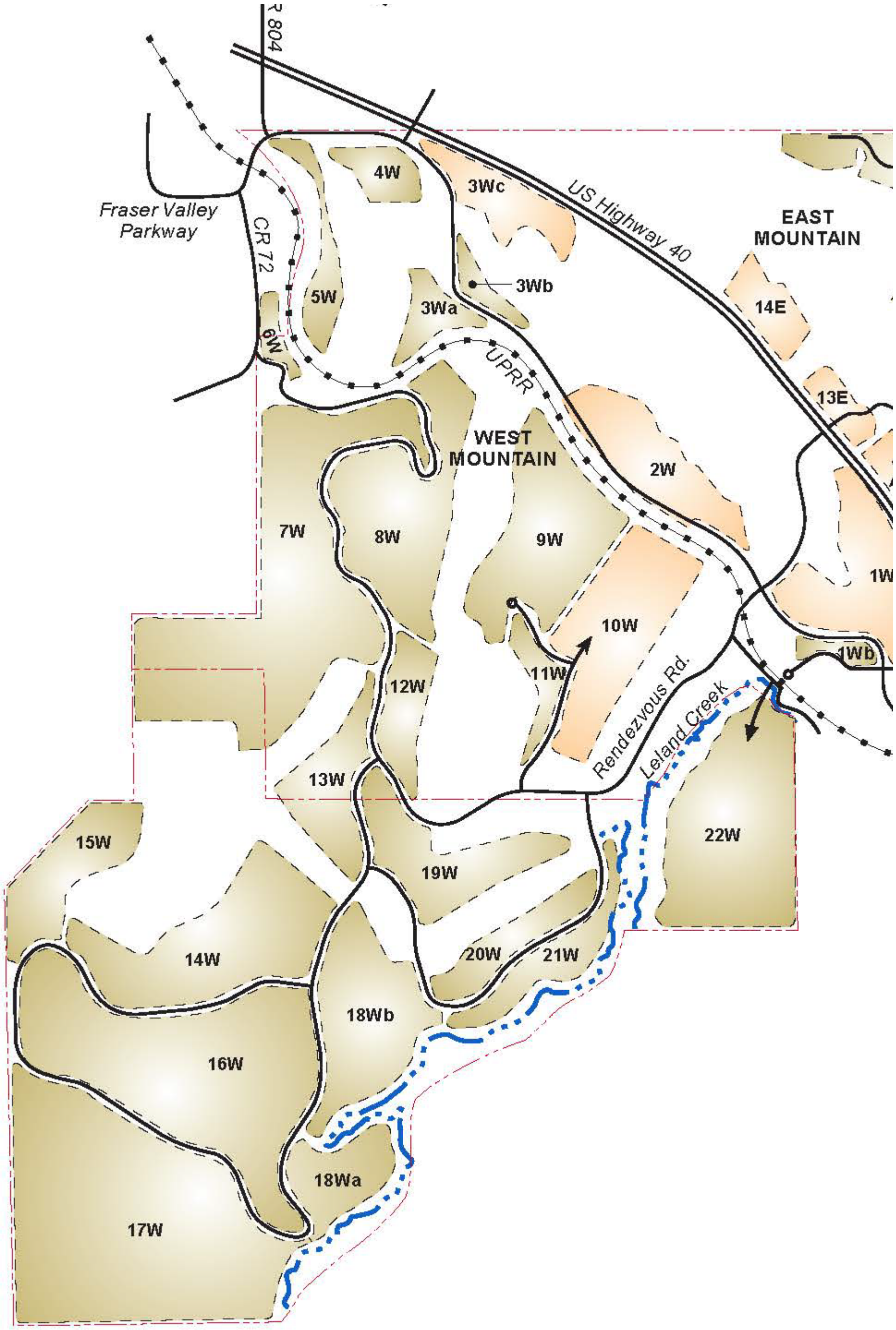


Figure 2. Grand Park West Development Plan (2004 Study)



Taken together, these studies provide a reliable assessment of projected transportation conditions associated with development of Grand Park at large and Grand Park West as a portion. Over time, the infrastructure measures identified in the studies have been implemented alongside development of Grand Park as documentation has demonstrated consistency of each part with the Master TIA.

Development Plan Comparison

Figure 1 and **Figure 2** provide a view of the current and 2004 site plans for Grand Park West, respectively. As shown, the planning areas (6W through 22W) included within Grand Park West are similar between the two plans, though there are adjustments to land coverage of each PA and the planned alignments of streets serving the area. **Table 1** provides a comparison of land use magnitude and type between the Master TIA and current land use for Grand Park West.

Table 1. Grand Park West Land Use Plan Comparison – Master TIA vs. Current

Master TIA Land Use						Current Land Use					
Planning Area	Residential			Lodging	Comm KSF	Planning Area	Residential			Lodging	Comm KSF
	SFD	SFA	MF				SFD	SFA	MF		
6W						6W					
7W	45	225				7W	76	28	72		
8W	63	75				8Wa	9	190			
Blank						8Wb		52			
9W		153		200	20	9W		56		250	26
10W		118		350	30	10W	92			250	39
11W	10	24		150		11W	41				
12W		92				12W	56	24		130	
13W	50					13Wa	36				
Blank						13Wb	52				
14W	117					14W	151				
15W	12					15W	15				
16W	90					16W	117				
17W	72					17W	129				
18Wa	14					18W	56				
18Wb	47										
19W	86	93				19W	129				
20W		57				20W	82				
21W		50				21W		64			
22W	80					22W					
TOTALS	686	887	0	700	50	TOTALS	1041	414	72	630	65

SFD = Single Family Detached Units
SFA = Single Family Attached Units
MF = Multi-Family Units (Apartments)
Comm KSF = Commercial 1,000 Square Feet

As shown, the land use scenario analyzed in the Master TIA anticipated similar residential totals to the current plan (1,572 vs. 1,527) but a different mix of single family detached and attached units. The current land use plan includes more detached homes. The spread of development across the PA's is similar between the two plans – commercial and lodging opportunities lie within PA's 9 and 10 and the other PA's emphasize residential units.

The comparative analysis of land use plans indicates that the current land use plan for Grand Park West is generally consistent with prior approved plans.

Trip Generation Comparison

The proposed development of Grand Park West would generate additional vehicle-trips along the surrounding roadway network. Trip generation estimates were included in the Master TIS for Grand Park West based on trip generation rates documented in the Town of Fraser Standards current at that time and rates provided from similar mountain agencies and sources. More recent traffic analyses of area development have been completed using trip generation information from the Institute of *Transportation Engineers Trip Generation Manual (11th Edition)*. **Table 2** provides a comparison of Master TIA and current trip generation using both the Master TIA and ITE rates.

Table 2. Grand Park West Trip Generation Comparison

Scenario	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Master TIA Trip Generation Rates							
Master TIA	14,233	276	735	1,011	835	473	1,308
Current	15,288	301	807	1,108	885	508	1,393
Difference	+1,055	+25	+72	+97	+50	+35	+85
ITE 11th Edition Trip Generation Rates							
Master TIA	21,172	480	866	1,346	1,080	813	1,893
Current	21,856	495	903	1,398	1,181	871	2,052
Difference	+684	+15	+37	+52	+101	+58	+159

As shown, the current land use plan is estimated to generate more vehicle-trips per day and per peak hour than the Master TIA land use. Though the current land use plan includes fewer total residential units than the Master TIA land use, increasing the mix of detached homes with the current plan causes increased traffic levels. Detached homes typically generate higher levels of traffic than attached homes.

The estimated differences are modest, however, amounting to approximately 5-10 percent additional daily and peak hour traffic. This increase would not be expected to result in additional traffic control or infrastructure needs within the Grand Park West site or along US 40.

Summary

In summary, this conformance analysis finds that:

- Prior traffic studies capturing Grand Park West development provide a reliable assessment of projected transportation conditions associated with development of Grand Park at large and Grand Park West as a portion. Over time, the infrastructure measures identified in these studies have been implemented alongside development of Grand Park as documentation has demonstrated consistency of each part with the Master TIA.

- The current proposed land use and roadway network plan for Grand Park West is consistent with prior approved plans.

- Vehicle-trip generation estimates for Grand Park West increase with the current plan in comparison with prior approved plans due to the introduction of additional detached homes, but the increases are modest and not expected to require additional traffic control or roadway infrastructure needs beyond those identified in prior studies.

Please feel free to contact me at (303)721-1440 or lyle.devries@fhueng.com with any questions.

Sincerely,

FELSBURG HOLT & ULLEVIG

Lyle E. DeVries, PE, PTOE
Principal

Appendix C. Level of Service Worksheets - Buildout Total Condition

Intersection	
Int Delay, s/veh	13.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	351	0	9	1	0	19	12	276	1	20	324	446
Future Vol, veh/h	351	0	9	1	0	19	12	276	1	20	324	446
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-	-	-	200
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	382	0	10	1	0	21	13	300	1	22	352	485

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	733	723	352	971	1208	301	837	0	0	301	0	0
Stage 1	396	396	-	327	327	-	-	-	-	-	-	-
Stage 2	337	327	-	644	881	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 336	352	692	232	183	739	797	-	-	1260	-	-
Stage 1	629	604	-	686	648	-	-	-	-	-	-	-
Stage 2	677	648	-	461	365	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 313	333	692	219	173	739	797	-	-	1260	-	-
Mov Cap-2 Maneuver	426	424	-	219	173	-	-	-	-	-	-	-
Stage 1	616	582	-	672	635	-	-	-	-	-	-	-
Stage 2	645	635	-	438	352	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	51.8	10.6	0.4	0.2
HCM LOS	F	B		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SELn2	SWL	SWT	SWR
Capacity (veh/h)	797	-	-	661	426	692	1260	-	-
HCM Lane V/C Ratio	0.016	-	-	0.033	0.896	0.014	0.017	-	-
HCM Control Delay (s)	9.6	0	-	10.6	52.9	10.3	7.9	0	-
HCM Lane LOS	A	A	-	B	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	9.5	0	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	5.2

Movement	NBL	NBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	25	0	13	135	26	145	115	38	0	24
Future Vol, veh/h	25	0	13	135	26	145	115	38	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	0	14	147	28	158	125	41	0	26

Major/Minor	Minor1		Major1			Major2			Minor2	
Conflicting Flow All	664	161	166	0	0	175	0	0	722	146
Stage 1	189	-	-	-	-	-	-	-	462	-
Stage 2	475	-	-	-	-	-	-	-	260	-
Critical Hdwy	7.12	6.22	4.12	-	-	4.12	-	-	7.12	6.22
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-	-	6.12	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-	-	6.12	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	374	884	1412	-	-	1401	-	-	342	901
Stage 1	813	-	-	-	-	-	-	-	580	-
Stage 2	570	-	-	-	-	-	-	-	745	-
Platoon blocked, %				-	-		-	-		
Mov Cap-1 Maneuver	329	884	1412	-	-	1401	-	-	260	901
Mov Cap-2 Maneuver	329	-	-	-	-	-	-	-	260	-
Stage 1	804	-	-	-	-	-	-	-	574	-
Stage 2	491	-	-	-	-	-	-	-	619	-

Approach	NB	SE	NW	SW
HCM Control Delay, s	11.8	0.6	3.8	11.9
HCM LOS	B			B

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	695	1401	-	-	1412	-	-	557
HCM Lane V/C Ratio	0.242	0.112	-	-	0.01	-	-	0.062
HCM Control Delay (s)	11.8	7.9	-	-	7.6	0	-	11.9
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.9	0.4	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	27	5	95	23	28	5	5	85	26	5	5
Future Vol, veh/h	5	27	5	95	23	28	5	5	85	26	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	29	5	103	25	30	5	5	92	28	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	55	0	0	34	0	0	293	303	32	336	290	40
Stage 1	-	-	-	-	-	-	42	42	-	246	246	-
Stage 2	-	-	-	-	-	-	251	261	-	90	44	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1550	-	-	1578	-	-	659	610	1042	618	620	1031
Stage 1	-	-	-	-	-	-	972	860	-	758	703	-
Stage 2	-	-	-	-	-	-	753	692	-	917	858	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1550	-	-	1578	-	-	616	567	1042	529	576	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	616	567	-	529	576	-
Stage 1	-	-	-	-	-	-	969	857	-	756	655	-
Stage 2	-	-	-	-	-	-	692	645	-	828	855	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	4.8	9.2	11.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	964	1550	-	-	1578	-	-	574
HCM Lane V/C Ratio	0.107	0.004	-	-	0.065	-	-	0.068
HCM Control Delay (s)	9.2	7.3	0	-	7.4	0	-	11.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	45	106	425	51	107	465
Future Vol, veh/h	45	106	425	51	107	465
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	115	462	55	116	505

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1227	490	0	0	517	0
Stage 1	490	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	197	578	-	-	1049	-
Stage 1	616	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	167	578	-	-	1049	-
Mov Cap-2 Maneuver	167	-	-	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	400	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	19.5	0	1.7
HCM LOS	C		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	167	578	1049	-
HCM Lane V/C Ratio	-	-	0.293	0.199	0.111	-
HCM Control Delay (s)	-	-	35.2	12.8	8.9	0
HCM Lane LOS	-	-	E	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.7	0.4	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	392	22	314	859
Demand Flow Rate, veh/h	400	22	320	876
Vehicles Circulating, veh/h	382	709	412	14
Vehicles Exiting, veh/h	508	23	370	717
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.0	5.7	8.0	10.7
Approach LOS	A	A	A	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	400	22	320	876
Cap Entry Lane, veh/h	935	670	906	1360
Entry HV Adj Factor	0.980	1.000	0.981	0.981
Flow Entry, veh/h	392	22	314	859
Cap Entry, veh/h	916	670	889	1334
V/C Ratio	0.428	0.033	0.353	0.644
Control Delay, s/veh	9.0	5.7	8.0	10.7
LOS	A	A	A	B
95th %tile Queue, veh	2	0	2	5

Intersection	
Int Delay, s/veh	54.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	383	0	10	1	0	22	11	348	2	38	569	413
Future Vol, veh/h	383	0	10	1	0	22	11	348	2	38	569	413
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-	-	-	200
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	416	0	11	1	0	24	12	378	2	41	618	449

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1115	1104	618	1333	1552	379	1067	0	0	380	0	0
Stage 1	700	700	-	403	403	-	-	-	-	-	-	-
Stage 2	415	404	-	930	1149	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 185	211	489	131	113	668	653	-	-	1178	-	-
Stage 1	430	441	-	624	600	-	-	-	-	-	-	-
Stage 2	615	599	-	321	273	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 162	186	489	117	100	668	653	-	-	1178	-	-
Mov Cap-2 Maneuver	~ 288	291	-	117	100	-	-	-	-	-	-	-
Stage 1	420	398	-	610	586	-	-	-	-	-	-	-
Stage 2	579	585	-	283	247	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	246.5	11.8	0.3	0.3
HCM LOS	F	B		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SELn2	SWL	SWT	SWR
Capacity (veh/h)	653	-	-	554	288	489	1178	-	-
HCM Lane V/C Ratio	0.018	-	-	0.045	1.446	0.022	0.035	-	-
HCM Control Delay (s)	10.6	0	-	11.8	252.6	12.5	8.2	0	-
HCM Lane LOS	B	A	-	B	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	22.9	0.1	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	7.2

Movement	NBL	NBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	28	0	10	167	47	269	212	29	0	9
Future Vol, veh/h	28	0	10	167	47	269	212	29	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	0	11	182	51	292	230	32	0	10

Major/Minor	Minor1		Major1			Major2			Minor2	
Conflicting Flow All	1065	208	262	0	0	233	0	0	1144	246
Stage 1	230	-	-	-	-	-	-	-	830	-
Stage 2	835	-	-	-	-	-	-	-	314	-
Critical Hdwy	7.12	6.22	4.12	-	-	4.12	-	-	7.12	6.22
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-	-	6.12	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-	-	6.12	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	200	832	1302	-	-	1335	-	-	177	793
Stage 1	773	-	-	-	-	-	-	-	364	-
Stage 2	362	-	-	-	-	-	-	-	697	-
Platoon blocked, %				-	-		-	-		
Mov Cap-1 Maneuver	163	832	1302	-	-	1335	-	-	116	793
Mov Cap-2 Maneuver	163	-	-	-	-	-	-	-	116	-
Stage 1	765	-	-	-	-	-	-	-	360	-
Stage 2	279	-	-	-	-	-	-	-	550	-

Approach	NB	SE	NW	SW
HCM Control Delay, s	16.5	0.3	4.5	39.4
HCM LOS	C			E

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	511	1335	-	-	1302	-	-	145
HCM Lane V/C Ratio	0.389	0.219	-	-	0.008	-	-	0.285
HCM Control Delay (s)	16.5	8.5	-	-	7.8	0	-	39.4
HCM Lane LOS	C	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	1.8	0.8	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	25	5	154	35	54	5	5	101	41	5	5
Future Vol, veh/h	5	25	5	154	35	54	5	5	101	41	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	27	5	167	38	59	5	5	110	45	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	32	0	0	447	471	30	499	444	68
Stage 1	-	-	-	-	-	-	40	40	-	402	402	-
Stage 2	-	-	-	-	-	-	407	431	-	97	42	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1496	-	-	1580	-	-	522	491	1044	482	508	995
Stage 1	-	-	-	-	-	-	975	862	-	625	600	-
Stage 2	-	-	-	-	-	-	621	583	-	910	860	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1496	-	-	1580	-	-	469	435	1044	390	450	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	469	435	-	390	450	-
Stage 1	-	-	-	-	-	-	972	859	-	623	533	-
Stage 2	-	-	-	-	-	-	543	518	-	807	857	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	4.8	9.4	14.8
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	934	1496	-	-	1580	-	-	421
HCM Lane V/C Ratio	0.129	0.004	-	-	0.106	-	-	0.132
HCM Control Delay (s)	9.4	7.4	0	-	7.5	0	-	14.8
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.4	-	-	0.5

Intersection	
Int Delay, s/veh	6.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	51	128	433	69	191	608
Future Vol, veh/h	51	128	433	69	191	608
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	55	139	471	75	208	661

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1586	509	0	0	546	0
Stage 1	509	-	-	-	-	-
Stage 2	1077	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	119	564	-	-	1023	-
Stage 1	604	-	-	-	-	-
Stage 2	327	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	81	564	-	-	1023	-
Mov Cap-2 Maneuver	81	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	222	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	42.5	0	2.3
HCM LOS	E		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	81	564	1023	-
HCM Lane V/C Ratio	-	-	0.684	0.247	0.203	-
HCM Control Delay (s)	-	-	115.3	13.5	9.4	0
HCM Lane LOS	-	-	F	B	A	A
HCM 95th %tile Q(veh)	-	-	3.2	1	0.8	-

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	427	25	392	1108
Demand Flow Rate, veh/h	435	25	400	1130
Vehicles Circulating, veh/h	673	822	466	13
Vehicles Exiting, veh/h	470	44	642	834
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.8	6.5	10.3	18.3
Approach LOS	C	A	B	C

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	435	25	400	1130
Cap Entry Lane, veh/h	695	597	858	1362
Entry HV Adj Factor	0.982	1.000	0.981	0.980
Flow Entry, veh/h	427	25	392	1108
Cap Entry, veh/h	682	597	842	1335
V/C Ratio	0.626	0.042	0.466	0.830
Control Delay, s/veh	16.8	6.5	10.3	18.3
LOS	C	A	B	C
95th %tile Queue, veh	4	0	3	11

Intersection	
Int Delay, s/veh	57.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	398	0	10	1	0	28	12	416	2	31	490	451
Future Vol, veh/h	398	0	10	1	0	28	12	416	2	31	490	451
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-	-	-	200
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	433	0	11	1	0	30	13	452	2	34	533	490

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1095	1081	533	1331	1570	453	1023	0	0	454	0	0
Stage 1	601	601	-	479	479	-	-	-	-	-	-	-
Stage 2	494	480	-	852	1091	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 191	218	547	132	111	607	679	-	-	1107	-	-
Stage 1	487	489	-	568	555	-	-	-	-	-	-	-
Stage 2	557	554	-	354	291	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 167	195	547	119	99	607	679	-	-	1107	-	-
Mov Cap-2 Maneuver	~ 294	306	-	119	99	-	-	-	-	-	-	-
Stage 1	474	449	-	553	541	-	-	-	-	-	-	-
Stage 2	515	540	-	319	267	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	256.4	12.2	0.3	0.3
HCM LOS	F	B		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SELn2	SWL	SWT	SWR
Capacity (veh/h)	679	-	-	532	294	547	1107	-	-
HCM Lane V/C Ratio	0.019	-	-	0.059	1.471	0.02	0.03	-	-
HCM Control Delay (s)	10.4	0	-	12.2	262.5	11.7	8.4	0	-
HCM Lane LOS	B	A	-	B	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	24.1	0.1	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	7.5

Movement	NBL	NBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	34	0	13	194	40	224	184	40	0	10
Future Vol, veh/h	34	0	13	194	40	224	184	40	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	0	-	-	-	-	0	-	-	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	0	14	211	43	243	200	43	0	11

Major/Minor	Minor1		Major1			Major2			Minor2	
Conflicting Flow All	974	233	243	0	0	254	0	0	1069	222
Stage 1	261	-	-	-	-	-	-	-	708	-
Stage 2	713	-	-	-	-	-	-	-	361	-
Critical Hdwy	7.12	6.22	4.12	-	-	4.12	-	-	7.12	6.22
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-	-	6.12	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-	-	6.12	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	231	806	1323	-	-	1311	-	-	199	818
Stage 1	744	-	-	-	-	-	-	-	426	-
Stage 2	423	-	-	-	-	-	-	-	657	-
Platoon blocked, %				-	-		-	-		
Mov Cap-1 Maneuver	194	806	1323	-	-	1311	-	-	127	818
Mov Cap-2 Maneuver	194	-	-	-	-	-	-	-	127	-
Stage 1	735	-	-	-	-	-	-	-	421	-
Stage 2	340	-	-	-	-	-	-	-	487	-

Approach	NB	SE	NW	SW
HCM Control Delay, s	16.8	0.4	4.2	36
HCM LOS	C			E

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	541	1311	-	-	1323	-	-	160
HCM Lane V/C Ratio	0.44	0.186	-	-	0.011	-	-	0.279
HCM Control Delay (s)	16.8	8.4	-	-	7.8	0	-	36
HCM Lane LOS	C	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	2.2	0.7	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	30	5	136	30	45	5	5	118	51	5	5
Future Vol, veh/h	5	30	5	136	30	45	5	5	118	51	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	33	5	148	33	49	5	5	128	55	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	82	0	0	38	0	0	405	424	36	466	402	58
Stage 1	-	-	-	-	-	-	46	46	-	354	354	-
Stage 2	-	-	-	-	-	-	359	378	-	112	48	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1515	-	-	1572	-	-	556	522	1037	507	537	1008
Stage 1	-	-	-	-	-	-	968	857	-	663	630	-
Stage 2	-	-	-	-	-	-	659	615	-	893	855	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1515	-	-	1572	-	-	505	469	1037	406	482	1008
Mov Cap-2 Maneuver	-	-	-	-	-	-	505	469	-	406	482	-
Stage 1	-	-	-	-	-	-	965	854	-	661	568	-
Stage 2	-	-	-	-	-	-	585	554	-	775	852	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	4.9	9.4	14.8
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	953	1515	-	-	1572	-	-	433
HCM Lane V/C Ratio	0.146	0.004	-	-	0.094	-	-	0.153
HCM Control Delay (s)	9.4	7.4	0	-	7.5	0	-	14.8
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0.3	-	-	0.5

Intersection	
Int Delay, s/veh	9.2

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	58	153	552	65	166	657
Future Vol, veh/h	58	153	552	65	166	657
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	166	600	71	180	714

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1710	636	0	0	671	0
Stage 1	636	-	-	-	-	-
Stage 2	1074	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	100	478	-	-	919	-
Stage 1	527	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	68	478	-	-	919	-
Mov Cap-2 Maneuver	68	-	-	-	-	-
Stage 1	527	-	-	-	-	-
Stage 2	221	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	64.5	0	2
HCM LOS	F		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	68	478	919	-
HCM Lane V/C Ratio	-	-	0.927	0.348	0.196	-
HCM Control Delay (s)	-	-	191.1	16.5	9.9	0
HCM Lane LOS	-	-	F	C	A	A
HCM 95th %tile Q(veh)	-	-	4.6	1.5	0.7	-

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	444	31	467	1059
Demand Flow Rate, veh/h	453	32	476	1081
Vehicles Circulating, veh/h	580	916	477	14
Vehicles Exiting, veh/h	515	37	556	934
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.5	7.6	12.5	16.2
Approach LOS	B	A	B	C

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	453	32	476	1081
Cap Entry Lane, veh/h	764	542	848	1360
Entry HV Adj Factor	0.980	0.969	0.981	0.980
Flow Entry, veh/h	444	31	467	1059
Cap Entry, veh/h	749	525	832	1333
V/C Ratio	0.593	0.059	0.561	0.795
Control Delay, s/veh	14.5	7.6	12.5	16.2
LOS	B	A	B	C
95th %tile Queue, veh	4	0	4	9

Town of Fraser
PO Box 370, Fraser, CO 80442 office: 970-726-5491 fax: 970-726-5518
www.frasercolorado.com

Town of Fraser Land Use Application Referral Summary

Date: January 23, 2026
Project Name: Grand Park West Mountain Filing 1 (Planning Area 10W & 11W) – Final Plat & FPDP
Project Number: TF22-10
Referral Begin Date: December 30, 2025
Referral End Date: January 16, 2026
Applicant: West Mountain Development, LLC
From: Alan Sielaff, Assistant Town Planner
CC: Garrett Scott, Town Planner
Michael Brack, Town Manager
Paul Johnson, Public Works Director

Documents sent on referral:

All documents from the 7th Final Plat & FPDP submittal received December 19, 2025, which includes:
- Preliminary Civil Construction Documents, dated as 2nd submittal 12/18/2025
- Final Planned Development Plan (FPDP), dated 12/18/2025
- Final Plat, dated 12/17/2025
- Scale Variance letter, dated 12/17/2025

Responding referral agencies:

Merrick & Company (Jeanne Boyle, Katherine Knight, Greg Steed, and Donna Barrentine as Town Engineer) – received January 23, 2026
JVAM (Cooper Gehle as Town Attorney) – received January 15, 2026
East Grand Fire Protection District (Ryan Mowrey) – received January 14, 2026
Mountain Parks Electric, Inc. (Jessica Tain) – received January 14, 2026
Xcel Energy (Julie Gittins) – received January 16, 2026

Planning Department
Town of Fraser
153 Fraser Avenue, P.O. Box 370
Fraser, CO 80442
970-726-5491 x219
asielaff@town.fraser.co.us

January 23, 2026

Layla Rosales, Principal
Terracina Design
10200 E Girard Ave, Ste A-314
Denver, CO 80231

RE: Grand Park West Mountain Filing 1 (Planning Area 10W & 11W) – Final Plat & FPDP (TF22-10)
7th Submittal Referral Summary and Planning Review

Dear Ms. Rosales,

The Town of Fraser Planning Department has reviewed the documents provided in the 7th submittal of the Grand Park West Mountain Filing 1 (Planning Area 10W & 11W) Final Plat and FPDP application and hereby provides the following review comments to be addressed in a resubmittal:

General Comments

1) Please provide written responses to the following Planning review comments as well as referral agencies with outstanding comments provided as an attachment to this letter.

2) As a reminder, a Development Improvements Agreement (DIA) and surety is required prior to infrastructure installation and plat recordation. The previous engineer's cost estimate that was provided dated April 2, 2025 will need to be updated to reflect the quantities per the revised civil plans as well as current unit prices.

3) In the previous approval for West Mountain Filing 1, Board of Trustees approval Resolution 2025-01-09 included condition of approval #2 stating "Prior to recordation of the FPDP and the Final Plat, the Applicant shall receive approval from the Town of Fraser of the West Mountain Water Master Plan and associated design drawings and reports, as stipulated in Articles 5.3, 5.5, and 5.6 of the 2003 Annexation Agreement." An 8th submittal of the construction drawings for the West Mountain Water system were received on January 9, 2026 and are currently under review. Since the water system is not yet fully approved, the previous condition of approval #2 will be recommended to be carried forward with this major amendment request.

4) An updated address map will be needed prior to plat approval. Please provide a blank map to staff and we will provide updated street numbers.

Final Plat

5) Note 3 includes blank references to the title commitment for the property. Please fill in and provide said title commitment with the next submittal.

6) MPEI and Xcel have indicated that adequate easements and/or plat notes meeting their requirements are still not being provided. Per Sec. 19-4-120, easements are to be provided in accordance with the requirements of the utility provider. The plat will not be approved and recorded until they confirm their requirements are met.

7) Depict all required drainage and utility easements on the final plat with blanks for reception numbers to be filled in once recorded. Updated easements deeds and exhibits for each easement will need to be provided with the next submittal as was done with the previous April 2025 submittal. The terms and/or exhibits for these previously provided easements will need to be updated to reflect the updated plat.

8) Depict all sight distance easements on the final plat that are included in the Civils CDs.

9) Provide separate plats for the individual phasing areas as depicted on sheet 8 of the FPDP if the intention is to plat in phases rather than all at once.

10) Label all streets and tracts on each sheet.

11) Sheet 2 - Labels for Lots 62, 68, and 69 are missing.

12) Sheet 3 – Remove the “unplatted” label from area within Tract A.

Final Planned Development Plan (FPDP)

General

13) Previous versions of the West Mountain Filing 1 FPDP included a lighting plan. This is required per the FPDP application checklist. Please add back in with next submittal.

14) Previous versions of the West Mountain FPDP did not include “preliminary” with the grading and utility plans. Final plans are required per the FPDP application checklist. Please update and confirm final civil plans with the next submittal.

Cover Sheet (Sheet 1)

15) Setback notes need to be updated to conform to the new planning area designations. The note lists Lots 1-52 as 11W, but only Lots 1-41 are proposed in 11W. We suggest updating the note as follows for clarity:

    2. Setbacks:

        2.1. Lots 1-41 (Single Family Detached in 11W): 10' Front, 6' Side, 10' Rear

        2.2. Lots 42-52 (Single Family Detached in 10W): 10' Front, 6' Side, 10' Rear

        2.3. Lots 53-79 (Single Family Detached and Attached Eligible in 10W): 10' Front, 20' Front to Garage, 0' Attached Side, Detached Side Must Meet Building and Fire Codes, 10' Rear

16) Previous notes 12 and 13 have been removed. Please add back in as they were included in the previous approvals for this FPDP.

17) The vicinity map and legal descriptions conflict in regards to the location of section lines and section numbers, as well as the legal description at the top left of the cover page and the legal description below the owners certificate. Correct the vicinity map, and only one legal description is necessary. The one below the owners block was not included in the previous submittal and appears to be the incorrect one.

18) Update the year to 2026 in the Owner Certificate signature block

Site Plans (Sheets 4 & 5)

19) Staff believes Tract D should include a trail connection along the railroad to the Filing 2 area. While this is a new comment for Filing 1, this area of 23W was not previously included in the FPDP boundaries. We can further discuss the topic as part of the Filing 2 submittal and will flag it for the Planning Commission and the Board as part of the Filing 2 review for their consideration. We acknowledge the PDD is difficult and potentially unclear to read, but there appears to be a hashed line to the left of the railroad. We have also come across a colorized version of the PDD from 2005, see attached. While this is not the recorded PDD and is a slightly earlier version, the trail marking appears to have been carried forward and included on Sheet 6 of the recorded PDD. Included is a highlighted version for reference. Based on the comment response with Filing 2, if topography in this location is challenging, perhaps the trail can be routed along Overlook Drive into Filing 2 and then branch off towards the railroad in order to provide a looped route back to Grand Park Drive on the west side of West Mountain.

20) Ensure labeling for Planning Areas does not interfere with Lot numbers.

21) Snow storage location needs to be coordinated with utility agencies to ensure no conflicts with their easement requirements.

Open Space (Sheet 6)

22) Please confirm the measurement for the open space within 10W.1. Staff's measurement of the open space area is showing only 2.28 acres of open space, roughly 14,000 square feet less than the 2.6 acres listed in the table and is less than the 15% required.

Landscape Plan (Sheet 7)

23) A tree and shrub planting list is provided, but no plantings are depicted. This list may be removed unless a specific approved planting list is proposed.

Grading and Drainage Plans (Sheets 9-10)

24) Sheets 9 and 10 are missing titles. Please label as final grading plan and final utility plan.

25) Lots 27-52 are mislabeled and need to be renumbered, shifting each lot by one (Lot 26 appears to have been labeled twice).

26) Poplar Ct. is labeled as Hunters Ct. on the plat. Please ensure all street names and consistent across all documents.

Referral comments from all responding agencies/entities are provided as an attachment to this letter. It is recognized that some comments provided herein may be duplicative or even contradictory. In the case of contradictions or conflicts in referral comments, the comment from the most applicable agency/entity shall take priority.

Also provided with this letter are PDF copies of the plan set and other submittal or reference documents that contain markups and comments from the planning review (in red) and engineering review (all other colors) that serve to augment and clarify the comments provided in this letter.

Please contact me or Town Planner Garrett Scott (970-505-0467, gscott@town.fraser.co.us) if there are any questions or to discuss any of the referral comments in more detail.

Sincerely,

Alan Sielaff
Assistant Town Planner
970-726-5491 x219
asielaff@town.fraser.co.us

this appears to be a regional or community trail

GRAND PARK

PLANNED DEVELOPMENT DISTRICT PLAN

LOCATED IN SECTIONS 20, 28, 29, 30, 31, 32
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO

SITE DATA CHART

Planning Area	Avg. Density	Approx. Acres	% Total Area	Residential		Lodging Units	Commercial Sq. Ft.
				detached	attached		
1Wa	7.6	30.3	2.3%		230	300	140,000
1Wb	6.8	5.9	0.5%		40		
2W	7.6	33.8	2.6%	150	100	278	30,000
3Wa	13.1	8.2	0.6%		95		
3Wb	4.7	11.8	0.9%	50	30		
3Wc	5.2	12.0	0.9%		60		70,000
4W	9.3	11.2	0.9%		100		105,800
5W	4.5	17.1	1.3%	70	30		
6W	0.0	4.0	0.3%				public site
7W	8.1	37.4	2.9%	50	90		
8Wa	2.0	58.2	4.4%	83	110		
8Wb	2.2	9.0	0.7%		40		
9W	4.7	23.8	1.8%	33	73	200	20,000
10W	4.7	40.8	3.1%	40	134	350	30,000
11W	2.6	16.1	1.2%	10	31	50	
12W	3.5	26.5	2.0%		92	100	
13Wa	1.4	21.7	1.7%	40			
13Wb	0.6	37.7	2.9%	40			
14W	1.6	72.1	5.5%	117			
15W*	0.5	26.4	2.0%	12			
16W*	1.0	92.0	7.0%	90			
17W*	0.6	121.8	9.3%	120			
18W	2.5	24.2	1.8%	61			
19W	3.1	47.4	3.6%	40	70		
20W	2.1	40.0	3.1%	26	56		
21W	5.1	13.4	1.0%	20	30		
subtotal	3.0	842.8	64.3%	1052	1411		
23W		468.1	35.7%				
TOTAL		1310.9	100.0%	2463		1278	395,800

* DENSITIES MAY BE ADJUSTED DEPENDENT UPON PROVISION OF CENTRAL SERVICES

LEGEND

- RESIDENTIAL
- MIXED USE
- OPEN SPACE/ GOLF COURSE
- CLUBHOUSE SITE
- PROPOSED MAINTENANCE FACILITY
- ROADWAYS
- MAJOR DRAINAGES
- REGIONAL TRAIL
- COMMUNITY TRAIL
- ON-ROAD TRAIL

NORTH

0 300 600 1200

SCALE: 1"=600'-0"

AN AMENDMENT OF THE RENDEZVOUS 2003 PLANNED DEVELOPMENT DISTRICT PLAN

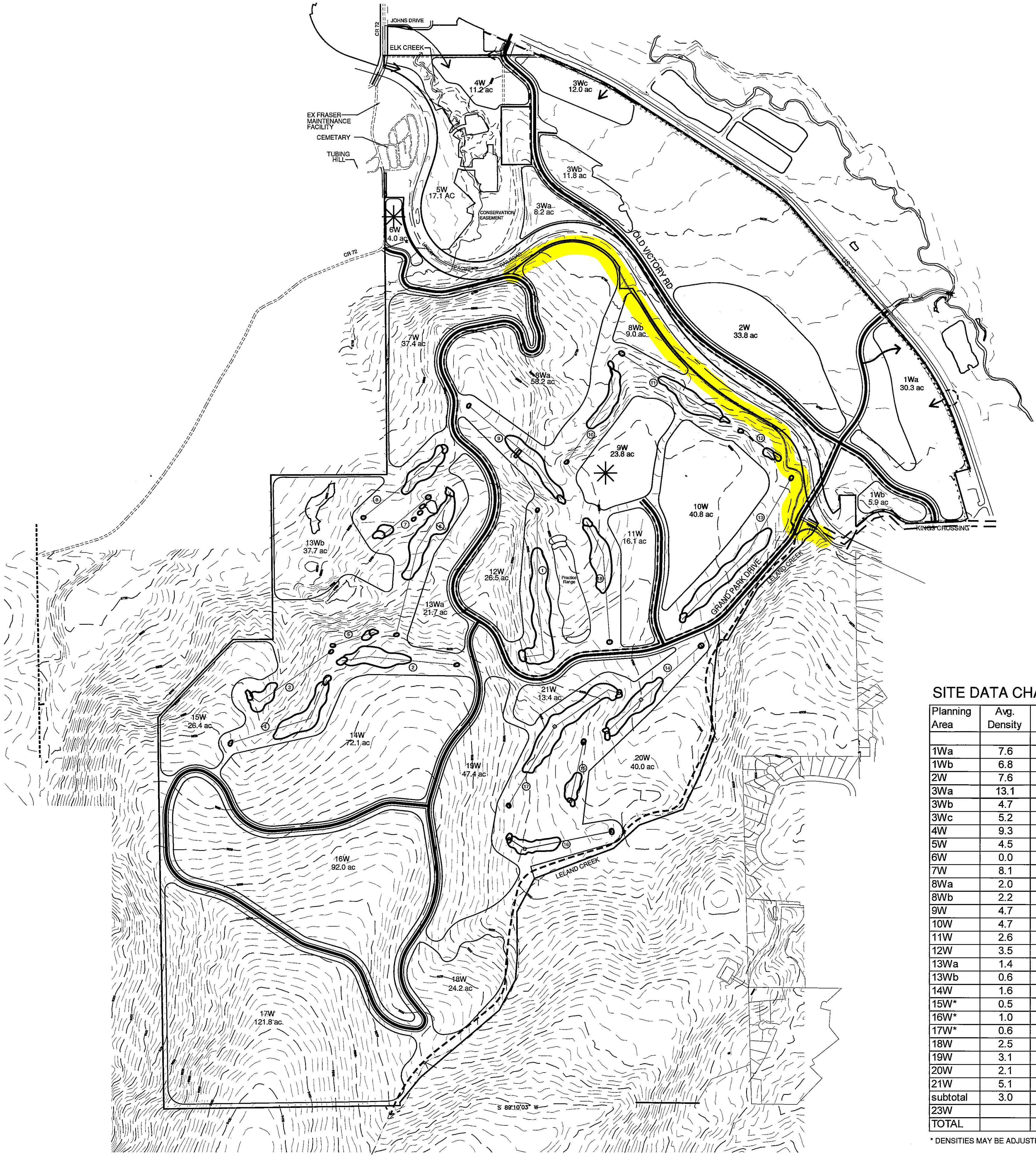
DATE: MARCH 18, 2005
REVISED: MAY 12, 2005

LAND USE PLAN

GRAND PARK

PLANNED DEVELOPMENT DISTRICT PLAN

A PART OF SECTIONS 20, 28, 29, 30, 31, 32
TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE 6TH PM
COUNTY OF GRAND, STATE OF COLORADO



SITE DATA CHART

Planning Area	Avg. Density	Approx. Acres	% Total Area	Residential		Lodging Units	Commercial Sq. Ft.
				detached	attached		
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3Wa	13.1	8.2	0.6%		95		
3Wb	4.7	11.8	0.9%	50	30		
3Wc	5.2	12.0	0.9%		60		70,000
4W	9.3	11.2	0.9%		100		105,800
5W	4.5	17.1	1.3%	70	30		
6W	0.0	4.0	0.3%				public site
7W	8.1	37.4	2.9%	50	90		
8Wa	2.0	58.2	4.4%	83	110		
8Wb	2.2	9.0	0.7%		40		
9W	4.7	23.8	1.8%	33	73	200	20,000
10W	4.7	40.8	3.1%	40	134	350	30,000
11W	2.6	16.1	1.2%	10	31	50	
12W	3.5	26.5	2.0%		92	100	
13Wa	1.4	21.7	1.7%	40			
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19W	3.1	47.4	3.6%	40	70		
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* DENSITIES MAY BE ADJUSTED DEPENDENT UPON PROVISION OF CENTRAL SERVICES

LEGEND

- RESIDENTIAL
- MIXED USE
- OPEN SPACE/ GOLF COURSE
- CLUBHOUSE SITE
- PROPOSED MAINTENANCE FACILITY
- ROADWAYS
- MAJOR DRAINAGES
- REGIONAL TRAIL
- COMMUNITY TRAIL
- ON-ROAD TRAIL

NORTH

0 300 600 1200
SCALE: 1"=600'-0"

AN AMENDMENT OF THE RENDEzVOUS 2003 PLANNED DEVELOPMENT DISTRICT PLAN

2005-012709

DATE: JUNE 16, 2005

STATE OF COLORADO
County of GRAND } SS
Filed for record this 8
day of November, 2005
at 4:04 o'clock P M.
Recorded in Book _____ Page ____
SARA L. ROSENE
Recorder
[signature]
Deputy
Fees $ 111

LAND USE PLAN

SHEET 6 OF 11

January 23, 2026

Garrett Scott, Town Planner
Town of Fraser
153 Fraser Avenue, P.O. Box 370
Fraser, Colorado 80442

RE: Grand Park West Mountain Filing 1 - 10W & 11W – Final Plat and FPDP Submittal 7 (Major Amendment) –Drainage, General Civil and Utility Review

Dear Mr. Scott:

Merrick has reviewed the Grand Park West Mountain Filing 1 Major Amendment submittal received December 30, 2025. The submittal included the following:

- Final Plat dated December 17, 2025
- Final Planned Development Plan dated December 18, 2025
- Preliminary Construction Plans dated December 18, 2025
- Plan Scale Variance Request Letter dated December 17, 2025

The Preliminary Construction Plans were determined to cover both the Filing 1 and Filing 2 areas and are the same plan set for both submittals, so the comments are the same for both filings. Similarly, no drainage report was submitted with Filing 1, but it was determined that the Filing 2 drainage report dated December 2025 also covers the Filing 1 area, so the Filing 2 drainage report comments are the same for both filings. Additionally, no wetland exhibit was submitted with Filing 1, but it was determined that the Filing 2 wetland exhibit dated December 18, 20205 covers the Filing 1 area, so it was included with our review for Filing 1.

This letter provides Merrick's review comments on the submitted items. The letter is organized in two sections as follows:

Section 1 – Drainage Review

Section 2 – General Civil and Utility Review

Section 3 – Transportation and Roadway Review

SECTION 1 - DRAINAGE REVIEW

We have the following comments to offer related to the proposed drainage improvements:

Final Plat:

1. Drainage and Utility easements by separate document were previously provided for this filing. If previously recorded, show and abandon as necessary.

2. Provide updated drainage easements for the revised layout, including for Ponds B and C and for drainage easements needed outside of the rights-of-way.

Final Planned Development Plan

3. The FPDP Boundary shown on Sheet 2 is different from the boundary shown on Sheets 3 and 4 and yet another different boundary is shown on Sheets 9 and 10. Define and show one consistent FPDP boundary. Also confirm that it matches the FPDP boundary for Filing 2.
4. On Sheet 7: Landscape Plan shows lots 68-79 as landscape area but provides no further direction to planting plans. Instead, it appears that this hatched area should be a seeded area. If so, revise the hatch label and provide the type of seed mix.
5. On Sheet 8: Phasing Plan, with each phase include the detention ponds to which each phase drains to since detention will be required to be constructed along with each phase.
6. On Sheet 9: Label sheet (appears to be grading plan).

Drainage Report:

7. Instead of HEC-HMS, provide hydrologic calculations using the rational method or CUHP. Per section 3.4.3 of the Grand County Storm Drainage Design and Technical Criteria Manual (SDDTCM), runoff shall be determined using the rational method or CUHP. These methods are also preferred since the report states that the HEC-HMS model's accuracy decreases when applied to steep slopes, forested regions, or mountainous areas.
8. It is stated that Pond A is intended to be used as a permanent pool as well as an extended detention basin (EDB). Provide documentation of approval from the State Engineer's Office that allows Pond A to retain and/or detain stormwater for more than the State allowable time period (CRS 37-92-602(8)). The comment response letter indicates that this has been provided. However, we are unable to find it in the Drainage Report.
9. The comment response letter states that the "capacity of the existing 48" culvert will be addressed in the subsequent reports with the final design of Pond A." This analysis is required for approval of the FPDP to show that downstream infrastructure will not be negatively impacted. Confirm that the capacity of the existing 48" culvert is greater than the design discharge for Pond A (stated as 90% or less of the predeveloped peak flow).
10. Provide inlet calculations for all proposed inlets and show the location and number of inlets required to meet street capacity requirements as required in Section 2.3 of the SDDTCM and Section 14-2-20 (Preliminary construction plan submittal) of the Fraser Municipal Code which states that "Construction plans...must contain sufficient information and detail to determine that all Town standards can be satisfied."
11. Provide storm pipe and culvert sizing calculations for all proposed storm sewer systems and show the location and label to match the analysis.
12. Provide swale capacity calculations for all proposed swales.
13. Discuss details for each detention facility, Ponds A, B and C, as required by Section 2.3 of the SDDTCM.
14. Pond B and Basin OS3 are routed to Design Point OS3 which is an existing 24" RCP culvert across the UPRR that routes flow to the Aspenglo development. Stormwater detention is not provided for Basin OS3. To maintain existing condition peak flows at Design Point OS3, reduce the release rates from Pond B to compensate for the increased runoff from Basin OS3.
15. We have the following comments on Appendix A:

a. The Vicinity Map and Preliminary CD do not match the Filing 1 and 2 FPDP's. Revise documents to match.

b. The comment response letter indicates that a "rough project location has been provided on the FEMA FIRM map." However, the project site is not shown. Provide the boundary of the proposed site on the FEMA FIRM.

16. We have the following comments on Appendix B.

    a. On page 37 for Pond A, the top of embankment elevation should be 8701, not 8702, as shown on Sheet 21 in the construction plans.

    b. On pages 37 and 38, provide the calculations used to determine the pond discharges and corresponding outlet structure dimensions.

    c. On page 39, include the calculated percent imperviousness in the tables for each basin.

    d. HEC-HMS Flow Results for Ponds A and B are provided on pages 40 and 41 that indicate the Proposed flows are higher than the Existing flows. Clarify if these flows show the inflows to these ponds or the release rates. If they are the release rates, the ponds will need to be resized to reduce the proposed peak flows to the existing peak flows. Also provide this analysis for Pond C.

17. We have the following comments on Appendix C:

    a. On page 43, the proposed land use percent imperviousness values for each basin do not match the values used on page 32 to determine the Curve Number Calculations. For example for Basin A, Historic = 64.3% and Paved = 4.8% on page 32, but are 55.2% and 8% on page 43. Revise to match and reflect the proposed improvements.

    b. The modified FAA method is not intended for watersheds larger than 160 acres. The total watershed that drains to Pond A is 209 acres. Use only MHFD-Detention to size the ponds which also includes the water quality control volume sizing and follows the recommendation of the SDDTCM per Section 11.2 to use extended detention basins. In addition, analysis methods cannot be mixed so the storage volume results from the FAA method cannot be entered as a User Defined volume in the MHFD-Detention spreadsheet. Revise the MHFD-Detention analyses without this override.

    c. On page 46, the highest stage is shown to be 8702 for Pond A, but the grading shown on Sheet 21 in the construction plans shows an embankment height of only 8701. Revise to match.

    d. For the MHFD-Detention calculations, the Detention Basin Outlet Structure Design analyses were not reviewed. These will be reviewed when details are provided.

18. Provide an extended detention basin (EDB) in place of the Sediment Pond C. A water quality/detention pond is required to treat and detain the runoff from proposed improvements per SDDTCM Sections 3.3.6 and 3.3.7.

19. We have the following comments on the Proposed Drainage Map in Appendix E:

    a. Revise the scale to a maximum of 1" = 200' per SDDTCM Section 2.3.1. Note that this may require two sheets.

    b. The comment response letter stated that "labels [for all proposed stormwater infrastructure] will be included in subsequent reports once hydraulic calculations have been performed to size infrastructure." All infrastructure must be sized and labeled prior to approval of this report.

c. Show proposed grading for Pond A.

d. Label required detention volumes, provided volumes, and water surface elevations for all ponds per Section 2.3.1 of the SDDTCM.

e. Significant amounts of water are anticipated to enter Pond A via surface runoff. Provide erosion protection on the side slopes of the pond where surface runoff is expected. We recommend providing a drop structure along No Name Drainageway into Pond A.

f. Label No Name Drainageway. It is part of Basin A.

g. At Design Point E1, extend the storm sewer across the proposed trail to capture runoff from Basin E1 since the trail is shown raised on Sheet 26 in the construction plans and forms a swale on the uphill side.

Preliminary Construction Plans:

20. Provide stabilization improvements along No Name Drainageway. It is understood that the Drainageway is not located within the Filing 2 Planning Areas. However, it will be impacted by increased and more frequent runoff from Filing 2.
21. On Sheets 21, 22, 24, 25, and 27, a 20’ drainage easement for a swale is shown along No Name Drainageway. A 20’ wide easement may not be sufficient to contain 100-year flows along this drainageway and provide stabilization improvements. Provide a conceptual design and analysis for the drainageway to show the intended concept.
22. All drainageway side slopes steeper than 4:1 (H:V) will require erosion protection, such as approved rolled erosion control product and/or slope protection. All other slopes steeper than 3:1 (H:V) will require erosion protection.
23. On Sheet 24, the slope on the south side of the Road A cul-de-sac of is shown as 39.05%. The maximum slope allowed is 3:1(H:V) or approximately 33.3%. Modify the design to meet allowable slopes.
24. Provide storm line plans and profiles.
25. Provide erosion protection at all storm sewer and culvert outfalls.
26. On Sheet 23 at the low point in Terrain Way, extend the outfall pipe to daylight near the toe of slope.
27. On Sheet 23, downstream of the Terrain Way outfall pipe a swale is proposed within a water/utility & drainage easement. Creating a swale above a water line or other utility is not recommended due to the potential for erosion.
28. On Sheet 24 on the north side of Road A east of Terrain Way, it appears there is a proposed sump. Regrade this area or provide a storm pipe to drain this sump.
29. We have the following comments related to detention ponds:

    a. Provide typical details for pond infrastructure, such as forebays, trickle channels, outlet structures, and emergency spillways. It is understood that this is not the final design of the pond or outlet. Typical details that show the concept are acceptable.

    b. A 12’ wide maintenance access trail at a maximum 10% slope must be provided to the bottom/outlet structure of all detention ponds in the final design. For this submittal, show the approximate route for maintenance vehicles to access the pond.

c. On Sheet 24, the maintenance access shown for Pond B must be modified to have a maximum 10% slope.

d. Provide trickle channel(s) with minimum 0.5% slope and slope the pond bottom at 2% minimum to the trickle channel(s). During preliminary design, the pond bottoms must be graded to meet this criteria to ensure the required volumes are available, per Section 14-2-20 (Preliminary construction plan submittal) of the Fraser Municipal Code.

e. On Sheet 21, the Pond A1 embankment appears to be more than 11 feet high, including the permanent pool. Note that coordination with the State Engineer's Office will be required if since the embankment height appears to exceeds 10 feet and could potentially be classified as a jurisdictional dam.

f. On Sheet 21, extend the outlet pipe for Pond A1 to daylight near the toe of slope and provide erosion protection at the outfall.

g. On Sheet 28, extend the outlet pipe for Pond C to daylight near the toe of slope and provide erosion protection at the outfall.

Wetland Exhibit:

30. The comment response letter for Filing 2 states that a jurisdictional determination for all wetlands and pond areas from the U.S. Army Corps of Engineers has been provided to the Town. Include a copy of this determination with this development referral for reference.

31. A USACE 404 Permit(s) or CDPHE Dredge and Fill Temporary Authorization(s) will be required for disturbances to jurisdictional wetlands and waters of the U.S. The Filing 2 comment response letter states that "all impacts were previously made and mitigated by the developer." Wetland impacts appear to be planned along Overlook Drive, Grand Park Drive, Outpost Club Drive (adjacent to Leland Creek), Pond F1 (Pond C in drainage report), and potentially near Lot 60 for installation of water and sanitary sewer improvements. Note that temporary impacts during construction also require permitting and/or authorization. Provide documentation that these impacts have been approved by the USACE.

32. Show and label proposed Pond B. Revise the label for Pond F1 to match the drainage report and construction plans to be Pond C.

33. Include the wetland mapping source and date of survey on the Wetland Exhibit.

Please let us know if you have any questions.

Sincerely,
Merrick & Company

Jeanne M. Boyle, PE, CFM | Theresa M. Ring, PE, CFM | Katherine E. Knight, CFM

SECTION 2 – GENERAL CIVIL AND UTILITY REVIEW

We have the following comments to offer related to the general civil and utility review:

Previous Comments (Not addressed)

1. Previous analysis of sewer loading at ultimate build out including loading from this development area indicate that piping capacity in Old Victory Road will exceed criteria (over 50% full). Any applications for building approvals shall include or be preceded by utility reports with calculated sewer loading of Average Daily Wastewater Flows and Peak Design Flows based on annexation agreement flow rates of gpd per household/unit/SFE.

2. Current water supply facilities are under capacity for existing Grand Park development demands. The Annexation Agreement requires the developer to design, construct, and convey to the Town all "Water Source Facilities" needed to serve the development.

   Provide a timeline or plan for infrastructure development in the wellfield capacity and augmentation storage.

3. Any applications for building approvals shall include or be preceded by utility reports with calculated Average Day Demands, Maximum Day Demands, Peak Hour Demands, and Irrigation Demands based on the annexation agreement gpd per household/unit/SFE.

   In addition, applicant shall provide water model data verifying the proposed water distribution system meets the Town of Fraser pressure requirements per Town Code 14-3-260(a.1(a&b)).

4. Sheet 2, CDs, General Notes: Update sanitary sewer note 8 to current Town Code description. Smith-Blair 229 collar is no longer applicable. (14-3-340 (a)(4)).

5. Sheet 2, CDs: Note 15.2, this part is no longer manufactured. See Town Code 14-4-320(c)(2).

Final Plat:

6. Cover Sheet: a. Provide contact names and phone numbers for owner/developer, surveyor and planner listed.

7. Sheet 2:

   a. Will the 20' utility easement rec. number 2022000996 be vacated by separate document or by this final plat now that there is a proposed 40' water and sanitary easement overlapping this location?

   b. Please clarify why the proposed 40' water and sanitary easement not shown on this final plat. Will it be recorded by separate document? If not, include in the final plat.

   c. The construction plans are showing the <u>20' utility easement</u> to be a <u>30' sanitary</u> easement. Please verify which is correct and revise to be consistent.

d. Several water and drainage easements that are shown in the construction plans are not shown on the final plat. Please clarify if those will be by separate document. If not, include in this final plat.

8. Sheet 3: Several water and drainage easements that are shown in the construction plans are not shown in the final plat. Please clarify if those will be by separate document. If not, include in this final plat.

9. Sheet 4: Correct road names where noted.

10. Sheet 5:

a. Will the 20’ utility easement rec. number 2022000996 be vacated by separate document or by this final plat, now that there is a proposed 40’ water and sanitary easement overlapping this location?

b. Why is the proposed 40’ water and sanitary easement not shown on this final plat? Will it be recorded by separate document? If not, include in this final plat.

c. The construction plans are showing the 20’ utility easement to be a 30’ sanitary easement. Please verify which is correct and revise to be consistent.

11. Sheet 6: See Comment 10 above.

12. Sheet 7:

a. Fix the street name that is cut off.
b. Add missing street name where noted.
c. Add missing water utility easement where noted.

FPDP:

13. Sheet 2: The 30’ sanitation easement is shown as a 20’ utility easement rec. number 2022000996 on the final plat. Verify which is correct and update all plans to be consistent.

14. Sheet 4:

a. Please correct the 36’ Right-of-Way (ROW) Road Sections (With and Without Storm Sewer) to eliminate duplicate text and dimensions.

b. Add a label showing the 10’ minimum clearance dimension between outside edge of water to outside edge of sanitary sewer.

Preliminary Construction Plans:

15. On Cover Sheet: Provide an equation for the conversion of NGVD 29 to NAVD 88 vertical datum for the Town’s reference and future use as needed for vertical control comparisons. NAVD 88 is required per the Town standards, Section 14-2-110(c), however, due to the status of these construction plans, the conversion equation on the cover sheet is acceptable.

16. Sheet 2: Add Collector and Arterial Road symbols along with their respective ROW and FL-FL data.

17. Sheet 3:

a. Change Grand Park Drive roadway section from 60’ ROW to 80’ ROW as it is classified as an Arterial Road. Fix dimensions per standard arterial road detail.

b. Add a roadway section for the emergency access easement/roadway.

c. The 4” mountable curb detail is shown on sheet 44 rather than sheet 75. Please correct sheet number.

d. Update the applicable street names listed under in the Local Street A detail. Also remove “A” since this detail applies to all local roads and all streets have updated names per the Final Plat.

e. Ensure consistency in all street names shown in the Final Plat, FPDP and CDs.

18. Sheet 5: Label 10W.2 and correct label for 10W.3 as indicated.

19. Sheet 6: Update street name where noted.

20. Sheet 7: Label Lot 187 for its intended use.

21. Sheet 8: Several water, sanitary and drainage easements are missing dimension labels.

22. Sheet 9:

a. Update Steet names where applicable
b. Label lot 187 for its intended use.
c. A floating slope label appears to be in the wrong location. Please correct.

23. Sheet 11:

Since the two 12-inch water lines along Grand Park Drive (to the yellow zone pump station site) will need to be constructed per these construction plans, please remove shading in the area of these pipelines. The piping as shown is incorrect. The north side 12” water main should extend to the storage tank site, which should also be shown on this sheet. The piping from the storage tank site to the pump station site needs be shown as these are necessary infrastructure to serve filings 1 and 2. Please correct the piping configuration.

24. Sheet 29: The existing sanitary sewer under No Name Creek is shown as a 16” sanitary sewer. Please verify and correct to match installed size.

25. Sheet 31:

a. Label future utility connection points in Terrain Way that will serve the commercial lots. A utility easement will be required for mains outside of the right-of-way.

b. Show dimension between outside of water mains to sanitary sewers at least once per street on all utility plan sheets.

26. Sheet 34:

a. Verify that a proposed 8” sanitary sewer will connect to an existing 12” sanitary sewer where shown.

b. Per previous comment, the existing 30’ sanitary easement is shown as a 20’ utility easement per recordation no. 202200996 on the Final Plat. Please correct inconsistency.

c. Label adjacent stormwater pond.

27. Sheet 35:

a. Label plug and blowoff at terminal end of water main Crossing Grand Park Drive at Road A68.

b. Per comment 11 above, since the two 12-inch water lines along Grand Park Drive (to the yellow zone pump station site) will need to be constructed per these construction plans, please remove shading in the area of these pipelines. The piping as shown is incorrect. The north side 12” water main should extend to the storage tank site, which should also be shown on this sheet. The piping from the storage tank site to the pump station site needs be shown as these are necessary infrastructure to serve filings 1 and 2. Please correct the piping configuration.

28. Sheet 36: The water main at the end of Terrain Ct is shown as a 12” water line. Please verify size and correct if needed. This is likely an 8” water main.

29. Sheet 44: Please add a detail for the 5’ curb cut.

Please let us know if you have any questions.

Sincerely,
Merrick & Company

Greg Steed, P.E.
Project Manager

Donna Barrentine, P.E.
Civil & Utility Review

SECTION 3 – TRANSPORTATION AND ROADWAY REVIEW

We have the following comments to offer related to the proposed transportation and roadway improvements:

Preliminary Plat:

1. General. Lot numbers different from the CDs. Please coordinate between the plat and the CDs.
2. General. Multiple road names different from the CDs. Please coordinate between the plat and the CDs.
3. Page 2. How do Lots 106 and 107 access the public ROW? Is an access easement needed across Tract C?
4. Page 3. Sight distance easement needed on Filing 1 Lot 21 per Preliminary CDs
5. Page 3. Sight distance easement needed on Filing 1 Lot 41 per Preliminary CDs
6. Page 10. Sight distance easement needed on Lots 1-4 per Preliminary CDs
7. Page 10. Sight distance easement needed on the Filing 1 Plat per Preliminary CDs

Roadway Exhibit:

8. General comment: Street names do not match the plat. Please coordinate and update accordingly.
9. Should there be a "Shared Drive" to provide legal access for the Clubhouse and the Lodging Units to access the public ROW?

Geotech Report

10. Page 16. Report states that recommendations should be reevaluated once traffic volume studies are available. The TIS traffic volumes are now available. Please update Geotech report and recommended pavement sections.
11. Missing pavement recommendation for collector roadway.

Preliminary CDs

12. General Comment. Lot numbers and street names do not match the plat. Please coordinate and update accordingly.
13. Page 1. Preliminary Plat checklist requires an Erosion and Sediment Control and Revegatation Plan.
14. Page 3 repeat comment. Label max and min catch slopes.
15. Page 3 repeat comment. Label max on the sidewalk cross slope.
16. Page 3 repeat comment. Fraser Design Standard Detail A-11 Mountable Curb Detail calls for 6" height (Typ all curbs).

17. Page 3 collector typical sections. Geotech report missing pavement recommendation for collectors. Work with geotech to include this analysis and update the typical section accordingly.

18. Page 3 local typical section. Label the 5” asphalt paving and 5” base course per the Geotech report. Geotech report notes the pavement recommendations should be reevaluated after traffic volumes are available. Please confirm these thicknesses with the geotech after the report is updated with the TIS traffic volumes.

19. General Comment. Lot numbers and street names do not match the plat. Please coordinate and update accordingly.

20. Page 7. How do Lots 185 & 186 access the public ROW? Is an access easement needed across Tact C?

21. Page 15. Provide curb ramps to connect the pedestrian network to the club house and open space at the intersection of Outpost Club Dr and Terrain Way.

22. Page 15. Confirm anticipated road slope west of the Outpost Club Dr and Terrain Way intersection. If greater than 5%, this sight distance needs to increase to 258.5 (10% increase per table footnote in 14-3-70(5) and AASHTO Table 9-5).

23. Page 16. Terrain Way road slope is 7%. Increase sight distance to 258.5' (10% increase per table footnote in Section 14-3-70(5) and AASHTO Table 9-5). Add sight easement on Lot 156 if needed after sight distance is updated.

24. Page 17. Outpost Club Dr slope is 4.6%. Increase sight distance at Compass Dr to 368.5' (10% increase per table footnote in Section 14-3-70(5) and AASHTO Table 9-5). Update sight easement on Lot 21.

25. Page 18. Might need a sight easement on the lot just north of Road A.

26. Page 18. Grand Park Dr slope is 6.3%. Increase sight distance at Overlook Dr to 368.5' (10% increase per table footnote in Section 14-3-70(5) and AASHTO Table 9-5).

27. See and address the additional redline comments within the submitted documents for further comments.

Should you have any questions about the above comments, please contact me.

Sincerely,

Merrick & Company
Brian Bern, P.E.
Senior Project Engineer

Cc: Paul Johnson, Town of Fraser
Garrett Scott, Town of Fraser

JVAM
A Mountain Law Firm

Cooper Gehle
(970) 922-2122
cooper@jvamlaw.com

January 15, 2026

Via Email
Town of Fraser
Alan Sielaff, Assistant Town Planner

Re: TF22-10: Grand Park West Mountain Filing 1 FPDP and Final Plat – 7th Submittal

Please review and address our comments below relating to the most recent submission. Some of the comments are made simply for clarity and tracking purposes, as previous conversations have occurred between the Developer and the Town regarding attached versus detached units and acreage flexibility.

1. Final indications of the detached or attached nature in this application are unclear. Site Plan (sheet 5 of the FPDP) notes there are 38 single family detached units in 10W.1 and 41 single family detached units in 11W. However, General Note 2 indicates that Lots 1-52 are single family detached in 11W and Lots 53-79 are single family attached eligible in 10W. 11W only encompasses Lots 1-41, so the application of Note 2.2 to Lots 42-52 is unclear. Further, the "single family attached eligible" language for 10W is unclear as well. It is recommended that Developer clarify the planned units in these planning areas so that accurate counts can be made for the total detached and attached units proposed through West Mountain in accordance to the terms of the PDD.

2. The orientation and cardinal direction present in the FPDP Sheet 3 – Land Use Plan appears incorrect. The North indicator depicts the direction for West.

3. Developer has removed General Notes 12 and 13 from the FPDP. Despite this removal, all light fixtures shall still be in compliance with the Town of Fraser Municipal Code Sections 14-5-30 and 19-4-195. Further, final engineering documents, construction drawings, and site specific geotechnical reports shall be submitted and approved prior to issuance of any building permit unless otherwise determined by Town Staff.

4. Modifications to the acreage of the planning areas are present from the levels approved in the PDD and the previous submission.
    a. 11W previously encompassed 16.1 acres and now covers 19.3 acres. This is an acreage increase of 3.2.
    b. 10W has a total of 40.8 acres on the PDD and is proposed in the FPDP to total 42.7. The previous application for this area had 10W.1 and 10W.2, but the current iteration of 10W.1 encompasses the area that was split between 10W.1 and 10W.2. The area of the current 10W.1 is 17.5 acres, whereas the previous consisted of 19.2 acres between 10W.1 and 10W.2. The application appears to indicate that some of 11W's growth accounts for the loss in acreage to 10W.1, but there is still an unexplained 1.5 acres added to 11W.
    c. Furthermore, this application increases the overall acreage for 11W and 10W by 5.1 acres greater than approved by the PDD.

   These notes are highlighted to address the question from where the excess acreage is transferred. The acreage for 23W in this area was not included in the previous application, so it is unclear if that area has been used to supply the increased acreage. Thus, it is recommended that for future applications which include portions of 23W, that the 23W acreage is included, as it has been here.

EAST GRAND FIRE PROTECTION DISTRICT NO. 4

P.O. Box 2967 • Winter Park, Colorado 80482
(970) 726-5824 • www.eastgrandfire.com

Mr. Alan Sielaff, January 14th, 2026

Thank you for the opportunity to comment on ***Grand Park West Mountain Filing 1 FPDP and Final Plat.*** Special attention to utility locations, wildfire hazard mitigation, access, and municipal water supply is necessary for the protection of lives and property.

Access into Grand Park West Mountain Filing 1 (10W.1,11W & A Portion of 23W) via Grand Park Dr to have access points open, maintained, and unobstructed during all phases of construction. Emergency access roads will be required to be maintained and accessible year-round and be capable of supporting 84,000lbs.

Item of note if *Grand Park West Mountain Filing 2 (Overlook at Grand Park)* is not constructed during the same time period the only access to 10W.1 including Terrain Court and Bulge Cout will be from Overlook Dr. This will need to be evaluated to ensure access in accordance with *2021 IFC D107.1 One- or Two-Family Residential Developments.* If Filing 2 is not to be constructed with secondary access, residential homes will be required to install fire sprinkler systems.

Currently Grand Park Drive is the only access in/out of the area where the local roads and collector roads provide multiple paths of travel, as such Grand Park Drive will be required to be completed, maintained, and accessible to County Rd 72 to provide additional access/egress points prior to the delivery of any combustible material.

The width of the roads in *Grand Park West Mountain Filing* 2 appear to not be less than 26ft wide (excluding emergency access roads) and are acceptable as drawn. Road slopes do not exceed 7% in Filing 2 and are acceptable as drawn.

Parking lot drive isles were not depicted in this submittal but in earlier submittals they were shown at 26ft wide which is acceptable for Aerial Apparatus Access Roads.

"**No Street Parking**" signage will be required throughout, placed, and maintained on both sides of all roads. As well in all Cul-de-sacs. Cul-de-sac design appear on plans in one design and differently on the Town of Fraser Design in Attachment A-12. Both designs differ from the *2021 IFC Appendix D figure D103.1 for Dead-End Fire Apparatus Access Road Turnaround.* For consistency, please make all cul-de-sacs to the largest design which is described in the 2021 IFC Appendix D.

Fire hydrant spacing along all roads appears adequate and meet requirements in IFC Appendix C. Additionally, we would request a hydrant be added to Overlook Dr between Bulge Ct and Terrain Ct as there is a long distance between hydrants in this area. All temporary roadways will be required to be completed at finish grade and accessible by East Grand Fire apparatus as well as fire suppression water supply for Filing 1 will be required to be in place prior to the delivery of combustible building materials. Flows and pressures will need to be verified once that zone is installed to confirm it is functioning as designed.

Consideration for ***Grand Park West Mountain Filing 1*** be given to exterior building materials, landscaping, and defensible space to provide for a more wildfire adapted community and the **required adoption of the Colorado Wildfire Resiliency Code in 2026.**

Thank You,

Ryan A Mowrey
Fire Marshal
East Grand Fire Protection District

Alan Sielaff

From: MPEI Plat Review <mpeiplatreview@mpei.com>
Sent: Wednesday, January 14, 2026 3:40 PM
To: Alan Sielaff
Cc: Gittins, Julie K
Subject: RE: TF22-10: Grand Park WMF1_FPDP and Final Plat - 7th Submittal Referral

Caution! This message was sent from outside your organization.

Hello,

MPEI has a remaining issue that must be addressed on the plat.

1) MPE requires the language "Snow storage is not permitted within 5 feet of above ground electrical equipment" added to plat note 9 since the U.E. is dedicated as utility easement and snow storage in the plat legend.

The item below would not prevent MPEI from approving the filing 1 plat, but is important to document at this time:

A) MPEI must loop primary from Bugle Court to filing 2's Road C as the number of lots on Bugle Court, and Road C, exceeds MPEI's limit for radial (non-looped) primary lines. MPEI would prefer for the primary route and easement to be documented on the Overlook at Grand Park (Grand Park West Mountain Filing 2) plat. MPEI will not install facilities along Bugle Court (filing 1) or Road C (filing 2) until a loop route is provided and easement is secured.

Regards,

Jessica Tain

Jessica Tain mpeiplatreview@mpei.com
970-281-0344

MOUNTAIN PARKS ELECTRIC INCORPORATED

321 West Agate Ave • P.O. Box 170, Granby, CO 80446-0170 •
970.887.3378
We are owned by those we serve.

From: Alan Sielaff <asielaff@town.fraser.co.us>
Sent: Tuesday, December 30, 2025 12:12 PM
To: Kent Whitmer <kent@jvamlaw.com>; Cooper Gehle <cooper@jvamlaw.com>; Greg Steed <greg.steed@merrick.com>; Jeanne Boyle <jeanne.boyle@merrick.com>; Donna Barrentine <donna.barrentine@merrick.com>; Katherine Knight <katherine.knight@merrick.com>; Theresa Ring <theresa.ring@merrick.com>; Ryan Mowrey - East Grand Fire Protecion District #4 <rmowrey@eastgrandfire.com>; MPEI Plat Review <mpeiplatreview@mpei.com>; Gittins, Julie K <julie.k.gittins@xcelenergy.com>

Alan Sielaff

From: Gittins, Julie K <Julie.K.Gittins@xcelenergy.com>
Sent: Friday, January 16, 2026 11:15 AM
To: Alan Sielaff
Cc: MPEI Plat Review
Subject: RE: TF22-10: Grand Park WMF1_FPDP and Final Plat - 7th Submittal Referral

Alan,

Good morning!

Xcel stands by their comments provided 4/29/25. We request that the dedicated utility easement language that has been provided in past reviews be added to the notes on the final plat along with the non-exclusive utility easement language for meter banks (see below for your convenience).

Ten-foot (10') wide dry utility easements are hereby dedicated on private property adjacent to the front and side lot lines of each lot in the subdivision or platted area identified as **single-family lots**, and around the perimeter of each **commercial/industrial** and **multi-family** lot in the subdivision or platted area including tracts, parcels and/or open space areas. Fifteen-foot (15') wide dry utility easements are hereby dedicated on private property adjacent to all public streets and side lot lines abutting exterior plat boundary lines. These easements are dedicated to the City/County for the benefit of the applicable utility providers for the installation, maintenance, and replacement of electric, gas, television, cable, and telecommunications facilities (Dry Utilities). Utility easements shall also be granted within any access easements and private streets in the subdivision. 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. WITH RESPECT TO THE UTILITY EASEMENT GRANTED HEREBY, NO STRUCTURE OR FOUNDATION SHALL BE ALLOWED CLOSER THAN FIVE FEET (5') AROUND ANY UNDERGROUND LINES. NO OTHER UTILITY LINE (WHETHER WATER, SEWER) SHALL BE ALLOWED CLOSER THAN TEN FEET (10') FROM ANY UNDERGROUND LINE. NOT WITHSTANDING THE FOREGOING, UNDERGROUND COMMUNICATION FACILITIES AND ELECTRIC SHALL NOT BE ALLOWED CLOSER THAN FIVE FEET (5') TO ANY GAS LINES AND ABOVE GROUND COMMUNICATION FACILITIES SHALL NOT BE CLOSER THAN FIVE FEET (5') TO ANY UNDERGROUND FACILITIES. NO GRADE CHANGES (FILL OR CUT) IN-EXCESS OF SIX INCHES (6") ARE PERMITTED WITHIN TEN FEET (10') OF ANY UNDERGROUND LINE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM PSCO. NO TREES OR BOULDERS MAY BE PLANTED OVER DISTRIBUTION OR SERVICE LINES AND MUST BE A MINIMUM OF 5' AWAY. SNOW STORAGE AND DRAINAGE CANNOT BE COMBINED WITH THE UTILITY EASEMENT.

> EACH TOWNHOME, DUPLEX, MULTI-FAMILY OR MULTI-USE BUILDING ON THE PROPERTY SHALL HAVE GAS METERS ON THE GABLE END OF ONE (1) END UNIT ("GAS METER BANK"). DEVELOPER, FUTURE HOMEOWNER, OR METRO DISTRICT HEREBY GRANTS TO XCEL (PSCO) A NON-EXCLUSIVE UTILITY EASEMENT FOR (I) ONE GAS METER BANK ON THE END OF ONE (1) END UNIT PER BUILDING AND (II) ALL OTHER THINGS REASONABLY NECESSARY TO CONSTRUCT, INSTALL, MAINTAIN AND OPERATE SUCH GAS METER BANK ON EACH OF THE BUILDINGS (THE "GAS METERING EASEMENT"). ALL LINES AND OTHER FACILITIES RELATED TO SUCH GAS METER

BANK, SUCH AS METER RISERS (BUT NOT INDIVIDUAL GAS METERS), SHALL BE THE PROPERTY OF THE DEVELOPER. ALL GAS METERS USED FOR SUCH GAS METER BANKS SHALL BE THE PROPERTY OF XCEL (PSCO). ALL OF THE FOREGOING RIGHTS AND BENEFITS OF XCEL (PSCO) WITH RESPECT TO THE GAS METERING EASEMENT SHALL BE BINDING UPON AND SHALL INURE TO THE BENEFIT OF SUCCESSORS AND ASSIGNS.

It is Xcel's desire to provide the developer as much information and help ahead of time to address any issues that may arise, but ultimately the proof of burden is on the developer to show that all current required clearances can be met and that there is room to install our distribution in a utility easement outside of ROW. If that can't be done, we may not be able to provide service. Our standards and requirements are based on "Safety First".

Please note – this is not a final assessment of what the new service request will entail. There may be additional things in the field I cannot see. Once an application has been submitted to XCEL, upon final recording of the plat, we can start the full design process and identify the scope of work that will need to be done for this request.

Have a great day!

Julie Gittins

Xcel Energy
Design Planner, Mountain Division
583 E. Jasper Ct., PO Box 528 Granby, CO 80446
C: 970-409-7613
E: Julie.K.Gittins@xcelenergy.com

Direct Supervisor: Kyle.C.Alsup@xcelenergy.com

M*y Office Hours: Tuesday thru Friday, 6:00 – 4:30 pm*

From: Alan Sielaff <asielaff@town.fraser.co.us>
Sent: Tuesday, December 30, 2025 12:12 PM
To: Kent Whitmer <kent@jvamlaw.com>; Cooper Gehle <cooper@jvamlaw.com>; Greg Steed <greg.steed@merrick.com>; Jeanne Boyle <jeanne.boyle@merrick.com>; Donna Barrentine <donna.barrentine@merrick.com>; Katherine Knight <katherine.knight@merrick.com>; Theresa Ring <theresa.ring@merrick.com>; Ryan Mowrey - East Grand Fire Protecion District #4 <rmowrey@eastgrandfire.com>; MPEI Plat Review <mpeiplatreview@mpei.com>; Gittins, Julie K <Julie.K.Gittins@xcelenergy.com>
Cc: Garrett Scott <gscott@town.fraser.co.us>; Paul Johnson <pjohnson@town.fraser.co.us>; Michael Brack <mbrack@town.fraser.co.us>; Lucas Seffens <lseffens@town.fraser.co.us>; Jeff Lunde <jlunde@town.fraser.co.us>; Brad Rome <brome@town.fraser.co.us>; Cathleen Brown <cbrown@town.fraser.co.us>
Subject: TF22-10: Grand Park WMF1_FPDP and Final Plat - 7th Submittal Referral

Hello all,

Column

See Proof on Next Page

AFFIDAVIT OF PUBLICATION

Ad #: YR1pbhXZQ3osJNpddkLx
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Edmar Corachia, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC, duly authorized agent of Sky-Hi News and Middle Park Times, that the same weekly newspaper printed, in whole or in part and published in the County of Grand, State of Colorado, and has a general circulation therein; that said newspaper has been published continuously and uninterruptedly in said County of Grand for a period of more than fifty-two consecutive weeks next prior to the first publication of the annexed legal notice or advertisement; that said newspaper has been admitted to the United States mails as a periodical under the provisions of the Act of March 3, 1879, or any amendments thereof, and that said newspaper is a weekly newspaper duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado.
That the annexed legal notice or advertisement was published in the regular and entire issue of every number of said weekly newspaper for the period of 1 insertion; and that the first publication of said notice was in the issue of said newspaper dated 14 Jan 2026 in the issue of said newspaper. That said newspaper was regularly issued and circulated on those dates.

Total cost for publication: $30.48

Edmar Corachia
(Signed)________________________________

VERIFICATION

State of Florida
County of Orange

Subscribed in my presence and sworn to before me on this: 01/14/2026

PAMELA BAEZ
Notary Public - State of Florida
Commission # HH 732409
Expires on October 19, 2029

____
Notary Public
Notarized remotely online using communication technology via Proof.

NOTICE OF PUBLIC HEARING
FRASER, COLORADO

NOTICE IS HEREBY GIVEN that a public hearing will be held by the Planning Commission of the Town of Fraser, Colorado, on Wednesday, January 28, 2026, at 6:30 PM in the Board Room of the Fraser Town Hall, located at 153 Fraser Avenue, Fraser, Colorado to consider the following agenda item:

Major Amendment to a Final Planned Development Plan (FPDP) and Major Subdivision (Final Plat) - For part of the Grand Park Development known as West Mountain Filing No. 1 (Planning Areas 10W and 11W).

LEGAL DESCRIPTION: A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 29 AND THE NORTH HALF OF SECTION 32, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO, CONTAINING AN AREA OF 47.838 ACRES, MORE OR LESS.

Property Location: The property is located north of a proposed extension to Grand Park Drive, west of the Union Pacific railroad.

Proposed plans for the subject property are on file with the Town Planning Department.

PUBLISHED IN THE SKY-HI NEWS AND MIDDLE PARK TIMES ON WEDNESDAY, JANUARY 14, 2026.

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Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 38			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8621 59			
Total			$10.77
First-Class Mail® Letter	1		$1.07
Denver, CO 80209			
Weight: 0 lb 1.10 oz			
Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 45			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8621 66			
Total			$10.77
First-Class Mail® Letter	1		$1.07
Lone Tree, CO 80124			
Weight: 0 lb 1.10 oz			
Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 52			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8621 73			
Total			$10.77
First-Class Mail® Letter	1		$1.07
Denver, CO 80206			
Weight: 0 lb 1.10 oz			
Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 69			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8621 80			
Total			$10.77
First-Class Mail® Letter	1		$1.07
Winter Park, CO 80482			
Weight: 0 lb 1.10 oz			
Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 76			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8621 97			
Total			$10.77
First-Class Mail® Letter	1		$1.07
Fraser, CO 80442			
Weight: 0 lb 1.10 oz			
Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 83			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8622 03			
Total			$10.77
First-Class Mail® Letter	1		$1.07
Winter Park, CO 80482			
Weight: 0 lb 1.10 oz			
Estimated Delivery Date Sat 01/17/2026			
Certified Mail®			$5.30
Tracking #: 9589 0710 5270 2000 6174 90			
Return Receipt			$4.40
Tracking #: 9590 9402 7586 2098 8622 10			
Total			$10.77

First-Class Mail® 1 $1.07
Letter
Winter Park, CO 80482
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Sat 01/17/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6175 06
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8622 27
Total $10.77

First-Class Mail® 1 $1.07
Letter
Broomfield, CO 80020
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Sat 01/17/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6150 45
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8622 34
Total $10.77

First-Class Mail® 1 $1.07
Letter
Winter Park, CO 80482
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Sat 01/17/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6150 69
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8622 41
Total $10.77

First-Class Mail® 1 $1.07
Letter
Morrison, CO 80465
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Sat 01/17/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6150 76
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8622 58
Total $10.77

First-Class Mail® 1 $1.07
Letter
Austin, TX 78726
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Tue 01/20/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6150 83
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8622 65
Total $10.77

First-Class Mail® 1 $1.07
Letter
Excelsior, MN 55331
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Tue 01/20/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6150 52
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8621 42
Total $10.77

First-Class Mail® 1 $1.07
Letter
Boulder, CO 80301
Weight: 0 lb 1.10 oz
Estimated Delivery Date
Sat 01/17/2026
Certified Mail® $5.30
Tracking #:
9589 0710 5270 2000 6150 90
Return Receipt $4.40
Tracking #:
9590 9402 7586 2098 8622 72
Total $10.77

Grand Total: $150.78

Credit Card Remit $150.78
Card Name: VISA
Account #: XXXXXXXXXXXX5303
Approval #: 07956G
Transaction #: 442
AID: A0000000031010 Contactless
AL: VISA CREDIT
CHASE VISA

9589 0710 5270 2000 6175 06

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

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Winter Park, CO 80482

OFFICIAL USE

Certified Mail Fee $5.30	0069
$ $4.40	06
Extra Services & Fees *(check box, add fee as appropriate)*	Postmark Here
☐ Return Receipt (hardcopy) $ $0.00	SULLIVAN STA DENVER CO 80237
☐ Return Receipt (electronic) $ $0.00	JAN 14 2026
☐ Certified Mail Restricted Delivery $ $0.00	01/14/2026
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $1.07	
$	
Total Postage and Fees $10.77	
$	

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6174 76

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Winter Park, CO 80482

OFFICIAL USE

Certified Mail Fee $5.30	0069
$ $4.40	06
Extra Services & Fees *(check box, add fee as appropriate)*	Postmark Here
☐ Return Receipt (hardcopy) $ $0.00	DENVER CO 80237 SULLIVAN STA
☐ Return Receipt (electronic) $ $0.00	JAN 1 4 2026
☐ Certified Mail Restricted Delivery $ $0.00	01/14/2026
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $1.07	
$	
Total Postage and Fees $10.77	
$	

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6174 90

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Winter Park, CO 80482

OFFICIAL USE

Certified Mail Fee $5.30	0069
$ $4.40	06
Extra Services & Fees *(check box, add fee as appropriate)*	Postmark Here
☐ Return Receipt (hardcopy) $ $0.00	DENVER CO 80237 SULLIVAN
☐ Return Receipt (electronic) $ $0.00	JAN 1 4 2026
☐ Certified Mail Restricted Delivery $ $0.00	01/14/2026
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $1.07	
$	
Total Postage and Fees $10.77	
$	

Sent To

Street and Apt. No., or PO Box No.

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9589 0710 5270 2000 6174 69

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OFFICIAL USE

Certified Mail Fee	
$	
Extra Services & Fees *(check box, add fee as appropriate)*	Postmark Here
☐ Return Receipt (hardcopy) $	SULLIVAN STA DENVER, CO 80206
☐ Return Receipt (electronic) $	JAN 1 4 2026
☐ Certified Mail Restricted Delivery $	
☐ Adult Signature Required $	
☐ Adult Signature Restricted Delivery $	
Postage	
$	
Total Postage and Fees	
$	

Robinson Michael
3033 E 7th Ave
Denver CO 80206

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

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9589 0710 5270 2000 6174 83

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

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Fraser, CO 80442

OFFICIAL USE

Certified Mail Fee $5.30	0069
$ $4.40	06
Extra Services & Fees *(check box, add fee as appropriate)*	Postmark Here
☐ Return Receipt (hardcopy) $ $0.00	CO 80237 DENVER STA
☐ Return Receipt (electronic) $ $0.00	JAN 1 4 2026
☐ Certified Mail Restricted Delivery $ $0.00	01/14/2026
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $1.07	
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Total Postage and Fees $10.77	
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Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6174 38

U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

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For delivery information, visit our website at *www.usps.com®*.

Winter Park, CO 80482

OFFICIAL USE

Certified Mail Fee $5.30	0069
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Extra Services & Fees *(check box, add fee as appropriate)*	Postmark Here
☐ Return Receipt (hardcopy) $ $0.00	SULLIVAN STA DENVER, CO 80237
☐ Return Receipt (electronic) $ $0.00	JAN 1 4 2026
☐ Certified Mail Restricted Delivery $ $0.00	01/14/2026
☐ Adult Signature Required $ $0.00	
☐ Adult Signature Restricted Delivery $	
Postage $1.07	
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Total Postage and Fees $10.77	
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Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

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9589 0710 5270 2000 6150 90

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Boulder, CO 80301

OFFICIAL USE

Certified Mail Fee $5.30
$ $4.40
Extra Services & Fees *(check box, add fee as appropriate)* $0.00
- ☐ Return Receipt (hardcopy) $ $0.00
- ☐ Return Receipt (electronic) $ $0.00
- ☐ Certified Mail Restricted Delivery $ $0.00
- ☐ Adult Signature Required $ $0.00
- ☐ Adult Signature Restricted Delivery $

Postage $1.07
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Total Postage and Fees $10.77
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Postmark Here
DENVER, CO 80237
JAN 14 2026
SULLIVAN STA
01/14/2026

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

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9589 0710 5270 2000 6150 69

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Winter Park, CO 80482

OFFICIAL USE

Certified Mail Fee $5.30
$ $4.40
Extra Services & Fees *(check box, add fee as appropriate)* $0.00
- ☐ Return Receipt (hardcopy) $ $0.00
- ☐ Return Receipt (electronic) $ $0.00
- ☐ Certified Mail Restricted Delivery $ $0.00
- ☐ Adult Signature Required $ $0.00
- ☐ Adult Signature Restricted Delivery $

Postage $1.07
$
Total Postage and Fees
$

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Postmark Here
DENVER, CO 80237
JAN 14 2026
SULLIVAN STA
01/14/2026

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6150 76

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For delivery information, visit our website at *www.usps.com®*.

Morrison, CO 80465

OFFICIAL USE

Certified Mail Fee $5.30
$ $4.40
Extra Services & Fees *(check box, add fee as appropriate)* $0.00
- ☐ Return Receipt (hardcopy) $ $0.00
- ☐ Return Receipt (electronic) $ $0.00
- ☐ Certified Mail Restricted Delivery $ $0.00
- ☐ Adult Signature Required $ $0.00
- ☐ Adult Signature Restricted Delivery $

Postage $1.07
$
Total Postage and Fees $10.77
$

0069
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Postmark Here
DENVER, CO 80237
JAN 14 2026
SULLIVAN STA
01/14/2026

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6150 52

U.S. Postal Service™
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OFFICIAL USE

Certified Mail Fee
$
Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$ Peterson Brenda
Total Postage and Fees
$ 195 W Point Rd
Sent To Excelsior MN 55331

Postmark Here

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6150 45

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
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For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

Certified Mail Fee
$
Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$ Post John Osborn
Total Postage and Fees
$ 13933 Gunnison Way
Sent To Broomfield CO 80020

Postmark Here
DENVER, CO 80237
JAN 14 2026
SULLIVAN STA

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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9589 0710 5270 2000 6150 83

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

Austin, TX 78726

OFFICIAL USE

Certified Mail Fee $5.30
$ $4.40
Extra Services & Fees *(check box, add fee as appropriate)* $0.00
- ☐ Return Receipt (hardcopy) $ $0.00
- ☐ Return Receipt (electronic) $ $0.00
- ☐ Certified Mail Restricted Delivery $ $0.00
- ☐ Adult Signature Required $ $0.00
- ☐ Adult Signature Restricted Delivery $

Postage $1.07
$
Total Postage and Fees $10.77
$

0069
06
Postmark Here
DENVER, CO 80237
JAN 14 2026
SULLIVAN STA
01/14/2026

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 2000 6174 52

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com*®.

Lone Tree, CO 80124

OFFICIAL USE

Certified Mail Fee $	$5.30
Extra Services & Fees *(check box, add fee as appropriate)*	$4.40
☐ Return Receipt (hardcopy) $	$0.00
☐ Return Receipt (electronic) $	$0.00
☐ Certified Mail Restricted Delivery $	$0.00
☐ Adult Signature Required $	$0.00
☐ Adult Signature Restricted Delivery $	
Postage $	$1.07
Total Postage and Fees $	$10.77

0069
04

Postmark Here

SULLIVAN STA DENVER, CO 80237 JAN 14 2026

01/14/2026

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 2000 6174 45

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com*®.

Denver, CO 80207

OFFICIAL USE

Certified Mail Fee $	$5.30
Extra Services & Fees *(check box, add fee as appropriate)*	$4.40
☐ Return Receipt (hardcopy) $	$0.00
☐ Return Receipt (electronic) $	$0.00
☐ Certified Mail Restricted Delivery $	$0.00
☐ Adult Signature Required $	$0.00
☐ Adult Signature Restricted Delivery $	
Postage $	$1.07
Total Postage and Fees $	$10.77

0069
04

Postmark Here

SULLIVAN STA DENVER, CO 80237 JAN 14 2026

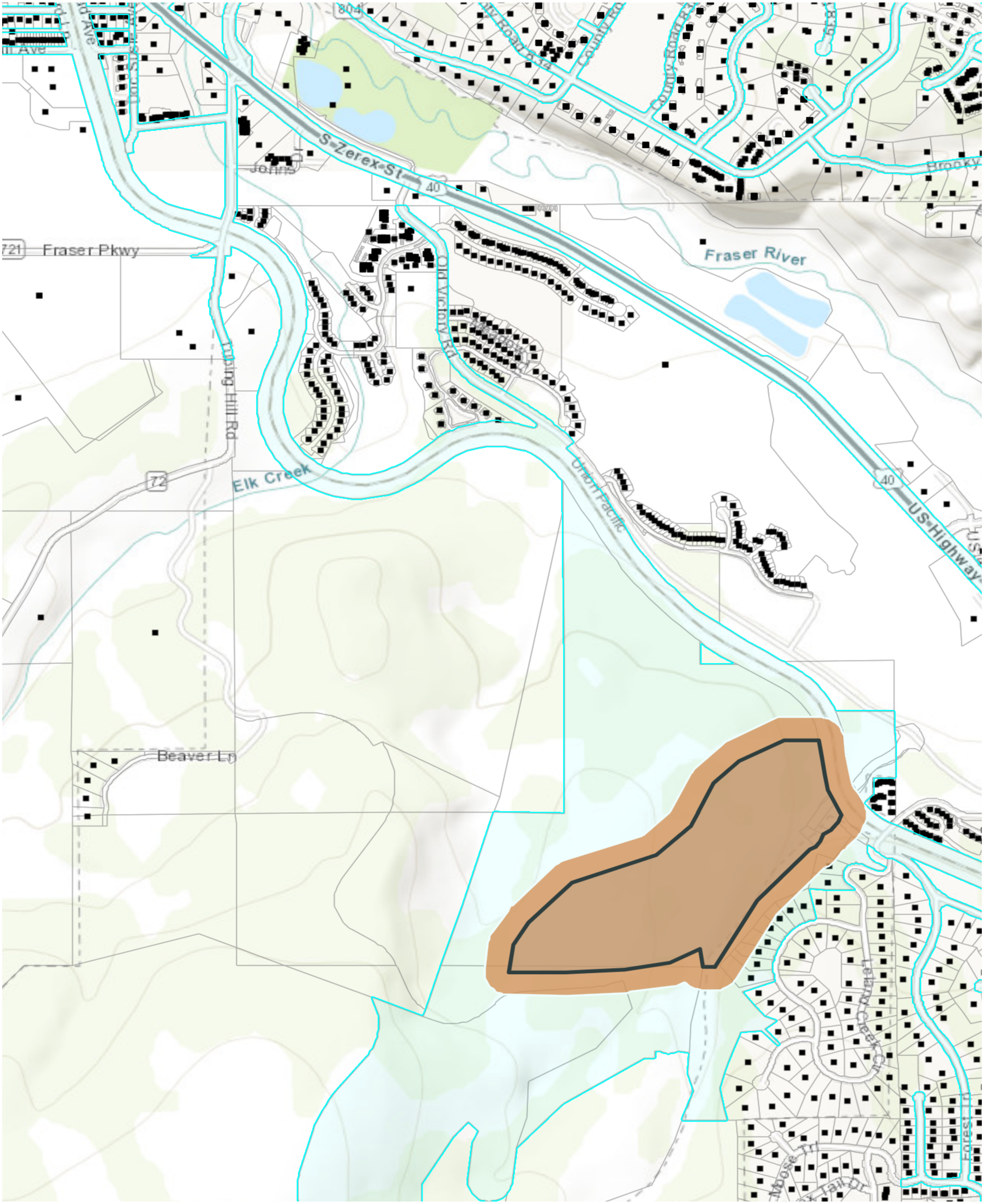
01/14/2026

Sent To

Street and Apt. No., or PO Box No.

City, State, ZIP+4®

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions



S Zerex St
Fraser Pkwy
Fraser River
Old Victory Rd
Elk Creek
Union Pacific
US Highway
Beaver Ln
Leland Creek Cir
Moose Trl

DESSEL, JAY H & PATRICIA A
4712 TALLY HO CT
BOULDER, CO 80301-3864

RYCOKA LLC
10812 BROKEN BROOK
AUSTIN, TX 78726-1904

KINDER KELLY F
10137 S SHADOW HILL DR
LONE TREE, CO 80124-6810

PERLMAN JACOB & SPAETH TRISHA
1070 S ADAMS ST
DENVER, CO 80209-4907

PRICE, THE DARYL AND DANA REV TRUST
6166 COLOROW DR
MORRISION, CO 80465-2271

ESHER PROPERTIES, INC
PO BOX 3541
WINTER PARK, CO 80482-3541

CHARLAND, SCOTT L & KAREN K
PO BOX 1941
WINTER PARK, CO 80482-1941

PETERSON STEPHEN TRUST AGREEMENT 08-27-2019 PETERSON BRENDA C TRUST AGREEMENT 08-27-2019
195 W POINT RD
EXCELSIOR , MN 55331-9422

POST JOHN OSBORN & POST SARAH EMILY
13933 GUNNISON WAY
BROOMFIELD , CO 80020-6051

ROBINSON, MICHAEL S & SAMANTHA F
3033 E 7TH AVENUE PKWY
DENVER, CO 80206-3907

LELAND CREEK OWNERS ASSN
PO BOX 30
WINTER PARK, CO 80482-0030

CORNERSTONE WINTER PARK HOLDINGS LLC
PO BOX 30
WINTER PARK, CO 80482-0030

,

FRASER TOWN OF
153 FRASER AVE
FRASER, CO 80442

GRAND PARK DEVELOPMENT LLC
PO BOX 30
WINTER PARK, CO 80482-0030

FRASER PLANNING COMMISSION
RESOLUTION NO. 2026-01-01

A RESOLUTION RECOMMENDING APPROVAL OF A FINAL PLAT AND FINAL PLANNED DEVELOPMENT PLAN (FPDP) FOR A RESIDENTIAL DEVELOPMENT KNOWN AS GRAND PARK WEST MOUNTAIN FILING NO. 1, PLANNING AREAS 10W AND 11W, LOCATED NORTH OF A PROPOSED EXTENSION TO GRAND PARK DRIVE, LEGALLY DESCRIBED AS A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 29 AND THE NORTH HALF OF SECTION 32, TOWNSHIP 1 SOUTH, RANGE 75 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF FRASER, COUNTY OF GRAND, STATE OF COLORADO, CONTAINING AN AREA OF 47.838 ACRES, MORE OR LESS

WHEREAS, on June 5, 2024, Cornerstone Winter Park Holdings, LLC, a Colorado limited liability company, received approval by the Fraser Board of Trustees via Resolution 2024-06-04, for a Final Plat and Final Planned Development Plan (FPDP) for the development of 72 residential units within the boundaries of Planning Areas 10W and 11W of the Grand Park Planned Development District (PDD), known as West Mountain Filing No. 1; and

WHEREAS, on January 22, 2025, Cornerstone Winter Park Holdings, LLC, received approval by the Fraser Board of Trustees via Resolution 2025-01-09 for an Amended Final Plat and Final Planned Development Plan (FPDP) for an increase of 7 units for the development of 79 residential units within the boundaries of Planning Areas 10W and 11W of the Grand Park Planned Development District (PDD), known as West Mountain Filing No. 1; and

WHEREAS, since that time, Cornerstone Winter Park Holdings, LLC, has worked to address the conditions of approval in Resolution 2025-01-09, but has not yet recorded or executed any of the required land use approval documents; and

WHEREAS, on December 19, 2025, West Mountain Development, LLC, a Colorado limited liability company, through Cornerstone Winter Park Holdings, LLC, submitted a revised Final Plat and FPDP application that would rearrange the lots in the previously approved application, which is considered a major amendment to the approved FPDP and therefore should be reviewed and approved by the Fraser Planning Commission and Board of Trustees; and

WHEREAS, West Mountain Development, LLC, a Colorado limited liability company, is the current owner of the property; and

WHEREAS, following a review of the submitted plans and documents by Town Staff and applicable referral entities, the application was considered during a regular meeting of the Fraser Planning Commission held on January 28, 2026 through a properly noticed public hearing; and

WHEREAS, Town Staff has determined that this application is in compliance with the governing documents of the Grand Park PDD and applicable provisions of the Land Development Code of the Town of Faser when the conditions listed below have been addressed.

NOW THEREFORE BE IT RESOLVED that the Fraser Planning Commission has voted to recommend approval of the Final Plat and FPDP application with the following conditions:

1) Prior to recordation of the FPDP and Final Plat, the Applicant must address all outstanding review comments to the satisfaction of the Town and/or applicable entity and revise and resubmit all documents accordingly.

2) Prior to recordation of the FPDP and the Final Plat, the Applicant shall receive approval from the Town of Fraser of the West Mountain Water Master Plan and associated construction design drawings and reports, as stipulated in Articles 5.3, 5.5, and 5.6 of the 2003 Annexation Agreement.

3) Prior to Final Plat recordation, the Applicant shall execute an approved Development Improvements Agreement and provide the appropriate surety.

4) Prior to Final Plat recordation, the Applicant shall provide the Town with the following items as outlined in the Major Subdivision Final Plat Checklist:
    a. Proof of filing the applicable articles of incorporation with the Secretary of State and the executed originals of all legal documents, including a final executed DIA and any required collateral.
    b. Final plat Mylar with appropriate signatures
    c. A digital file of the approved final plat and 911 emergency system drawing / address map in both CAD and PDF format for the Town's Geographic Information System (GIS).

5) Concurrent with the recordation of the Final Plat or any portion/phase thereof, the Town shall record the corresponding Development Improvements Agreement (DIA) as well as the necessary HOA declaration, restrictive covenants, and bylaws.

APPROVED AND ADOPTED THIS 28TH DAY OF JANUARY, 2026.

FRASER PLANNING COMMISSION

____
Chairperson

ATTEST:

____
Town Clerk

FRASER FORWARD

COMPREHENSIVE PLAN

Guiding Growth Through Nature's Rhythm

Draft: 1/23/2026

FRASER

Dear Residents, Stakeholders, and Visitors of Fraser,

It is with great pride and optimism that I present *Fraser Forward: The Town of Fraser Comprehensive Plan*. This document represents more than a statutory requirement or a planning exercise - it is a reflection of who we are as a community and a shared commitment to steward Fraser thoughtfully through the next twenty years.

Fraser has always been shaped by its environment, its people, and its sense of purpose. From our early roots as a railroad and timber town to our evolution into a vibrant and year-round mountain destination community, Fraser has remained resilient, creative, and deeply connected to place. Today, as growth and change accelerate throughout the Fraser Valley, we find ourselves at a pivotal moment - one that calls for intentional choices grounded in our values and guided by a clear, community-driven vision.

Fraser Forward is the result of an eighteen-month collaborative process involving residents, business owners, local organizations, regional partners, Town staff, the Planning Commission, the Downtown Development Authority Board, and the Board of Trustees. Through surveys, workshops, open houses, pop-up events, and countless conversations, the community articulated what matters most: preserving our small-town character, protecting the natural environment, supporting a year-round and diverse population, and ensuring that Fraser remains a place where people of all ages can live, work, and thrive.

This plan builds upon the many strengths and accomplishments that already define Fraser. In recent years, Fraser has experienced strategic growth and reinvestment that are strengthening our community's vitality and long-term sustainability. Major developments such as Rendezvous and Grand Park, as well as in Downtown Fraser, have attracted new residents and businesses, contributing to a higher year-round population, increased visitation, and meaningful sales tax growth that supports essential services and community priorities. These developments complement significant public investments in community assets, including the Fraser River Trail, which enhances connectivity and outdoor recreation for residents and visitors alike; the Grand Park Recreation Center, a hub for health, wellness, and community programming; and the recently opened Middle Park Health Fraser Medical Center, which ensures critical health care access close to home. Together, these projects reflect a shared commitment to balanced growth that honors Fraser's small-town character while expanding opportunities for quality of life, economic resilience, and year-round vibrancy.

Our community is supported by institutions and organizations that consistently demonstrate excellence, dedication, and service. Fraser Valley Elementary School, part of the East Grand School District, fosters learning, inclusion, and opportunity for our youngest residents. In 2024, the elementary school was recognized with two of the most prestigious awards granted by the Colorado Department of Education: the Governor's Distinguished Improvement Award and the John Irwin School of Excellence Award. This coincided with the opening of a new arts and sciences wing at the elementary school ahead of the 2024-2025 school year.

The Fraser Valley Library, operated by the Grand County Library District, serves as a trusted and welcoming hub for education, connection, and lifelong learning, adapting to the evolving needs of residents across generations. In 2023, the library district was recognized with the President's Community Award by the Colorado Association of Libraries for its Senior Lunch & Learn program in partnership with Grand County Public Health and the Mountain Family Center.

Equally important are the civic and volunteer organizations that embody Fraser's spirit of generosity and engagement. These include the Fraser Valley Lions Club and the Grand Foundation, which through decades of service and millions of dollars invested in our community have strengthened bonds and provided meaningful support to residents in need - quietly but consistently improving quality of life.

Fraser Valley Arts has long played a vital role in shaping Fraser's creative identity, championing visual and performing arts, education, and the prestigious Fraser Mountain Mural Festival and Fire and Ice Festival. Building on this legacy, the organization is advancing plans for The Fraser Center for Creative Arts, a transformative new facility anticipated to break ground in Downtown Fraser and envisioned as a year-round home for performances, exhibitions, education, and community gatherings. Designed to serve as a cultural anchor and economic catalyst, the Center will activate Downtown Fraser and reinforce revitalization efforts with a core focus maker's space and live performances.

Our regional partnerships also play a vital role in Fraser's success. Winter Park Resort, a world-class destination and a major economic driver which was recognized as the most family-friendly ski resort in North America for the 2023-2024 season, contributes to the vitality of the Fraser Valley while reinforcing our shared identity as a year-round recreation community. The close relationship between Fraser, Winter Park, Granby, and Grand County underscores the importance of collaboration in addressing shared challenges such as housing affordability, transportation, infrastructure, and workforce sustainability.

Fraser Forward provides a roadmap for navigating these challenges while building on our assets. Organized around the rhythms of the four seasons - Spring, Summer, Fall, and Winter - the plan reflects how residents experience Fraser throughout the year and how different priorities come into focus over time. From a renewed vision for Downtown Fraser and expanded housing opportunities, to enhanced parks, trails, and public spaces; from sustainability and land stewardship to resilient infrastructure, transportation, and intergovernmental coordination - this plan integrates policy, investment, and implementation into a cohesive framework.

At its core, *Fraser Forward* is grounded in six community values: economic resiliency and workforce development; affordable and diverse housing options; Fraser's unique spirit and character; safe roads and access for all; strong public services and community resources; and the protection of natural spaces and wild places. These values are not abstract ideals - they are directly tied to goals, strategies, and actions that will guide day-to-day decision-making and long-term investments. The accompanying *Fraser in Action* implementation framework ensures accountability by identifying priorities, timelines, partners, and resources needed to move from vision to results.

These values are already being translated into action through projects such as St. Louis Landing. Phase 1 of St. Louis Landing will deliver 129 deed-restricted affordable apartments with completion anticipated in summer 2027 providing much-needed housing for local workers and families. Future phases are envisioned to expand affordable ownership opportunities, reinforcing the Town's commitment to long-term housing stability, economic inclusion, and a diverse, year-round community. St. Louis Landing exemplifies how Fraser Forward aligns policy with tangible outcomes—ensuring that those who contribute to the community can also afford to call it home.

This plan is intended to be a living document - one that evolves as Fraser evolves. It will inform future updates to the Land Development Code, guide capital improvement planning, and serve as a touchstone for community conversations in the years ahead. Most importantly, it provides a shared foundation for aligning public and private efforts toward a common future.

I want to extend my sincere gratitude to everyone who contributed to this process. Your voices, insights, and care for this community are evident throughout every page of this plan. Fraser Forward belongs to all of us, and its success will be measured not only by policies adopted or projects completed, but by our continued willingness to work together with creativity, respect, and intention.

Together, we will ensure that Fraser remains a distinctive mountain town - rooted in its history, responsive to change, and thriving in every season.

With appreciation and confidence in our shared future,

Brian Cerkvenik
Mayor, Town of Fraser

Acknowledgements

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Cushing Terrell
Leland Consulting
Fehr & Peers

FRASER COMMUNITY

A special thanks to community members who participated in the planning process in 2024 and 2025.

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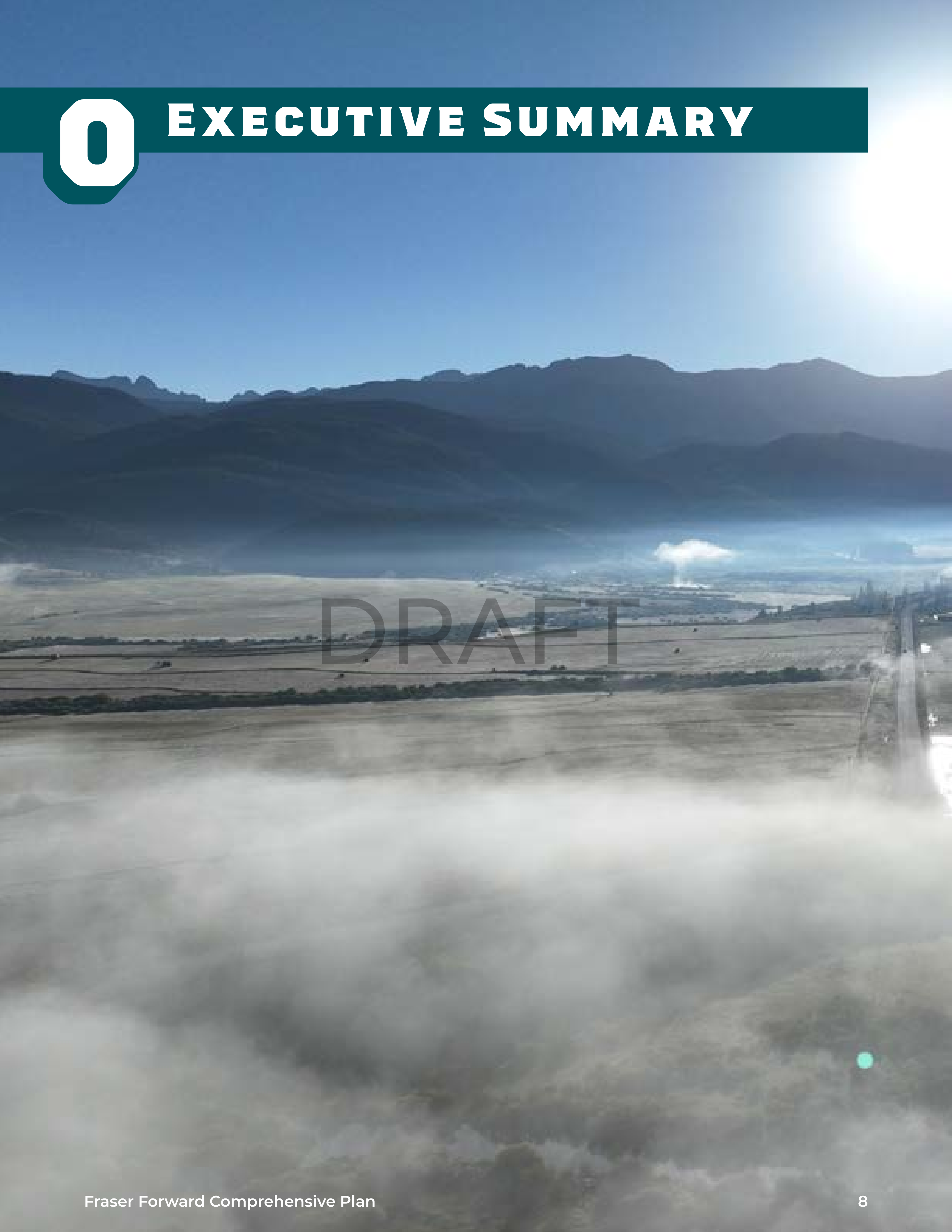
0 Executive Summary



Executive Summary

A PLAN FOR FRASER'S FUTURE

Fraser Forward: Comprehensive Plan sets a clear direction for how the Town of Fraser will grow, evolve, and sustain its unique mountain character over the next twenty years. It builds on Fraser's strong sense of community, environmental stewardship, and creative energy to ensure that future development reflects local values, enhances livability, and strengthens the town's identity as the "Center of Adventure" in the Fraser Valley.

The plan provides a roadmap for decisions about land use, housing, transportation, parks and open space, and economic development. It integrates community priorities, aligns with regional initiatives, and establishes an implementation framework to guide investments and policy updates over time.

Community-Driven Vision

The plan is grounded in an extensive public engagement process that reached residents, business owners, and organizations through workshops, surveys, focus groups, and events. Community input consistently emphasized a desire to preserve Fraser's small-town character, maintain access to the outdoors, and support a diverse, year-round community.

From this foundation, the community vision emerged:

Fraser is a vibrant, connected mountain town that celebrates creativity, protects its natural environment, and offers opportunities for people of all ages to live, work, and play.

This vision is expressed through several core community values found on the following page.

Affordable & Diverse Housing Options:
A community where all can find safe, comfortable housing within their means.

Economic Resiliency and Workforce Development:
Activity year-round with employment opportunities that align with community members.

Fraser's Unique Spirit and Character:
Building on the Town's artistic culture and entrepreneurial spirit.

Safe Roads and Access for All:
Supporting trails, mobility options, and healthy lifestyles.

Public Services and Community Resources:
Providing amenities that are critical to feel supported in our community.

Natural Spaces and Wild Places:
Stewarding the Fraser River, surrounding forests, and open spaces.

FRASER TODAY

Fraser is at a pivotal point in its evolution. Once a quiet mountain community, it has become an increasingly popular place to live and visit. The town's population, economy, and tourism activity are growing, bringing both opportunities and challenges.

Key trends shaping Fraser today include:

- Rapid growth and housing pressure driven by seasonal tourism, regional job centers, and second-home ownership.
- Limited workforce housing, affecting affordability and local employment stability.
- Environmental constraints such as National Forests, St. Louis Creek and Fraser River, and other natural resource conservation.
- A vibrant creative culture that fuels community identity and local events like Fraser Mountain Mural Festival.
- Strong regional connections with Winter Park, Granby, and the greater Grand County economy.

Understanding these dynamics allows Fraser to shape growth intentionally—leveraging opportunity while protecting the community's character and natural assets.

Plan Framework

Fraser Forward organizes goals, policies, and actions under a cohesive framework that reflects how residents experience the town day-to-day. Each chapter builds on the community vision with targeted objectives and implementation strategies. Organizing the planning topics into the four seasons reflects the identity of Fraser as a year-round community shaped by seasonal change. Each season highlights a different rhythm of life – spring brings new opportunities, summer drives energy and activity, autumn gathers the harvest and reflects, and winter strengthens foundations and prepares for the year ahead.

Spring: Growth & New Beginnings

Spring represents opportunity and renewal. This chapter focuses on a Downtown vision, housing, and economic vitality—key drivers of Fraser's long-term prosperity. The plan envisions a thriving Downtown core with a mix of uses, creative placemaking, and attainable housing that supports residents and local businesses alike.

Summer: Vibrancy & Connection

Fraser's summers are full of energy, activity, and connection. This theme centers on enhancing parks, recreation, open space, and trails while strengthening community gathering places. The plan envisions a connected system of green spaces and active transportation routes that encourage outdoor living and celebrate Fraser's mountain lifestyle.

Fall: Stewardship & Resilience

As the seasons change, Fraser's focus turns to sustainability. This chapter addresses land use and sustainability, guiding how and where the town grows. Policies emphasize compact, efficient development, protection of natural resources, climate readiness, and continued commitment to dark skies and water conservation.

Winter: Foundations & Support

Fraser's winter identity represents endurance and strength. This section focuses on intergovernmental coordination especially services, infrastructure, transportation, and mobility— all the systems that keep the town functioning year-round. Goals include improving multimodal transportation, investing in resilient utilities and public facilities, and coordinating regionally to manage growth and shared services.

Together, these four themes form an integrated vision of Fraser as a complete, connected, and sustainable mountain town.

IMPLEMENTATION: FRASER IN ACTION

The final section, Fraser in Action, translates vision into results. It identifies clear strategies, timelines, and partnerships to move the plan forward. Implementation tools include:

- Action matrix outlining short-, mid-, and long-term priorities as well as estimated investment cost and potential partners.
- Integration with capital improvement planning and annual budgeting.
- Coordination among town departments and regional partners.
- Performance monitoring and updates to track progress over time.

Fraser Forward is intended as a living document—one that evolves with the community and remains relevant as new opportunities and challenges emerge.

Moving Forward Together

Fraser Forward reflects the collective aspirations of a community proud of its past and excited for its future. It captures Fraser's enduring spirit of creativity, stewardship, and connection while charting a course for sustainable, inclusive growth.

By implementing this plan, Fraser commits to shaping its future with intention—to remain a distinctive mountain town that values both people and place, and continues to thrive in every season.

1 Introduction

Plan Purpose

WHAT IS A COMPREHENSIVE PLAN?

A comprehensive plan's primary purpose is to provide guidance to Town leadership to make thoughtful, coordinated decisions over time. It guides decisions about laws, budgets, public services, infrastructure, and major projects to ensure that they are in support of the community's vision for the future. The community vision is crafted throughout this process to understand the values, needs, and priorities of residents. In order to acheive the community vision, this plan provides various goals, strategies, and actions for Town staff, elected officials, and the Fraser community to implement. The final component of the plan is the future land use map, which translates the community's vision into on-the-ground solutions.

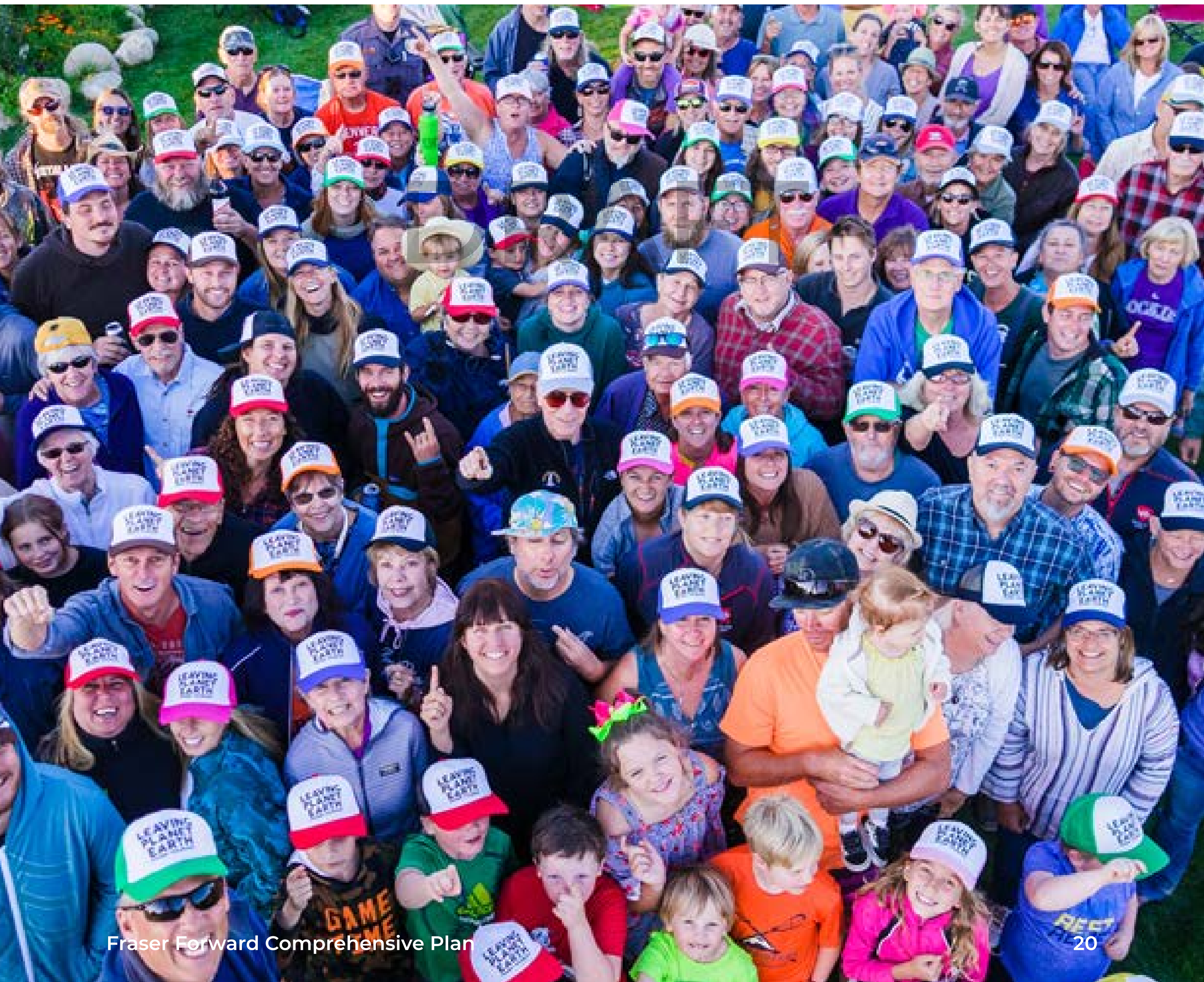
Plan Process

Fraser's Comprehensive Plan was created through a collaborative process led by Town Staff and consultants from Cushing Terrell. Guided by the Planning Commission, Board of Trustees, and informed by the community and local partners, the Comprehensive Plan was crafted over eighteen months in 2024 and 2025. Extensive engagement was conducted with Fraser residents around their vision for Fraser's future. The process followed four phases of plan development, which included:

Plan Use

HOW SHOULD THIS DOCUMENT BE USED?

This Plan is designed to be Fraser's compass for the future. The strategies it contains will guide key decisions on everything from transportation and new development to the protection of stable neighborhoods. It will shape investments in parks and trails, support choices that enhance climate resilience, and inform important community conversations for years to come. It is a tool for alignment, to help ensure that community ideas, partner initiatives, and private development are all working toward the Town's goals. While it provides the foundational direction for future zoning changes and capital projects, this document does not directly change the Land Development Code or assign funding. Rather, it is a living blueprint that serves as a basis to measure decisions against – and ensures that all future changes are moving **Fraser Forward**.



Plans Referenced

WHERE WE LOOKED

A good comprehensive plan aligns with and incorporates other local or regional plans. This ensures that the Town and other organizations are moving in the same direction and highlights opportunities for collaboration and partnership. As a part of the comprehensive plan update, the following plans were reviewed and incorporated into the **Fraser Forward** and **Fraser in Action** chapters where relevant.

- 2004 Fraser Valley Retail Market Analysis
- 2007 Fraser-Winter Park Joint Working Group Final Report
- 2010 Fraser Comprehensive Plan
- 2014 Fraser Winter Park Community Trails Plan
- 2015 Fraser Water Firming Study
- 2016 Fraser Housing Needs and Development Study
- 2016 Fraser Sustainability Plan
- 2017 Downtown Strategic Plan
- 2017 Out of Town Report Service Agreement
- 2018 Fraser River Corridor Master Plan
- 2019 Headwaters Trails Alliance Strategic Trails Plan
- 2019 Regional Workforce Housing Report
- 2020 Town of Fraser Water Supply Report
- 2020 Downtown Fraser
- 2021 Economic Impacts of Outdoor Recreation
- 2021 The Mountain Migration Report
- 2022 Fraser River Valley Housing Needs Assessment Update
- 2022 Wastewater Collection System Master Plan
- 2023 10-Year Water Capital Improvements Plan
- 2023 Workforce Housing Report
- 2023 Water Efficiency Plan

Planning Area

STATE STATUTE

Municipalities in Colorado are required to create and adopt a comprehensive plan for physical development. This plan must also address areas outside the municipality's boundaries.

Although the comprehensive plan itself is an advisory document, it provides the vision that is enforced by other regulatory tools, like the Town's Land Development Code. It is vital to include land within the Three-Mile Area in this plan to ensure that future growth is consistent with the character and vision of Fraser. The Land Use section of this plan, including the Future Land Use Map, provides further detail on this approach.

Source: Town of Fraser

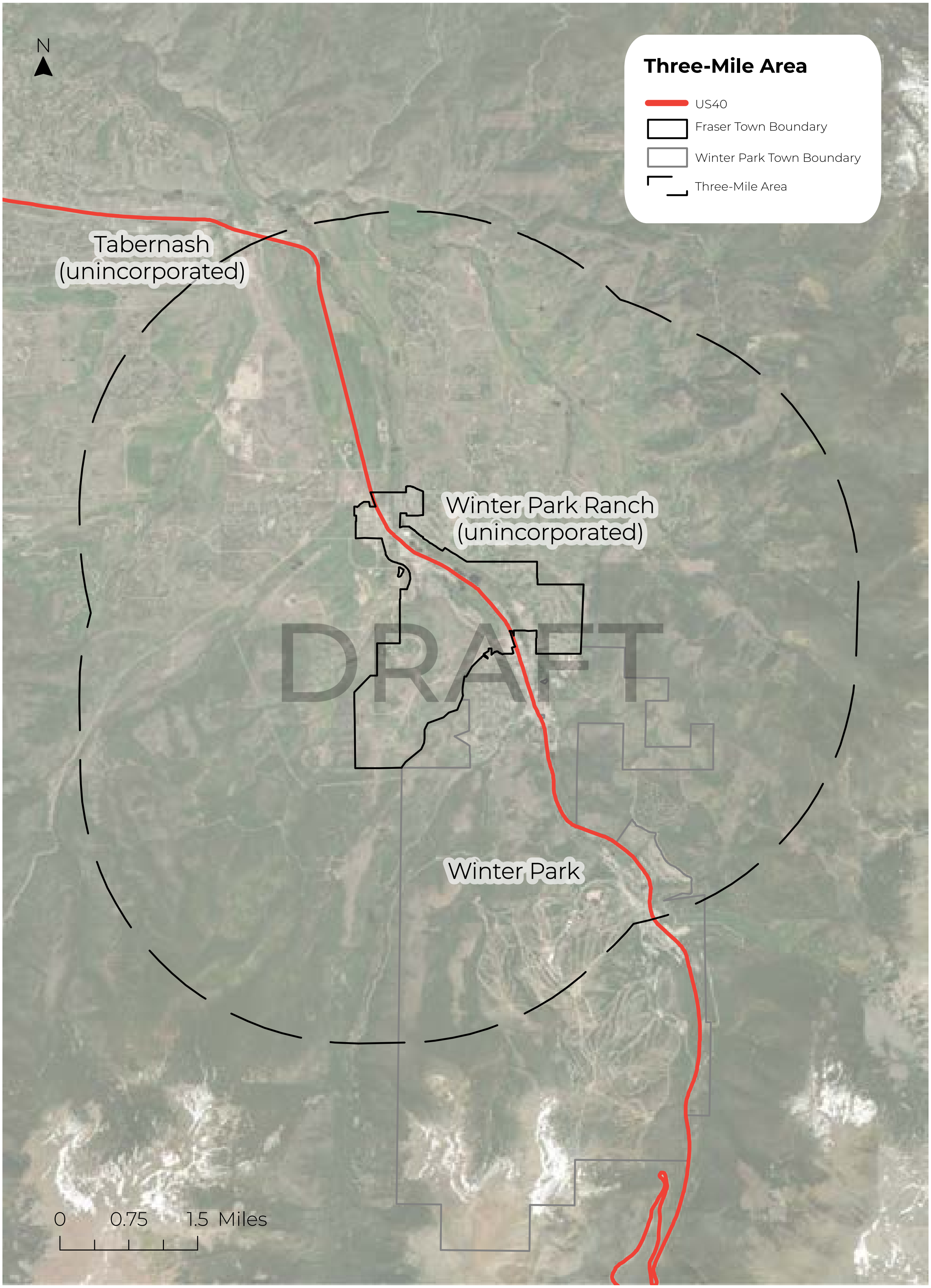
THREE-MILE AREA LEGALITY

The Colorado Municipal Annexation Act of 1965, C.R.S. 31-12-105(e), charges the Planning Commission with creating a plan that addresses areas outside municipal boundaries to improve decision making relative to annexations and guide overall growth and development. In 1987, the state legislature also made changes to annexation law limiting municipal annexations to no more than three miles beyond the current municipal boundary in any given year.

As a result, this document covers land use beyond the current Town of Fraser; it also includes the Three-Mile Area surrounding the town. This entire region is referred to as the planning area and is detailed on the accompanying Three-Mile Area Map. (Figure 1)

Not all properties within the Planning Area have been assigned a future land use designation, as there are lands held by public agencies like Denver Water and the Forest Service, and others lie within the Winter Park Planning Area. Some privately-owned properties are not designated to prevent leapfrog development in unincorporated areas

Figure 1: Town of Fraser Plan Area and Three-Mile Area Map



Source: Town of Fraser GIS

2 Fraser today

HISTORY AND DEVELOPMENT

Fraser's history and context is vital to understanding where we are today and what is possible in the future. In 1905, George Eastom acquired the townsite land and recorded a plat of the town, which would not be formally incorporated as Fraser until 1953. Eastom came to the area to set up a lumber operation called the Middle Park Lumber Company, in conjunction with the development of the Moffat Line Railroad. Early residents included ranchers, loggers, railroad workers, and even some who sought the area's cold, dry climate as a respite from tuberculosis, including Dr. Susan Anderson, known as Doc Susie, who practiced medicine in the town for 50 years. In 1944, 200 German prisoners of war arrived in the area to work at the Kopper's logging and lumbering operation manufacturing railroad ties and telephone poles. The prisoners worked diligently in the lumber camp as loggers, skidders, horse-shoers, and carpenters. In the years following their time in the region many former German POWs returned to visit the area and fondly reminisce about their time here. Manufacturers have recognized the opportunity to conduct product research and development, along with field applications in the challenging environment as motor vehicle anti-freeze, batteries, and snow tires were presented to residents for testing for many years following World War II. Later, Fraser became known as the "Western White House" when President Eisenhower spent many summer months fly fishing the local waters while in office.

Source: https://www.angelfire.com/co/chuckgraves/Fraser.html

The development of the ski industry in nearby Winter Park continues to draw many people to the area, both visitors and residents. The resort is owned by the City of Denver but operated by Alterra Mountain Company under a 50-year lease which originated in 2002. The recreation and tourism industry, along with remote workers and the second home market, will continue to play an important role in the local economy. The influx of second home owners and tourists greatly increase the peak demands on services within the Fraser Valley. While Fraser did not experience the boom in second homes like the Town of Winter Park during the 1960s, 1970s, and 1980s, more recent trends and development patterns have come to Fraser and will continue to play a major role in the community. In addition to recreation based employment, people have located within the Fraser Valley for a recreation-oriented lifestyle as people continue to move to the area while maintaining Front Range or even national employment through telecommuting.

The local climate is extreme. Located very near the Continental Divide at an elevation of over 8,550 feet, the Town of Fraser has been called the "Icebox of the Nation." It's not unusual to see drastic temperature variations of 40 degrees within a day. According to climate-data.org, the average high in January is 22.9 and the average low is 2 degrees, but frequently drops to single and double digit below zero temperatures The climate that provides the local ski area with an annual average of over 362 inches of snow also provides for a rich and diverse wildlife habitat. Recognizing this, the 23,000-acre Fraser Experimental Forest (FEF) was established in 1937 as a representative site for conducting studies in the alpine/subalpine environment of the central Rockies. Most early research was oriented towards timber or water production resulting from forest management. In 1976, the FEF was designated a Biosphere Reserve by the United Nations Educational, Scientific and Cultural Organization.

Future generations will benefit from the establishment of the James Peak Protection Area. This wilderness area supplements other areas around the Fraser Valley and within the Arapaho National Forest including the Indian Peaks Wilderness Area, the Vasquez Wilderness Area, the Byers Peak Wilderness Area, and Rocky Mountain National Park. Visitors have come to the area to enjoy the scenic beauty since the late 1800s. Grand County consists of approximately 73% public lands. These public lands are managed by several different entities: U.S. and State Forest Services, National Park Service, the Bureau of Land Management and the State Land Board.

Fraser Today

WHERE WE ARE NOW

The Town of Fraser (Town) is a unique mountain community renowned for its snow-capped peaks, abundant recreational opportunities, access to public lands, and relaxing open space. At the same time, Fraser is not immune to the broader forces of change that affect mountain towns across the region - like shifting economic conditions, population growth, housing costs, evolving visitor patterns, and increasing demands on infrastructure and natural resources. While these dynamics are often viewed as challenges, they also present opportunities to work towards solutions for current and future residents.

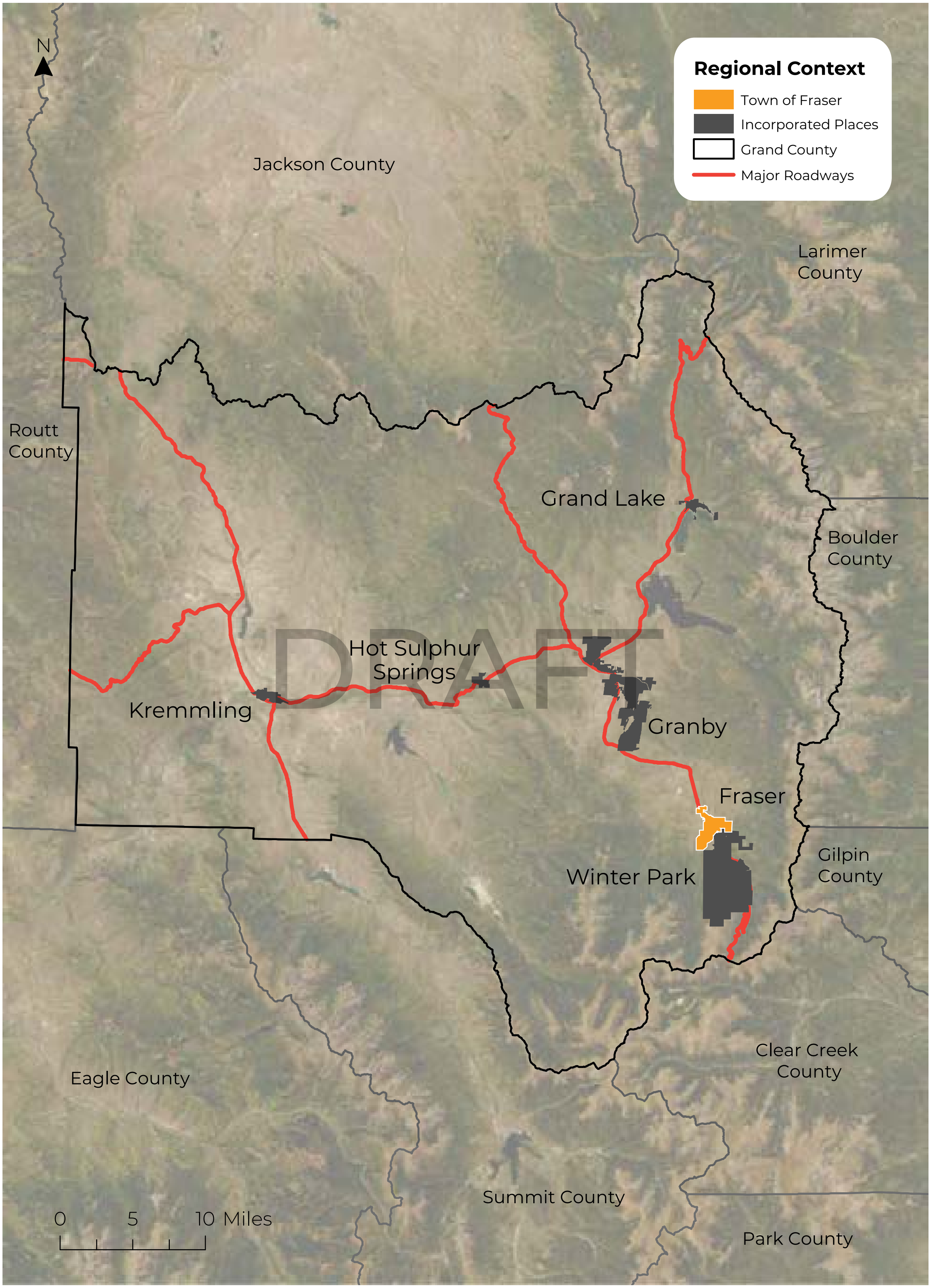
LAND USE

Nearly two thirds (65.5%) of the land area in the Town is undeveloped.

The majority of land within the municipal limits of Fraser is covered by two Planned Development (PD) areas – Rendezvous and Grand Park. While Rendezvous is primarily built out, Grand Park remains mostly undeveloped and is expected to include single-family, multi-family residential, and mixed use commercial development. The completion of these developments has the potential to significantly increase the Town's population. Looking inward, Downtown Fraser also has opportunity for infill development with over a quarter (28.8%) of property currently undeveloped. Many of these unbuilt properties are zoned under the Business or Riverwalk District (regulations that support a walkable, mixed-use Downtown). (Figure 4)

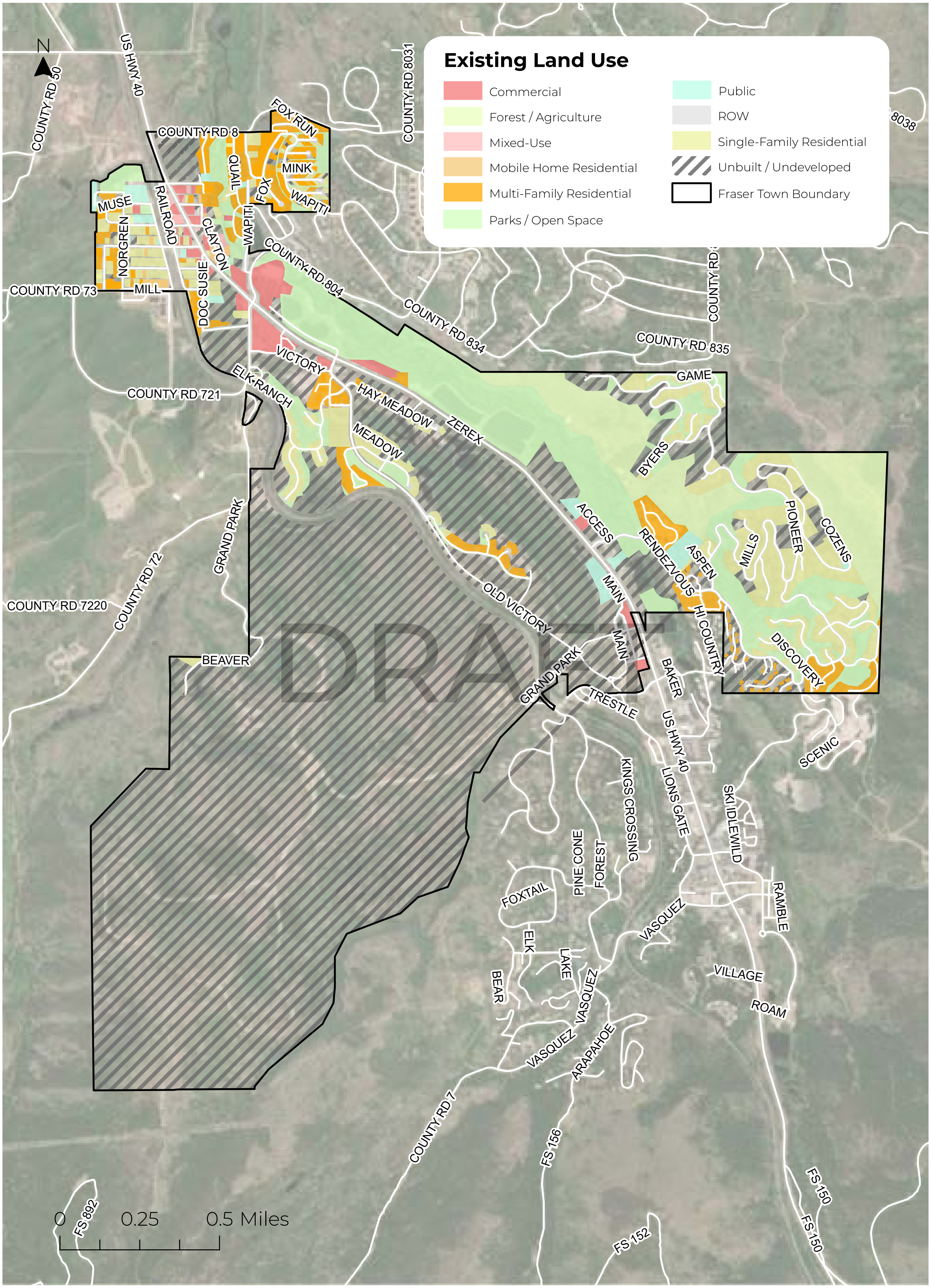
Source: Town of Fraser

Figure 2: Town of Fraser Regional Context Map



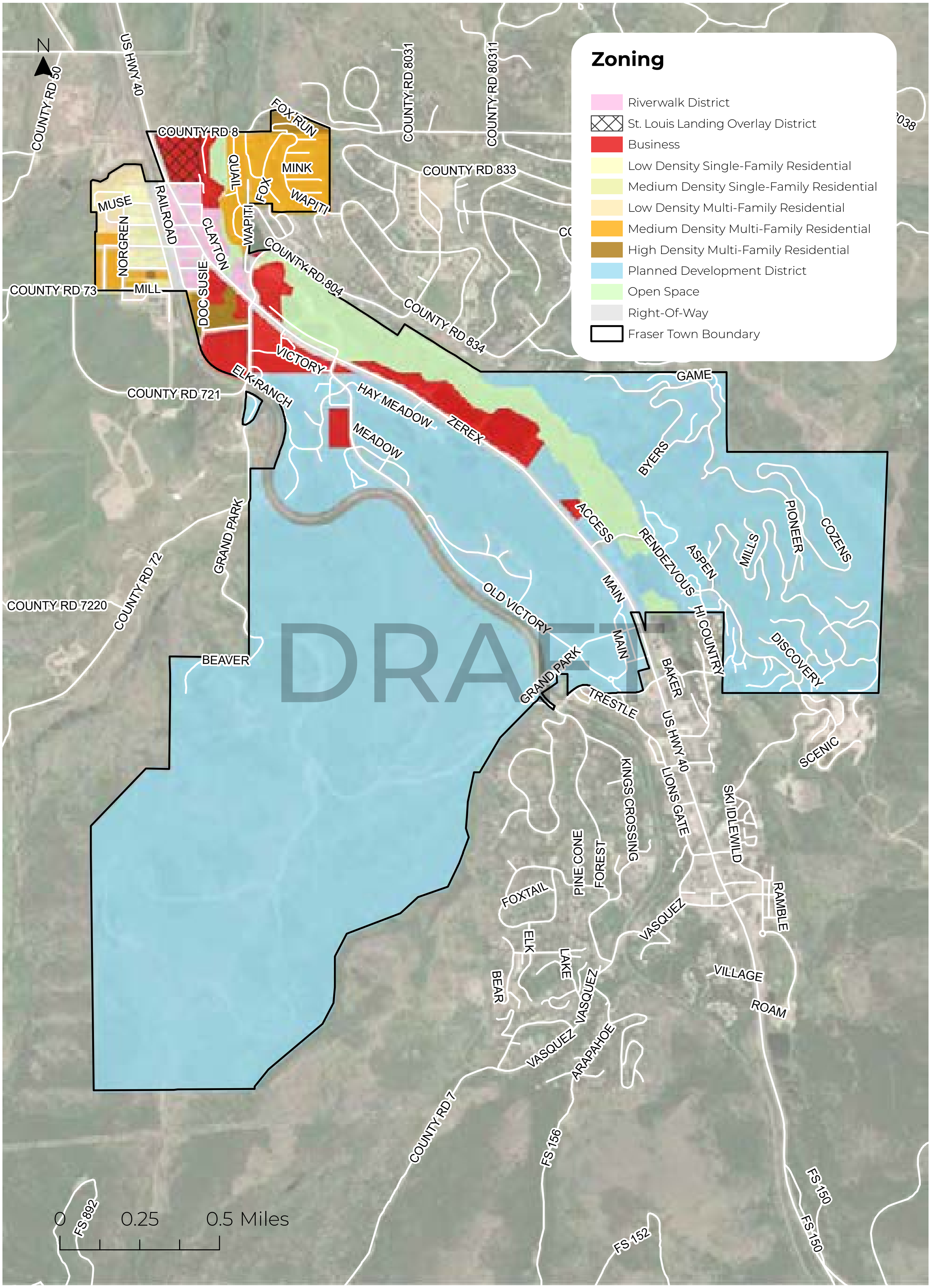
Source: Grand County GIS

Figure 3: Town of Fraser Existing Land Use Map



Source: Town of Fraser GIS

Figure 4: Town of Fraser Zoning Map



Source: Town of Fraser GIS

+14.1 %

Fraser 10-year growth rate (2010-2020)

Winter Park

1,033

Fraser

1,400

Paonia

1,447

Kremmling

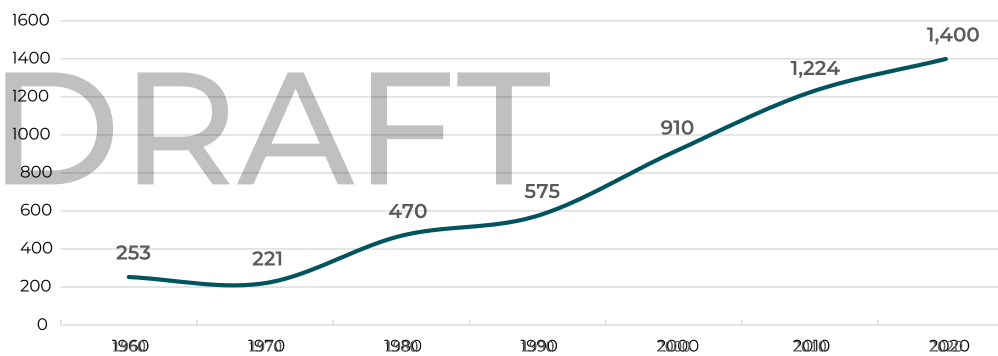
1,509

Source: US Census Decennial Survey

POPULATION

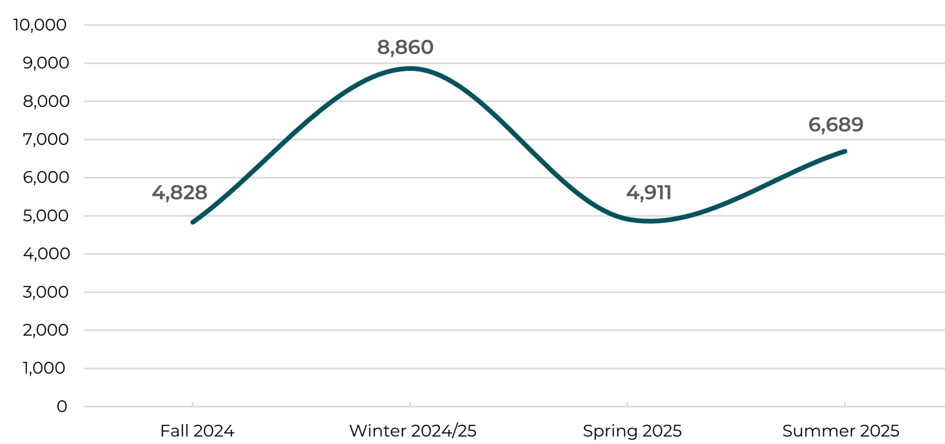
Since 1970, Fraser has seen slow and consistent growth, adding 100-350 people every decade. In 2020, Fraser officially reached 1,400 full-time residents (Figure 5). This compares with other mountain town communities like Paonia (1,447), Kremmling (1,509), and neighboring Winter Park (1,033). The area's population fluctuates throughout the year, peaking during the winter and summer (to a lesser extent) tourist seasons due to seasonal workers, second homeowners, and visitors (Figure 6). This seasonal increase in population results in a greater strain on the Town's resources and infrastructure, in addition to causing greater traffic volumes/vehicular congestion and contributing to higher housing costs.

Figure 5: **Town of Fraser Population Change 1960-2020**



Source: US Census 2020 Decennial Survey

Figure 6: **Town of Fraser Average Daily Population of Seasonal Residents, Second Homeowners, and Tourists**



Source: Placer .ai, 2024-2025

Fraser is starting to lose its families, children, and seniors.

In the past, Fraser might have been known as a place for hardened outdoor enthusiasts. Over time it has expanded to include families, children, and seniors. However, challenges in childcare, housing types, and healthcare may be contributing to a loss in these demographic groups. Family households, school aged children, and the 65+ community have all seen declining rates since 2010. Efforts are being made to ensure these populations can remain in Fraser through the creation of deed-restricted housing, such as the St. Louis Landing development that is currently under construction. The first phase will include 129 deed-restricted multifamily residential units ranging from 30% to 120% of Area Median Income (AMI), as well as an early childcare facility and commercial space.

Fraser is seeing an increase in young adults, single households, and demographic diversity.

Young adults (25-34) are now the largest age group in Fraser while the share of residents living alone has also grown. Residents' race, ethnicity, language, and other demographics have also changed – underscoring the importance of community engagement to understand the needs of diverse community members.

**Due to Fraser's small population, higher margins of error in presented data are possible.*

5.1% ↘ 3.6%

Residents 65 years or older

35.8% ↘ 19.5%

Households with one or more people under 18 years old

31.7% ↘ 22.5%

The 19-24 years age group

13.2% ↗ 21.1%

25-34 year old age group

30.6% ↗ 42.1%

Householders living alone

Hispanic or Latino Ethnicity +8.9%

Nonwhite Residents +24.4%

People who speak Spanish at home 11.3%

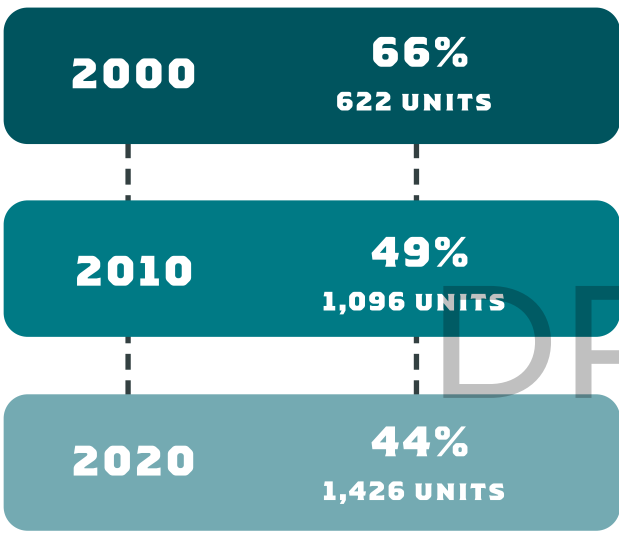
Source: US Census ACS 5-year estimates (2010-2022)

AFFORDABILITY

Increasing interest in vacation homes in Fraser has exacerbated affordability problems for year-round residents.

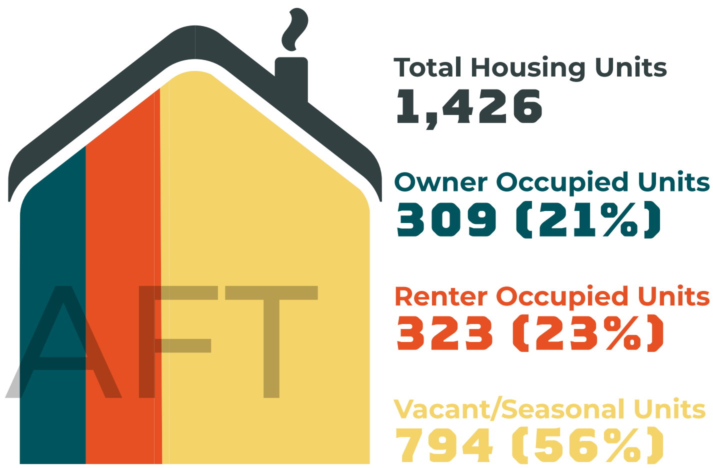
The percentage of homes occupied year-round has been dropping since 2000, despite the total number of homes in Fraser increasing over that time. Additionally, the share of households that are cost-burdened (spending more than 30% of their income on housing costs) remains the highest amongst neighboring areas (43%).

Homes in Fraser Occupied Year-round



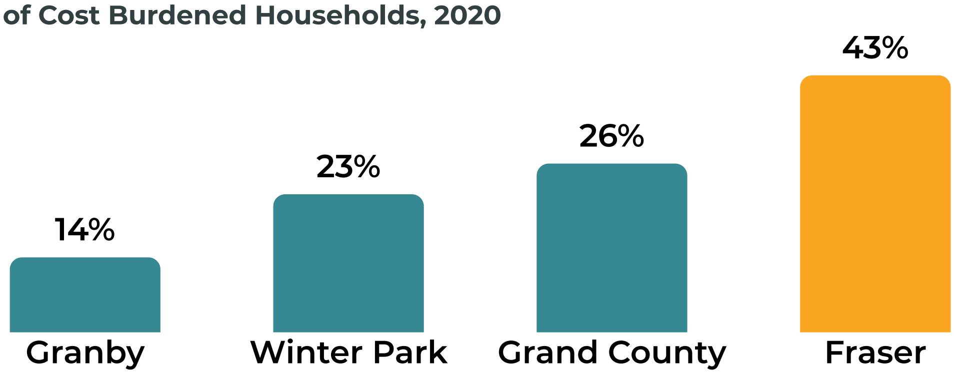
Source: US Census Bureau 2000, 2010, and 2020 Decennial Surveys

Housing Unit Occupancy Status, 2020



Source: US Census Bureau 2020 Decennial Survey

Share of Cost Burdened Households, 2020



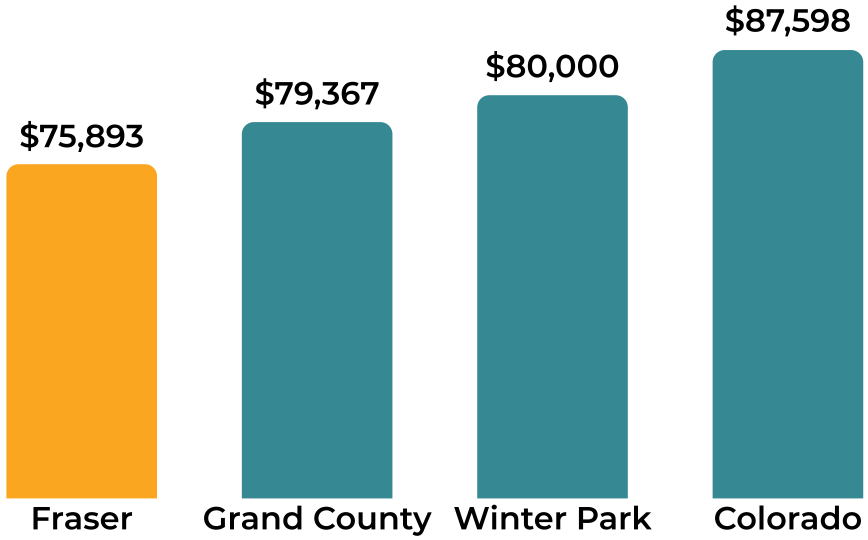
Source: Grand County Housing Needs Assessment; HUD 2016-2020 CHAS Data

LOCAL ECONOMY

The Town's biggest industries depend on lower-wage workers who are vulnerable to displacement as housing costs rise.

This is largely due to the high concentration of jobs in the arts, entertainment, and recreation sector, which support the local tourism and ski economy. Supporting these workers will require ensuring that they are able to afford to live in the area. Fraser has made progress in addressing this critical need by partnering with the Town of Granby, Town of Winter Park, and Grand County to create the Fraser River Valley Housing Partnership, a multi-jurisdictional housing authority. In November 2022, the authority passed a 2-mil property tax levy to generate approximately $1.2 million each year to address workforce housing in the region.

Median Household Income, 2020



Fraser Valley (within three miles of Fraser) top employment sectors:

Arts, Entertainment, and Recreation **50%**

Accomodation and Food Services **18%**

Real Estate and Rental Leasing **7%**

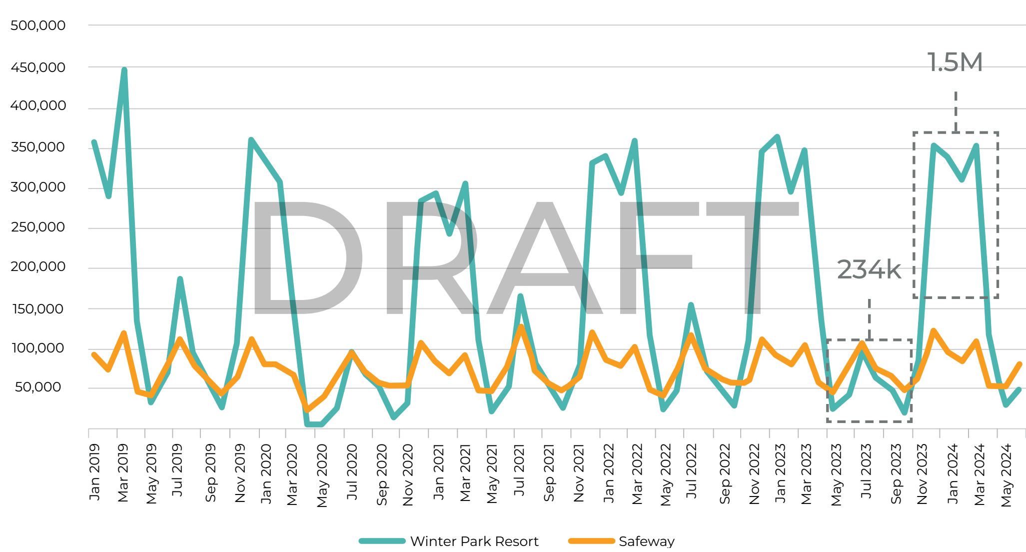
Retail Trade **7%**

Sources: US Census LEHD OntheMap, US Census ACS 5-year estimates

Fraser's commercial activity reflects both its role as a winter sports destination and a local service hub for everyday needs such as groceries, healthcare, and gas.

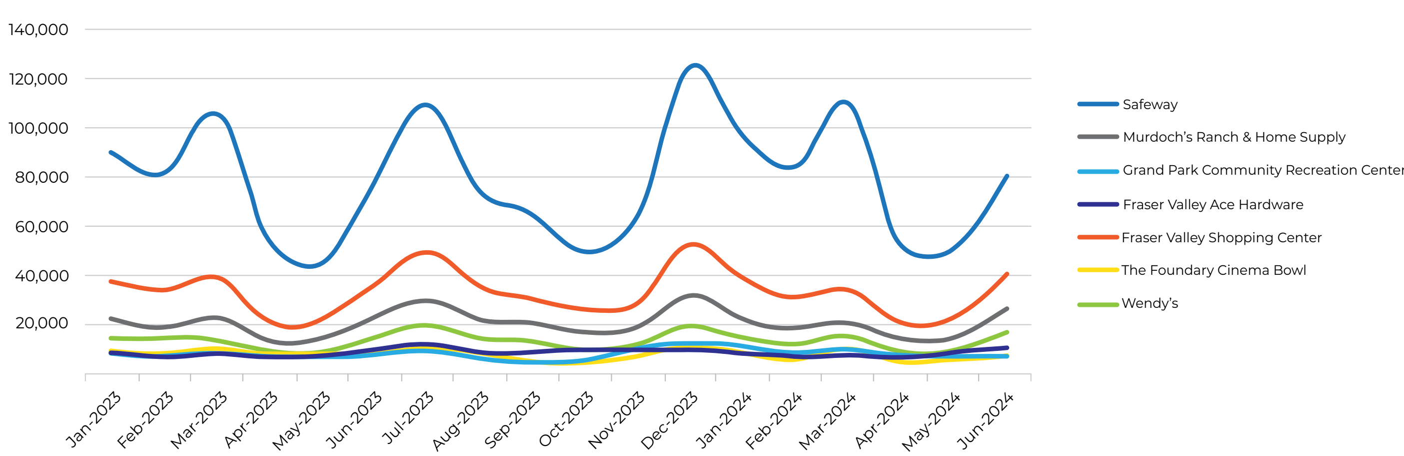
Nearby Winter Park Resort experiences strong seasonal swings, with over 1.5 million visits in peak winter (Dec-Mar) compared to under 234,000 in summer (Jul-Oct) this past year (Figure 7). In contrast, everyday destinations like Safeway and the Fraser Valley Shopping Center maintain steadier activity all year long, especially in the summer (Figure 8). With Safeway drawing from over 40 miles and 5,000 zip codes — Fraser functions as both a community anchor and visitor gateway regardless of time of year. Importantly, few Winter Park Resort guests travel directly to or from home, presenting Fraser with opportunities to capture more dining, entertainment, and retail spending by expanding nighttime attractions and amenities during the winter.

Figure 7: Monthly Visits to the Winter Park Resort and Safeway, 2019-2024



Source: Placer .ai

Figure 8: Town of Fraser Monthly Visits to Key Locations



Source: Placer .ai, 2023-2024

INFRASTRUCTURE

The Town's Public Works department maintains and operates most streets and roads in addition to stormwater systems, parks, trails, open spaces, streetscapes, and public gardens.

The Town has its own Water Division which operates ground water wells and the distribution and collection systems through its own enterprise fund. The Upper Fraser Valley Wastewater Treatment Plant, which is staffed and operated by the Town of Fraser, collects and treats sewage from the Town of Fraser, Grand County Water and Sanitation District #1, and the Winter Park Ranch Water and Sanitation District. In 2022, the Town adopted a 10-year Capital Improvement Plan specifically targeted at improving its water system infrastructure, and a water & wastewater rate study completed in early 2024. Additionally, the Town has identified the need for a new Public Works Facility as the current facility is limited in its ability to expand.

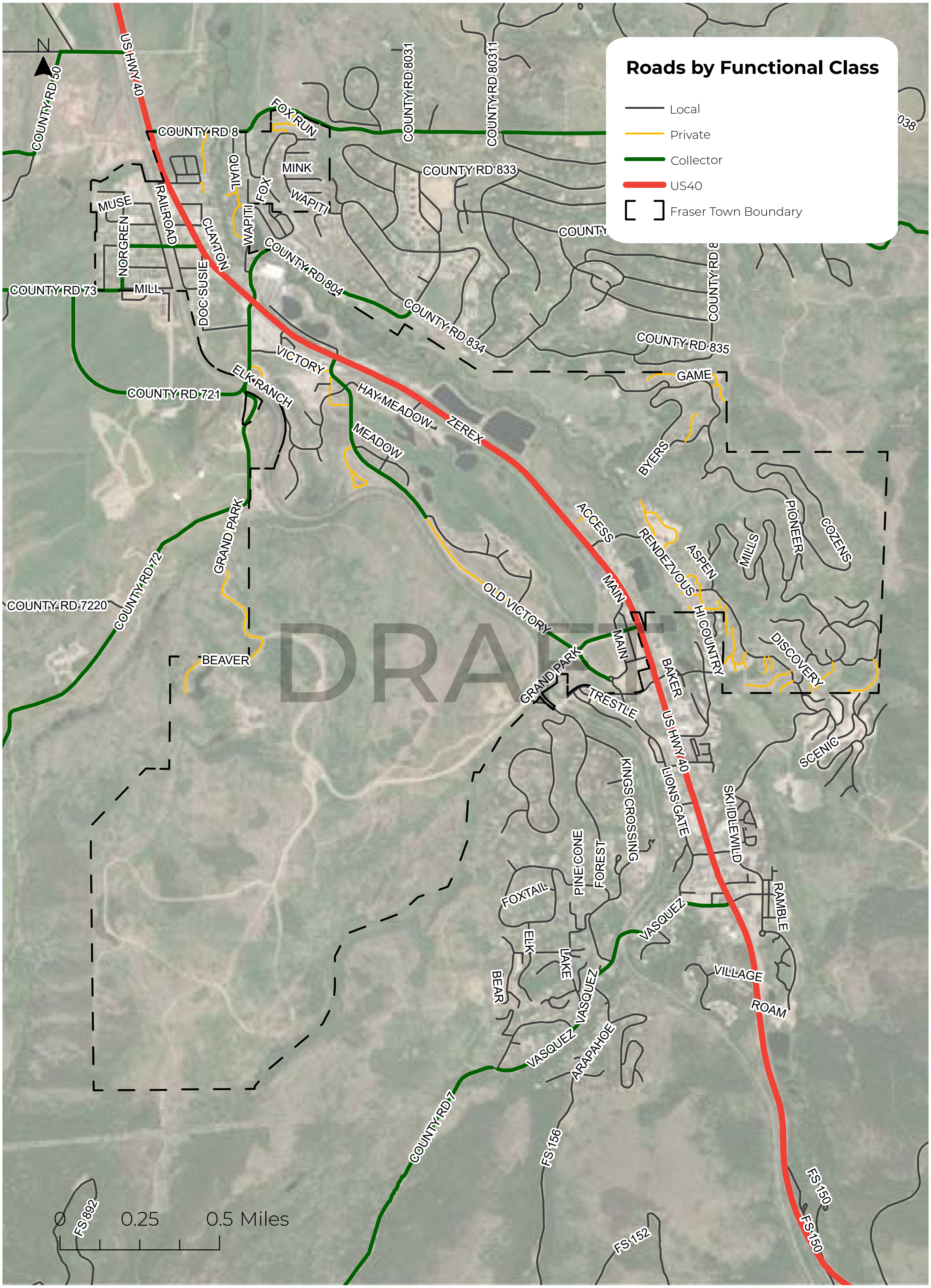
TRANSPORTATION

The reliance on US 40 as the town's primary mobility corridor complicates both local and regional travel, making Fraser vulnerable to traffic congestion, disruptions, and safety concerns.

A feasibility study to widen US 40 through Fraser was completed in 2020, and engineering design of these improvements is underway through a CDOT funded process. Grand County has also identified a bypass route for US 40, known as the Fraser Valley Parkway, for which planning is underway.

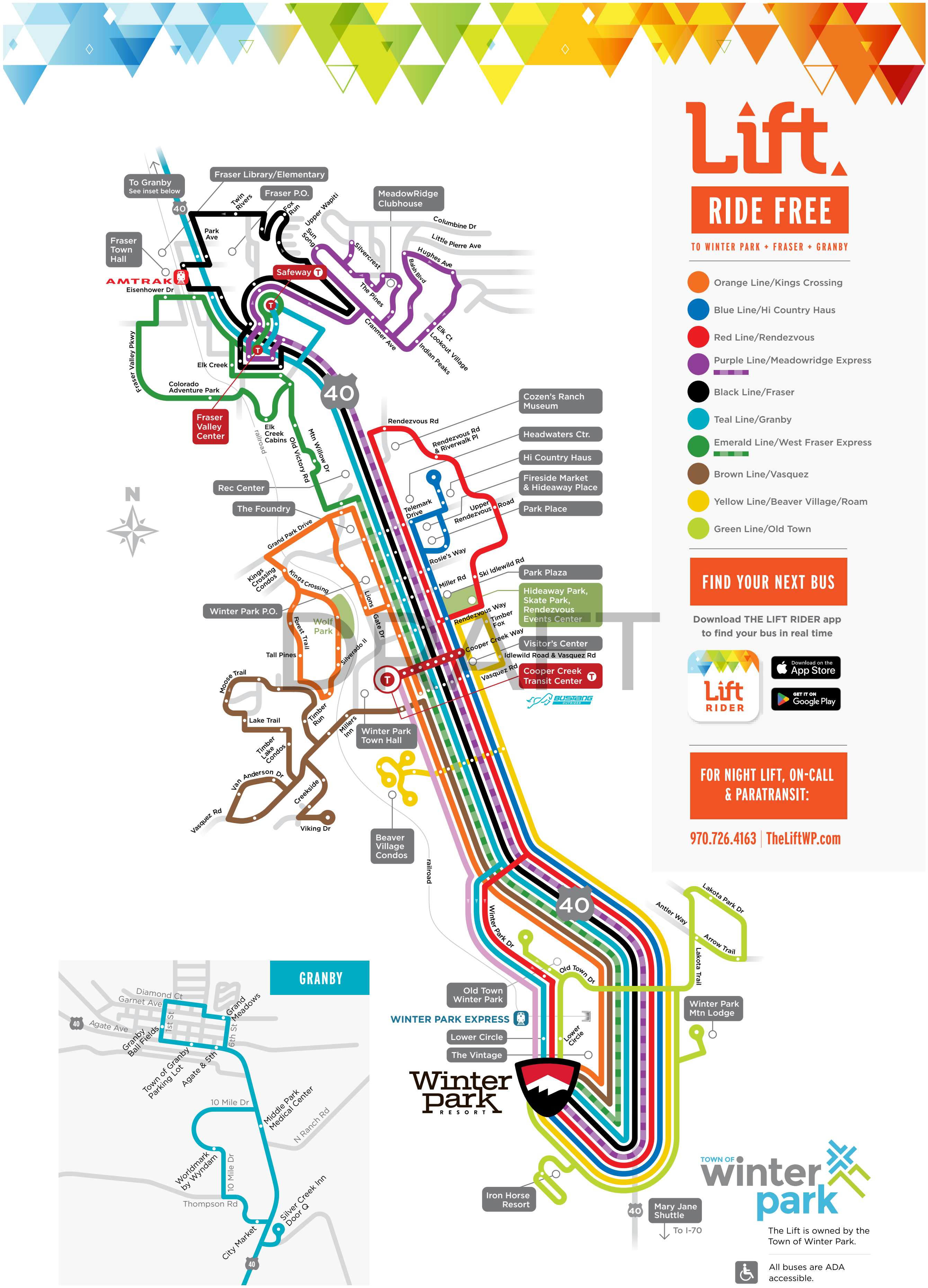
While several other transportation options exist, US 40 continues to be a barrier, and gaps in multi-modal infrastructure make utilizing transit, biking, and walking difficult or unsafe. Fraser has an extensive trail network, a rail station with commuter rail and future mountain rail service, regional Bustang service, and is served by six local bus lines operated by the Town of Winter Park. However, sidewalks and crosswalks are limited throughout town. This lack of first- and last-mile connection can discourage non-vehicular travel once you are in Fraser. (Figure 9)

Figure 9: Town of Fraser Road Network Map



Source: Town of Fraser GIS

Figure 10: Winter Park Transportation Network Map, 2024



Source: Winter Park

3 Community Voices

Engagement Process

Figure 11: Engagement Process Timeline

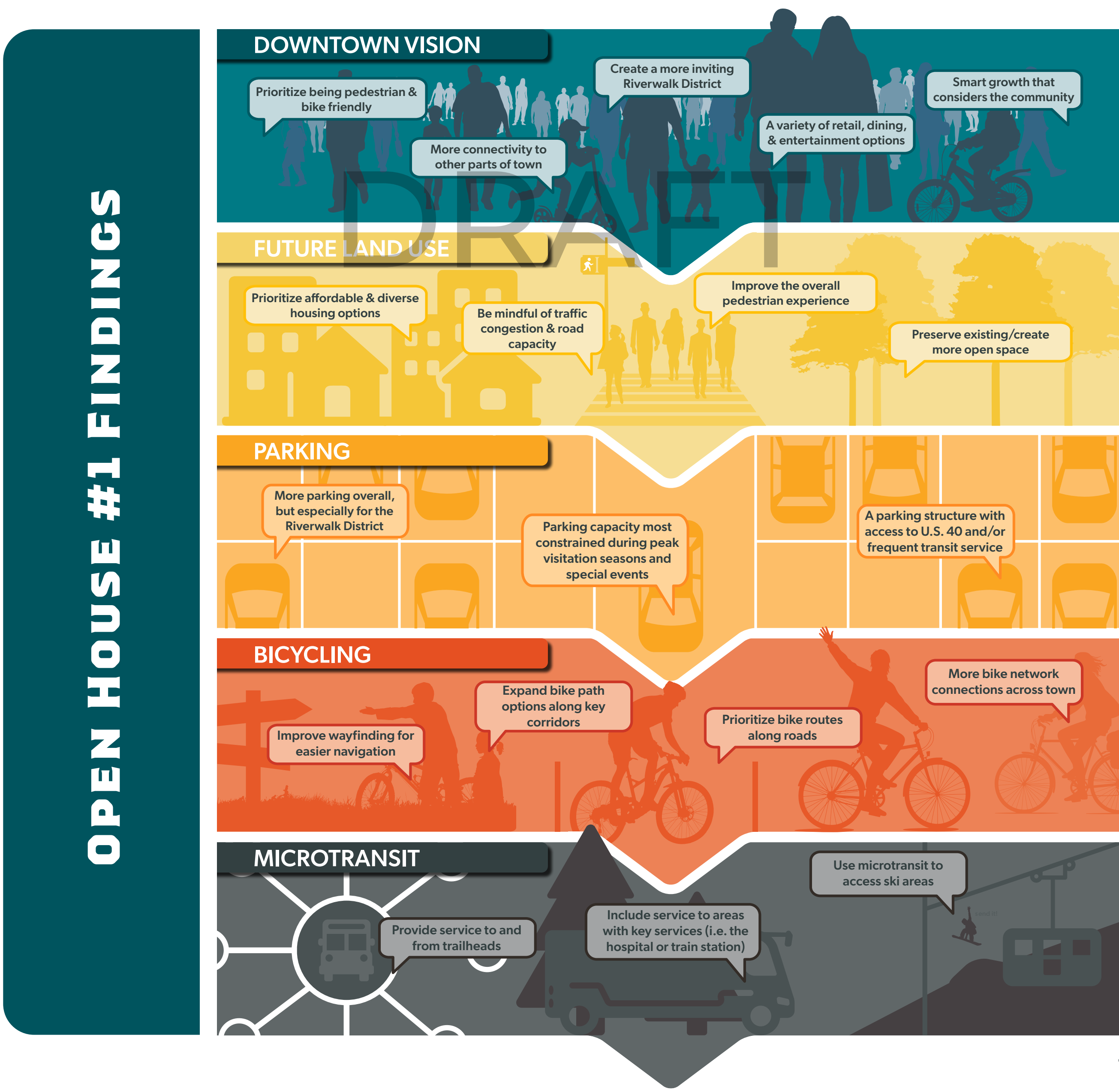
Phase								
Phase 1: Kick-off & Planning	Website Launch 6/7 2024	Community Survey 8/7-9/20 2024	Picnic at the Park 8/20 2024	Board of Trustees Update 10/16 2024	Planning Commission Update 10/23/2024			
Phase 2: Data Collection	Stakeholder Interviews Oct/Nov 2024	DDA Board Update Dec/Feb 2024	Planning Commission Update 1/15/2025	Board of Trustees Update 1/22/2025	Open House #1 Mar 2025	Planning Commission Update 4/23/2025		
Phase 3: Exploration	Board of Trustees Update 5/7/2025	DDA Board Update 6/10/2025	Board Retreat 6/17/2025	DDA Board Update Jul 2025	Pop-up Events Jun/Jul 2025	Open House #2 Jul 2025	Online Open House #2 Jul 2025	Community Survey #2 Jul/Aug 2025
Phase 4: Draft & Final Plan	DDA Board Update Oct 2025	Ratification Hearing Jan 2026	Adoption Hearing Feb 2026					

WEBSITE & SURVEY

This comprehensive plan update began with a project website launch to serve as a landing page for residents or anyone interested in the project to be able to find information quickly and subscribe to updates. The site was regularly updated with the most current information and at times, opportunities to engage online. A survey was distributed to gauge residents' sentiments and priorities, which was advertised through a variety of digital and in-person outreach efforts, starting with a pop-up at the well-attended summer concert series in Fraser, Picnic in the Park. The survey received 180 responses and the results provided the foundation for future engagement and the community values. Full survey results can be found in the appendix (**page 170**). This initial phase was rounded out by reporting the survey results and existing conditions highlights to the Planning Commission and the Board of Trustees.

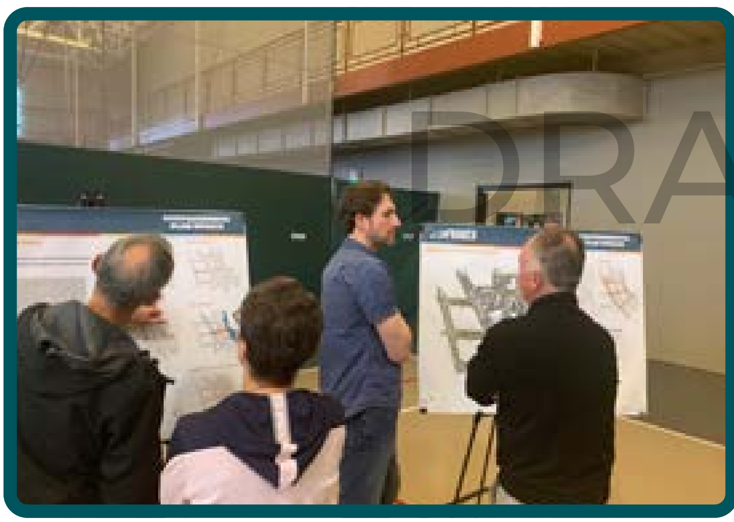
DATA COLLECTION

Nine stakeholder interviews were conducted virtually as a part of phase 2 to gain local knowledge from professionals and local organization leaders. Seven of them were grouped by planning topic areas such as mobility, sustainability/ resiliency, arts/history/culture, Downtown development/housing, community services, community needs/quality, and parks/recreation/open space. The remaining two were with stakeholders/developers of the Rendezvous and Grand Park neighborhoods. This was followed by another update with the Planning Commission and Board of Trustees to gain preliminary feedback on the Future Land Use Map and the Downtown Vision. With direction from local leadership, open house #1 was conducted at the Grand Park Recreation Center in March 2025. An estimated 60 people were in attendance while 5 people left feedback online through a digital open house survey. Planning Commission, Board of Trustees, and the Downtown Development Authority meetings after open house #1 closed out the data collection phase.



EXPLORATION

Based on the feedback and refinement of ideas from previous engagement opportunities, a draft of policy recommendations and implementation strategies were developed and shared at a second open house event. Digital and in-person outreach was done to promote the event, including passing out postcards at the Picnic in the Park event in July 2025. Open house #2 was conducted at Grand Park Recreation Center, and this time an estimated 50 people were in attendance while 13 people left feedback online.



"I love this vision for Downtown that makes Fraser a destination rather than a drive through. Great idea to focus on the river"

"I support the over-arching theme of maintaining the mountain community "vibe" with emphasis on small business, the Riverwalk District, recreation, and open space"

DRAFT & FINAL PLAN

To be completed

Online Draft
Planning Commission Hearing
Board Adoption

Community Values

HOW DO WE CONTINUE TO MOVE FRASER FORWARD?

This Comprehensive Plan isn't just a document; it's a guidebook to decisive, sustained action that ensures the community's evolution and prosperity. Moving Fraser forward means actively transitioning from conceptual discussions to tangible outcomes that enhance residents' quality of life, strengthen the local economy, and preserve the town's unique character. This sustained progress requires ongoing collaboration between local government, residents, businesses, and community organizations to leverage resources, overcome challenges, and consistently push for innovation and improvement across all sectors. This plan provides the definitive roadmap for maintaining this forward momentum for years to come.

HOW WILL THESE VALUES BE USED THROUGHOUT THE PLAN?

The six foundational community values are the operational backbone of this comprehensive plan, ensuring that the community's core beliefs drive its future. To ensure these values are not merely aspirational statements, they have been integrated into the plan's functional structure. Throughout the document, each value is directly tied to a corresponding set of specific, measurable goals, practical strategies, and concrete actions that will be undertaken by the Town and its partners. This alignment shows that every step Fraser takes, from allocating resources to making policy decisions, is directly rooted in and supportive of the community's priorities.

This framework creates a transparent and accountable system for implementation. By assigning specific values to these functional elements, a direct, traceable link between daily work and the long-term vision is established. This means that the successful completion of any strategy or action is intrinsically designed to advance a desired community value, effectively linking the day-to-day decisions and operations of the town to the broad, shared vision for Fraser. This structure ensures that the plan remains relevant, focused, and truly community-driven throughout its life cycle.

Affordable & Diverse Housing Options

This was one of the most prevalent and pressing issues found in the survey as well as in several focus group meetings. Sentiments included concerns about being priced out of Fraser, housing dependent on work status, and the effects of short-term rentals on the supply of housing. Key words or phrases throughout the process included affordability, attainability, costs, property tax, and second homes.

Economic Resiliency and Workforce Development

This was identified as an opportunity in the survey and the topic of discussion at the open houses and local leadership updates. Sentiments included a desire for more food/drink options in town, supporting small businesses, and attracting and retaining workers. Key words or phrases throughout the process include retail, jobs, tourism, and economic development.

Fraser's Unique Spirit and Character

In the survey, community character was identified as a major opportunity, the reason most cited for the desire to live/work/play in Fraser, and should be a key consideration in the development of Downtown. Sentiments included appreciation for the small size and feel of town, the active yet laid-back lifestyle, and the down-to-earth people in an out of this world place. Key words include creative, friendly, fun, and quality of life.

Safe Roads and Access for All

According to survey respondents, the most important transportation issues were safe road crossings and a better environment for walking and biking. Specifically, US 40 was identified as the largest barrier to moving in and around Fraser. Sentiments included an openness to using micro transit options to access the Fraser Rail Station and trailheads. There was also a desire for enhanced transit services and improved pedestrian infrastructure. Key words include safety, sidewalks, connectivity, and trails.

Public Services and Community Resources

Town services and resources were highlighted as an opportunity in the survey and in focus group meetings. Sentiments include a need for affordable childcare and senior services, more local health care options, and a wider range of mental and behavioral health services. Key words include families, funding, and collaboration.

Natural Spaces and Wild Places

In the survey, preservation of natural resources was identified as the most important topic to focus on, while enhancing the Fraser River Trail and green spaces was identified as the most important focus of Downtown. Sentiments include protecting open space and wildlife habitats, specifically Cozen's Meadow and the Fraser River, while maintaining and expanding outdoor recreational opportunities. Key words include conservation, mountains, beauty, and trails.

4 Fraser Forward

Plan Organization

Organizing the planning topics into the four seasons reflects the identity of Fraser as a year-round community shaped by seasonal change. Each season highlights a different rhythm of life – spring brings new opportunities, summer drives energy and activity, autumn gathers the harvest and reflects, and winter strengthens foundations and prepares for the year ahead. This framework makes the plan more relatable, aligning technical planning topics with the natural cycles residents and visitors experience throughout the year. Using the seasons also underscores Fraser's unique character and helps communicate planning priorities in a way that feels both memorable and true to place.

Each planning topic then has a vision, goals, strategies, and actions.

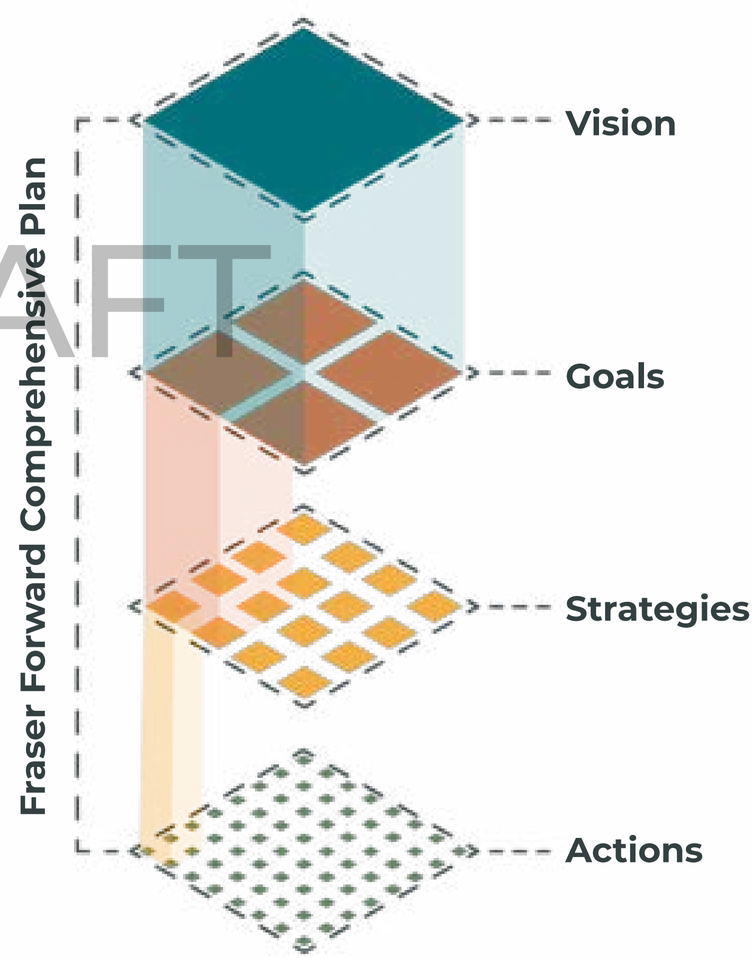
Vision: A high level, prophetic statement that envisions what a future might look like where all or most of our goals are accomplished. It serves as both inspiration and direction, providing a unifying guide for decision-making at the local level.

Goals: Statements that are broad but achievable. They speak to different aspects of a planning topic but if achieved, come together to accomplish the vision.

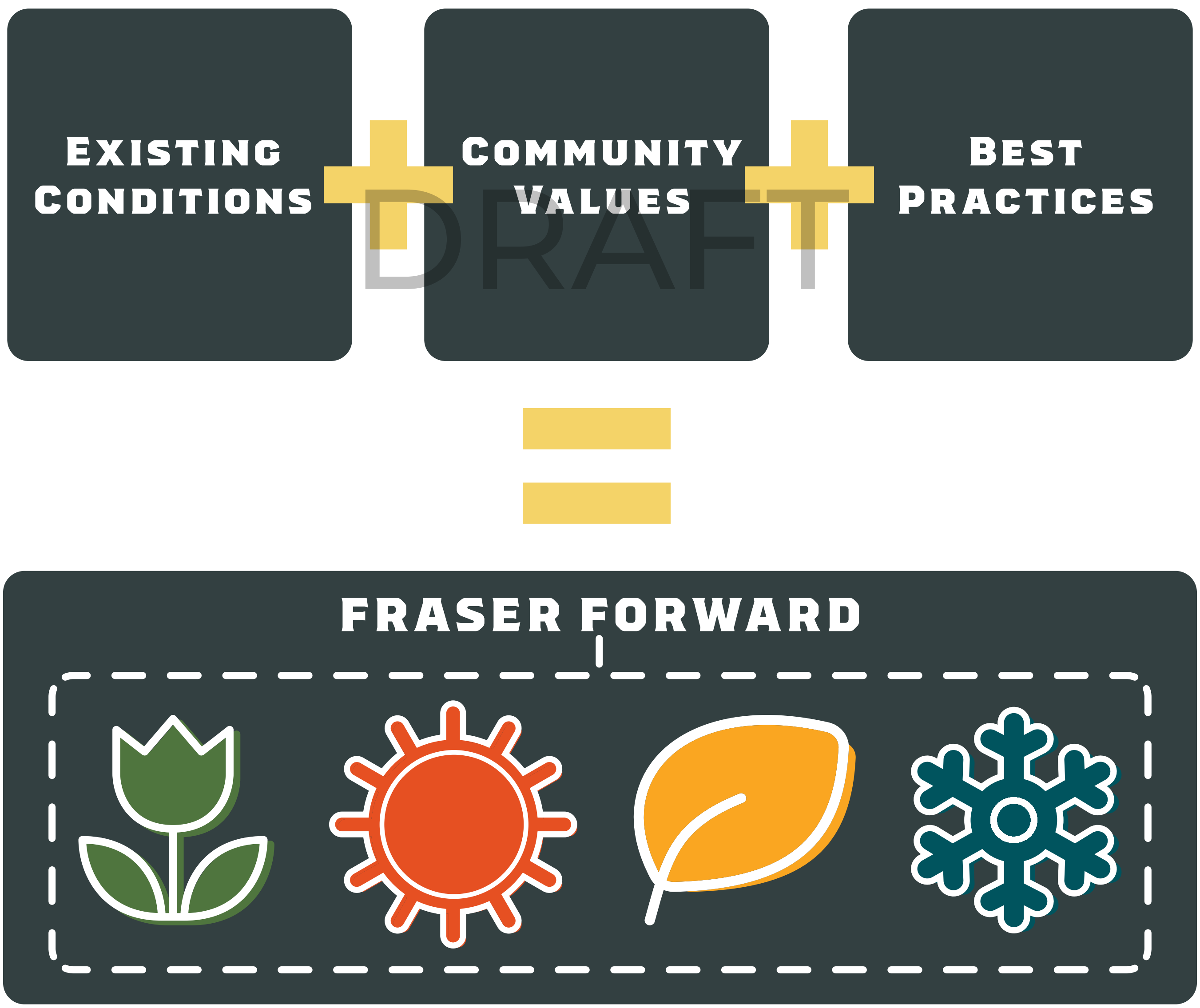
Strategies: Provide a policy, program, or approach that an entity can work towards in the greater pursuit of achieving the corresponding goal. They bridge the gap between broad aspiration and specific steps.

Actions: Specific tasks, projects, or initiatives that can be undertaken to implement the higher-level strategies, goals, and vision. They also have a priority level, timeframe, estimated cost range, and partners associated with them found in the Fraser in Action Chapter to provide a clear roadmap for how each planning topic will be advanced.

Figure 12: Plan Organization & Hierarchy



Fraser Forward is shaped by three primary inputs: existing conditions, community values, and best practices. Existing conditions (Fraser Today) provide a clear understanding of the opportunities and challenges facing the community. They offer an inventory of current assets and a realistic framework for identifying the greatest needs and determining what can be reasonably accomplished. Community values (Community Voices) reflect the priorities and aspirations voiced by residents, businesses, and stakeholders during the engagement process, ensuring the plan stays rooted in what matters most to the people it serves. Goals are directly tied to Community Values and are visually denoted by icons throughout this chapter. Lastly, best practices use proven ideas and successful strategies from other communities and the planning field, providing tested approaches that can be adapted to fit Fraser's unique needs.



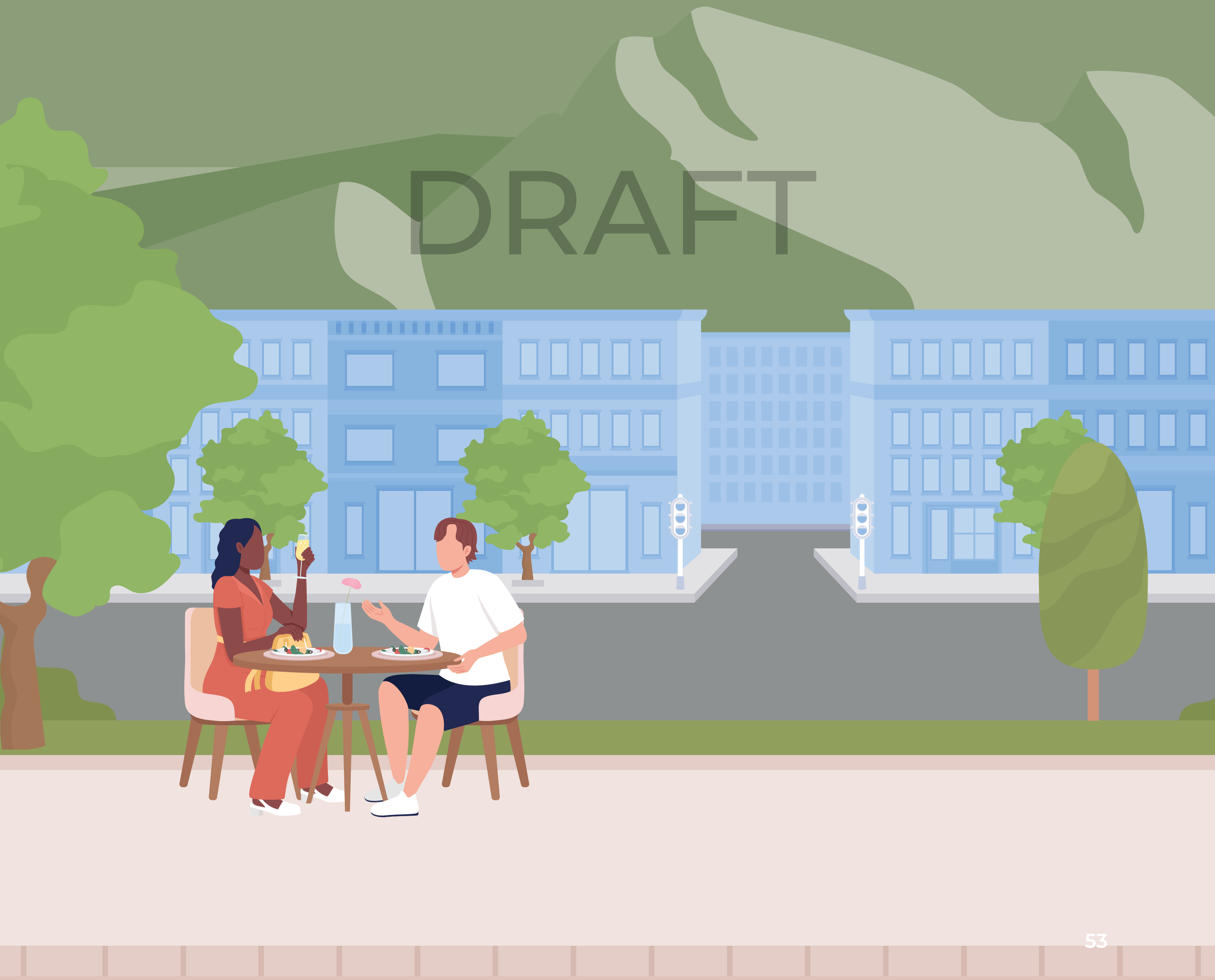
Spring

Growth & New Beginnings

Downtown Vision
Housing
Economic Vitality

Just as the spring season in Fraser is defined by peak energy, vibrant activity, and flourishing landscapes, the spring chapter of this Plan embodies a vision for a period of dynamic growth and new beginnings. This section addresses the core elements that will drive the Town's evolution and transformation.

The topics of Downtown Fraser, Economic Vitality, and Housing each in their own way represent the most significant areas of change and expansion. Creating a thriving, vibrant Downtown is a chance to build a central hub of culture and community life that reflects Fraser's future. Expanding housing options is the foundation for future growth, welcoming new residents and families who will bring fresh energy to the community, as well as giving long-term residents a place to set down roots and grow. Finally, fostering economic vitality is the engine that will power this growth, bringing new opportunities and prosperity. Together, these elements capture a shared vision for a Fraser in full bloom.



Downtown Vision

Vision

Create a vibrant and inviting Downtown that embodies the individuality of Fraser through thriving businesses, lively community spaces, walkable destinations, and local character.

DOWNTOWN FRASER

Evolving over time and forever the centerpiece of Fraser, Downtown embodies the Town's individuality and identity. Fraser's unique character, natural features, and seasonal opportunities converge in Downtown, where many of these possibilities come to life. The benefits of a thriving Downtown radiate throughout the Town. At the heart of this vision is Clayton Court, located between Highway 40 and the Fraser River.

"Downtown Fraser is a vibrant and creative community that embraces its unique character and funky spirit and is committed to fostering a Downtown that celebrates individuality. It is a place where community and commerce thrive. It is a hub where culture and community are preserved and celebrated and local businesses are supported. Downtown Fraser seeks to enhance the overall quality of life for its residents and contribute to the Town's long-term social, environmental and fiscal sustainability."

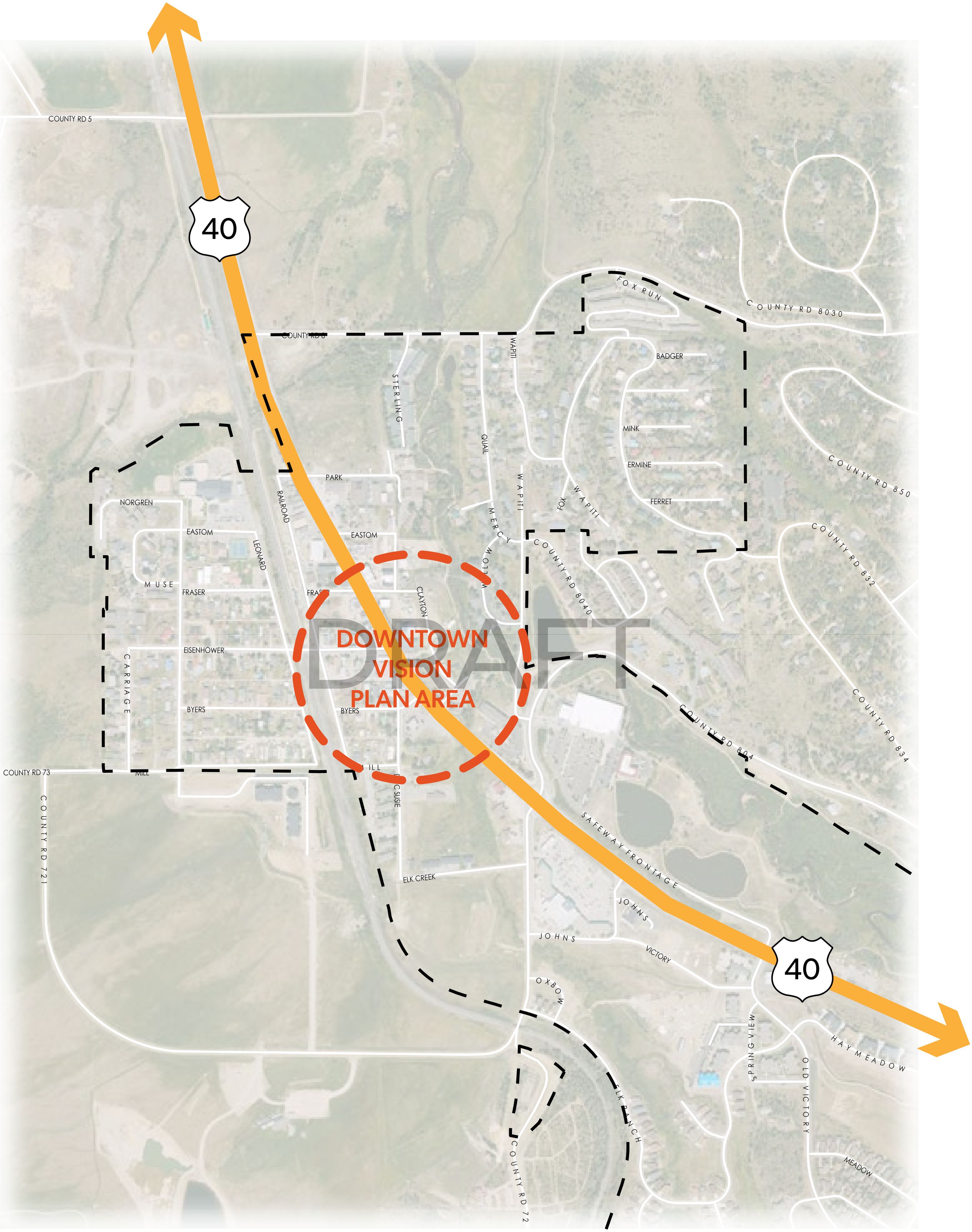
-Fraser Downtown Development Authority

To better engage the community and stakeholders, a conceptual Vision Plan was developed to explore what is possible and imagine what Downtown could become. The Vision Plan is long-term—likely spanning 20+ years—and, as the name suggests, is aspirational. It aims to break down barriers, whether perceived or actual, to achieve the essence of what the community desires.

These goals are interdependent, and when achieved together, their benefits are amplified.

As illustrated in the legend of the following graphic (**page 59**), the Vision Plan incorporates design elements that support the realization of these goals. Key components include:

1. Strengthening the physical and visual connection between Highway 40 and the Fraser River through integrated public gathering spaces.
2. Minimizing off-street surface parking in the Downtown core by incorporating tuck-under, on-street, structured, and district parking strategies to reduce visual impact.
3. Activating street-level building fronts with local retail and upper-level residential or commercial uses.
4. Improving connectivity through new pedestrian and vehicular pathways and linkages.
5. Leveraging the Fraser River and Fraser River Trail to enrich the Downtown experience.
6. Expanding and enhancing signage, public art, and wayfinding elements.



COUNTY RD 5
40
COUNTY RD 8
FOX RUN
COUNTY RD 8030
WAPITI
BADGER
STERLING
MINK
QUAIL
ERMINE
PARK
COUNTY RD 850
NORGREN
RAILROAD
MERCY
WAPITI
FOX
WAPITI
FERRET
EASTOM
EASTOM
LEONARD
WILLOW
COUNTY RD 8040
COUNTY RD 832
MUSE
FRASER
CLAYTON
DOWNTOWN
VISION
PLAN AREA
DRAFT
EISENHOWER
CARRIAGE
BYERS
BYERS
COUNTY RD 804
COUNTY RD 834
COUNTY RD 73
MILL
SUSIE
COUNTY RD 721
SAFEWAY FRONTAGE
ELK CREEK
JOHNS
JOHNS
VICTORY
40
OXBOW
SPRINGVIEW
HAY MEADOW
OLD VICTORY
ELK RANCH
COUNTY RD 72
MEADOW

ACTIVE MOBILITY

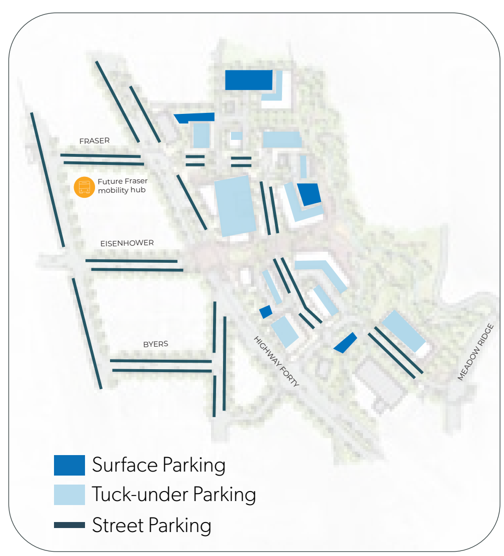
VEHICULAR CIRCULATION

PUBLIC SPACES

ENTRY MONUMENTS

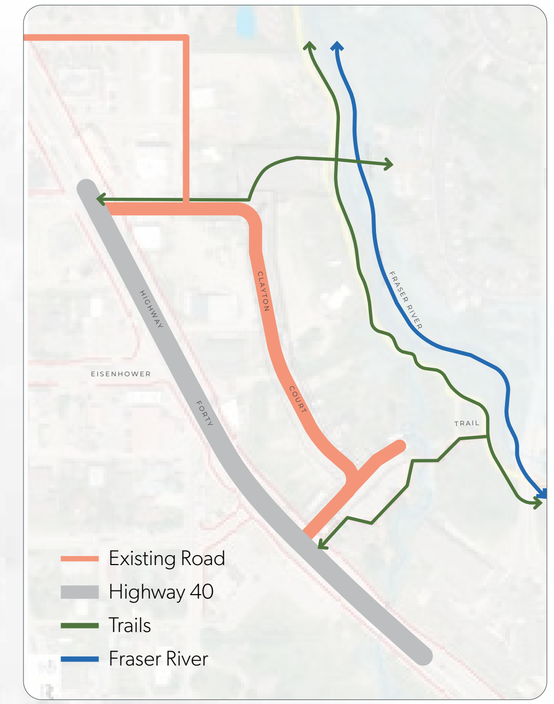
GROUND FLOOR ACTIVATION

PARKING



Downtown Vision Plan

EXISTING FRAMEWORK



PROPOSED FRAMEWORK

Connecting vision to goals...

DTV 1 DTV 2 DTV 3 DTV 4

- (A) Trail Overlook
- (B) Existing Bridge
- (C) Terraced Gathering Area & Overlook
- (D) Planned Art Center
- (E) Planned Signal & Streetscape Improvements
- (F) Grade Transition
- (G) Programmed Plaza
- (H) Play/Gathering Zone
- (I) Potential Roadway Connection to Meadow Ridge
- (J) Potential Wapiti Realignment
- (K) Potential Roadway Connection at Sun River Drive
- (L) Existing Roadway Bridge
- (M) Potential Byers Relocation
- (N) Streetscape Improvements
- (O) Shared Train/Downtown Parking
- (P) Transit Stop
- (Q) Headwaters Trail Alliance Building
- (R) Distillery Barrel Storage Building
- (S) Potential Shared Parking Opportunity
- (T) Festival Street
- (U) Future Fraser Mobility Hub

DOWNTOWN VISION GOAL 1

Create an environment where walking, biking, and rolling feels fun, easy, and accessible.

DTV 1.1

Improve signage and wayfinding for easier navigation.

- Create artistic monuments in and around Downtown through the commissioning of local or regional artists that create natural wayfinding elements.
- Use the Winter Park & Fraser Wayfinding Plan to identify signage and wayfinding deficiencies and fill these gaps.
- Adopt and implement the Winter Park & Fraser Signage and Wayfinding Master Plan.

DTV 1.2

Improve pedestrian and vehicular safety.

- Emphasize the importance of pedestrian and vehicular safety in discussions with CDOT on potential Highway 40 modifications.
- Integrate safety best practices in the design of future roads and pathways.
- Incorporate principals of Crime Prevention through Environmental Design (CPTED) in the design of public spaces.
- Add sidewalks to existing and proposed roadways and ensure all spaces meet The Americans with Disabilities Act (ADA).
- Inventory current deficiencies and projected replacement timeframes for pedestrian and vehicular infrastructure and add to Town Budget/Capital Improvement Plan.
- Widen the Fraser River Trail within Downtown to separate cyclists from pedestrians where possible.
- In high speed or high traffic areas, consider grade separated crossings between active and passive modes of transportation.

DTV 1.3

Expand and improve mobility options.

- Establish a public-private partnership to establish a shared-use parking lot or garage in Downtown Fraser.
- Work with the railroad to create additional parking on the east side of the tracks that could be used by Downtown visitors.
- Improve roadways and/or stripe additional parallel parking on the roads west of Highway 40.
- Install public EV charging stations.
- Conduct a parking analysis and/or Parking Master Plan.
- Continue to explore the feasibility of connecting a road to Safeway and Sun River Drive, as shown on the Vision Plan.
- Work with The Lift to maintain and improve bus service to Downtown.
- Consider micro-transit options to compliment bus routes and services from the LIFT.
- Create an affordable and seasonal on-demand (e)bike share system.
- Establish the Town-owned property at 360 Railroad Avenue as the Fraser Mobility Hub.

DTV 1.4

Allocate and design space that is friendly to walk, bike, and roll.

- Consider updating the Riverwalk District standards, street standards, and other applicable portions of the Town code to secure a minimum of 12’ for sidewalks when buildings face roadways to allow the inclusion of street trees and more comfortably create space for site furnishings such as benches, bike racks, pedestrian lighting, and litter receptacles.
- Design streets using best practices that are naturally safe for cyclists. Provide striping and signage to improve visibility to clearly delineate cyclist space.
- Pursue development of a trail along Elk Creek, from the Fraser River to CR 72 and potentially beyond, with a grade separated underpass under US 40 to connect Clayton Court and the Fraser River Trail to the Fraser Valley Center.

DOWNTOWN VISION GOAL 2

Build a lively and sustainable business environment that supports small, local shops and businesses, reflecting the town's unique and fun spirit.

DTV 2.1

Promote business diversity, local businesses, and entrepreneurs that provide goods and services appealing to both locals and visitors.

- Provide economic incentives to desired businesses via financial incentives.
- Provide incubator space for desired businesses to become established and grow.
- Create marketing collateral to attract businesses.
- Invest in public infrastructure that creates value for prospective investors.

DTV 2.2

Increase foot-traffic and visitation.

- Enhance marketing and advertising campaigns through various media outlets.

DTV 2.3

Provide inclusive housing that prioritizes the workforce.

- Continue to assess and evaluate the effectiveness of zoning incentives for developments that voluntarily provide affordable housing and adjust the requirements/criteria on affordable unit ratios and AMI's, as needed.
- Continue to explore new ways to integrate affordable and market-rate housing for local employees.
- Work with the Fraser River Valley Housing Partnership on additional affordable residential projects.

DTV 2.4

Create a full-day Fraser experience.

- Encourage traditional lodging types beyond short-term rentals (STR) to diversify housing options.
- Encourage non-competing local businesses to partner with each other to promote the local economy.
- Encourage future development to facilitate a full-day visitor experience to make it an easier choice for weekend and time-constrained visitors.

DOWNTOWN VISION GOAL 3

Make the Fraser River and Fraser River Trail the heart of Downtown, shaping the area's identity and offering a vibrant, scenic space for residents and visitors to enjoy.

DTV 3.1

Enhance Fraser River Trail amenities and gathering spaces near Downtown.

- Acquire areas within the Downtown intended for parks and open space to ensure the Downtown Vision is realized as desired.
- Incorporate the Downtown Vision Plan as part of the design review process in which developers must abide by.
- Upon securing public areas, develop detailed public space designs that work with adjacent development parcels and enhance future development.

DTV 3.2

Encourage active uses and programming along the Fraser River while respecting ecologically sensitive areas.

- Evaluate ecological conditions and functions and provide best-practice solutions. Explore options that improve the current user experience.
- Evaluate construction constraints such as wetlands and challenging geotechnical conditions.
- Continue to evaluate Riverwalk District zoning as projects are built and, as needed, make any changes that might affect active ground floor uses along the River.
- Create events and programs along the Fraser River that bring people into the Downtown.

DTV 3.3

Improve non-motorized access and visibility from Highway 40 and Clayton Court to the River.

- Integrate new wayfinding signage and monuments that lead individuals to the Fraser River.
- Create stronger physical connections between these points through wider sidewalks, plazas, lawns, and other communal spaces.
- Create a memorable landmark/trailhead at the junction of the Fraser River Trail and Downtown.

DOWNTOWN VISION GOAL 4

Enhance Downtown to be the go-to destination, buzzing with excitement and events every month of the year, where there's always something fun for everyone.

DTV 4.1

Enhance event and programming efforts.

- Coordinate with local municipalities and Winter Park Resort to ensure that valley-wide events and programming are complementary and don't result in efforts taking attendance away from each other.
- Enhance four-season programming and event planning to promote visitation during typical shoulder seasons.
- Continue to support and enhance the Town's signature multi-day events such as Fraser Mountain Mural Festival and Fraser Fire & Ice.

DTV 4.2

Ensure high-quality architectural and public realm design that is memorable and unique.

- Work with the local community during the planning of public realm spaces to create community ownership.
- Hire local artists to create memorable elements that are unique to Fraser.
- Allocate budget to maintain a clean and enjoyable public realm. Work with the Downtown Development Authority (DDA) and business owners to discuss current challenges and opportunities.
- Work with the property owners of the Safeway shopping center and Fraser Valley Center (Murdoch's) to encourage redevelopment / retrofitting of these suburban style commercial developments to a more urban form that integrates with the rest of Downtown Fraser.

Housing

Vision

Encourage the building and maintenance of great places to call home, whether year-round or seasonally.

A great community starts with great places to call home. The availability, affordability, and quality of homes shape not only where people live, but also how they connect to jobs, schools, parks, and services. A strong housing framework supports a diverse population, provides stability for families, and helps attract and retain a skilled workforce. Whether year-round or seasonal, housing in our community should reflect the character, needs, and aspirations of the people who live here.

This plan encourages both the creation of new housing and the maintenance of existing neighborhoods, with a focus on quality, affordability, and long-term livability. By supporting diverse housing options, we strengthen community identity, provide stability for residents, and build resilience for the future.

HOUSING GOAL 1

Promote a variety of housing options to meet the needs of both renters and homebuyers, offering something for everyone in the community.

H 1.1

Create incentives and streamlined processes for developing a range of housing types, including missing middle housing options like small-lot single-family (cottage courts), townhomes, duplexes, and small-scale multifamily.

- Evaluate the Town's current residential unit thresholds for minor and major site plan applications.
- Consider allowing small-scale multifamily (4 units or less) to only require administrative approval.

H 1.2

Support housing solutions that serve diverse household compositions, income levels, and life stages.

- Identify potential developers to complete public-private partnerships.

H 1.3

Modify zoning and land use codes to allow greater housing variety and density in appropriate areas.

- Consider changes to reduce minimum open space, reduce required setbacks, and increase maximum building height in residential zone districts.
- Consider inclusionary zoning models and practices that would incentivize and/ or require construction of low/ middle income units as part of housing developments.

H 1.4

Establish programs to help maintain and preserve existing affordable housing stock.

- Collaborate with the Fraser River Valley Housing Partnership to offer a deed restriction program for existing residential units and tailor the incentives it provides to be attractive to local homeowners and homebuyers.

HOUSING GOAL 2

Encourage mixed-use housing development in areas where it can make the neighborhood more walkable, contribute to its character, and boost local business.

H 2.1

Identify priority areas where mixed-use development should be concentrated, particularly near Downtown and transit corridors.

- Consider changes to the allowed uses within commercial and mixed-use zone districts so that permitted development is not comprised of only residential uses.

H 2.2

Create design guidelines that ensure mixed-use developments contribute positively to neighborhood character and walkability.

H 2.3

Review and update regulatory/zoning incentives such as density bonuses and parking reductions for mixed-use projects that incorporate housing into targeted areas.

H 2.4

Support the adaptive reuse of existing buildings for mixed-use development.

- Implement expedited permitting and review processes for adaptive reuse projects that are mixed-use.
- Consider fee reductions/waivers for adaptive reuse projects that are mixed-use.

HOUSING GOAL 3

Build and strengthen partnerships with state, regional/county, and philanthropic organizations that can help Fraser increase affordable and attainable housing to better meet the needs of local workers.

H 3.1

Actively participate in regional housing coalitions and initiatives, such as the Fraser River Valley Housing Partnership, to leverage shared resources and expertise.

H 3.2

Pursue grants, tax credits, and other external funding sources for housing development and assistance programs.

- Work with DOLA and other agencies to identify proper funding sources.

H 3.3

Collaborate with major employers and business organizations to develop employer-assisted housing programs.

H 3.4

Partner with nonprofit housing developers to increase capacity for affordable housing development that is subsidized and/or protected.

HOUSING GOAL 4

Seek a balance of housing options for year-round residents, seasonal workforce, non-resident owners, and short-term visitors – recognizing the importance of each for the local economy and quality of life.

H 4.1

Create dedicated seasonal workforce housing solutions through partnerships and targeted development.

H 4.2

Establish monitoring systems to track housing inventory across different occupancy types to help inform policies to expand workforce-appropriate housing.

H 4.3

Implement policies that encourage non-resident homeowners to make properties available for long-term rental when not in use.

- Explore case studies for temporary subsidies or incentives to unlock existing housing stock for long-term rentals.

Economic Vitality

Vision

A vibrant mountain town filled with shopping, dining, and entertainment options fueled by happy visitors and residents.

A vibrant economy is essential to the life of a mountain town. Shopping, dining, and entertainment create destinations that serve both residents and visitors, while generating the energy and activity that define a thriving community. By supporting local businesses, attracting new investment, and celebrating the area's unique character, the economy fuels prosperity and Fraser's high quality of life.

This plan seeks to strengthen the community as a place where businesses can grow, workers can thrive, and visitors feel welcomed. A diverse mix of experiences ensures that the local economy remains resilient, sustainable, and enjoyable for all.

ECONOMIC VITALITY GOAL 1

Build and nurture a thriving, memorable mountain Downtown.

EV 1.1

Enhance the physical environment of Downtown.

- Complete streetscape improvements including sidewalk widening, street furniture, and wayfinding signage along main Downtown corridors.
- Continue to support and consider expanding the existing business enhancement grant program to assist property owners with building upgrades that enhance Downtown character.

EV 1.2

Support existing Downtown businesses while attracting complementary new businesses.

- Work with the DDA and Chamber to identify market gaps and actively recruit businesses that fill those gaps.
- Streamline permitting and approval processes for Downtown business expansions and tenant improvements.

EV 1.3

Enhance Downtown's market position and visibility.

- Create a Downtown marketing and branding strategy that highlights Fraser's unique character and offerings.
- Support DDA social media and promotional efforts that showcase Downtown events and businesses.

EV 1.4

Activate Downtown through events and programming.

- Develop and maintain a coordinated annual calendar of Downtown events and activities that drive foot traffic year-round.
- Support pop-up activations and temporary uses that bring energy to Downtown during shoulder seasons.

ECONOMIC VITALITY GOAL 2

Bolster counter-seasonal business to help balance workforce needs and revenue generation across the year.

EV 2.1

Identify and promote off-season tourism opportunities.

- Develop and promote signature off-season events that draw visitors and support local businesses.

EV 2.2

Support businesses in developing shoulder season products and services.

- Connect businesses with technical assistance resources for developing new off-season products or services.

EV 2.3

Incentivize year-round business activity and employment.

- Identify brownfield funding opportunities and other supports to incentivize a manufacturing use at the former pole yard property.
- Explore creation of a year-round employment incentive program (e.g., tax rebates, fee waivers) for businesses maintaining staff during shoulder seasons.
- Consider property tax incentives or other financial tools for businesses that provide year-round goods/services critical to community needs.

ECONOMIC VITALITY GOAL 3

Encourage growth in small businesses that help diversify the local economy and fit with Fraser's mountain setting.

EV 3.1

Provide business support services and resources.

- Maintain and promote online resources that connect entrepreneurs to capital access programs, grants, and lending opportunities.
- Sponsor or co-sponsor quarterly networking events for local entrepreneurs and small business owners.

EV 3.2

Expand availability of flexible, affordable business space.

- Support adaptive reuse of existing buildings for pop-up retail, artist studios, or flexible commercial space.
- Consider zoning amendments to allow live-work units and home-based business options in appropriate locations.

EV 3.3

Attract businesses that complement Fraser's character and fill service gaps.

- Target recruitment efforts toward businesses that complement the mountain lifestyle and fill gaps in local services.
- Maintain inventory of available commercial spaces and actively market them to desired business types.

EV 3.4

Support remote workers and home-based businesses.

- Continue infrastructure improvements including broadband expansion.
- Create or support co-working space development that provides professional workspace and networking opportunities.

ECONOMIC VITALITY GOAL 4

Make Fraser a place where people can both live and work affordably.

EV 4.1

Support regional workforce development initiatives.

- Share information about local employment opportunities and employer needs with regional workforce development partners.

EV 4.2

Support the creation of year-round, higher wage jobs.

- Track and report on job quality metrics including wage levels, benefits, and year-round vs. seasonal employment.

EV 4.3

Help to integrate work and living options.

- Support mixed-use development that allows residents to live near employment centers and reduce commuting costs.

EV 4.4

Integrate economic development with housing and childcare.

- Survey local employers about employee housing and childcare needs to inform policy decisions.

ECONOMIC VITALITY GOAL 5

Encourage businesses to collaborate in emerging shopping areas to create a dynamic environment where everyone benefits.

EV 5.1

Support business association and merchant groups.

- Encourage formation of merchant associations in emerging commercial areas.

EV 5.2

Foster a collaborative approach to marketing and programming.

- Facilitate regular meetings between Downtown and highway-oriented business groups to coordinate marketing and events.


STOP
P
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LOUNGE

Summer

Vibrancy & Connection

Community
Parks, Recreation, Open Space, & Trails

Summer in Fraser is all about connecting with community and the great outdoors. This chapter of the plan focuses on the elements that will enhance that connection, fostering a lively, active, and deeply integrated community.

The topics of Community and Parks, Recreation, Open Space, and Trails are representative of the very heart of Fraser's outdoor culture. Parks and trails are not just amenities; they are the places where people gather, where friendships are forged, and where the community's energy truly shines. By focusing on these elements the plan aims to create a more accessible and vibrant environment, ensuring that residents and visitors alike have endless opportunities to connect with one another and with the stunning natural landscapes that define Fraser. This chapter is a blueprint for celebrating and strengthening the connections that make Fraser such a special place to live, work, and play.

Community

Vision

A funky and authentic town that celebrates its local history, outdoor recreation, welcoming community, and mountain town character.

Community is more than a collection of buildings or streets. It is the spirit that brings people together and makes a place feel like home. Here, that spirit is defined by a funky and authentic character that reflects both the town's history and its mountain setting. Local traditions, adventurous attitudes, and a welcoming culture give the community its unique sense of place and draw people who value both connection and individuality.

Looking ahead, the community will continue to grow and change, but Fraser's character should remain the foundation. This plan encourages the creation of inclusive gathering spaces, the preservation of cultural and historic assets, and the support of events and activities that strengthen the local identity that is so beloved. By nurturing these qualities, the town can remain a welcoming, vibrant place where residents and visitors alike feel a strong sense of belonging.

COMMUNITY GOAL 1

Preserve Fraser's one-of-a-kind charm, mountain town vibe, and strong sense of community.

C 1.1

Encourage community leadership and participation in Town government.

- Establish a Citizen's Academy to educate and inform Fraser Valley residents on the role of their local government and its operations.

C 1.2

Establish community gateways, wayfinding, and signage that showcase Fraser's unique identity and educate residents and visitors about the Town and its history.

- Use the Winter Park & Fraser Wayfinding Plan to identify priority areas for gateways, signage, and informational kiosks.

C 1.3

Support development, spaces, and programming that enhance quality of life for everyone.

- Support the Fraser Bike Park with programming and events.
- Pursue/support the addition of new parks and park facilities.

C 1.4

Encourage second homeowners to become active members of the community.

- Develop programs and spaces that bring together longtime locals and new residents.

COMMUNITY GOAL 2

Ensure development enhances the visual character of the area, blending modern design with the unique charm and natural beauty of the community to create a cohesive and vibrant built environment.

C 2.1

Incorporate elements of Fraser's history and traditions into architectural design, streetscapes, and public spaces.

C 2.2

Promote and protect architectural integrity.

- Partner with the Grand County Historical Association, the Grand County Historic Preservation Board, and other entities to develop a local register of historic structures.
- In partnership with the Fraser Downtown Development Authority (FDDA), provide incentives for preservation or adaptive reuse of historic structures.
- Provide signage at historic landmarks to educate on building history and significance.
- Establish a walking tour of Fraser guidebook.

C 2.3

Support oversight to ensure new development is compatible with existing character.

- Establish design guidelines for new development.
- Incorporate public spaces that reflect the character of Fraser and create community in new development.
- Preserve walkable, small-town streetscapes that activate frontages and provide gathering spaces.
- Integrate the built environment with Fraser's natural surroundings to enhance the mountain character and outdoor lifestyle.
- Establish and maintain view corridors of Byers Peak, the Continental Divide, and Winter Park Resort.

COMMUNITY GOAL 3

Celebrate arts and culture as a vital force in shaping the town's identity, fostering inclusivity, and creating spaces that connect and inspire people.

C 3.1

Support local arts and culture to leverage Fraser as an artist community.

- Partner with local artists and other creatives to develop public art, murals, and other installations that reflect Fraser's history and culture.
- Maintain and increase funding for Art in Public Places in the Town's annual budget.
- Encourage the collaboration and support of the Public Arts Committee, the Fraser Downtown Development Authority, and other entities to fund the arts.

C 3.2

Leverage the future Fraser Valley Arts Center as a place for communication and collaboration amongst different art groups in the community.

C 3.3

Host or support events, festivals, pop-ups, and other activities that bring the community together and showcase music, crafts, and traditions.

- Explore supporting events such as the Winter Park Film Festival and/or providing supplemental activities.

Parks, Recreation, Open Space, & Trails

Vision

Fraser's parks, recreation, open spaces and trails enrich the community by providing fun places to explore, stay active, and enjoy a healthy environment.

Fraser's parks, recreation opportunities, open spaces, and trails are central to the community's quality of life. They provide places to play, gather, and explore - while also protecting the natural beauty that defines the town's mountain character. These resources encourage active lifestyles, support public health, and offer fun, accessible ways for people of all ages and abilities to connect with the outdoors.

Looking forward, this plan seeks to build on this strong foundation by expanding trail connections, improving park facilities, and ensuring that recreation opportunities remain accessible. By investing in both natural areas and recreational amenities, Fraser can continue to offer a healthy environment and a variety of experiences that strengthen its reputation as an outdoor recreation hub.

PARKS, RECREATION, OPEN SPACE, & TRAILS GOAL 1

Protect and enhance Fraser's open spaces ensuring they remain beautiful, accessible, and enjoyable for all.

PROST 1.1

Protect and enhance the Cozens Ranch Open Space.

- Implement the recommendations from the 2018 Fraser River Corridor Master Plan to enhance both conservation and recreation in the Cozens Ranch Open Space.
- Work with Colorado Open Lands to place a conservation easement over a majority of the land within the Cozens Ranch Open Space.

PROST 1.2

Develop properties in a manner that preserves the natural features of a site and provides new or connects to existing public open space.

PROST 1.3

Promote responsible open space use through signage, education, and stewardship.

- Update current and install new interpretive signage that showcases ecological features and Leave No Trace principles.
- Create volunteer opportunities for clean-up days, native plant restoration, or wildlife monitoring in Fraser's open space.

PARKS, RECREATION, OPEN SPACE, & TRAILS GOAL 2

Maintain and enhance a rich and varied public trail network, creating more opportunities for outdoor adventure and connecting the community to nature and nearby public lands.

PROST 2.1

Improve trailheads with amenities that support access and comfort.

- Upgrade trailheads with essentials like restrooms, bike racks, trash and recycling bins, shade, seating, and expanded parking.
- Prioritize improvements at high-use trailheads and those serving multiple user groups.

PROST 2.2

Enhance trail wayfinding and navigation across the network.

- Work with regional partners and organizations to install consistent, clear signage with trail names, distances, and safety information across regional trails based on the Winter Park & Fraser Wayfinding Plan.

PROST 2.3

Improve pedestrian and bicycle connections.

- Prioritize trail linkages that create a cohesive network, allowing one to travel conveniently without a car.
- Identify gaps, new connections, and trail extensions to improve recreation and non-motorized transportation options.

PROST 2.4

Plan and construct new trails with consideration for environmental sensitivity and land use compatibility.

PROST 2.5

Continue to provide high-quality parks and outdoor facilities and support their expansion and improvement.

- Support the completion and ongoing maintenance of the Fraser Bike Park.

PARKS, RECREATION, OPEN SPACE, & TRAILS GOAL 3

Provide more opportunities for indoor recreation, offering the community a variety of activities to stay active, social, and engaged, no matter the weather.

PROST 3.1

In partnership with the Fraser Valley Metropolitan Recreation District, explore opportunities for a fieldhouse/multi-purpose use facility for additional indoor recreation opportunities.

PROST 3.2

Support the Grand Park Community Recreation Center.

PROST 3.3

Expand indoor programming within existing buildings.

- Use schools or other public spaces for programs like fitness classes, youth activities, or community gatherings.

PARKS, RECREATION, OPEN SPACE, & TRAILS GOAL 4

Promote inclusive and barrier-free access to all public spaces, making sure everyone in Fraser feels welcome and engaged, and benefits from community resources.

PROST 4.1

Find opportunities to expand and protect public lands.

- Secure easements or access agreements where necessary and work to prevent the loss or privatization of established access routes.

PROST 4.2

Identify and remove barriers to using public spaces.

- Offer scholarships, reduced fees, or free programs to ensure cost isn't a barrier to accessing recreation opportunities.
- Provide transportation options to parks, recreation facilities, libraries, and other public spaces.
- Incorporate universal design elements and ADA compliance.

PROST 4.3

Promote public events and resources to all community members.

- Use multiple communication channels to advertise Town sponsored events and recreational opportunities.
- Partner with community organizations to reach underrepresented groups.
- Provide signage and communications in multiple languages as appropriate.

PROST 4.4

Maintain funding sources to support growth and improvements.

- Where feasible, look to expand parks and recreation facilities by utilizing land dedicated through land dedication requirements.
- Utilize fees-in-lieu of park land dedication to fund capital improvements and expansions to existing parks.

Fall

Stewardship & Resilience

Land Use
Sustainability

Fall in Fraser is a time of both bounty and preparation, a natural cue for focusing on long-term stewardship and community resilience. Unlike the forward-looking growth of spring, this chapter centers on the foundational elements that will preserve and protect Fraser for the future.

The topics of Land Use and Sustainability and Natural Resources are brought together here to address the careful management of the town's assets. Thoughtful land use is the framework that guides how Fraser grows, ensuring it preserves its unique character and open spaces. Sustainability and the protection of Fraser's natural resources are not just policy choices; they are commitments to the health of the environment, the economy, and the community. This chapter provides a clear strategy for responsible governance, ensuring Fraser remains vibrant and capable of adapting to future challenges. It is the town's blueprint for maintaining the delicate balance between progress and preservation.

Land Use

Vision

Fraser grows thoughtfully and sustainably, ensuring a vibrant community that meets the needs of both current and future residents while preserving unique character.

Land use shapes the way a community grows, functions, and feels. In Fraser, thoughtful and sustainable land use decisions are essential to creating a vibrant town that meets the needs of current residents while planning for future growth. By guiding how land is developed, preserved, and connected, the community can ensure that neighborhoods, businesses, parks, and public spaces all work together to support a high quality of life.

This plan focuses on guiding growth in ways that respect Fraser's unique character, protect natural resources, and support the community's long-term needs. Thoughtful land use decisions will encourage development that fits the town's scale, strengthen neighborhoods, and create activated public spaces. By balancing preservation with new opportunities, Fraser can remain an attractive, resilient, and well-organized community without compromising the small-town feel that is so beloved.

LAND USE GOAL 1

Promote a balanced mix of land uses that supports current and future residents and the Town's ability to provide services, while also ensuring we preserve green spaces, enhance outdoor recreation amenities, and protect natural resources.

LU 1.1

Encourage mixed-use development that integrates housing, stores, businesses, and services in key areas, like Downtown and near transit.

LU 1.2

Support small-scale neighborhood serving retail and services within or near residential areas.

- Encourage future development and annexations to integrate small-scale retail.

LAND USE GOAL 2

Plan development where infrastructure and services already exist to reduce the impact and cost of new development.

LU 2.1

Encourage the development of empty lots and renovation of existing buildings in areas supported by existing infrastructure.

- Prioritize the use of underused or empty parcels within existing town boundaries.
- Direct growth to locations with available sewer, water, transportation, and emergency services.

LU 2.2

Promote compact, walkable, transit-supported development patterns that preserve open space.

LU 2.3

Discourage sprawl and leapfrog development patterns that strain town services and inefficiently consume land.

LAND USE GOAL 3

Ensure new development is beneficial to the fiscal sustainability of the Town of Fraser.

LU 3.1

Implement and regularly update development impact fees at least every 3 years to ensure new development contributes its fair share toward infrastructure, green space, and public services.

- Conduct a study to determine the feasibility of implementing impact fees for transportation, affordable/workforce housing, and other essential servives.
- Ensure that plant investment fees for water and sewer are regularly updated to align with the cost of capital expansions.
- Reevaluate the Town's current land dedication and fee-in-lieu requirements for parks and schools.
- Coordinate and collaborate with the East Grand Fire Protection District on periodic reassessments of their impact fees for new development.
- Review and adjust fee structures periodically to reflect actual service costs.

LU 3.2

Require off-site improvements, when necessary, as a condition of approval for development projects to mitigate community impacts.

- Strengthen and clarify existing regulations for off-site improvements (such as transportation/roadway improvements, drainage and snow storage/melting facilities, parks/trails/open space, etc.) and right-of-way dedication for new development projects.

LU 3.3

Develop and adopt a standard annexation agreement that guides future annexations and their development.

- Explore provisions that require new annexations to contribute to the cost of infrastructure, public services, and amenities, and/or provide affordable housing, open space, and commercial land uses.
- Codify the proposed annexation policy and template agreement outlining expectations for infrastructure contributions, conveyance of water rights, service provisions, and community benefits.

LU 3.4

Promote commercial and mixed-use development in appropriate areas for sales tax generation.

- Encourage development that expands retail, lodging, and service sectors to increase sales and lodging tax revenues.
- Target high-visibility or high-traffic locations for commercial and mixed-use areas.
- Inclusion of light industrial/manufacturing land uses to diversify the region's job and tax base.

LAND USE GOAL 4

Align development codes, policies, and processes with the vision and goals of the Comprehensive Plan.

LU 4.1

Follow the Future Land Use Map for strategic future annexations and rezoning requests.

- Review and periodically update the Future Land Use Map and 3-mile

LU 4.2

Update the land development code to support the vision and goals in this document.

Sustainability & Natural Resources

Vision

Fraser treasures its natural resources and is dedicated to preserving and improving them, ensuring they are accessible for future generations to enjoy.

Fraser is committed to sustainability as a core part of its identity. The town prioritizes protecting natural resources, reducing environmental impacts, and promoting practices that support long-term community resilience. From energy and water use to land management and waste reduction, sustainable strategies help ensure that Fraser's forests, waterways, wildlife, and open spaces remain healthy, vibrant, and accessible for years to come.

This plan emphasizes integrating sustainability into every aspect of community planning. By fostering environmentally responsible growth, protecting natural assets, and encouraging eco-friendly lifestyles, Fraser can continue to thrive as a resilient mountain town that balances human needs with the needs of the earth.

SUSTAINABILITY & NATURAL RESOURCES GOAL 1

Foster and support initiatives that preserve and enhance Fraser's natural beauty, ensuring its unique landscapes remain vibrant for years to come.

SNR 1.1

Protect wildlife habitat through restoring and preserving wildlife corridors.

- Designate and preserve corridors that facilitate wildlife movement, reducing habitat fragmentation through the adoption of conservation zoning regulations that limit development in critical habitats or provide restorative measures.
- Collaborate with CDOT and CPW to implement wildlife crossings of US 40 where feasible.

SNR 1.2

Enhance riparian corridors through buffer zones, native vegetation restoration, and erosion control measures.

- Implement the Fraser River Corridor Maintenance Plan and explore expansion in the future.
- Maintain and expand the Town's current regulations regarding buffer zones / setbacks along waterways to limit erosion, restore riparian integrity, filter pollutants, and provide wildlife habitat.
- Prioritize the replanting of native flora along waterways to improve ecological health and resilience.

SNR 1.3

Protect, restore, and enhance wetlands by implementing control measures.

- Conduct comprehensive mapping of existing wetlands to identify priority wetlands and inform planning decisions.
- Enforce development restrictions to protect existing wetlands and employ mitigation banking to compensate for previous or future impacts.

SNR 1.4

Protect watersheds through a comprehensive watershed management plan.

- Develop and implement plans that address land use, water quality, and conservation within the watershed and implement best practices to reduce runoff and prevent pollution in waterways.

SNR 1.5

Conserve water through community outreach that removes barriers to implement best practices.

- In partnership with local municipalities and water & sanitation districts, promote water savings programs including audits, retrofits, and the use of water efficient landscaping practices through public education and demonstration gardens.
- Implement the recommendations from the 2023 Water Efficiency Plan and monitor/evaluate their effectiveness.
- Update the Town's landscaping regulations for new development to require vegetation that does not require irrigation once it is established.

SNR 1.6

Restore and protect the tree canopy through programs, ordinances, and community events.

- Expand the role of the Town's streetscape and public gardens management staff to plant new and maintain existing trees in public spaces to enhance canopy cover.
- Enact ordinances that protect mature trees when development occurs, including a tree replacement equivalency schedule for any impacted mature trees
- Organize events that encourage community participation in tree planting and care (Plant a Tree Day).

SNR 1.7

Manage noxious weeds through integrated weed management, monitoring, and awareness.

- Adopt a combination of mechanical, chemical, and biological control methods to manage invasive species, educate the community on identifying and reporting, and conduct routine surveys to detect and address noxious weed infestations promptly.

SNR 1.8

Manage stormwater through maintenance, ordinances, and sustainable infrastructure.

- Utilize the existing conditions survey of stormwater infrastructure and form a holistic, regional/neighborhood based approach to update inefficient stormwater infrastructure.
- Adopt supplemental regulations to the Grand County Storm Drainage Design and Criteria Manual to encourage and incentivize new developments to incorporate rain gardens, bioswales, permeable pavements and other green infrastructure to manage stormwater naturally.
- Explore partnerships with the school district, library district, and other entities to educate the community on stormwater management with hands-on demonstrations along St. Louis Creek.

SNR 1.9

Strive to achieve Dark Sky Community Designation by 2035 - reducing light pollution through ordinances and education.

- Strengthen existing exterior lighting ordinances to minimize skyglow and light trespass and/or require the use of shielded fixtures that direct light downward.
- Inform residents and businesses about the benefits of reducing light pollution.
- Partner with HOA’s to update and enforce neighborhood lighting regulations.
- Explore implementing a grant program to support local compliance.

SUSTAINABILITY & NATURAL RESOURCES GOAL 2

Embrace sustainable development practices that create harmony between growth with the natural environment, ensuring a thriving community while protecting the beauty and resources of Fraser.

SNR 2.1

Encourage energy efficiency for all homes and businesses in Fraser.

- Support and partner with Sustainable Grand and other nonprofit community groups that provide education and outreach with regards to energy efficiency.
- Update local building codes to align with the latest International Energy Conservation Code (IECC) standards.
- Provide subsidized energy audits for homes and small businesses, and additional support/subsidies for weatherization, insulation, and HVAC upgrades.

SNR 2.2

Support green building design by offering density bonuses, expedited permits, or reduced fees for projects that meet LEED or other high-performance building standards.

SNR 2.3

Lead by example by retrofitting town-owned facilities with high-efficiency appliances and fixtures and utilizing native plantings and drought-tolerant species across town facilities.

- Conduct a greenhouse gas emissions inventory to determine progress/impact of the recommendations from the 2016 Sustainability Plan.
- Create a new Sustainability Plan and implement its recommendations.

SNR 2.4

Ensure development oriented in a way that mitigates the risk of natural and human-made disaster.

- Create defensible space programs and vegetation management, especially near the Wildland-Urban Interface (WUI).
- Adopt codes and regulations that align with the Colorado Wildfire Resiliency Code.
- Ensure new development is outside of the 100-year floodplain and wetland designations.

SUSTAINABILITY & NATURAL RESOURCES GOAL 3

Promote efforts to improve air quality helping to create a cleaner, healthier environment for residents.

SNR 3.1

Measure, track, and set targets for greenhouse gas reduction.

SNR 3.2

Advance renewable energy.

- Advocate for Mountain Parks Electric to increase the share of its electric power that comes from renewable energy sources such as solar and wind.
- Promote community solar programs.

SNR 3.3

Reduce solid waste.

- Promote the pay-as-you-throw trash and recycling services available at the Town's facility, The Drop.
- Create programs and incentives to increase usage of The Drop by both residents and visitors.
- Explore, and implement where feasible, expansion of recycling services and what is collected, as well as composting services for organics.
- Adopt policies in line with the implementation of the Colorado Producer Responsibility Program and Minimum Recyclables List and require licensed haulers or contracted services to provide recycling.

SNR 3.4

Further vehicle electrification and support development of EV charging infrastructure.

- Convert transit and Town fleet vehicles to electric or hybrid models.
- Adopt the permitting processes and standards from the EV Charging Model Land Use Code promulgated by the Colorado Energy Office to reduce barriers to EV charging development.

SUSTAINABILITY & NATURAL RESOURCES GOAL 4

Inspire and support healthy, sustainable lifestyles that nourish both people and the planet.

SNR 4.1

Reduce vehicle miles traveled.

- Implement a car share program.
- Explore a parking demand strategy to reduce idling and increased driving.

SNR 4.2

Encourage multi-modal transportation by designing roads for all users—pedestrians, cyclists, transit riders, and drivers—with safe sidewalks, crosswalks, and bike lanes.

- Collaborate with neighboring communities and regional agencies to expand public transit routes and schedules for the Lift and other public transit options.
- Audit the bicycle connectivity network and incorporate into strategic development.
- Explore, and implement if feasible, micro-transit or bike-share programs to complement Lift services.

Winter

Foundations & Support

Town Services & Infrastructure
Transportation & Mobility
Intergovernmental Coordination

Winter in Fraser calls for a strong foundation and a network of support, which mirrors this chapter's focus on the essential systems and partnerships that sustain the town. Unlike the visible growth of spring and summer, or the long-term stewardship of fall, this section is dedicated to the robust infrastructure and foundational relationships that ensure daily life runs smoothly.

Town Services/Infrastructure, Transportation/Mobility, and Intergovernmental Cooperation highlight the critical backbone of the community. Reliable town services and infrastructure provide the support systems residents depend on, from utilities to public safety. Efficient transportation and mobility infrastructure ensures the town remains accessible and functional, connecting people and places, no matter the weather. Finally, strong intergovernmental cooperation strengthens Fraser's capacity by building a network of support with neighboring entities, ensuring the region can collaboratively meet its needs. This chapter outlines the strategic investments and partnerships required to maintain the fundamental support systems that allow Fraser to thrive year-round.

Town Services & Infrastructure

Vision

Fraser's services and infrastructure provide residents with safe, reliable, and effective amenities.

Fraser will maintain and enhance its town services and infrastructure to support a safe, efficient, and thriving community. Roads, utilities, public facilities, and emergency services will be reliable, resilient, and designed to meet both current and future needs. Strategic investments will ensure services are accessible, efficient, and adaptable, preparing the town for any changing conditions.

This chapter examines existing systems, identifies gaps, and outlines strategies to guide improvements over time. By focusing on sustainability, innovation, and long-term planning, Fraser can strengthen its foundation, support economic vitality, and sustain the quality-of-life residents value.

TOWN SERVICES & INFRASTRUCTURE GOAL 1

Provide essential services for residents of all ages, backgrounds, and abilities.

TSI 1.1

Improve access to affordable childcare and early childhood education.

- Enhance partnerships with local providers, schools, and nonprofits to expand childcare options and increase childcare capacity.
- Secure funding/revenue opportunities to provide licensing and support operations for childcare providers.
- Explore incentives for businesses or housing developments that include on-site childcare.
- Work at the county level with Grand Beginnings, the county, neighboring municipalities, local businesses and foundations to address the need for sustainable early childhood education funding.

TSI 1.2

Expand educational and community services.

- Support increased senior services such as transportation, meal delivery, social programming, and in-home care support for older residents.
- Support local libraries to expand programming and resources.
- Support the formation of a 6-12 grade school facility in Fraser.

TSI 1.3

Expand access to multilingual, culturally inclusive, and digitally accessible communications.

- Provide translation and interpretation services for public information, especially around emergency services.
- Offer Town materials and service information in multiple languages and a digitally accessible format.

TSI 1.4

Ensure facilities meet American Disabilities Act (ADA) standards and are universally accessible.

- Ensure that public buildings, sidewalks, trails, and other amenities meet accessibility standards and guidelines and retrofit/upgrade these facilities if needed.
- Ensure existing businesses and commercial properties make upgrades that meet accessibility standards and guidelines and require new developments to comply during the development review process.

TSI 1.5

Strengthen community outreach and services to further support residents.

- Partner with non-profits and agencies to connect residents with available resources and services.
- Endeavor to meet the needs of all residents through culturally inclusive and multilingual programming.

TSI 1.6

Support emergency preparedness and resilience efforts in the case of natural or human-made disasters.

- Equip the community with the tools, knowledge, and resources needed to prepare for, respond to, and recover from disasters.
- Identify and make places of refuge available during severe snow or weather events, particularly during closures of Berthoud Pass.

TOWN SERVICES & INFRASTRUCTURE GOAL 2

Expand health services to support the growing needs and quality care of Fraser's residents.

TSI 2.1

Increase healthcare options and services.

- Support the new Middle Park Health Hospital campus and facilitate the development of additional healthcare related services.
- Recruit health providers in Fraser to serve local needs.

TSI 2.2

Expand mental and behavioral health services.

- Create partnerships with current mental healthcare providers and facilities.
- Collaborate with county and nonprofit mental health providers to increase access.

TSI 2.3

Integrate health promotion into Town programs.

- Use parks and recreation programming and community events to encourage physical activity, healthy lifestyles, and preventative care.
- Expand community event offerings to include a wider range of activities that appeal to all residents, including those seeking non-alcohol centered experiences, and enhance access to additional support resources.

TOWN SERVICES & INFRASTRUCTURE GOAL 3

Maintain and enhance Fraser's physical infrastructure to ensure it's ready to support the community's growth and needs.

TSI 3.1

Ensure long-term water supply and high-quality drinking water.

- Plan for future water use through conservation programs, infrastructure upgrades, and watershed protection.
- Continue to monitor and maintain water treatment facilities to meet quality standards.
- Incorporate rain gardens, bioswales, permeable pavements and other green infrastructure into public streets to manage stormwater naturally and protect the Fraser River and its tributaries.
- Locate snow storage and melting facilities away from the Fraser River.

TSI 3.2

Invest in sewer and wastewater systems upgrades.

- Upgrade aging sewer infrastructure and expand capacity in areas targeted for growth.

TSI 3.3

Support the expansion or consolidation of Town services.

- Support the expansion or relocation of the post office within Town boundaries.
- Expand recycling and compost services and facilities.
- Explore the creation of a separate parks division or department.

TSI 3.4

Review and update the Capital Improvement Plan (CIP) based on infrastructure condition, development trends, available funding, and reaching 50% completion on previous CIP.

Transportation & Mobility

Vision

A joyful and connected mountain town where walking, biking, and transit make it easy to get around and explore.

Fraser envisions a transportation system that is safe, connected, and accessible for all. Roads, trails, transit, and pedestrian networks connect neighborhoods, support local businesses, and promote sustainable, multimodal travel. Strategic planning and targeted investments will ensure the transportation system meets current needs while anticipating changing travel patterns.

This chapter establishes a framework for the future of Fraser's transportation system. By planning strategically and prioritizing multimodal options, Fraser can accommodate future growth, reduce congestion, enhance safety, and encourage sustainable travel choices. The framework also emphasizes resilience and adaptability, ensuring the transportation system can respond to changing needs, emerging technologies, and evolving community priorities.

TRANSPORTATION & MOBILITY GOAL 1

Build safe, inspiring walking and biking connections—whether strolling Downtown or heading out on a scenic trail—that invite people to explore year-round.

TM 1.1

Improve pedestrian, ADA accessibility, and bicycle connectivity, comfort, and safety.

- Identify gaps in the pedestrian and bicycle networks.
- Improve key bicycle and pedestrian crossings.
- Improve regional trail connections through Fraser.
- Evaluate and improve ADA accessibility on all existing pedestrian facilities within the Town, and ensure ADA compliance for all new facilities.
- Conduct a study for pedestrian connections from the Fraser Valley Elementary School, across the railroad and US 40, to St. Louis Landing and other neighborhoods and amenities east of US 40.
- Address drainage and snow removal issues to improve pedestrian friendly sidewalks throughout the winter and spring months.

TM 1.2

Develop new standard/typical roadway sections that allocate space for non-motorized users.

TRANSPORTATION & MOBILITY GOAL 2

Plan for a flexible and seamless transit experience that includes local solutions like micro-transit and a rail station area that welcomes travelers into Fraser's vibrant Downtown.

TM 2.1

Support increased passenger rail traffic to Fraser.

- Develop a Rail Station Area Plan for the Fraser Rail Station.
- Work with rail service providers to ensure consistent service.
- Plan for the future Fraser Mobility Hub to connect rail passengers to bus, bicycle, and other transportation services.

TM 2.2

Improve transit connectivity for areas not served by fixed-route transit.

- Evaluate feasibility of implementing micro-transit service.

TRANSPORTATION & MOBILITY GOAL 3

Support a well-connected road network that improves traffic flow, reduces congestion, and ensures the safe, efficient movement of people and vehicles throughout Fraser.

TM 3.1

Maintain and adapt Fraser's road network to support year-round access, safety, and the town's unique mountain context.

- Maintain and enhance roadway conditions through targeted reinvestment.
- Coordinate with CDOT on the US 40 capacity project to reflect local needs.
- Coordinate with Grand County on the completion of the Fraser Valley Parkway (FVP) from CR 73 (St. Louis Creek Road) to CR 50 (Church Park Road).
- Identify a north-south connection east of US 40 from CR 8 to Safeway (Edna Tucker Way-Sun River Dr-Clayton Ct).

TRANSPORTATION & MOBILITY GOAL 4

Provide thoughtful and easy-to-find parking that is balanced with the Town's commitment to walkability and placemaking.

TM 4.1

Balance parking supply and management with walkability and placemaking.

- Explore time restrictions for on-street parking near highly visited destinations and implement if needed.
- Add signage in key locations as consistent with the Winter Park & Fraser Wayfinding Plan throughout Town to clarify parking, destinations, and transportation options.
- Coordinate with CDOT Mountain Passenger Rail improvements and Clayton Court development to identify a location for a shared parking facility.
- Evaluate the feasibility of a parking monitoring program.
- Evaluate a fee-in-lieu and shared parking models.

Intergovernmental Coordination

Vision

The town of Fraser communicates and coordinates with other jurisdictions, agencies, and nonprofits to collaboratively address regional planning issues.

Effective collaboration with neighboring jurisdictions, regional agencies, and state and federal partners is essential for Fraser's long-term growth. Intergovernmental coordination ensures that services are implemented efficiently, reducing duplication, leveraging resources, and addressing shared challenges.

This chapter establishes a framework for proactive communication, partnership, and alignment with other governmental entities. By fostering strong relationships and coordinated planning, Fraser can advance regional priorities, respond to emerging challenges, and achieve outcomes that benefit residents, businesses, and the broader community. Through strategic coordination, the town strengthens its ability to deliver services, manage growth, and enhance its role as a collaborative and forward-looking member of the region.

INTERGOVERNMENTAL COORDINATION GOAL 1

Develop a framework for ongoing regional collaboration to foster strong partnerships and drive impactful solutions across communities and regions.

IGC 1.1

Create and formalize intergovernmental agreements for shared services and infrastructure .

- Inventory and monitor active IGAs between Fraser and other entities.

INTERGOVERNMENTAL COORDINATION GOAL 2

Encourage coordination and collaboration around land use in the Fraser Valley.

IGC 2.1

Work with Winter Park, Grand County, and other partners to identify shared growth areas, environmental resources, and land use goals that cross jurisdictions.

- Establish a procedure for notifying and consulting nearby towns and the County on significant development proposals, annexations, or rezonings near shared boundaries.

INTERGOVERNMENTAL COORDINATION GOAL 3

Coordinate regional transit plans and projects to efficiently move people throughout the Valley.

IGC 3.1

Foster relationships with CDOT, Grand County, and Union Pacific to be involved with regional transportation master planning efforts.

IGC 3.2

Work with Winter Park, Winter Park Resort, Granby, and Grand County to support operation and expansion of The Lift transit service.

- Secure additional, sustainable joint funding for transit infrastructure and operations.
- Explore the formation of a Regional Transportation Authority (RTA).

INTERGOVERNMENTAL COORDINATION GOAL 4

Create forward-thinking, regional housing plans that address the needs of the entire Valley.

IGC 4.1

Work with Fraser Valley Housing Partnership, Winter Park, and Grand County to create a Valley-wide strategy for workforce, seasonal, and affordable housing.

IGC 4.2

Explore shared tools and incentives for housing development.

INTERGOVERNMENTAL COORDINATION GOAL 5

Work with Grand County and Winter Park to understand capacity and plan for services and infrastructure upgrades.

IGC 5.1

Work with government entities and special districts in the Fraser River Valley to further long-range planning goals and align Capital Improvement Plans across jurisdictions.

- Continue to explore a location for a shared composting site with Grand County and Winter Park.
- In partnership with Grand County, continue to advocate for a quiet zone and pedestrian amenities at the CR 5 railroad crossing.

IGC 5.2

Provide leadership and participation in efforts to address local challenges through regional cooperation.

IGC 5.3

Collaborate with the Grand County Library District to enhance library programming to engage a greater number of residents.

IGC 5.4

Further explore opportunities to share municipal services with Winter Park for advanced efficiency and coordination.

- Identify shared projects with adjacent water & sanitation districts.

INTERGOVERNMENTAL COORDINATION GOAL 6

Coordinate efforts around parks, recreation, open space, and trails to create a cohesive regional network.

IGC 6.1

Coordinate regional recreation and collaborate with the Fraser Valley Metropolitan Recreation District (FVMRD), Headwaters Trail Alliance (HTA), Colorado Open Lands (COL), and the Town of Winter Park.

IGC 6.2

Collaborate on joint use facilities and programming.

- Inventory and assess recreation district-wide.
- Identify land for acquisition across jurisdictions.
- Share facilities, funding, and programming to expand access.

IGC 6.3

Encourage regional strategic planning and initiatives regarding Fraser River Regional trail linkages.

INTERGOVERNMENTAL COORDINATION GOAL 7

Protect residents, visitors, and property from human or natural made disasters.

IGC 7.1

Coordinate with regional agencies and adjacent communities on hazard mitigation and preparedness.

- Continue to participate in regular updates to the Grand County Multi-Hazard Mitigation Plan, Emergency Operations Plans, and Community Wildfire Protection Plan.

5 Fraser in action

Implementation

The implementation matrix on the following pages serves as a tool to track and manage progress. Each action has a priority level, timeframe, estimated cost range, and Town partners for notification, collaboration, and potential funding opportunities. Each action's realization is in the greater mission of accomplishing the strategy and ultimately the goal identified above each action in the matrix.

IMPLEMENTATION MATRIX KEY

PRIORITY LEVEL

1: Critical
2: Vital
3: Desirable

TIMEFRAME

Ongoing (ON): as needed
Short term (ST): 0-3 years
Medium term (MT): 3-5 years
Long term (LT): 5+ years

COST

NM: non-monetary
$: $0-$25k
$$: $25k-$75k
$$$: $75k+

PARTNERS

AM	Amtrak
CDOT	Colorado Department of Transportation
CHFA	Colorado Housing and Finance Authority
COEDIT	Colorado Office of Economic Development and International Trade
COL	Colorado Open Lands
CPW	Colorado Parks and Wildlife
CWCB	Colorado Water Conservation Board
D	The Drop
DCI	Downtown Colorado Inc.
DOLA	Colorado Department of Local Affairs
EGFPD	East Grand Fire Protection District
EGSD	East Grand School District
FDDA	Fraser Downtown Development Authority
FEMA	Federal Emergency Management Agency
FRVHP	Fraser River Valley Housing Partnership
FVA	Fraser Valley Arts
FVMRD	Fraser Valley Metropolitan Recreation District
FWPC	Fraser-Winter Park Chamber
FWPPD	Fraser-Winter Park Police Department
GB	Grand Beginings
GC	Grand County
GC1	Grand County Water and Sanitation #1
GCED	Grand County Economic Development
GCHPB	Grand County Historic Preservation Board
GCHS	Grand County Historical Society
GCLD	Grand County Library District
GCRHN	Grand County Rural Health Network
GF	The Grand Foundation
GKLC	Grand Kids Learning Center
GY	Town of Granby
HTA	Headwater Trails Alliance
LT	The Lift Transit
MFC	Mountain Family Center
MPE	Mountain Parks Electric
MPH	Middle Park Health
PAC	Public Arts Committee
SG	Sustainable Grand
UCWET	Upper Colorado Watershed Environment Team
UPRR	Union Pacific Railroad
USACE	US Army Corps of Engineers
USFS	US Forest Service
WP	Town of Winter Park
WPRWS	Winter Park Ranch Water and Sanitation

Figure 13: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
DTV 1: Create an environment where walking, biking, and rolling feels fun, easy, and accessible.					
DTV 1.1 Improve signage and wayfinding for easier navigation.					DTV 2.2, DTV3.3, EV1.1, C1.2, PROST2.2, TM4.1, IGC6.1
Create artistic monuments in and around Downtown through the commissioning of local or regional artists that create natural wayfinding elements.	3	ON	$$	FDDA, FWPC, FVA, PAC	
Use the Winter Park & Fraser Wayfinding Plan to identify signage and wayfinding deficiencies and fill these gaps.	2	ON	$$	WP, HTA, FVMRD	
Adopt and implement the Winter Park and Fraser Signage & Wayfinding Master Plan.	2	LT	$$$	WP, HTA, FVMRD, FDDA, DOLA	
DTV 1.2 Improve pedestrian and vehicular safety.					DTV1.4, DTV 2.2, DTV 3.1, DTV 4.2, PROST2.2, TSI3.4, TM1.1, TM1.2, TM3.1
Emphasize the importance of pedestrian and vehicular safety in discussions with CDOT on potential Highway 40 modifications.	1	ON	$	CDOT, GC	
Integrate safety best practices in the design of future roads and pathways.	1	ON	$	CDOT, GC, HTA	
Incorporate principals of Crime Prevention through Environmental Design (CPTED) in the design of public spaces.	1	ON	$		
Add sidewalks to existing and proposed roadways and ensure all spaces meet The Americans with Disabilities Act (ADA).	2	ON	$$$	DOLA, FDDA	
Inventory current deficiencies and projected replacement timeframes for pedestrian and vehicular infrastructure and add to Town Budget/Capital Improvement Plan.	2	ON	$$	FDDA	
Widen the Fraser River Trail within Downtown to separate cyclists from pedestrians where possible.	2	LT	$$$	CDOT, HTA, DOLA, FDDA, FEMA, FVMRD	

Figure 14: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
In high speed or high traffic areas, consider grade separated crossings between active and passive modes of transportation.	2	LT	$$$	CDOT, GC	
DTV 1.3 Expand and improve mobility options.					DTV2.2, Transportation & Mobility Section (TM), SNR3.4, SNR4.1, SNR4.2, IGC3.1
Establish a public-private partnership to establish a shared-use parking lot or garage in Downtown Fraser.	3	LT	$$$	FDDA	
Work with the railroad to create additional parking on the east side of the tracks that could be used by Downtown visitors.	2	MT	$$	AM, UPRR	
Improve roadways and/or stripe additional parallel parking on the roads west of Highway 40.	2	LT	$$$		
Install public EV charging stations.	3	LT	$$$	SG, FDDA	
Conduct a parking analysis and/or Parking Master Plan.	2	ST	$$$	DOLA, FDDA	
Continue to explore the feasibility of connecting a road to Safeway and Sun River Drive, as shown on the Vision Plan.	2	ST	$		
Work with The Lift to improve bus service to Downtown.	2	ON	$	LF, WP	
Consider micro-transit options to compliment bus routes and services from the LIFT.	2	MT	$$$	LF, WP, FWPC	
Create an affordable and seasonal on-demand (e)bike share system.	3	LT	$$$	SG, FDDA, HTA, FVMRD	
Establish the Town-owned property at 360 Railroad Avenue as the Fraser Mobility Hub.	1	ST	$$$	CDOT, WP, AM	
DTV 1.4 Allocate and design space that is friendly to walk, bike, and roll.					DTV1.2, DTV 2.2, DTV3.3, DTV4.2, EV1.1, PROST2.3, PROST2.4, PROST4.2, LU4.2, SNR1.6, SNR4.2, TSI1.4, TM1.1, TM1.2

Figure 15: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Consider updating the Riverwalk District standards, street standards, and other applicable portions of the Town code to secure 12' sidewalks where possible to create space for street trees or site furnishings such as benches, bike racks, pedestrian lighting, and litter receptacles.	1	MT	$		
Design streets using best practices that are naturally safe for cyclists. Provide striping and signage to improve visibility to clearly delineate cyclist space.	1	ON	$	HTA	
Pursue development of a trail along Elk Creek, from the Fraser River to CR 72 and potentially beyond, with a grade separated underpass under US 40 to connect Clayton Court and the Fraser River Trail to the Fraser Valley Center.	3	LT	$$$	CDOT, DOLA, HTA, FVMRD	
DTV 2: Build a lively and sustainable business environment that supports small, local shops and businesses, reflecting the town's unique and fun spirit.					
DTV 2.1 Promote business diversity, local businesses, and entrepreneurs that provide goods and services appealing to both locals and visitors.					DTV2.2, DTV2.4, DTV4.2, H3.3, Economic Vitality Section (EV), LU1.1, TSI1.1, TM2.1, IGC1.1
Provide economic incentives to desired businesses via financial incentives.	2	MT	$$$	FDDA, COEDIT, DOLA, FWPC	
Provide incubator space for desired businesses to become established and grow.	2	MT	$$$	FDDA, COEDIT, DOLA, FWPC	
Create marketing collateral to attract businesses.	3	MT	$$$	FDDA, COEDIT, DOLA, FWPC	
Invest in public infrastructure that creates value for prospective investors.	2	LT	$$$	FDDA, DOLA	
DTV 2.2 Increase foot-traffic and visitation.					Downtown Vision Section (DTV), EV1.3, EV2.1, C1.2, TM4.1

Figure 16: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Enhance marketing and advertising campaigns through various media outlets.	2	ON	$$	FDDA, FWPC	
DTV 2.3 Provide inclusive housing that prioritizes the workforce.					DTV2.2, EV4.1, Housing Section (H), IGC4.1, IGC4.2
Continue to assess and evaluate the effectiveness of zoning incentives for developments that voluntarily provide affordable housing and adjust the requirements/criteria on affordable unit ratios and AMI's, as needed.	2	ON	$	FRVHP	
Continue to explore new ways to integrate affordable and market-rate housing for local employees.	2	ON	$	CHFA, FWPC, FRVHP	
Work with the Fraser River Valley Housing Partnership on additional affordable residential projects.	2	ON	$	FRVHP	
DTV 2.4 Create a full-day Fraser visitor experience.					DTV2.1, DTV2.2, DTV4.1, DTV4.2, H4.3
Encourage traditional lodging types beyond short-term rentals (STR) to diversify lodging options.	2	ON	$	FDDA, FWPC	
Encourage non-competing local businesses to partner with each other to promote the local economy.	2	ON	$	FDDA, FWPC	
Encourage future development to facilitate a full-day visitor experience to make it an easier choice for weekend and time-constrained visitors.	3	ON	$	FDDA, FWPC	
DTV 3: Make the Fraser River and Fraser River Trail the heart of Downtown, shaping the area's identity and offering a vibrant, scenic space for residents and visitors to enjoy.					
DTV 3.1 Enhance Fraser River Trail amenities and gathering spaces near Downtown.					DTV1.2, DTV2.2, DTV3.3, DTV4.2, PROST2.1, PROST4.4, TSI1.4, IGC6.1
Acquire areas within the Downtown intended for parks and open space to ensure the Downtown Vision is realized as desired.	1	ST	$$$	FDDA, FWPC	

Figure 17: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Incorporate the Downtown Vision Plan as part of the design review process in which developers must abide by.	1	ST	$	FDDA	
Upon securing public areas, develop detailed public space designs that work with adjacent development parcels and enhance future development.	3	LT	$$$	FDDA, FVMRD	
DTV 3.2 Encourage active uses and programming along the Fraser River while respecting ecologically sensitive areas.					DTV2.2, DTV4.1, EV1.4, EV5.2, C1.3, C3.3, SNR1.3, TSI2.3
Evaluate ecological conditions and functions and provide best-practice solutions. Explore options that improve the current user experience.	2	LT	$$$	USACE, CPW, FEMA	
Evaluate construction constraints such as wetlands and challenging geotechnical conditions.	2	ON	$$	USACE, CPW, FEMA	
Continue to evaluate Riverwalk District zoning as projects are built, and as needed, make any changes that might affect active ground floor uses along the River.	2	ON	$		
Create events and programs along the Fraser River that bring people into the Downtown.	1	LT	$$$	FDDA, DCI, FWPC	
DTV 3.3 Improve non-motorized access and visibility from Highway 40 and Clayton Court to the River.					DTV 1.4, DTV2.2, DTV 3.1, C1.2, PROST2.1, PROST 2.2, PROST2.3
Integrate new wayfinding signage and monuments that lead individuals to the Fraser River	2	MT	$$	FDDA	
Create stronger physical connections between these points through wider sidewalks, plazas, lawns, and other communal spaces.	2	LT	$$$	FDDA	
Create a memorable landmark/ trailhead at the junction of the Fraser River Trail and Downtown.	3	LT	$$$	HTA, FDDA, FVMRD	
DTV 4: Enhance Downtown to be the go-to destination, buzzing with excitement and events every month of the year, where there's always something fun for everyone.					

Figure 18: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
DTV 4.1 Enhance event and programming efforts.					DTV2.2, DTV2.4, DTV 3.2, EV1.3, EV1.4, EV2.1, EV5.2, C3.3, PROST4.3, TSI2.3
Coordinate with local municipalities and Winter Park Resort to ensure that valley-wide events and programming are complementary and don't result in efforts taking attendance away from each other.	3	ON	$	WP, GC	
Enhance four-season programming and event planning to promote visitation during typical shoulder seasons.	3	ON	$$$	FDDA, FWPC	
Continue to support and enhance the Town's signature multi-day events such as Fraser Mountain Mural Festival and Fraser Fire & Ice.	3	ON	$	FDDA, FWPC, FVA	
DTV 4.2 Ensure high-quality architectural and public realm design that is memorable and unique.					DTV1.2, DTV1.4, DTV 2.1, DTV2.2, DTV2.4, DTV3.1, EV5.1, H2.2, C2.1, C2.3, C3.1, PROST4.2, TM3.1
Work with the local community during the planning of public realm spaces to create community ownership.	2	LT	$		
Hire local artists to create memorable elements that are unique to Fraser.	3	LT	$$	FDDA, FWPC, FVA	
Allocate budget to maintain a clean and enjoyable public realm. Work with the Downtown Development Authority (DDA) and business owners to discuss current challenges and opportunities.	2	ON	$$$	FDDA, FWPC, FVA	

Figure 19: Downtown Vision Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Work with the property owners of the Safeway shopping center and Fraser Valley Center (Murdoch's) to encourage redevelopment / retrofitting of these suburban style commercial developments to a more urban form that integrates with the rest of Downtown Fraser.	2	ON	$$$	FWPC, FDDA	

Figure 20: Housing Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
H 1: Promote a variety of housing options to meet the needs of both renters and homebuyers, offering something for everyone in the community.					
H 1.1 Create incentives and streamlined processes for developing a range of housing types, including missing middle housing options like small-lot single-family (cottage courts), townhomes, duplexes, and small-scale multifamily.					DTV 2.3, H1.2, H1.4, H2.3, H4.3, C2.2, SNR2.2, IGC4.2
Evaluate the Town's current residential unit thresholds for minor and major site plan applications.	2	ON	NM	FRVHP	
Consider allowing small-scale multifamily (4 units or less) to only require administrative approval.	2	ON	NM	FRVHP	
H 1.2 Support housing solutions that serve diverse household compositions, income levels, and life stages.					DTV 2.3, H1.1 , H4.2
Identify potential developers to complete public-private partnerships.	3	ON	NM	FRVHP	
H 1.3 Modify zoning and land use codes to allow greater housing variety and density in appropriate areas.					DTV 2.3, H2.3, EV3.2, LU4.2
Consider changes to reduce minimum open space, reduce required setbacks, and increase maximum building height in residential zone districts.	2	ON	NM	FRVHP	
Consider inclusionary zoning models and practices that would incentivize and/ or require construction of low/ middle income units as part of housing developments.	3	ON	NM	FRVHP	
H 1.4 Establish programs to help maintain and preserve existing affordable housing stock.					DTV 2.3, H1.1, H4.3, LU2.1
Collaborate with the Fraser River Valley Housing Partnership to offer a deed restriction program for existing residential units and tailor the incentives it provides to be attractive to local homeowners and homebuyers.	3	ON	NM	FRVHP, CHFA, DOLA	

Figure 21: Housing Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
H 2: Encourage mixed-use housing development in areas where it can make the neighborhood more walkable, contribute to its character, and boost local business.					
H 2.1 Identify priority areas where mixed-use development should be concentrated, particularly near Downtown and transit corridors.					DTV 2.3, EV4.3, H2.3, LU1.1, LU3.4
Consider changes to the allowed uses within commercial and mixed-use zone districts so that permitted development is not comprised of only residential uses.	1	ST	NM	FRVHP	
H 2.2 Create design guidelines that ensure mixed-use developments contribute positively to neighborhood character and walkability.					DTV 2.3, DTV4.2, EV1.1, C2.1, C2.3, LU2.2
H 2.3 Review and update regulatory/zoning incentives such as density bonuses and parking reductions for mixed-use projects that incorporate housing into targeted areas.					DTV 2.3, H 1.1 , H1.3, H2.1, LU1.1, TM4.1, IGC4.2
H 2.4 Support the adaptive reuse of existing buildings for mixed-use development.					DTV 2.3, EV3.2, EV4.3, C2.2, LU2.1
Implement expedited permitting and review processes for adaptive reuse projects that are mixed-use.	2	ST	NM	GCHS, FRVHP, CHFA	
Consider fee reductions/waivers for adaptive reuse projects that are mixed-use.	2	ST	NM	GCHS, FRVHP, CHFA	
H 3: Build and strengthen partnerships with state, regional/county, and philanthropic organizations that can help Fraser increase affordable and attainable housing to better meet the needs of local workers.					
H 3.1 Actively participate in regional housing coalitions and initiatives, such as the Fraser River Valley Housing Partnership, to leverage shared resources and expertise.					DTV 2.3, IGC2.1, IGC4.1, IGC5.2
H 3.2 Pursue grants, tax credits, and other external funding sources for housing development and assistance programs.					DTV 2.3, EV1.1
Work with DOLA and other agencies to identify proper funding sources.	2	ON	NM	DOLA, FRVHP, CHFA	
H 3.3 Collaborate with major employers and business organizations to develop employer-assisted housing programs.					DTV2.1, DTV 2.3, EV4.1, EV4.4
H 3.4 Partner with nonprofit housing developers to increase capacity for affordable housing development that is subsidized and/or protected.					DTV 2.3

Figure 22: Housing Implementation Matrix

<table>
<tr><th>Goal/Strategy/Action</th><th>Priority</th><th>Timeframe</th><th>Cost</th><th>Partners</th><th>Other Applicable Policy</th></tr>
<tr><td colspan="6">H 4: Seek a balance of housing options for year-round residents, seasonal workforce, non-resident owners, and short-term visitors – recognizing the importance of each for the local economy and quality of life.</td></tr>
<tr><td colspan="5">H 4.1 Create dedicated seasonal workforce housing solutions through partnerships and targeted development.</td><td>DTV 2.3, EV4.1, IGC4.1</td></tr>
<tr><td colspan="5">H 4.2 Establish monitoring systems to track housing inventory across different occupancy types to help inform policies to expand workforce-appropriate housing.</td><td>DTV 2.3, H1.2</td></tr>
<tr><td colspan="5">H 4.3 Implement policies that encourage non-resident homeowners to make properties available for long-term rental when not in use.</td><td>DTV 2.3, DTV2.4, H1.1, H1.4</td></tr>
<tr><td>Explore case studies for temporary subsidies or incentives to unlock existing housing stock for long-term rentals.</td><td>3</td><td>ON</td><td>NM</td><td colspan="2">FRVHP, CHFA</td></tr>
</table>

Figure 23: Economic Vitality Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
EV 1: Build and nurture a thriving, memorable mountain Downtown.					
EV 1.1 Enhance the physical environment of Downtown.					DTV1.1, DTV 1.4, DTV2.1, H2.2, H3.2, C1.2, C2.3, LU3.2
Complete streetscape improvements including sidewalk widening, street furniture, and wayfinding signage along main Downtown corridors.	2	LT	$$$	FDDA, FWPC	
Continue to support and consider expanding the existing business enhancement grant program to assist property owners with building upgrades that enhance Downtown character.	3	MT	$$$	FDDA, FWPC	
EV 1.2 Support existing Downtown businesses while attracting complementary new businesses.					DTV2.1, EV3.2, EV3.3, LU2.1, TSI1.4
Work with the DDA and Chamber to identify market gaps and actively recruit businesses that fill those gaps.	2	ON	NM	FDDA, FWPC	
Streamline permitting and approval processes for Downtown business expansions and tenant improvements.	1	ST	NM	WP	
EV 1.3 Enhance Downtown's market position and visibility.					DTV2.1, DTV2.2, DTV4.1, EV1.2, EV5.2, C3.3,
Create a Downtown marketing and branding strategy that highlights Fraser's unique character and offerings.	3	MT	$$$	FDDA, FWPC	
Support DDA social media and promotional efforts that showcase Downtown events and businesses.	3	ON	NM	FDDA, FWPC	
EV 1.4 Activate Downtown through events and programming.					DTV2.1, DTV 3.2, DTV4.1, EV2.1, EV2.2, EV2.3, EV5.2, C1.3, C1.4, C3.3, PROST3.3, TSI1.5, TSI2.3

Figure 24: Economic Vitality Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Develop and maintain a coordinated annual calendar of Downtown events and activities that drive foot traffic year-round.	3	ST	$	FDDA, FWPC	
Support pop-up activations and temporary uses that bring energy to Downtown during shoulder seasons.	2	ON	NM	FDDA, FWPC	
EV 2: Bolster counter-seasonal business to help balance workforce needs and revenue generation across the year.					
EV 2.1 Identify and promote off-season tourism opportunities.					DTV2.1, DTV2.2, DTV4.1, EV1.4, EV2.2
Develop and promote signature off-season events that draw visitors and support local businesses.	2	MT	$$	FDDA, FWPC	
EV 2.2 Support businesses in developing shoulder season products and services.					DTV2.1, EV1.4, EV2.1, EV3.1
Connect businesses with technical assistance resources for developing new off-season products or services.	2	LT	$	FDDA, FWPC	
EV 2.3 Incentivize year-round business activity and employment.					DTV2.1, EV1.4, EV2.1, EV4.2, LU1.2, TSI2.1
Identify brownfield funding opportunities and other supports to incentivize a manufacturing use at the former pole yard property.	2	MT	NM	DOLA, GCED, FWPC, COEDIT	
Explore creation of a year-round employment incentive program (e.g., tax rebates, fee waivers) for businesses maintaining staff during shoulder seasons.	1	ST	$$$	GCED, FDDA, FWPC, COEDIT	
Consider property tax incentives or other financial tools for businesses that provide year-round goods/services critical to community needs.	2	LT	$$		
EV 3: Encourage growth in small businesses that help diversify the local economy and fit with Fraser's mountain setting.					

Figure 25: Economic Vitality Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
EV 3.1 Provide business support services and resources.					DTV2.1, EV2.2, EV5.1, LU2.1, LU1.2, SNR2.1, TSI1.1
Maintain and promote online resources that connect entrepreneurs to capital access programs, grants, and lending opportunities.	3	ST	$	GCED, FDDA, FWPC	
Sponsor or co-sponsor quarterly networking events for local entrepreneurs and small business owners.	3	ST	$	GCED, FDDA, FWPC	
EV 3.2 Expand availability of flexible, affordable business space.					DTV2.1, EV1.2, EV3.4, H1.3, H2.4, C3.1, LU2.1
Support adaptive reuse of existing buildings for pop-up retail, artist studios, or flexible commercial space.	3	LT	NM	FDDA	
Consider zoning amendments to allow live-work units and home-based business options in appropriate locations.	2	ST	NM		
EV 3.3 Attract businesses that complement Fraser's character and fill service gaps.					DTV2.1, EV1.2, LU1.2, TSI1.2, TSI2.1
Target recruitment efforts toward businesses that complement the mountain lifestyle and fill gaps in local services.	1	ON	$$	FDDA, FWPC, GCED	
Maintain inventory of available commercial spaces and actively market them to desired business types.	1	ON	NM	FDDA, FWPC	
EV 3.4 Support remote workers and home-based businesses.					DTV2.1, EV3.2, LU2.1, TSI1.4
Continue infrastructure improvements including broadband expansion.	2	ON	$$$		
Create or support co-working space development that provides professional workspace and networking opportunities.	3	ON	$	FDDA, FWPC	
EV 4: Make Fraser a place where people can both live and work affordably.					

Figure 26: Economic Vitality Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
EV 4.1 Support regional workforce development initiatives.					DTV2.1, DTV2.3, H3.3, H4.1, IGC4.1, IGC5.2
Share information about local employment opportunities and employer needs with regional workforce development partners.	3	ON	NM	FDDA, FWPC, GCED, COEDIT	
EV 4.2 Support the creation of year-round, higher wage jobs.					DTV2.1, EV2.3
Track and report on job quality metrics including wage levels, benefits, and year-round vs. seasonal employment.	2	LT	$	FDDA, FWPC	
EV 4.3 Help to integrate work and living options.					DTV2.1, H2.1, H2.4, LU1.1, LU2.4, LU3.4
Support mixed-use development that allows residents to live near employment centers and reduce commuting costs.	2	ON	NM		
EV 4.4 Integrate economic development with housing and childcare.					DTV2.1, H3.3, TSI1.1
Survey local employers about employee housing and childcare needs to inform policy decisions.	2	MT	$$	FDDA, FWPC	
EV 5: Encourage businesses to collaborate in emerging shopping areas to create a dynamic environment where everyone benefits.					
EV 5.1 Support business association and merchant groups.					DTV2.1, DTV4.2, EV3.1, EV5.2
Encourage formation of merchant associations in emerging commercial areas.	2	ON	NM	FWPC	
EV 5.2 Foster collaborative approach to marketing and programming.					DTV2.1, DTV 3.2, DTV 4.1, EV1.3, EV1.4, EV5.1, C3.3
Facilitate regular meetings between Downtown and highway-oriented business groups to coordinate marketing and events.	2	ON	NM	FDDA, FWPC	

Figure 27: Community Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
C 1: Preserve Fraser's one-of-a-kind charm, mountain town vibe, and strong sense of community.					
C 1.1 Encourage community leadership and participation in Town government.					C1.4, PROST4.3, TSI1.5, TSI1.6
Establish a Citizen's Academy to educate and inform Fraser Valley residents on the role of their local government and its operations.	3	ON	NM		
C 1.2 Establish community gateways, wayfinding, and signage that showcase Fraser's unique identity and educate residents and visitors about the Town and its history.					DTV1.1, DTV2.2, DTV3.3, EV1.1, C2.1, C2.2, C3.1, PROST2.2, TM4.1
Use the Winter Park & Fraser Wayfinding Plan to identify priority areas for gateways, signage, and informational kiosks.	2	MT	$$$	FDDA, FWPC, WP	
C 1.3 Support development, spaces, and programming that enhance quality of life for everyone.					DTV 3.2, EV1.4, LU3.3, TSI1.4, IGC5.3
Support the Fraser Bike Park with programming and events.	2	ON	$$	FVMRD	
Pursue/support the addition of new parks and park facilities.	3	ON	$$$	FVMRD	
C 1.4 Encourage second homeowners to become active members of the community.					EV1.4, C1.1
Develop programs and spaces that bring together longtime locals and new residents.	3	ON	NM	FVMRD, GCLD, FVA, PAC	
C 2: Ensure development enhances the visual character of the area, blending modern design with the unique charm and natural beauty of the community to create a cohesive and vibrant built environment.					
C 2.1 Incorporate elements of Fraser's history and traditions into architectural design, streetscapes, and public spaces.					DTV4.2, H2.2, C1.2
C 2.2 Promote and protect architectural integrity.					H1.1, H2.4, C1.2, SNR2.2
Partner with the Grand County Historical Association, the Grand County Historic Preservation Board, and other entities to develop a local register of historic structures.	2	MT	$$	GCHS, GCHPB	

Figure 28: Community Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
In partnership with the Fraser Downtown Development Authority (FDDA), provide incentives for preservation or adaptive reuse of historic structures.	2	ST	$$	FDDA	
Provide signage at historic landmarks to educate on building history and significance.	3	ON	$$	GCHS, GCHPB	
Establish a walking tour of Fraser guidebook.	2	MT	$$	GCHS, GCHPB, FDDA	
C 2.3 Support oversight to ensure new development is compatible with existing character.					DTV4.2, EV1.1, H2.2, LU2.2, PROST1.2, PROST2.4, PROST2.4, TM3.1
Establish design guidelines for new development.	1	LT	$$$		
Incorporate public spaces that reflect the character of Fraser and create community in new development.	1	ON	NM	FDDA, PAC	
Preserve walkable, small-town streetscapes that activate frontages and provide gathering spaces.	1	ON	NM	FDDA	
Integrate the built environment with Fraser's natural surroundings to enhance the mountain character and outdoor lifestyle.	1	ON	NM	HTA	
Establish and maintain view corridors of Byers Peak, the Continental Divide, and Winter Park Resort.	3	LT	NM		
C 3: Celebrate arts and culture as a vital force in shaping the town's identity, fostering inclusivity, and creating spaces that connect and inspire people.					
C 3.1 Support local arts and culture to leverage Fraser as an artist community.					DTV4.2, EV3.2, C1.2, C3.2
Partner with local artists and other creatives to develop public art, murals, and other installations that reflect Fraser's history and culture.	2	ON	$$	FDDA, FVA, FWPC, PAC	

Figure 29: Community Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Maintain and increase funding for Art in Public Places in the Town's annual budget.	3	ON	$$$	PAC	
Encourage the collaboration and support of the Public Arts Committee, the Fraser Downtown Development Authority, and other entities to fund the arts.	3	ST	$$	FDDA, PAC	
C 3.2 Leverage the future Fraser Valley Arts Center as a place for communication and collaboration amongst different art groups in the community.					C3.1
C 3.3 Host or support events, festivals, pop-ups, and other activities that bring the community together and showcase music, crafts, and traditions.					DTV3.2, DTV4.1, EV1.3, EV1.4, EV2.1, EV5.2, PROST4.3, TSI2.3
Explore supporting events such as the Winter Park Film Festival and/or providing supplemental activities.	2	ST	$$$	WP, FDDA, FWPC	

Figure 30: Parks, Recreation, Open Space, & Trails Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
PROST 1: Protect and enhance Fraser's open spaces ensuring they remain beautiful, accessible, and enjoyable for all.					
PROST 1.1 Protect and enhance the Cozens Ranch Open Space.					PROST1.3, PROST4.1, SNR1.1, SNR1.4, TSI3.1
Implement the recommendations from the 2018 Fraser River Corridor Master Plan to enhance both conservation and recreation in the Cozens Ranch Open Space.	2	ON	$$$	COL, CPW, HTA	
Work with Colorado Open Lands to place a conservation easement over a majority of the land within the Cozens Ranch Open Space.	2	ON	$	COL, CPW	
PROST 1.2 Develop properties in a manner that preserves the natural features of a site and provides new or connects to existing public open space.					C2.3, PROST2.3, LU2.2, SNR1.2, SNR1.8, TSI3.1
PROST 1.3 Promote responsible open space use through signage, education, and stewardship.					PROST1.1, LU2.2, LU3.3, SNR1.1, SNR1.2, IGC6.3
Update current and install new interpretive signage that showcases ecological features and Leave No Trace principles.	2	LT	$$	HTA, USFS	
Create volunteer opportunities for clean-up days, native plant restoration, or wildlife monitoring in Fraser's open space.	2	MT	NM	HTA	
PROST 2: Maintain and enhance a rich and varied public trail network, creating more opportunities for outdoor adventure and connecting the community to nature and nearby public lands.					
PROST 2.1 Improve trailheads with amenities that support access and comfort.					DTV3.1, DTV3.3, SNR3.3, SNR4.2, TSI1.4, TM1.1, TM4.1, IGC6.1
Upgrade trailheads with essentials like restrooms, bike racks, trash and recycling bins, shade, seating, and expanded parking.	2	LT	$$$	HTA, CPW, USFS, GC	
Prioritize improvements at high-use trailheads and those serving multiple user groups.	1	ST	$$$	HTA, CPW, USFS, GC	
PROST 2.2 Enhance trail wayfinding and navigation across the network.					DTV1.1, DTV1.2, DTV3.3, C1.2, TM1.1, IGC5.2, IGC6.1

Figure 31: Parks, Recreation, Open Space, & Trails Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Work with regional partners and organizations to install consistent, clear signage with trail names, distances, and safety information across regional trails based on the Winter Park & Fraser Wayfinding Plan	2	LT	$$$	HTA, CPW, USFS, GC	
PROST 2.3 Improve pedestrian and bicycle connections.					DTV1.4, DTV3.3, PROST1.2, PROST2.4, SNR4.2, TM1.1, IGC6.1
Prioritize trail linkages that create a cohesive network, allowing one to travel conveniently without a car.	1	ST	$$$	HTA, CPW, USFS, GC	
Identify gaps, new connections, and trail extensions to improve recreation and non-motorized transportation options.	2	MT	$$	HTA, CPW, USFS, GC	
PROST 2.4 Plan and construct new trails with consideration for environmental sensitivity and land use compatibility.					DTV1.4, C2.3, PROST2.3, TM1.1, IGC6.1, IGC6.3
PROST 2.5 Continue to provide high-quality parks and outdoor facilities and support their expansion and improvement.					
Support the completion and ongoing maintenance of the Fraser Bike Park	1	ST	$		
PROST 3: Provide more opportunities for indoor recreation, offering the community a variety of activities to stay active, social, and engaged, no matter the weather.					
PROST 3.1 In partnership with the Fraser Valley Metropolitan Recreation District, explore opportunities for a fieldhouse/multi-purpose use facility for additional indoor recreation opportunities.					PROST3.1, PROST3.2, PROST3.3, PROST4.4, IGC6.1, IGC6.2
PROST 3.2 Support the Grand Park Community Recreation Center.					PROST3.1, PROST4.2, PROST4.3, TSI2.3, IGC6.1, IGC6.2
PROST 3.3 Expand indoor programming within existing buildings.					EV1.4, PROST3.1, IGC5.3
Use schools or other public spaces for programs like fitness classes, youth activities, or community gatherings.	2	ST	NM	EGSD	
PROST 4: Promote inclusive and barrier-free access to all public spaces, making sure everyone in Fraser feels welcome and engaged, and benefits from community resources.					

Figure 32: Parks, Recreation, Open Space, & Trails Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
PROST 4.1 Find opportunities to expand and protect public lands.					PROST1.1, SNR1.1, SNR1.4, IGC1.1
Secure easements or access agreements where necessary and work to prevent the loss or privatization of established access routes.	1	MT	NM	USFS, CDOT, GC	
PROST 4.2 Identify and remove barriers to using public spaces.					DTV1.4, DTV4.2, PROST3.2, TSI1.3, TSI1.4, TM1.2
Offer scholarships, reduced fees, or free programs to ensure cost isn't a barrier to accessing recreation opportunities.	2	ST	$$	CPW, HTA, FVMRD	
Provide transportation options to parks, recreation facilities, libraries, and other public spaces.	2	MT	$$$	CPW, HTA	
Incorporate universal design elements and ADA compliance.	2	ON	$$$	CDOT, CPW, USFS, HTA	
PROST 4.3 Promote public events and resources to all community members.					DTV4.1, EV5.2, C1.1, C3.3, PROST3.2, SNR1.6, TSI1.3, TSI2.3
Use multiple communication channels to advertise Town sponsored events and recreational opportunities.	3	ON	NM	HTA, FVMRD	
Partner with community organizations to reach underrepresented groups.	3	ON	NM	HTA, FVMRD, MFC	
Provide signage and communications in multiple languages as appropriate.	2	ON	$	HTA, FVMRD	
PROST 4.4 Maintain funding sources to support growth and improvements.					DTV3.1, PROST3.1, LU3.1, LU3.2, TSI3.3, TSI3.4, IGC5.1, IGC6.2
Where feasible, look to expand parks and recreation facilities by utilizing land dedicated through land dedication requirements.	3	ON	$	FVMRD	
Utilize fees-in-lieu of park land dedication to fund capital improvements and expansions to existing parks.	3	ON	$	FVMRD	

Figure 33: Land Use Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
LU 1: Promote a balanced mix of land uses that supports current and future residents and the Town's ability to provide services, while also ensuring we preserve green spaces, enhance outdoor recreation amenities, and protect natural resources.					
LU 1.1 Encourage mixed-use development that integrates housing, stores, businesses, and services in key areas, like Downtown and near transit.					DTV2.1, EV4.3, H2.1, H2.3, LU3.4, TSI2.1
LU 1.2 Support small-scale neighborhood serving retail and services within or near residential areas.					EV2.3, EV3.1, EV3.3, LU2.3, LU2.4, LU3.3, LU3.4, LU4.1, TSI1.5
Encourage future development and annexations to integrate small-scale retail.	1	ST	NM		
LU 2: Plan development where infrastructure and services already exist to reduce the impact and cost of new development.					
LU 2.1 Encourage the development of empty lots and renovation of existing buildings in areas supported by existing infrastructure.					EV1.2, EV3.1, EV3.2, H1.4, H2.4, LU2, TSI1.4, TSI3.1, TSI3.2, TM1.1
Prioritize the use of underused or empty parcels within existing town boundaries.	1	ST	NM		
Direct growth to locations with available sewer, water, transportation, and emergency services.	1	ST	NM		
LU 2.2 Promote compact, walkable, transit-supported development patterns that preserve open space.					H2.2, C2.3, PROST1.2, PROST1.3, LU2, SNR1.1
LU 2.3 Discourage sprawl and leapfrog development patterns that strain town services and inefficiently consume land.					LU1.2, LU2
LU 3: Ensure new development is beneficial to the fiscal sustainability of the Town of Fraser.					
LU 3.1 Implement and regularly update development impact fees at least every 3 years to ensure new development contributes its fair share toward infrastructure, green space, and public services.					PROST4.4, LU3.2, H1.3, TSI1.6, TSI3.1, TSI3.2, TSI3.3, TM4.1, IGC5.1, IGC6.2, IGC7.1
Conduct a study to determine the feasibility of implementing impact fees for transportation, affordable/workforce housing, and other essential services.	1	ST	NM	FRVHP, GC, WP, FWPPD	

Figure 34: Land Use Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Ensure that plant investment fees for water and sewer are regularly updated to align with the cost of capital expansions.	1	ST	NM	WPRWS	
Reevaluate the Town's current land dedication and fee-in-lieu requirements for parks and schools.	1	ST	NM	EGSD	
Coordinate and collaborate with the East Grand Fire Protection District on periodic reassessments of their impact fees for new development.	1	ON	NM	EGFPD	
Review and adjust fee structures periodically to reflect actual service costs.	1	ON	NM		
LU 3.2 Require off-site improvements, when necessary, as a condition of approval for development projects to mitigate community impacts.					EV1.1, PROST4.4, LU3.1, SNR2.4, TM4.1, IGC5.1
Strengthen and clarify existing regulations for off-site improvements (such as transportation/roadway improvements, drainage and snow storage/melting facilities, parks/trails/open space, etc.) and right-of-way dedication for new development projects.	1	ST	NM		
LU 3.3 Develop and adopt a standard annexation agreement that guides future annexations and their development.					C1.3, PROST1.3, LU1.2, LU3, LU4.1, TSI3.3, IGC1.1, IGC2.1
Include provisions that require new annexations to contribute to the cost of or dedicate land for infrastructure, public services, and amenities; and/or provide affordable housing, open space, and commercial land uses.	1	ST	NM		
Codify the proposed annexation policy and template agreement outlining expectations for infrastructure contributions, conveyance of water rights, service provisions, and community benefits.	1	ST	NM		
LU 3.4 Promote commercial and mixed-use developments in appropriate areas for sales tax generation.					EV4.3, H2.1, LU1.2

Figure 35: Land Use Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Encourage development that expands retail, lodging, and service sectors to increase sales and lodging tax revenues.	1	ST	NM		
Target high-visibility or high-traffic locations for commercial and mixed-use areas.	1	ON	NM		
Inclusion of light industrial/ manufacturing land uses to diversify the region's job and tax base.	3	ON	NM	GCED, FWPC	
LU 4: Align development codes, policies, and processes with the vision and goals of the Comprehensive Plan.					
LU 4.1 Follow the Future Land Use Map for strategic future annexations and rezoning requests.					LU1.2, LU3.3, SNR1.2, IGC2.1, IGC5.1, IGC6.3
Review and periodically update the Future Land Use Map and 3-mile plan.	2	ON	NM	GC, WP	
LU 4.2 Update the land development code to support the vision and goals in this document.					DTV1.4, H1.3, SNR1.1, SNR1.6, SNR1.8, SNR1.9, SNR2.4

Figure 36: Sustainability & Natural Resources Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
SNR 1: Foster and support initiatives that preserve and enhance Fraser's natural beauty, ensuring its unique landscapes remain vibrant for years to come.					
SNR 1.1 Protect wildlife habitat through restoring and preserving wildlife corridors.					PROST1.1, PROST1.3, PROST4.1, LU2.2, LU4.3, SNR1, IGC3.1
Designate and preserve corridors that facilitate wildlife movement, reducing habitat fragmentation through the adoption of conservation zoning regulations that limit development in critical habitats or provide restorative measures.	2	ON	NM	CPW, COL	
Collaborate with CDOT and CPW to implement wildlife crossings of US 40 where feasible.	3	LT	$$$	CDOT, CPW	
SNR 1.2 Enhance riparian corridors through buffer zones, native vegetation restoration, and erosion control measures.					PROST1.2, PROST1.3, LU4.1, SNR1
Implement the Fraser River Corridor Maintenance Plan and explore expansion in the future.	2	ON	$$	CPW	
Maintain and expand the Town's current regulations regarding buffer zones / setbacks along waterways to limit erosion, restore riparian integrity, filter pollutants, and provide wildlife habitat.	1	ON	NM	USACE, CWCB, UCWET	
Prioritize the replanting of native flora along waterways to improve ecological health and resilience.	2	ON	$$	CWCB, UCWET	
SNR 1.3 Protect, restore, and enhance wetlands by implementing control measures.					DTV3.2, SNR1, SNR2.4
Conduct comprehensive mapping of existing wetlands to identify priority wetlands and inform planning decisions.	2	MT	$$	USACE, CWCB	
Enforce development restrictions to protect existing wetlands and employ mitigation banking to compensate for previous or future impacts.	1	ON	NM	USACE, CWCB, CPW	

Figure 37: Sustainability & Natural Resources Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
SNR 1.4 Protect watersheds through a comprehensive watershed management plan.					PROST1.1, PROST 4.1, SNR1, TSI3.1
Develop and implement plans that address land use, water quality, and conservation within the watershed and implement best practices to reduce runoff and prevent pollution in waterways.	2	ON	NM	CWCB	
SNR 1.5 Conserve water through community outreach that removes barriers to implement best practices.					SNR1, SNR2.3, TSI1.5, TSI3.1, IGC5.4
In partnership with local municipalities and water & sanitation districts, promote water savings programs including audits, retrofits, and the use of water efficient landscaping practices through public education and demonstration gardens.	3	MT	$$	GC1, WPRWS	
Implement the recommendations from the 2023 Water Efficiency Plan and monitor/evaluate their effectiveness.	2	ON	$		
Update the Town's landscaping regulations for new development to require vegetation that does not require irrigation once it is established.	2	ST	NM		
SNR 1.6 Restore and protect the tree canopy through programs, ordinances, and community events.					DTV1.4, PROST 4.3, LU4.2, SNR1
Expand the role of the Town's streetscape and public gardens management staff to plant new and maintain existing trees in public spaces to enhance canopy cover.	2	MT	$$$		
Enact ordinances that protect mature trees when development occurs,	1	ST	NM		
Organize events that encourage community participation in tree planting and care (Plant a Tree Day).	3	ST	$		

Figure 38: Sustainability & Natural Resources Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
SNR 1.7 Manage noxious weeds through integrated weed management, monitoring, and awareness.					SNR1, SNR2.4
Adopt a combination of mechanical, chemical, and biological control methods to manage invasive species, educate the community on identifying and reporting, and conduct routine surveys to detect and address noxious weed infestations promptly.	3	LT	$$$		
SNR 1.8 Manage stormwater through maintenance, ordinances, and sustainable infrastructure.					PROST1.2, LU4.2, SNR1, SNR2.2, TSI3.1, TM1.1, IGC5.2
Survey existing conditions and form a holistic, regional/ neighborhood based approach to update inefficient stormwater infrastructure.	3	MT	$$		
Adopt supplemental regulations to the Grand County Storm Drainage Design and Criteria Manual to encourage and incentivize new developments to incorporate rain gardens, bioswales, permeable pavements and other green infrastructure to manage stormwater naturally.	2	ST	$$		
Explore partnerships with the school district, library district, and other entities to educate the community on stormwater management with hands-on demonstrations along St. Louis Creek.	1	ST	$	EGSD, GCLC, UCWET, GCWIN, LBD	
SNR 1.9 Strive to achieve Dark Sky Community Designation by 2035 - reducing light pollution through ordinances and education.					LU4.2, SNR1, SNR2.3
Strengthen existing exterior lighting ordinances to minimize skyglow and light trespass and/ or require the use of shielded fixtures that direct light downward.	2	ST	NM		
Inform residents and businesses about the benefits of reducing light pollution.	3	ON	$	FDDA, FWPC, SG	

Figure 39: Sustainability & Natural Resources Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Partner with HOA's to update and enforce neighborhood lighting regulations.	2	ON	NM		
Explore implementing a grant program to support local compliance.	3	MT	$$$		
SNR 2: Embrace sustainable development practices that create harmony between growth with the natural environment, ensuring a thriving community while protecting the beauty and resources of Fraser.					
SNR 2.1 Encourage energy efficiency for all homes and businesses in Fraser.					EV3.1, SNR3.2, TSI1.5
Support and partner with Sustainable Grand and other nonprofit community groups that provide education and outreach with regards to energy efficiency.	3	ON	$	SG	
Update local building codes to align with the latest International Energy Conservation Code (IECC) standards.	2	ON	NM	SG	
Provide subsidized energy audits for homes and small businesses, and additional support/subsidies for weatherization, insulation, and HVAC upgrades.	2	LT	$$$	SG	
SNR 2.2 Support green building design by offering density bonuses, expedited permits, or reduced fees for projects that meet LEED or other high-performance building standards.					H1.1, C2.2, SNR1.8, SNR3.1
SNR 2.3 Lead by example by retrofitting town-owned facilities with high-efficiency appliances and fixtures and utilizing native plantings and drought-tolerant species across town facilities.					SNR1.5, SNR1.9, SNR3.1, TSI1.4
Conduct a greenhouse gas emissions inventory to determine progress/impact of the recommendations from the 2016 Sustainability Plan.	2	MT	$$$	SG	
Create a new Sustainability Plan and implement its recommendations.	2	LT	$$$	SG, CWCB, D, MPE	
SNR 2.4 Ensure development is oriented in a way that mitigates the risk of natural and human-made disaster.					LU3.2, LU4.2, SNR1.3, SNR1.7, TSI1.6, IGC7.1

Figure 40: Sustainability & Natural Resources Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Create defensible space programs and vegetation management, especially near the Wildland-Urban Interface (WUI).	2	ST	$$	CPW, USFS, EGFPD, WP, GC	
Adopt codes and regulations that align with the Colorado Wildfire Resiliency Code.	1	ST	NM	EGFPD, WP, GC	
Ensure new development is outside of the 100-year floodplain and wetland designations.	1	ON	NM	USACE	
SNR 3: Promote efforts to improve air quality helping to create a cleaner, healthier environment for residents.					
SNR 3.1 Measure, track, and set targets for greenhouse gas reduction.					SNR2.2, SNR2.3, IGC2.1
SNR 3.2 Advance renewable energy.					SNR2.1, SNR3.4
Advocate for Mountain Parks Electric to increase the share of its electric power that comes from renewable energy sources such as solar and wind.	3	ON	NM	MPE, SG	
Promote community solar programs.	3	ON	$$	MPE, SG	
SNR 3.3 Reduce solid waste.					PROST2.1, TSI3.2, TSI3.3
Promote the pay-as-you-throw trash and recycling services available at the Town's facility, The Drop.	2	ON	NM	D	
Create programs and incentives to increase usage of The Drop by both residents and visitors.	2	ST	$$	D	
Explore, and implement where feasible, expansion of recycling services and what is collected, as well as composting services for organics.	3	MT	$$	D	
Adopt policies in line with the implementation of the Colorado Producer Responsibility Program and Minimum Recyclables List and require licensed haulers or contracted services to provide recycling.	2	MT	NM	D	

Figure 41: Sustainability & Natural Resources Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
SNR 3.4 Further vehicle electrification and support development of EV charging infrastructure.					DTV1.3, SNR3.2, SNR4.1
Convert transit and Town fleet vehicles to electric or hybrid models.	3	LT	$$$	SG, LF, WP, MPE	
Adopt the permitting processes and standards from the EV Charging Model Land Use Code promulgated by the Colorado Energy Office to reduce barriers to EV charging development.	2	ST	NM	SG, MPE	
SNR 4: Inspire and support healthy, sustainable lifestyles that nourish both people and the planet.					
SNR 4.1 Reduce vehicle miles traveled.					DTV1.3, SNR3.4, SNR4.2, TM4.1
Implement a car share program.	2	LT	$$$	CDOT, LF, WP	
Explore a parking demand strategy to reduce idling and increased driving.	3	MT	$$	CDOT, WP	
SNR 4.2 Encourage multi-modal transportation by designing roads for all users—pedestrians, cyclists, transit riders, and drivers—with safe sidewalks, crosswalks, and bike lanes.					DTV1.3, DTV1.4, SNR4.1, TM2.2, PROST2.1, PROST2.3, LU2.4, TM1.2, TM2.2, IGC5.2
Collaborate with neighboring communities and regional agencies to expand public transit routes and schedules for the Lift and other public transit options.	1	ST	$$$	LF, WP	
Audit the bicycle connectivity network and incorporate into strategic development.	2	MT	$$	HTA	
Explore, and implement if feasible, micro-transit or bike-share programs to complement Lift services.	2	MT	$$$	LF, WP, GC	

Figure 42: Town Services & Infrastructure Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
TSI 1: Provide essential services for residents of all ages, backgrounds, and abilities.					
TSI 1.1 Improve access to affordable childcare and early childhood education.					DTV2.1, EV3.1, EV4.4
Enhance partnerships with local providers, schools, and nonprofits to expand childcare options and increase childcare capacity.	1	ON	NM	EGSD, GKLC, GF, GB	
Secure funding/revenue opportunities to provide licensing and support operations for childcare providers.	1	ST	NM	GF	
Explore incentives for businesses or housing developments that include on-site childcare.	1	ST	NM		
Work at the county level with Grand Beginnings, the county, neighboring municipalities, local businesses and foundations to address the need for sustainable early childhood education funding.	1	LT	NM	GF, GB, GKLC, WP, GY, FWPC	
TSI 1.2 Expand educational and community services.					EV3.3, TSI1.5, TSI2.1, TM2.2, IGC3.2, IGC5.3
Support increased senior services such as transportation, meal delivery, social programming, and in-home care support for older residents.	2	ST	$$$	GCCA	
Support local libraries to expand programming and resources.	2	MT	$$	GCLD	
Support the formation of a 6-12 grade school facility in Fraser.	1	LT	$$$	EGSD	
TSI 1.3 Expand access to multilingual, culturally inclusive, and digitally accessible communications.					PROST4.2, PROST4.3, TSI1.5, TSI1.6, TSI3.3, IGC6.2, IGC7.1
Provide translation and interpretation services for public information, especially around emergency services.	1	MT	$$$		

Figure 43: Town Services & Infrastructure Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Offer Town materials and service information in multiple languages and a digitally accessible format.	2	MT	$$		
TSI 1.4 Ensure facilities meet American Disabilities Act (ADA) standards and are universally accessible.					DTV 1.4, DTV 3.1, EV1.2, C1.3, PROST2.1, PROST4.2, LU2.1, SNR2.3, TM1.1
Ensure that public buildings, sidewalks, trails, and other amenities meet accessibility standards and guidelines and retrofit/upgrade these facilities if needed.	2	LT	$$$		
Ensure existing businesses and commercial properties make upgrades that meet accessibility standards and guidelines and require new developments to comply during the development review process.	2	MT	NM	FDDA, FWPC	
TSI 1.5 Strengthen community outreach and services to further support residents.					EV1.4, C1.1, LU1.2, SNR1.5, SNR2.1, TSI1.2, TSI1.3, IGC5.3
Partner with non-profits and agencies to connect residents with available resources and services.	3	ON	NM	GCRHN, MPH, GKLC, GB, GCLD, MFC	
Endeavor to meet the needs of all residents through culturally inclusive and multilingual programming.	3	ON	$		
TSI 1.6 Support emergency preparedness and resilience efforts in the case of natural or human-made disasters.					C1.1, LU3.1, SNR2.4, TSI1.3, IGC7.1
Equip the community with the tools, knowledge, and resources needed to prepare for, respond to, and recover from disasters.	2	ON	$$	GC, EGFPD, FWPPD	
Identify and make places of refuge available during severe snow or weather events, particularly during closures of Berthoud Pass.	3	LT	$$$	FVMRD, FWPPD, EGFPD, EGSD	

Figure 44: Town Services & Infrastructure Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
TSI 2: Expand health services to support the growing needs and quality care of Fraser's residents.					
TSI 2.1 Increase healthcare options and services.					EV2.3, EV3.3, LU1.1, TSI1.2, TSI2.2, TSI2.3, IGC5.2
Support the new Middle Park Health Hospital campus and facilitate the development of additional healthcare related services.	3	ON	$$$	MPH, GCRHN	
Recruit health providers in Fraser to serve local needs.	2	ON	NM	GCRHN	
TSI 2.2 Expand mental and behavioral health services.					TSI2.1, IGC5.2
Create partnerships with current mental healthcare providers and facilities.	3	ON	NM	MPH, GCRHN, MFC	
Collaborate with county and nonprofit mental health providers to increase access.	3	ON	NM	GC, MPH, GCRHN	
TSI 2.3 Integrate health promotion into Town programs.					DTV 3.2, DTV4.1, EV1.4, C3.3, PROST3.2, PROST4.3, TSI2.1
Use parks & recreation programming and community events to encourage physical activity, healthy lifestyles, and preventative care.	3	ON	NM		
Expand community event offerings to include a wider range of activities that appeal to all residents, including those seeking non-alcohol centered experiences, and enhance access to additional support resources.	2	ST	$$		
TSI 3: Maintain and enhance Fraser's physical infrastructure to ensure it's ready to support the community's growth and needs.					
TSI 3.1 Ensure long-term water supply and high-quality drinking water.					PROST1.1, PROST1.2, LU2.1, LU3.1, SNR 1.4, SNR1.5, SNR1.8, IGC5.4

Figure 45: Town Services & Infrastructure Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Plan for future water use through conservation programs, infrastructure upgrades, and watershed protection.	2	LT	$$$	CWCB	
Continue to monitor and maintain water treatment facilities to meet quality standards.	2	ON	$$$	CWCB	
Incorporate rain gardens, bioswales, permeable pavements and other green infrastructure into public streets to manage stormwater naturally and protect the Fraser River and its tributaries.	2	ON	$$$		
Locate snow storage and melting facilities away from the Fraser River.					
TSI 3.2 Invest in sewer and wastewater systems upgrades.					SNR3.3, LU2.1, LU3.1, IGC5.4
Upgrade aging sewer infrastructure and expand capacity in areas targeted for growth.	2	LT	$$$	GC1, WPRWSD	
TSI 3.3 Support the expansion or consolidation of Town services.					PROST4.4, LU3.1, LU3.3, SNR3.3, TSI1.3, IGC1.1, IGC3.2, IGC5.4
Support the expansion or relocation of the post office within Town boundaries.	2	LT	$$$		
Expand recycling and compost services and facilities.	3	ON	$$$		
Explore the creation of a separate parks division or department.	2	LT	$$		
TSI 3.4 Review and update the Capital Improvement Plan (CIP) based on infrastructure condition, development trends, available funding, and reaching 50% completion on previous CIP.					DTV1.2, PROST4.4, IGC5.1

Figure 46: Transportation & Mobility Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
TM 1: Build safe, inspiring walking and biking connections—whether strolling Downtown or heading out on a scenic trail—that invite people to explore year-round.					
TM 1.1 Improve pedestrian, ADA accessibility, and bicycle connectivity, comfort, and safety.					DTV1.2, DTV1.3, DTV1.4, PROST2.1, PROST2.2, PROST2.3, PROST2.4, LU2.1, SNR1.8, SNR4.2, TSI1.4, TM3.1, IGC6.1, IGC6.3
Identify gaps in the pedestrian and bicycle networks.	2	ST	$	HTA	
Improve key bicycle and pedestrian crossings.	2	LT	$$$	CDOT	
Improve regional trail connections through Fraser.	2	ON	$$$	HTA	
Evaluate and improve ADA accessibility on all existing pedestrian facilities within the Town, and ensure ADA compliance for all new facilities.	1	ON	$$$		
Conduct a study for pedestrian connections from the Fraser Valley Elementary School, across the railroad and US 40, to St. Louis Landing and other neighborhoods and amenities east of US 40.	2	LT	$$$	AM, CDOT	
Address drainage and snow removal issues to improve pedestrian friendly sidewalks throughout the winter and spring months.	1	LT	$$	CDOT, FDDA	
TM 1.2 Develop new standard/typical roadway sections that allocate space for non-motorized users.					DTV1.2, DTV1.3, DTV1.4, DTV3.3, PROST4.2, SNR4.2
TM 2: Plan for a flexible and seamless transit experience that includes local solutions like micro-transit and a rail station area that welcomes travelers into Fraser's vibrant Downtown.					
TM 2.1 Support increased passenger rail traffic to Fraser.					DTV1.3, DTV2.1, TM4.1, IGC3.1, IGC3.2
Develop a Rail Station Area Plan for the Fraser Rail Station.	1	ST	$$$	AM, CDOT	
Work with rail service providers to ensure consistent service.	2	ON	NM	AM, CDOT	

Figure 47: Transportation & Mobility Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Plan for the future Fraser Mobility Hub to connect rail passengers to bus, bicycle, and other transportation services.	2	MT	NM	AM, CDOT	
TM 2.2 Improve transit connectivity for areas not served by fixed-route transit.					DTV1.3, SNR4.2, TSI1.2, IGC3.2
Evaluate the feasibility of implementing a micro-transit service.	2	MT	$$$	LF, WP, GC	
TM 3: Support a well-connected road network that improves traffic flow, reduces congestion, and ensures the safe, efficient movement of people and vehicles throughout Fraser.					
TM 3.1 Maintain and adapt Fraser's road network to support year-round access, safety, and the town's unique mountain context.					DTV1.2, DTV1.3, DTV4.2, C2.3, TM1.1, TM4.1, IGC3.1
Maintain and enhance roadway conditions through targeted reinvestment.	1	ON	$$$		
Coordinate with CDOT on the US 40 capacity project to reflect local needs.	2	ON	NM	CDOT	
Coordinate with Grand County on the completion of the Fraser Valley Parkway (FVP) from CR 73 (St. Louis Creek Road) to CR 522.	2	ON	NM	GC	
Identify a north-south connection east of US 40 from CR 8 to Safeway (Edna Tucker Way-Sun River Dr-Clayton Ct).	2	ON	NM	FDDA	
TM 4: Provide thoughtful and easy-to-find parking that is balanced with the Town's commitment to walkability and placemaking.					
TM 4.1: Balance parking supply and management with walkability and placemaking.					DTV1.1, DTV1.3, DTV2.2, H2.3, C1.2, PROST2.1, LU3.1, LU3.2, SNR4.1, TM2.1, TM3.1, IGC2.1, IGC3.1
Explore time restrictions for on-street parking near highly visited destinations and implement if needed.	3	ON	NM		

Figure 48: Transportation & Mobility Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Add signage in key locations as consistent with the Winter Park & Fraser Wayfinding Plan throughout Town to clarify parking, destinations, and transportation options.	3	MT	$$$		
Coordinate with CDOT Mountain Passenger Rail improvements and Clayton Court development to identify a location for a shared parking facility.	1	LT	NM	CDOT, AM	
Evaluate the feasibility of a parking monitoring program.	2	MT	$$	FDDA	
Evaluate a fee-in-lieu and shared parking models.	1	ST	$$	FDDA	

Figure 49: Intergovernmental Coordination Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
IGC 1: Develop a framework for ongoing regional collaboration to foster strong partnerships and drive impactful solutions across communities and regions.					
IGC 1.1 Create and formalize intergovernmental agreements for shared services and infrastructure.					DTV2.1, PROST4.1, LU3.3, TSI3.3, IGC2.1, IGC3.2, IGC5.1, IGC5.4
Inventory and monitor active IGAs between Fraser and other entities.	3	ON	$		
IGC 2: Encourage coordination and collaboration around land use in the Fraser Valley.					
IGC 2.1 Work with Winter Park, Grand County, and other partners to identify shared growth areas, environmental resources, and land use goals that cross jurisdictions.					H3.1, LU3.3, LU4.1, SNR3.1, TM4.1, IGC1.1, IGC4.2, IGC5.1, IGC5.4
Establish a procedure for notifying and consulting nearby towns and the County on significant development proposals, annexations, or rezonings near shared boundaries.	2	MT	$	GC, WP	
IGC 3: Coordinate regional transit plans and projects to efficiently move people throughout the Valley.					
IGC 3.1 Foster relationships with CDOT, Grand County, and Union Pacific to be involved with regional transportation master planning efforts.					DTV1.3, SNR1.1, TM2.1, TM3.1, TM4.1, IGC3.2, IGC5.1
IGC 3.2 Work with Winter Park, Winter Park Resort, Granby, and Grand County to support operation and expansion of The Lift transit service.					TSI1.2, TSI3.3, TM2.1, TM2.2, IGC1.1, IGC3.1, IGC5.2
Secure additional, sustainable joint funding for transit infrastructure and operations.	2	ON	NM	WP, GY, GC	
Explore the formation of a Regional Transportation Authority (RTA).	3	LT	$$$	WP, GY, GC	
IGC 4: Create forward-thinking, regional housing plans that address the needs of the entire Valley.					
IGC 4.1 Work with Fraser Valley Housing Partnership, Winter Park, and Grand County to create a Valley-wide strategy for workforce, seasonal, and affordable housing.					DTV2.3, EV4.1, H3.1, H4.1
IGC 4.2 Explore shared tools and incentives for housing development.					DTV2.3, H1.1, H2.3, IGC2.1
IGC 5: Work with Grand County and Winter Park to understand capacity and plan for services and infrastructure upgrades.					

Figure 50: Intergovernmental Coordination Implementation Matrix

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
IGC 5.1 Work with government entities and special districts in the Fraser River Valley to further long-range planning goals and align Capital Improvement Plans across jurisdictions.					PROST4.4, LU3.1, LU3.2, LU4.1, TSI2.2, TSI3.4, IGC1.1, IGC2.1, IGC5.4, IGC6.2
Continue to explore a location for a shared composting site with Grand County and Winter Park.	3	ON	$	GC, WP, D	
In partnership with Grand County, continue to advocate for a quiet zone and pedestrian amenities at the CR 5 railroad crossing.	2	MT	$	GC	
IGC 5.2 Provide leadership and participation in efforts to address local challenges through regional cooperation.					H3.1, EV4.1, PROST2.2, SNR1.8, SNR4.2, TSI2.1, IGC3.2, IGC6.1, IGC6.3, IGC7.1
IGC 5.3 Collaborate with the Grand County Library District to enhance library programming to engage a greater number of residents.					C1.3, PROST3.3, TSI1.2, TSI1.5, IGC6.2
IGC 5.4 Further explore opportunities to share municipal services with Winter Park for advanced efficiency and coordination.					SNR1.5, TSI3.1, TSI3.3, IGC1.1, IGC2.1, IGC5.1, IGC6.2
Identify shared projects with adjacent water & sanitation districts.	2	ON	$$$	WPRWSD, GC1	
IGC 6: Coordinate efforts around parks, recreation, open space, and trails to create a cohesive regional network.					
IGC 6.1 Coordinate regional recreation and collaborate with the Fraser Valley Metropolitan Recreation District (FVMRD), Headwaters Trail Alliance (HTA), Colorado Open Lands (COL), and the Town of Winter Park.					DTV1.1, DTV3.1, PROST2, PROST3.1, PROST3.2, TM1.1, IGC5.2, IGC6.2
IGC 6.2 Collaborate on joint use facilities and programming.					PROST3.1, PROST3.2, PROST4.4, LU3.1, TSI1.3, IGC5.1, IGC5.3, IGC5.4, IGC6.1
Inventory and assess recreation district-wide.	3	LT	$$$	FVMRD, WP	
Identify land for acquisition across jurisdictions.	3	LT	$	FVMRD, WP	

Figure 51: **Intergovernmental Coordination Implementation Matrix**

Goal/Strategy/Action	Priority	Timeframe	Cost	Partners	Other Applicable Policy
Share facilities, funding, and programming to expand access.	2	ON	$	FVMRD, WP	
IGC 6.3 Encourage regional strategic planning and initiatives regarding Fraser River Regional trail linkages.					PROST1.3, PROST2.4, LU4.1, TM1.1, IGC5.2
IGC 7: Protect residents, visitors, and property from human or natural made disasters.					
IGC 7.1 Coordinate with regional agencies and adjacent communities on hazard mitigation and prepardeness.					LU3.1, SNR2.4, TSI1.3, TSI1.6, IGC5.2
Continue to participate in regular updates to the Grand County Multi-Hazard Mitigation Plan, Emergency Operations Plans, and Community Wildfire Protection Plan.	1	ON	NM	GC, FEMA, USFS, CWPP, GFWP, GY, FWPPD, EGFPD, USACE	

Future Land Use

WHAT IS FUTURE LAND USE?

Future land use is a common tool used in comprehensive planning to guide land use decisions and inform changes to development regulations. A description of each future land use designation can be found on pages **163-166**, along with the intent, an example in Fraser (or elsewhere) where this designation already exists, and how much land area the designation represents within the Town and the larger 3-mile area. The colors of each designation correspond to the Future Land Use Map (FLUM) in **Figure 52**. While the purpose of future land use can vary from municipality to municipality, in Fraser it is used in the following ways.

Ties the type of activity and intensity of different land uses to geographic areas in Fraser & the 3-mile area.

Forms the basis for decision making when it comes to zoning changes and development.

Guides development towards areas with infrastructure and planned improvements.

Protects open and natural spaces.

Future land use ties the type of activity and intensity of different land uses to geographic areas in Fraser & the 3-mile area.

Future land use's primary role is to categorize land uses based on activity level, impacts, and character. By integrating all the planning elements outlined in the Fraser Forward chapter, the framework translates community priorities and policy recommendations into the physical environment. Within Fraser, designations highlight current conditions and guide how areas should evolve, while in the 3-mile area they identify the types of activities best suited for future and planned expansion.

It forms the basis for decision making when it comes to zoning changes and development.

Although it is not zoning, it is a key component that guides future code updates and rezonings. Future land use is intentionally broad so that multiple zoning districts can fit into one future land use designation. This provides some general direction for the type of developments and where they can occur, but provides flexibility for context-sensitive design.

Future land use guides development towards areas with infrastructure and planned improvements.

By categorizing and regulating the density and activities of areas, the town can ensure that it is growing in a financially sustainable manner. Encouraging development in places already served by infrastructure such as roads, water, and sewer reduces the cost of extending and maintaining infrastructure.

It's used to protect open and natural spaces.

By encouraging infill development and designating environmentally sensitive areas, future land use guides development to appropriate areas and can even prohibit development of open and natural spaces. By guiding development in areas already served by infrastructure it makes the town more vibrant and keeps the natural areas – natural.

PLANNED NATURAL AREA (PNA) BOUNDARY

The PNA Boundary is the 2.6 acres of wetland habitat that is protected in the St. Louis Landing (formerly Victoria Village) development. The PNA was originally established in 2012 with deed restrictions as part of wetland mitigation for wetland fill on site under the United States Army Corps of Engineers (USACE). The Town worked with Grand Environmental Services (GES) to receive USACE approval to modify the PNA boundary to facilitate a bridge crossing of the St Louis Creek for the proposed road that will run through the development. Displaying the PNA Boundary on the future land use map helps ensure it is conserved as intended and properly managed for years to come.

FRASER VALLEY PARKWAY

The existing and planned Fraser Valley Parkway is displayed to give greater context to future land use decisions that are made on adjacent properties. The Fraser Valley Parkway expansion is currently in the planning stages with Grand County and CDOT, with the Town of Fraser being a major stakeholder in the process.

PLANNED DEVELOPMENT (PD) ZONING

Almost all of Fraser's more recent development has occurred within the Grand Park and Rendezvous neighborhoods and has been guided by the framework of their Planned Development (PD) zoning. PDs generally are established to allow for more flexibility than standard zoning districts in exchange for more detailed and thoughtful design, and they are often established in conjunction with securing additional public benefits negotiated through the annexation process. Due to both of these development areas having established standards and amendment processes, this Comprehensive Plan focuses on areas of investment and possible future strategic growth while strengthening and celebrating the transformational nature of these PD neighborhoods in terms of the new housing choices, recreation opportunities, and services and attractions for residents and visitors alike that they have created. The Future Land Use Map reflects the latest approvals and entitlements for the Grand Park and Rendezvous Planned Developments. Any future amendments to these areas are subject to review and approval by the Town in conjunction with the planned development amendment procedures and their respective annexation agreements.

FUTURE ANNEXATION

Land may be considered for annexation into the Town of Fraser, if the annexation would comply with state annexation statutes and the policies of this Comprehensive Plan. It is the responsibility of the applicant or annexation petitioner to demonstrate how the proposed annexation would comply with all of the pertinent policies and show why annexation would be a benefit to the Town of Fraser.

If a property is annexed, zoning will be established according to the Future Land Use Map contained in this Comprehensive Plan and through an evaluation of the rezoning criteria contained the Fraser Land Development Code. The annexed land will need to meet the development standards of the Fraser Land Development Code.

All proposed annexations shall be accompanied by an annexation agreement which contains the specific obligations of development. The agreement shall be executed upon approval of the annexation application by the Fraser Board of Trustees. The obligations contained in the annexation agreement should provide a clear community benefit to the Town of Fraser and serve the best long-term needs and interests of the Town. These obligations should relate to the goals, strategies, and actions contained in this Comprehensive Plan.

The following items listed are identified community needs (higher priority) and interests (lower priority) that could be achieved through an annexation proposal. This is not an exhaustive list but rather intended to facilitate discussion with parties interested in annexation into the Town of Fraser.

Community Needs

- Conveyance of water rights to the Town
- Dedication of land for future 6th 12th grade public school(s) to serve the Fraser Valley
- Dedication of approximately 15 acres of land, west of the existing Upper Fraser Valley Wastewater Treatment Plant, to facilitate future capacity improvements
- Assurance that the annexed are is served by proper postal services, either through expansion/ renovation of the existing post office building or construction of a new post office
- Dedication of land for a public works satellite facility
- Inclusionary zoning / affordable housing incorporated into the development of the annexed area
- Extension of the Fraser River Trail and permanent preservation of open space / riparian areas

Community Interests

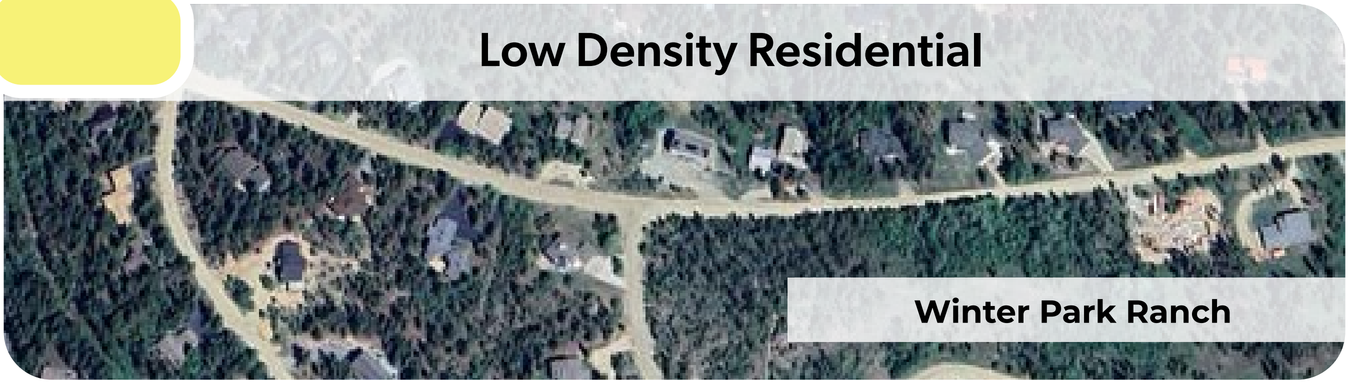
- Dedication of land for post-secondary education, such as a community college or trade school campus
- Dedication of land to the Fraser Valley Metropolitan Recreation District for additional facilities
- Dedication of land for a future public purpose
- Inclusion of light industrial / manufacturing uses within the annexation area to diversify the region's job and tax base
- Creation of a geothermal utility district within the annexation area

FUTURE LAND USE DESIGNATIONS

RESIDENTIAL

Town: 25.2%   3-mile area: 34.2%

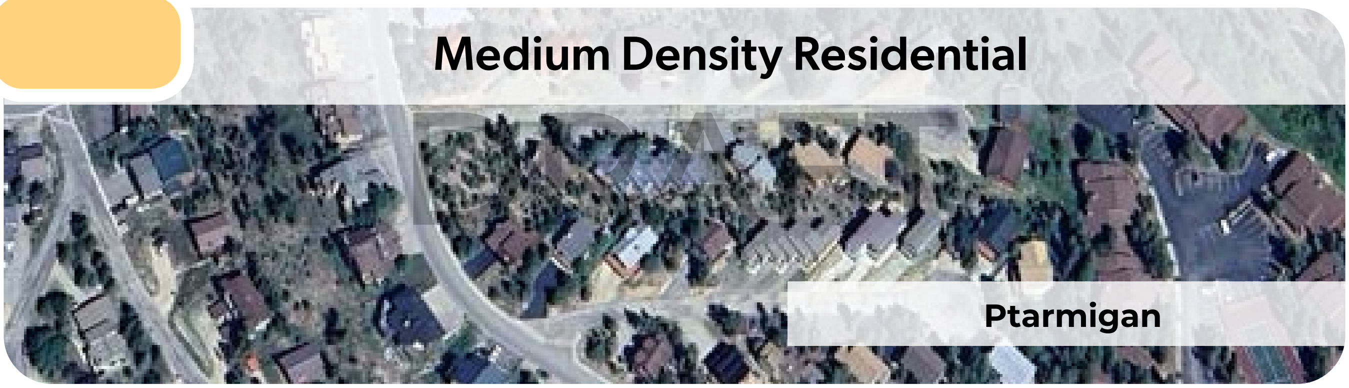
Low Density Residential



Preserve and enhance Fraser's mountain-town character and natural surroundings by providing areas primarily for single-family homes on larger lots.

Town: 18.3%   3-mile area: 4.4%

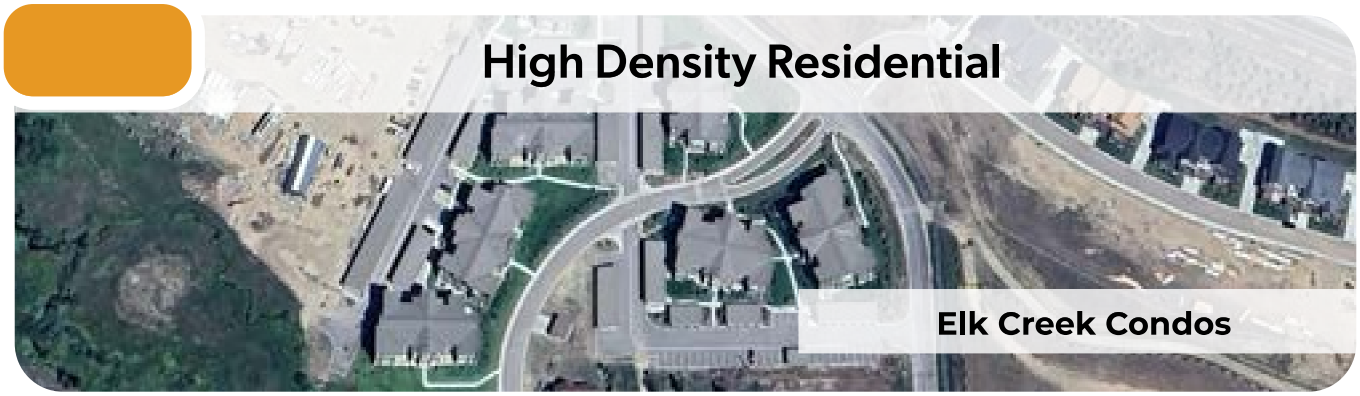
Medium Density Residential



Provide for a diverse range of housing options, including single-family homes on smaller lots, duplexes, townhomes, and appropriately scaled multi-family dwellings, that contribute to a vibrant and accessible community.

Town: 4.7%   3-mile area: 4.4%

High Density Residential



Strategically accommodate a variety of higher-density housing types, including apartments and condominiums, in areas that are well-served by existing infrastructure, public transportation, and within convenient walking or cycling distance of commercial centers, employment opportunities, and community amenities.

FUTURE LAND USE DESIGNATIONS

COMMERCIAL/MIXED USE

Town: 1.2%   3-mile area: 0.3%

Commercial

Murdoch's Ranch & Home Supply

Provide dedicated areas for a range of retail, service, office, and light commercial establishments necessary to serve the daily needs of Fraser residents and visitors.

Town: 7.0%   3-mile area: 2.6%

Mixed Use/Riverwalk


Trinidad, CO

Foster vibrant, walkable, and economically diverse activity centers within Fraser. Encourages the integration of complementary commercial, retail, office, service, and residential uses.

Town: 0%   3-mile area: 2.3%

Mixed Use Light Industrial/Flex


Fraser Valley Distilling

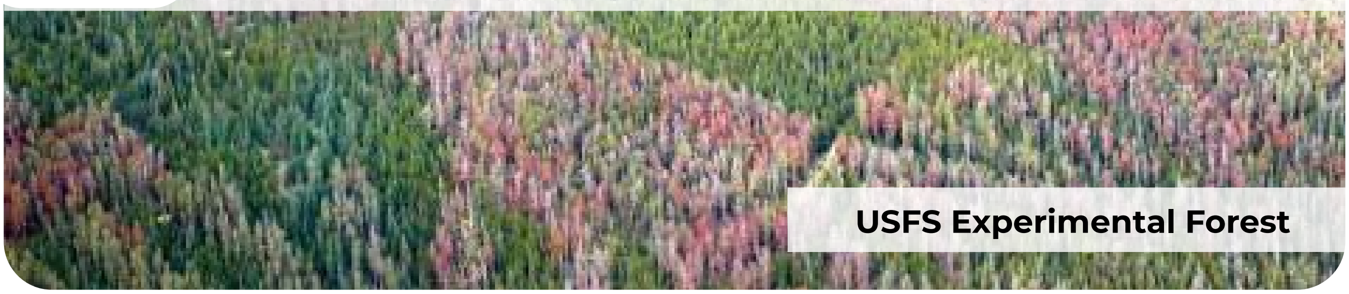
Create flexible areas that support a range of light industrial, manufacturing, warehousing, research and development, and compatible commercial uses that require larger spaces or specific operational characteristics.

FUTURE LAND USE DESIGNATIONS

NATURAL/RECREATION/PUBLIC

Town: 0%   3-mile area: 18.2%

Forest/Agriculture

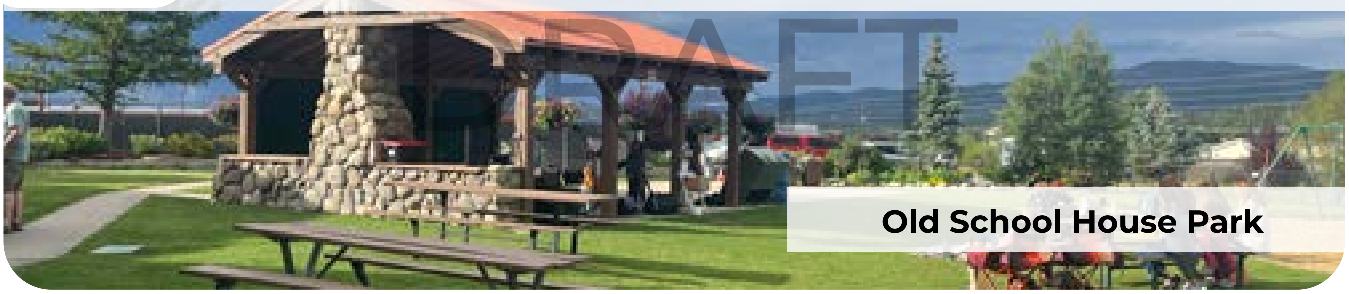


USFS Experimental Forest

Preserve and protect large tracts of Fraser's natural and rural landscapes, including forests, agricultural lands, open meadows, and sensitive ecological areas.

Town: 38.1%   3-mile area: 16.2%

Parks/Open Space



Old School House Park

Provide accessible recreational opportunities for all residents and visitors, preserve scenic vistas, and enhance the overall health and well-being of the community.

Town: 3.4%   3-mile area: 3.6%

Conservation Easement

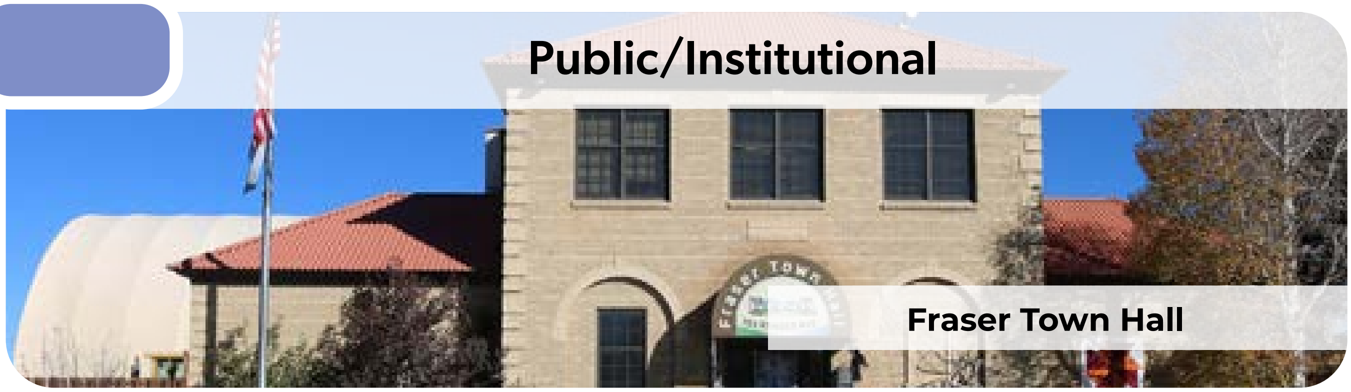
Cozens Ranch

Ensure the long-term stewardship of critical environmental resources, wildlife habitat, riparian corridors, agricultural viability, and public access.

FUTURE LAND USE DESIGNATIONS

Town: 1.7%   3-mile area: 1.1%

Public/Institutional


Fraser Town Hall

Ensure the efficient and effective provision of necessary public services, support civic functions, and promote community well-being.

Town: 0.5%   3-mile area: 13.7%

Future Collaboration Area


Fraser, CO

Foster strategic and coordinated development within designated areas of Fraser through active partnerships.

OVERLAYS

60 Foot Fraser River Overlay


Fraser River

Safeguard water quality, protect critical riparian and aquatic ecosystems, manage stormwater, mitigate flood risks, and provide for passive recreational opportunities where appropriate.

Planned Development Overlay

Grand Park

Applies area specific standards or conditions to allow for flexibility in land use and design.

Figure 52: Town of Fraser Future Land Use Map

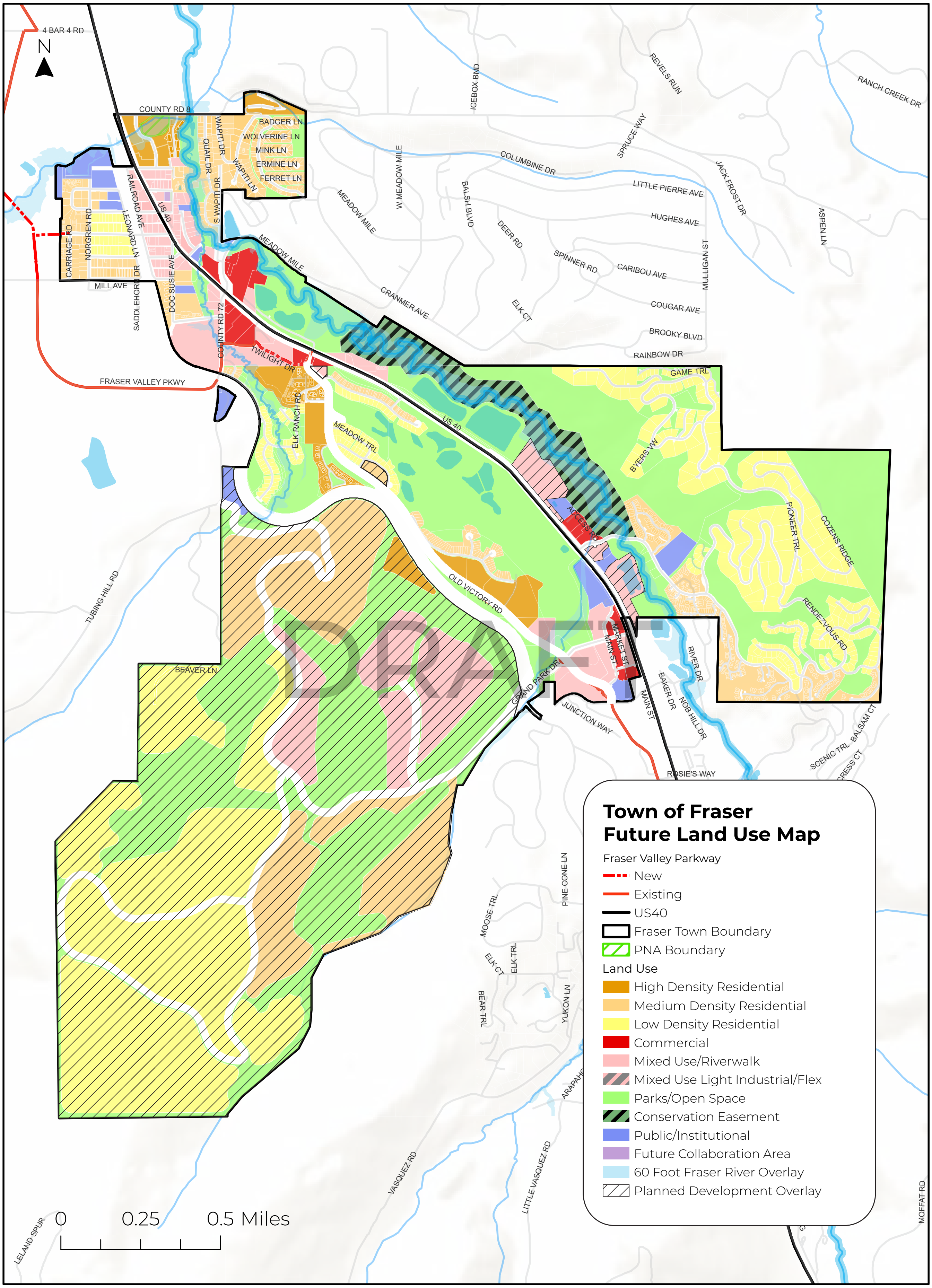
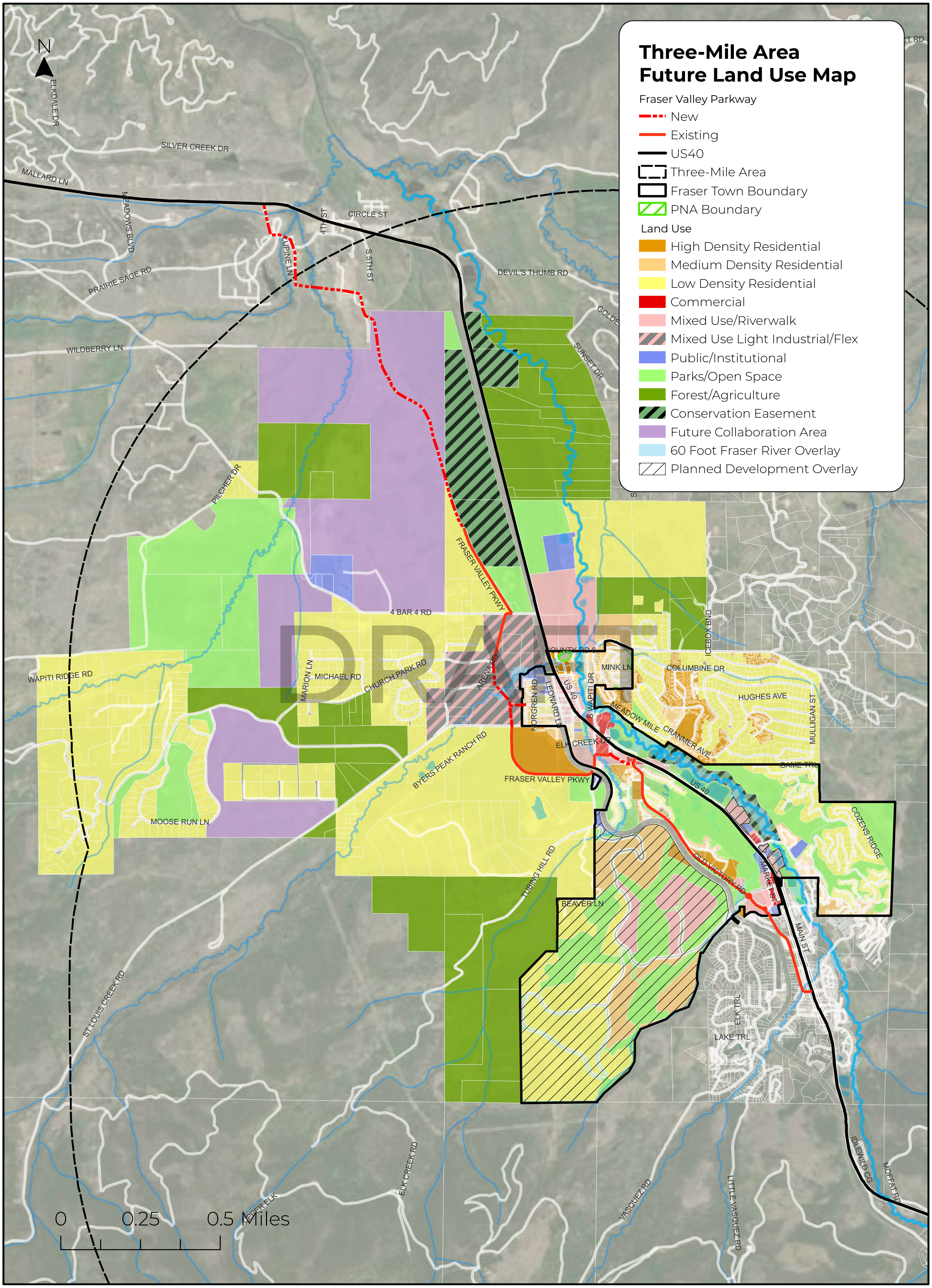
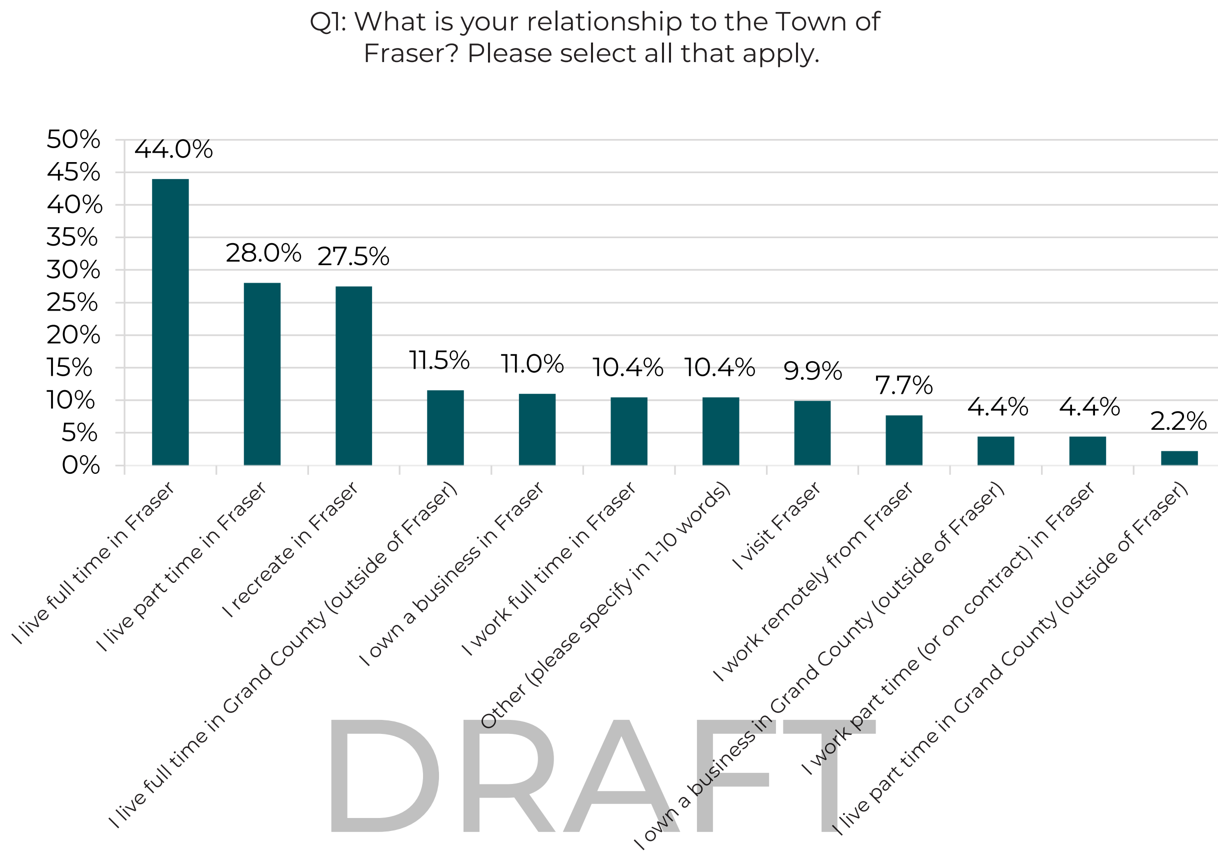


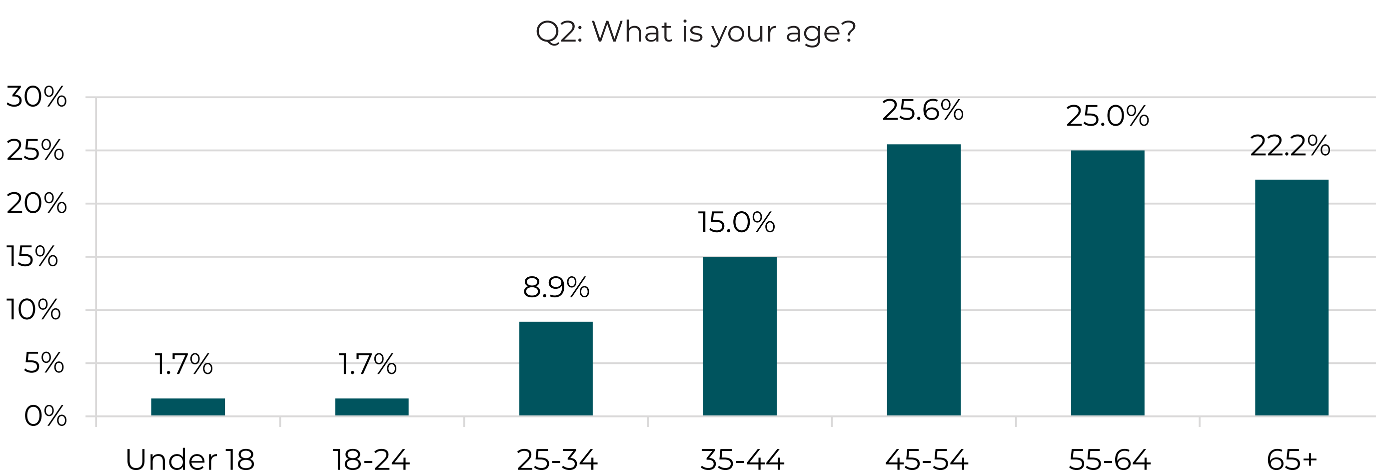
Figure 53: Three-Mile Area Future Land Use Map



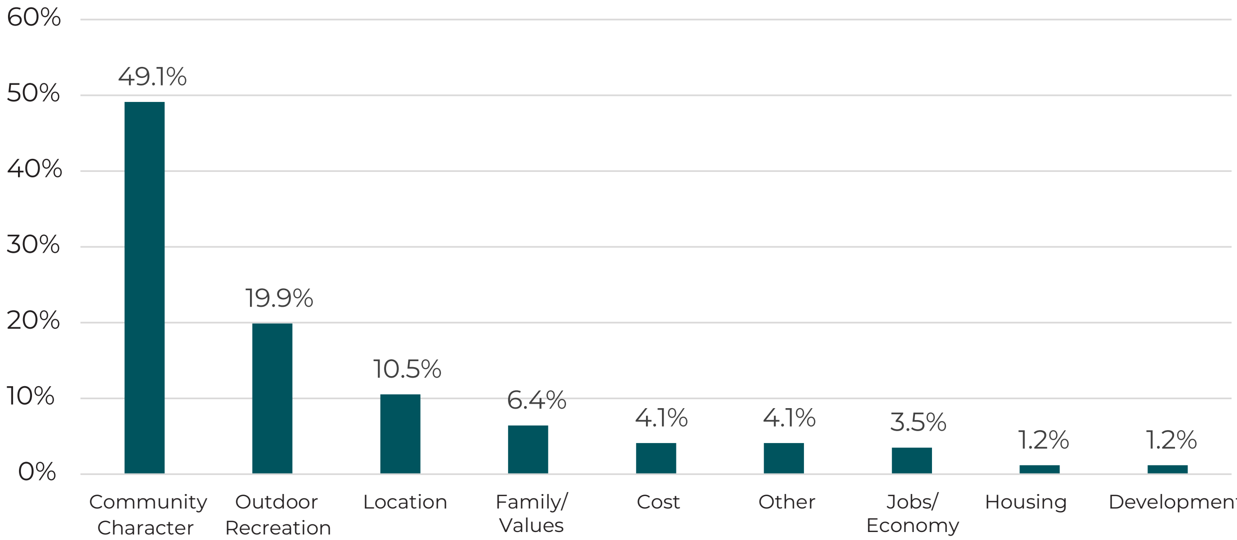
6 Appendix

COMMUNITY SURVEY RESULTS

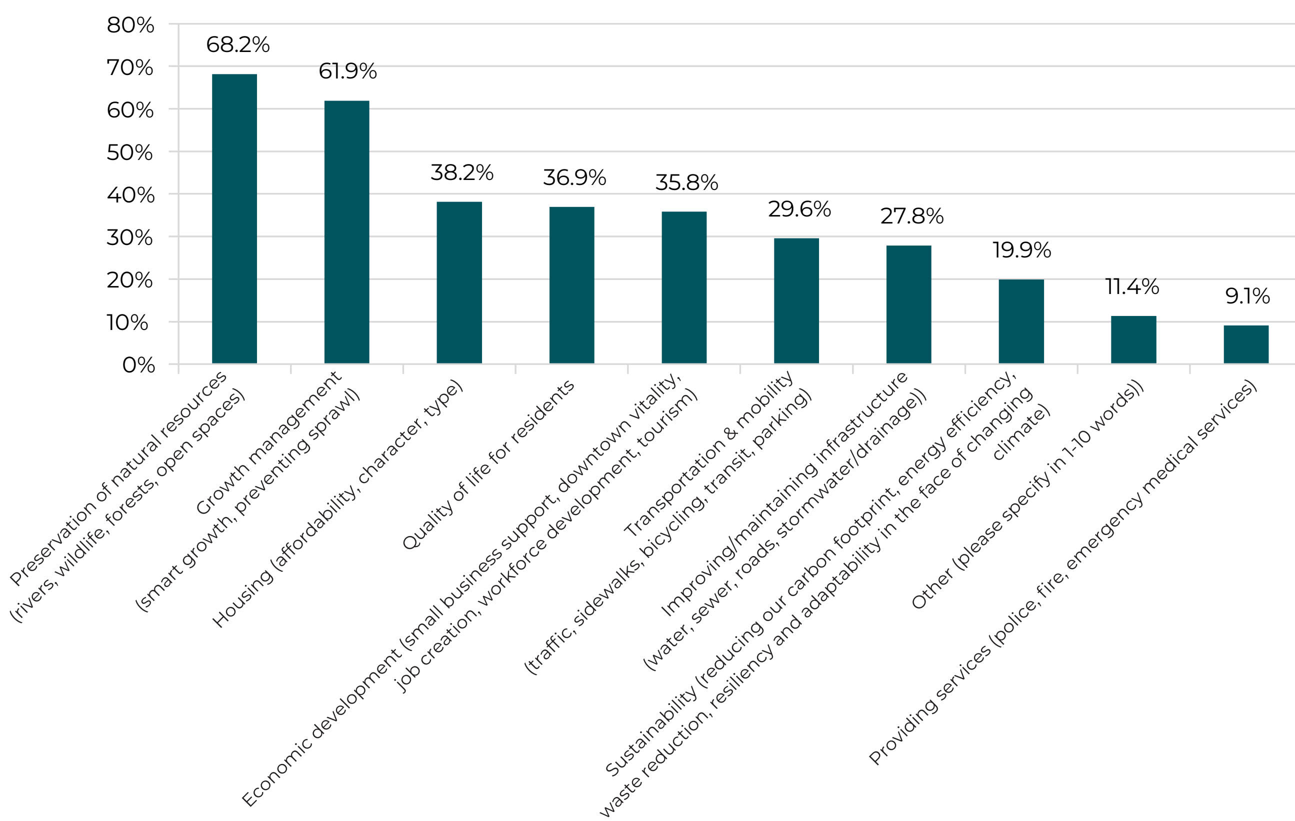




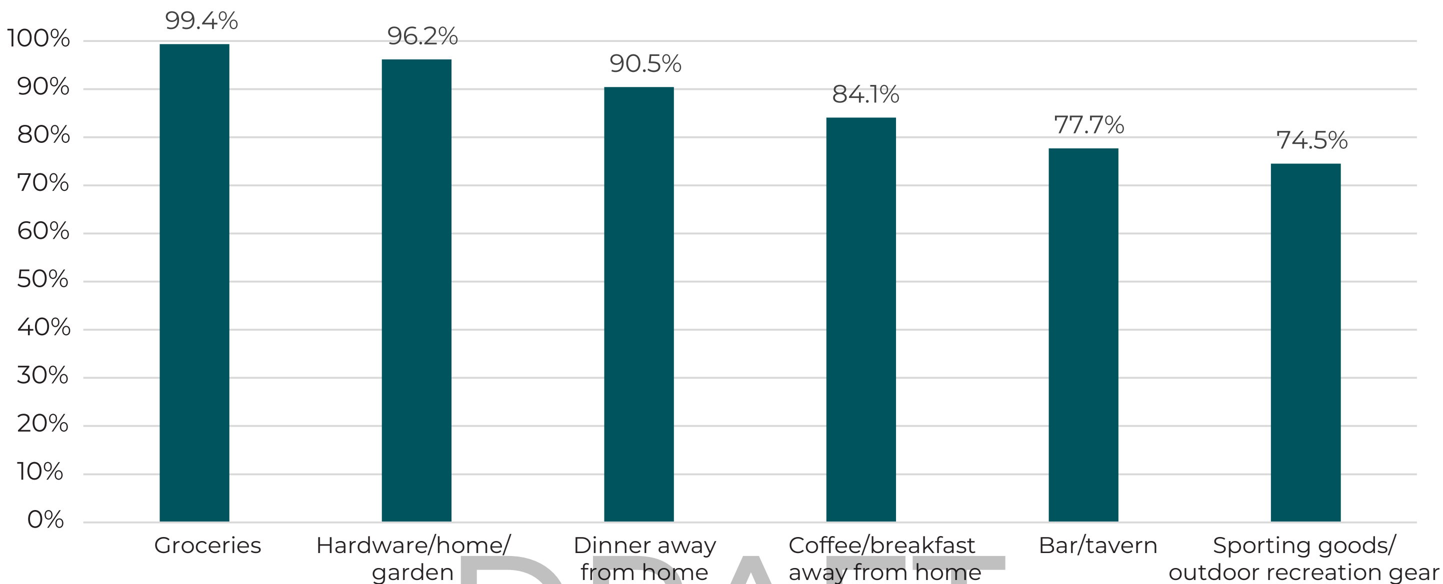
Q3: Why do you choose to live/work/play in Fraser?

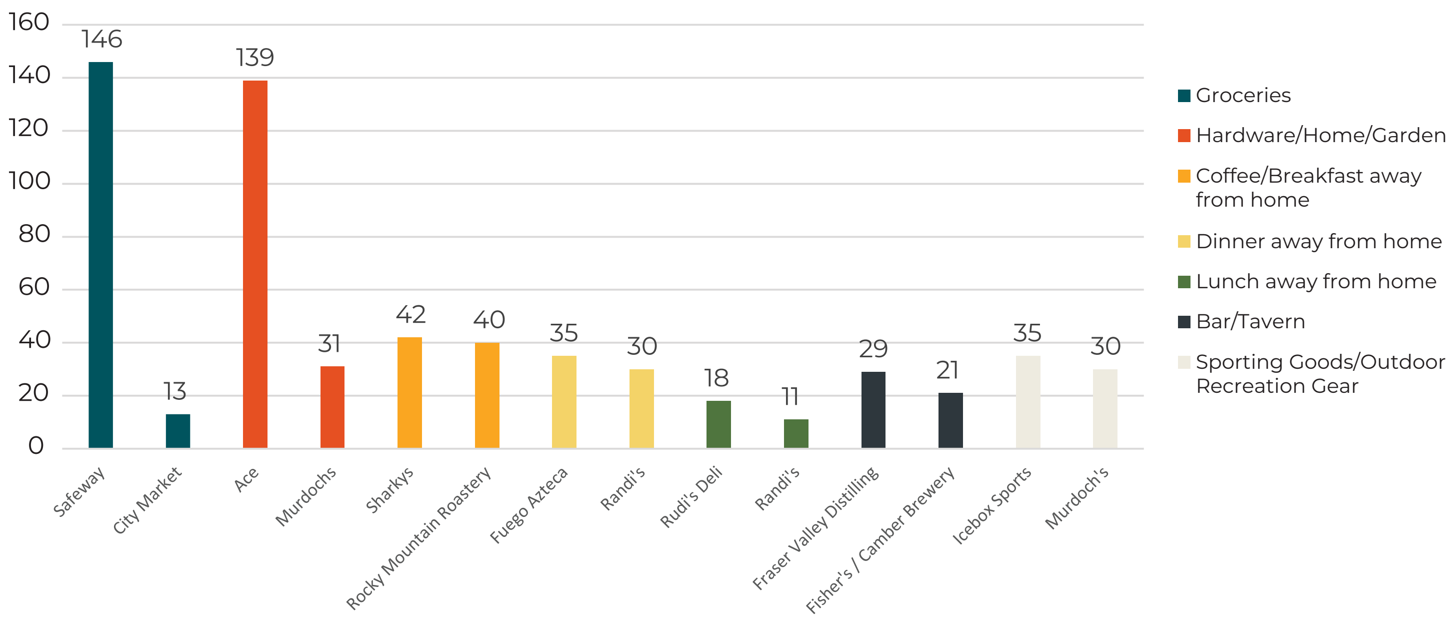


Q4: What are the most important topics that this Comprehensive Plan should focus on? Please select your top three (3).

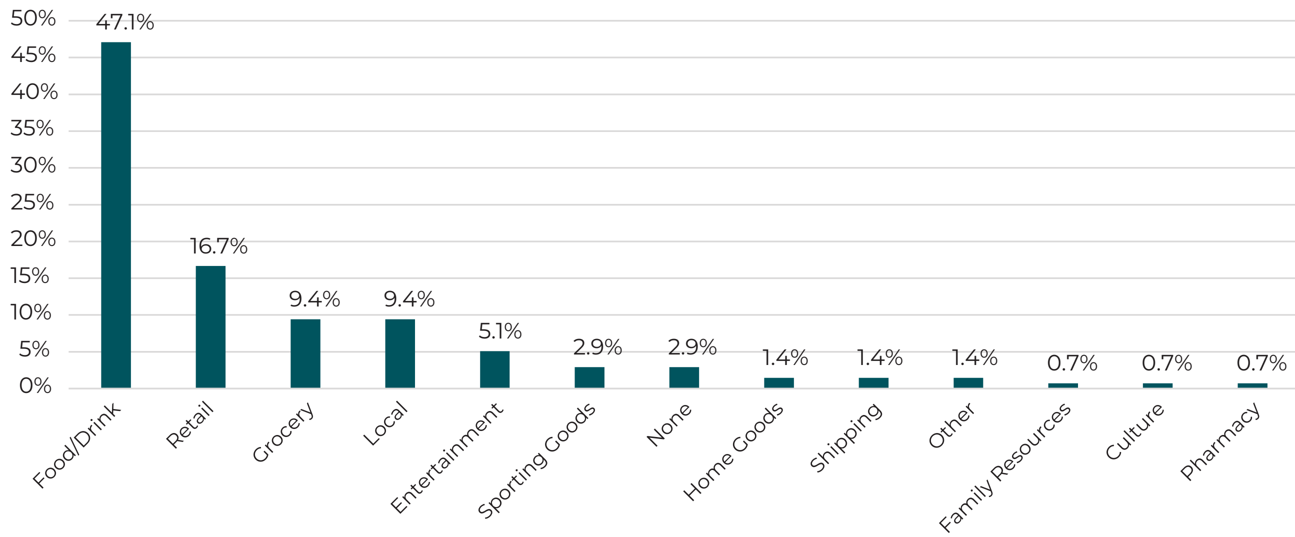


Q5: When in Fraser, what specific establishments do you visit most often for the following spending categories, whether the establishment is located in Fraser or not? You can list more than one establishment in each category (or none), but please list the most frequently visited first.).

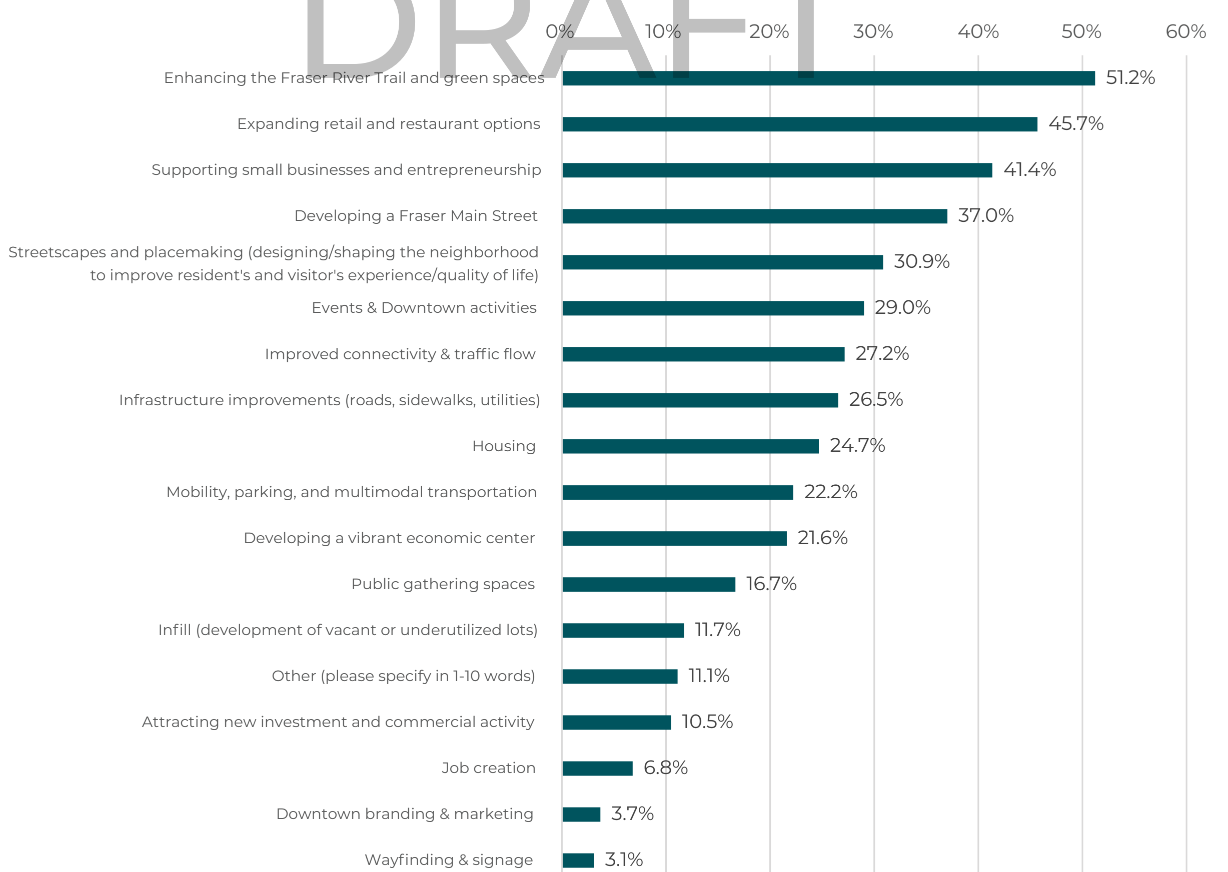


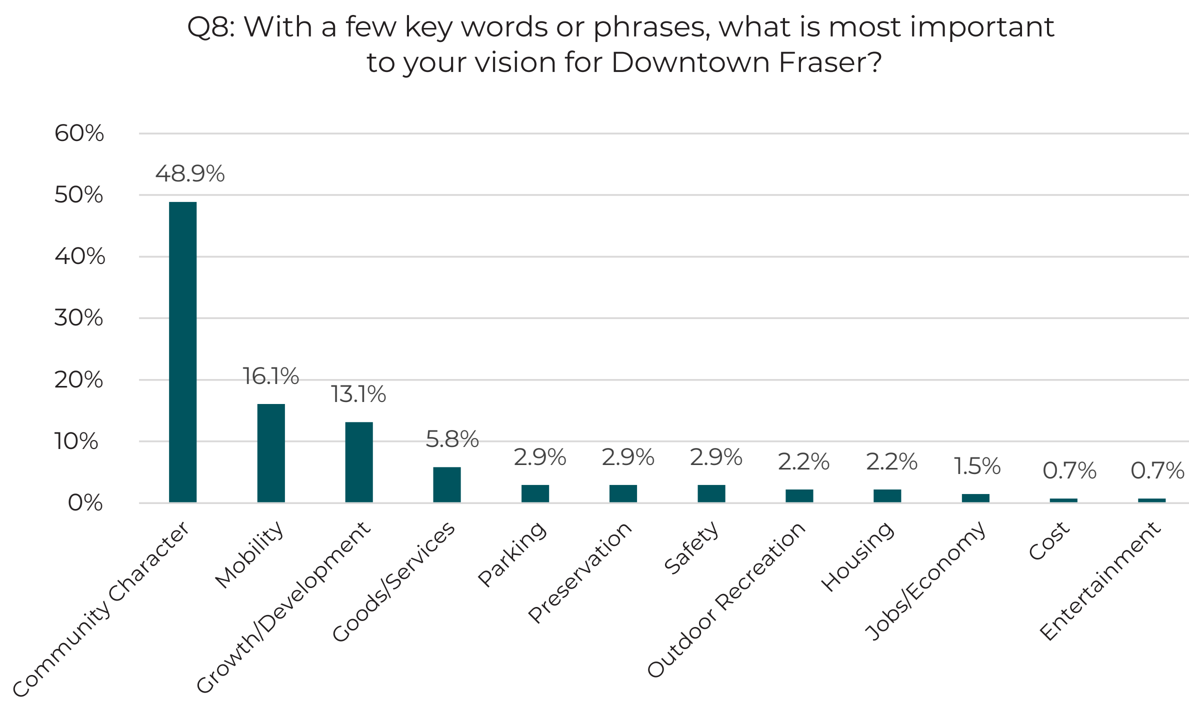


Q6: What type of new store/establishment/restaurant, or experiential retail would you most like to see added in Fraser? Please include the specific brand/chain if you'd like, or you may just focus on the type of establishment.

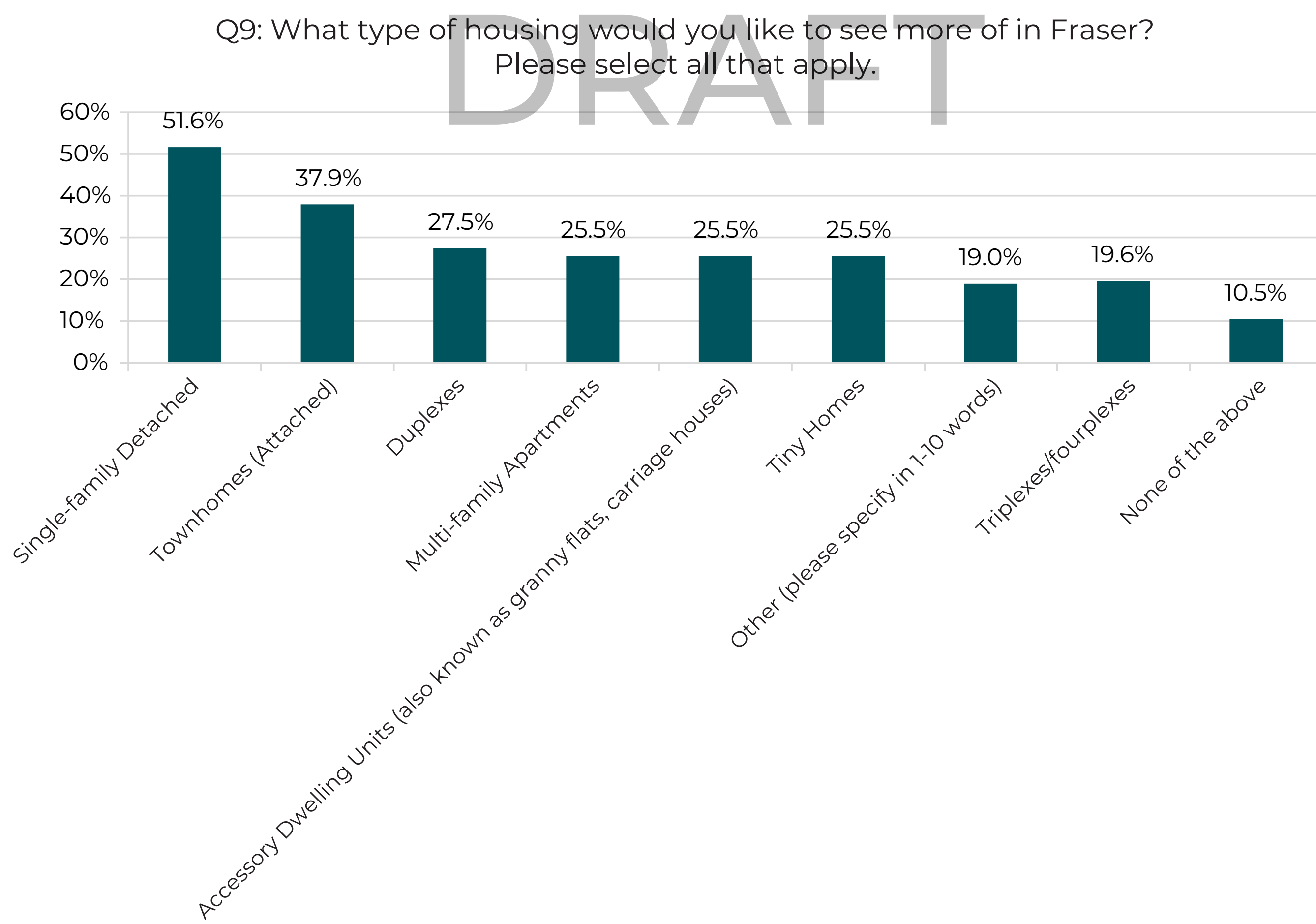


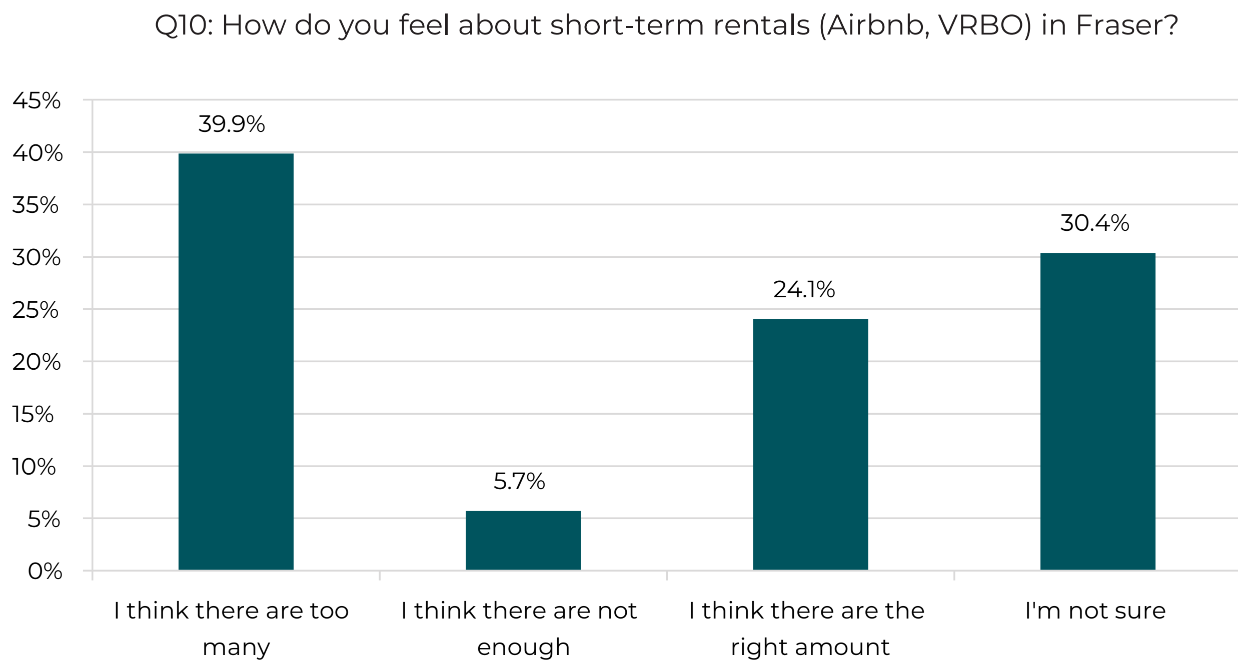
Q7: What areas would you like to see focused on for Downtown development in Fraser? Please select your top four (4).

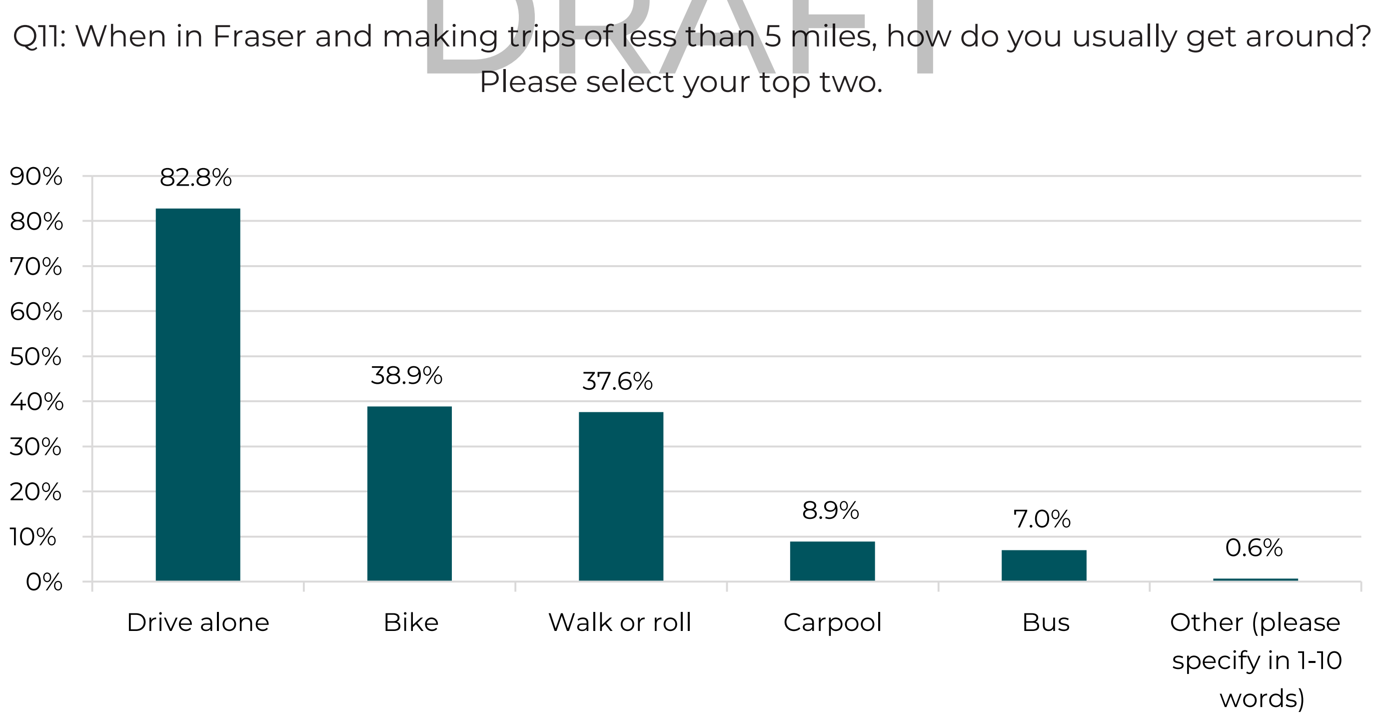



Q8: With a few key words or phrases, what is most important to your vision for Downtown Fraser?
60%
50%
40%
30%
20%
10%
0%
48.9%
16.1%
13.1%
5.8%
2.9%
2.9%
2.9%
2.2%
2.2%
1.5%
0.7%
0.7%
Community Character
Mobility
Growth/Development
Goods/Services
Parking
Preservation
Safety
Outdoor Recreation
Housing
Jobs/Economy
Cost
Entertainment

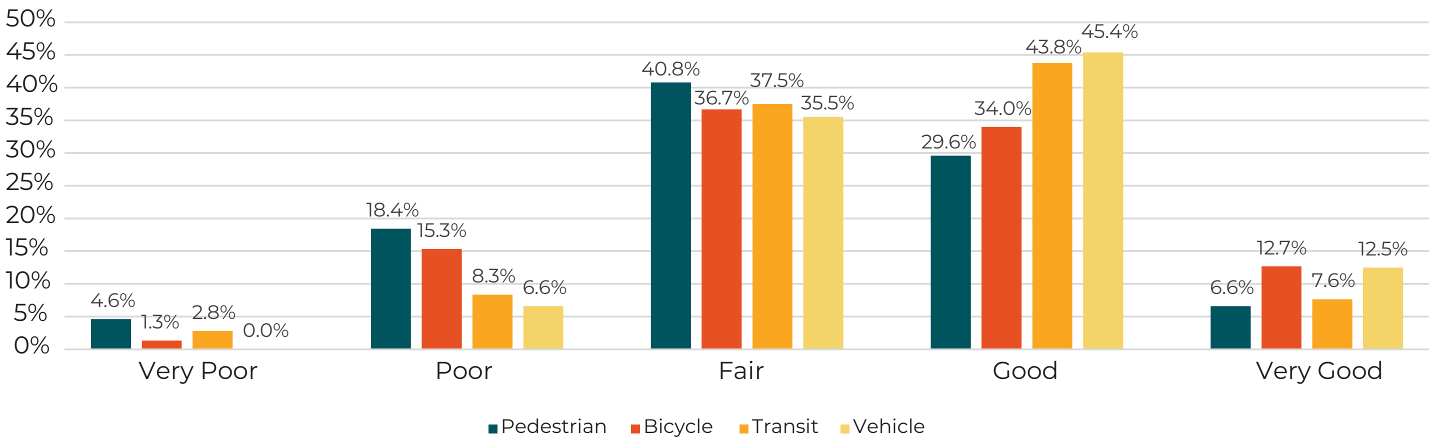
DRAFT


Q9: What type of housing would you like to see more of in Fraser? Please select all that apply.
60%
50%
40%
30%
20%
10%
0%
51.6%
37.9%
27.5%
25.5%
25.5%
25.5%
19.0%
19.6%
10.5%
Single-family Detached
Townhomes (Attached)
Duplexes
Multi-family Apartments
Accessory Dwelling Units (also known as granny flats, carriage houses)
Tiny Homes
Other (please specify in 1-10 words)
Triplexes/fourplexes
None of the above

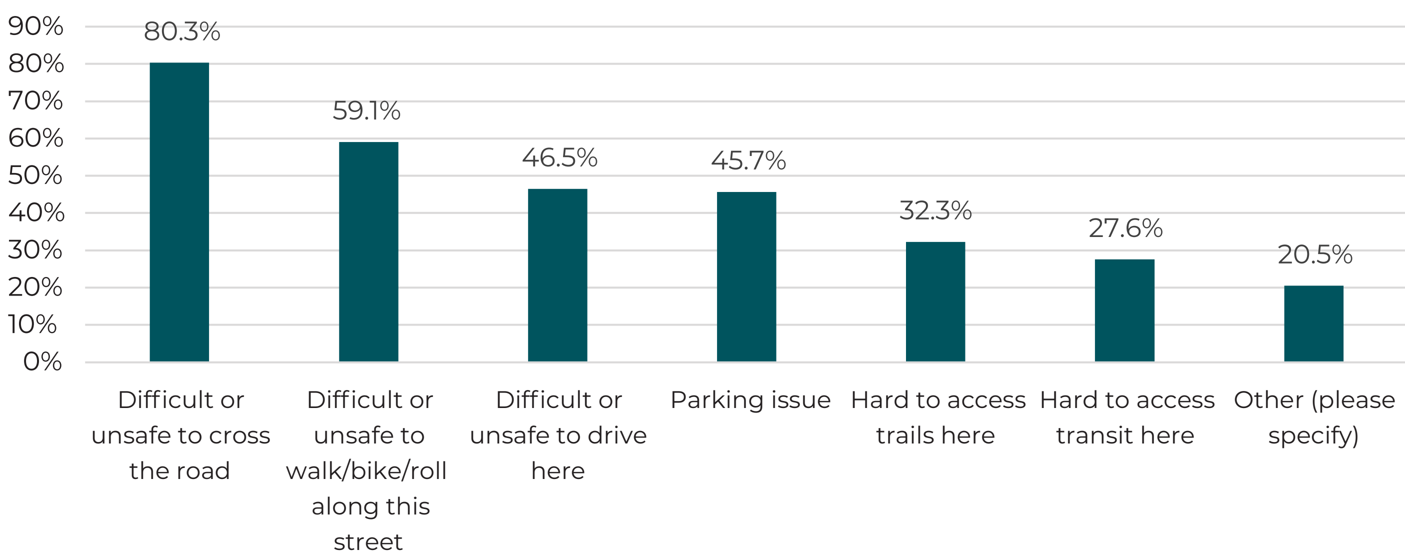

Q10: How do you feel about short-term rentals (Airbnb, VRBO) in Fraser?
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
39.9%
5.7%
24.1%
30.4%
I think there are too many
I think there are not enough
I think there are the right amount
I'm not sure


Q11: When in Fraser and making trips of less than 5 miles, how do you usually get around? Please select your top two.
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
82.8%
38.9%
37.6%
8.9%
7.0%
0.6%
Drive alone
Bike
Walk or roll
Carpool
Bus
Other (please specify in 1-10 words)

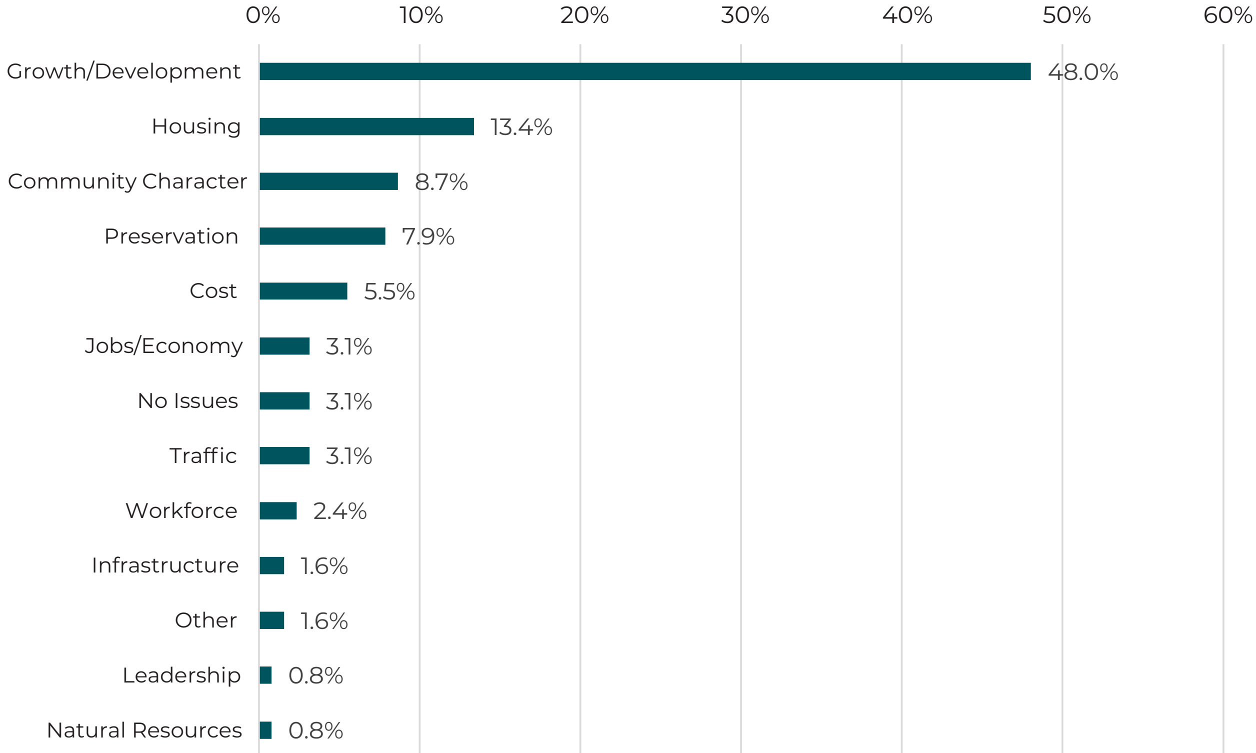
Q12: How would you describe the quality of transportation infrastructure in Fraser?



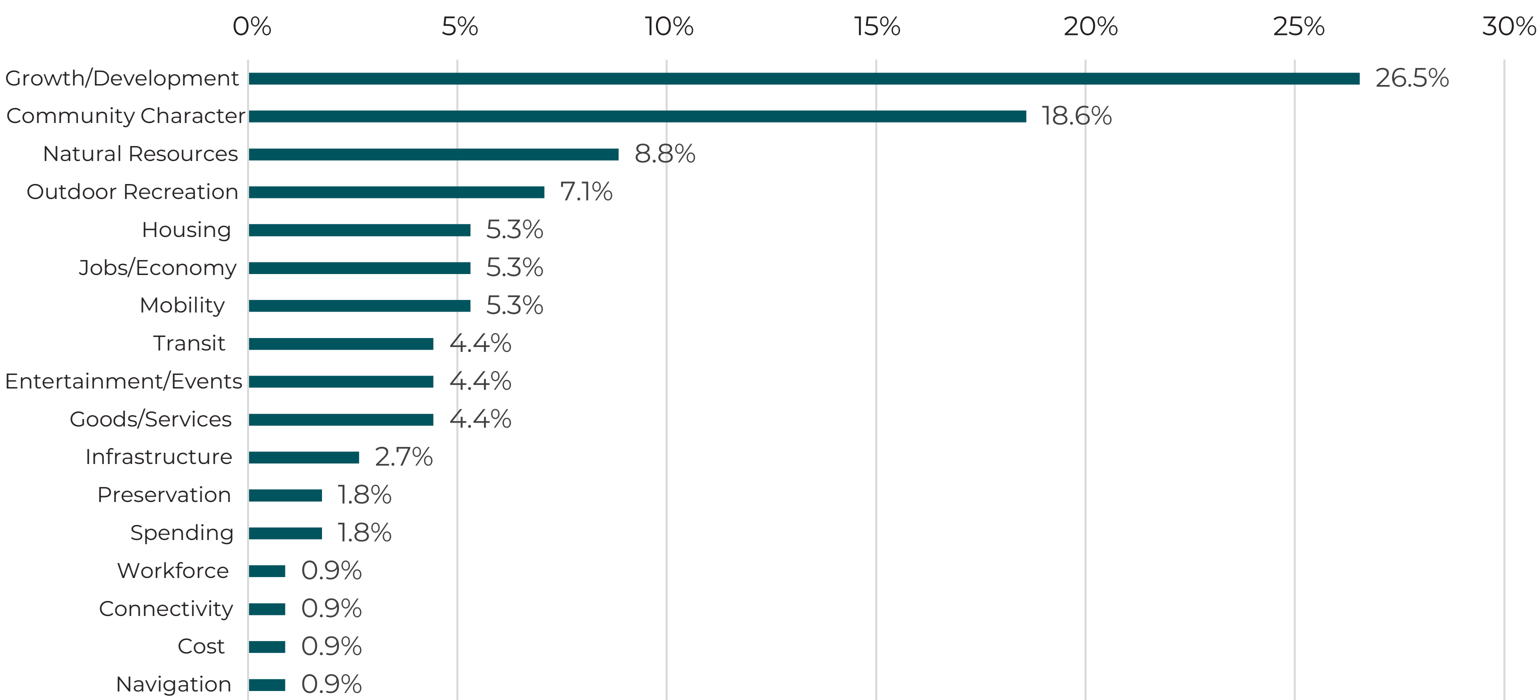
Q13: Where are current transportation issues or challenges in Fraser?



Q14: Do you have any concerns about the future of Fraser? Please describe in 1-20 words.



Q15: What do you see as opportunities for Fraser? Please describe in 1-20 words.



POP-UP SURVEY RESULTS

Growth Management	Economic Development	Preservation of Natural Resources	Providing Services	Housing	Sustainability	Transportation and Mobility	Improving/ Maintaining Infrastructure	Other
Oversight of building/ structures to preserve quaint, small town look, considering history!	Natural Grocer in the county!		Post office doesn't have any space left.	Live @ Nordron, Speed limit 20, safety for pets + kids, construction folks are considerate, affordable challenges with housing.		Additional lift frequency, stops (Northend) express, copper creek	What is the big vision?	School House Park!
	Koselig development really great - want more like it.		Daycare + Childcare options	Great to get more affordable housing for staff at restaurants + such. Housing is so expensive.		E-bike docking share	Walkable food/restaurants, retail can cross easily	Hot Air Balloons! (be known for this)
						Quiet zones (train)	Similar condition river, train, main st. Look to Truckee for how they did it.	Competition: Mr.Whiskers of Fraser
						Less folks from Denver on weekend	Integration with the river.	"Highwood" aka Guinness record for "pot shops" but better
						Crosswalk Hwy 40 + Victory - very unsafe for bikers	Shade at Mural Park	The Icebox - be known for this!
						Amtrak service always delayed, Better bike racks at town hall and throughout town, Quiet crossing at Eisenhower, train whistles at 4am are bad.		
						Median was not a good use of money on 40		
						CR 8 + 40 Traffic circle		
						County road 8 + 40 intersection. Safety. Traffic light.		
						Don't build roads on west side of town		
						More Downtown parking		
						Denver to Steamboat bypass		
						Where I live - add I live in grand county! Resident by proximity!		
						Mural Park has no shade. Poles not orange		

FOCUS GROUP FINDINGS

SUSTAINABILITY & RESILIENCY

- Key focus areas:
  - Preservation & restoration of natural resources
  - Alternative energy & energy efficiency
  - Multimodal transportation

ARTS, HISTORY & CULTURE

- Key focus areas:
  - Continue fundraising and momentum behind the Arts Center
  - Look to DDA revenues for arts fund
  - Leveraging passenger rail

DOWNTOWN DEVELOPMENT / HOUSING

- Key focus areas:
  - Increase workforce housing by 500-700 units by 2027 (in Grand County partnership area)
  - Support the business community
  - Attract new industry
  - Build out vision for Downtown Fraser as a mixed use hub, walkable, with greater interaction with the River
  - Support the short-term rental market that's critical to the tourism economy

COMMUNITY SERVICES

- Key focus areas:
  - Provide health care locally so residents and visitors don't have to travel outside the County
  - Lack of childcare & services for older adults
  - Providing more mental and behavioral health services

PARKS / RECREATION / OPEN SPACE

- Key focus areas:
  - Maintaining grant funding for HTA
  - Hwy 40 crossings and trailhead parking
  - More opportunities for indoor recreation
  - Micro-transit to connect train station to destinations

MOBILITY

- Key focus areas:
  - Last mile connections to train station
  - Lack of sidewalks in Old Town
  - Safe crossings of Hwy 40
  - Need to expand Lift service in Fraser
  - Managing traffic and decreasing single occupancy vehicle trips on Hwy 40

COMMUNITY NEEDS / QUALITY OF LIFE

- Key focus areas:
  - Seeking more funding opportunities to provide licensing for childcare providers
  - Possible solutions: sales tax, Summit County as case study ($400k)
  - Large opportunity for after school outdoor based programs, youth experiences, and nature-based learning opportunities for kids
  - Library wants to serve more teens and seniors by making improvements to digital resources, groups/clubs, and increased outdoor space
  - Bus stop/station at library would help improve awareness and accessibility
  - Continued collaboration and partnership between non-profit entities and the Town in regards to housing, childcare, and services

OPEN HOUSE 1 SURVEY RESULTS (IN-PERSON)

Feedback on Downtown Vision
Headed in right direction. Smart growth not too fully driven by economics
Pedestrian friendly/bike friendly
Architectural review of Riverwalk District
Consider land owners - who pay vs others
Make decks on all buildings in Riverwalk District overlooking river
Connect train visitors
Like connection to Safeway
Should continue vision plan to the Railroad tracks - specifically the colored pavement shown at the intersection of Eisenhower
Left turn from Distillery is challenging - particually if CDOT adds more lanes in this area
Comment (multiple): Don't see much parking. Response: Pointed out how parking is concealed away from view via tuckunder, on street, potential district/centralized location to give more community space. Feedback: Most appeared to appreciate that.
Getting across 40 is hard right now. (multiple) Concern about pedestrian safety crossing 40 which would likely worse with potential widening of road with CDOT plans.
Koselig is too close to road and more room should be given for walking space
Show north up on the plans (multiple)
Want it to be local rather than tourist central (multiple).
Would good place for folks that don't want to go to Winter Park for retail.
More options for commercial services. Have Ace, Murdochs, but not much else. Don't want a Target (or other big box stores). Fine with going down 70 to go to Costco occassionally.
Attainability is a challenge not just affordability
Think we have enough breweries
Consistency is needed - year round avaiability
Design should start with pedestrian network and safety
Pedestrian underpass under railroad would be good to improve safety and connectivity
Okay with taller development in the valley but not along the ridge and hillside due to visibility and light reflection. Why just 45' max height?
CDOT Byers alignment makes sense

Feedback on Future Land Use
Family oriented housing
Make St.Louis Landing affordable
Open space and wildlife considerations
Obviously not aware of all the good Clark has done (below)
Keep tabs on Clark
Why? He's done great things for Fraser (above)
Focus on pedestrian walkways, bridge over 40, 2 lane 40 through town
Natural resource preservation
All growth has to consider capacity of US40. It is at its max at times now
Consider pedestrian traffic vs car traffic
Affordable housing
Yes this! -open space/cozens meadow
Tiny home area without huge monthly rental fee (additional comment says "great idea")
Mix of affordable housing products (apartments, condos, townhomes, tiny homes, etc.)
Affordable housing + open space
Byers Peak Ranch should be mixed use
Affordable single family homes. Preservation of land, resources
Space for "homeless" ex: car, van, campers
Allow for wildlife corridors. Increase affordable housing. Require - for all developers
Make railroad crossing. No train whistles
Jones Ranch should be open space
How will it be executed?

Parking	
Where do you have the most trouble parking Downtown today?	
Location	Comment
N Zerex St	Pedestrian Crossing
Meadow Ridge Rd	Ped/Bicycle Markings
US 40	Roundabout

Bicycling		
What kind of bike improvements would make you feel most comfortable?		
Topic	Sticker Count	Comments
Better Wayfinding and Signage	4	Fraser Valley River Trail
Prioritized on-street bike routes	7	
Improved trail network	6	
Improved roadway crossings	8	Safeway Crossing, Trailhead/ Parking Hub

Microtransit
What destinations should be included in a potential microtransit service area?
Microtransit to lift stations
All Fraser-Granby trailheads
Remote parking lot with frequent transit/micro
Train station
Resort
No lift here - need micro (on dot sticker)
Hospital (on dot sticker)

OPEN HOUSE 1 SURVEY RESULTS (ONLINE)

Question 1: Do you have any feedback on the themes we heard from community engagement?
This seems like an accurate portrayal of the people and needs. If new development feels out of place, how does old town residences and business fit into the plan? Will those residents and business owners eventually be displaced or replaced? What steps are being taken to include them in the planning for the future?
"I think the voices of those who live her full time should be elevated. I agree that managed growth is a risk and opportunity. Most of this board seems too high level to provide significant guidance.
Question 2: Do you have any feedback on the draft Downtown Vision Plan?
Parking structure with access off of 40
The Clayton Ave connection from US 40(N Zerex St) to CR 804(Meadow Ridge Rd) is amazing and it would be both a great car and pedestrian connection that is much needed. Also the realignment of S Wapiti Dr looks amazing, SOUTH wapiti Dr should also connect to Wapiti drive for another N/S connection, there's a small ROW/property impact but the connection is needed. It would make the most sense given that the road is named "South" wapiti drive, so connecting it to Wapiti Drive would be the most convenient. The Downtown plan looks great and will provide a great community space, pedestrian space, and a needed place to gather.
I'm concerned that the plan doesn't seem to include the old town area. It creates an us vs them, old vs new feeling, with 40 down the middle furthering that feeling. I'd like to see how the vision meshes with the old. I think it's harmful not to include the future rail plans and incorporate train as a transit option. It would be beneficial to the overall plan to see how things like the train depot, school, and library fit into the plan for flow.
I like the Downtown vision, the connectivity is great and I like the scale of the proposed development. I would prefer a more grid like layout to mirror the old Downtown area and improve the ease of wayfinding/navigation. Any reason for these building footprints at these angles? It appears most of this is in the floodplain, is it feasible?
Question 3: Do you have any thoughts about the Draft Future Land Use Maps?
All the open space planned looks amazing, and is needed. Density is also good to for areas close to town, single family houses wouldn't make sense within the Downtown area, so the higher density planned area look great.
These maps seem correct and logical

I would like to see the road grid improved to support additional growth- 40 is being widened but that will only sustain growth for so long. Improving connectivity with grid style networks off of 40 will support local commerce and residents.

Question 4: Do you have any comments on microtransit and/or parking?

More parking for River Walk District- parking structure

Old victory rd, Fraser valley pkwy, tubing hill rd(CR 72), east and west Eisenhower Dr, North and south Zerex St, and Norgren Rd will be important corridors, ensuring they have proper facilities for pedestrians and bikers will be vital. Encourage only Detached sidewalks, never ever allow an attached sidewalk to be installed within the town of Fraser, they are unsafe and outdated. — also make any new developers like those at grand park install sidewalks and paths on Both sides of the road, not just one, pedestrian facilities in Fraser are getting better but need improvement, even in the new grand park they are extremely lacking and reflective of how neighborhoods were built in the 60s - very car centric. proper pavement markings which is currently a issue(stop bars/crosswalks often not painted, painted turn arrows, etc) having larger paved multi use paths will be important, also always encouraging roundabouts in any new development or for intersection improvements far before signals or stop signs are looked at will benefit all who use the road and create a better environment with safer roads and more efficient traffic patterns. way finding is important too — signage on sidewalks will be great to direct pedestrians to where they want to go, the signs that are currently in Fraser are great! I know these aren't micro transit related issues but they are somewhat related as the road network they use needs to be robust and encourage all modes to use it. People will bike more and walk more if there's proper and safe facilities that are planned out very well. People will use the bus more if there's proper bus stops with lighting shelter, seating, and the most important part which is currently an issue in both Fraser and winter park- a sidewalk to reach the bus stops, many bus stops are literally just in the dirt. Even though it's a smaller town and not a city, it's helpful to be fair to all users and make the stops look cared for, maintained and not an afterthought, and be easy to access without having to walk across muddy grass. The current network is great and it hits important destinations, it may need to expand later in the future but overall the network is great considering it's a smaller town.

The microtransit option might be great, especially if the old town areas aren't part of the future plans to be more walkable.

“Micro transit seems like overkill given our bus system, it is pricey for the cost per trip (via is a great resource for costing this), I don't think it is worth the cost given our transit that exists.

I would love to see improved bike connections that parallel an overall improvement in the roadway grid.”

OPEN HOUSE 2 SURVEY RESULTS (IN-PERSON)

Vision & Goals	
Topic	**Comments**
Community	Who determines the aesthetics of Fraser's charm and mountain town vibe? How is the aesthetic enforced?
Land Use	Don't cause confusion on maps by inaccurate color coding of land uses No high density housing along River/Meadow north of town. Preserve River Front
Housing	Compost. Encourage recycling and reuse
Economic Development	
Sustainability & Natural Resources	Compost. Encourage recycling and reuse
Town Services & Infrastructure	Child care
Transportation & Mobility	How to take the train to ski and stay in town - how do I get around?
Parks, Recreation, Open Space & Trails	Dog park please
Intergovernmental Coordination	
Downtown Vision	Need shops and restuarants on Riverfront Town events - Monthly - Curb side, "Free day" for stuff, Builds community & brings in shoppers
Have We Missed Anything?	Child care is fundamental to growth Encourage, educate, support stated dark sky implementation. How about a compost area at the daop 2?

Downtown Vision and Goals			
DTV1	DTV2	DTV3	DTV4
Hourly rental bikes (Lime) no scooters! Pedestrian sidewalks	Coffee shops, restaurants with outdoor patios	Outdoor ice skating at Lions Club ponds. Ice castle at pond. Coffee shop, skate rentals, etc.	I do not want loud music and bright lights here ever!
Consider stop lights @ post office & Meadow Ridge with 25 mph through heart of Downtown	UPS store, pharmacy (like CVS), additional hair/nail salons, speciality grocery, "Farm Stop" with local grower/farmer offerings	Fountains, chimes, greenery, fire pits, patio festive lighting, seating - i.e. like Estes Park river walk.	Farmer's market, garden workshops, meet the local firefighters
Stop light on Eisenhower should be moved to end of town. Maybe by post office. We should not curb businesses in especially gas stations	Antique + Art stores	Picnic tables. Playground - fountains, swings, basketball, pickleball, bocce. Mini Golf	Craft Fairs
	important to have local shops	Art Center	Farmers markets
	No loud music from the tubing hill. No bright lights from the tubing hill		Monthly outdoor movies, rollerskating nights & ice skating, ice cream socials, s'mores nights, pickleball tournaments, fun runs, outdoor yoga, kite flying
	*Want class action lawsuit against Clark Development and tubing hill		
	Bakery, pharmacy, UPS		

OPEN HOUSE 2 SURVEY RESULTS (ONLINE)

Question 1: Do you have any feedback on the Community Engagement Themes or Open House #1 Findings?
No more commercial development - except for whatever is already zoned for that. Lower the commercial development height to maintain the mtn views and open vibe of Fraser. Less condo development - prefer townhomes and single family homes. Even in the affordable housing sector - people want homes they can own and they like single family homes. Need to make those affordable homes deed restricted forever so the town isn't having to redo housing again in 50 years.
I support the over arching theme of maintaining the mountain community "vibe" with emphasis on small business, The River walk district, recreation and open space
Like the overall direction
I attended both Open Houses and was disappointed to see so few attended. There were also fewer boards where people could make comments. Regarding the timeline--how many surveys do you want to receive prior to making decisions? Will you publish the results? And comments, too? The maps are dated and not accurate--really important to update before the survey. For example, the maps are misrepresenting land uses for Grand Park, Rendezvous and Foundry in their mapping which can cause a lot of confusion, misperceptions, misinterpretations and unrealistic expectations in the future. The new maps are a departure from previously approved Fraser maps that characterized Grand Park, Rendezvous and Foundry in one solid color, not defining specific land uses.
The town of Fraser seems to have conflicting goals when protecting our pristine valley's natural resources. We as a town have fought the grand park development tooth and nail spending a million plus dollars of tax money in suits (one being lost, another still being adjudicated) despite being pre-approved to protect cozens meadow. This proposed plan seems to reflect a double standard with the town trying to place high density residential, a business district and a Downtown development authority all overlaid and next to the Fraser River with greatly reduced or no setbacks required. While we are excited to see the mobile homes go, the land should be protected in and around the river and let development occur in the grand park area that has been planned and approved for 20 years.
While the Community Engagement Themes appropriately emphasize public input and environmental stewardship, there appears to be a disconnect between community values and the proposed planning direction. Specifically, the strong public preference for preserving sensitive natural areas—such as the river corridor north of town—does not appear to be adequately reflected in the current draft. Community engagement is only meaningful if it informs the final plan in a transparent and consistent manner.

Your survey received a very low response rate. It strikes me as too low to merit consideration (even though I count myself among the 181 responses).
Question 2: Do you have any thoughts about the Draft Future Land Use Designations and Maps?
more conservation easements to protect the land and habitat for the animals and plants. I've seen the encroachment on the moose breeding and rearing habitat in Grand Park and it makes me sick to see those animals being pushed out. I want to see the town of fraser buy land to protect it from over development. I like the idea of more connected bike paths for all types of skill level. I've had friends ask for more pickball courts and that the pickballers don't like the Fraser Ice Box pickleball courts.
I did not see building height limits addressed. Maintaining visual open space and view sheds maximizes what is so very special about Fraser, the 360 degree beauty. Also new development can (and has) taken away views from existing developments and that should be considered and avoided.
Like the overall direction. Want to make sure that if the Fraser Valley Parkway comes to fruition, which I support, that there also is a safe bike route.
Making a high density residential zone next to the river goes against all logic and vision.
These maps are very misleading as there are very defined areas of the map (i.e. the northern part of town with high density and b district) that wouldn't change while large swaths of planned development (rendezvous and grand park) show designated open space/park areas (even including it in the riverwalk district? maybe its for mixed use?) that will very likely change. At the open house, the town planner very clearly stated (was in group discussion, another attendee asked specifically about these maps) that these maps reflect the 2005 maps. This was either intentionally said to mislead (lied about it) or was said without knowing the 2005 map (either are quite egregious). This doesn't seem to be the transparent nature the town manager has expressed in multiple interviews that the town is playing by and very misleading to the citizens, me included. The town is very specific in the proposed changes on the northern part of the map while designating open space and parks that are subject to change. Why can't I find anything on the towns site about this survey? Easily found on the consultant's site that was present yesterday. Why were we only informed 5 days before the open house? It didn't seem well attended and doesn't seem very transparent, particularly the 'affordable' SLL project.
The maps misrepresent land uses and will cause confusion with the public because they will think that all areas marked with a specific color key are set in stone. They will also think the areas in green are Parks/Open Space even if they are on private land.
The current draft map inaccurately represents land use designations for Grand Park, Rendezvous, and the Foundry by delineating specific land uses within areas that have historically been illustrated using a unified, consolidated designation. This deviation from previously adopted Fraser land use maps introduces a risk of confusion, misinterpretation, and the formation of unrealistic expectations among both the public and the development community.

There is a major discrepancy between the stated goals of increasing ease of walking and biking, on the one hand, while limiting high-density housing on the other hand. Most of the high-density residential areas are already built. First, as a resident of one of these areas, I would dispute that these are all appropriately categorized. You include multi-story apartment buildings and duplexes within the same land-use category. Those do not seem to me equivalent. Moreover, you can't increase ease of walking and biking relying on residential options that favor single-family residences in medium- or low-density areas. Nothing reduces use of private vehicles like high-density housing, especially if in mixed use buildings. Importantly, the existing high-density housing shown on your maps consists of Grand Park, none of which is mixed-use.

Question 3: Do you have any feedback on the Draft Vision & Goals?
Please specify what vision and goal you have comments on.

All the open space planned looks amazing, and is needed. Density is also good to for areas close to town, single family houses wouldn’t make sense within the Downtown area, so the higher density planned area look great.

I don't understand how you will protect the character of Fraser when there is so much development planned, seems like a huge hypocrisy.   I'd like to see the Downtown riverwalk development to be small and impactful and focused in that area. Keep everything close together so that it is easy for people to walk around and explore.

There is a need for more restaurants and retail. Perhaps consideration of a store like Walmart should not be dismissed. We need retails for basic household goods and perhaps used furniture or other stores that is not expensive up scale hoity toity. We need a livable community.

Like the overall direction

I agree with the vision, but is it realistic? Based on my experience, the town will have to expand their staff considerably to execute to these goals. Where will the money come from???

The town seems to really push back on other development while they (the developers) have brought a hospital to the valley (one of the goals outlined in TSI), provided massive infrastructure investment to the town in the way of water treatment facility, built the last deed restricted property in the county right outside of Fraser amongst other much needed amenities and not at the taxpayers expensive (such as the proposed SLL). Very confused about what the town of Fraser's stance is on development. We fight it on the one hand while propping it up as the most needed thing on the other.

Regarding land use, it is a travesty to have the north end of town be developed as high density real estate. Public sentiment was clear to preserve the river area. It is also a double standard because Fraser is fighting development in the Grand Park meadow that already has conservation protections but is actively planning dense development on even more sensitive river front property with no protections or open space allocated.

The Draft Vision outlines commendable goals such as responsible land use and environmental sustainability; however, these objectives are undermined by proposed land use designations that contradict them. For instance, planning high-density development along an ecologically sensitive river corridor directly conflicts with the vision of environmental stewardship. Consistency between stated goals and actual implementation is essential to the plan's credibility.
Courts designated for Pickleball. Official courts
Question 4: Do you have any comments on the Draft Downtown Vision & Goals? Please specify what goal you have comments on.
I'm worried about the impact on the Fraser river habitat. And the height of those buildings destroying the mountain views. We might as well be on the front range. Need lots of green spaces here so it doesn't look like a concrete hell. I would suggest a few pocket parks with grass and trees and flowers. And can you make the railroad crossing safer for bicycles and pedestrians? There is a narrowing of the road there and it is an accident waiting to happen.
I think it looks good!
Like the overall direction. Wondering if another traffic light will be needed on Park Ave or the North end of town. And what the long term plan is for the post office.
Unsure why the town doesn't want to leave the development where it has been approved for 2 decades and now double the development by placing a heavy emphasis on the northern part of town and on the pristine shores of the Fraser River. Isn't the corridor to town from the south where we get 20k cars per day coming from that direction during peak season? The only time people come from the north to enter Fraser is on their way out, back to their originating destinations. At least from what can be garnered from Sundays as traffic backs up on the flats. It is important to revitalize the Downtown Fraser area as it's been an eyesore for a long time. It is nice to see the distillery and simple buildings go up although the approved designs don't really match the character well. Wonder what the simple coffee building aesthetic will look like in 40 years?
It seems like the maps are deliberately omitting the high-density plan on the north end of town.
The Draft Downtown Vision outlines commendable goals such as walkability and community vitality; however, these must be pursued alongside a consistent, town-wide application of land use principles. Planning decisions affecting sensitive areas outside the Downtown core—particularly when they appear to favor certain developers—undermine public trust and the integrity of the vision. Consistency in standards is essential to achieving a cohesive and sustainable future for Fraser.
Will there still be a trail linkage from the bridge from Wapiti Meadows to Downtown Fraser? Doesn't appear to be one on the map.
Add designated pickleball courts to the recreation plan.

DTV 1 - I’d love to see dedicated bike paths and interconnected walking paths. I love this vision for Downtown that makes Fraser a destination rather than a drive through. Great idea to focus on the river!

Regarding DTV1, the most valuable addition to Downtown would be to slow through traffic significantly or reposition vehicular traffic away from pedestrians, bicyclists, and commercial establishments.

Regarding DTV2, businesses that support the outdoor activities that are available in the Fraser Valley plus high-quality food and drinking establishments.

Regarding DTV3, the key is to seamlessly connect the river to Downtown such they are not distinct. To do this, commercial establishments should face the river with exterior that make the river visible as well as plentiful outdoor seating. In addition, the town should raise the attractiveness of the river by developing seating and walking/biking trails along the riverfront.

For the Riverwalk District, I would like to see a stronger articulation of a common parking solution that encompasses things like the train station, the Arts Center, and the hospitality and retail areas that are contemplated. As some of these things are nearing reality, the uncertainty (and burden) on these entites makes it harder to plan and make them reality. If there were a clear solution proposed, that would be helpful.

Community Engagement Themes or Open House #1 Findings

it seems these challenges have been created by the town by being so staunchly against adding units that serve local populations for decades while blaming developers who solve this problem by adding to the supply. Increased housing supply will reduce the cost of housing. if the full projects that are already preapproed are realized , housing costs will go down as free markets come into play. no chance country haus can charge 2k for a 1 bedroom if having to compete with newly built units

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Why would we say we want to preserve open space while proposing high density residential and b districts on the shores of the fraser river where open space exists? the hypocrisy is dizzying and already have a plan for massive development up-valley. is fraser becoming like the developers we fought so long to keep at bay? very confusing with this new plan bolstering heavy development on pristine natural resources

Totally agree with the above comments
Future Land Use Map and Designations
Why high density so close to the Fraser River? This goes against the vision and community input.
this looks nothing like the 2005 maps, where did the town planner get this information
It looks like the existing Fraser-Granby trail will be part of the Fraser valley parkway from the ball fields to Tabernash. That isn't conducive to walking or biking away from traffic. not a fan of losing the trail.
Draft and Vision
Where will additional bike/pedestrian lanes or trails be located? The proposed Fraser Valley Parkway route seems workable except for the loss of that portion of the Fraser-Granby trail. Will it be relocated? Maintained as a safe bikeway through that area?
Land Use: Don't put high density housing on the most valuable, pristine riverfront property and not put any open space around it. This section of the river on the north end of town should be preserved or developed in a way that honors and respects the land. LU4: Aligning development codes, policies, and process should mean being consistent with the demands placed on other developments. It's contradictory to plan high density development on the north end of town on the river while fighting development in other areas of Fraser.
interesting perspective...i will be sure to attend the board meeting regarding that project
Yes, the St. Louis Landing project is a joke! There were supposed to be buildings there this summer. The financing is not final, it's no longer affordable, the units will be cheap and developers are dishonest. Fraser deserves better.
How are you planning for wildlife corridors/crossings to improve connectivity in habitat while promoting safety for both drivers and animals?
This all looks fine, but ambitious. Does the town have resources to do all this? I don't think so. Look at the St. Louis Landing debacle. It's an example of what happens when well meaning people don't have the experience to manage a massive project.

Housing: Keep government out of development because you don't know what you're doing. The St. Louis Landing project is the most mismanaged project in the Valley. It should be called Unattainable Affordable Housing because nobody who needs it will be able to afford living there. If more housing development is slated, leave it to the people that have experience.
the TSI slide should be omitted seems to have been solved in every way by current development; massive private investment in municipal water system, private investment in bringing the new middle park health campus to fraser ...surprising the town doesnt want private equity to maintain the towns muni systems as well
Draft Downtown Vision and Goals
The Downtown vision and goals map is pretty, but it completely omits the most offensive part of the plan which is to put high density housing on the river north of town by St. Louis Landing. Why would this critical element of the plan not be represented?

FRASER FORWARD

COMPREHENSIVE PLAN

DRAFT

Column

See Proof on Next Page

AFFIDAVIT OF PUBLICATION

Ad #: YuQGOgP96hNE6L0cQSJ4
Customer: Garrett Scott

State of Florida, County of Orange, ss:

Anjana Bhadoriya, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC, duly authorized agent of Sky-Hi News and Middle Park Times, that the same weekly newspaper printed, in whole or in part and published in the County of Grand, State of Colorado, and has a general circulation therein; that said newspaper has been published continuously and uninterruptedly in said County of Grand for a period of more than fifty-two consecutive weeks next prior to the first publication of the annexed legal notice or advertisement; that said newspaper has been admitted to the United States mails as a periodical under the provisions of the Act of March 3, 1879, or any amendments thereof, and that said newspaper is a weekly newspaper duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado.
That the annexed legal notice or advertisement was published in the regular and entire issue of every number of said weekly newspaper for the period of 2 insertions; and that the first publication of said notice was in the issue of said newspaper dated 14 Jan 2026, 21 Jan 2026 in the issue of said newspaper. That said newspaper was regularly issued and circulated on those dates.

Total cost for publication: $35.04

Anjana Bhadoriya

(Signed)________________________________

VERIFICATION

State of Florida
County of Orange

NOTARY PUBLIC • STATE OF FLORIDA
JESSICA GORDON-THOMPSON
Notary Public - State of Florida
Commission # HH301656
Expires on August 17, 2026

Subscribed in my presence and sworn to before me on this: 01/22/2026

J. Ra

____
Notary Public
Notarized remotely online using communication technology via Proof.

NOTICE OF PUBLIC HEARING
FRASER, COLORADO

NOTICE IS HEREBY GIVEN that a public hearing will be held by the Planning Commission of the Town of Fraser, Colorado, on Wednesday, January 28, 2026, at 6:30 PM in the Board Room of the Fraser Town Hall, located at 153 Fraser Avenue, Fraser, Colorado to consider approval and certification to the Board of Trustees for adoption of an amended Comprehensive Plan for the Town of Fraser.

The proposed Comprehensive Plan is on file with the Town Planning Department and will be made available on the Town website prior to the Planning Commission meeting via the following webpages:

https://www.frasercolorado.com/160/Planning

https://cushingterrell.com/fraser-comprehensive-plan/

PUBLISHED IN THE SKY-HI NEWS AND MIDDLE PARK TIMES ON WEDNESDAY, JANUARY 14, 2026 AND WEDNESDAY, JANUARY 21, 2026.

FRASER PLANNING COMMISSION
RESOLUTION NO. 2026-01-01

A RESOLUTION APPROVING AND CERTIFYING TO THE BOARD OF TRUSTEES THE FRASER FORWARD COMPREHENSIVE PLAN (MASTER PLAN) FOR THE TOWN OF FRASER AND SUCH ADDITIONAL TERRITORY AS INCLUDED THEREIN, AS AUTHORIZED BY COLORADO REVISED STATUTES, AS AMENDED, SPECIFICALLY TITLE 31, ARTICLE 23, PART 2

WHEREAS, it is the duty of the Planning Commission of the Town of Fraser to adopt a Comprehensive Plan (Master Plan), pursuant to Title 31, Article 23, Part 2 of the Colorado Revised Statutes, as amended, for the physical development of the municipality, including certain areas outside its boundaries; and

WHEREAS, the Planning Commission, in conjunction with Town staff and its consultant team, has prepared an updated Comprehensive Plan, known as Fraser Forward, after making careful and comprehensive review and evaluation of present conditions and future of the Town of Fraser, with due regard to neighboring territory; and

WHEREAS, said updated Comprehensive Plan is intended to replace the Town's current Comprehensive Plan, as previously adopted and amended; and

WHEREAS, an updated Three Mile Plan is incorporated within the Fraser Forward Comprehensive Plan, and final adoption of this Comprehensive Plan will also constitute adopting this Three Mile Plan in compliance with C.R.S. 31-12-105(1)(e); and

WHEREAS, the Planning Commission has conducted a noticed public hearing during a regular meeting held on January 28, 2026, at which were considered public comments.

NOW THEREFORE, BE IT RESOLVED THAT THE TOWN OF FRASER PLANNING COMMISSION

1. That *Fraser Forward: The Town of Fraser Comprehensive Plan*, attached hereto as Exhibit A (including all maps and descriptive and other matter contained therein) shall be and is hereby adopted by the Planning Commission as the updated Comprehensive Plan (Master Plan) of the Town of Fraser, Colorado, to apply to all territory within the boundaries of the Town of Fraser and those areas outside town as provided by C.R.S. 31-12-105(1)(e), and shall constitute the whole of said Plan, subject to all conditions and authority as authorized by the Colorado Revised Statutes, Title 31, Article 23, Part 2, as amended, and subject to final approval by the Board of Trustees.

DULY MOVED AND ADOPTED BY THE TOWN OF FRASER PLANNING COMMISSION BY THE AFFIRMATIVE VOTE OF AT LEAST TWO-THIRDS OF THE ENTIRE MEMBERSHIP OF THE COMMISSION, THIS 28TH DAY OF JANUARY, 2026.

FRASER PLANNING COMMISSION

Chairperson

ATTEST:

Town Clerk