



## LARAMIE COUNTY PLANNING & DEVELOPMENT DEPARTMENT

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### Planning • Building

#### MEMORANDUM

**TO:** Laramie County Planning Commission

**FROM:** Sonny M. Pourchot, Associate Planner

**DATE:** January 22<sup>nd</sup>, 2026

**TITLE:** Review and Action on a Class B Conditional Use Permit for the Microsoft CYS07 Parking Area and Laydown Yard, located in a parcel of land situated in the SW ¼ NE ¼ of Section 5, Township 13 North, Range 67 West, of the 6<sup>th</sup> P.M., Laramie County, WY.

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#### EXECUTIVE SUMMARY

AVI, PC, on behalf of Hensel Phelps, has submitted Class B Conditional Use and Site Plan applications for the Microsoft CYS07 Parking Area and Laydown Yard project. The purpose of the project is to construct a parking area, supply laydown yard, paved roads to access the new Microsoft CYS07 building site (City of Cheyenne jurisdiction), and multiple job trailers in association with this construction.

#### BACKGROUND

The subject property is located in the Land Use (LU) zone district and consists of 11.09 acres. The surrounding area is zoned PUD – Planned Unit Development, North Range Business Park, attached to this report.

The Site Plan will be approved Administratively and is included in this report for informational purposes only.

#### **Pertinent Laramie County Land Use Regulations or Statutory Provisions include:**

Section 1-3-100 governing public notice.  
Section 2-3-102(d)(ii) governing the Conditional Use Type B permitting process.  
Section 2-4-104 governing the LU – Land Use Zone District.  
Section 3-1-109 governing commercial projects.

## **DISCUSSION**

The Laramie County Comprehensive Plan identifies the area as Rural Metro (RM), which is generally outside the Urban Interface of Cheyenne, and includes areas within the Metropolitan Planning Organization (MPO) boundaries. Additionally, this area includes similarly developing properties in close proximity to the MPO district. PlanCheyenne identifies specific uses for areas within the MPO boundary and designates this area as Mixed-Use Employment (MU-E) Campus, which is intended to include a variety of uses, with primary focus on employment designed in a business campus setting, such as North Range Business Park. Both plans agree with this project Site Plan and Class B Conditional Use Permit.

At the time of this report, agency review comments are still being addressed, mainly, WYDOT's access permitting and a detailed Traffic Impact Study need to be submitted. WY Game and Fish comments were received regarding the site being a part of pronghorn winter range habitat and that construction and development activities during the winter stipulation period of November 15 – April 30 should be avoided. And finally, the second configuration of the site plan does not allow for adequate fire apparatus clearance and will need to be a minimum of 20' wide and extend within 150' of all portions of the facility and exterior walls.

Public notice was provided, and no comments were received.

A conditional use is given to land use meant to be beneficial to the permitted uses or those similar within a zoning district with conditions; or it requires conditions to mitigate impacts it may have on the surrounding area. Every listed land use or land use proposal similar in nature, intensity and community impact which requires a conditional use permit has probable impacts and is required to meet all conditions within the LCLUR. It was determined that a Class B Conditional Use Permit would be required along with a Site Plan. Class B conditional uses are those meant to be beneficial to an area and are permissible in their zoning district.

Section 2-3-102 (a) of the Laramie County Land Use Regulations requires that the Laramie County Planning Commission find that the proposed use is permitted and is in conformance with all applicable development standards. Staff find this application is in conformance with the plans and policies of Laramie County.

## **RECOMMENDATION and FINDINGS**

**Based on evidence provided, staff finds that:**

- a.** This application meets the criteria for a Class B Conditional Use permit pursuant to section 2-3-102 of the 2025 Laramie County Land Use Regulations (LCLUR); and,
- b.** This application is in conformance with section 2-3-102(d)(ii) of the 2025 LCLUR governing Conditional Use Class B permits; and,
- c.** This application is in conformance with section 2-4-104 of the 2025 LCLUR governing the LU – Land Use Zone District.



**and that the Planning Commission may approve the Class B Conditional Use Permit for the Microsoft CYS07 Parking Area and Laydown Yard with the following conditions:**

- 1. Comply with Wyoming Game and Fish to avoid development and construction and other development related activities at the site between November 15<sup>th</sup> – April 30<sup>th</sup>.**
- 2. All agency comments must be addressed and/or corrected on the site plan prior to a Certificate of Review being issued by Laramie County Planning and Development.**

### **PROPOSED MOTION**

I move to approve the Class B Conditional Use Permit for the Microsoft CYS07 Parking Area and Laydown Yard, and adopt the findings of facts a, b, and c of the staff report with the following conditions:

- 1. Comply with Wyoming Game and Fish to avoid development and construction activities at the site between November 15<sup>th</sup> – April 30<sup>th</sup>.**
- 2. All agency comments must be addressed and/or corrected on the site plan prior to a Certificate of Review being issued by Laramie County Planning and Development.**

### **ATTACHMENTS**

- Attachment 1: Location Map
- Attachment 2: Pre-Application Notes
- Attachment 3: Project Narrative
- Attachment 4: Agency Review Comments with Applicant Responses
- Attachment 5: Wyoming Game and Fish Letters
- Attachment 6: Drainage Report
- Attachment 7: Landscape Waiver Request
- Attachment 8: Transportation Worksheet
- Attachment 9: Civil Design Plans
- Attachment 10: Class B Conditional Use Permit Resolution
- Attachment 11: Exhibit A – Site Plan
- Attachment 12: Exhibit B – North Range Business Park PUD
- Attachment 13: Exhibit C – North Range Business Park PUD Amendment



**Laramie County, WY**  
**Laramie County Planning and Development Office**

3966 Archer Pkwy  
Cheyenne, WY 82009  
(307) 633-4303  
www.laramiecountywy.gov  
planning@laramiecounty.com

**PERMIT**

**PA-25-00095**

**PRE-APPLICATION MEETINGS**

**SITE ADDRESS:** 10333 HAPPY JACK RD CHEYENNE  
**PRIMARY PARCEL:** 13670510001400  
**PROJECT NAME:** CYS07 STAGING AREA

**ISSUED:** 10/09/2025  
**EXPIRES:** 04/07/2026

**APPLICANT:** AVI PC  
1103 OLD TOWNE LN STE 101  
CHEYENNE, WY 82009  
(307) 637-6017

**OWNER:** KING RANCH COMPANY L P  
PO BOX 905  
CHEYENNE, WY 82003

**DESIGNER:** Koch, Connor  
1103 old town lane ste 101  
cheyenne, WY 82009  
570-730-5077

**POINT OF CONTACT:** Cordier, Tristan  
1103 old town lane ste 101  
cheyenne, WY 82009  
307-637-6017

Detail Name	Detail Value
Meeting Date	10/09/2025
MEETING AM OR PM	AM
Application Types	Site Plan
Attendees	Online (Teams Meeting)
Property Interest	Owner
Detailed Project Narrative	Proposed laydown yard, job trailers, and large parking lot to be associated with and connected to the existing CYS07 site to the east (NORTH RANGE BUSINESS PARK, 11TH FILING: LOT 1, BLOCK 16). This project will also include road design and new approach to connect the site north to happy jack road. Site includes gravel surfacing for laydown yard, asphalt surfacing for parking lot and roads, and concrete valley pan.
Staff Attending	CC SP SC JC SL CS
Application Fees	Yes
Copy of Pre-App Notes	REQUIRED FOR APPLICATION SUBMITTAL
Project Narrative Letter	Yes
Warranty Deed and/or Lease Agreement	Yes



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Development Action	Site Plan
Drainage Plans	Yes
Drainage Study	Yes
Traffic Study	Yes
Public Safety Fees Acknowledgement Letter	No
Community Facility Fees Acknowledgement Letter	No
WY DEQ Chapter 23 Study/Submittal Letter	No
Development Agreement	No
Roadway Maintenance Plan	No
Road/Easement Use Agreement	No
Right-of-Way Construction Permit	Upon Construction
Engineer Review - Paid by Applicant	Yes
Environmental Health Review/Approval	Yes
Environmental and Services Impact Report	No
GESC Permit	Yes, Standard
Floodplain Development Permit	No
Perimeter Fence Construction per W.S.S. 18-5-319	No
Public Notice, Paid by Applicant	Yes
Newspaper Legal Notice, Paid by Applicant	No
Adjacent Property Owner Letter, Paid by Applicant	Yes



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#### Miscellaneous Notes

This is the office trailers and the laydown yard area on the King Ranch property that is being leased by Microsoft. They will be hooking up to BOPU city water/sewer that is already existing on site. Seth Lloyd City of Cheyenne: Because the laydown yard and trailers are outside of city jurisdiction hooking up to city water to service county property may become an issue. The access road will also cross through both jurisdictions and the threshold for city is going to be triggered as well as county's and this will require two grading permits. Drainage study will be submitted for this project and a traffic study due to WYDOT's requirements. Tristan will not submit a full traffic study due to WYDOT's requirements and they will most likely need more on the traffic study. This parking laydown yard will be accessed from Happy Jack and will predominantly used for trade workers, some construction materials, but the majority of the construction work will come in off of Logistics.

#### Miscellaneous Notes (2)

Jeff Cooper Sr. Bldg Inspector: Permits are required for the trailers and all pertinent inspections. Dennis Lewis DEQ: Should the wastewater discharge be 2,000 gallons/day or greater, a UIC permit would be required. For Environmental Health, a commercial wastewater permit is required. Commercial septic systems are designed by an engineer. Seth Lloyd final response: One site plan submitted to the County with City agencies as reviewers is sufficient (as long as comments from BOPU and from the City [for items within City limits] are considered binding) City fire prevention is concerned that a 4" water main extending over 1,200' to the laydown area will not be large enough for fire flow (even for County fire response) City Engineering will need a City grading permit for the grading occurring within City limits. BOPU will need to be involved in the water and sewer discussion.



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#### Miscellaneous Notes (3)

At this time, the reps from BOPU are thinking that an Outside User Agreement will not be needed, but they will do a more in-depth analysis on the issue and consult with the Board. They reserve the right to request an Outside User Agreement after completing the in-depth analysis. It is anticipated that any traffic analysis sufficient for WYDOT will be sufficient for the City. The temporary structures within City limits will need building permits from the City. The City standard for access roads/driveways is to have them be paved. Although the laydown yard and parking area may be temporary, the access/driveway may become permanent (for the BHE sites and possibly as a secondary access for the Microsoft sites). If demonstrated to be a permanent replacement of the existing access, the access/driveway that is proposed will need to be paved within City limits.

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### CONDITIONS

\* Disclaimer: These are intended as guidance only. Fee calculations are determined at the time of application, and issues that arise during review periods are not always anticipated at pre-application stage. Public Records Act: This document and any documents provided by the applicant to Planning may constitute a public record under W.S.S. 16-4-201 et seq. Applicants are advised not to divulge any information at a Pre-Application Meeting with Planning that they do not yet desire to be public information.

\* A traffic study may be required for any site plan, subdivision permit, or access request for any development and shall be required for any project or development that will generate 100 or more trips during any hour or over 200 trips per day. Traffic studies shall be prepared by a qualified civil engineer licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming. The applicant and the engineer shall meet with the County prior to preparation of the traffic study to discuss specific issues or concerns. The Director of Planning and Development may waive a traffic study based on estimated ADT, and peak hour trips, or existing road or site conditions, including adequate pedestrian access.

\* Requests for waivers for drainage impact studies shall be made in writing to the Laramie County Public Works Department. The County shall review the request and approve the grant for a waiver or identify the level of study required for the proposed development action. Laramie County Public Works may waive the requirement for drainage study based on the following: a. Information is provided to substantiate there are no potential drainage problems at the site or downstream of the site (including impacts to downstream floodplains). b. The development or redevelopment will not result in an increase in the historic impervious area. c. The development or redevelopment of an area is immediately adjacent to a major drainageway that is capable of conveying the fully developed basin 100-year flood without impact to the base flood elevation. d. The development or redevelopment is unlikely to create drainage problems.



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\* A waiver or alternative to the required landscaping may be presented to the Planning and Development Director for review. The Director shall approve the proposed alternative landscape plan based on the following criteria: A. the proposed alternative meets or exceeds the intent of this regulation, and B. the proposed alternative is well-integrated with the surrounding landscaping and land uses, and C. the proposed alternative meets the goals of Laramie County Comprehensive Plan and; D. the purpose of the required site plan is to legalize an existing use and the impact or benefits of the landscape plan on the property would be minimal; or E. the landscaping as required would prohibit reasonable use of the property.

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Laramie County Planning and Development

October 15, 2025

3966 Archer Parkway

5016.25

Cheyenne, WY 82009

**RE: CYS07 Staging Area Site Plan – Project Narrative & Drainage Waiver Request**

To whom it may concern,

AVI P.C., on behalf of Hensel Phelps, is submitting a Site Plan for a proposed parking area and laydown yard located south of Happy Jack Road and west of North Range Business Park, 11<sup>th</sup> Filing. The project will include site grading, gravel laydown yard, paved roads to access the site, multiple job trailers, and paved parking area. Water is proposed to be connected to the existing 12" BOPU system to the east, and a septic tank/ leach field is proposed. A detention pond with outlet structure and WQCV design is also proposed to mitigate the increased imperviousness stormwater runoff.

A warranty deed for the site is not yet available due to the pending sale of the property. A warranty deed will be provided as soon as possible.

We are requesting the Landscape Plan be waived for the site at this time, due to the nature and purpose of the site and the surrounding Microsoft sites.

If you have any questions or require additional information, please feel free to contact me directly.

Respectfully Submitted

**AVI PROFESSIONAL CORPORATION**

Tristan Cordier, PE

1103 Old Town Lane | Cheyenne, Wyoming 82009 | 307.637.6017

2290 E Prospect Road Suite 5, Fort Collins, Colorado 80524 | 970.420.0086

[avi@avipc.com](mailto:avi@avipc.com) | [www.avipc.com](http://www.avipc.com)

h:\5016\_hp cys 15&16 staging site\planning\5016\_drainage memo.docx

Permit Notes

Permit Number: PZ-25-00070

Applicant: AVI PC

Owner: KING RANCH COMPANY L P

Project Description: Construction staging, offices, and contractor parking for existing and future Microsoft centers.

Parcel Number: 13670510001400

Site Address: 10333 HAPPY JACK RD

Cheyenne, WY 82001

Submitted: 10/16/2025

Technically Complete: 10/16/2025

Approved: Issued:

Begin Date	End Date	Permit Area	Subject	Note Type	Note Text	Created By
10/20/2025		Workflow	GIS REVIEW	GENERAL	The address of 10333 Happy Jack RD is associated with a residence over a half mile away and utilizing a different access point. If an address is determined to be of use, it will be issued with the building permit.	CAMBIA.MCCOLLOM@LARAMIECOUNTY.WY.GOV
10/20/2025	10/20/2025	Application	PZ-25-00070	GENERAL	No concerns noted for this project with direct impact to natural resources	CONSERVATIONDISTRICT@LARAMIECOUNTY.WY.GOV
10/22/2025		Workflow	COUNTY ASSESSOR REVIEW	GENERAL	Current ownership: KING RANCH COMPANY LP. No concerns.	CANDICE.MCCART@LARAMIECOUNTY.WY.GOV
10/22/2025		Workflow	SHERIFF'S OFFICE REVIEW	GENERAL	No concerns	AARON.VELDHEER@LARAMIECOUNTY.WY.GOV
10/22/2025	10/22/2025	Application	PZ-25-00070	GENERAL	No comments	MATTHEW.BUTLER@LARAMIECOUNTY.WY.GOV
10/24/2025		Workflow	BUILDING FIRE CODE REVIEW	GENERAL	Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. Fire Apparatus Roads required per 2024 IFC section 503. Fire protection water Supplies required per 2024 IFC section 507	DANIEL.PETERS@LARAMIECOUNTY.WY.GOV
10/24/2025		Workflow	WYOMING STATE ENGINEER'S OFFICE	GENERAL	No Concerns	WESLEY.FRAN1@LARAMIECOUNTY.WY.GOV
10/27/2025		Workflow	ENGINEERS REVIEW	GENERAL	1.Please include the radii dimensions for the access road off Happy Jack Road on the site plan and construction plans. 2.Per 3-1-109g.xxvi and 5-2-102.j, the site plan needs to include a recorded drainage easement encompassing the detention pond. 3.Will there be any trash dumpsters/receptacles associated with the job trailers, etc.? 4.Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. 5.Per 5-2-103.e, drainage planning shall include a design to maintain post-development runoff rates to historic rates for all return periods. Please show how the historic rates for each	SCOTT.LARSON@LARAMIECOUNTY.WY.GOV



## Permit Notes

storm are released/maintained through the outlet structure.  
 6.Per 5-2-103.c, detention ponds shall be designed to have 1 foot of freeboard. The plans currently indicate the HWL and the spillway crest are at the same elevation.  
 7.I believe the engineers certification in the Drainage Report (pg. 2) refers to the incorrect project.  
 8.What is the velocity coming out of the outlet pipe from the detention pond? Does it require riprap to prevent erosion?  
 9.How were the culverts under the access road sized? I do not see the analysis for them in the Drainage Report. In addition, some of the pipes have steep slopes; is riprap required to prevent erosion at the culvert outlets?  
 10.Although shown visually/graphically on the plans (but they arent called out/labeled), can you please call out flared end sections are required for the culverts just for clarification.  
 11.The Transportation Worksheet submitted is not the worksheet outlined/included in the LCLUR. However, since the access is off a WYDOT controlled and maintained roadway, I will defer to WYDOT regarding the needed traffic information. Per the LCLUR and the worksheet that was supplied, it does meet the requirements for a Criteria II Traffic Impact Study.  
 12.It would be helpful and prudent if the FEMA floodplain is shown on the site plan to show all work will be outside of the floodplain area.  
 13.A grading permit will be required to be submitted to the County prior to construction.

10/27/2025	Workflow	WYDOT REVIEW GENERAL	<p>1. Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123).Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program.</p> <p>2/ Any overhead power lines constructed in the WYDOT right-of-way will require a short term traffic plans that account for "dead ending" at the poles adjacent to the ROW. Long</p>	TAYLOR.MCCORT @LARAMIECOUNT WYV.GOV
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## Permit Notes

spans will not be allowed to be pulled across WYDOT roads.

3. Per WYDOT's Access Manual the selected location does not meet minimum spacing criteria (1320 FT, Commercial to Commercial, pg. 14). The proposed location also is along a horizontal curve with a hill and sight distance will need to be verified if it is an allowable location. For these reasons WYDOT would encourage the applicant to seek an easement agreement and share the existing commercial approach to the West (RM 4.258 or 41.130118, -104.911355).

4. A traffic impact study may be required based on the number of vehicles required. Please provide an estimate to the number of trips for the day and during AM/PM peak hours. If the construction will need trucks larger than a WB-67 please provide truck swept path analysis.

5. Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118).

To obtain an access permit application (Access application (M-3A)) see the following link:

[https://www.dot.state.wy.us/home/engineering\\_technical\\_programs/manuals\\_publications.html](https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html)

10/28/2025		Application	PZ-25-00070	GENERAL	1. Please provide the number of trips for the day and during AM/PM peak hours volumes.	CHRISTOPHER.YA NEY@LARAMIECO UNTYWY.GOV
10/28/2025		Workflow	ENVIRONMENTA L HEALTH REVIEW	GENERAL	Commercial small wastewater permit will be required for septic system. Here is the application: <a href="https://clcpublichealth.org/wp-content/uploads/2025/07/Commercial-Septic-Application-2025-Revised-1-1.pdf">https://clcpublichealth.org/wp-content/uploads/2025/07/Commercial-Septic-Application-2025-Revised-1-1.pdf</a> . If there are any questions contact Environmental Health at (307) 633-4091.	TIFFANY.GAERTN ER@LARAMIECOU NTYWY.GOV
10/28/2025	10/28/2025	Workflow	COUNTY REAL ESTATE OFFICE REVIEW	GENERAL	no comments	TERESA.LEMASTE R@LARAMIECOUN TYWY.GOV
11/03/2025		Workflow	PUBLIC WORKS REVIEW	GENERAL	1. Comments provided in PZ-25-00069 shall be shall be addressed and resolved appropriately.	MOLLY.BENNETT @LARAMIECOUNT YWY.GOV
11/03/2025		Workflow	UTILITIES REVIEW	GENERAL	Not High West Territory	BERT.MACY@LAR AMIECOUNTYWY. GOV

Permit Notes

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Applicant: AVI PC

Owner: KING RANCH COMPANY L P

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## Permit Notes

spans will not be allowed to be pulled across WYDOT roads.

3. Per WYDOT's Access Manual the selected location does not meet minimum spacing criteria (1320 FT, Commercial to Commercial, pg. 14). The proposed location also is along a horizontal curve with a hill and sight distance will need to be verified if it is an allowable location. For these reasons WYDOT would encourage the applicant to seek an easement agreement and share the existing commercial approach to the West (RM 4.258 or 41.130118, -104.911355).

4. A traffic impact study may be required based on the number of vehicles required. Please provide an estimate to the number of trips for the day and during AM/PM peak hours. If the construction will need trucks larger than a WB-67 please provide truck swept path analysis.

5. Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118).

To obtain an access permit application (Access application (M-3A)) see the following link:

[https://www.dot.state.wy.us/home/engineering\\_technical\\_programs/manuals\\_publications.html](https://www.dot.state.wy.us/home/engineering_technical_programs/manuals_publications.html)

10/28/2025		Application	PZ-25-00070	GENERAL	1. Please provide the number of trips for the day and during AM/PM peak hours volumes.	CHRISTOPHER.YA NEY@LARAMIECO UNTYWY.GOV
10/28/2025		Workflow	ENVIRONMENTA L HEALTH REVIEW	GENERAL	Commercial small wastewater permit will be required for septic system. Here is the application: <a href="https://clcpublichealth.org/wp-content/uploads/2025/07/Commercial-Septic-Application-2025-Revised-1-1.pdf">https://clcpublichealth.org/wp-content/uploads/2025/07/Commercial-Septic-Application-2025-Revised-1-1.pdf</a> . If there are any questions contact Environmental Health at (307) 633-4091.	TIFFANY.GAERTN ER@LARAMIECOU NTYWY.GOV
10/28/2025	10/28/2025	Workflow	COUNTY REAL ESTATE OFFICE REVIEW	GENERAL	no comments	TERESA.LEMASTE R@LARAMIECOUN TYWY.GOV
11/03/2025		Workflow	PUBLIC WORKS REVIEW	GENERAL	1. Comments provided in PZ-25-00069 shall be shall be addressed and resolved appropriately.	MOLLY.BENNETT @LARAMIECOUNT YWY.GOV
11/03/2025		Workflow	UTILITIES REVIEW	GENERAL	Not High West Territory	BERT.MACY@LAR AMIECOUNTYWY. GOV

Molly Cook  
Laramie County Public Works  
13797 Prairie Center Circle  
Cheyenne, WY 82009  
[molly.cook@laramiecountywy.gov](mailto:molly.cook@laramiecountywy.gov)

December 18, 2025  
2-5016.25

**RE: RESPONSE TO PERMIT NUMBER: PZ-25-00070**

Dear Molly,

Attached for your review and approval is a resubmittal of the Conditional Use Type B for the proposed CYS07 Staging Area. The plans have been revised according to the County review comments received on November 4, 2025. The comments are listed below with the design team's response or proposed resolution in *red*.

**Sheriff's Office – Aaron Veldheer**

- 1) Only "issue" may be traffic on Happy Jack when trucks are slow to pull in to or out of the lot. *Noted, AVI is coordinating with WYDOT for an approach permit and design/construction improvements to be made based on the ongoing traffic study.*
- 2) Microsoft has been annexed into the city. Will this entire project be in the county? *Yes, with exception of a short portion of the proposed access road.*

**WAPA**

WAPA has a conflict with this project. Developer/Project Manager must contact WAPA for permit to cross under our transmission line easements. *Hensel Phelps and AVI are working directly with WAPA to complete the required crossing permit and design requirements.*

**GIS – Cambia McCollom**

The address of 10333 Happy Jack RD is associated with a residence over a half mile away and utilizing a different access point. If an address is determined to be of use, it will be issued with the building permit. *Noted*

**Building Fire Code Review – Daniel Peters**

- 1) Premises identification shall be in accordance with 2024 IFC section 505 and 2024 IRC section 308, and 2024 IBC section 502.1. *Noted*
- 2) Fire Apparatus Roads required per 2024 IFC section 503. *Noted, see truck turning movements provided with this submittal.*
- 3) Fire protection water Supplies required per 2024 IFC section 507 *See plans for proposed hydrant locations.*



### Engineer's Review – Scott Larson

- 1) Please include the radii dimensions for the access road off Happy Jack Road on the site plan and construction plans. **Added, also please note that efforts are underway directly with WYDOT to complete the design for this approach.**
- 2) Per 3-1-109g.xxvi and 5-2-102.j, the site plan needs to include a recorded drainage easement encompassing the detention pond. **Noted, drainage easement identified on the plans, and intended to be recorded upon approval of design.**
- 3) Will there be any trash dumpsters/receptacles associated with the job trailers, etc.? **See revised site plan and SWPPP map for proposed trash dumpsters and locations.**
- 4) Per 5-2-104, the NOAA Atlas 14, Volume 12 shall be used for design rainfall intensity data for the specific location of the development. **Please see revised drainage report.**
- 5) Per 5-2-103.e, drainage planning shall include a design to maintain post-development runoff rates to historic rates for all return periods. Please show how the historic rates for each storm are released/maintained through the outlet structure. **Please see revised drainage report.**
- 6) Per 5-2-103.c, detention ponds shall be designed to have 1 foot of freeboard. The plans currently indicate the HWL and the spillway crest are at the same elevation. **Please see revised drainage report and drawings.**
- 7) I believe the engineers certification in the Drainage Report (pg. 2) refers to the incorrect project. **Corrected**
- 8) What is the velocity coming out of the outlet pipe from the detention pond? Does it require riprap to prevent erosion? **Please see revised drainage report.**
- 9) How were the culverts under the access road sized? I do not see the analysis for them in the Drainage Report. In addition, some of the pipes have steep slopes; is riprap required to prevent erosion at the culvert outlets? **The 24" and 36" RCP's shown crossing under the proposed access road match existing size and types and will not see added flows from this project. Other culverts including the 18" CMP under the proposed Happy Jack approach, as well as the culvert under the proposed access connecting onto existing facilities will see minimal flows and have been sized as the 18" typical minimum. Two additional culverts have been added crossing the proposed "haul road", both at 24". One of these will hydraulically balance a sump area the road crosses, the other has been sized considering detention discharge along with runoff from a small portion of prairie. Also, please see revised plans/drainage study for riprap and sizing calculations.**
- 10) Although shown visually/graphically on the plans (but they aren't called out/labeled), can you please call out flared end sections are required for the culverts just for clarification. **These have been added.**
- 11) The Transportation Worksheet submitted is not the worksheet outlined/included in the LCLUR. However, since the access is off a WYDOT controlled and maintained roadway, I will defer to WYDOT regarding the needed traffic information. Per the LCLUR and the worksheet that was supplied, it does meet the requirements for a Criteria II Traffic Impact Study. **Noted, traffic study is currently in progress and AVI is coordinating directly with WYDOT to complete requirements regarding the approach.**

12) It would be helpful and prudent if the FEMA floodplain is shown on the site plan to show all work will be outside of the floodplain area. **Floodplain now shown on the site plan.**

13) A grading permit will be required to be submitted to the County prior to construction. **Noted, grading permit to be submitted shortly.**

#### **WYDOT Review – Taylor McCort**

1) Developers and landowners should be aware that any work or presence in the right of way created by development/construction for this project will need the appropriate permitting or licensing between the utility owner (or appropriate local agency for fence modifications) and WYDOT District 1 Maintenance (access permits are with D1 Traffic). Utility owners, including governmental entities, will be responsible for the licensing and/or permitting of all utility facilities in the WYDOT right-of-way. Other work in the ROW can be approved through a temporary use permit. Permits (except for access permits) and licenses can be acquired by contacting Michael Elliott (Michael.Elliott@wyo.gov, 307-745-2123). Also, the development must maintain historic drainage corridors so that drainage is not diverted to other entry points to the R/W. If drainage is affected in the highway right-of-way, a drainage study needs to demonstrate that post-development discharge rates are metered at or below pre-development rates for 2, 5, 10, 25, 50 and 100 year events and will need to be reviewed by WYDOT Bridge/Hydraulics Program. **WYDOT access permit to be submitted with traffic study. No drainage is intended to be discharged into the Happy Jack ROW.**

2) Any overhead power lines constructed in the WYDOT right-of-way will require a short term traffic plans that account for "dead ending" at the poles adjacent to the ROW. Long spans will not be allowed to be pulled across WYDOT roads. **No power lines are proposed within the ROW.**

3) Per WYDOT's Access Manual the selected location does not meet minimum spacing criteria (1320 FT, Commercial to Commercial, pg. 14). The proposed location also is along a horizontal curve with a hill and sight distance will need to be verified if it is an allowable location. For these reasons WYDOT would encourage the applicant to seek an easement agreement and share the existing commercial approach to the West (RM 4.258 or 41.130118, -104.911355). **The existing approach is expected to be removed with this project. These efforts are being coordinated with Black Hills Energy along with the access road easement.**

4) A traffic impact study may be required based on the number of vehicles required. Please provide an estimate to the number of trips for the day and during AM/PM peak hours. If the construction will need trucks larger than a WB-67 please provide truck swept path analysis. **Traffic study is currently in progress.**

5) Access roads from the state highway system will require WYDOT access permits for new/modified/change in use, including removal. Maintain existing drainage patterns so that stormwater is not concentrated and diverted from locations where it currently crosses WYDOT R/W. Please submit all access documentation to Paul Beckett (Paul.Beckett@wyo.gov- 307.745.2118). **WYDOT access permit will be submitted to WYDOT with traffic study and full approach design.**



**MPO – Christopher Yaney**

1) Based on the traffic work sheet for construction trip volumes. A traffic analysis is needed to the Access onto Happy Jack Road. With 2400 trips per day will generate trips concerns for public using Happy Jack Road, workers and heavy trucks use per day and am/pm peak hours. **Traffic study is currently in progress.**

**Environmental General Health – Tiffany Gaertner**

Commercial small wastewater permit will be required for septic system. **Noted. Application to be submitted once site address is issued.**

**Wyoming Game and Fish – Will Schultz**

The staff of the Wyoming Game and Fish Department (Department) has reviewed the proposed CYS07 Staging Area at T13N R67W in Section 5. The Department is statutorily charged with managing and protecting all Wyoming wildlife (W.S. 23-1-103). Pursuant to our mission, we offer the following comments for your consideration. The proposed project is a proposed parking area and laydown yard adjacent to the existing Microsoft data center industrial sites, approximately 11 acres in size. The project would also include concrete runoff channels that would lead to a stormwater detention pond north of the site. The project area is located in the pronghorn's crucial winter range habitat.

**Terrestrial Recommendations:**

Avoid impacts to wintering pronghorn - The site is located in a pronghorn crucial winter range for the Iron Mountain pronghorn herd. Crucial winter range habitat is defined as habitat that is a determining factor in a populations ability to maintain itself at the desired level over the long term. This pronghorn herd is currently more than 40% below its population objective due to habitat fragmentation and conversion, as well as many other factors. Further development in this area will reduce the functionality of the pronghorn's crucial winter range habitat. The Department recommends:

Avoiding construction and development activities during the winter stipulation period of November 15 - April 30.

Obtaining the geospatial data for the pronghorn's crucial winter range habitat from the Departments GIS open source webpage at: <https://wyoming-wgfd.opendata.arcgis.com/>, and incorporating this layer into county planning spatial data tools. Encouraging wildlife-friendly fencing for the project, if fencing is required for the project. This type of fencing can minimize big game entanglement and allow for necessary movement across the landscape. More information and a downloadable guide to wildlife-friendly fencing specifications is available at: <https://wgfd.wyo.gov/news-events/updated-fencing-guide-landowners-available-through-game-and-fish>.

**We have reviewed the considerations and mapping and appreciate the intent of the comment. Due to the unique characteristics of Microsoft centers and supporting projects, the site is required to incorporate security fencing with restricted access. Wildlife will not be able to cross the proposed fencing. Construction is anticipated to begin as soon as the grading permit is approved, however is believed to have minimal impact on wildlife due to the location being a small area immediately adjacent a fully developed facility. If there are other considerations, we would encourage a discussion with the WGFD to accommodate this unique site and situation.**

If you have any questions or require additional information, please feel free to contact me directly.

Respectfully Submitted

Tristan Cordier, PE

1103 Old Town Lane | Cheyenne, Wyoming 82009 | 307.637.6017

[avi@avipc.com](mailto:avi@avipc.com) | [www.avipc.com](http://www.avipc.com)

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# Wyoming Game and Fish Department

*Conserving Wildlife, Serving People*

Governor Mark Gordon • Director Angi Bruce

## Commissioners

Ashlee Lundvall, President

Mark Jolovich, Vice President

Rusty Bell

Bill Mai

Carlisle "Fonzy" Haskell

John Masterson

Kenneth D. Roberts

October 27, 2025

WER 4502.202  
Laramie County  
CYS07 Staging Area  
PZ-25-00070

Sonny Pourchot  
Associate Planner  
Laramie County  
Sonny.Pourchot@laramiecountywy.gov

Dear Mr. Pourchot,

The staff of the Wyoming Game and Fish Department (Department) has reviewed the proposed CYS07 Staging Area at T13N R67W in Section 5. The Department is statutorily charged with managing and protecting all Wyoming wildlife (W.S. 23-1-103). Pursuant to our mission, we offer the following comments for your consideration.

The proposed project is a proposed parking area and laydown yard adjacent to existing Microsoft data center industrial sites, approximately 11 acres in size. The project would also include concrete runoff channels that would lead to a stormwater detention pond north of the site. The project area is located in pronghorn crucial winter range habitat.

### **Terrestrial Recommendations:**

**Avoid impacts to wintering pronghorn** – The site is located in pronghorn crucial winter range for the Iron Mountain pronghorn herd. Crucial winter range habitat is defined as habitat that is a determining factor in a population's ability to maintain itself at the desired level over the long term. This pronghorn herd is currently more than 40% below its population objective due to habitat fragmentation and conversion, as well as many other factors. Further development in this area will reduce the functionality of pronghorn crucial winter range habitat. The Department recommends:

- Avoiding construction and development activities during the winter stipulation period of November 15 – April 30.
- Obtaining the geospatial data for pronghorn crucial winter range habitat from the Department's GIS open source webpage at: <https://wyoming-wgfd.opendata.arcgis.com/>, and incorporating this layer into county planning spatial data tools.
- Encouraging wildlife-friendly fencing for the project, if fencing is required for the project. This type of fencing can minimize big game entanglement and allow for necessary movement across the landscape. More information and a downloadable guide to wildlife-

Sonny Pourchot  
October 27, 2025

Page 2 of 2 – WER 4502.202

friendly fencing specifications is available at: <https://wgfd.wyo.gov/news-events/updated-fencing-guide-landowners-available-through-game-and-fish>.

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Lauren Throop, Habitat Protection Biologist, at (307) 721-1396.

Sincerely,

A handwritten signature in black ink, appearing to read 'Will Schultz', with a stylized flourish at the end.

Will Schultz  
Habitat Protection Supervisor

WS/lt

cc: U.S. Fish and Wildlife Service  
Chris Wichmann, Wyoming Department of Agriculture



# Wyoming Game and Fish Department

*Conserving Wildlife, Serving People*

Governor Mark Gordon • Director Angi Bruce

## Commissioners

Ashlee Lundvall, President

Mark Jolovich, Vice President

Rusty Bell

Bill Mai

Carlisle "Fonzy" Haskell

John Masterson

Kenneth D. Roberts

December 22, 2025

WER 4502.202

Laramie County

CYS07 Staging Area

PZ-25-00069 and -00070

Sonny Pourchot

Associate Planner

Laramie County

Sonny.Pourchot@laramiecountywy.gov

Dear Ms. Pourchot,

The staff of the Wyoming Game and Fish Department (Department) has reviewed the response to comments regarding the proposed CYS07 Staging Area at T13N R67W in Section 5. The Department is statutorily charged with managing and protecting all Wyoming wildlife (W.S. 23-1-103). We offer the following comments for your review.

The project area is located in pronghorn crucial winter range habitat. Crucial winter range habitat is designated as such because it is a determining factor in a population's ability to maintain itself long-term, meaning that the Iron Mountain Pronghorn Herd depends on the use of these delineated crucial habitats to maintain population viability. The continued development of subdivisions, industrial parks, fencing, and road networks near the City of Cheyenne have somewhat limited the available habitat for pronghorn and other big game species. This situation is exacerbated when development is sited in vital habitats such as crucial winter range, and when development activities occur during the sensitive winter months.

Despite the proposed project's location adjacent to another development, pronghorn herds use these lands west of Cheyenne in and around Dry and Diamond Creeks for winter habitat. In this region, pronghorn move nomadically across the landscape to find hospitable winter habitat until they meet I-80 and the City of Cheyenne and cannot move further south or east, thus often remaining in the area surrounding the proposed development. Construction activity during the winter months can disrupt and displace wintering pronghorn that are using this area.

Our Department is directed by the Wyoming Game and Fish Commission in their [Mitigation Policy \(2016\)](#) to maintain no net loss of crucial winter range habitat, and to recommend seasonal timing stipulations to minimize impacts when avoidance is not possible. As such, the Department continues to recommend:

Sonny Pourchot  
December 22, 2025  
Page 2 of 2 – WER 4502.202a

- Avoiding construction and development activities during the winter stipulation period of November 15 – April 30.

We appreciate the project proponent clarifying that exclusionary security fencing will be required for all components of this new development due to security concerns. We understand that is deemed to be necessary for this project and that wildlife-friendly fencing is not feasible for the access road or staging area/parking lot site.

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Lauren Throop, Habitat Protection Biologist, at (307) 721-1396.

Sincerely,

A handwritten signature in black ink, appearing to read 'Will Schultz', with a stylized flourish at the end.

Will Schultz  
Habitat Protection Supervisor

WS/lt

cc: U.S. Fish and Wildlife Service  
Chris Wichmann, Wyoming Department of Agriculture



2025

# CYS07 Staging Area

## Drainage Report

Prepared for

Hensel Phelps Construction

644 Logistics Drive

Cheyenne, WY 82009



AVI Professional Corporation  
1103 Old Town Lane, Ste. 101 • Cheyenne, WY 82009  
P 307.637.6017 • F 307.632.9326  
December 17, 2025



## Table of Contents

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## I. INTRODUCTION

The CYS07 Staging Area site development will consist of an 11.09 acre site adjacent to the existing Microsoft site located on Lot 1, Block 16 of North Range Business Park, 11<sup>th</sup> Filing in Cheyenne. The current site is entirely undeveloped, and runoff flows to the north/northeast, ultimately to Crow Creek. The project consists of a gravel laydown yard with job trailers, bathrooms, and a paved parking area for employees, with a calculated 84% total site imperviousness. The project proposes to convey runoff through a series of concrete channels that will ultimately connect to a proposed detention pond to the north. This can be seen in the Site Plan in Appendix A.

Peak flow rates were estimated using the Rational Method  $Q=CIA$ . Precipitation data used in the Rational Method analysis comes from the NOAA Atlas 14, Volume 12, which can be seen in Appendix A. Runoff Coefficients were determined for the effective impervious areas using Table 6-7 for soil group 'B' located in the Mile High Flood District Criteria Manual, Volume 1, Chapter 6. Tc values were determined using the equations also listed in the Mile High Flood District Criteria Manual, Volume 1, Chapter 6, page 10. Results from the Rational Method calculations were then input into the FAA detention spreadsheet to determine the necessary volume of the detention pond. The soils report, subbasin exhibits, all hand calculations, and FAA detention spreadsheet can be seen in Appendix A.

## II. HISTORIC AND POST-DEVELOPMENT HYDROLOGY

### 1. Historic Peak Flowrate

$Q_{50\text{year}} = 12.07 \text{ cfs}$

HISTORIC PEAK FLOWRATE				
TC (MIN)	AREA (ACRES)	INTENSITY (IN/HR)	C- VALUE	Q PEAK 50-YR (CFS)
37.97	11.09	3.2	0.34	12.07

### 2. Post-Development Flowrate

$Q_{100\text{year}} = 81.84 \text{ cfs}$

HISTORIC PEAK FLOWRATE				
TC (MIN)	AREA (ACRES)	INTENSITY (IN/HR)	C- VALUE	Q PEAK 100-YR (CFS)
10.00	11.09	9.0	0.82	81.84

Using these results in the FAA detention calculations, it was determined that a 49,817 ft<sup>3</sup> pond volume is required with an allowable release rate of 12.07 cfs. The proposed detention pond is capable of a storage volume of 70,720.84 ft<sup>3</sup> at the HWL elevation of 6292.00. See FAA Calculations, Pond Storage Calculations, and Hydraflow Spillway Calculations in Appendix A. Orifice Calculations, WQCV Calculations, and Outlet Structure Details can also be found in Appendix A.

### III. OUTLET STRUCTURE RELEASE RATES

Utilizing the EPA SWMM Output, release rates are shown for the designed outlet structure in the table below for each return period. The SWMM Output and Outlet Structure Details can be found in Appendix A.

Storm Event	Q Hist (cfs)	Q Dev (cfs)
5-Yr	1.6	1.2
10-Yr	2.3	2
25-Yr	4.1	3.5
50-Yr	6.4	4.6
100-Yr	N/A (Release@50-Yr)	6.1

### IV. ENGINEER'S CERTIFICATION

I hereby attest that this report for the Drainage Analysis for CYS07 Staging Area was prepared by me, or under my direct supervision, in accordance with the provisions of the Laramie County Land Use Regulations for the responsible parties thereof. I understand that Laramie County does not and shall not assume liability for drainage facilities designed by others.

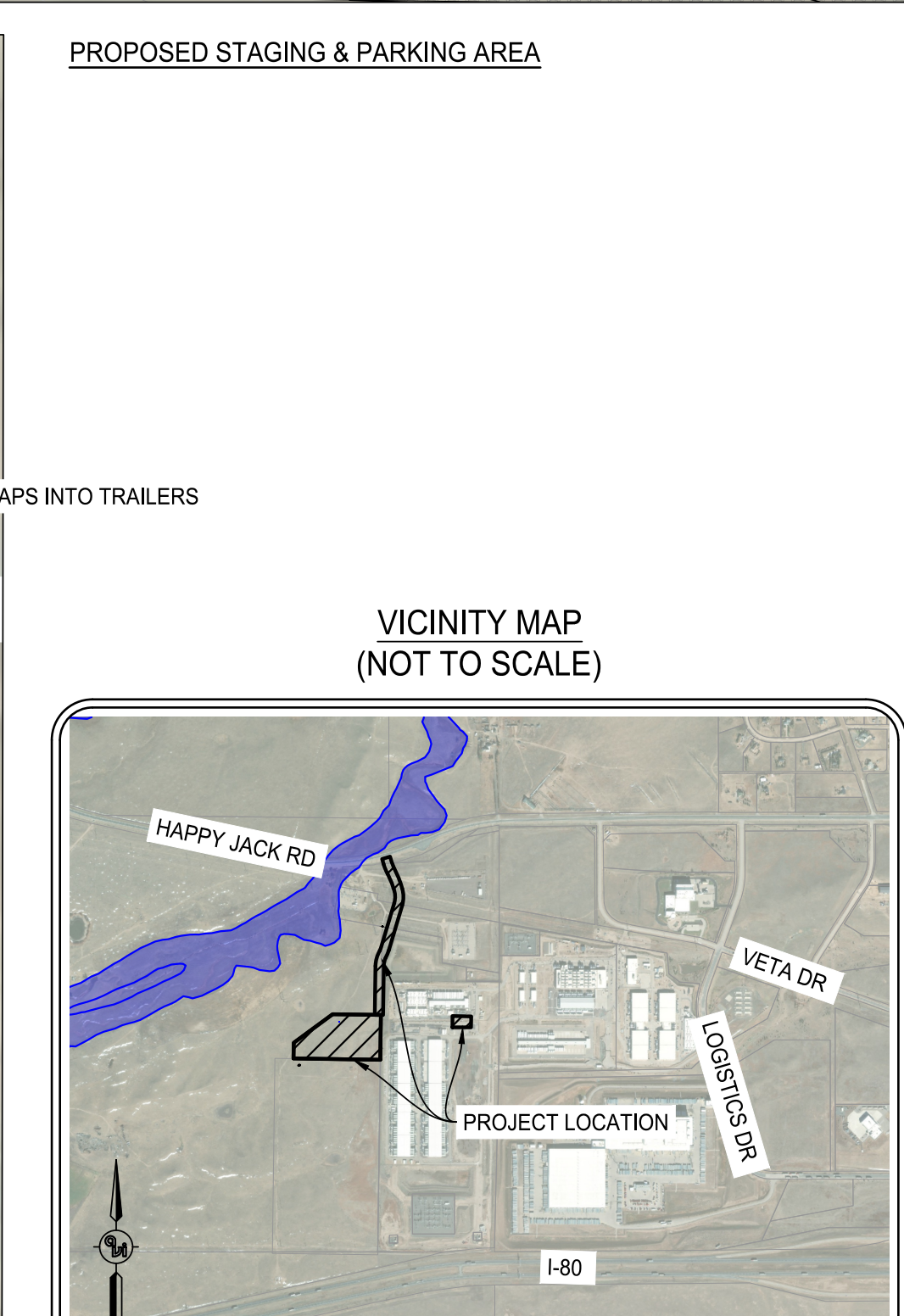
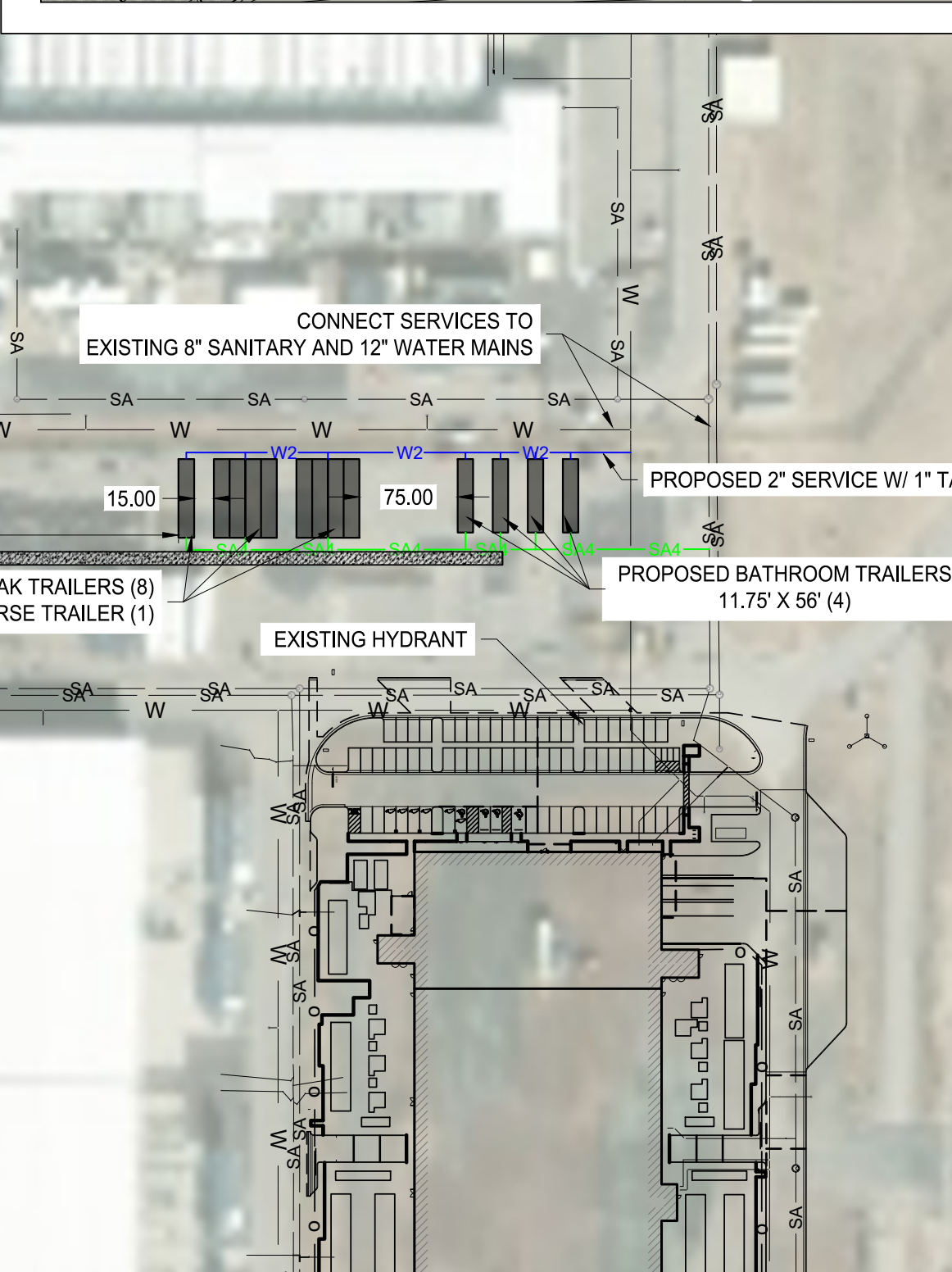
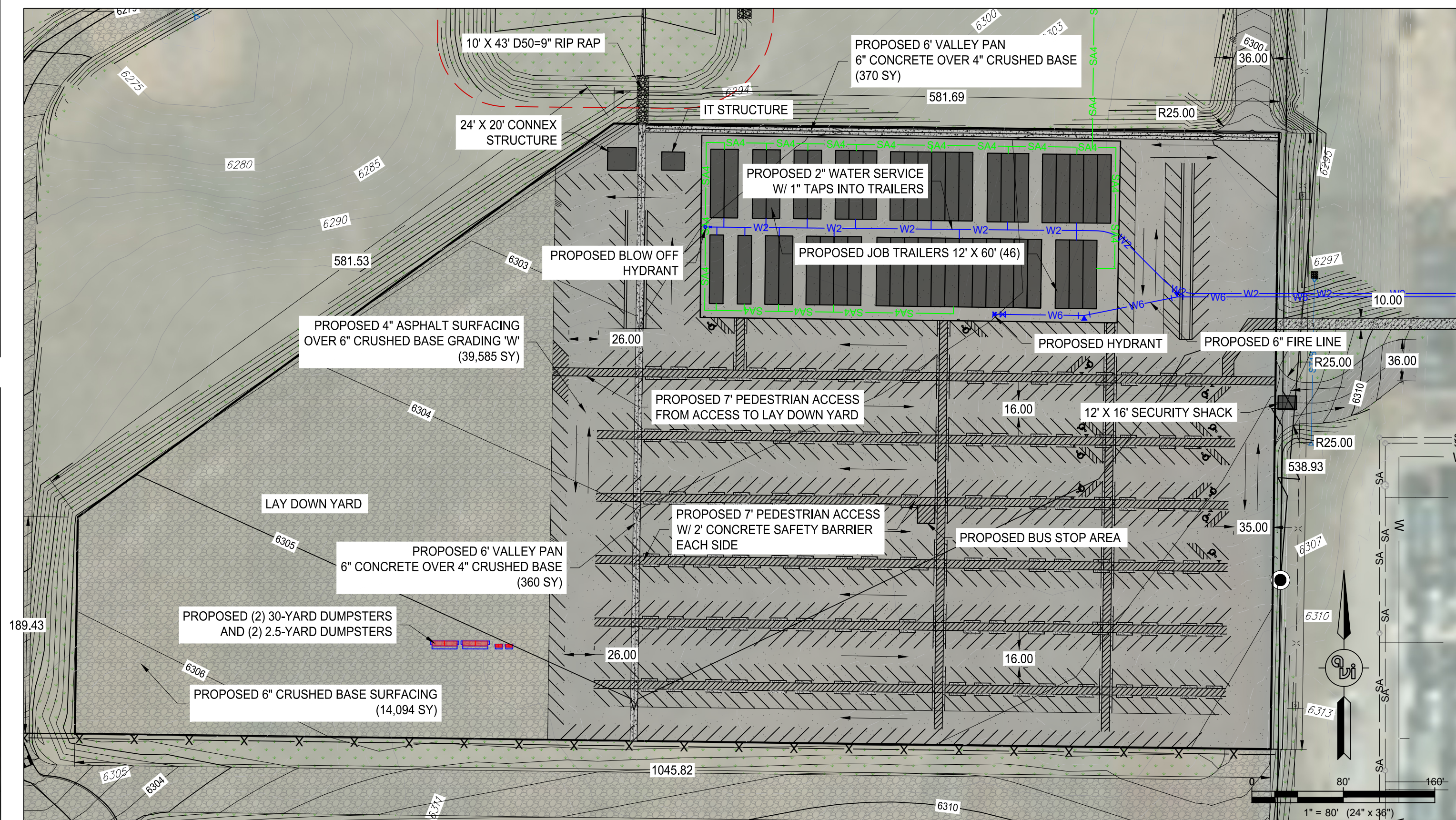
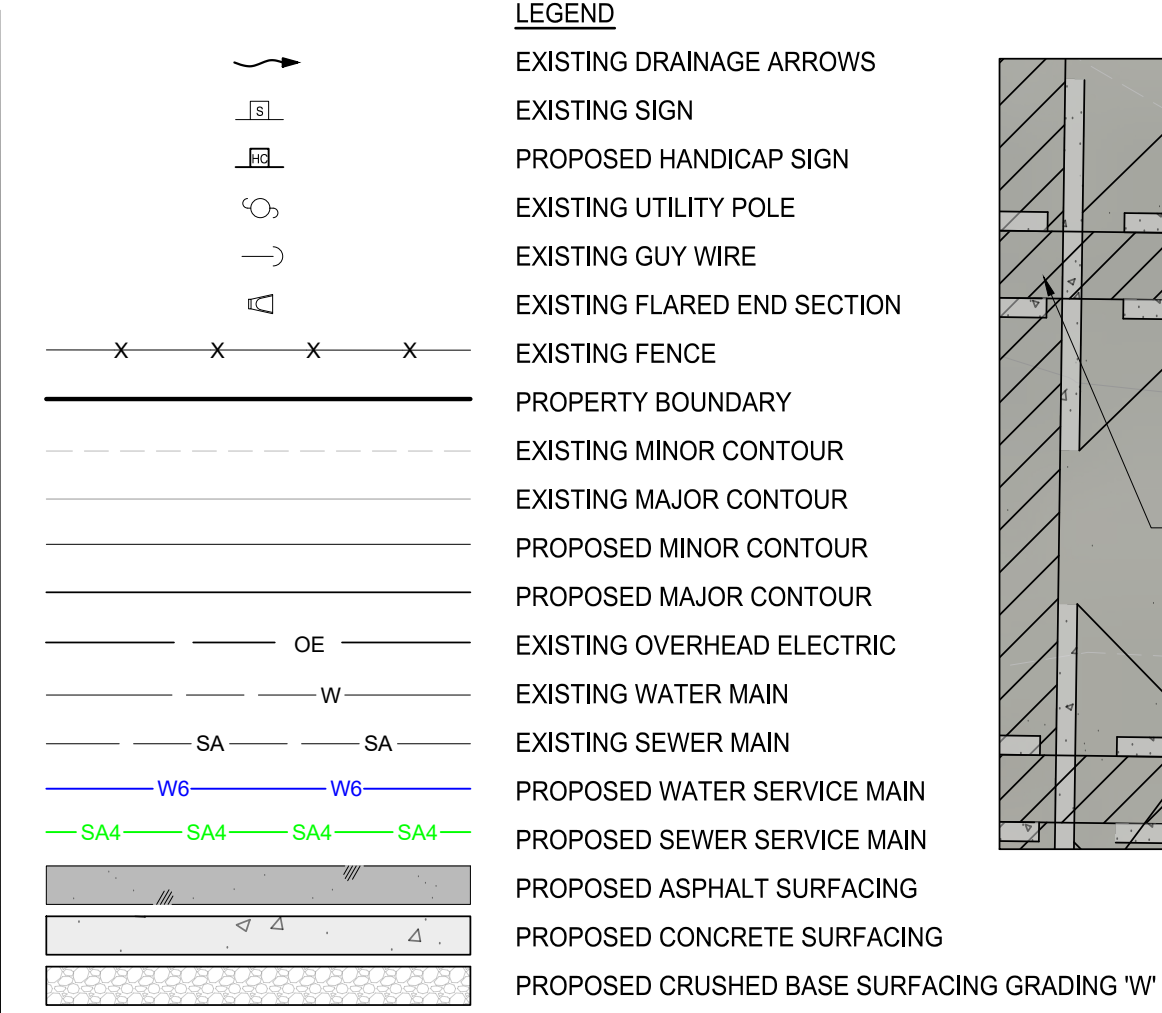
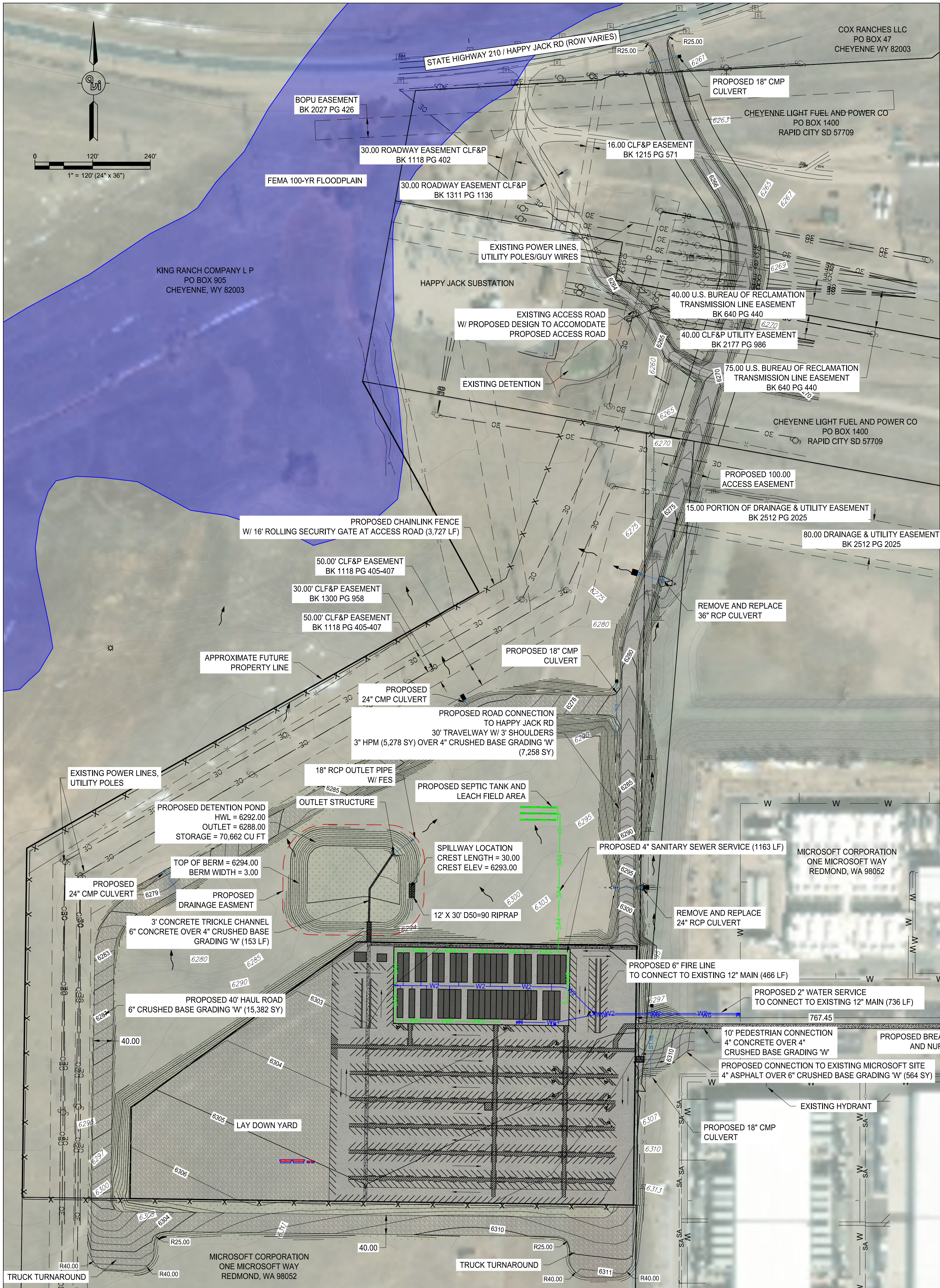
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Tristan Cordier, PE  
AVI Professional Corporation  
Wyoming PE No. 15931

## **APPENDIX A**

- Site Plan
- Basin Exhibits
- Soils Report
- NOAA Atlas
- Hand Calculations
- FAA Detention Spreadsheet
- Stage Storage
- Pond Spillway
- SWMM Output
- Outlet Structure Details
- Culvert Flow Calculations
- Riprap Sizing





**NOTES:**

- ALL CONCRETE SHALL BE 4,500 PSI MIX.
- CONTRACTOR RESPONSIBLE FOR ENSURING THE STORM WATER FROM THE SITE IS ENTIRELY CONVEYED TO THE PROPOSED SWALE AND CAPTURED BEFORE LEAVING THE SITE.

**COMPUTATION TABLE**

TOTAL PROJECT AREA = 11.09 AC± (NOT INCLUDING ACCESS RD + HAUL RD)
TOTAL PROJECT BUILDING FOOTPRINT AREA = 20,817 SF
TOTAL PROJECT PAVED AREA (95% IMPERVIOUSNESS) = 7.20 AC
TOTAL PROJECT GRAVEL AREA (60% IMPERVIOUSNESS) = 3.88 AC

**ZONING & USE**

CURRENT ZONING - A-2  
CURRENT USE - AGRICULTURAL  
TOTAL NUMBER OF EMPLOYEES = TBD

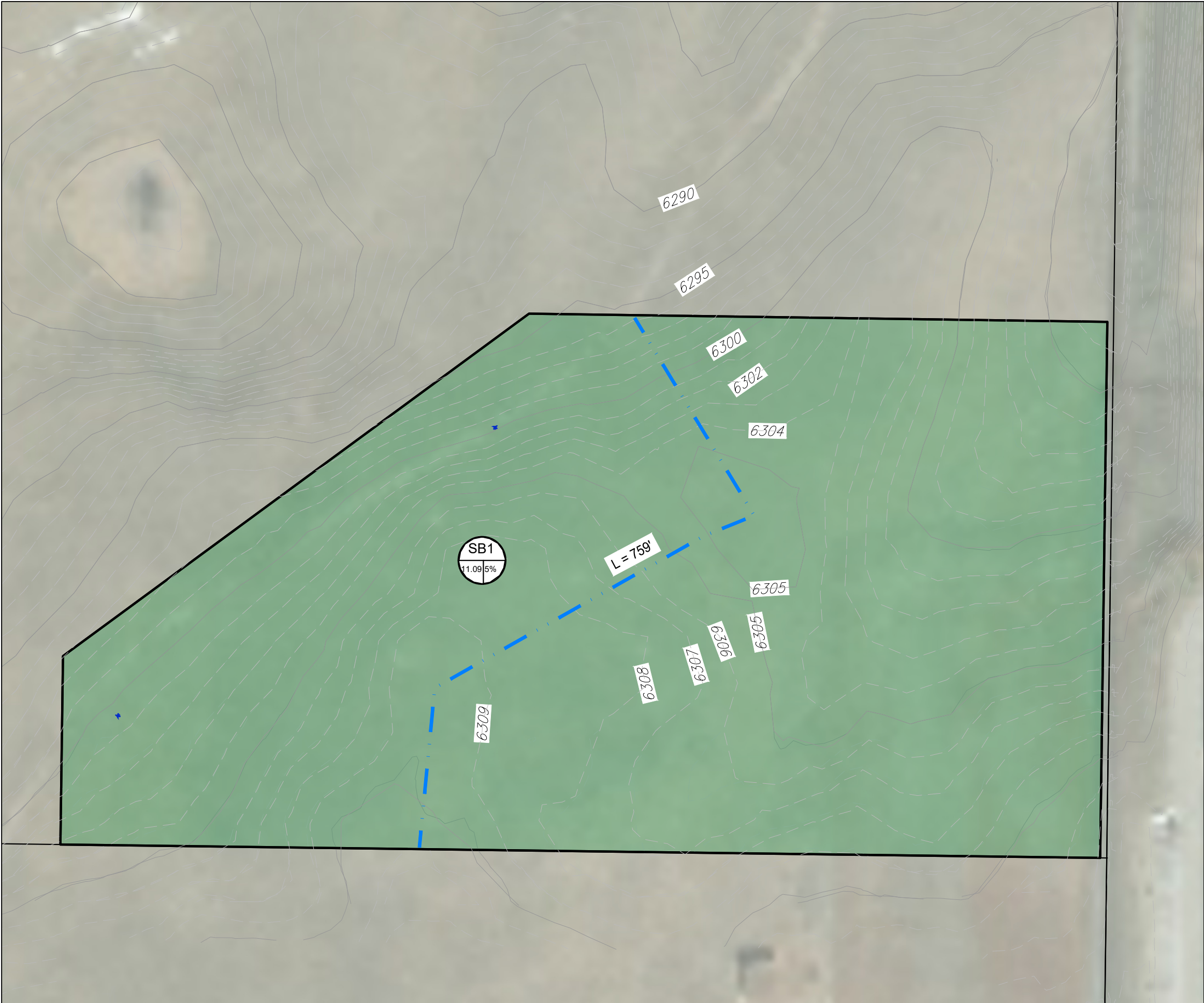
**PARKING**

TOTAL SPACES PROVIDED = 614 SPACES, 9' x 20'  
REQUIRED ADA SPACES = 12 SPACES (6 VAN ACCESSIBLE, 11' x 20')

DATE	
REVISION	
NO.	
PROJECT:	HENSEL PHELPS 12121 GRANT ST, SUITE 410 THORNTON, CO 80241
DRAWING TITLE:	CYS07 STAGING AREA SITE PLAN
DATE PLOTTED:	Dec 18, 2025
DRAWN BY:	CK
DESIGNED BY:	CK
CHECKED BY:	TC
JOB NO.:	5016
DWG NO.	SP OF

**SITE PLAN FOR CYS07 STAGING AREA**  
A PARCEL OF LAND BEING SITUATED IN THE SW 1/4 OF SECTION 5, T13N, R67W OF THE 6TH PRINCIPAL MERIDIAN, CHEYENNE, WYOMING  
PREPARED DECEMBER 2025








**LEGEND**

FLOWLINES

PROJECT BOUNDARY

 SUBBASIN DELINEATION





1"=100'  
(11x17)

NO.	REVISION	DATE

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT: CYS07 STAGING AREA

DRAWING TITLE: HISTORIC SUBBASIN EXHIBIT

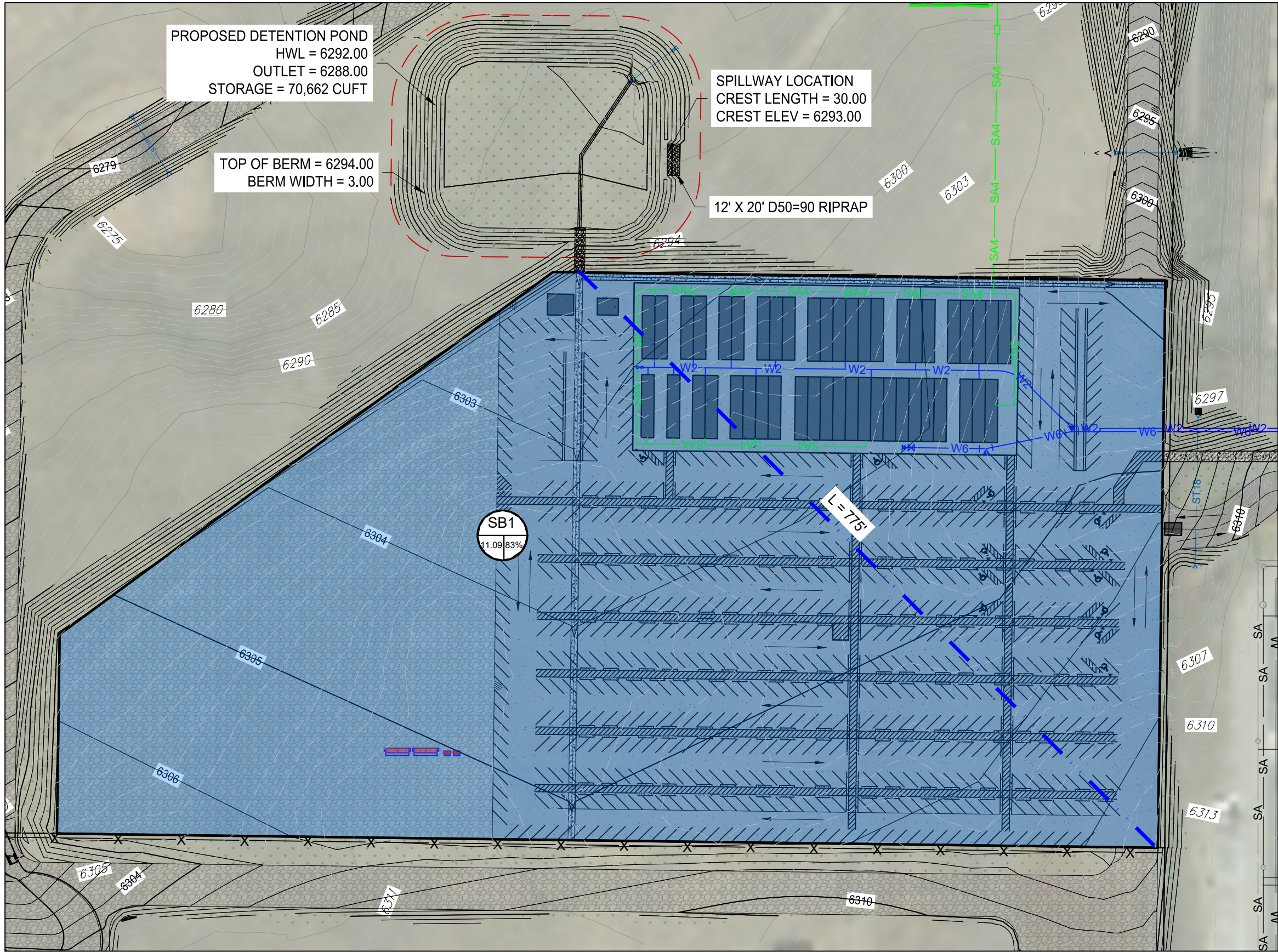
  
ENGINEERING • PLANNING • SURVEYING

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:	Oct 13, 2025
DRAWN BY:	CK
DESIGNED BY:	CK
CHECKED BY:	TC
JOB NO.:	5016
DWG NO.	OF



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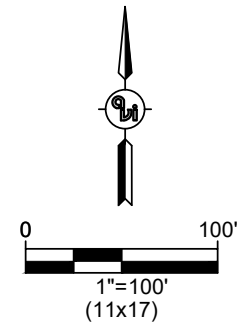
**LEGEND**

→ DRAINAGE DIRECTION

--- FLOWLINES

SBX  
 A I (%)

SUBBASIN DELINEATION



COMPUTATION TABLE

TOTAL PROJECT AREA = 11.09 AC± (NOT INCLUDING ROAD DESIGN TO HAPPY JACK RD)

TOTAL PROJECT BUILDING FOOTPRINT AREA (95% IMPERVIOUSNESS) = 20,817 SF

TOTAL PROJECT PAVED AREA (95% IMPERVIOUSNESS) = 7.20 AC

TOTAL PROJECT GRAVEL AREA (60% IMPERVIOUSNESS) = 3.88 AC

TOTAL CALCULATED IMPERVIOUSNESS = 84%

DATE	REVISION	NO.

**90% PLANS**  
 NOT FOR CONSTRUCTION

PREPARED FOR:  
 HENSEL PHELPS  
 12121 GRANT ST, SUITE 410  
 THORNTON, CO 80241

PROJECT:  
 CYS07 STAGING AREA

DRAWING TITLE:  
 POST-DEVELOPMENT SUBBASIN EXHIBIT

387.637.6817  
 1103 OLD TOWN LANE, SUITE 101  
 CHEYENNE, WY 82009  
 AVI@AVIPC.COM

DATE PLOTTED:  
 Dec 17, 2025

DRAWN BY: CK

DESIGNED BY: CK

CHECKED BY: TC

JOB NO.: 5016

DWG NO. OF





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

# Custom Soil Resource Report for Laramie County, Wyoming, Western Part



# Preface

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

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

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

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

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

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

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# How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

## Custom Soil Resource Report

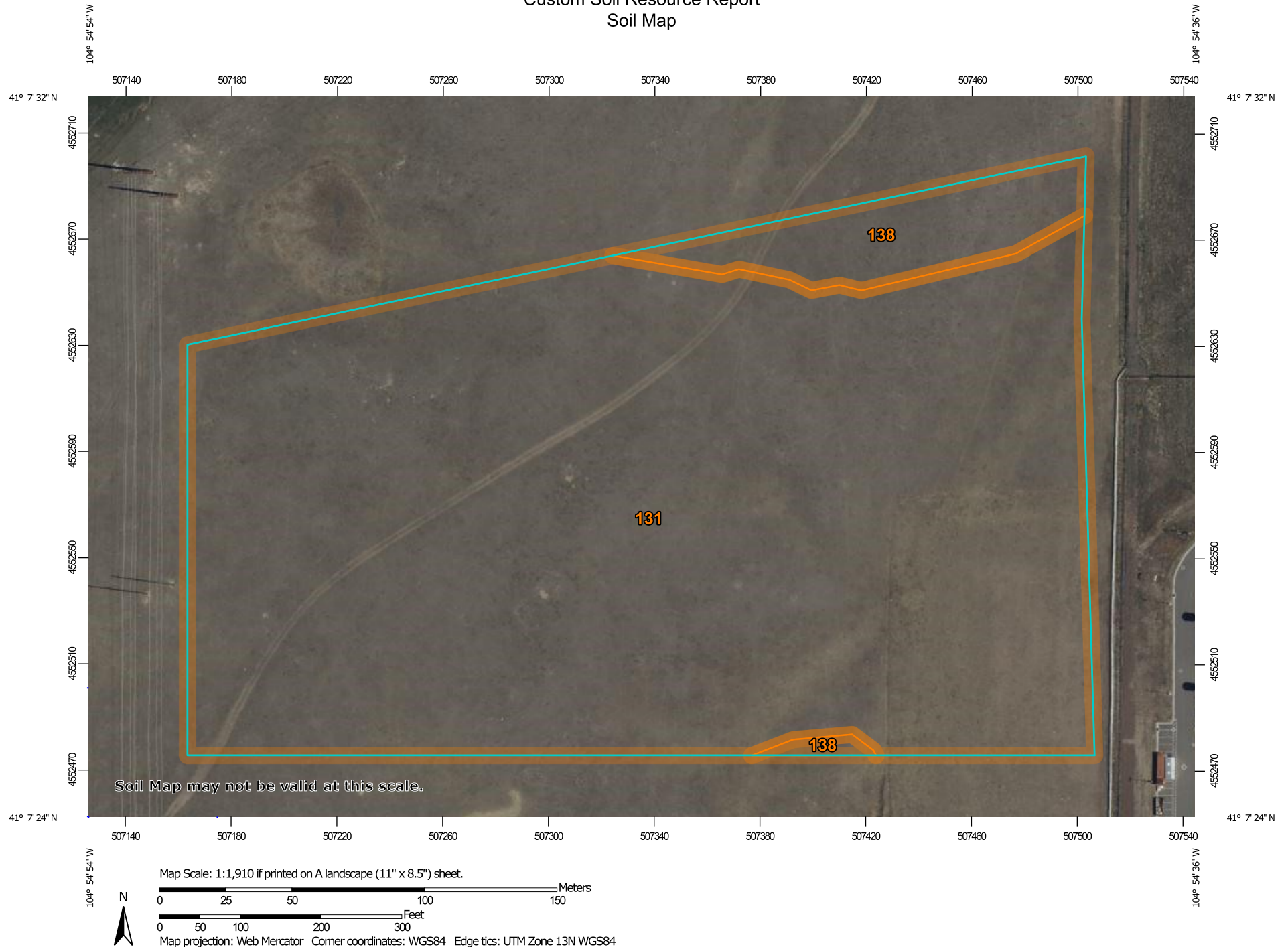
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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


# Custom Soil Resource Report Soil Map



# Custom Soil Resource Report


## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)


### Soils


 Soil Map Unit Polygons


 Soil Map Unit Lines


 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp


 Mine or Quarry


 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole

 Slide or Slip


 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals


### Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Laramie County, Wyoming, Western Part  
Survey Area Data: Version 18, Sep 4, 2025

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

Date(s) aerial images were photographed: Jul 2, 2022—Aug 8, 2022

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



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
131	Evanston loam, 0 to 6 percent slopes	15.0	93.2%
138	Ipson-Evanston complex, 6 to 30 percent slopes	1.1	6.8%
<b>Totals for Area of Interest</b>		<b>16.1</b>	<b>100.0%</b>

## Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

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

## Laramie County, Wyoming, Western Part

### 131—Evanston loam, 0 to 6 percent slopes

#### Map Unit Setting

*National map unit symbol:* 3j5x  
*Elevation:* 6,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 17 inches  
*Mean annual air temperature:* 41 to 45 degrees F  
*Frost-free period:* 90 to 115 days  
*Farmland classification:* Prime farmland if irrigated

#### Map Unit Composition

*Evanston and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Evanston

##### Setting

*Landform:* Fan remnants, alluvial fans  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from igneous, metamorphic and sedimentary rock

##### Typical profile

*H1 - 0 to 3 inches:* loam  
*H2 - 3 to 15 inches:* clay loam  
*H3 - 15 to 60 inches:* sandy clay loam

##### Properties and qualities

*Slope:* 0 to 6 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 15 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* High (about 9.8 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* B  
*Ecological site:* R067AY122WY - Loamy (Ly)  
*Hydric soil rating:* No

#### Minor Components

##### Ipson

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

## 138—Ipson-Evanston complex, 6 to 30 percent slopes

### Map Unit Setting

*National map unit symbol:* 3j64

*Elevation:* 6,500 to 7,500 feet

*Mean annual precipitation:* 15 to 17 inches

*Mean annual air temperature:* 41 to 45 degrees F

*Frost-free period:* 90 to 115 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Ipson and similar soils:* 50 percent

*Evanston and similar soils:* 40 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ipson

#### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Parent material:* Gravelly alluvium derived from igneous, metamorphic and sedimentary rock

#### Typical profile

*H1 - 0 to 8 inches:* gravelly loam

*H2 - 8 to 14 inches:* very gravelly sandy clay loam

*H3 - 14 to 60 inches:* very gravelly sandy loam

#### Properties and qualities

*Slope:* 10 to 30 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.60 to 2.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 10 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 4.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 6e

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* B

*Ecological site:* R067AY112WY - Gravelly (Gr)

*Hydric soil rating:* No

## Description of Evanston

### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Parent material:* Alluvium derived from igneous, metamorphic and sedimentary rock

### Typical profile

*H1 - 0 to 7 inches:* loam

*H2 - 7 to 28 inches:* clay loam

*H3 - 28 to 60 inches:* loam

### Properties and qualities

*Slope:* 6 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 15 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* High (about 10.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* 4e

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Ecological site:* R067AY122WY - Loamy (Ly)

*Hydric soil rating:* No

## Minor Components

### Poposhia

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

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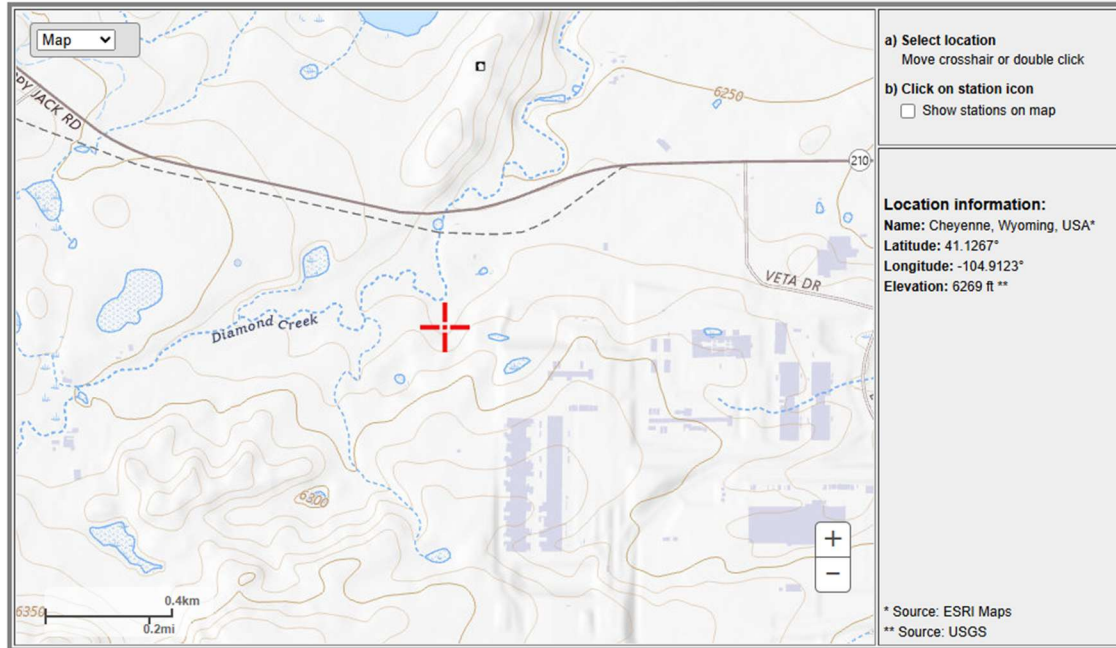
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**POINT PRECIPITATION FREQUENCY (PF) ESTIMATES**  
WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION  
NOAA Atlas 14, Volume 12, Version 2

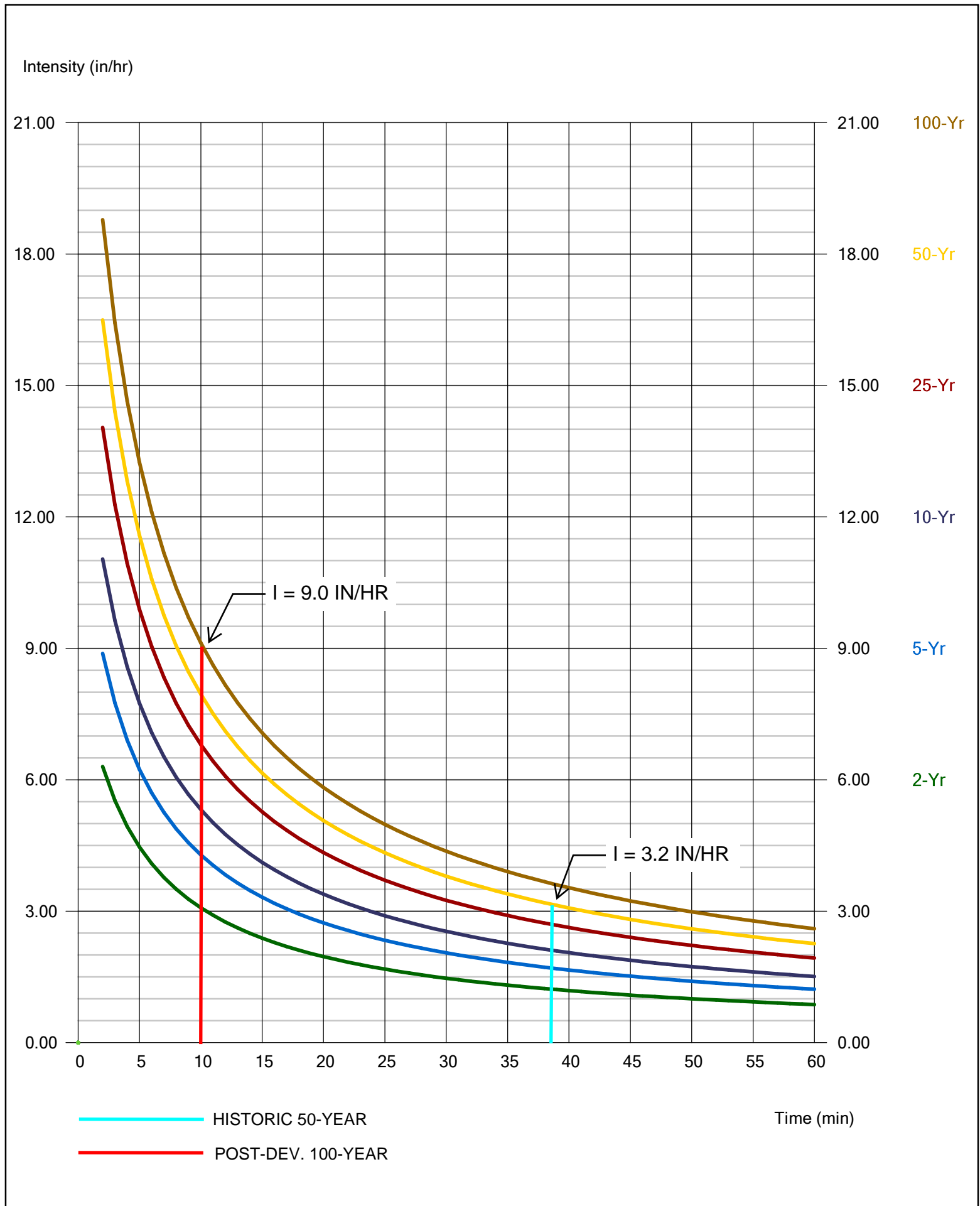
PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	3.42 (2.93-3.98)	4.48 (3.85-5.26)	6.25 (5.33-7.45)	7.78 (6.49-9.35)	9.92 (8.02-12.1)	11.6 (9.08-14.4)	13.3 (10.0-17.0)	15.1 (10.9-20.1)	17.6 (11.8-24.8)	19.5 (12.5-28.8)
10-min	2.38 (2.03-2.76)	3.11 (2.66-3.64)	4.34 (3.69-5.17)	5.39 (4.51-6.49)	6.88 (5.56-8.42)	8.06 (6.30-10.0)	9.25 (6.96-11.8)	10.5 (7.54-13.9)	12.2 (8.21-17.2)	13.5 (8.65-20.0)
15-min	1.84 (1.57-2.14)	2.41 (2.07-2.82)	3.36 (2.86-4.00)	4.18 (3.49-5.02)	5.33 (4.30-6.52)	6.24 (4.88-7.75)	7.17 (5.39-9.14)	8.14 (5.84-10.8)	9.46 (6.36-13.3)	10.5 (6.70-15.5)
30-min	1.12 (0.958-1.30)	1.47 (1.26-1.72)	2.05 (1.74-2.44)	2.54 (2.13-3.06)	3.25 (2.62-3.97)	3.80 (2.97-4.72)	4.37 (3.28-5.57)	4.96 (3.56-6.58)	5.76 (3.88-8.12)	6.39 (4.08-9.43)
60-min	0.667 (0.570-0.776)	0.872 (0.751-1.02)	1.22 (1.04-1.45)	1.51 (1.26-1.82)	1.93 (1.56-2.36)	2.26 (1.77-2.81)	2.60 (1.95-3.32)	2.95 (2.12-3.92)	3.43 (2.31-4.83)	3.80 (2.43-5.61)
2-hr	0.381 (0.329-0.442)	0.501 (0.434-0.586)	0.702 (0.600-0.835)	0.874 (0.732-1.05)	1.12 (0.900-1.36)	1.31 (1.02-1.62)	1.50 (1.12-1.92)	1.70 (1.20-2.26)	1.97 (1.30-2.78)	2.19 (1.37-3.22)
3-hr	0.272 (0.237-0.315)	0.359 (0.313-0.419)	0.504 (0.431-0.597)	0.627 (0.527-0.752)	0.800 (0.646-0.978)	0.936 (0.729-1.16)	1.07 (0.799-1.37)	1.22 (0.858-1.62)	1.41 (0.925-1.98)	1.56 (0.972-2.30)
6-hr	0.158 (0.138-0.180)	0.206 (0.181-0.237)	0.286 (0.248-0.335)	0.354 (0.302-0.418)	0.449 (0.369-0.540)	0.524 (0.415-0.639)	0.600 (0.454-0.750)	0.679 (0.487-0.881)	0.785 (0.524-1.08)	0.868 (0.550-1.25)
12-hr	0.096 (0.086-0.106)	0.120 (0.108-0.135)	0.161 (0.144-0.183)	0.196 (0.173-0.224)	0.245 (0.211-0.283)	0.285 (0.238-0.332)	0.324 (0.263-0.387)	0.366 (0.286-0.453)	0.423 (0.313-0.554)	0.467 (0.331-0.641)
24-hr	0.059 (0.054-0.064)	0.071 (0.065-0.078)	0.092 (0.084-0.101)	0.110 (0.100-0.121)	0.135 (0.121-0.150)	0.156 (0.137-0.174)	0.177 (0.153-0.202)	0.199 (0.167-0.235)	0.229 (0.186-0.288)	0.253 (0.199-0.333)
2-day	0.035 (0.032-0.038)	0.041 (0.038-0.045)	0.052 (0.048-0.057)	0.062 (0.056-0.067)	0.075 (0.068-0.083)	0.086 (0.076-0.096)	0.097 (0.085-0.110)	0.109 (0.093-0.128)	0.125 (0.103-0.156)	0.137 (0.110-0.180)
3-day	0.025 (0.023-0.027)	0.030 (0.028-0.032)	0.038 (0.035-0.041)	0.044 (0.040-0.049)	0.054 (0.048-0.059)	0.061 (0.054-0.069)	0.069 (0.060-0.079)	0.077 (0.065-0.091)	0.088 (0.072-0.111)	0.096 (0.077-0.127)
4-day	0.020 (0.019-0.022)	0.024 (0.022-0.026)	0.030 (0.027-0.033)	0.035 (0.032-0.039)	0.042 (0.038-0.047)	0.048 (0.043-0.054)	0.054 (0.047-0.062)	0.060 (0.051-0.072)	0.069 (0.057-0.087)	0.075 (0.060-0.100)
7-day	0.013 (0.012-0.014)	0.015 (0.014-0.017)	0.019 (0.018-0.021)	0.023 (0.021-0.025)	0.027 (0.025-0.030)	0.031 (0.027-0.035)	0.035 (0.030-0.040)	0.038 (0.033-0.046)	0.043 (0.036-0.055)	0.047 (0.038-0.063)
10-day	0.010 (0.009-0.011)	0.012 (0.011-0.013)	0.015 (0.014-0.016)	0.018 (0.016-0.019)	0.021 (0.019-0.023)	0.024 (0.021-0.027)	0.026 (0.023-0.030)	0.029 (0.025-0.035)	0.032 (0.027-0.042)	0.035 (0.029-0.047)
20-day	0.007 (0.006-0.007)	0.008 (0.007-0.008)	0.010 (0.009-0.010)	0.011 (0.010-0.012)	0.013 (0.012-0.015)	0.015 (0.013-0.016)	0.016 (0.014-0.019)	0.017 (0.015-0.021)	0.019 (0.017-0.025)	0.021 (0.018-0.028)
30-day	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.007-0.008)	0.009 (0.008-0.009)	0.010 (0.009-0.011)	0.011 (0.010-0.013)	0.012 (0.011-0.014)	0.013 (0.012-0.016)	0.014 (0.013-0.018)	0.015 (0.013-0.020)
45-day	0.004 (0.004-0.005)	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.007 (0.006-0.007)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.009 (0.008-0.011)	0.010 (0.009-0.012)	0.011 (0.010-0.014)	0.011 (0.010-0.015)
60-day	0.004 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.005)	0.006 (0.005-0.006)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.009)	0.008 (0.008-0.010)	0.009 (0.008-0.011)	0.009 (0.008-0.013)

<sup>1</sup> 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.



# Hydraflow IDF Curves

IDF file: 5016 IDF CURVE DATA.IDF



# RATIONAL METHOD HAND CALCS

## HISTORIC BASIN

- Assume 2% IMPERVIOUS FOR UNDEVELOPED

$$C_{50} = 0.34$$

$$t_i = \frac{.395(1.1 - .34)\sqrt{500}}{.0092^{.33}} = 31.54 \text{ min.}$$

$$t_t = \frac{259}{60 \times 7 \times \sqrt{.0092}} = 6.43 \text{ min.}$$

$$t_c = 31.54 + 6.43 = \underline{37.97 \text{ min.}}$$

- From IDF CHART ~ I = 3.2 in/hr

$$Q_{50} = .34 \times 3.2 \times 11.09 = \underline{\underline{12.07 \text{ cfs}}}$$

## POST-DEVELOPMENT BASIN

- GRAVEL = 60% IMPERVIOUS,
- ASPHALT/CONC./BUILDINGS = 95% IMPERVIOUS,

$$C_{100} = 0.82$$

$$t_i = \frac{.395(1.1 - .82)\sqrt{300}}{.0188^{.33}} = 7.11 \text{ min.}$$

$$t_t = \frac{475}{60 \times 20 \times \sqrt{.0188}} = 2.89 \text{ min.}$$

$$t_c = 7.11 + 2.89 = \underline{10 \text{ min.}}$$

- From IDF CHART ~ I = 9.0 in/hr

$$Q_{100} = .82 \times 9.0 \times 11.09 = \underline{\underline{81.84 \text{ cfs}}}$$

PROJECT: 5016 CYS07

Pre-Project			5-Year			10-Year			25-Year			50-Year			100-Year		
Drainage Area, A =			11.09 acres			11.09 acres			11.09 acres			11.09 acres			11.09 acres		
Rational Method C =			0.01			0.07			0.26			0.34			0.44		
Correction Coefficient, Cf =			1.00			1.00			1.00			1.00			1.00		
Time of Concentration, Tc =			37.97 minutes			37.97 minutes			37.97 minutes			37.97 minutes			37.97 minutes		
Intensity, I =			1.726 in/hr			2.143 in/hr			2.736 in/hr			3.198 in/hr			3.681 in/hr		
Allowable Release Rate, Q =			0.19 cfs			1.66 cfs			7.89 cfs			12.06 cfs			12.06 cfs		
Post-Project			5-Year			10-Year			25-Year			50-Year			100-Year		
Drainage Area, A =			11.09 acres			11.09 acres			11.09 acres			11.09 acres			11.09 acres		
Rational Method C =			0.72			0.74			0.78			0.80			0.82		
Correction Coefficient, Cf =			1.00			1.00			1.00			1.00			1.00		
Time of Concentration, Tc =			10.00 minutes			10.00 minutes			10.00 minutes			10.00 minutes			10.00 minutes		
Intensity, I =			4.281 in/hr			5.322 in/hr			6.798 in/hr			7.944 in/hr			9.117 in/hr		
Peak Inflow Rate, Q =			34.19 cfs			43.68 cfs			58.80 cfs			70.48 cfs			82.91 cfs		

5	<= Time Step																													
Rainfall Duration (minutes)	Rainfall Intensity (inches / hr)	Inflow Volume (cubic feet)	Adjustment Factor "m"	Average Outflow (cfs)	Outflow Volume (cubic feet)	Storage Volume (cubic feet)	Rainfall Intensity (inches / hr)	Inflow Volume (cubic feet)	Adjustment Factor "m"	Average Outflow (cfs)	Outflow Volume (cubic feet)	Storage Volume (cubic feet)	Rainfall Intensity (inches / hr)	Inflow Volume (cubic feet)	Adjustment Factor "m"	Average Outflow (cfs)	Outflow Volume (cubic feet)	Storage Volume (cubic feet)	Rainfall Intensity (inches / hr)	Inflow Volume (cubic feet)	Adjustment Factor "m"	Average Outflow (cfs)	Outflow Volume (cubic feet)	Storage Volume (cubic feet)	Rainfall Intensity (inches / hr)	Inflow Volume (cubic feet)	Adjustment Factor "m"	Average Outflow (cfs)	Outflow Volume (cubic feet)	Storage Volume (cubic feet)
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	6.234	14,932	1.00	0.19	57	14,875	7.752	19,086	1.00	1.66	499	18,587	9.885	25652	1.00	7.89	2366	23,286	11.571	30,798	1.00	12.06	3,618	27,180	13.240	36,120	1.00	12.06	3,618	32,502
10	4.281	20,512	1.00	0.19	115	20,397	5.322	26,205	1.00	1.66	998	25,207	6.798	35281	1.00	7.89	4733	30,548	7.944	42,287	1.00	12.06	7,236	35,051	9.117	49,746	1.00	12.06	7,236	42,510
15	3.315	23,822	1.00	0.19	172	23,650	4.119	30,425	1.00	1.66	1,497	28,928	5.263	40977	1.00	7.89	7099	33,878	6.149	49,097	1.00	12.06	10,854	38,243	7.066	57,831	1.00	12.06	10,854	46,978
20	2.730	26,155	1.00	0.19	230	25,926	3.391	33,397	1.00	1.66	1,996	31,401	4.333	44978	1.00	7.89	9466	35,513	5.062	53,892	1.00	12.06	14,472	39,420	5.821	63,524	1.00	12.06	14,472	49,052
25	2.334	27,954	1.00	0.19	287	27,667	2.899	35,687	1.00	1.66	2,495	33,191	3.704	48054	1.00	7.89	11832	36,222	4.327	57,587	1.00	12.06	18,090	39,497	4.978	67,907	1.00	12.06	18,090	49,817
30	2.047	29,418	1.00	0.19	344	29,074	2.542	37,550	1.00	1.66	2,994	34,556	3.247	50553	1.00	7.89	14199	36,354	3.794	60,594	1.00	12.06	21,708	38,886	4.366	71,472	1.00	12.06	21,708	49,765
35	1.828	30,656	1.00	0.19	402	30,254	2.270	39,124	1.00	1.66	3,493	35,631	2.899	52659	1.00	7.89	16565	36,093	3.389	63,133	1.00	12.06	25,326	37,808	3.900	74,480	1.00	12.06	25,326	49,155
40	1.656	31,728	0.97	0.19	448	31,280	2.056	40,488	0.97	1.62	3,891	36,597	2.624	54481	0.97	7.69	18451	36,029	3.068	65,334	0.97	11.75	28,209	37,125	3.532	77,086	0.97	11.75	28,209	48,877
45	1.516	32,676	0.92	0.18	476	32,199	1.882	41,692	0.92	1.53	4,140	37,552	2.402	56088	0.92	7.27	19635	36,454	2.809	67,278	0.92	11.12	30,018	37,260	3.233	79,386	0.92	11.12	30,018	49,368
50	1.400	33,526	0.88	0.17	505	33,021	1.737	42,773	0.88	1.46	4,390	38,383	2.217	57529	0.88	6.94	20818	36,711	2.593	69,022	0.88	10.61	31,827	37,195	2.986	81,449	0.88	10.61	31,827	49,622
55	1.302	34,298	0.85	0.16	534	33,764	1.616	43,754	0.85	1.41	4,639	39,115	2.061	58835	0.85	6.67	22001	36,834	2.412	70,605	0.85	10.19	33,636	36,969	2.776	83,320	0.85	10.19	33,636	49,684
60	1.218	35,005	0.82	0.16	562	34,443	1.511	44,653	0.82	1.36	4,889	39,764	1.928	60030	0.82	6.44	23184	36,846	2.256	72,055	0.82	9.85	35,445	36,611	2.597	85,034	0.82	9.85	35,445	49,589
65	1.145	35,659	0.79	0.15	591	35,068	1.421	45,483	0.79	1.32	5,138	40,345	1.812	61133	0.79	6.25	24367	36,766	2.121	73,395	0.79	9.55	37,254	36,141	2.442	86,617	0.79	9.55	37,254	49,363
70	1.081	36,267	0.77	0.15	620	35,647	1.342	46,255	0.77	1.28	5,388	40,867	1.711	62159	0.77	6.08	25551	36,608	2.003	74,641	0.77	9.30	39,063	35,578	2.306	88,088	0.77	9.30	39,063	49,025
75	1.025	36,835	0.75	0.14	649	36,187	1.272	46,977	0.75	1.25	5,637	41,340	1.621	63117	0.75	5.94	26734	36,383	1.899	75,806	0.75	9.08	40,872	34,934	2.186	89,463	0.75	9.08	40,872	48,591
80	0.975	37,369	0.74	0.14	677	36,692	1.210	47,655	0.74	1.23	5,887	41,768	1.542	64016	0.74	5.82	27917	36,099	1.806	76,900	0.74	8.89	42,681	34,220	2.079	90,755	0.74	8.89	42,681	48,074
85	0.930	37,874	0.72	0.14	706	37,168	1.154	48,296	0.72	1.20	6,136	42,159	1.470	64865	0.72	5.71	29100	35,764	1.722	77,934	0.72	8.72	44,490	33,444	1.983	91,974	0.72	8.72	44,490	47,484
90	0.889	38,351	0.71	0.14	735	37,616	1.103	48,902	0.71	1.18	6,386	42,516	1.406	65668	0.71	5.61	30284	35,384	1.647	78,912	0.71	8.57	46,299	32,613	1.896	93,128	0.71	8.57	46,299	46,829
95	0.853	38,805	0.70	0.13	763	38,042	1.058	49,478	0.70	1.16	6,636	42,843	1.347	66431	0.70	5.52	31467	34,964	1.579	79,842	0.70	8.44	48,108	31,734	1.818	94,224	0.70	8.44	48,108	46,117
100	0.819	39,238	0.69	0.13	792	38,446	1.016	50,027	0.69	1.15	6,885	43,142	1.294	67157	0.69	5.44	32650	34,507	1.517	80,728	0.69	8.32	49,917	30,811	1.746	95,269	0.69	8.32	49,917	45,353
105	0.788	39,651	0.68	0.13	821	38,830	0.978	50,552	0.68	1.13	7,135	43,417	1.245	67851	0.68	5.37	33833	34,018	1.459	81,575	0.68	8.21	51,726	29,849	1.680	96,267	0.68	8.21	51,726	44,542
110	0.760	40,047	0.67	0.13	850	39,198	0.943	51,055	0.67	1.12	7,384	43,671	1.200	68516	0.67	5.31	35017	33,499	1.407	82,386	0.67	8.11	53,534	28,851	1.620	97,223	0.67	8.11	53,534	43,689
115	0.734	40,427	0.67	0.13	878	39,549	0.910	51,537	0.67	1.11	7,634	43,903	1.159	69153	0.67	5.25	36200	32,954	1.359	83,164	0.67	8.02	55,343	27,820	1.564	98,140	0.67	8.02	55,343	42,797
120	0.710	40,793	0.66	0.13	907	39,886	0.880	52,001	0.66	1.09	7,883	44,118	1.120	69766	0.66	5.19	37383	32,383	1.314	83,912	0.66	7.94	57,152	26,760	1.512	99,022	0.66	7.94	57,152	41,870

Storage, cubic feet = 39,886  
acre feet = 0.916

Storage, cubic feet = 44,118  
acre feet = 1.013

Storage, cubic feet = 36,846  
acre feet = 0.846

Storage, cubic feet = 39,497  
acre feet = 0.907

Storage, cubic feet = 49,817  
acre feet = 1.144

# Pond Report

## Pond No. 1 - <New Pond>

### Pond Data

**Contours** -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 6288.00 ft

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	6288.00	00	0	0
1.00	6289.00	3,679	1,226	1,226
2.00	6290.00	21,008	11,158	12,384
3.00	6291.00	31,067	25,871	38,256
4.00	6292.00	33,772	32,407	70,662

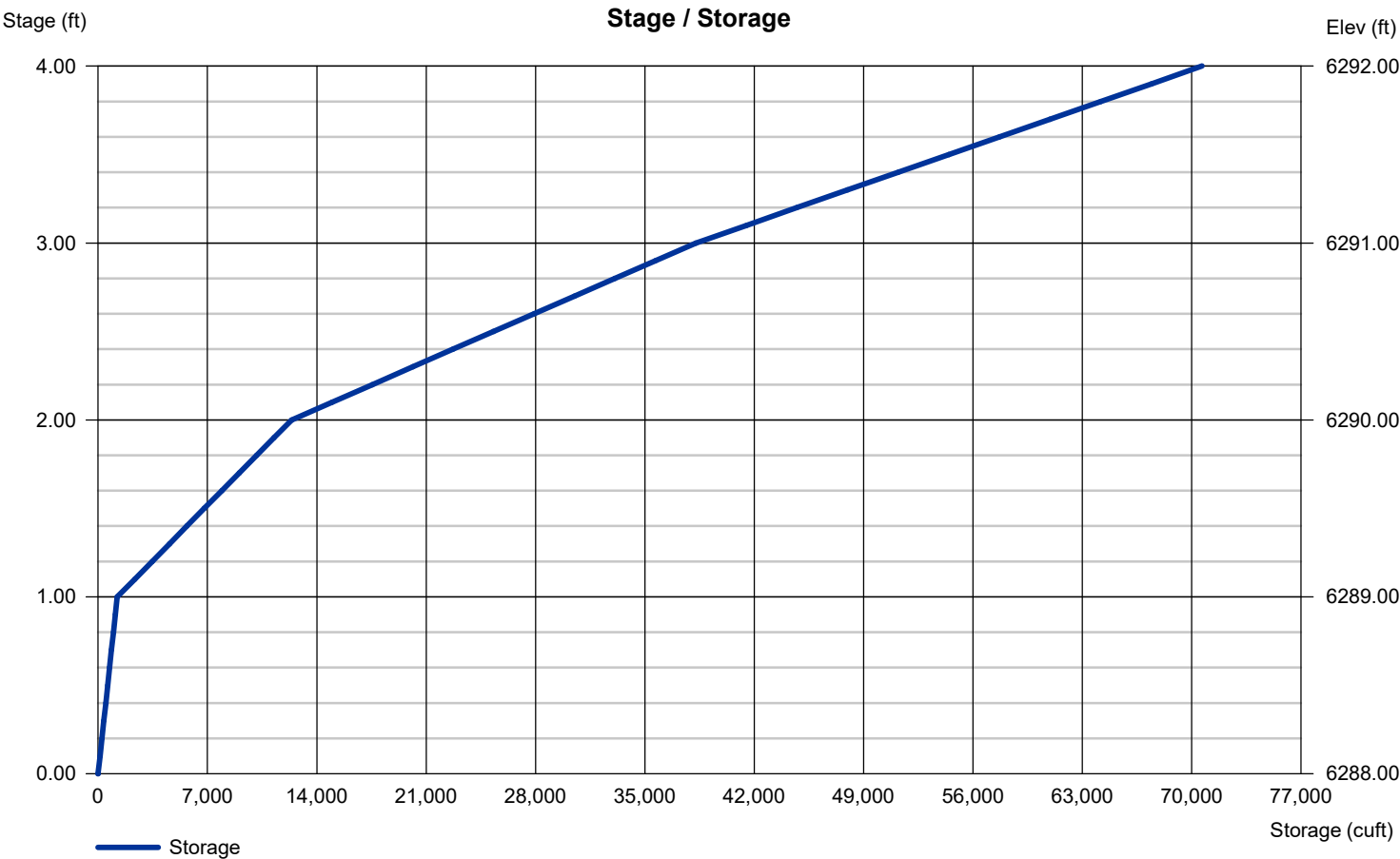
### Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



# Weir Report

<Name>

### Trapezoidal Weir

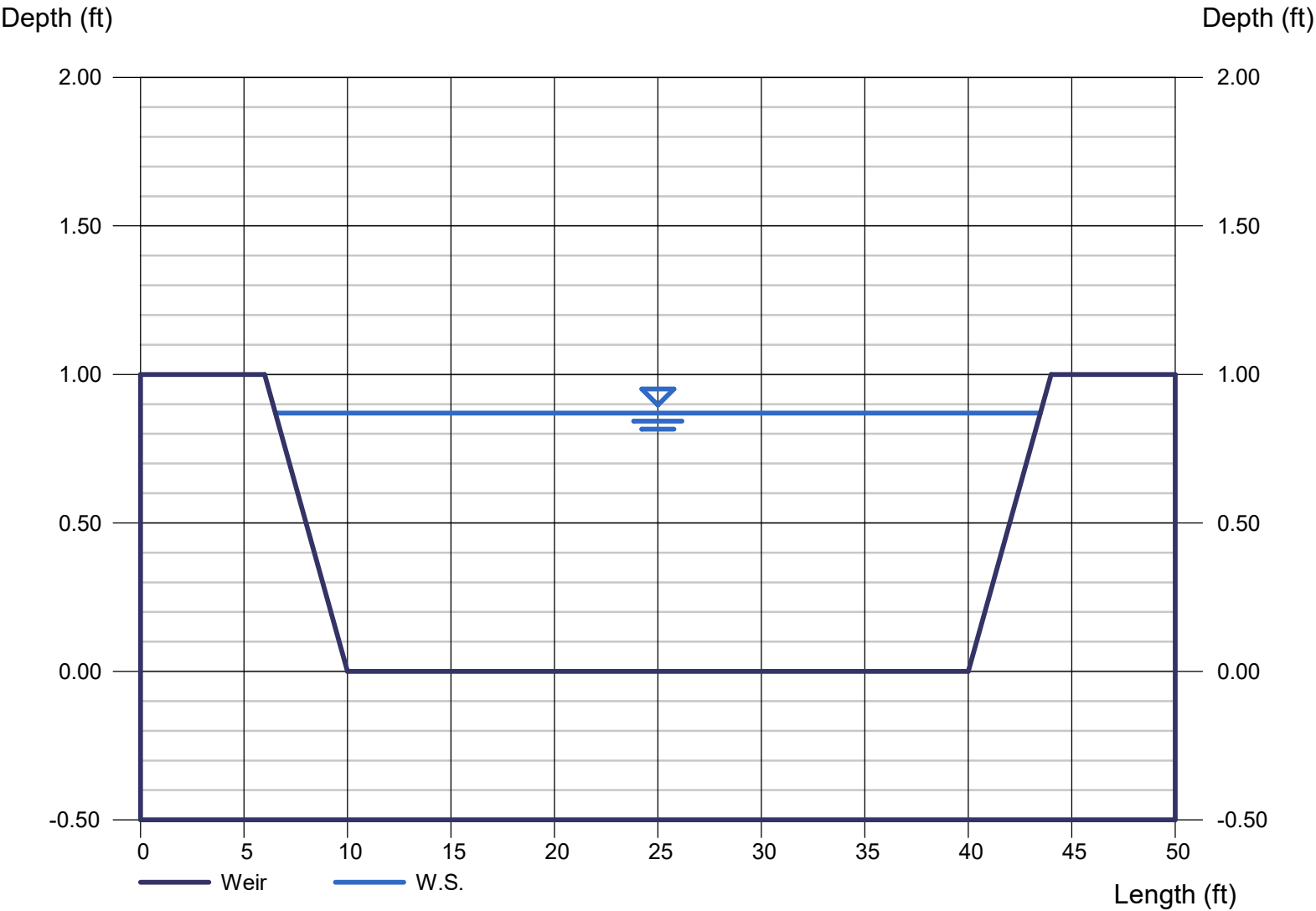
Crest = Sharp  
Bottom Length (ft) = 30.00  
Total Depth (ft) = 1.00  
Side Slope (z:1) = 4.00

### Highlighted

Depth (ft) = 0.87  
Q (cfs) = 81.84  
Area (sqft) = 29.13  
Velocity (ft/s) = 2.81  
Top Width (ft) = 36.96

### Calculations

Weir Coeff. Cw = 3.10  
Compute by: Known Q  
Known Q (cfs) = 81.84



**EPA SWMM OUTPUT**

**HISTORIC CONDITIONS 5-YR STORM EVENT**



## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

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AVI-5016

Historic Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation .....	1.412	1.420
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	1.382	1.391
Surface Runoff .....	0.029	0.030
Final Storage .....	0.002	0.002
Continuity Error (%) .....	-0.151	

*****	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal

## AVI-5016

```

*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 0.029 0.010
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.029 0.010
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000
  
```

```

*****
Subcatchment Runoff Summary
*****
  
```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PropArea	1.42	0.00	0.00	1.39	0.03	0.00	0.03	0.01	1.56

```

Analysis begun on: Wed Dec 17 13:37:34 2025
Analysis ended on: Wed Dec 17 13:37:34 2025
Total elapsed time: < 1 sec
  
```

**EPA SWMM OUTPUT**  
**HISTORIC CONDITIONS 10-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Historic Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation .....	1.770	1.780
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	1.674	1.684
Surface Runoff .....	0.097	0.098
Final Storage .....	0.002	0.002
Continuity Error (%) .....	-0.183	

*****	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal

## AVI-5016

```

*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 0.097 0.032
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.097 0.032
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Subcatchment Runoff Summary
*****

```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PropArea	1.78	0.00	0.00	1.68	0.04	0.06	0.10	0.03	2.30

```

Analysis begun on: Wed Dec 17 13:38:09 2025
Analysis ended on: Wed Dec 17 13:38:09 2025
Total elapsed time: < 1 sec

```

**EPA SWMM OUTPUT**

**HISTORIC CONDITIONS 25-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Historic Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation .....	2.267	2.280
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	1.918	1.929
Surface Runoff .....	0.353	0.355
Final Storage .....	0.002	0.002
Continuity Error (%) .....	-0.258	

*****	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal



## AVI-5016

```

*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 0.353 0.115
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.353 0.115
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Subcatchment Runoff Summary
*****

```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PropArea	2.28	0.00	0.00	1.93	0.05	0.31	0.35	0.11	4.07

```

Analysis begun on: Wed Dec 17 13:38:36 2025
Analysis ended on: Wed Dec 17 13:38:36 2025
Total elapsed time: < 1 sec

```

**EPA SWMM OUTPUT**

**HISTORIC CONDITIONS 50-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Historic Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation .....	2.644	2.660
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	2.036	2.048
Surface Runoff .....	0.615	0.618
Final Storage .....	0.002	0.002
Continuity Error (%) .....	-0.311	

*****	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal

## AVI-5016

```

*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 0.615 0.200
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.615 0.200
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000
  
```

```

*****
Subcatchment Runoff Summary
*****
  
```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PropArea	2.66	0.00	0.00	2.05	0.05	0.57	0.62	0.20	6.43

```

Analysis begun on:  Wed Dec 17 13:39:25 2025
Analysis ended on:  Wed Dec 17 13:39:25 2025
Total elapsed time: < 1 sec
  
```

**EPA SWMM OUTPUT**

**HISTORIC CONDITIONS 100-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Historic Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation .....	3.022	3.040
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	2.129	2.141
Surface Runoff .....	0.902	0.908
Final Storage .....	0.002	0.002
Continuity Error (%) .....	-0.358	

*****	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal

## AVI-5016

```

*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 0.902 0.294
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.902 0.294
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Subcatchment Runoff Summary
*****

```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS
PropArea	3.04	0.00	0.00	2.14	0.06	0.85	0.91	0.29	9.41

```

Analysis begun on:  Wed Dec 17 13:39:47 2025
Analysis ended on:  Wed Dec 17 13:39:47 2025
Total elapsed time: < 1 sec

```

**EPA SWMM OUTPUT**

**DEVELOPED CONDITIONS 5-YR STORM EVENT**



## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Post-Developed Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... KINWAVE

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

Routing Time Step ..... 15.00 sec

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity    acre-feet    inches

## AVI-5016

```
*****
Total Precipitation ..... 1.412 1.420
Evaporation Loss ..... 0.000 0.000
Infiltration Loss ..... 0.846 0.851
Surface Runoff ..... 0.553 0.556
Final Storage ..... 0.040 0.040
Continuity Error (%) ..... -1.932
```

```
*****
Flow Routing Continuity      Volume      Volume
                             acre-feet  10^6 gal
*****
Dry Weather Inflow ..... 0.000 0.000
Wet Weather Inflow ..... 0.553 0.180
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.553 0.180
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.014
```

\*\*\*\*\*

### Highest Flow Instability Indexes

\*\*\*\*\*

All links are stable.

\*\*\*\*\*

## AVI-5016

### Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step : 15.00 sec  
 Average Time Step : 15.00 sec  
 Maximum Time Step : 15.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 1.00  
 % of Steps Not Converging : 0.00

\*\*\*\*\*

### Subcatchment Runoff Summary

\*\*\*\*\*

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
PropArea	1.42	0.00	0.00	0.85	0.56	0.00	0.56	0.18	17.10	0.392

\*\*\*\*\*

### Node Depth Summary

\*\*\*\*\*

Node	Average Depth Type	Maximum Depth Feet	Maximum HGL Feet	Maximum Occurrence days	Time of Max Max Depth hr:min	Reported Max Depth Feet
Outfall	OUTFALL	0.00	0.00	120.00	0 00:00	0.00
Pond	STORAGE	0.56	2.14	124.14	0 01:37	2.14

## AVI-5016

\*\*\*\*\*

### Node Inflow Summary

\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Maximum Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Outfall	OUTFALL	0.00	1.17	0 01:37	0	0.18	0.000
Pond	STORAGE	17.10	17.10	0 00:10	0.18	0.18	0.014

\*\*\*\*\*

### Node Flooding Summary

\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*

### Storage Volume Summary

\*\*\*\*\*

Storage Unit	Average Volume 1000 ft³	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume 1000 ft³	Max Pcnt	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Pond	2.512	1	0	0	17.201	5	0 01:37	1.17

## AVI-5016

\*\*\*\*\*

### Outfall Loading Summary

\*\*\*\*\*

Outfall Node	Flow Freq	Avg Flow Pcnt	Max Flow CFS	Total Volume 10^6 gal
Outfall	49.16	0.28	1.17	0.180
System	49.16	0.28	1.17	0.180

\*\*\*\*\*

### Link Flow Summary

\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Max  Veloc  ft/sec	Maximum Full Flow	Max/ Full Depth
PondOut	DUMMY	1.17	0 01:37			

\*\*\*\*\*

### Conduit Surcharge Summary

\*\*\*\*\*

No conduits were surcharged.

## **AVI-5016**

Analysis begun on: Wed Dec 17 13:30:54 2025

Analysis ended on: Wed Dec 17 13:30:54 2025

Total elapsed time: < 1 sec

**EPA SWMM OUTPUT**

**DEVELOPED CONDITIONS 10-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Post-Developed Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... KINWAVE

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

Routing Time Step ..... 15.00 sec

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

Volume

acre-feet

-----

Depth

inches

-----

Total Precipitation .....

1.770

1.780

Evaporation Loss .....

0.000

0.000

Infiltration Loss .....

1.023

1.029

Surface Runoff .....

0.743

0.747

Final Storage .....

0.040

0.040

Continuity Error (%) .....

-2.048



## AVI-5016

	Volume acre-feet	Volume 10 <sup>6</sup> gal
	-----	-----
Flow Routing Continuity		
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.743	0.242
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.743	0.242
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.000	0.000
Continuity Error (%) .....	0.012	

Highest Flow Instability Indexes  
All links are stable.

Routing Time Step Summary

Minimum Time Step	:	15.00 sec
Average Time Step	:	15.00 sec
Maximum Time Step	:	15.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	1.00
% of Steps Not Converging	:	0.00

Subcatchment Runoff Summary

Total	Total	Total	Total	Imperv	Perv	Total	Total	Peak
-------	-------	-------	-------	--------	------	-------	-------	------

## AVI-5016

Subcatchment	Precip in	Runon in	Evap in	Infil in	Runoff in	Runoff in	Runoff in	Runoff 10^6 gal	Runoff CFS
PropArea	1.78	0.00	0.00	1.03	0.71	0.04	0.75	0.24	24.22

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
Outfall	OUTFALL	0.00	0.00	120.00	0 00:00	0.00
Pond	STORAGE	0.60	2.33	124.33	0 01:10	2.33

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Outfall	OUTFALL	0.00	2.01	0 01:10	0	0.242	0.000
Pond	STORAGE	24.22	24.22	0 00:10	0.242	0.242	0.012

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*

## AVI-5016

### Storage Volume Summary

\*\*\*\*\*

Storage Unit	Average Volume 1000 ft <sup>3</sup>	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft <sup>3</sup>	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Pond	2.925	1	0	0	21.748	7	0 01:10	2.01

\*\*\*\*\*

### Outfall Loading Summary

\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10 <sup>6</sup> gal
Outfall	50.45	0.37	2.01	0.242
System	50.45	0.37	2.01	0.242

\*\*\*\*\*

### Link Flow Summary

\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
PondOut	DUMMY	2.01	0 01:10			

\*\*\*\*\*

### Conduit Surcharge Summary

\*\*\*\*\*

## **AVI-5016**

No conduits were surcharged.

Analysis begun on: Wed Dec 17 13:32:53 2025  
Analysis ended on: Wed Dec 17 13:32:53 2025  
Total elapsed time: < 1 sec

**EPA SWMM OUTPUT**

**DEVELOPED CONDITIONS 25-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Post-Developed Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... KINWAVE

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

Routing Time Step ..... 15.00 sec

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

Volume

acre-feet

-----

Depth

inches

-----

Total Precipitation .....

2.267

2.280

Evaporation Loss .....

0.000

0.000

Infiltration Loss .....

1.168

1.175

Surface Runoff .....

1.108

1.114

Final Storage .....

0.040

0.040

Continuity Error (%) .....

-2.181

## AVI-5016

	Volume acre-feet	Volume 10^6 gal
	-----	-----
Flow Routing Continuity		
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.108	0.361
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	1.108	0.361
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.000	0.000
Continuity Error (%) .....	0.023	

Highest Flow Instability Indexes  
All links are stable.

Routing Time Step Summary

Minimum Time Step	:	15.00 sec
Average Time Step	:	15.00 sec
Maximum Time Step	:	15.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	1.00
% of Steps Not Converging	:	0.00

Subcatchment Runoff Summary

Total	Total	Total	Total	Imperv	Perv	Total	Total	Peak
-------	-------	-------	-------	--------	------	-------	-------	------

## AVI-5016

Subcatchment	Precip in	Runon in	Evap in	Infil in	Runoff in	Runoff in	Runoff in	Runoff 10^6 gal	Runoff CFS
PropArea	2.28	0.00	0.00	1.18	0.92	0.20	1.11	0.36	35.53

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
Outfall	OUTFALL	0.00	0.00	120.00	0 00:00	0.00
Pond	STORAGE	0.65	2.68	124.68	0 01:11	2.68

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Outfall	OUTFALL	0.00	3.49	0 01:11	0	0.361	0.000
Pond	STORAGE	35.53	35.53	0 00:10	0.361	0.361	0.023

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*



## AVI-5016

### Storage Volume Summary

\*\*\*\*\*

Storage Unit	Average Volume 1000 ft <sup>3</sup>	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft <sup>3</sup>	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Pond	3.637	1	0	0	30.728	9	0 01:11	3.49

\*\*\*\*\*

### Outfall Loading Summary

\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10 <sup>6</sup> gal
Outfall	52.07	0.54	3.49	0.361
System	52.07	0.54	3.49	0.361

\*\*\*\*\*

### Link Flow Summary

\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
PondOut	DUMMY	3.49	0 01:11			

\*\*\*\*\*

### Conduit Surcharge Summary

\*\*\*\*\*

## **AVI-5016**

No conduits were surcharged.

Analysis begun on: Wed Dec 17 13:33:19 2025  
Analysis ended on: Wed Dec 17 13:33:19 2025  
Total elapsed time: < 1 sec

**EPA SWMM OUTPUT**

**DEVELOPED CONDITIONS 50-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Post-Developed Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... KINWAVE

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

Routing Time Step ..... 15.00 sec

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

Volume

acre-feet

-----

Depth

inches

-----

Total Precipitation .....

2.644

2.660

Evaporation Loss .....

0.000

0.000

Infiltration Loss .....

1.238

1.245

Surface Runoff .....

1.426

1.434

Final Storage .....

0.040

0.040

Continuity Error (%) .....

-2.231

## AVI-5016

***** Flow Routing Continuity *****	Volume acre-feet -----	Volume 10^6 gal -----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.426	0.465
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	1.425	0.464
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.000	0.000
Continuity Error (%) .....	0.029	

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*  
All links are stable.

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step	:	15.00 sec
Average Time Step	:	15.00 sec
Maximum Time Step	:	15.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	1.00
% of Steps Not Converging	:	0.00

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

-----	Total	Total	Total	Total	Imperv	Perv	Total	Total	Peak
-------	-------	-------	-------	-------	--------	------	-------	-------	------

## AVI-5016

Subcatchment	Precip in	Runon in	Evap in	Infil in	Runoff in	Runoff in	Runoff in	Runoff 10^6 gal	Runoff CFS
PropArea	2.66	0.00	0.00	1.25	1.08	0.35	1.43	0.46	44.34

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
Outfall	OUTFALL	0.00	0.00	120.00	0 00:00	0.00
Pond	STORAGE	0.69	2.94	124.94	0 01:12	2.94

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Outfall	OUTFALL	0.00	4.62	0 01:12	0	0.464	0.000
Pond	STORAGE	44.34	44.34	0 00:10	0.464	0.464	0.029

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*

## AVI-5016

### Storage Volume Summary

\*\*\*\*\*

Storage Unit	Average Volume 1000 ft <sup>3</sup>	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft <sup>3</sup>	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Pond	4.249	1	0	0	38.335	12	0 01:12	4.62

\*\*\*\*\*

### Outfall Loading Summary

\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10 <sup>6</sup> gal
Outfall	53.16	0.68	4.62	0.464
System	53.16	0.68	4.62	0.464

\*\*\*\*\*

### Link Flow Summary

\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
PondOut	DUMMY	4.62	0 01:12			

\*\*\*\*\*

### Conduit Surcharge Summary

\*\*\*\*\*

## **AVI-5016**

No conduits were surcharged.

Analysis begun on: Wed Dec 17 13:33:42 2025  
Analysis ended on: Wed Dec 17 13:33:42 2025  
Total elapsed time: < 1 sec



**EPA SWMM OUTPUT**

**DEVELOPED CONDITIONS 100-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Post-Developed Conditions SWMM

5-, 10-, 25-, 50-, 100-Yr Analyses

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... KINWAVE

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/17/2016 00:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

Routing Time Step ..... 15.00 sec

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

Volume

acre-feet

-----

Depth

inches

-----

Total Precipitation .....

3.022

3.040

Evaporation Loss .....

0.000

0.000

Infiltration Loss .....

1.293

1.301

Surface Runoff .....

1.759

1.769

Final Storage .....

0.040

0.040

Continuity Error (%) .....

-2.282

## AVI-5016

***** Flow Routing Continuity *****	Volume acre-feet -----	Volume 10^6 gal -----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.759	0.573
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	1.758	0.573
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.000	0.000
Continuity Error (%) .....	0.034	

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*  
All links are stable.

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step	:	15.00 sec
Average Time Step	:	15.00 sec
Maximum Time Step	:	15.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	1.00
% of Steps Not Converging	:	0.00

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

-----	Total	Total	Total	Total	Imperv	Perv	Total	Total	Peak
-------	-------	-------	-------	-------	--------	------	-------	-------	------

## AVI-5016

Subcatchment	Precip in	Runon in	Evap in	Infil in	Runoff in	Runoff in	Runoff in	Runoff 10^6 gal	Runoff CFS
PropArea	3.04	0.00	0.00	1.30	1.24	0.53	1.77	0.57	54.13

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
Outfall	OUTFALL	0.00	0.00	120.00	0 00:00	0.00
Pond	STORAGE	0.72	3.18	125.18	0 01:10	3.18

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
Outfall	OUTFALL	0.00	6.08	0 01:10	0	0.573	0.000
Pond	STORAGE	54.13	54.13	0 00:10	0.573	0.573	0.034

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*

## AVI-5016

### Storage Volume Summary

\*\*\*\*\*

Storage Unit	Average Volume 1000 ft <sup>3</sup>	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft <sup>3</sup>	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Pond	4.831	1	0	0	45.825	14	0 01:10	6.08

\*\*\*\*\*

### Outfall Loading Summary

\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10 <sup>6</sup> gal
Outfall	53.99	0.82	6.08	0.573
System	53.99	0.82	6.08	0.573

\*\*\*\*\*

### Link Flow Summary

\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
PondOut	DUMMY	6.08	0 01:10			

\*\*\*\*\*

### Conduit Surcharge Summary

\*\*\*\*\*

## **AVI-5016**

No conduits were surcharged.

Analysis begun on: Wed Dec 17 13:34:10 2025  
Analysis ended on: Wed Dec 17 13:34:10 2025  
Total elapsed time: < 1 sec

**EPA SWMM OUTPUT**

**EXISTING SUMP AREA 100-YR STORM EVENT**

## AVI-5016

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

---

AVI-5016

Existing Sump Area 100-Yr Analyses

Front Range Stormwater & Floodplain Consulting

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... KINWAVE

Starting Date ..... 03/15/2016 00:00:00

Ending Date ..... 03/15/2016 05:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:05:00

Wet Time Step ..... 00:05:00

Dry Time Step ..... 00:05:00

Routing Time Step ..... 15.00 sec

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation .....	4.109	3.680
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	2.202	1.972
Surface Runoff .....	1.901	1.703
Final Storage .....	0.017	0.015
Continuity Error (%) .....	-0.260	



## AVI-5016

*****	Volume acre-feet	Volume 10^6 gal
Flow Routing Continuity		
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.901	0.620
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.004	0.001
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	1.897	0.618
Continuity Error (%) .....	0.000	

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*  
All links are stable.

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step	:	15.00 sec
Average Time Step	:	15.00 sec
Maximum Time Step	:	15.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	1.00
% of Steps Not Converging	:	0.00

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

-----	Total	Total	Total	Total	Imperv	Perv	Total	Total	Peak
-------	-------	-------	-------	-------	--------	------	-------	-------	------

## AVI-5016

Subcatchment	Precip in	Runon in	Evap in	Infil in	Runoff in	Runoff in	Runoff in	Runoff 10^6 gal	Runoff CFS
OV-Sump	3.68	0.00	0.00	1.97	0.54	1.16	1.70	0.62	28.94

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
OUTFALL	OUTFALL	0.00	0.00	100.00	0 00:00	0.00
1	STORAGE	2.09	2.57	104.57	0 02:50	2.57

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
OUTFALL	OUTFALL	0.00	0.01	0 02:50	0	0.0014	0.000
1	STORAGE	28.94	28.94	0 00:45	0.619	0.619	-0.000

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*

## AVI-5016

### Storage Volume Summary

\*\*\*\*\*

Storage Unit	Average Volume 1000 ft <sup>3</sup>	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft <sup>3</sup>	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
1	62.382	5	0	0	82.716	7	0 02:50	0.01

\*\*\*\*\*

### Outfall Loading Summary

\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10 <sup>6</sup> gal
OUTFALL	94.33	0.01	0.01	0.001
System	94.33	0.01	0.01	0.001

\*\*\*\*\*

### Link Flow Summary

\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
1	DUMMY	0.01	0 02:50			

\*\*\*\*\*

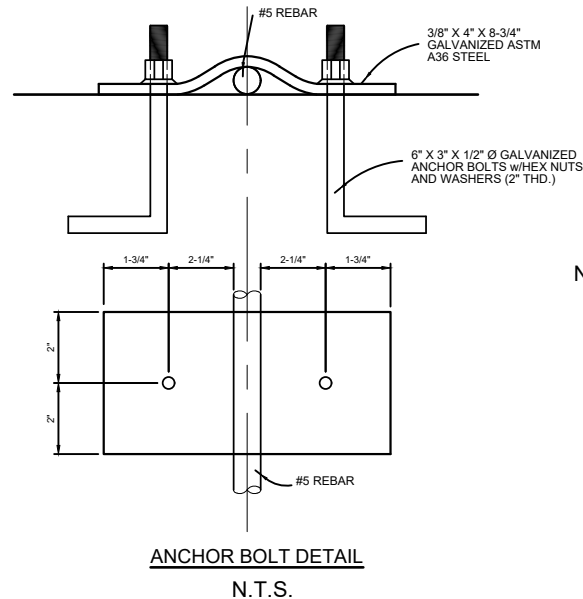
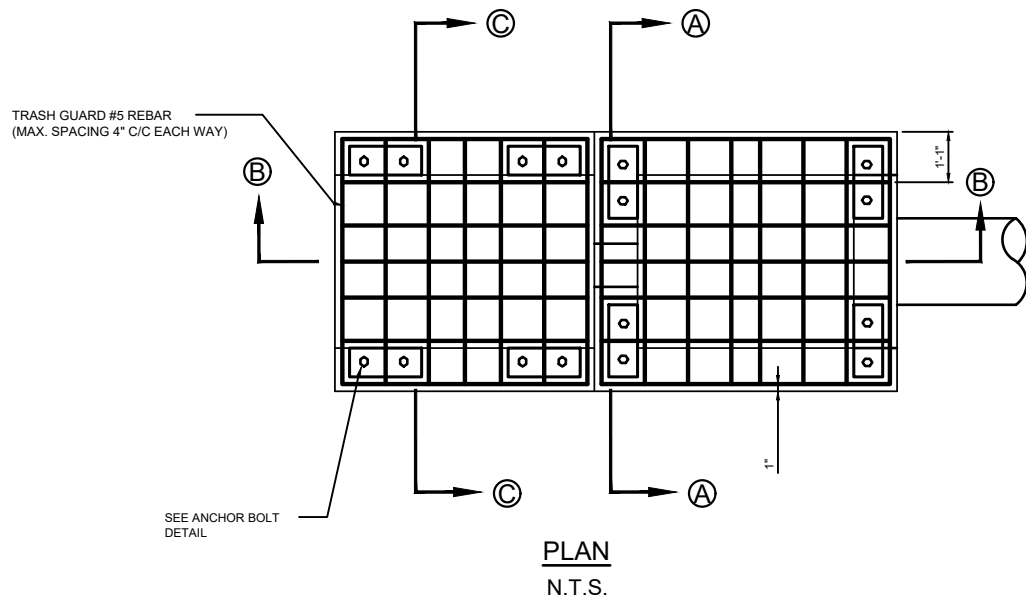
### Conduit Surcharge Summary

\*\*\*\*\*

## **AVI-5016**

No conduits were surcharged.

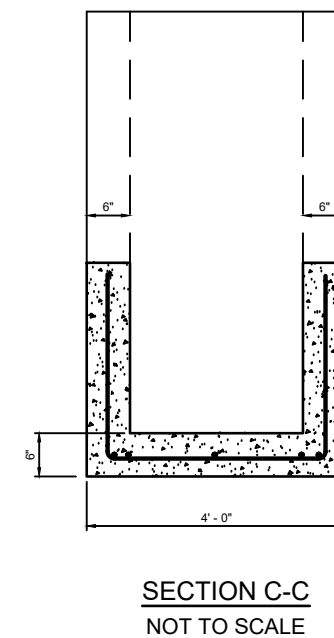
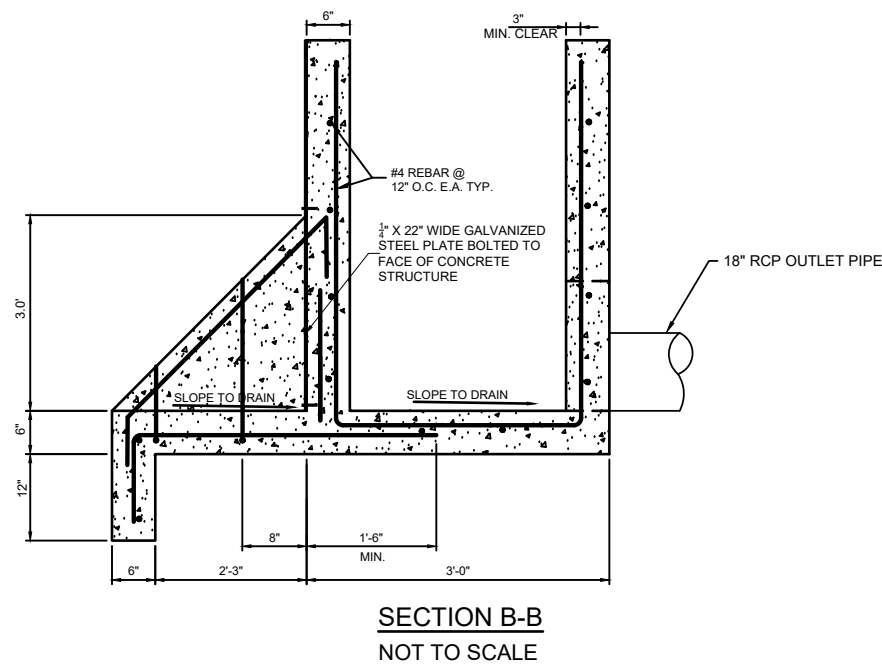
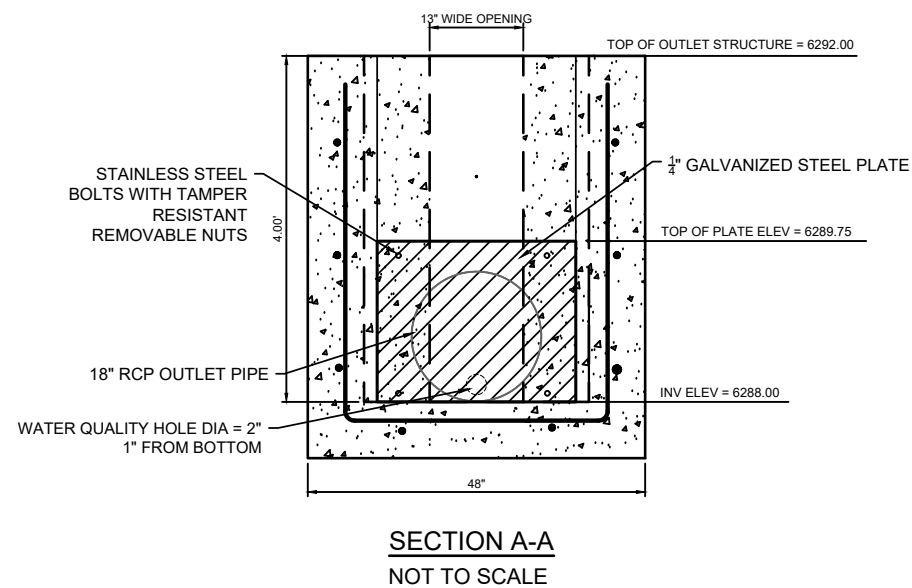
Analysis begun on: Wed Dec 17 14:05:23 2025  
Analysis ended on: Wed Dec 17 14:05:23 2025  
Total elapsed time: < 1 sec



- NOTES:
1. TYPICAL CLEAR SPACE IS 3" MIN.
  2. 90° OVERLAPS CAN BE SUBSTITUTED FOR ONE PIECE BENDS. OVERLAPS SHALL BE 12" MINIMUM
  3. #5 REBAR GRATES TO BE WELDED @ EACH BAR INTERSECTION AND BOTH GRATES TO BE EPOXY COATED.
  4. CONCRETE FOR POND OUTLET STRUCTURE SHALL MEET THE REQUIREMENTS OF CITY OF CHEYENNE SPECIFICATIONS CLASS 4000 CONCRETE.
  5. REINFORCING STEEL SHALL BE CENTERED IN THE 6" THICK WALLS AND SLABS.
  6. FIELD TRIM REBAR AS REQUIRED.
  7. THE FLOOR SLAB OF THE OUTLET STRUCTURE SHALL BE SLOPED A MINIMUM OF  $\frac{1}{2}$ " PER FOOT TOTAL.
  8. THE GALVANIZED STEEL PLATE SHALL BE ATTACHED TO THE OUTLET STRUCTURE W/ STAINLESS STEEL EXPANSION ANCHOR BOLTS AND REMOVABLE STAINLESS STEEL NUTS.
  9. ADD 1 ADDITIONAL 'A' BAR EACH SIDE OF THE 18" OUTLET CULVERT, AND ADD 1 ADDITIONAL 'B' BAR ON THE TOP SIDE OF THE 18" OUTLET CULVERT.

OUTLET STRUCTURE SUMMARY

OUTLET PIPE DIA.	OUTLET INV. ELEV.	TOP OF PLATE ELEV.	TOP OF STRUCTURE ELEV.
18" RCP	6288.00	6289.75	6292.00



DATE	
REVISION	
NO.	

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT: CYS07 STAGING AREA

DRAWING TITLE: OUTLET STRUCTURE DETAILS

ENGINEERING • PLANNING • SURVEYING

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED: Dec 17, 2025

DRAWN BY: CK

DESIGNED BY: CK

CHECKED BY: TC

JOB NO.: 5016

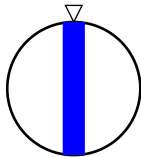
DWG NO. DT2 OF

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

### 18" CMP SOUTH APPROACH

Inputs			Results		
Pipe diameter, $d_0$	18	in	Flow depth, $y$	18.0000	in
<a href="#">Manning roughness, <math>n</math></a>	0.022		Flow area, $a$	254.4695	sq. in.
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	4.26	% rise/run	Pipe area, $a_0$	254.4695	sq. in.
Relative flow depth, $y/d_0$	1	fraction	Relative area, $a/a_0$	1.0000	fraction
			Wetted perimeter, $P_w$	56.5487	in
			Hydraulic radius, $R_h$	4.5000	in
			Top width, $T$	0.0000	in
			Velocity, $v$	7.2493	ft/sec
			Velocity head, $h_v$	9.8010	in H2O
			<a href="#">Froude number, <math>E</math></a>	0.00	
			Average shear stress (tractive force), $\tau$	0.9973	psf
			<b>Flow, <math>Q</math></b> (See notes)	12.8101	cfs
			Full flow, $Q_0$	12.8101	cfs
			Ratio to full flow, $Q/Q_0$	1.0000	fraction



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

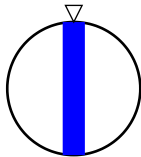
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

18" CMP NORTH @ HAPPY JACK

Inputs			Results		
Pipe diameter, $d_0$	18	in	Flow depth, $y$	18.0000	in
<a href="#">Manning roughness, <math>n</math></a>	0.022		Flow area, $a$	254.4695	sq. in.
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	.12	% rise/run	Pipe area, $a_0$	254.4695	sq. in.
Relative flow depth, $y/d_0$	1	fraction	Relative area, $a/a_0$	1.0000	fraction
			Wetted perimeter, $P_w$	56.5487	in
			Hydraulic radius, $R_h$	4.5000	in
			Top width, $T$	0.0000	in
			Velocity, $v$	1.2167	ft/sec
			Velocity head, $h_v$	0.2761	in H2O
			<a href="#">Froude number, <math>E</math></a>	0.00	
			Average shear stress (tractive force), $\tau$	0.0281	psf
			<b>Flow, <math>Q</math></b> (See notes)	2.1500	cfs
			Full flow, $Q_0$	2.1500	cfs
			Ratio to full flow, $Q/Q_0$	1.0000	fraction



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

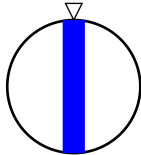
24" RCP

Inputs

Pipe diameter, $d_0$	24	in ▾
<a href="#">Manning roughness, <math>n</math></a>	0.013	
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	4.11	% rise/run ▾
Relative flow depth, $y/d_0$	1	fraction ▾

Results

Flow depth, $y$	24.0000	in ▾
Flow area, $a$	452.3902	sq. in. ▾
Pipe area, $a_0$	452.3902	sq. in. ▾
Relative area, $a/a_0$	1.0000	fraction ▾
Wetted perimeter, $P_w$	75.3982	in ▾
Hydraulic radius, $R_h$	6.0000	in ▾
Top width, $T$	0.0000	in ▾
Velocity, $v$	14.5976	ft/sec ▾
Velocity head, $h_v$	39.7417	in H2O ▾
<a href="#">Froude number, <math>E</math></a>	0.00	
Average shear stress (tractive force), $\tau$	1.2829	psf ▾
<b>Flow, <math>Q</math></b> (See notes)	45.8583	cfs ▾
Full flow, $Q_0$	45.8583	cfs ▾
Ratio to full flow, $Q/Q_0$	1.0000	fraction ▾



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.



# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

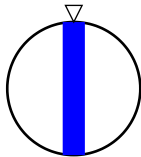
36" RCP

Inputs

Pipe diameter, $d_0$	36	in ▾
<a href="#">Manning roughness, <math>n</math></a>	0.013	
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	1.45	% rise/run ▾
Relative flow depth, $y/d_0$	1	fraction ▾

Results

Flow depth, $y$	36.0000	in ▾
Flow area, $a$	1017.8781	sq. in. ▾
Pipe area, $a_0$	1017.8781	sq. in. ▾
Relative area, $a/a_0$	1.0000	fraction ▾
Wetted perimeter, $P_w$	113.0973	in ▾
Hydraulic radius, $R_h$	9.0000	in ▾
Top width, $T$	0.0000	in ▾
Velocity, $v$	11.3616	ft/sec ▾
Velocity head, $h_v$	24.0747	in H2O ▾
<a href="#">Froude number, <math>E</math></a>	0.00	
Average shear stress (tractive force), $\tau$	0.6789	psf ▾
<b>Flow, <math>Q</math></b> (See notes)	80.3077	cfs ▾
Full flow, $Q_0$	80.3077	cfs ▾
Ratio to full flow, $Q/Q_0$	1.0000	fraction ▾



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

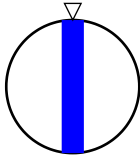
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

24" CMP HAUL RD WEST

Inputs			Results		
Pipe diameter, $d_0$	24	in	Flow depth, $y$	24.0000	in
<a href="#">Manning roughness, <math>n</math></a>	0.022		Flow area, $a$	452.3902	sq. in.
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	.9	% rise/run	Pipe area, $a_0$	452.3902	sq. in.
Relative flow depth, $y/d_0$	1	fraction	Relative area, $a/a_0$	1.0000	fraction
			Wetted perimeter, $P_w$	75.3982	in
			Hydraulic radius, $R_h$	6.0000	in
			Top width, $T$	0.0000	in
			Velocity, $v$	4.0365	ft/sec
			Velocity head, $h_v$	3.0387	in H2O
			<a href="#">Froude number, <math>E</math></a>	0.00	
			Average shear stress (tractive force), $\tau$	0.2809	psf
			<b>Flow, <math>Q</math></b> (See notes)	12.6806	cfs
			Full flow, $Q_0$	12.6806	cfs
			Ratio to full flow, $Q/Q_0$	1.0000	fraction



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

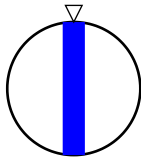
18" CMP @ HAUL RD & ACCESS RD

Inputs

Pipe diameter, $d_0$	18	in ▾
<a href="#">Manning roughness, <math>n</math></a>	0.022	
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	1.41	% rise/run ▾
Relative flow depth, $y/d_0$	1	fraction ▾

Results

Flow depth, $y$	18.0000	in ▾
Flow area, $a$	254.4695	sq. in. ▾
Pipe area, $a_0$	254.4695	sq. in. ▾
Relative area, $a/a_0$	1.0000	fraction ▾
Wetted perimeter, $P_w$	56.5487	in ▾
Hydraulic radius, $R_h$	4.5000	in ▾
Top width, $T$	0.0000	in ▾
Velocity, $v$	4.1706	ft/sec ▾
Velocity head, $h_v$	3.2440	in H2O ▾
<a href="#">Froude number, <math>E</math></a>	0.00	
Average shear stress (tractive force), $\tau$	0.3301	psf ▾
<b>Flow, <math>Q</math></b> (See notes)	7.3698	cfs ▾
Full flow, $Q_0$	7.3698	cfs ▾
Ratio to full flow, $Q/Q_0$	1.0000	fraction ▾



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

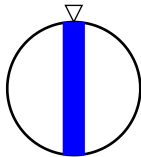
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

24" CMP HAUL RD EAST

Inputs			Results		
Pipe diameter, $d_0$	24	in	Flow depth, $y$	24.0000	in
<a href="#">Manning roughness, <math>n</math></a>	0.022		Flow area, $a$	452.3902	sq. in.
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	3.66	% rise/run	Pipe area, $a_0$	452.3902	sq. in.
Relative flow depth, $y/d_0$	1	fraction	Relative area, $a/a_0$	1.0000	fraction
			Wetted perimeter, $P_w$	75.3982	in
			Hydraulic radius, $R_h$	6.0000	in
			Top width, $T$	0.0000	in
			Velocity, $v$	8.1399	ft/sec
			Velocity head, $h_v$	12.3574	in H2O
			<a href="#">Froude number, <math>E</math></a>	0.00	
			Average shear stress (tractive force), $\tau$	1.1425	psf
			<b>Flow, <math>Q</math></b> (See notes)	25.5716	cfs
			Full flow, $Q_0$	25.5716	cfs
			Ratio to full flow, $Q/Q_0$	1.0000	fraction



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## CYS07 Staging Area

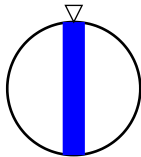
### 18" RCP STORM OUTLET

#### Inputs

Pipe diameter, $d_0$	18	in ▾
<a href="#">Manning roughness, <math>n</math></a>	0.013	
Pressure slope (possibly <a href="#">2</a> equal to pipe slope), $S_0$	0.77	% rise/run ▾
Relative flow depth, $y/d_0$	1	fraction ▾

#### Results

Flow depth, $y$	18.0000	in ▾
Flow area, $a$	254.4695	sq. in. ▾
Pipe area, $a_0$	254.4695	sq. in. ▾
Relative area, $a/a_0$	1.0000	fraction ▾
Wetted perimeter, $P_w$	56.5487	in ▾
Hydraulic radius, $R_h$	4.5000	in ▾
Top width, $T$	0.0000	in ▾
Velocity, $v$	5.2157	ft/sec ▾
Velocity head, $h_v$	5.0735	in H2O ▾
<a href="#">Froude number, <math>E</math></a>	0.00	
Average shear stress (tractive force), $\tau$	0.1803	psf ▾
<b>Flow, <math>Q</math></b> (See notes)	9.2166	cfs ▾
Full flow, $Q_0$	9.2166	cfs ▾
Ratio to full flow, $Q/Q_0$	1.0000	fraction ▾



#### Notes:

**This is the flow and depth inside an *infinitely long* pipe.**

Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or [see my 2-minute tutorial](#) for standard culvert headwater calculations using HY-8.

## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **SOUTH 18" CMP, CYS APPROACH**

---

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	7.25	(ft/s)		--- User Input
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		--- Computer Output
	Design depth of flow at pipe outlet (d) =	1.50	(ft)		--- Obtained from other source (chart, table, etc.)
	Pipe diameter (D) =	1.50	(ft)		

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  10.04

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches) 1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  6.00  
or (greater) or Use L = 6.00 (ft)  
 $L = (D)^{1/2}(V/2) =$  4.44

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  6.00 (ft)

Riprap Apron Dimensions	9.00	x	1.5	x	6.00	x	6.00
	(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)

## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **NORTH 18" CMP, HAPPY JACK APPROACH**

---

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	1.22	(ft/s)		--- User Input
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		--- Computer Output
Design depth of flow at pipe outlet (d) =		1.50	(ft)		--- Obtained from other source (chart, table, etc.)
	Pipe diameter (D) =	1.50	(ft)		

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  7.06

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches) 1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  6.00  
or (greater) or Use L = 6.00 (ft)  
 $L = (D)^{1/2}(V/2) =$  0.75

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  6.00 (ft)

Riprap Apron Dimensions	9.00	x	1.5	x	6.00	x	6.00
	(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)

## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **24" RCP**

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	14.6	(ft/s)		---	User Input
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		---	Computer Output
	Design depth of flow at pipe outlet (d) =	2.00	(ft)		---	Obtained from other source (chart, table, etc.)
	Pipe diameter (D) =	2.00	(ft)			

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  16.66

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches) 1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  8.00  
or (greater) or Use L = 10.32 (ft)  
 $L = (D)^{1/2}(V/2) =$  10.32

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  8.00 (ft)

Riprap Apron Dimensions	→	9.00	x	1.5	x	10.32	x	8.00
		(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)



## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **36" RCP**

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	11.36	(ft/s)		---	User Input
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		---	Computer Output
	Design depth of flow at pipe outlet (d) =	3.00	(ft)		---	Obtained from other source (chart, table, etc.)
	Pipe diameter (D) =	3.00	(ft)			

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  15.02

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches) 1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  12.00  
or (greater) or Use L = 12.00 (ft)  
 $L = (D)^{1/2}(V/2) =$  9.84

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  12.00 (ft)

Riprap Apron Dimensions	9.00	x	1.5	x	12.00	x	12.00
	(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)

## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **24" CMP HAUL ROAD WEST**

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	4.03	(ft/s)		
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		
	Design depth of flow at pipe outlet (d) =	2.00	(ft)		
	Pipe diameter (D) =	2.00	(ft)		

	--- User Input
	--- Computer Output
	--- Obtained from other source (chart, table, etc.)

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  8.98

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches)      1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  8.00  
or (greater)      or      Use L = 8.00 (ft)  
 $L = (D)^{1/2}(V/2) =$  2.85

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  8.00 (ft)

Riprap Apron Dimensions	→	9.00	x	1.5	x	8.00	x	8.00
		(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)

## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **24" CMP HAUL ROAD WEST**

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	8.14	(ft/s)		---	User Input
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		---	Computer Output
	Design depth of flow at pipe outlet (d) =	2.00	(ft)		---	Obtained from other source (chart, table, etc.)
	Pipe diameter (D) =	2.00	(ft)			

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  11.43

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches) 1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  8.00  
 or (greater) or Use L = 8.00 (ft)  
 $L = (D)^{1/2}(V/2) =$  5.76

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  8.00 (ft)

Riprap Apron Dimensions	→	9.00	x	1.5	x	8.00	x	8.00
		(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)

## RIPRAP SIZING USED FOR CIRCULAR PIPES

CULVERT ID / LOCATION = **18" RCP, POND OUTLET**

### RIPRAP SIZING DESIGN PARAMETER ( $P_d$ ):

Input Cells:	Velocity (V) =	5.216	(ft/s)		
	Gravity Acceleration (g) =	32.2	(ft/s <sup>2</sup> )		
	Design depth of flow at pipe outlet (d) =	1.50	(ft)		
	Pipe diameter (D) =	1.50	(ft)		

	--- User Input
	--- Computer Output
	--- Obtained from other source (chart, table, etc.)

Output Cell:  $P_d = (V^2 + gd)^{1/2} =$  8.69

\*\*\* Obtain Median Riprap size from Table HS-9 ( $D_{50}$ ) = 9.00 (inches)

### THICKNESS OF RIPRAP LAYER (T):

Output Cells:  $T = 1.75 * D_{50} =$  15.75 (inches)      1.5 (ft) - Round Up to nearest 1/2 foot

### BASIN LENGTH (L):

Output Cells:  $L = 4 * D =$  6.00  
or (greater)      or      Use L = 6.00 (ft)  
 $L = (D)^{1/2}(V/2) =$  3.19

### BASIN WIDTH (W):

Output Cells:  $W = 4 * D =$  6.00 (ft)

Riprap Apron Dimensions	9.00	x	1.5	x	6.00	x	6.00
	(Median Diameter - inches)		(feet - Thick)		(feet - Long)		(feet - Wide)

Laramie County Planning and Development

October 15, 2025

3966 Archer Parkway

5016.25

Cheyenne, WY 82009

**RE: CYS07 Staging Area Site Plan – Project Narrative & Drainage Waiver Request**

To whom it may concern,

AVI P.C., on behalf of Hensel Phelps, is submitting a Site Plan for a proposed parking area and laydown yard located south of Happy Jack Road and west of North Range Business Park, 11<sup>th</sup> Filing. The project will include site grading, gravel laydown yard, paved roads to access the site, multiple job trailers, and paved parking area. Water is proposed to be connected to the existing 12" BOPU system to the east, and a septic tank/ leach field is proposed. A detention pond with outlet structure and WQCV design is also proposed to mitigate the increased imperviousness stormwater runoff.

A warranty deed for the site is not yet available due to the pending sale of the property. A warranty deed will be provided as soon as possible.

We are requesting the Landscape Plan be waived for the site at this time, due to the nature and purpose of the site and the surrounding Microsoft sites.

If you have any questions or require additional information, please feel free to contact me directly.

Respectfully Submitted

**AVI PROFESSIONAL CORPORATION**

Tristan Cordier, PE

1103 Old Town Lane | Cheyenne, Wyoming 82009 | 307.637.6017

2290 E Prospect Road Suite 5, Fort Collins, Colorado 80524 | 970.420.0086

[avi@avipc.com](mailto:avi@avipc.com) | [www.avipc.com](http://www.avipc.com)

h:\5016\_hp cys 15&16 staging site\planning\5016\_drainage memo.docx

**APPENDIX C – TRANSPORTATION WORKSHEET**

The following transportation Worksheet shall be filled out in association with Sections 3.1.1 and 3.1.2 of this Code.

Project Name: CYS07 STAGING AREA By: TRISTAN CORDIER

Date: 8/11/25 Title: ENGINEER

Property Address or Legal Description (lot, block, subdivision): Address: \_\_\_\_\_  
PARCEL OF LAND IN THE SW1/4NE1/4 SECTION 5, T13N, R67W OF THE 6TH PM

Phone: 307-637-6017

Fax: \_\_\_\_\_

Existing Zoning: A-2

E-mail: TCORDIER@AVIPC.COM

Developer: HENSEL PHELPS

**Part One: All Developments**

Provide the following information, to the best of your knowledge, for all projects:

1. Has a previous Transportation Impact Study (TIS) been prepared for the site? Yes \_\_\_\_\_ No X
2. Are there proposed street intersections included with this development? Yes \_\_\_\_\_ No X
3. Are there existing intersections affected by the development action(s)? Yes \_\_\_\_\_ No X  
 If yes, which? \_\_\_\_\_
4. What is the proposed year of build-out? 2026
5. Will the project be phased? Yes \_\_\_\_\_ No X  
 If yes, what is the proposed phasing plan? \_\_\_\_\_
6. Are there other proposed developments in the study area? NO
7. Are there other committed roadway improvements in the area? NO
8. Are there proposed roadway improvements to be provided by the Applicant with this project? \_\_\_\_\_  
SITE CONNECTION TO THE EAST, AND CONNECTION TO NORTH HAPPY JACK ACCESS ROAD NEAR NORTH RANGE SUBSTATION
9. Are there bicycle and pedestrian attractions near the development? (Existing or imminent within 1320' of the site. This distance may be increased up to 1.5 miles for residential projects near existing or proposed school sites.)  
 Yes \_\_\_\_\_ No NO

**Part Two: Non-residential Development**

Provide the following information, to the best of your knowledge, for all non-residential projects:

**A. Existing Use:**

1. Description of existing land use: (if none, proceed with Part B): VACANT, AGRICULTURAL
2. Existing building area (square footage) for above use(s): \_\_\_\_\_
3. Number of employees on site each day: \_\_\_\_\_
4. Daily trip ends for employees [multiply line 3 by the number 4]: \_\_\_\_\_
5. Number of customers on site each day: \_\_\_\_\_
6. Daily trip ends for customers [multiply line 5 by the number 2]: \_\_\_\_\_
7. Number of vendors on site each day (include trash, UPS, etc.): \_\_\_\_\_
8. Daily trip ends for vendors [multiply line 7 by the number 2]: \_\_\_\_\_
9. Total vehicular daily trip ends [line 4 plus line 6 plus line 8]: \_\_\_\_\_
10. How many Company Vehicles are used daily: \_\_\_\_\_
11. How many Company Vehicles will be parked on site: \_\_\_\_\_
10. Source of trip generation data (circle one): ITE, business records, traffic engineer, personal estimates, other: \_\_\_\_\_  
\_\_\_\_\_. Attach documentation to support your data.
11. Number of accesses, width, and type of drive surface exiting onto the public street(s) from this property: \_\_\_\_\_
12. Number of pedestrians visiting site each day: \_\_\_\_\_
13. Number of bicyclists visiting site each day: \_\_\_\_\_
14. Do sidewalks exist along all street(s) adjacent to property? Yes \_\_\_\_ No X
15. Is property adjacent to a major collector or arterial street? Yes \_\_\_\_ No X

**B. Proposed Use:**

1. Description of proposed land use: MICROSOFT CONSTRUCTION STAGING AREA
2. Proposed building area (square footage) for above use(s): N/A
3. Anticipated number of employees on site each day: 600
4. Daily trip ends for employees [multiply line 3 by the number 4]: 2400

5. Anticipated number of customers on site each day: 0
6. Daily trip ends for customers [multiply line 5 by the number 2]: 0
7. Anticipated number of venders on site each day: 0
8. Daily trip ends for venders [multiply line 7 by the number 2]: 0
9. Total vehicular daily trip ends [line 4 plus line 6 plus line 8]: 2400
10. Source of trip generation data (circle one): ITE, business records, traffic engineer, personal estimates, other: \_\_\_\_\_  
 \_\_\_\_\_, Attach documentation to support your data.
11. Proposed number of accesses onto the public street(s) from this property (does NOT include any existing accesses proposed to remain for use): 1
12. Number of existing accesses proposed to remain and be used: 0
13. Number of pedestrians visiting site each day: 0
14. Number of bicyclists visiting site each day: 0
15. Do sidewalks exist along street(s) adjacent to property? Yes \_\_\_\_ No X
16. Property is not adjacent to a major collector or arterial street as shown on the City's Master Transportation Plan.  
 Yes \_\_\_\_ No X
17. Is a zone change requested? Yes X No \_\_\_\_
18. If yes, the existing zone is \_\_\_\_\_, and the proposed zone is \_\_\_\_\_.

If the total new trips (the difference between the daily trip ends calculation for any existing use and the total daily trip ends calculation for any existing use and the total trip ends calculated for the proposed use) is less than 500 and if peak hour and/or daily traffic counts demonstrate that the existing traffic plus the site generated traffic volumes are within the limits by these standards, you (the applicant) may request a waiver of the Transportation Impact Study submitted requirements by signing below.

Signature: \_\_\_\_\_ Date: 9/30/25

Transportation Impact Study  
Required: \_\_\_\_\_

Transportation Impact Assessment  
Required: \_\_\_\_\_

TIS  
Waived: \_\_\_\_\_

By: \_\_\_\_\_ Date: \_\_\_\_\_



## Part Three: Residential Development

Fill out the table below and indicate in the table the number of dwelling units or access changes proposed for the type(s) of residential development included in your development. If the number of dwelling units and changes in access are less than the thresholds established above and if peak hour and/or daily traffic counts demonstrate that the existing traffic plus the site generated traffic volumes are within the limits set by City policy, you (the applicant) may request a waiver from the TIS requirement by signing your name below. Provide the following information, to the best of your knowledge, for all residential projects:

NUMBER	RESIDENTIAL DEVELOPMENT TYPE
	Single-family detached/dwelling units
	Multi-family dwelling units in duplex, tri-plex, or four-plex structures
	Multi-family dwelling units in structures containing five or more units
	Access changes onto a collector or arterial roadway

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Transportation Impact Study  
Required: \_\_\_\_\_

Transportation Impact Assessment  
Required: \_\_\_\_\_

TIS  
Waived: \_\_\_\_\_

By: \_\_\_\_\_

Date: \_\_\_\_\_

CYS07 STAGING AREA

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SITE PLAN AND CONSTRUCTION DRAWINGS FOR

CYS07 STAGING AREA

December 17, 2025

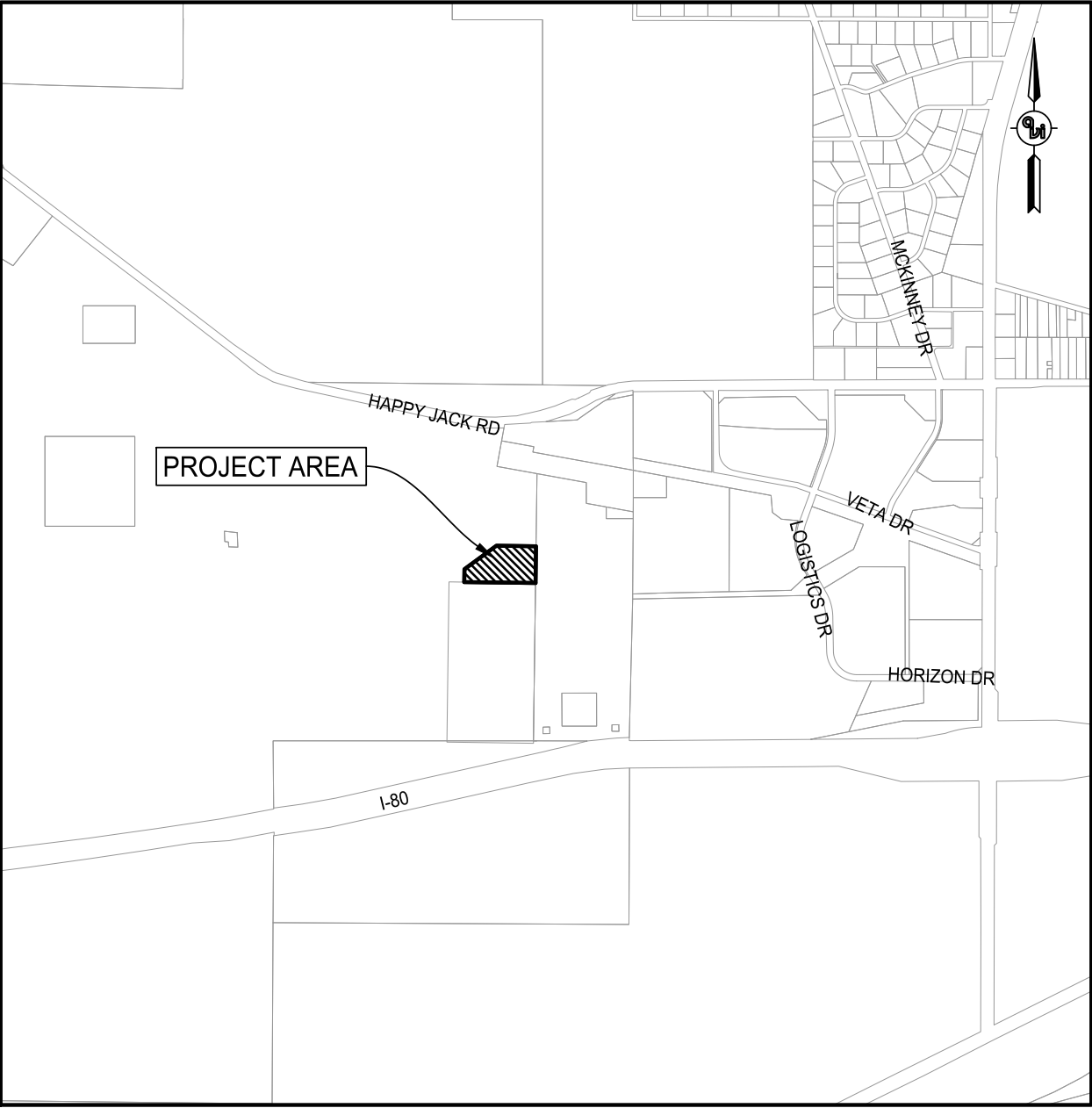
CHEYENNE, WYOMING

OWNER

HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

ENGINEER

 AVI PC,  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WYOMING 82009  
307.637.6017  
FAX 307.632.9326  
WWW.AVIPC.COM



VICINITY MAP  
NTS

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	SUMMARIES
TS	TYPICAL SECTIONS
SP	SITE PLAN
GP	GRADING PLAN
XS1 - XS4	SITE CROSS SECTIONS
R1 - R4	ROAD PLAN & PROFILES
XS5 - XS7	ACCESS ROAD CROSS SECTIONS
WA1 - WA3	WATER SERVICE PLAN & PROFILES
SA1 - SA3	SANITARY SERVICE PLAN & PROFILE
CU1 - CU3	CULVERTS PLAN & PROFILE
ST	STORM OUTLET PLAN & PROFILE
EC1 - EC2	EROSION CONTROL & SEDIMENT PLAN
DT1 - DT5	STANDARD DETAILS

90% PLANS  
NOT FOR CONSTRUCTION

ENGINEER'S CERTIFICATE

I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME  
OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY  
REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF  
WYOMING.



REVIEWED AND APPROVED PER LARAMIE COUNTY STANDARDS, AND ROAD STANDARDS	
LARAMIE COUNTY PUBLIC WORKS	DATE APPROVED

GENERAL NOTES:

1.

CONTRACTOR SHALL NOTIFY THE LARAMIE COUNTY PUBLIC WORKS DEPARTMENT PRIOR TO CONSTRUCTION TO NOTIFY WHEN CONSTRUCTION SHALL BEGIN.
2.

CONTRACTOR SHALL CONTACT THE LARAMIE COUNTY PUBLIC WORKS DEPARTMENT TO CONDUCT ALL NECESSARY INSPECTIONS WHICH INCLUDE BUT ARE NOT LIMITED TO: CULVERT INSTALLATIONS, PROOF ROLL INSPECTION FOR SUBGRADE AND BASE MATERIAL, ETC.
3.

CONTRACTOR SHALL SUPPLY THE FOLLOWING ITEMS TO THE LARAMIE COUNTY PUBLIC WORKS DEPARTMENT: 1) COMPACTION TEST RESULTS FOR SUBGRADE, BASE MATERIAL, ASPHALT (IF PLACED), BACKFILLING OF ALL CULVERTS, ETC. 2) COPIES OF WEIGH TICKETS FOR BASE MATERIAL AND ASPHALT ALONG WITH CALCULATIONS SHOWING THAT THE PROPER AMOUNT OF BASE MATERIAL AND ASPHALT MATERIAL WAS DELIVERED AND PLACED FOR ALL ROADWAYS FOR THE PROPER WIDTH, DEPTH, AND LENGTH OF ROADWAYS 3) SEED MIXTURE TICKETS AND TOTAL QUANTITY OF SEED PLACED IN THE DISTURBED AREA.
4.

CONTRACTOR SHALL NOTIFY THE LARAMIE COUNTY PUBLIC WORKS DEPARTMENT WHEN ALL ASSOCIATED WORK HAS BEEN COMPLETED SUCH THAT THE COUNTY CAN PERFORM A FINAL INSPECTION.
5.

ALL WORK SHOWN ON THESE CIVIL DRAWINGS WHETHER PUBLIC OR PRIVATE IMPROVEMENTS SHALL COMPLY WITH THE LARAMIE COUNTY SPECIFICATIONS AND THE PROJECT SPECIFICATIONS. IF CONFLICTS EXIST BETWEEN THE PROJECT SPECIFICATIONS AND/OR DRAWINGS, LARAMIE COUNTY PUBLIC WORKS DEPARTMENT SHALL MAKE ALL DECISIONS.
6.

ALL WORK IN RIGHT-OF-WAY SHALL CONFORM TO LARAMIE COUNTY CONSTRUCTION SPECIFICATIONS AND THE CONSTRUCTION PLANS IN THEIR ENTIRETY.
7.

ALL WORK IN THE RIGHT-OF-WAY REQUIRES A "RIGHT-OF-WAY CONSTRUCTION PERMIT". TWO SETS OF APPROVED PLANS SHALL ACCOMPANY RIGHT-OF-WAY PERMIT APPLICATION AS WELL AS TRAFFIC CONTROL PLAN. NO WORK IN THE RIGHT-OF-WAY SHALL BEGIN UNTIL PERMIT HAS BEEN APPROVED AND ISSUED.
8.

UPON COMPLETION OF CULVERT INSTALLATION & ACCEPTANCE, CONTRACTOR SHALL BLUETOP CENTERLINE SUBGRADE AT 50 FOOT SPACING. THE ROADWAY SHALL BE PROOF ROLLED AND ANY AREA DEEMED DEFICIENT OR SUBSTANDARD SHALL BE REWORKED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHAPING OF STREET CROWN, COMPACTING SUBGRADE TO 95% ASTM D698 AND MOISTURE CONTENT WITHIN -4% TO +2% OPTIMUM, PROOF ROLLING SUBGRADE WITH 25 TON LOADED DUMP TRUCK IN THE PRESENCE OF THE ENGINEER, NUCLEAR DENSITY AND MOISTURE CONTENT TESTS AT A FREQUENCY NO GREATER THAN 250 LF WITHIN THE TRAVEL LANES. SAID PROOF ROLL AND TESTING MUST BE COMPLETED PRIOR TO PLACEMENT OF CRUSHED BASE. 'PROOF ROLL' VEHICLES SHALL NOT TRAVEL AT SPEEDS GREATER THAN 3 M.P.H. ANY AREA DEEMED DEFICIENT OR SUBSTANDARD AND EXHIBITS EXCESSIVE PUMPING OR DEFORMATION SHALL BE REWORKED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER. ALL 'PROOF ROLLS' SHALL BE PERFORMED IN THE PRESENCE OF THE COUNTY INSPECTOR AND ENGINEER.
9.

PLEASE REFER TO OTHER REQUIREMENTS & SPECIAL CONDITIONS AS PROVIDED FOR IN THE "INVITATION TO BID" WHICH ARE HEREBY INCORPORATED HEREIN BY REFERENCE.
10.

PLEASE INCORPORATE ALL OTHER NOTES AS MAY BE PRESENTED WITHIN AND THROUGHOUT THIS PLAN SET AS SET FORTH HEREIN.
11.

PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A DETAILED WRITTEN CONSTRUCTION PLAN, TRAFFIC CONTROL PLAN AND CONSTRUCTION SCHEDULE TO BE APPROVED BY THE ENGINEER PRIOR TO THE PRE-CONSTRUCTION MEETING.
12.

THE CONTRACTOR SHALL PROVIDE A PROJECT SUPERINTENDENT ON-SITE AT ALL TIMES DURING CONSTRUCTION ACTIVITIES. THE SUPERINTENDENT SHALL BE RESPONSIBLE FOR, BUT NOT LIMITED TO THE FOLLOWING TASKS:

12.1.

MUST BE KNOWLEDGEABLE AND FAMILIAR WITH PLANS, SPECS, ADDENDUMS, AND SHOP DRAWINGS.

12.2.

MANAGE THE CONSTRUCTION ACTIVITIES OF ALL SUB-CONTRACTORS ON-SITE.

12.3.

REVIEW AND APPROVE SHOP DRAWINGS INCLUDING SUB-CONTRACTORS.

12.4.

REVIEW STAKEOUT DATA, SURVEY STAKES AND VERIFY AGAINST THE DESIGN PLANS PRIOR TO ASSOCIATED CONSTRUCTION ACTIVITY. IF A DISCREPANCY IS DISCOVERED, WORK IS TO STOP IMMEDIATELY UNTIL RESOLVED BY THE ENGINEER, AT NO ADDITIONAL COST TO THE OWNER.

12.5.

OBTAIN APPROVAL FROM THE OWNER/ENGINEER PRIOR TO BEGINNING ANY FORCE ACCOUNT EFFORTS.

12.6.

PROVIDE AN ACCURATE WEEKLY CONSTRUCTION SCHEDULE.

12.7.

AVAILABLE DURING NON-WORKING HOURS FOR EMERGENCIES AND OR STORMWATER MANAGEMENT EROSION CONTROL TIMES.

12.8.

SUBSTITUTION BY PERMISSION ONLY.
13.

THE CONTRACTOR SHALL HIRE AN INDEPENDENT REPUTABLE MATERIAL TESTING COMPANY FOR MATERIALS TESTING SOILS, BASE, AND ASPHALT COMPACTION AND PROVIDE COPIES OF ALL TESTS TO THE OWNER, ENGINEER AND COUNTY.
14.

THE OWNER'S SURVEYOR SHALL VERIFY PROJECT HORIZONTAL AND VERTICAL CONTROL WITH A LEVEL LOOP PRIOR TO BEGINNING ANY CONSTRUCTION WORK AND NOTIFY THE ENGINEER IS A DISCREPANCY IS FOUND.

STREET/SURFACING CONSTRUCTION NOTES:

1.

DESIGN SLOPES AND ELEVATIONS SHOWN IN STREET PROFILES ARE ALONG CENTERLINE OF STREET/PARKING LOT UNLESS INDICATED OTHERWISE.
2.

STATIONING SHOWN IN STREET PROFILES IS ALONG STREET CENTERLINE.
3.

SPOT ELEVATIONS ARE TO FINISHED GRADE.
4.

THE OWNER AND/OR THE ENGINEERS RESERVE THE RIGHT TO MAKE MINOR ADJUSTMENTS TO THE DESIGN IN THE FIELD AT NO ADDITIONAL COST TO THE OWNER.
5.

UPON COMPLETION OF CONSTRUCTION, THE SITE SHALL BE CLEANED AND RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED BEFORE CONSTRUCTION, OR TO THE GRADES AND CONDITION REQUIRED BY THESE PLANS.

GENERAL / GRADING NOTES:

1.

ALL STATIONING IS ALONG ROADWAY OR BASELINE CENTERLINE, UNLESS OTHERWISE NOTED.
2.

IN THE PLAN AND PROFILE SHEETS, LT. IS LEFT AND RT. IS RIGHT OF CENTERLINE LOOKING "UPSTATION" ALONG CENTERLINE.
3.

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION (HORIZONTAL AND VERTICAL) AND SIZE (OUTSIDE DIAMETER, ETC.) OF ALL EXISTING IMPROVEMENTS THAT MAY BE AFFECTED BY THE CONSTRUCTION WITHIN PROJECT LIMITS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO THE CONSTRUCTION OF IMPROVEMENTS THAT ARE AFFECTED BY INFORMATION THAT DIFFERS FROM THAT SHOWN ON THESE PLANS.
4.

ANY UTILITIES OR IMPROVEMENTS THAT ARE DISCOVERED DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE PLANS SHALL BE IMMEDIATELY BROUGHT TO THE ENGINEER'S ATTENTION.
5.

LOCATIONS OF POTENTIAL CONFLICT BETWEEN EXISTING UTILITIES AND NEW CONSTRUCTION SHALL BE POT-HOLED AND THE EXISTING IMPROVEMENT SHALL BE SURVEYED. THE SURVEY RESULTS SHALL BE PRESENTED TO THE OWNER & AVI AND ANY DESIGN CHANGES WILL TAKE UP TO 5 WORKING DAYS TO RETURN TO THE CONTRACTOR.
6.

THE CONTRACTOR SHALL NOT OPERATE ANY FACILITIES OWNED BY ANY UTILITY.
7.

THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, SIGNS, BARRICADES, FLAG PERSONS, OR OTHER DEVICES NECESSARY TO PROVIDE FOR PUBLIC SAFETY, IN ACCORDANCE WITH LARAMIE COUNTY AND/OR THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
8.

THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS AS NOTED PRIOR TO COMMENCEMENT OF ANY WORK ON THE PROJECT.
9.

THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF AS-BUILT RECORD DRAWINGS TO THE OWNER AT THE END OF THE PROJECT PRIOR TO FINAL PAYMENT. THE DRAWINGS SHALL BE COMPLETE WITH DETAILS, DIMENSIONS, AND ELEVATIONS OF ALL INSTALLATIONS VARYING FROM THESE PLANS (SEE CONTRACTOR'S AS-BUILT DRAWING NOTES, THIS SHEET).
10.

OWNER - 1 SET  
ENGINEER - 1 SET
10.

ANY DAMAGE TO ANYTHING OUTSIDE THE CONSTRUCTION LIMITS OR INTENTS SHALL BE REPAIRED OR REPLACED PER COUNTY STANDARDS AND SPECIFICATIONS AT NO COST TO THE OWNER.
11.

THE CONTRACTOR SHALL CONTROL STORMWATER RUNOFF, DUST AND MUD FROM ALL CONSTRUCTION ACTIVITIES PER STATE AND FEDERAL REQUIREMENTS, INCLUDING ACCESS ROADS THROUGHOUT CONSTRUCTION.
12.

QUALITY ASSURANCE MATERIAL TESTING FOR SOILS, BASE, AND ASPHALT WILL BE PERFORMED BY AN INDEPENDENT TESTING LAB, HIRED BY THE CONTRACTOR, FOR VERIFICATION OF CONTRACTOR'S COMPLIANCE. THE CONTRACTOR IS NOT RELIEVED FROM COMPLYING WITH ALL APPLICABLE SPECIFICATIONS. ANY RETESTS REQUIRED WILL BE PAID FOR BY THE CONTRACTOR. SEE NOTE 4. OF GENERAL NOTES FOR TESTING REQUIREMENTS.
13.

THE CONTRACTOR IS RESPONSIBLE FOR CONTINUOUS STORMWATER MANAGEMENT, SEDIMENT, EROSION CONTROL AND FULL REHABILITATION OF ALL DAMAGED IMPROVEMENTS, INCLUDING CULVERTS TO ORIGINAL OR BETTER CONDITION. AFTER A STORM EVENT, ALL STANDING WATER SHALL BE PUMPED OUT TO PROTECT ROADWAY SUBGRADE.
14.

GRADE ALL WORK AREAS TO MAINTAIN POSITIVE SURFACE DRAINAGE DURING THE WORK.
15.

ALL REMOVED MATERIALS (UNSUITABLE SOIL, EXCESS MATERIAL, ROCK MATERIAL, STRUCTURES, PIPE, ETC.) SHALL BE PROPERLY DISPOSED OF, OFF SITE, AT THE CONTRACTOR'S EXPENSE UNLESS DESIGNATED OTHERWISE.
16.

AVI & THE OWNER ARE NOT A GUARANTOR OF THE CONSTRUCTING CONTRACTOR'S OBLIGATION AND PERFORMANCE OF WORK.
17.

AVI & THE OWNER ARE NOT RESPONSIBLE FOR SAFETY, IN, ON, OR ABOUT THE PROJECT SITE, NOR FOR COMPLIANCE BY THE APPROPRIATE PARTY OF ANY REGULATIONS THERETO.
18.

AVI & THE OWNER EXERCISE NO CONTROL OF THE SAFETY OR ADEQUACY OF ANY EQUIPMENT, BUILDING COMPONENTS, SCAFFOLDING, FORMS, OR OTHER WORK AIDS USED IN OR ABOUT THE PROJECT, OR IN THE SUPERVISION OF THE SAME.
19.

ALL NOTES AND REQUIREMENTS IDENTIFIED IN THE BID PACKAGE ARE APPLICABLE AND PART OF THE ENTIRE CONSTRUCTION DOCUMENTS.
20.

EMBANKMENTS CONSTRUCTED FOR THE PURPOSE OF STORMWATER CONTROL SHALL BE PLACED IN 8" MAXIMUM LIFTS COMPACTED TO 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT OF ± 2% OPTIMUM.
21.

THERE SHALL BE NO EARTH DISTURBING ACTIVITIES OUTSIDE THE LIMITS DESIGNATED ON THESE PLANS.
22.

TOPSOIL SHALL BE REMOVED AND STOCKPILED PRIOR TO ROADWAY GRADING ACTIVITIES.
23.

A WATER TRUCK SHALL BE KEPT ON-SITE AT ALL TIMES DURING EARTHWORK ACTIVITIES FOR DUST ABATEMENT.

PIPE CULVERT CONSTRUCTION NOTES:

1.

ALL CULVERT PIPE SHALL BE OF THE TYPE AND SIZE INDICATED ON THE PLANS.
2.

ALL LENGTHS OF STORM SEWER LINE SHOWN ARE HORIZONTAL DISTANCES.
3.

TRENCHES SHALL BE DEWATERED CONTINUOUSLY WHILE INSTALLATION IS IN PROGRESS. DEWATERING SHALL BE SUBSIDIARY TO OTHER CONTRACT PAY ITEMS
4.

THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ANY EXISTING UTILITIES THAT CONFLICT WITH NEW UTILITIES OR THAT ARE DESIGNATED FOR REMOVAL ON THE PLANS.

DRAWING SCALE NOTE:

1.

DRAWING SCALES ARE BASED ON 22"X34" (FULL SIZE) OR 11"X17" (HALF SIZE)
2.

DIMENSIONS FOR LAYOUT AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWING. IF PERTINENT DIMENSIONS ARE NOT SHOWN, CONTACT THE ENGINEER FOR CLARIFICATION, AND ANNOTATE THE DIMENSION ON THE AS-CONSTRUCTED RECORD DRAWINGS.

UTILITY LOCATION NOTES:

1.

CALL FOR UTILITY LOCATES 48 HOURS BEFORE DIGGING IN THE CONSTRUCTION SITE: DIAL 811
2.

UTILITY OWNER REPRESENTATIVE SHALL BE PRESENT FOR ALL UTILITY POT HOLING ACTIVITIES
3.

CONTRACTOR IS RESPONSIBLE FOR NOTING ALL UTILITY LOCATIONS ON THE AS-BUILT SET OF DRAWINGS IF THE DOCUMENTS ARE NOT ACCURATE
4.

THE CONTRACTOR SHALL VERIFY ALL ABANDONED UTILITIES IN THE PROJECT PRIOR TO BEGINNING CONSTRUCTION.

PERMITS & FEES REQUIRED:

PERMITS & ASSOCIATED FEES REQUIRED TO BE OBTAINED BY THE CONTRACTOR FOR THIS PROJECT MAY INCLUDE, BUT MAY NOT BE LIMITED TO THE FOLLOWING:

GRADING PERMIT & FEES - BY CONTRACTOR TO LARAMIE COUNTY  
DUST CONTROL PLAN BY CONTRACTOR WITH APPROVAL BY COUNTY.  
RIGHT-OF-WAY PERMIT: BY CONTRACTOR  
CONSTRUCTION WATER: CONTRACTOR SOURCE  
STORM WATER POLLUTION PLAN AND PERMIT TO DISCHARGE FROM DEQ.  
PLAN REVIEW FEES - BY OWNER.  
APPROVED PERMIT: BY CONTRACTOR.

CONTRACTOR'S AS-BUILT DRAWING NOTES:

1.

THE CONTRACTOR SHALL PROVIDE, AT THE COMPLETION OF THE PROJECT OR EACH PHASE OF THE PROJECT AND PRIOR TO FINAL PAYMENT, A COMPLETE SET OF REPRODUCIBLE "AS-BUILT" DRAWINGS TO THE OWNER PRIOR TO FINAL PAYMENT. THE AS-BUILT DRAWINGS WILL CONSIST OF A MARKED-UP SET OF "ISSUED FOR CONSTRUCTION" DRAWINGS VERIFYING THE FOLLOWING:

1.1.

ALL LENGTHS, SIZES AND MATERIAL OF INSTALLED PIPE, AND ANY OTHER IMPROVEMENT.

1.2.

INVERT ELEVATION OF EACH PIPE.

1.3.

SLOPE OF STORM PIPES.

1.4.

ANY OTHER VARIATIONS FROM THE CONSTRUCTION DOCUMENTS MUST BE CLEARLY NOTED AND DETAILED ON THE PLANS.
2.

THE FINAL AS-BUILT DRAWING CERTIFICATE SHALL BE SIGNED ON EACH SHEET BY THE CONTRACTOR OR SUBCONTRACTOR RESPONSIBLE FOR THE WORK.
3.

CONTRACTOR AS-BUILT DRAWINGS WILL BE DUE PRIOR TO SUBMITTING THE FINAL PAY REQUEST. NON-CONFORMING AS-BUILT DRAWINGS WILL BE RETURNED TO THE CONTRACTOR FOR REVISIONS AND RESUBMITTAL. FINAL PAYMENT WILL NOT BE ISSUED UNTIL THE OWNER HAS REVIEWED AND APPROVED THE AS-BUILT DRAWINGS.
4.

ASBUILT UPDATES ARE TO BE SUBMITTED WITH MONTHLY INVOICES TO ENSURE TIMELY TURNAROUND AFTER COMPLETION

SANITARY SEWER SERVICE CONSTRUCTION NOTES:

1.

JET CLEAN, PRESSURE TEST, MANDREL AND VAC TEST MANHOLES, VIDEO INSPECTION FOR SANITARY SEWER PIPE, INCLUDING SERVICE LINES AND STRUCTURES IS TO BE PERFORMED PER THE SPECIFICATIONS. WRITTEN TEST REPORTS ARE TO BE PROVIDED TO THE OWNER FOR ALL PRESSURE TESTS. THIS WORK SHALL BE SUBSIDIARY TO OTHER SANITARY SEWER PAY ITEMS.
2.

THE CONTRACTOR SHALL INSTALL TEMPORARY PLUGS IN THE MANHOLES AT THE POINTS OF CONNECTION TO THE EXISTING SEWER SYSTEM. PLUGS SHALL REMAIN IN PLACE UNTIL CONSTRUCTION ACCEPTANCE IS ISSUED, AT WHICH TIME THEY SHALL BE REMOVED BY THE CONTRACTOR.
3.

CONTRACTOR TO CHECK SURVEY GRADE STAKES OF SEWER LINES AND VERIFY AGAINST PLANS PRIOR TO INSTALLATION. ALL SEWER LINES TO BE INSTALLED USING LASER GRADE CONTROL DEVICE.
4.

TRENCHES SHALL BE DEWATERED CONTINUOUSLY WHILE INSTALLATION IS IN PROGRESS. DEWATERING SHALL BE SUBSIDIARY TO OTHER CONTRACT PAY ITEMS.
5.

DENSITY COMPACTION TESTS OF THE SOIL SHALL BE TAKEN ALONG TRENCH AT SEVERAL DEPTHS. COMPACTION EQUIPMENT FOR CONFINED SPACES SUCH AS A 'JUMPING JACK' OR EQUIVALENT PRODUCING 650 BLOWS/MIN, AND 59 LBS/BLOW SHALL BE USED AROUND MANHOLE FOR COMPACTION EFFORTS. THIS SHALL BE DONE FROM THE BOTTOM OF THE TRENCH TO THE FINISH GRADE IN 1 FOOT LIFTS.
6.

SEWER SERVICE IS 4" SDR 35 PVC UNLESS OTHERWISE NOTED.
7.

THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ANY EXISTING UTILITIES THAT CONFLICT WITH NEW UTILITIES OR THAT ARE DESIGNATED FOR REMOVAL ON THE PLANS.

WATER SERVICE & FIRE LINE CONSTRUCTION NOTES:

1.

DR14 C900 SHALL BE USED FOR 6" SERVICE LINE.
2.

CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING CONNECTIONS TO EXISTING WATER MAINS.
3.

TRENCHES SHALL BE DEWATERED CONTINUOUSLY WHILE INSTALLATION IS IN PROGRESS. DEWATERING SHALL BE SUBSIDIARY TO OTHER CONTRACT PAY ITEMS
4.

CONTRACTOR IS RESPONSIBLE FOR SETTING ALL WATER SERVICE LINES TO THE REQUIRED FINISH GRADE. CONTRACTOR IS RESPONSIBLE FOR ORDERING THE CORRECT BENDS AND PROVIDING APPROPRIATE FITTINGS TO ARRIVE AT THE CORRECT GRADE. ALL ACTIVITIES AND MATERIALS ASSOCIATED WITH THIS SHALL BE SUBSIDIARY TO THE INDIVIDUAL PAY ITEM. ANY DISTURBANCE TO YARDS, SOD, FENCES, SPRINKLER SYSTEMS, LANDSCAPING, PLANTINGS, SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER.

DATE

REVISION

NO.

PREPARED FOR:

HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:

CYS07 STAGING AREA

DRAWING TITLE:

GENERAL NOTES

vi

45

YEARS

ENGINEERING PLANNING SURVEYING

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:

Dec 17, 2025

DRAWN BY:

CK

DESIGNED BY:

CK

CHECKED BY:

TC

JOB NO.:

5016

DWG NO.

2

OF

GRADING SUMMARY	
DESCRIPTION	CY
UNCLASSIFIED EXCAVATION (CUT) (ORIGINAL GROUND TO FINISH GRADE)	43,587
FILL (ORIGINAL GROUND TO FINISH GRADE WITH 15% SHRINK)	66,465
TOTAL SURFACING VOLUME	19,363
NET BALANCE	3,515

SURFACING SUMMARY						
UNITS	SY					
ITEMS	4" CONCRETE	6" CONCRETE	6" BASE	4" BASE	4" ASPHALT	3" ASPHALT
QUANTITY	1128	780	78972	10476	37771	7680
TOTAL	1128	780	78972	10476	37771	7680

WATER LINE SUMMARY									
WATER SHEETS	LF	EA		LF	EA				
	WATER SERVICE HDPE	GATE VALVE	TAPPING SADDLE	FIRE LINE C900 DR14	GATE VALVE	BLOW-OFF HYDRANT	FIRE HYDRANT ASSEMBLY	11.25 HORIZ. BEND	11.25 VERT. BEND
-	2"	2"	1"	6"	6"	-	6"	6"	6"
WA1	472	1	13	-		1	-	-	-
WA2	264	1	-	-	-	-	-	-	-
WA3	-		-	466	2	-	1	2	4
TOTAL	736	2	13	466	2	1	1	2	4

SANITARY SEWER SUMMARY		
SANITARY SHEETS	LF	EA
	SANITARY SEWER SDR-35 PVC	SERVICE CONNECTIONS
	4"	4"
SA1	515	9
SA2	314	4
SA3	247	-
SERVICE CONNECTIONS	87	-
TOTAL	1163	13

- GRADING NOTES:
- 1) THE CONTRACTOR SHALL COMPLETE THEIR OWN EARTHWORK VOLUME CALCULATIONS. IF SIGNIFICANT DISCREPANCIES ARE FOUND, THEY SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER.
  - 2) PAYMENT FOR ALL GRADING EARTHWORK SHALL BE MADE UNDER THE "UNCLASSIFIED EXCAVATION (CUT)" BID ITEM. THE OVERLOT GRADED SITE WILL BE GPS SURVEYED BY THE OWNER. FINAL EARTHWORK VOLUMES SHALL BE MADE BY COMPARISON OF THE OF STRIPPED VS. OVERLOT GRADED SURFACE.
  - 3) CONSTRUCTION WATER FOR EARTHWORK EFFORTS SHALL BE CONSIDERED SUBSIDIARY TO THE UNCLASSIFIED EXCAVATION-OVERLOT GRADING (CUT) BID ITEM.
  - 4) GRADING QUANTITIES ARE BASED ON OG TIN MINUS 4 INCHES TO SUBGRADE OF ROADWAY.

STORM SEWER SUMMARY		
STORM SHEETS	LF	EA
CU1	18" CMP	18" CMP FES
	146	2
	24" CMP	24" CMP FES
	62	2
CU2	36" CMP	36" CMP FES
	58	2
	18" CMP	18" CMP FES
	55	2
CU3	18" CMP	18" CMP FES
	102	2
CU4	24" CMP	24" CMP FES
	128	4
ST	18" RCP	18" RCP FES
	50	1
TOTAL	601	15

- STORM SEWER NOTES:
- 1) ALL STORM SEWER JOINTS SHALL BE GASKETED.
  - 2) CONSTRUCTION DEWATERING SHALL BE CONSIDERED SUBSIDIARY TO STORM SEWER BID ITEMS.

- WATER NOTES:
- 1) NEW WATER VALVE ADJUSTMENT TO FINISH GRADE, SAWCUTTING, VALVE BOX EXTENSIONS, CONCRETE COLLAR, SHALL BE SUBSIDIARY TO THE WATER VALVE BID ITEM.
  - 2) VALVE BOX ADJUSTMENTS TO FINISH GRADE SHALL BE COMPLETED WITHIN 30 DAYS OF PAVING EFFORTS.
  - 3) ANY CONSTRUCTION DE-WATERING SHALL BE CONSIDERED SUBSIDIARY TO WATER SERVICE BID ITEM.
  - 4) RESTRAINT BLOCKS AND THRUST BLOCKS ARE CONSIDERED SUBSIDIARY TO FITTING BID ITEMS.
  - 5) CLEAN SUITABLE SPOIL MATERIAL SHALL REMAIN ONSITE AND BE USED FOR FILL.

- SANITARY SEWER NOTES:
- 1) ANY CONSTRUCTION DE-WATERING SHALL BE CONSIDERED SUBSIDIARY TO SANITARY SEWER SERVICE PVC SDR 35 - 4" BID ITEM.

DATE

REVISION

NO.

90% PLANS

NOT FOR CONSTRUCTION

PREPARED FOR:

HENSEL PHELPS

12121 GRANT ST, SUITE 410

THORNTON, CO 80241

PROJECT:

CYS07 STAGING AREA

DRAWING TITLE:

SUMMARIES

avi

45

YEARS

ENGINEERING · PLANNING · SURVEYING

307.637.6017

1103 OLD TOWN LANE, SUITE 101

CHEYENNE, WY 82009

AVI@AVIPC.COM

DATE PLOTTED:

Dec 17, 2025

DRAWN BY:

CK

DESIGNED BY:

CK

CHECKED BY:

TC

JOB NO.:

5016

DWG NO.

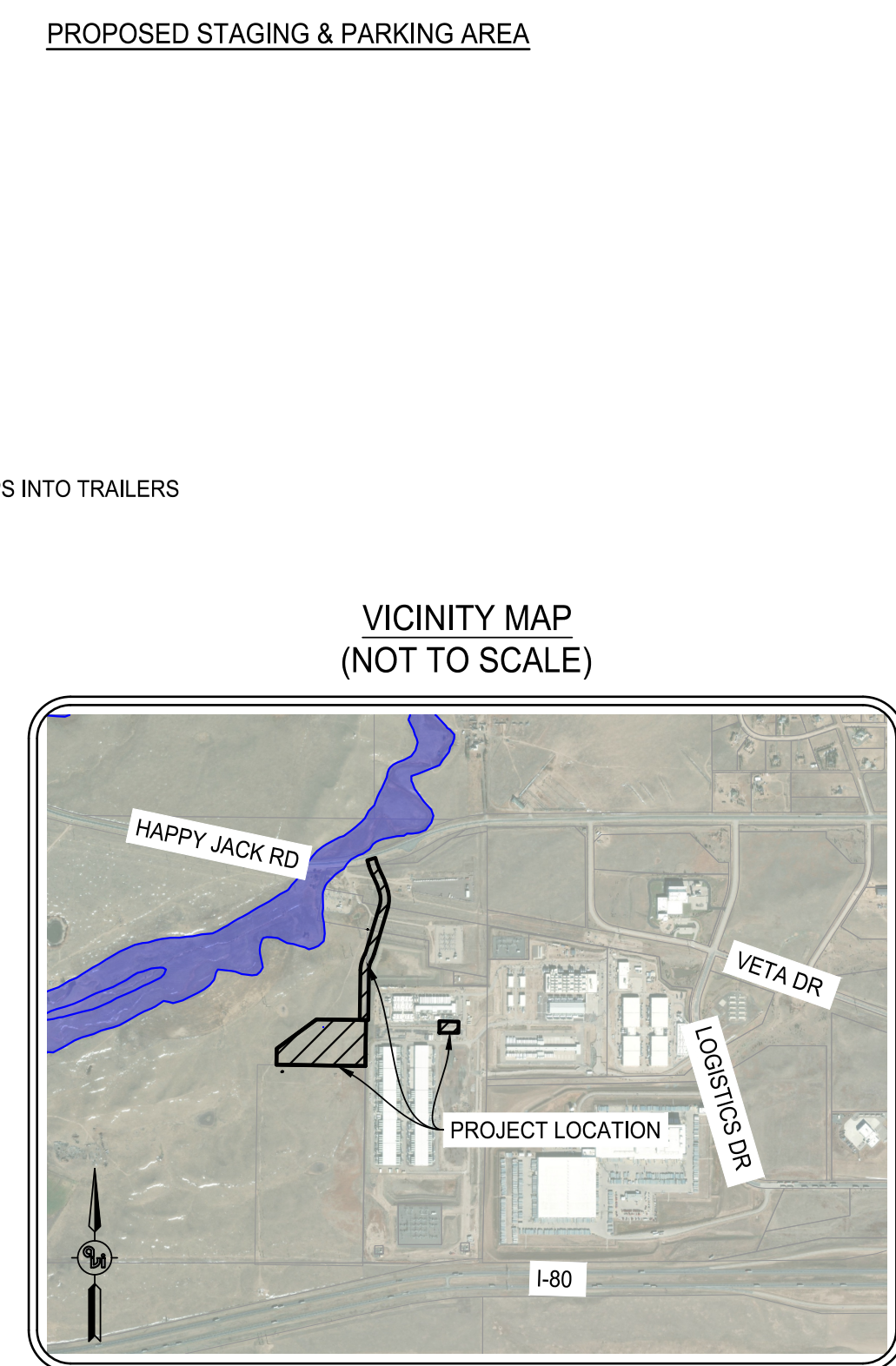
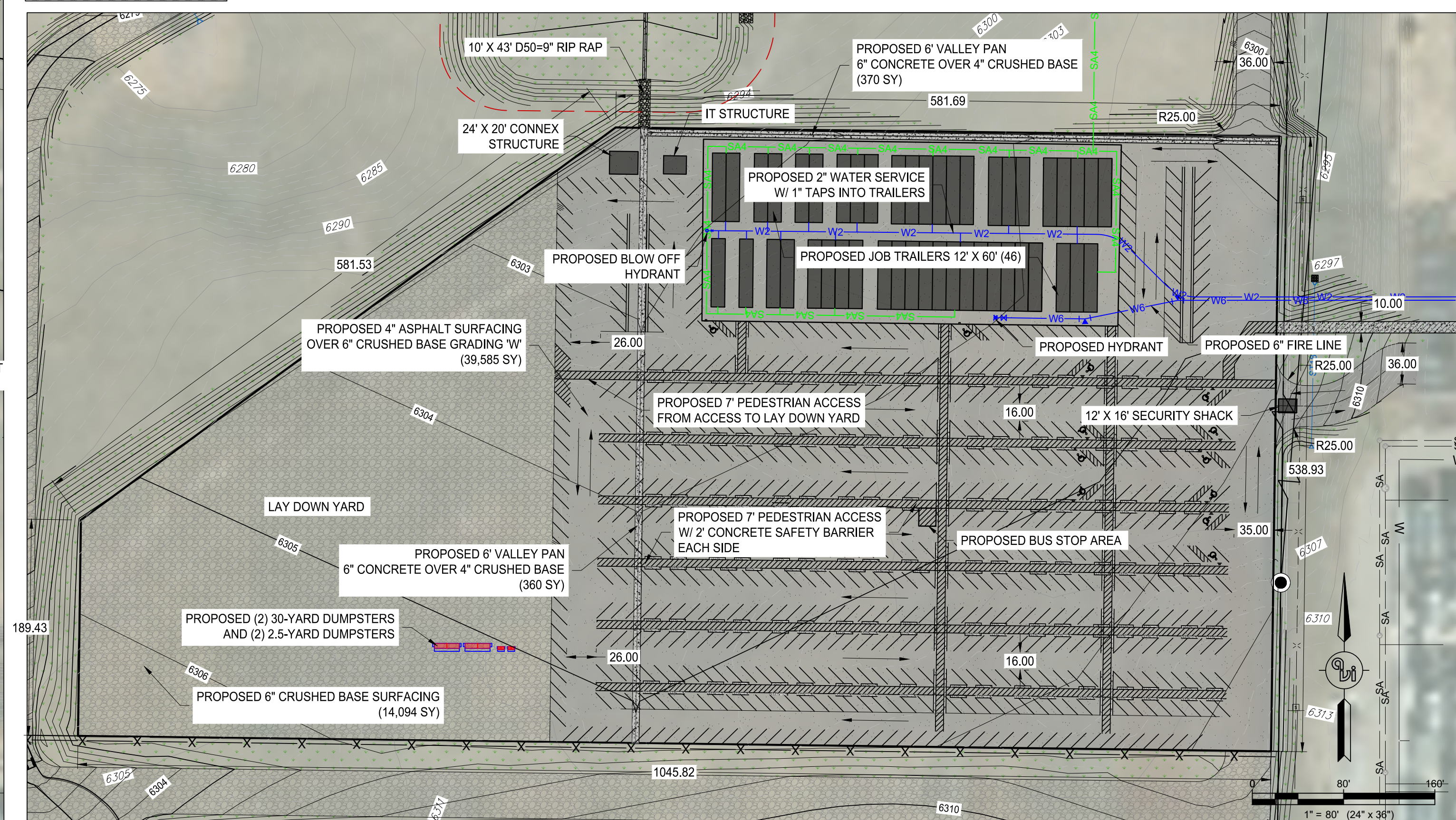
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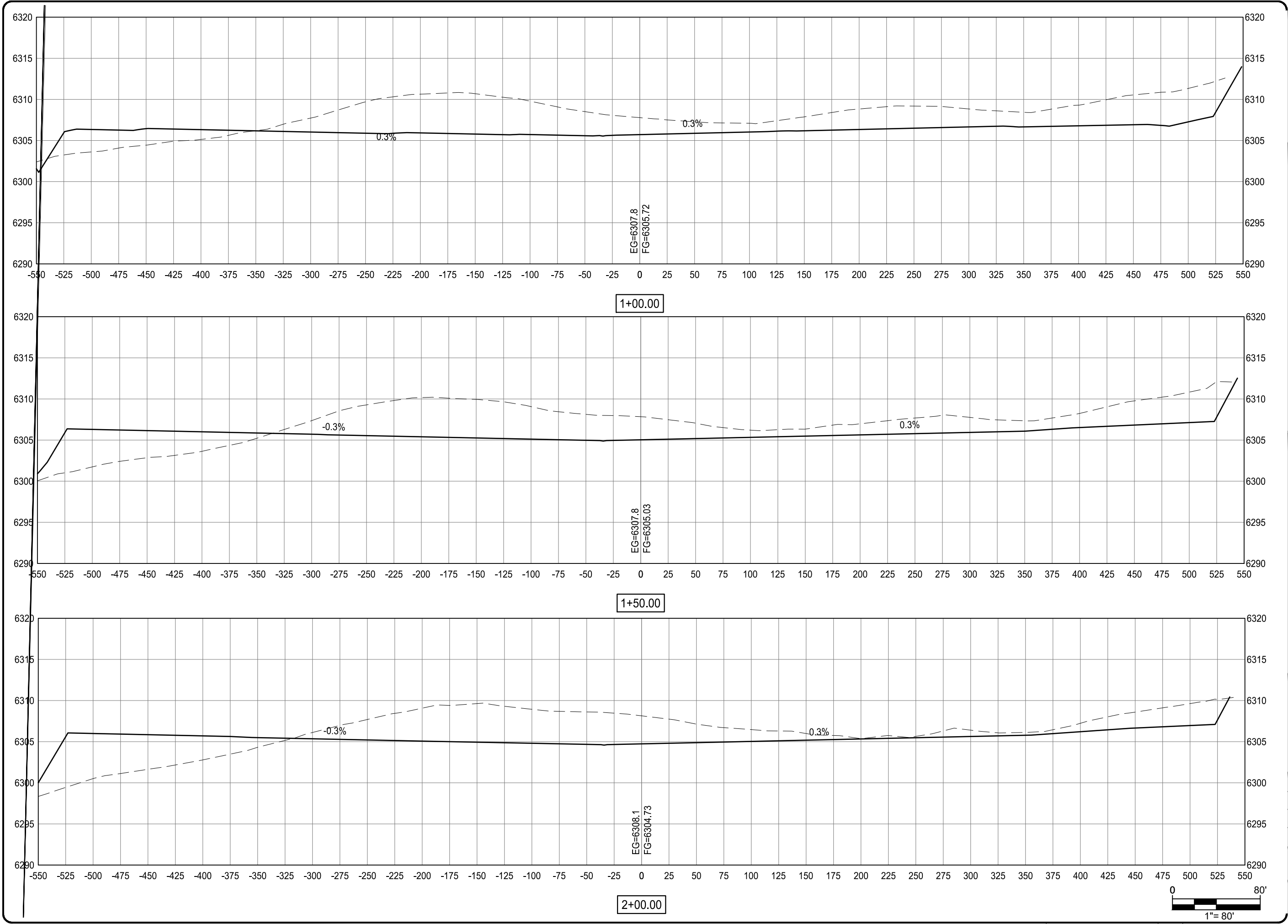
**SITE PLAN  
FOR  
CYS07 STAGING AREA**  
A PARCEL OF LAND BEING SITUATED IN  
THE SW<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub> OF SECTION 5, T13N,  
R67W OF THE 6TH PRINCIPAL MERIDIAN,  
CHEYENNE, WYOMING  
PREPARED DECEMBER 2025

PROJECT:		NO.	REVISION	DATE
CYS07 STAGING AREA				
DRAWING TITLE:		PREPARED FOR:		
SITE PLAN		HENSEL PHELPS 12121 GRANT ST, SUITE 410 THORNTON, CO 80241		
 ENGINEERING PLANNING SURVEYING		307.637.6017 1103 OLD TOWN LANE, SUITE 101 CHEYENNE, WY 82009 AVI@AVIPC.COM		
DATE PLOTTED:		Dec 18, 2025		
DRAWN BY:		CK		
DESIGNED BY:		CK		
CHECKED BY:		TC		
JOB NO.:		5016		










NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
SITE CROSS SECTIONS



307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

DRAWN BY:  
CK

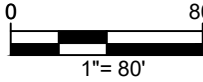
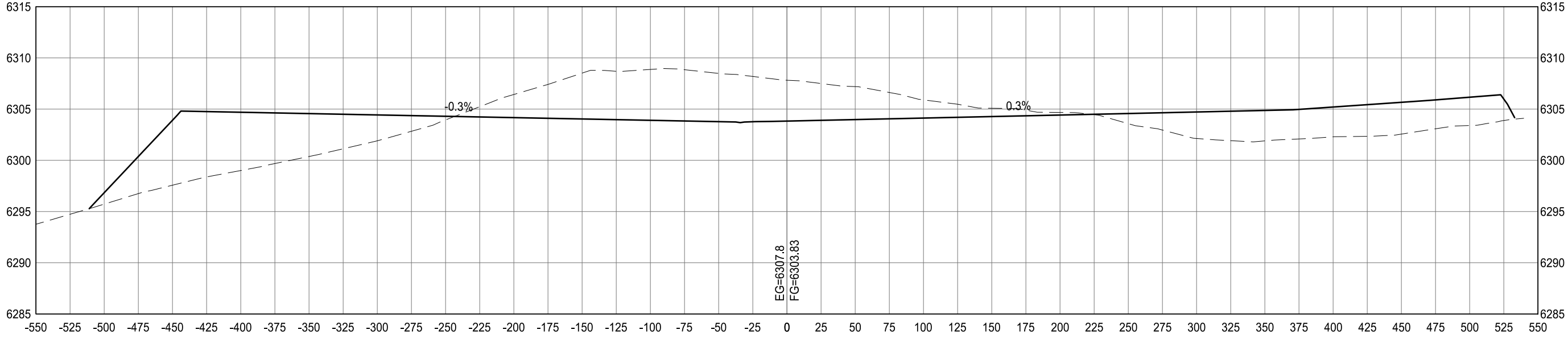
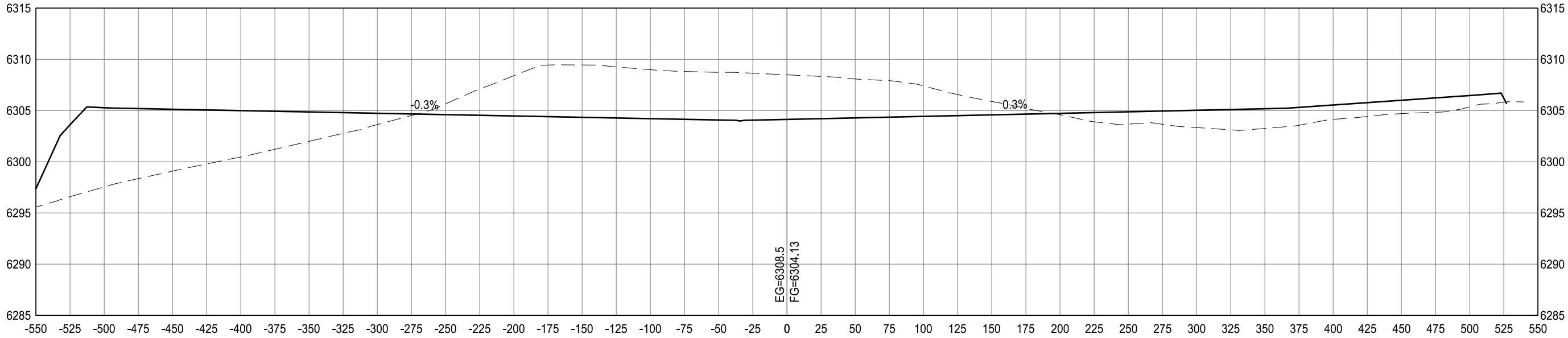
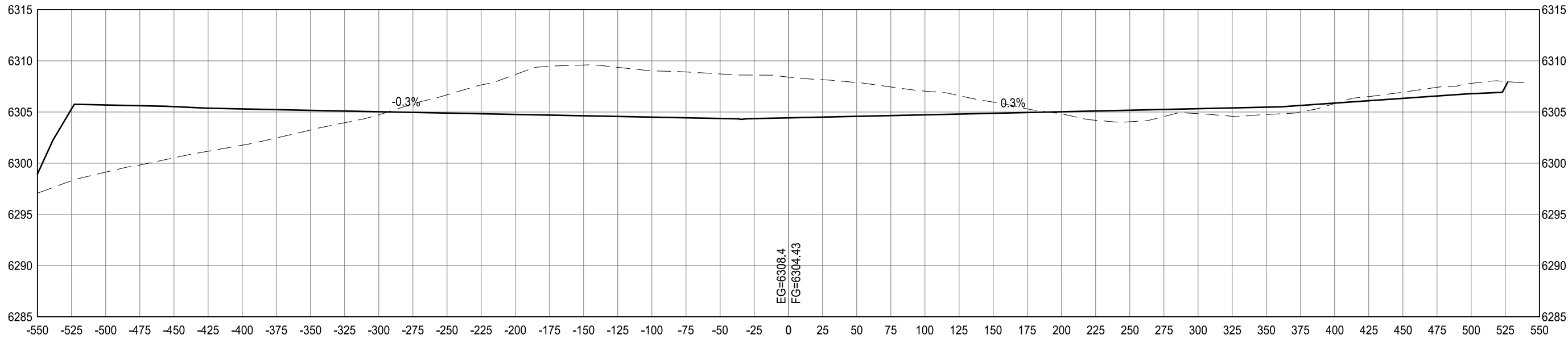
DESIGNED BY:  
CK

CHECKED BY:  
TC

JOB NO.:  
5016

DWG NO. XS1 OF





NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

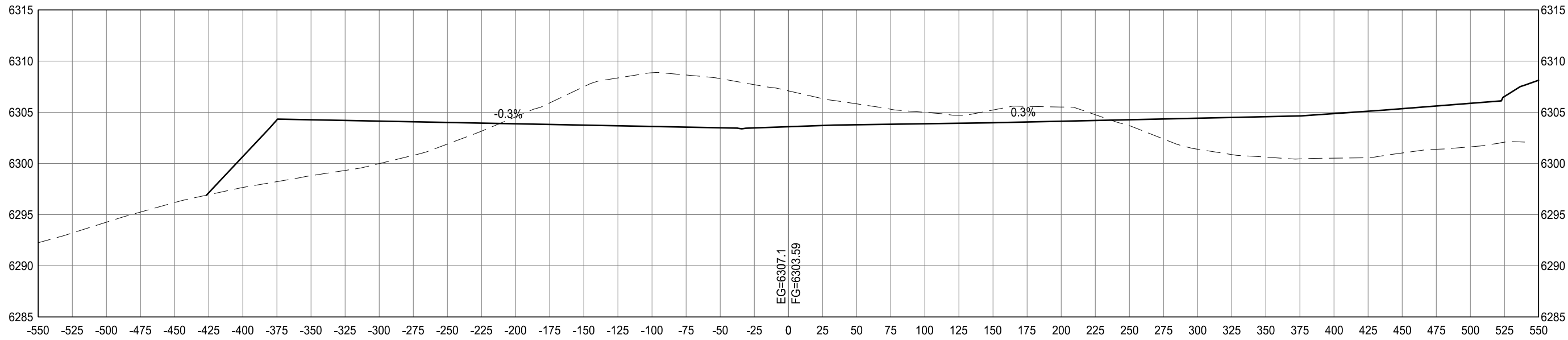
DRAWING TITLE:  
SITE CROSS SECTIONS



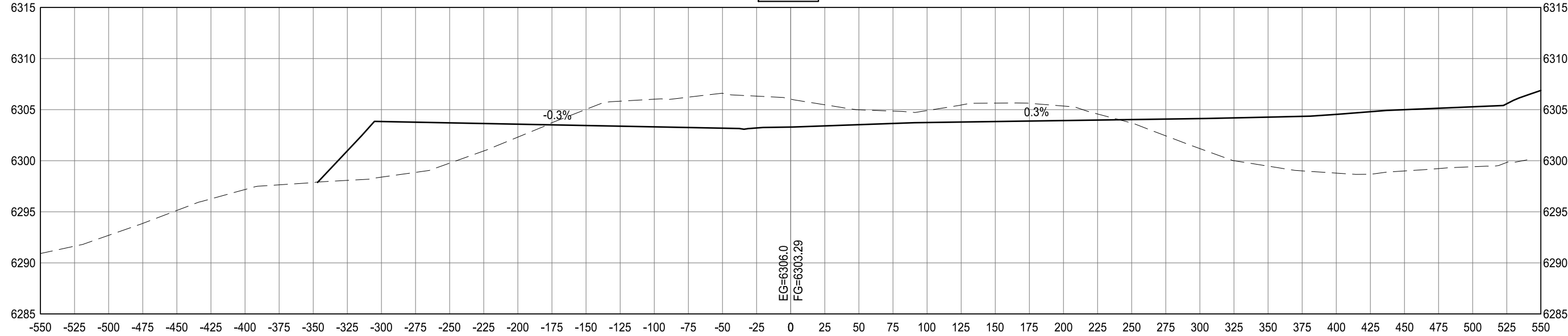
DATE PLOTTED:	Dec 17, 2025
DRAWN BY:	CK
DESIGNED BY:	CK
CHECKED BY:	TC

JOB NO.:  
5016

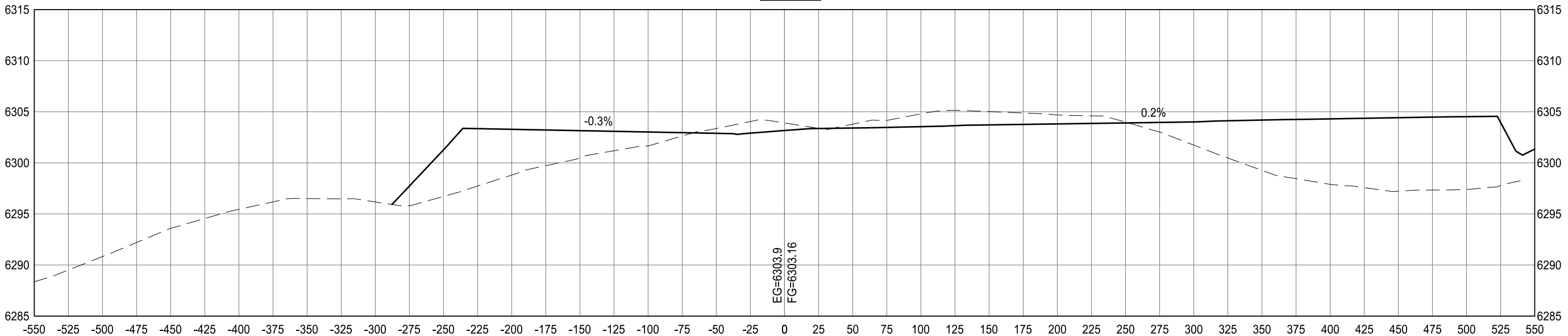
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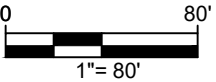
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4+50.00



5+00.00



NO.	REVISION	DATE

90% PLANS  
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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
SITE CROSS SECTIONS



307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

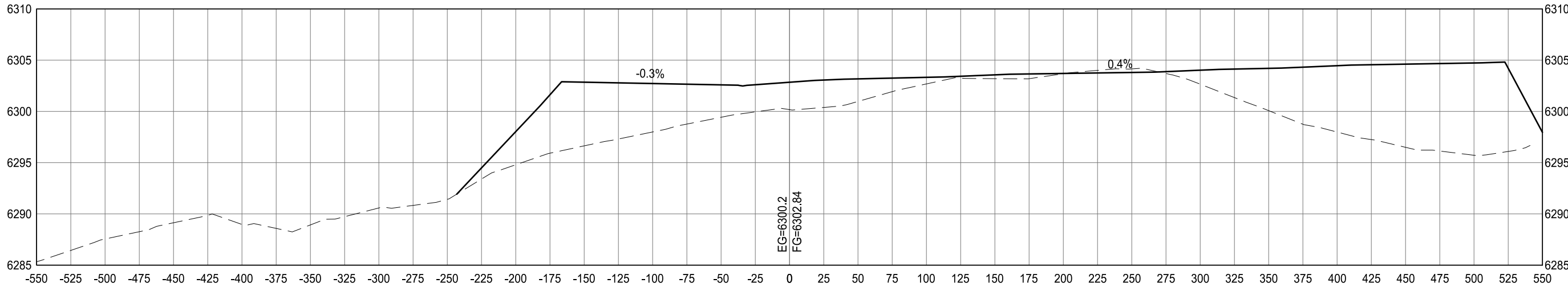
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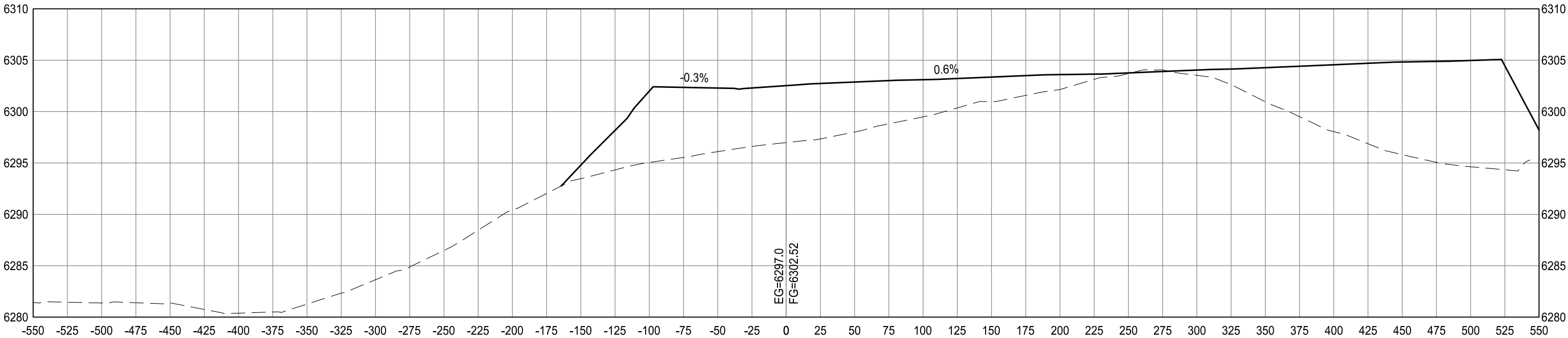
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JOB NO.: 5016

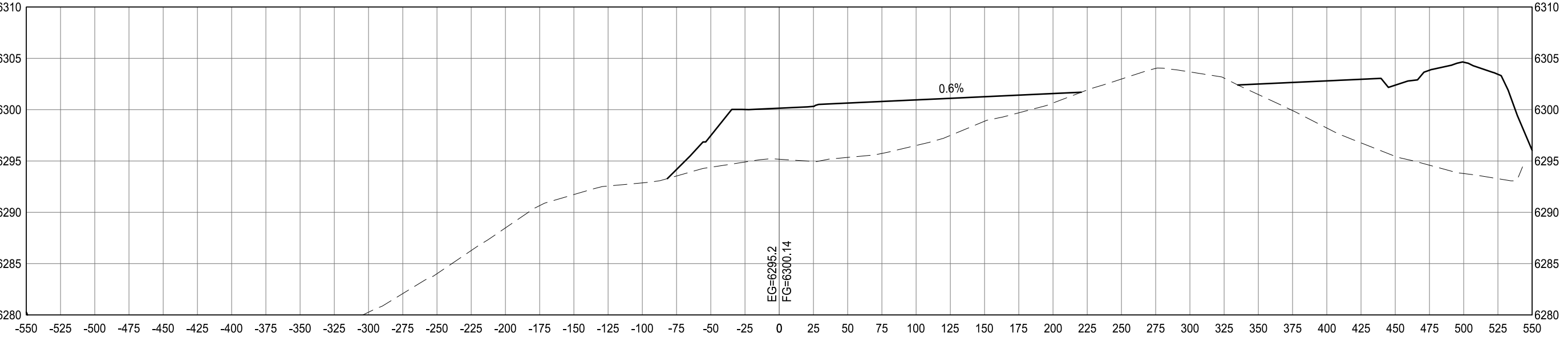
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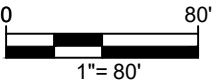
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6+00.00



6+50.00



NO.	REVISION	DATE

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NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
SITE CROSS SECTIONS



307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

DRAWN BY: CK

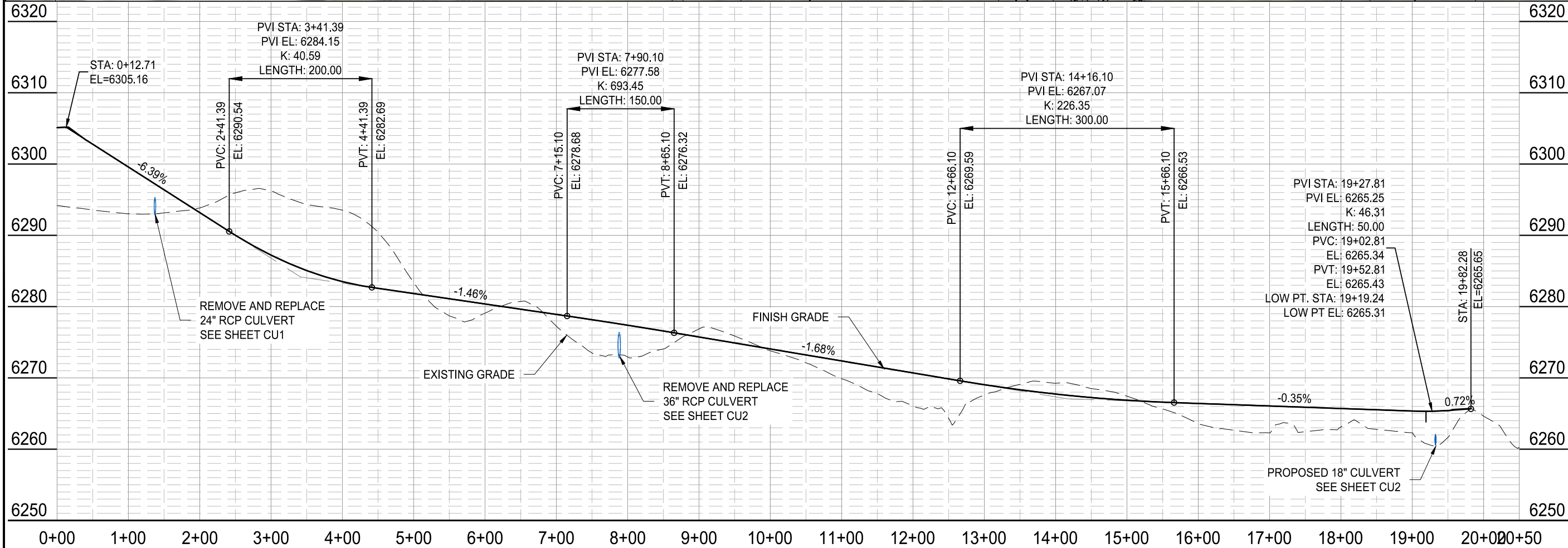
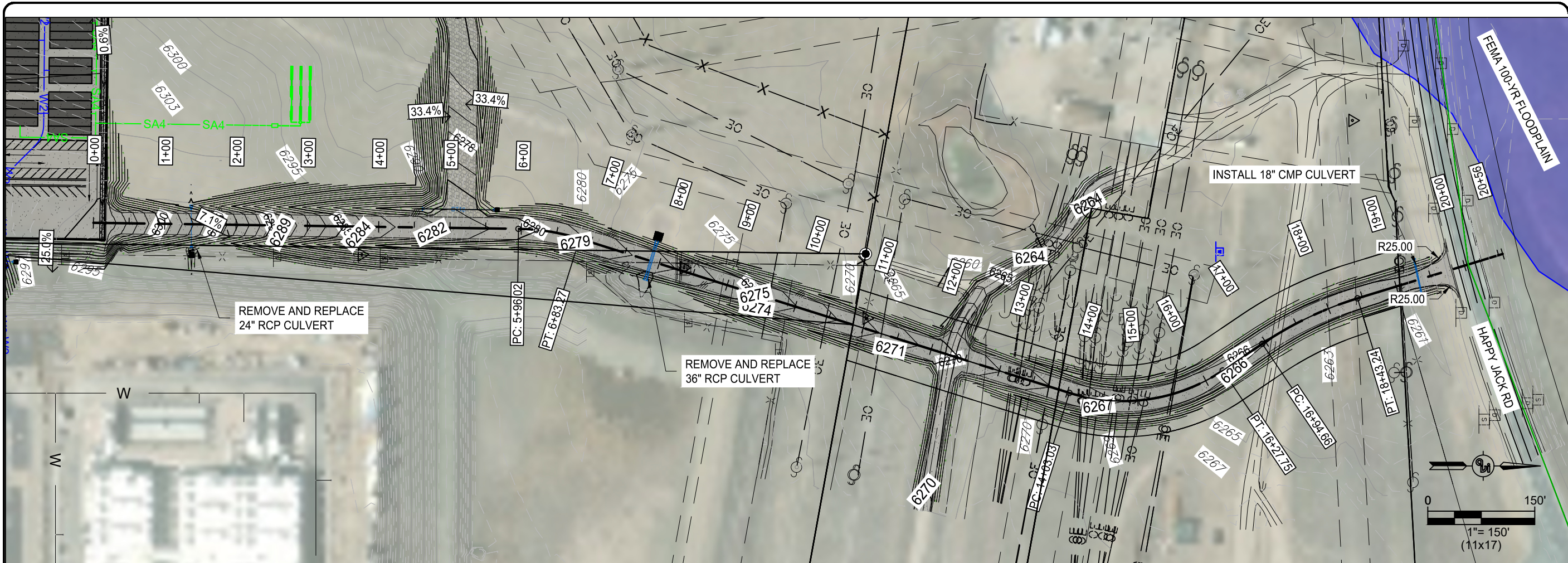
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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
HAPPY JACK RD ACCESS PLAN & PROFILE

387.637.6817  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

DRAWN BY:  
CK

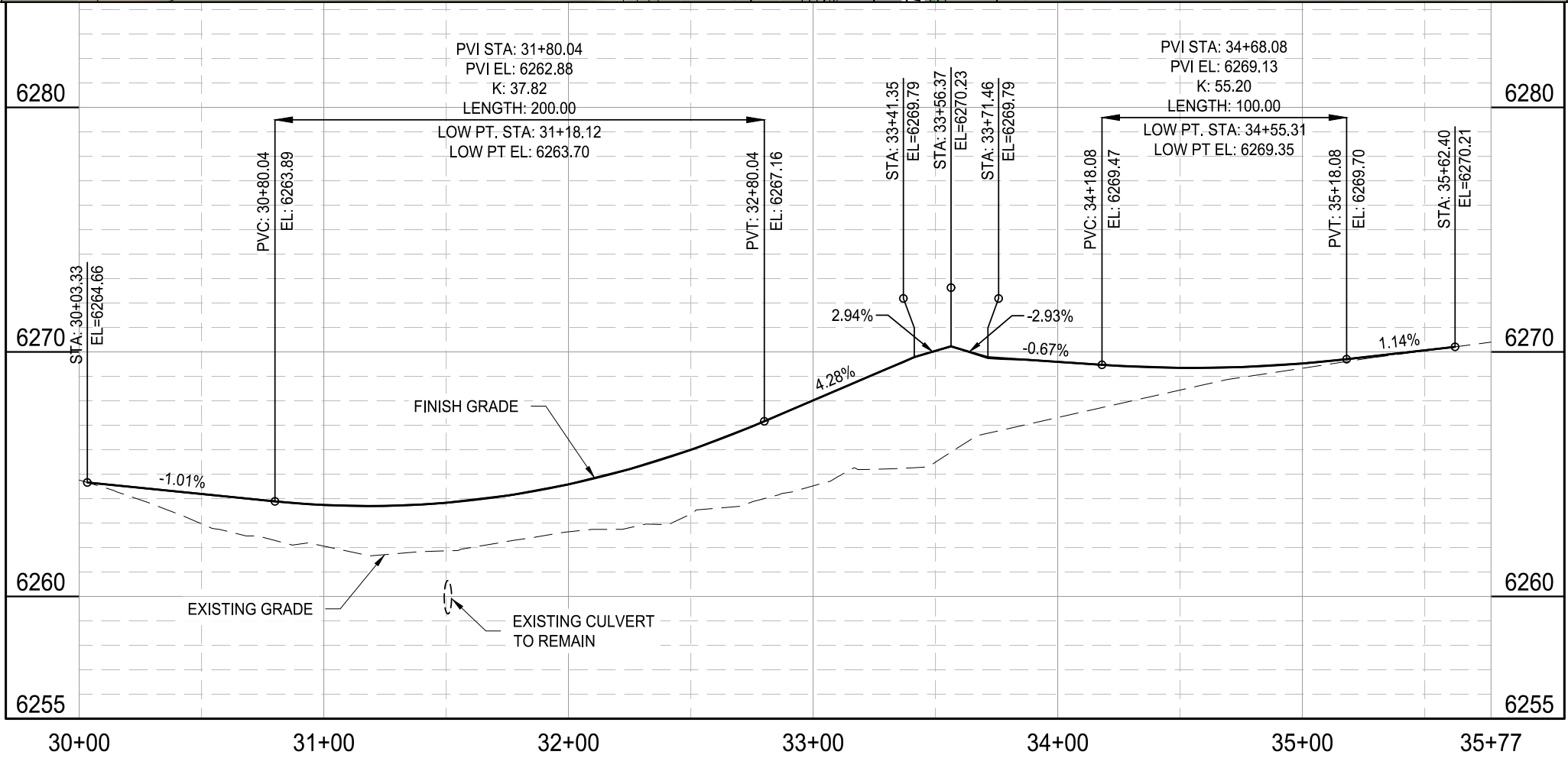
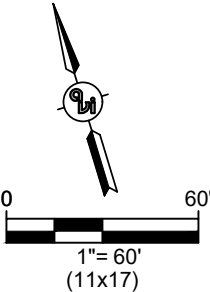
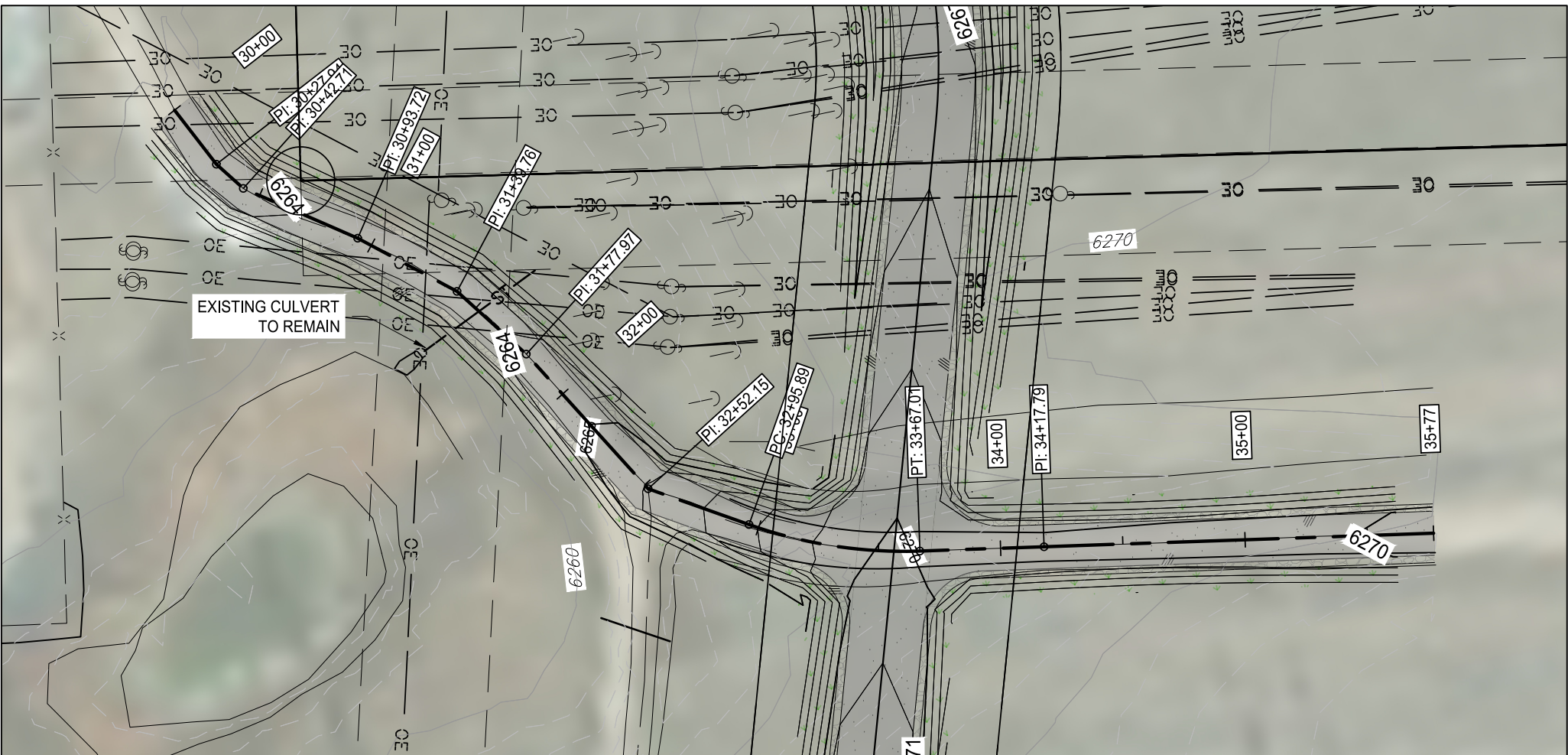
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CK

CHECKED BY:  
TC

JOB NO.:  
5016

DWG NO. R1 OF





NO.	REVISION	DATE

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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
HAPPY JACK RD ACCESS PLAN & PROFILE



387.637.6817  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 18, 2025

DRAWN BY: CK

DESIGNED BY: CK

CHECKED BY: TC

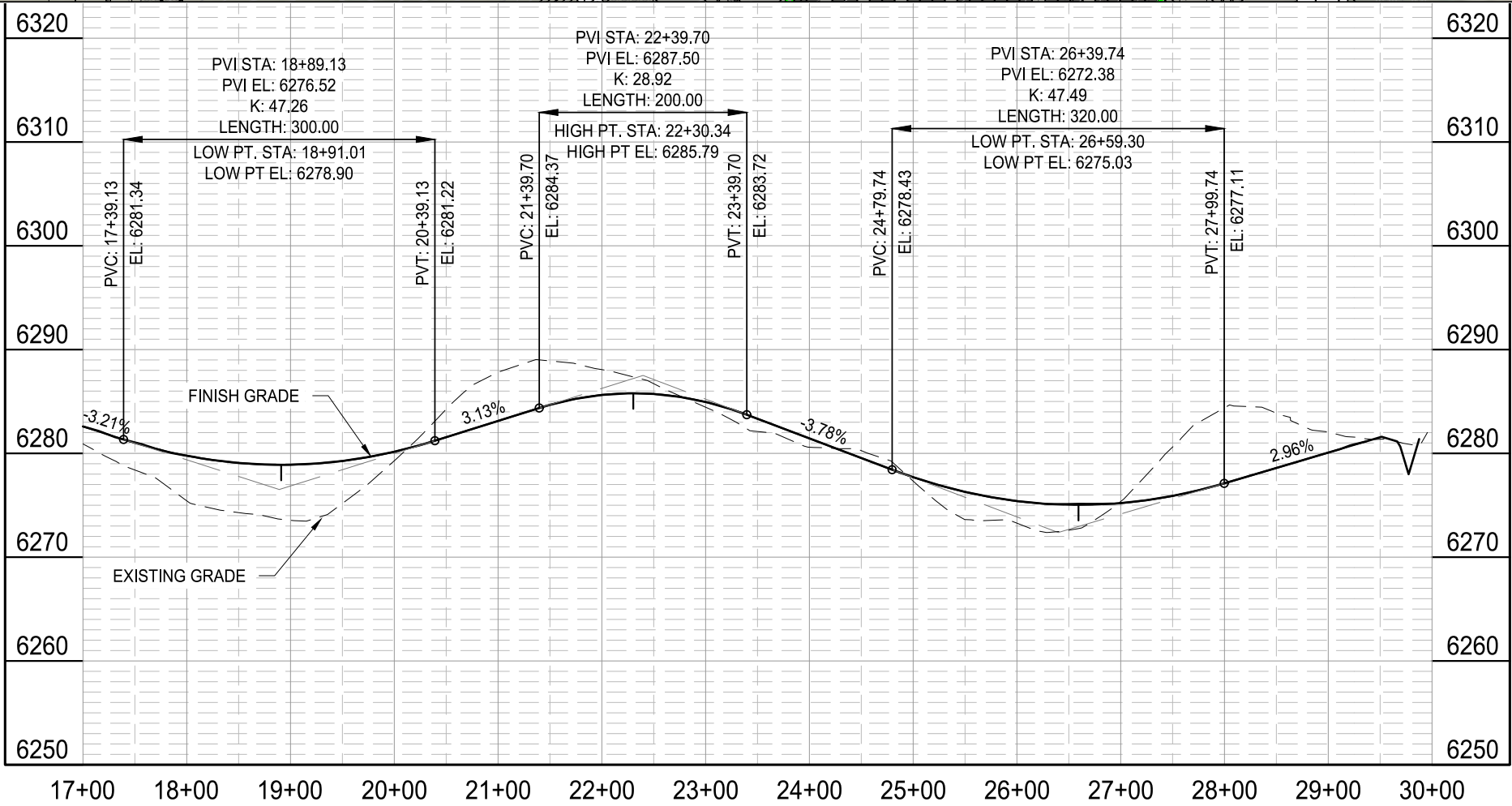
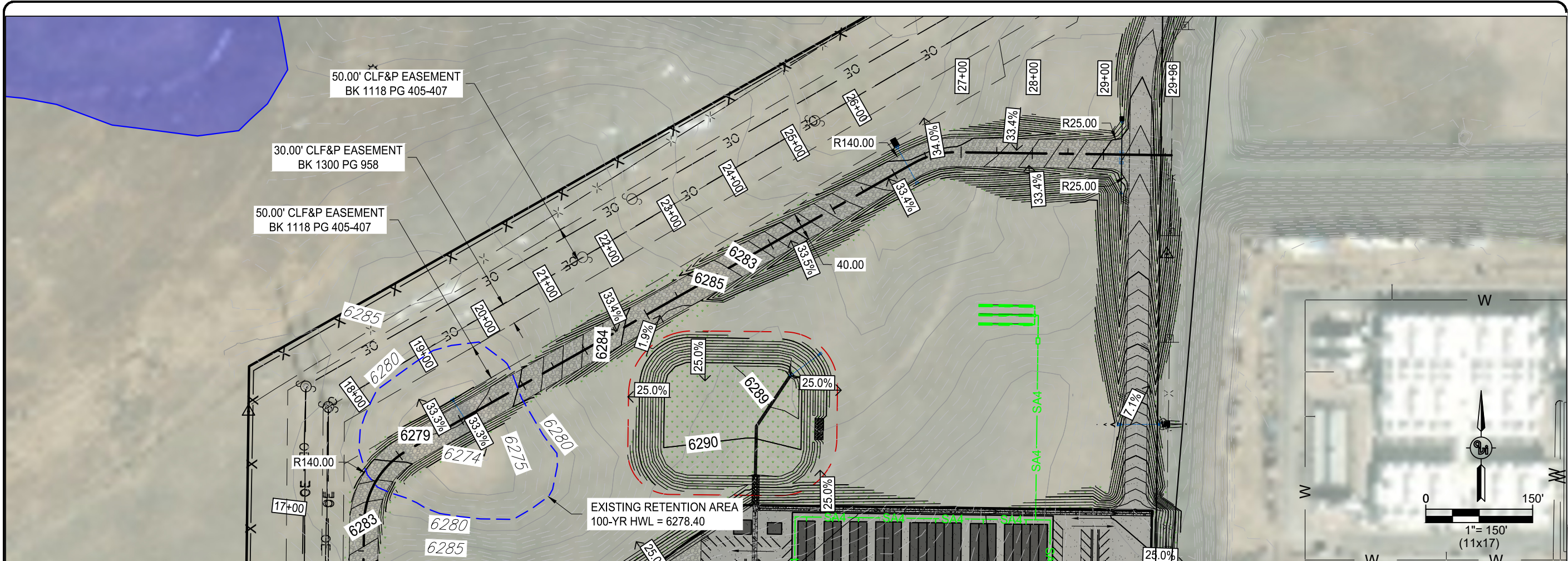
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DWG NO. R2 OF









NO.	REVISION	DATE

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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
HAUL RD PLAN & PROFILE

ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

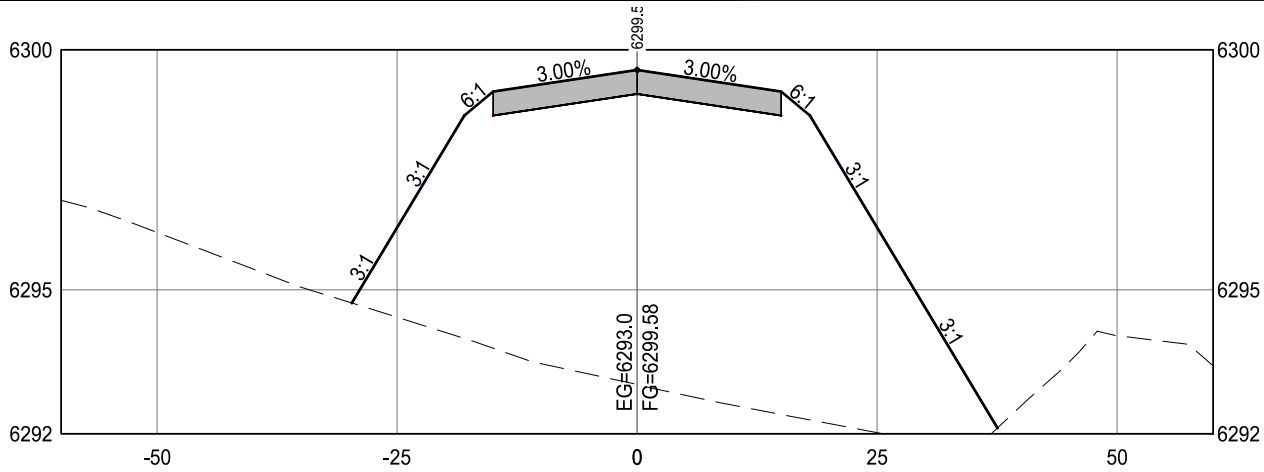
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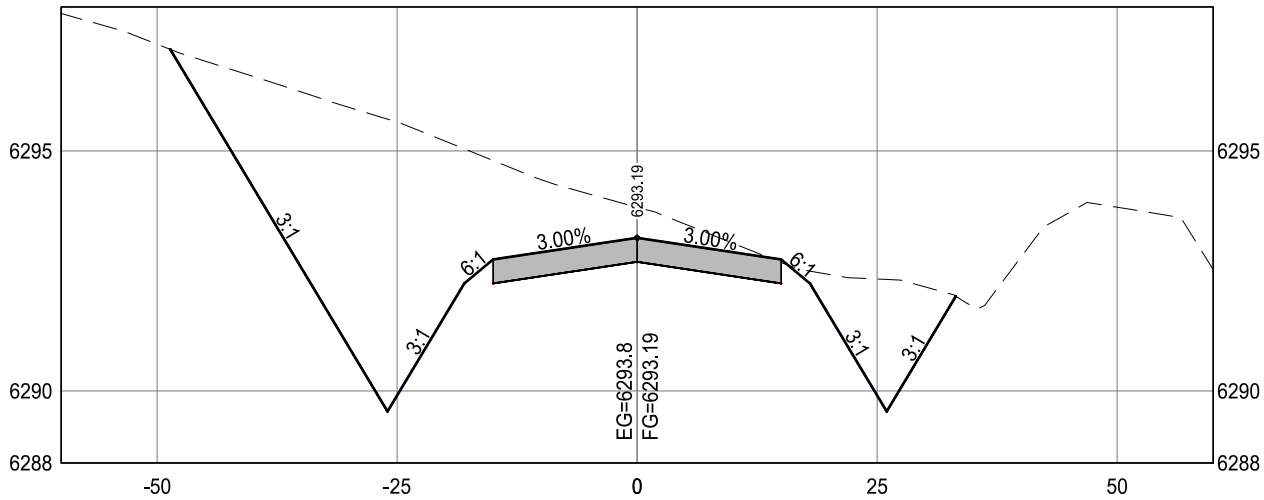
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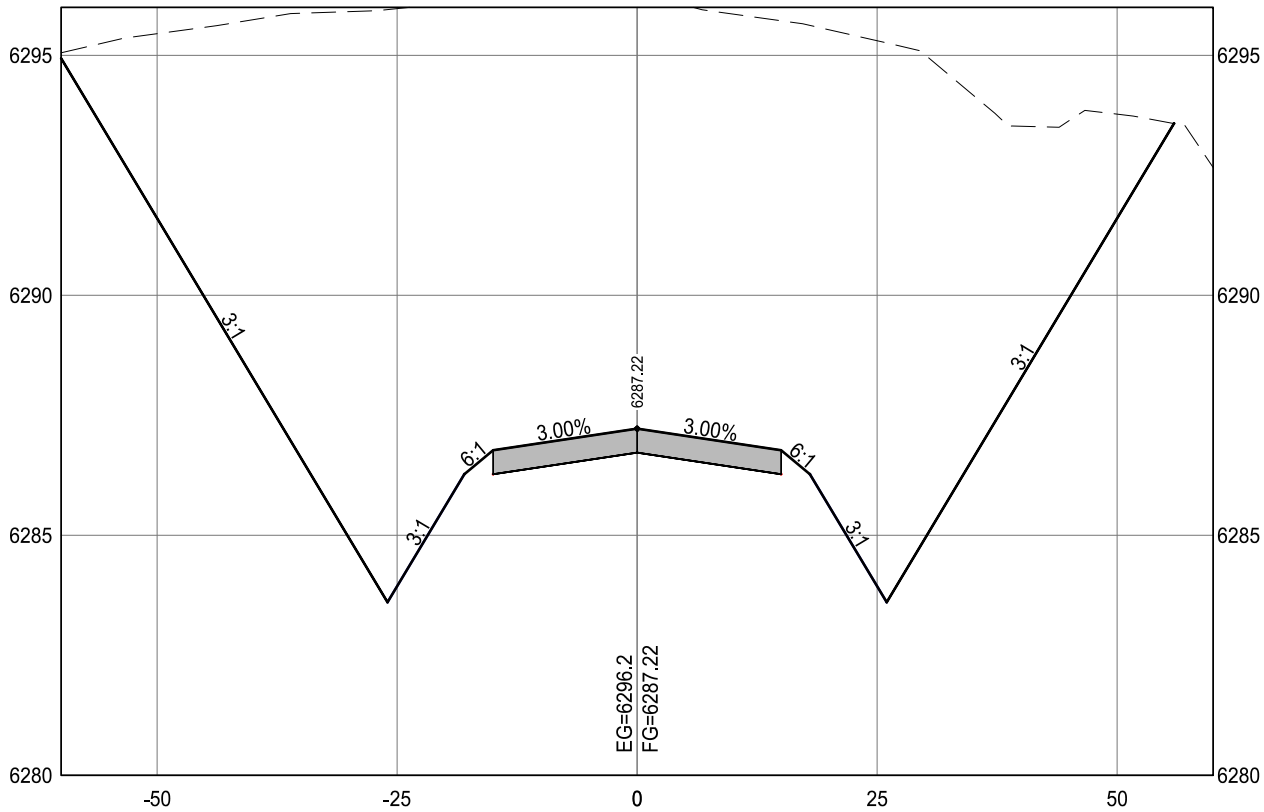
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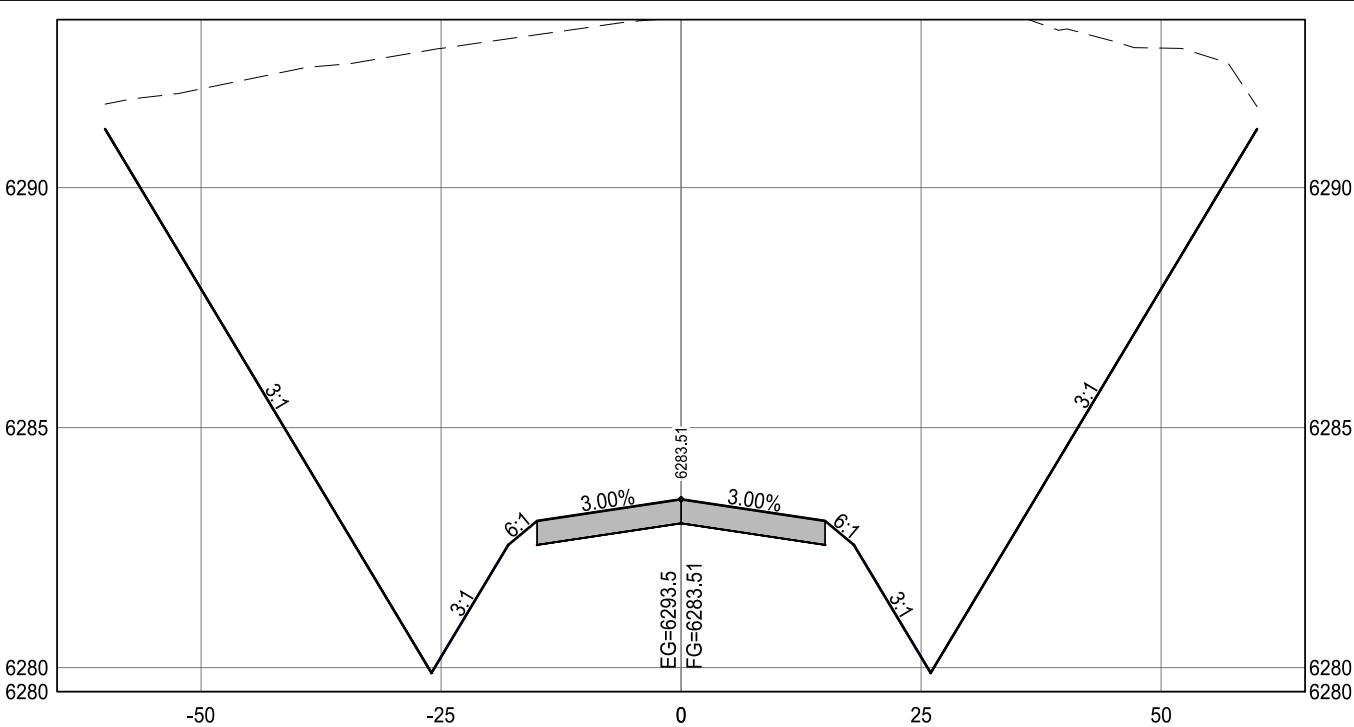
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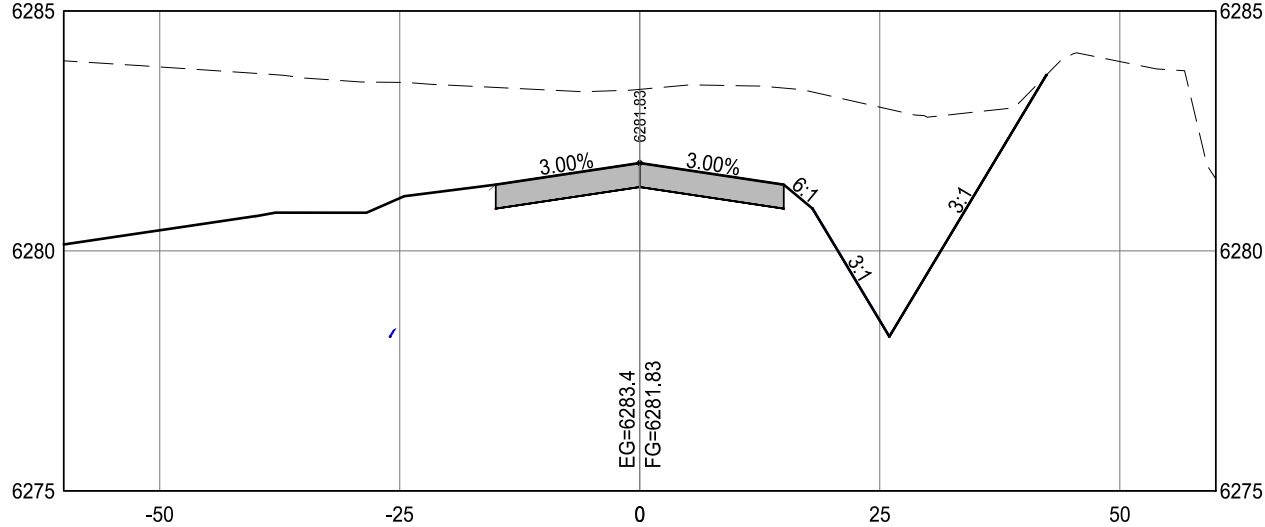
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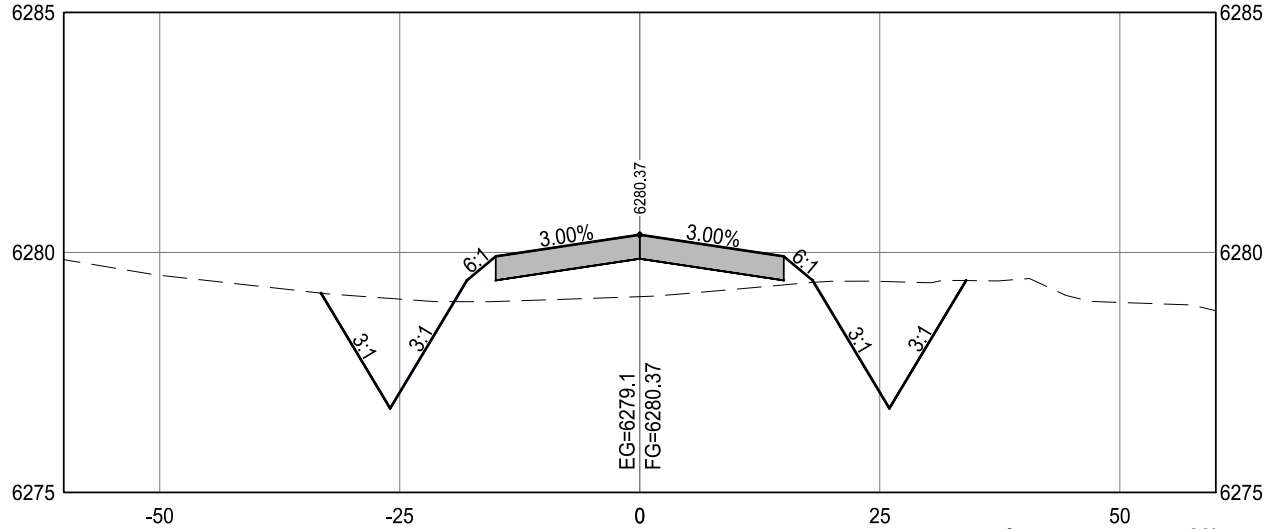
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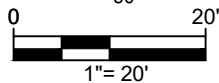
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6+00.00



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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

CYS07 STAGING AREA

ACCESS RD CROSS  
SECTIONS

PROJECT:

DRAWING TITLE:



DATE PLOTTED:  
Dec 17, 2025

DRAWN BY: CK

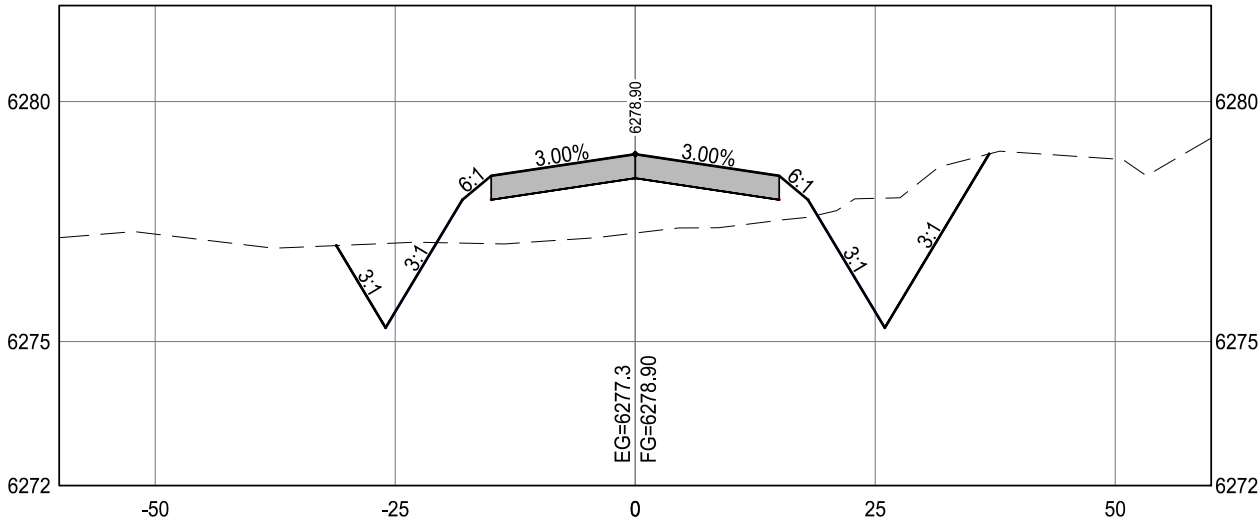
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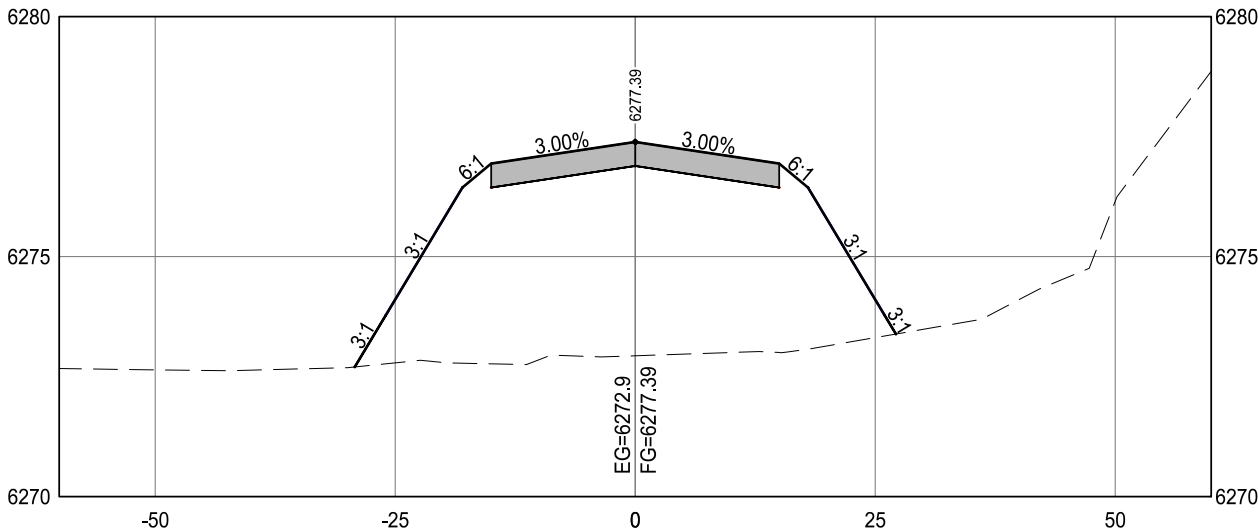
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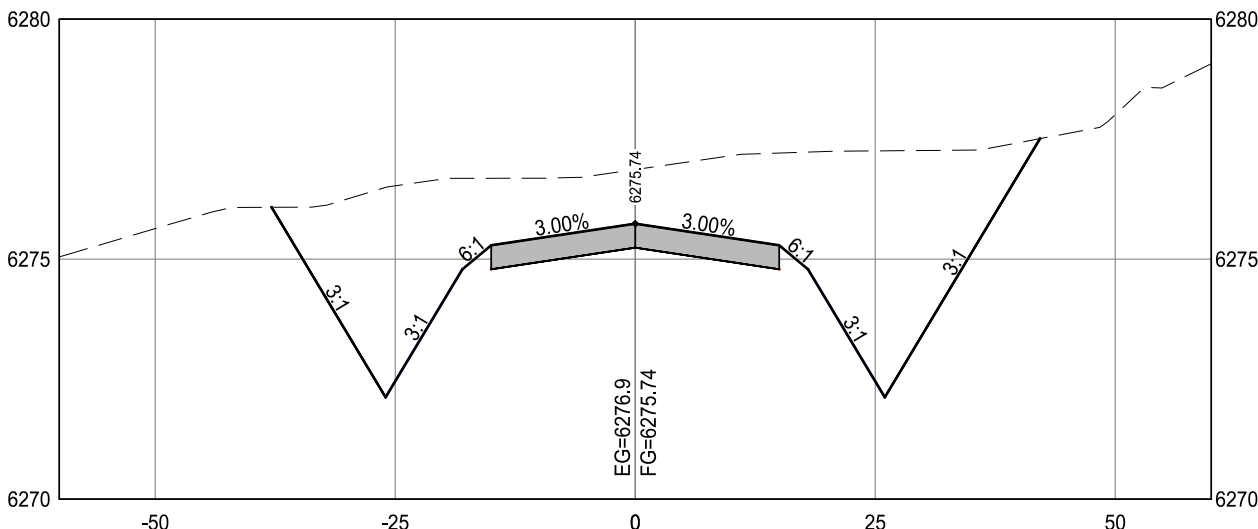




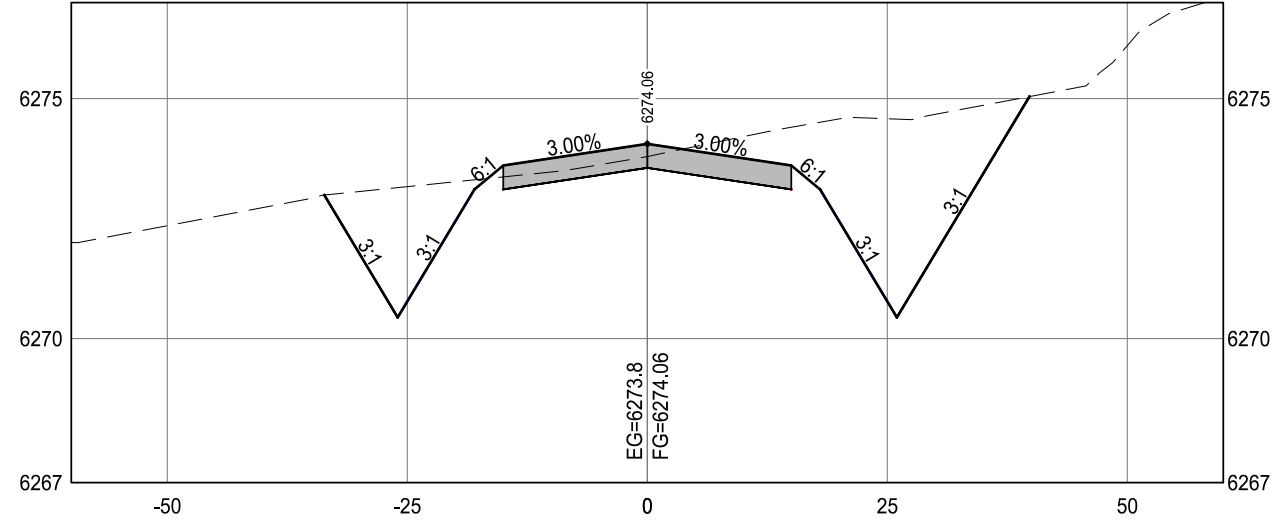
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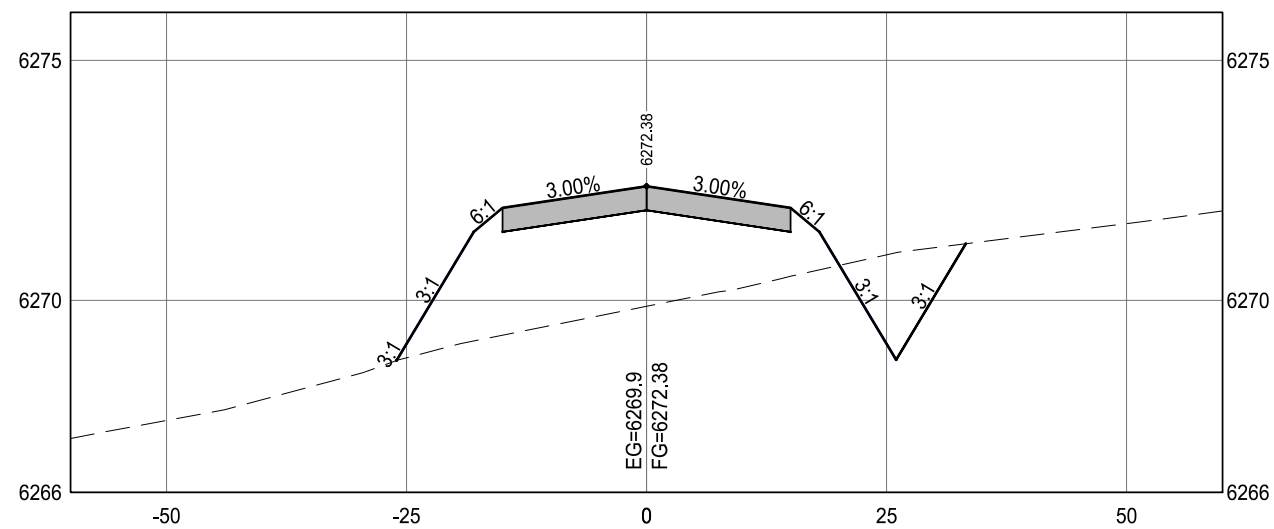
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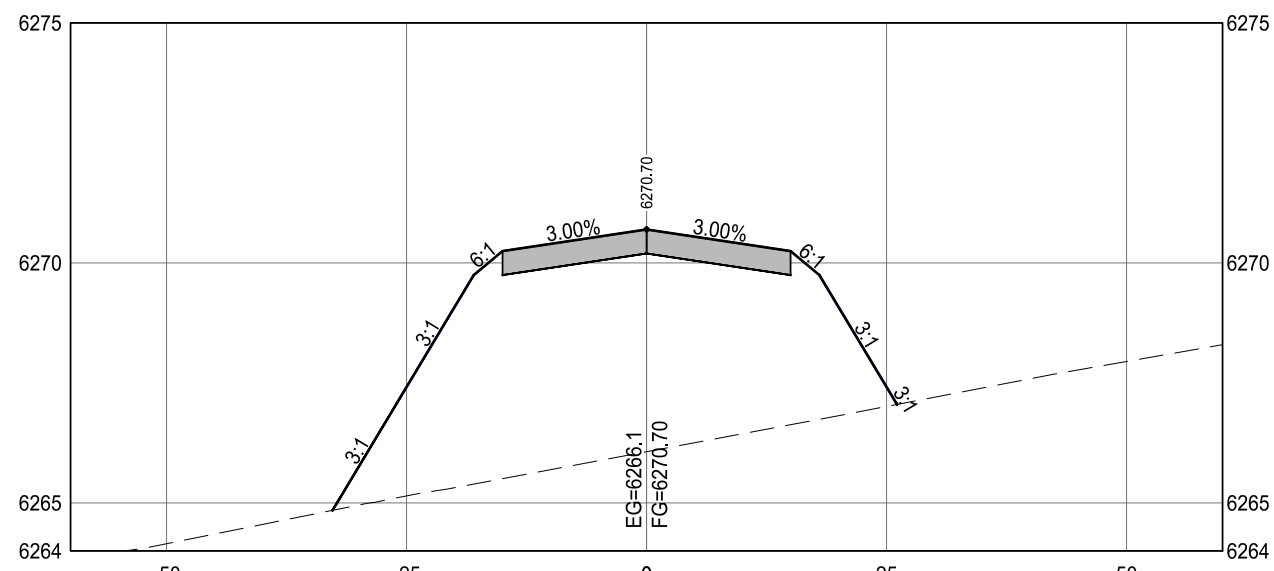
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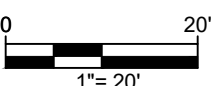
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11+00.00



12+00.00



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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

CYS07 STAGING AREA

ACCESS RD CROSS  
SECTIONS

PROJECT:

DRAWING TITLE:

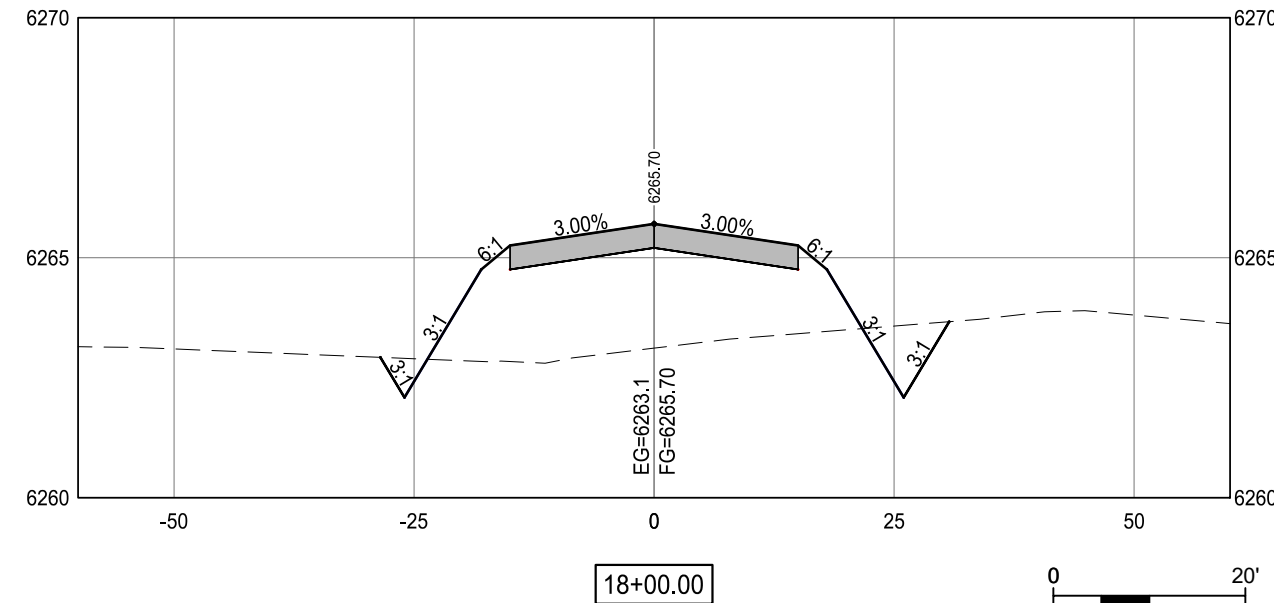
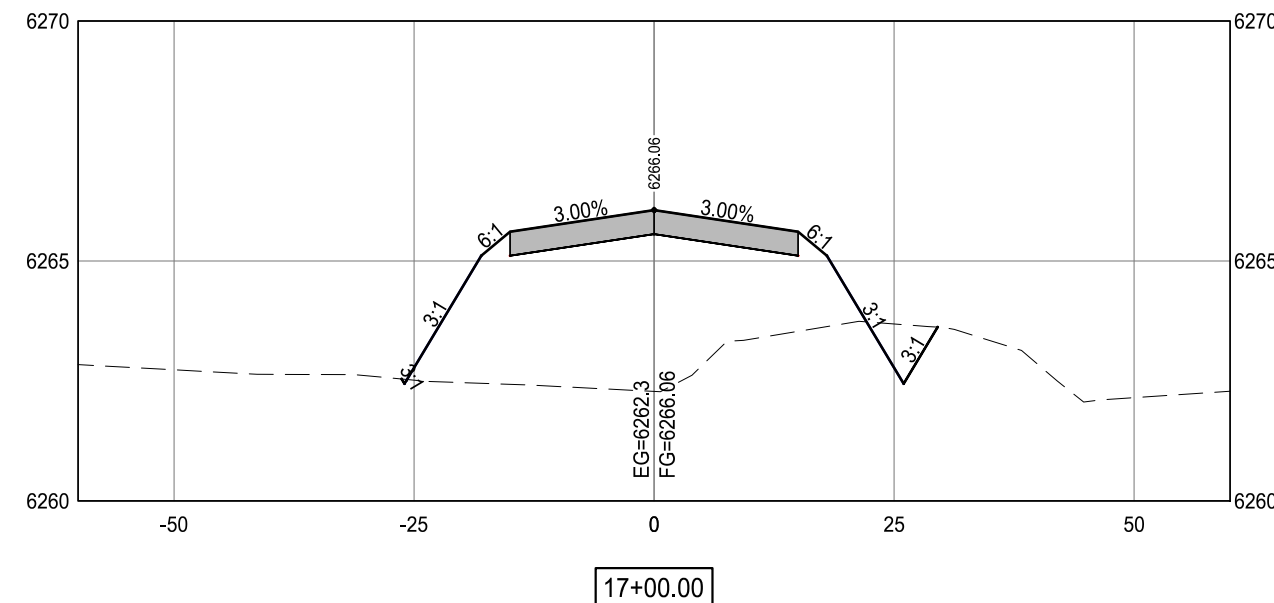
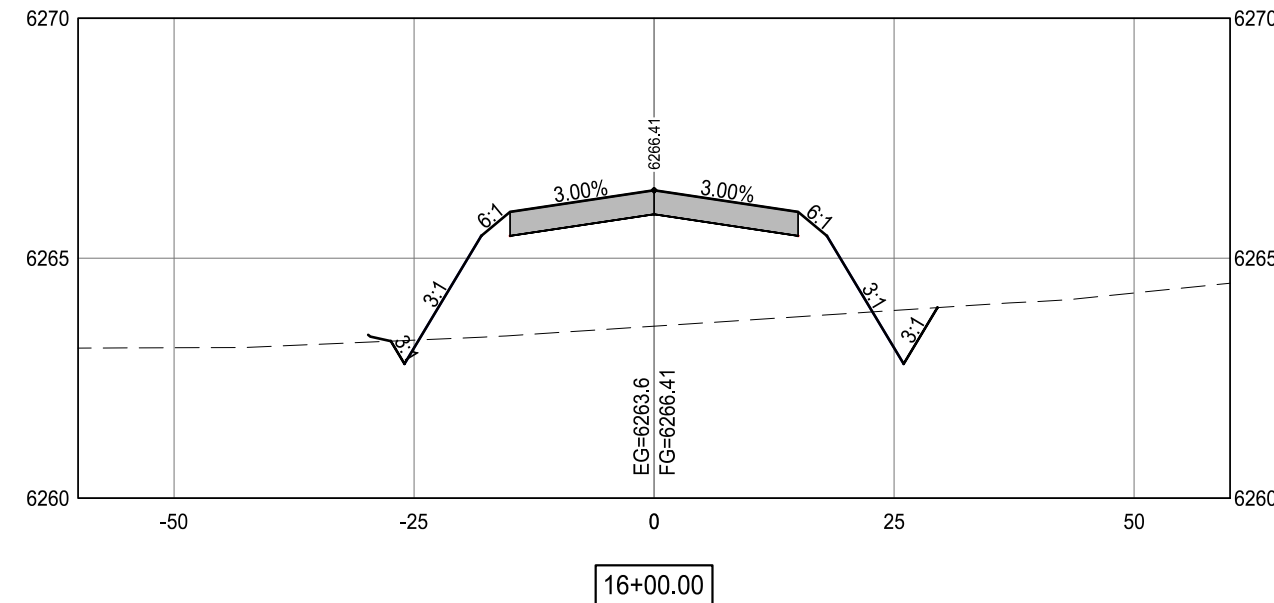
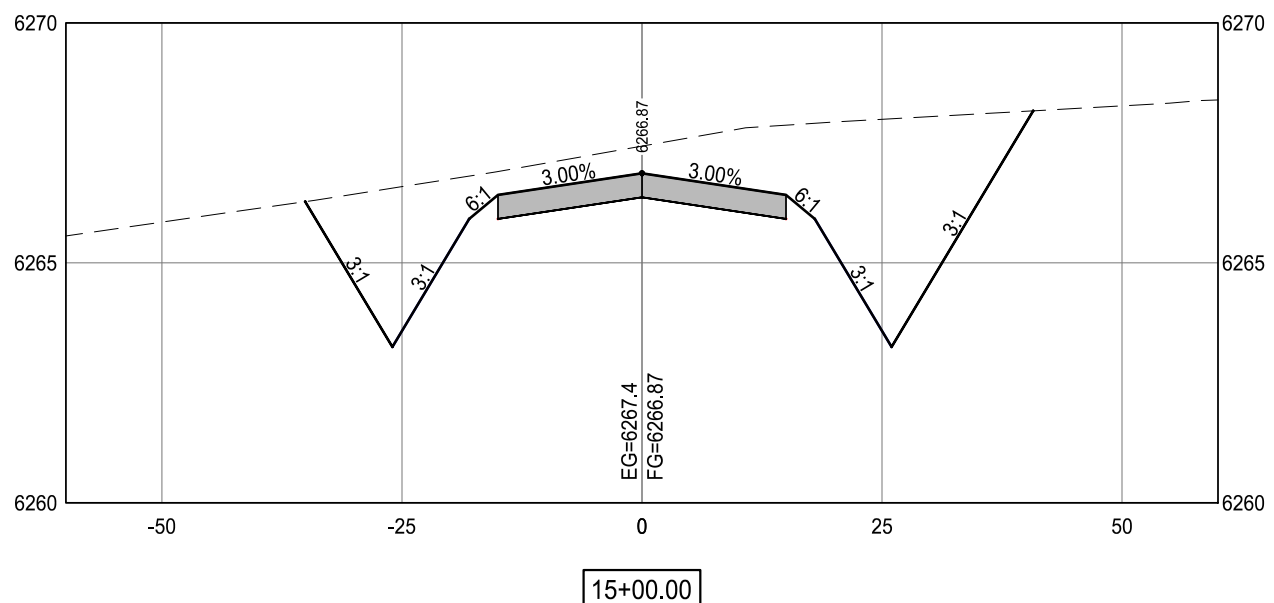
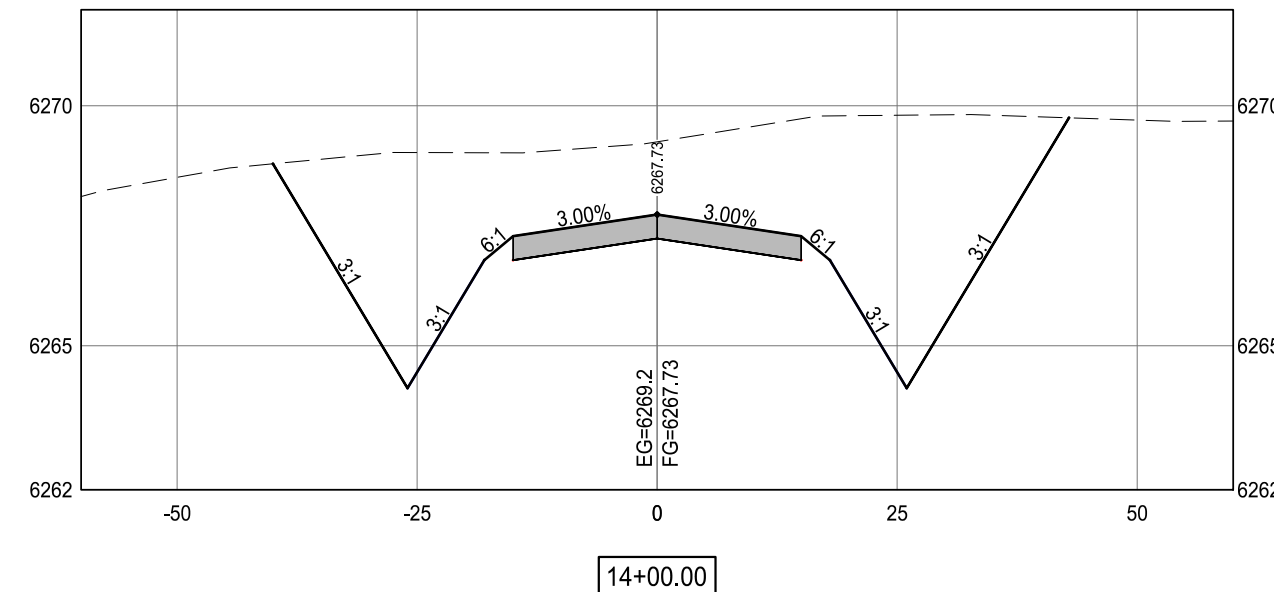
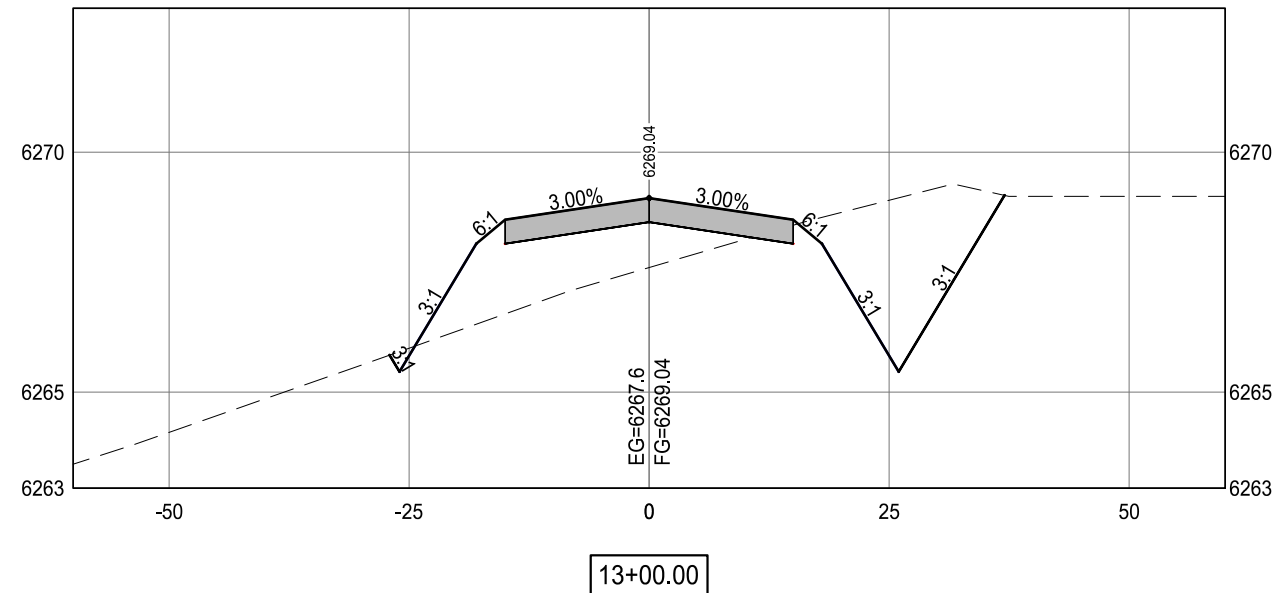
ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025  
DRAWN BY:  
CK  
DESIGNED BY:  
CK  
CHECKED BY:  
TC

JOB NO.:

5016

DWG NO. XS6 OF




NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
ACCESS RD CROSS  
SECTIONS

  
ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

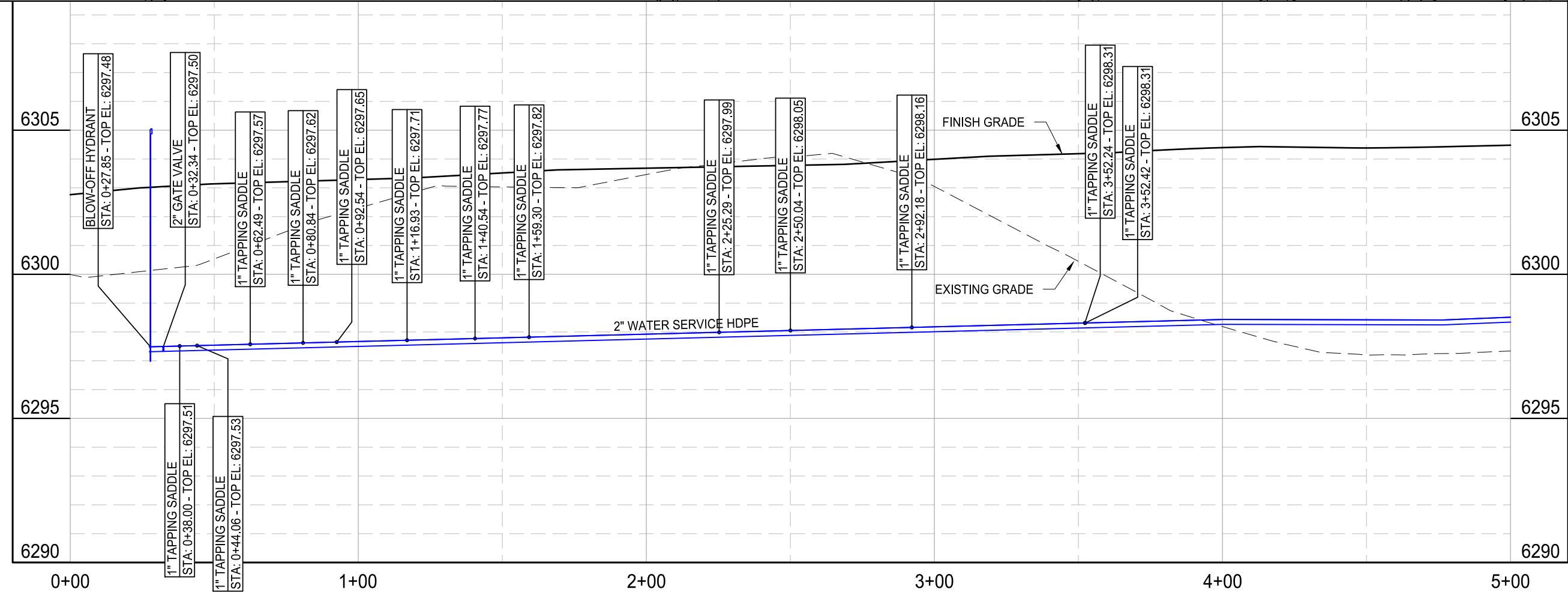
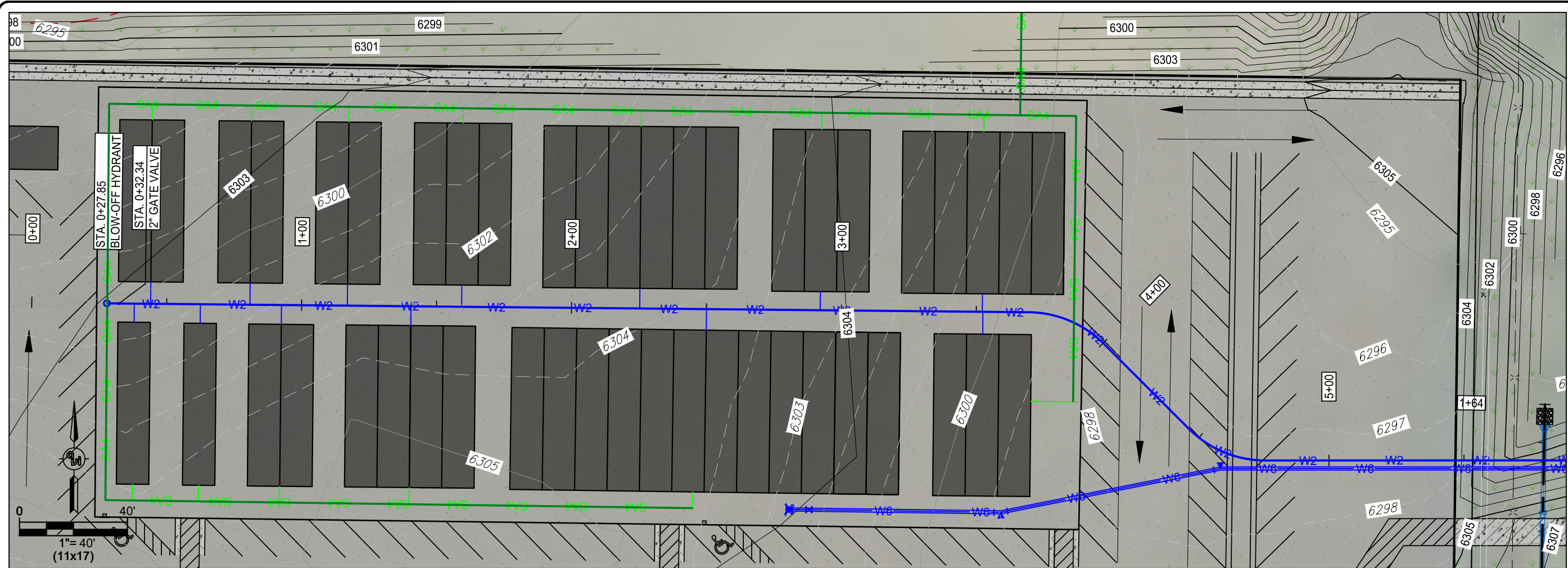
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DESIGNED BY:  
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CHECKED BY:  
TC

JOB NO.:  
5016

DWG NO. XS7 OF



NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
WATER SERVICE PLAN & PROFILE

ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

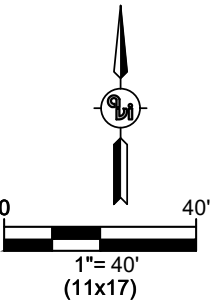
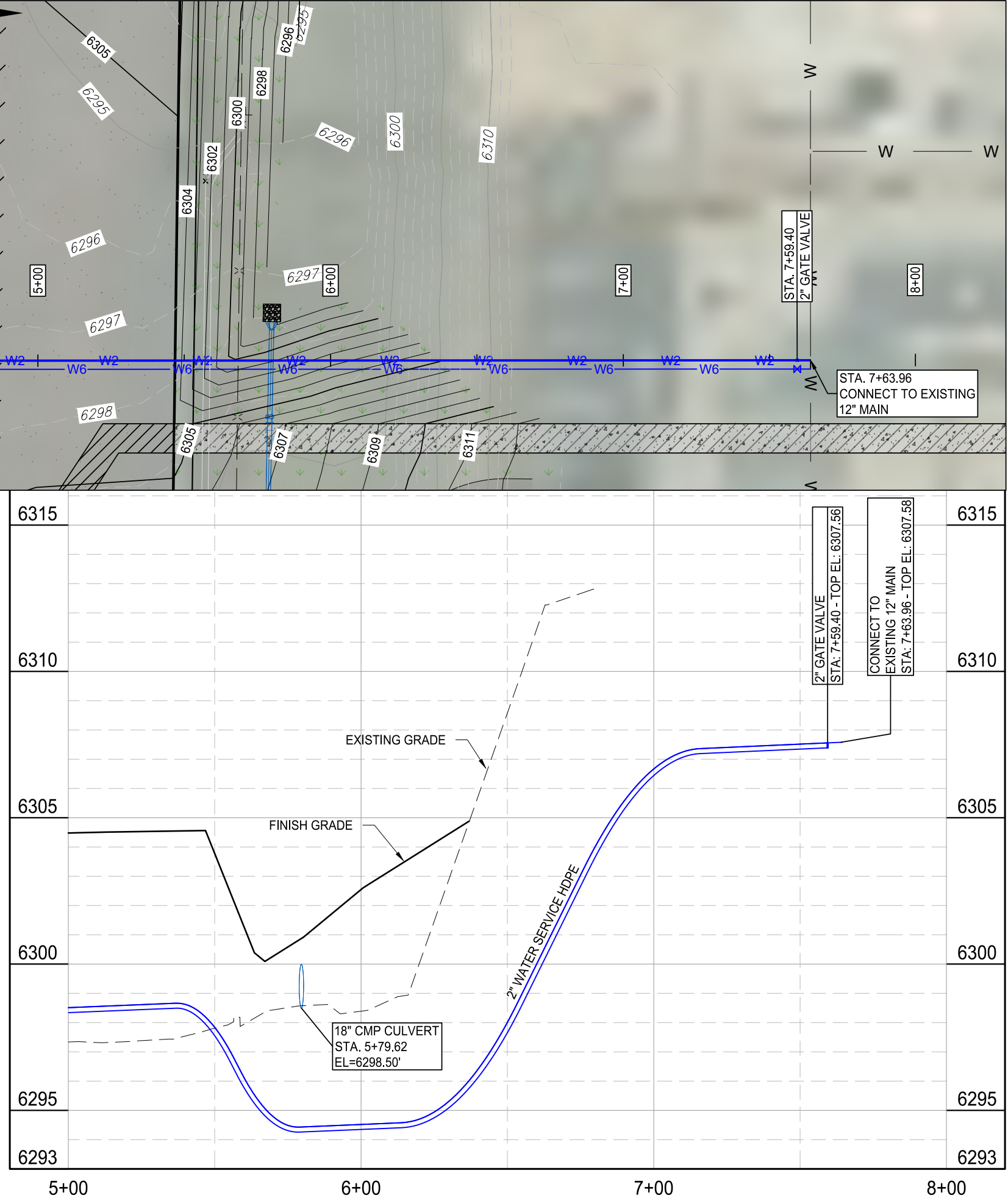
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CHECKED BY:  
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JOB NO.:  
5016

DWG NO. WA1 OF



DATE

REVISION

NO.

90% PLANS

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PREPARED FOR:

HENSEL PHELPS

12121 GRANT ST, SUITE 410

THORNTON, CO 80241

PROJECT:

CYS07 STAGING AREA

DRAWING TITLE:

WATER SERVICE PLAN & PROFILE

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:

Dec 17, 2025

DRAWN BY:

CK

DESIGNED BY:

CK

CHECKED BY:

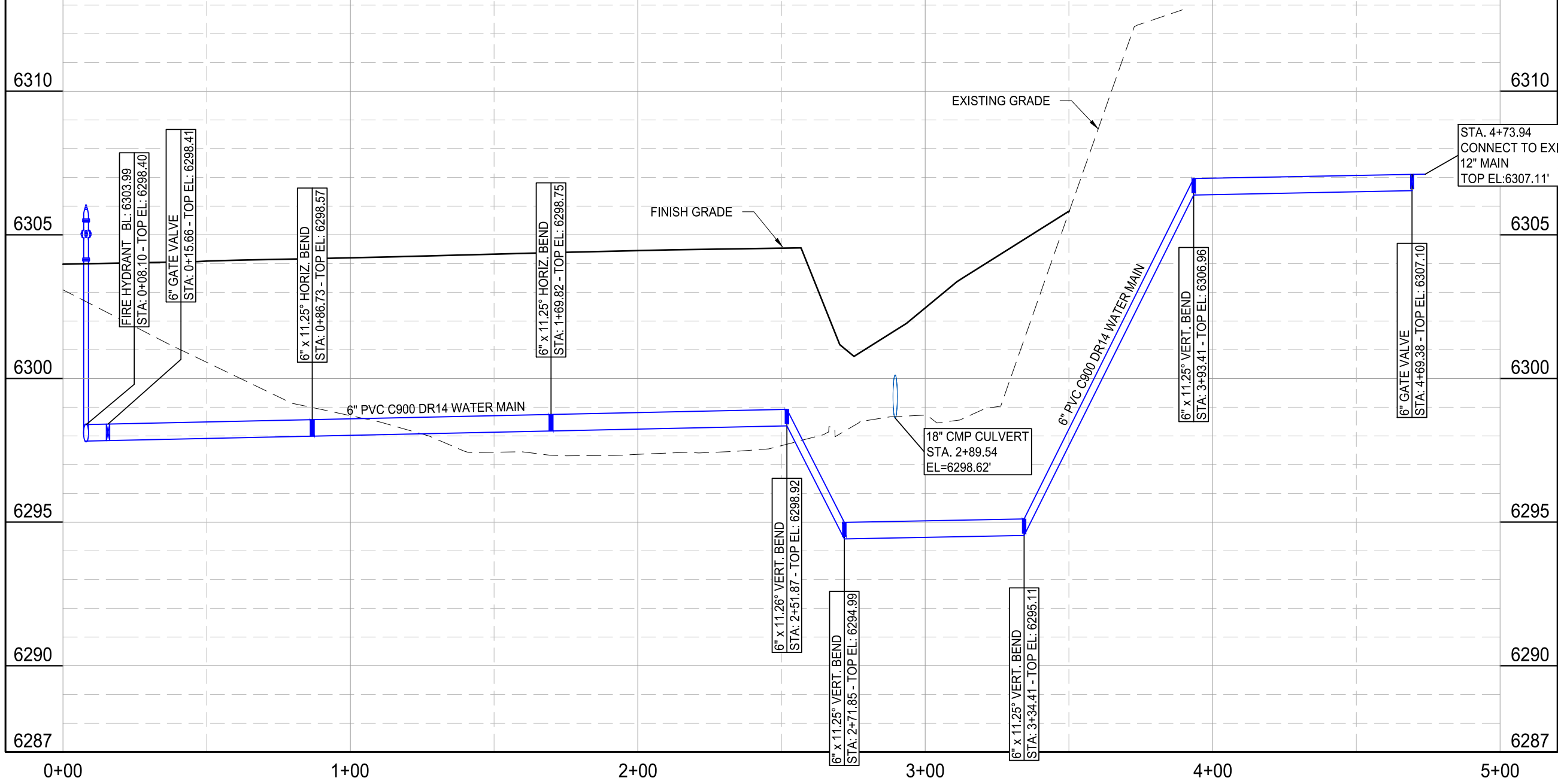
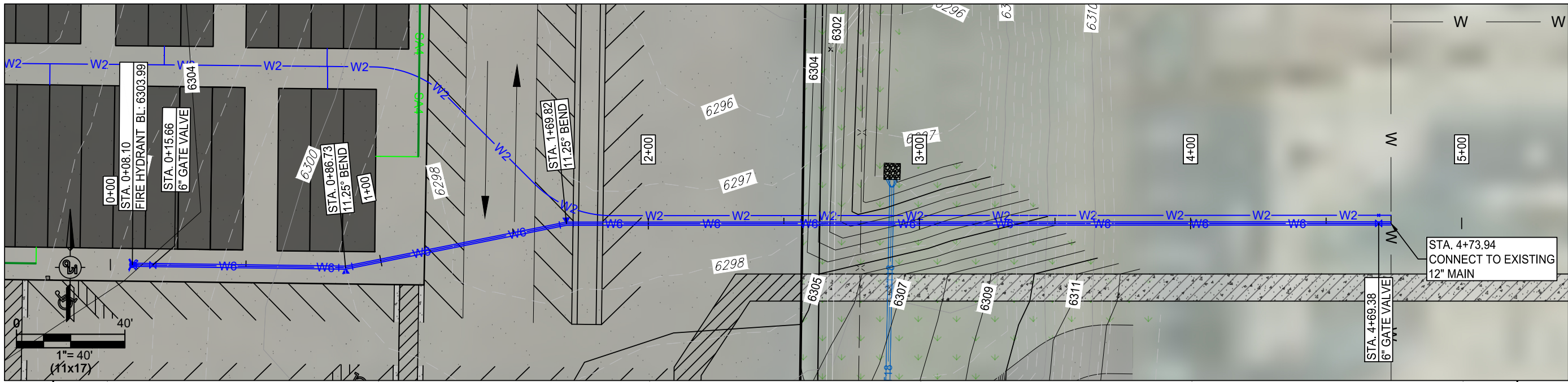
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JOB NO.:

5016

DWG NO. WA2 OF





NO.	REVISION	DATE

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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT: CYS07 STAGING AREA  
DRAWING TITLE: WATER SERVICE PLAN & PROFILE



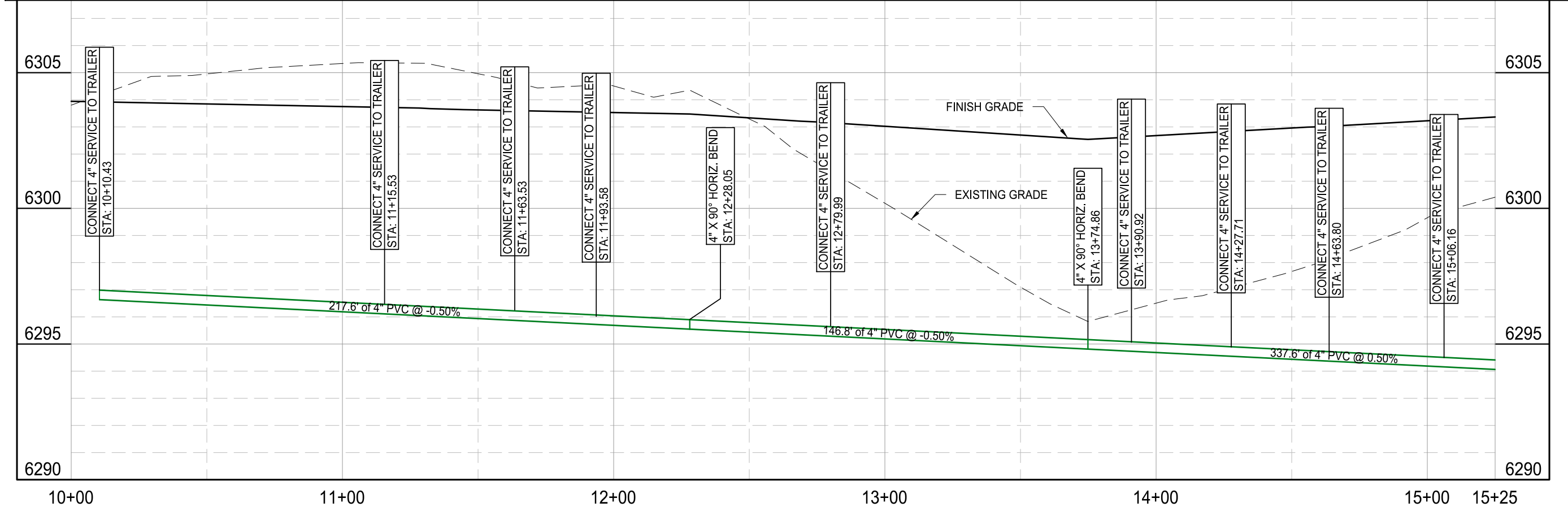
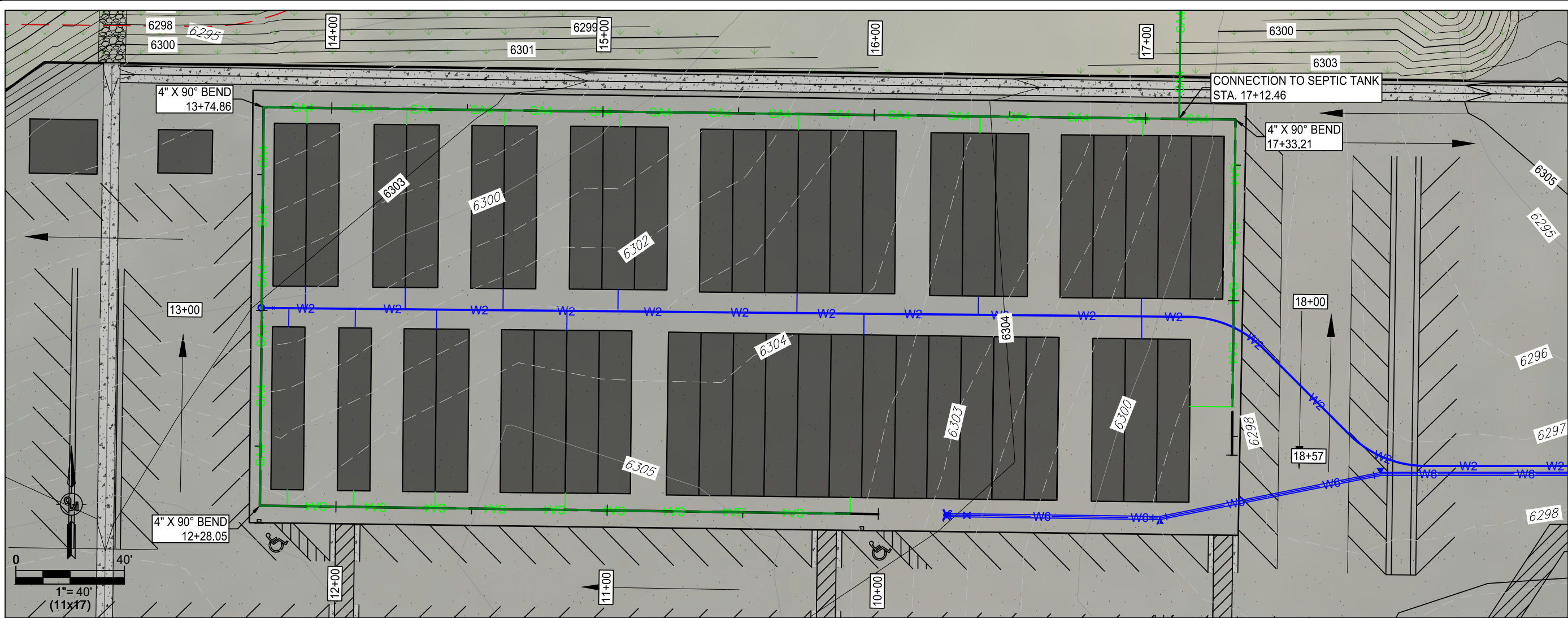
45  
YEARS

ENGINEERING PLANNING SURVEYING

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:	Dec 17, 2025
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JOB NO.:	5016

DWG NO. WA3 OF



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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

CYS07 STAGING AREA

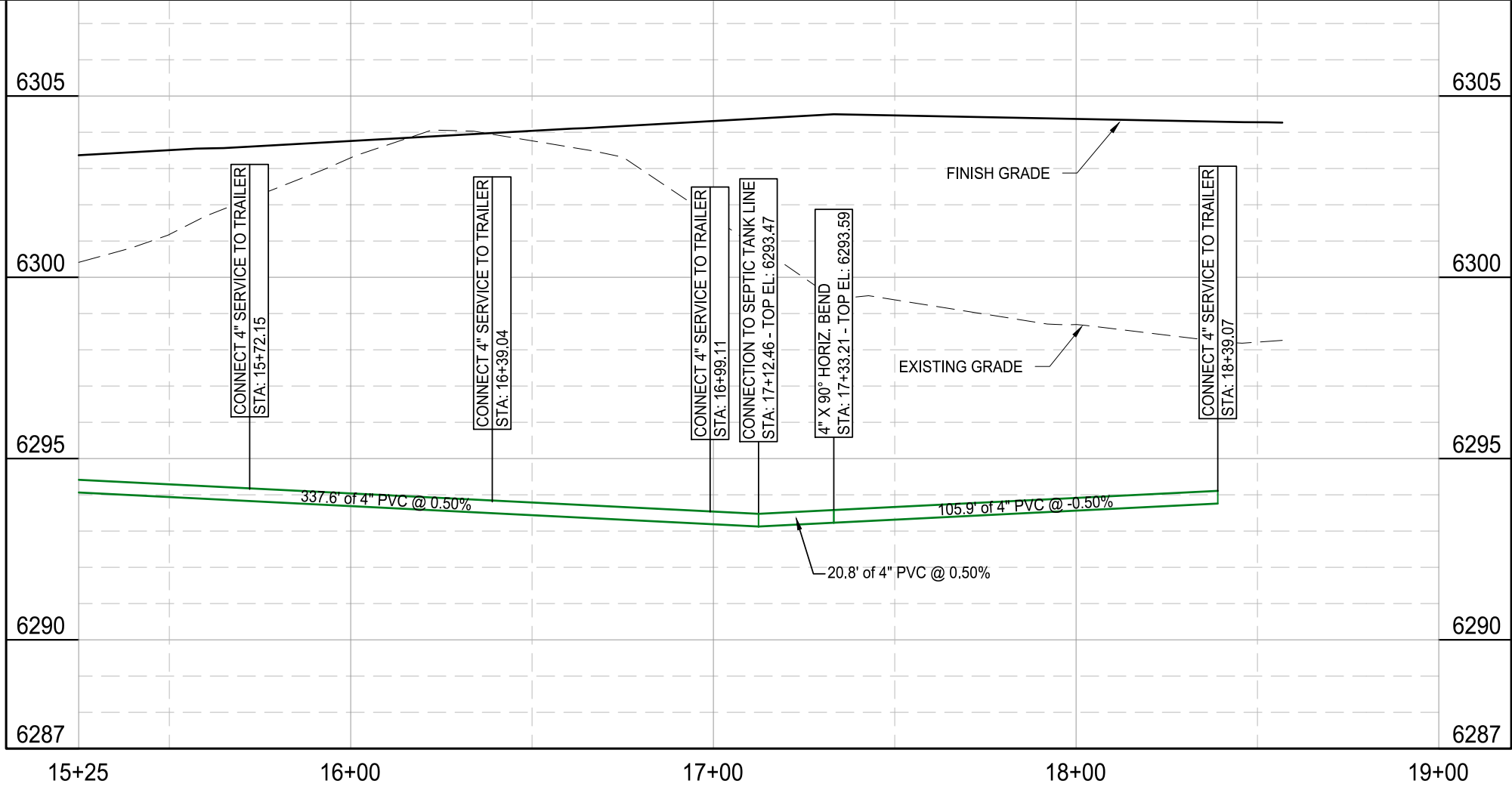
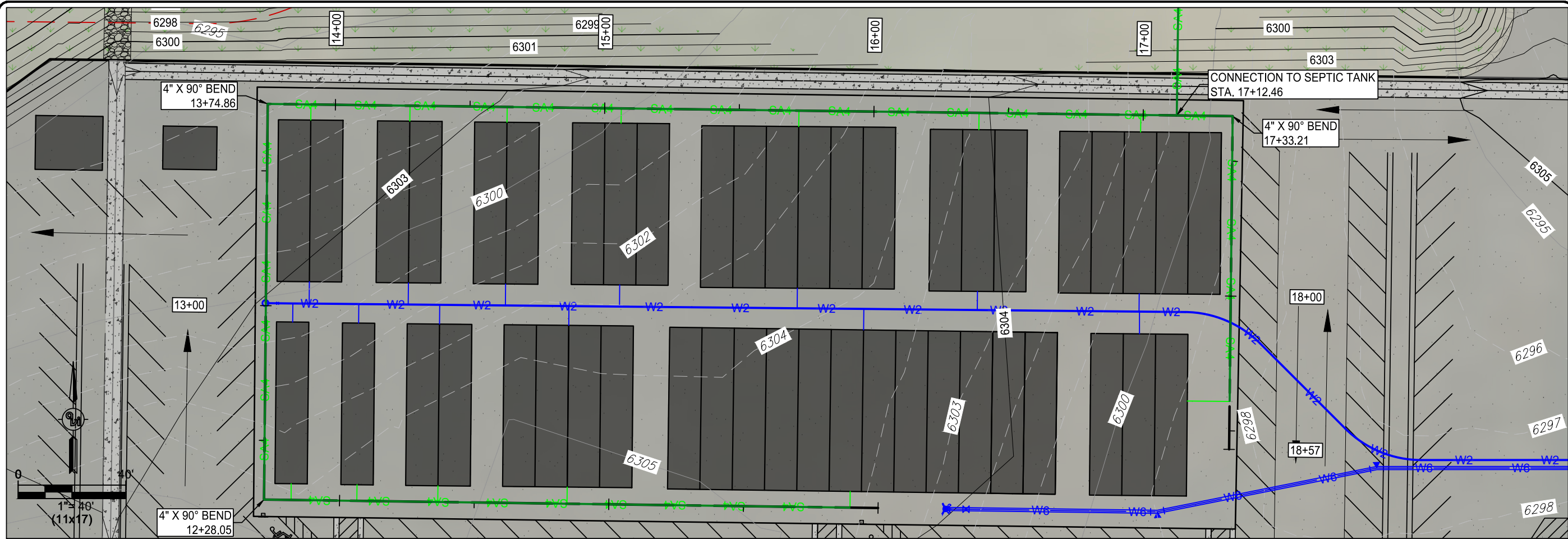
SANITARY SERVICE PLAN & PROFILE

ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025  
DRAWN BY: CK  
DESIGNED BY: CK  
CHECKED BY: TC  
JOB NO.: 5016

DWG NO. SA1 OF





NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
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1103 OLD TOWN LANE, SUITE 101  
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DATE PLOTTED:  
Dec 17, 2025

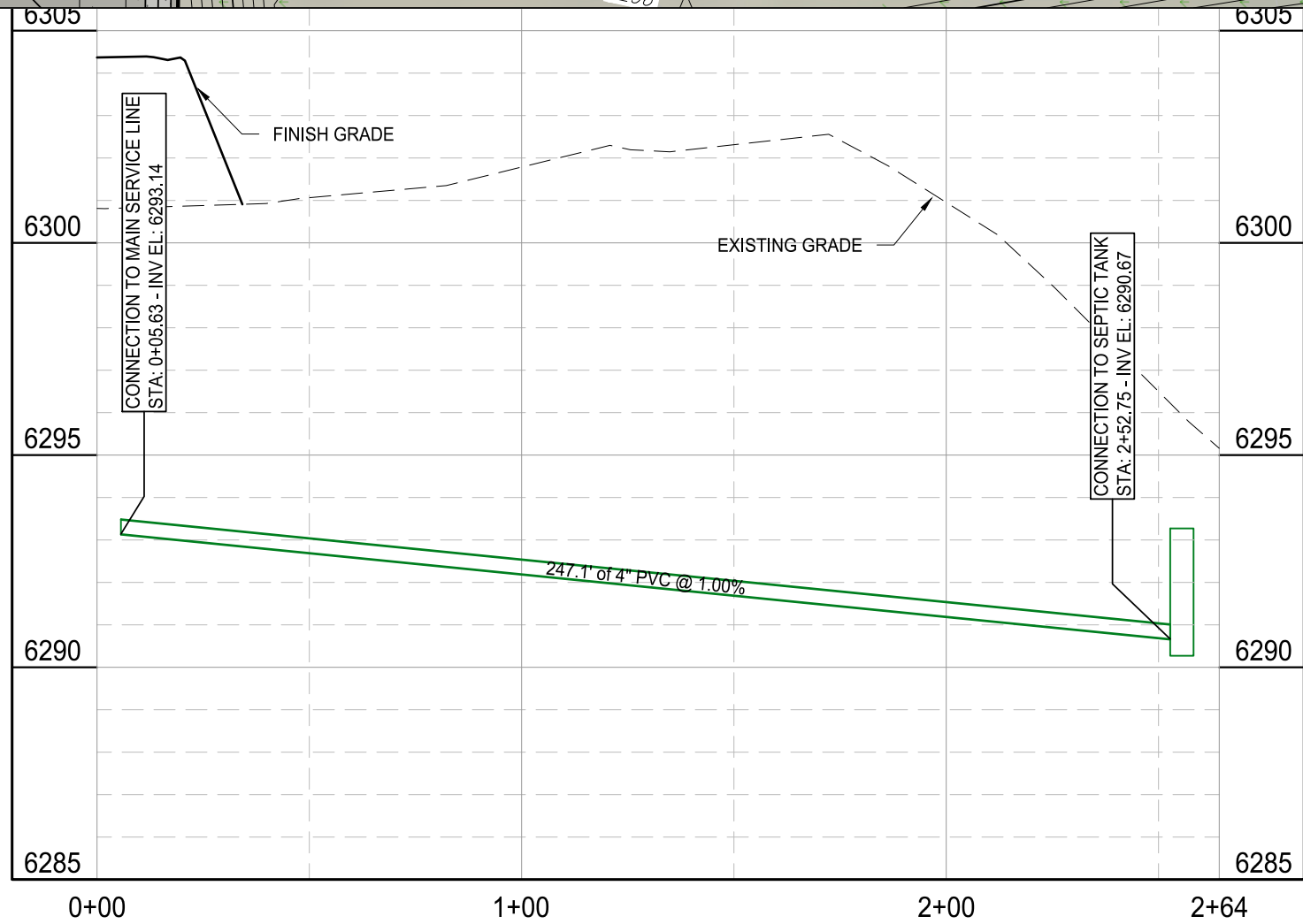
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DESIGNED BY: CK

CHECKED BY: TC

JOB NO.: 5016

DWG NO. SA2 OF



NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
SANITARY SERVICE PLAN & PROFILE

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

DRAWN BY: CK

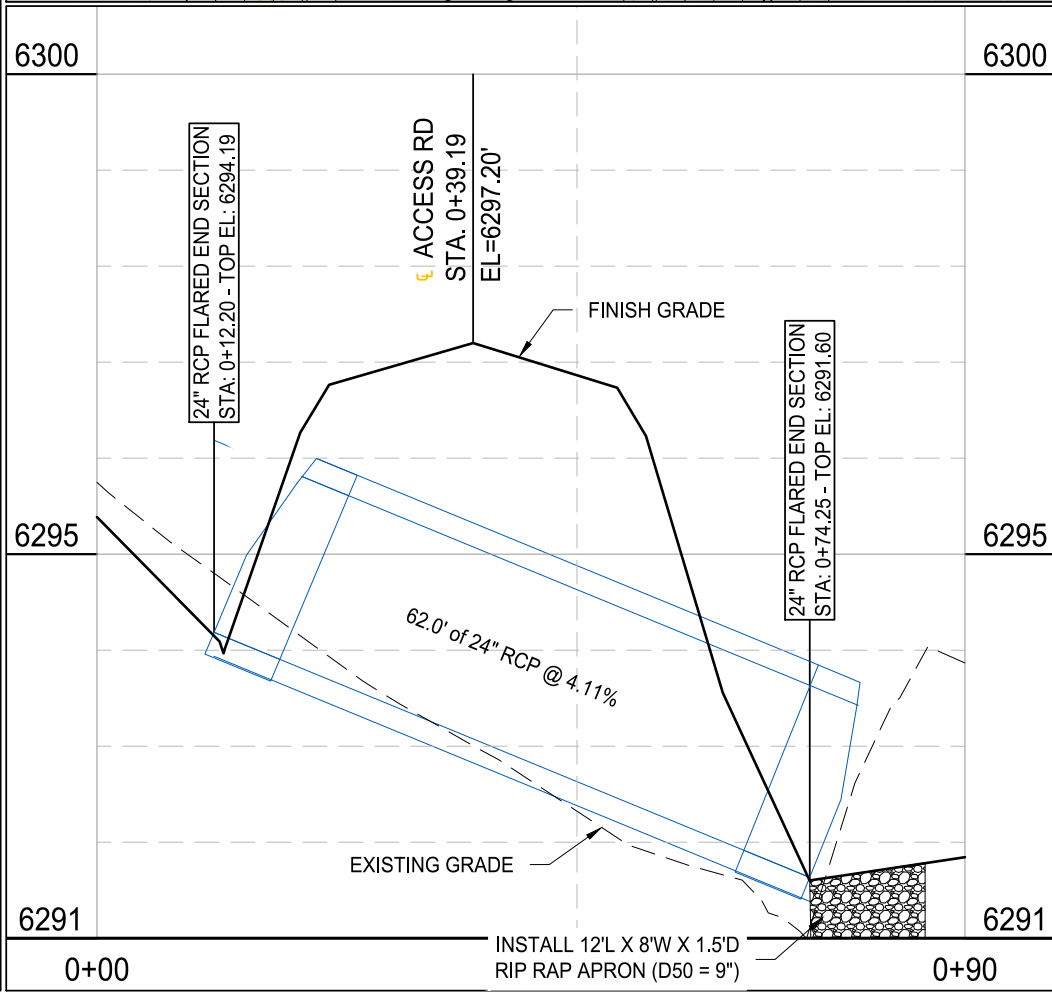
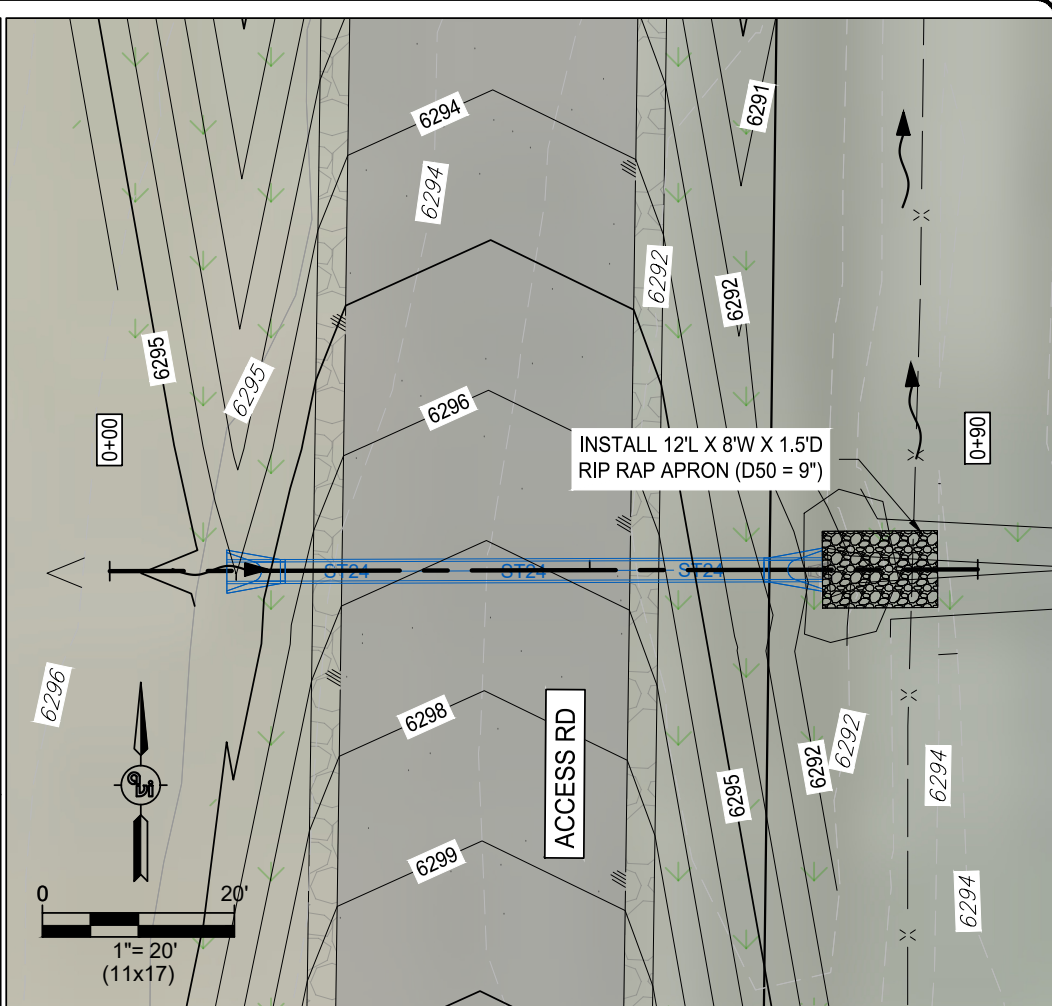
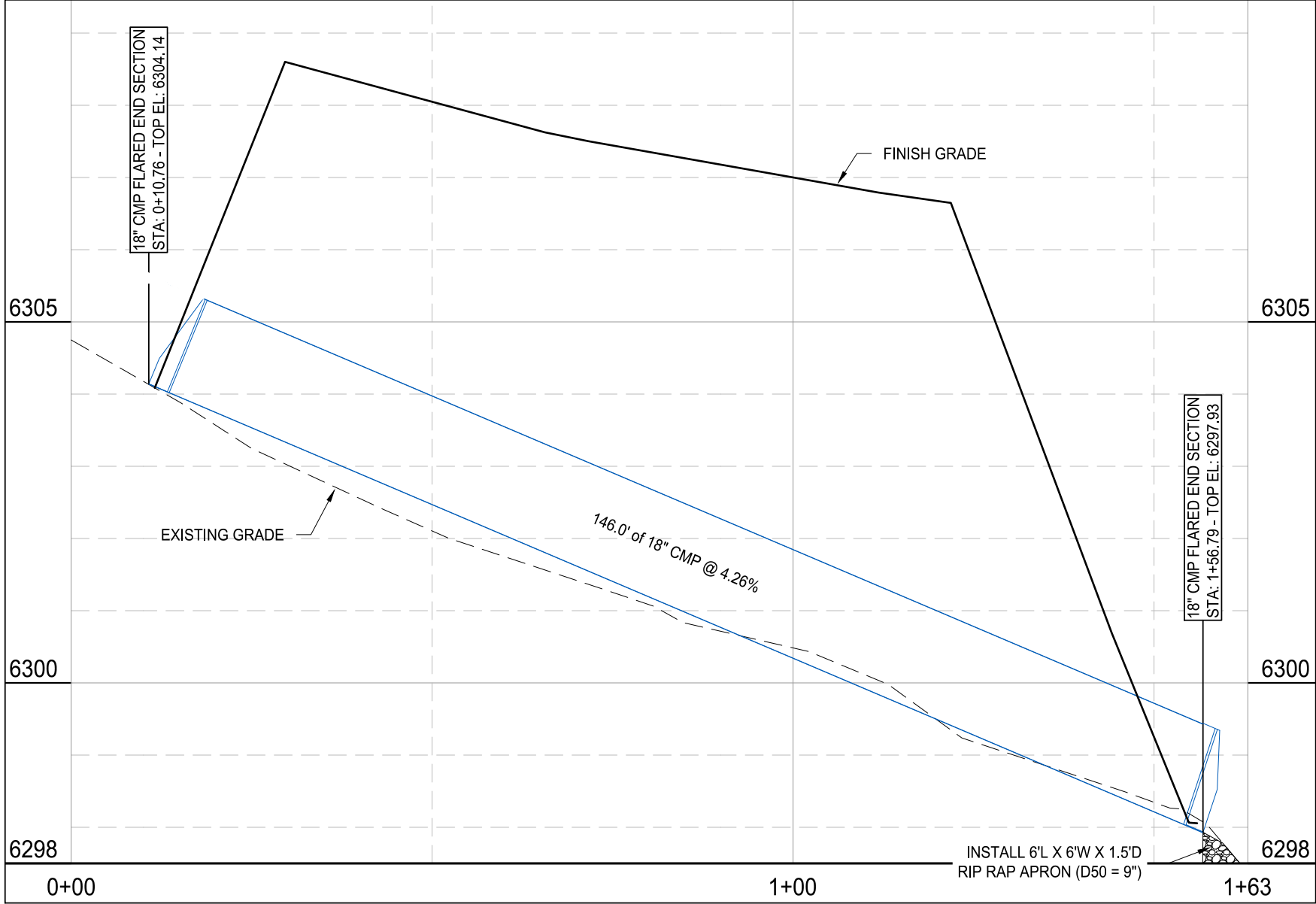
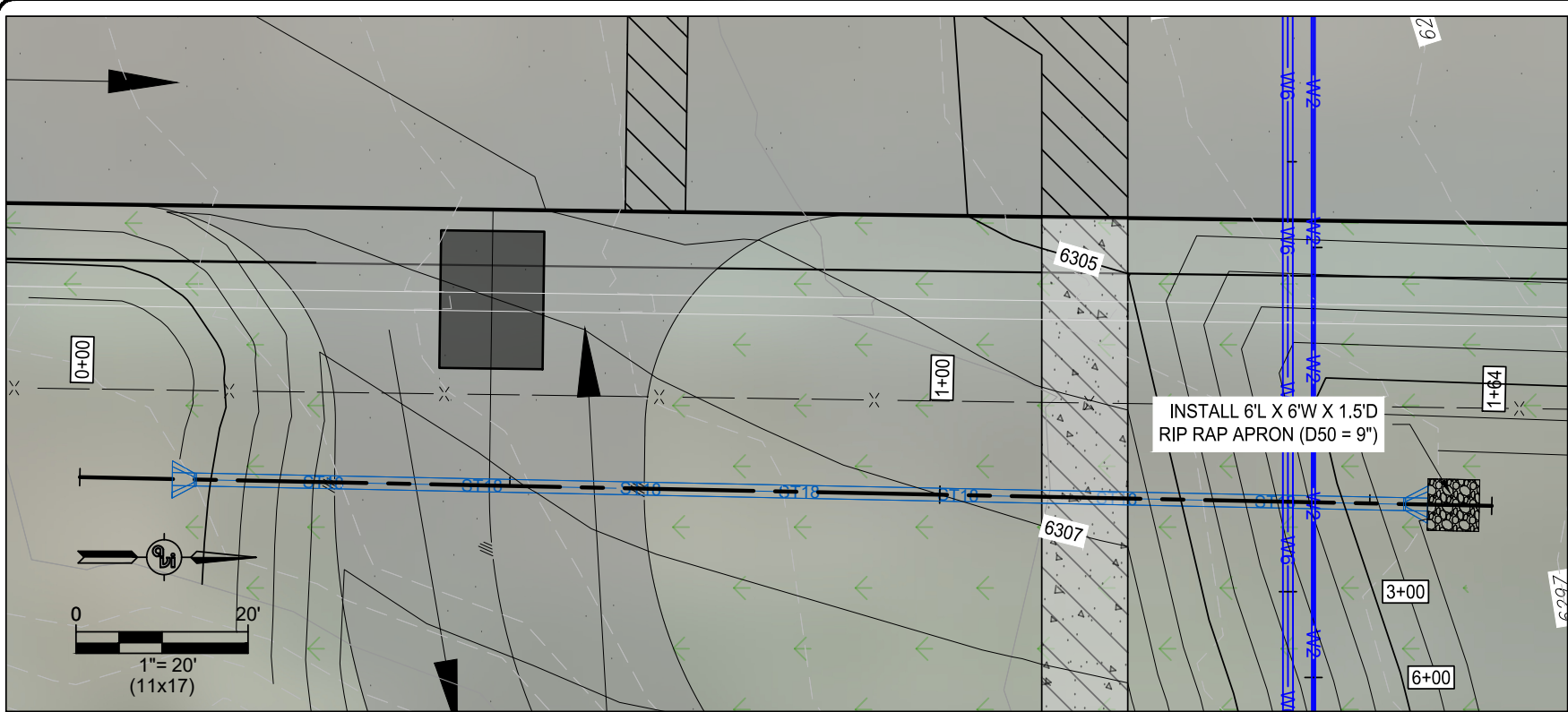
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CHECKED BY: TC

JOB NO.: 5016

DWG NO. SA3 OF





NO.		REVISION		DATE	

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

CYS07 STAGING AREA

CULVERT PLAN & PROFILES

avi 45 YEARS  
ENGINEERING PLANNING SURVEYING

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

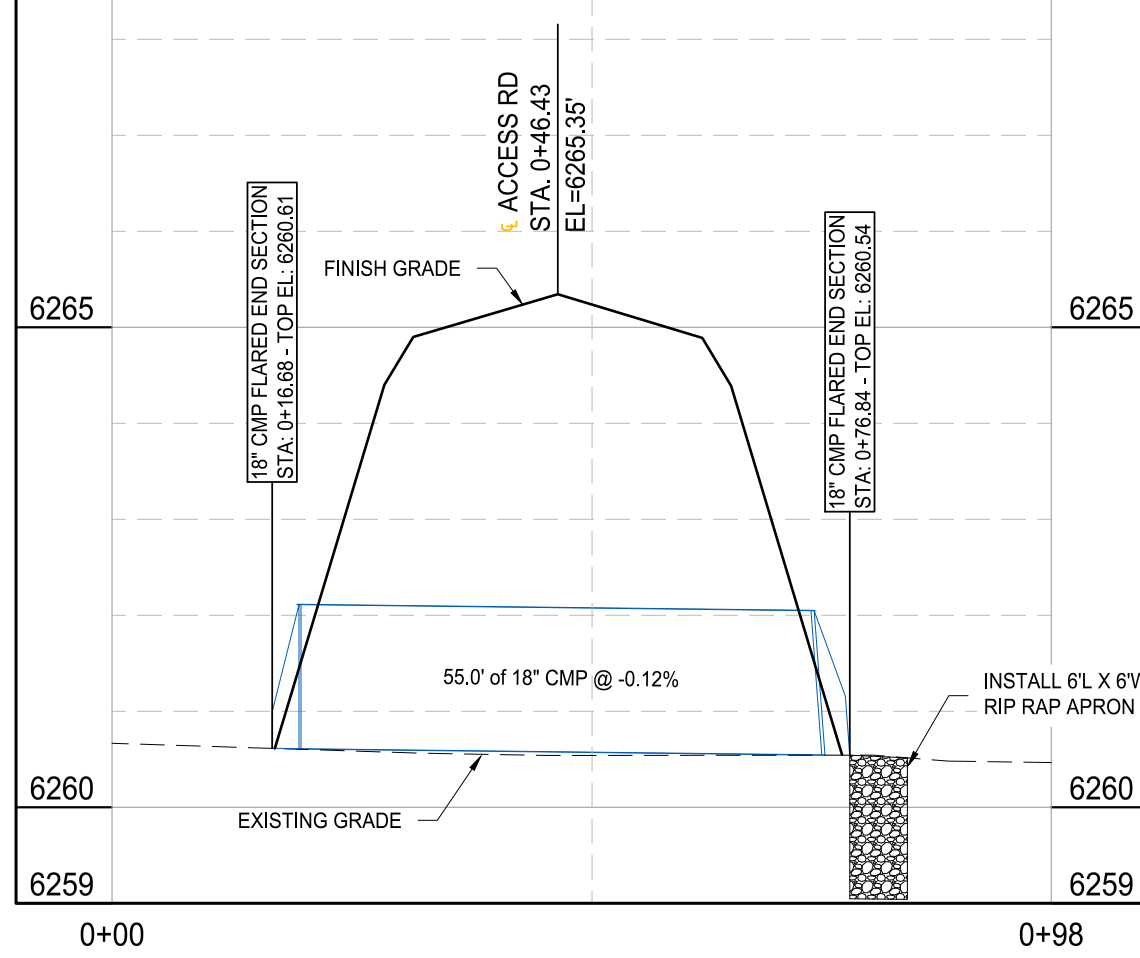
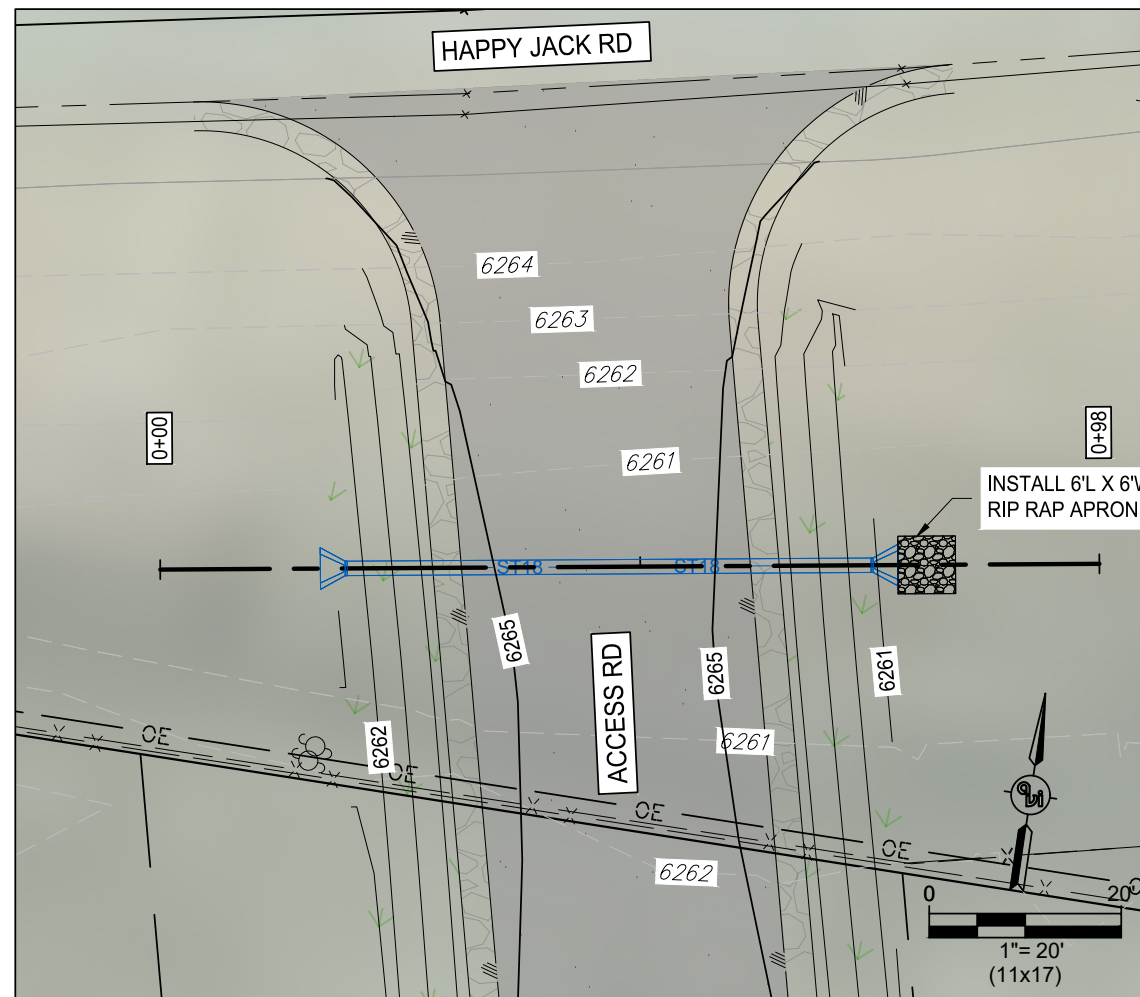
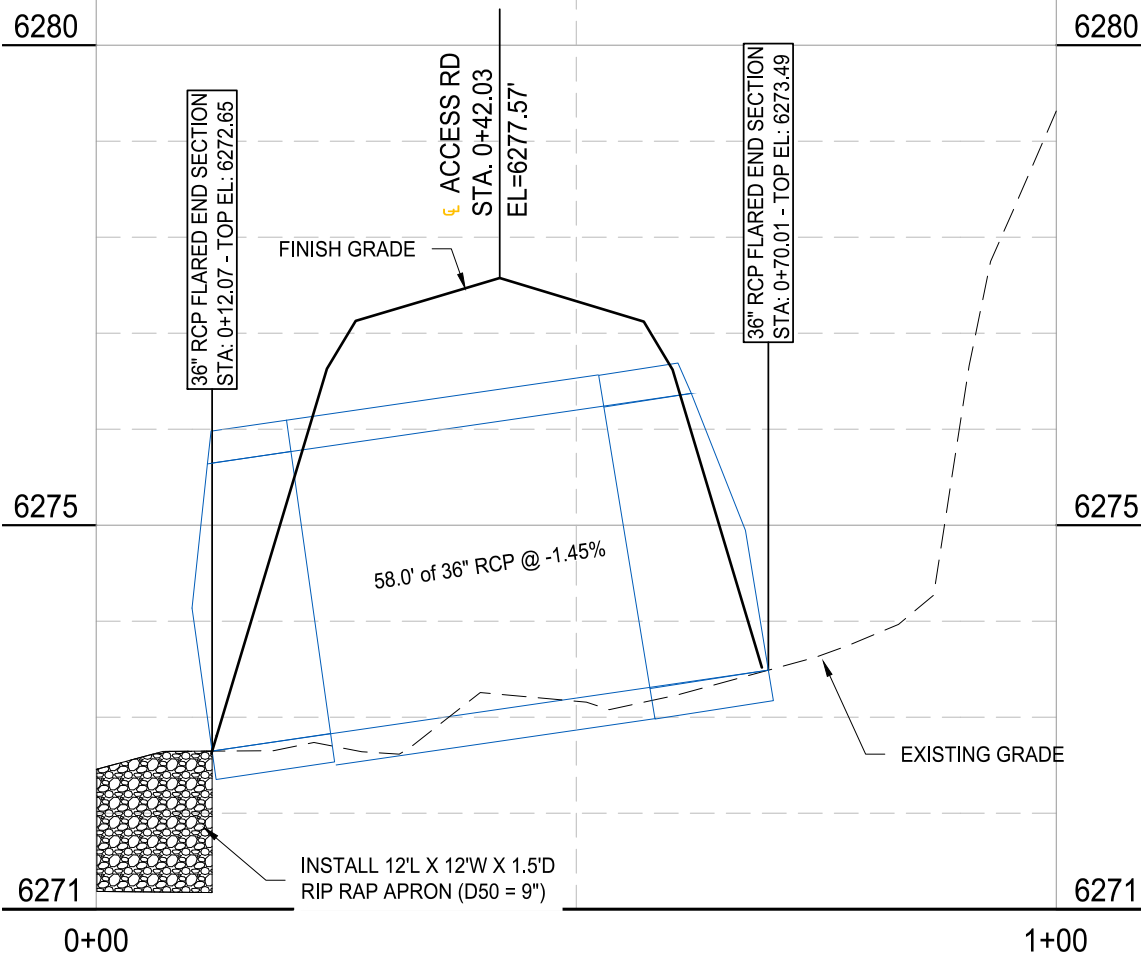
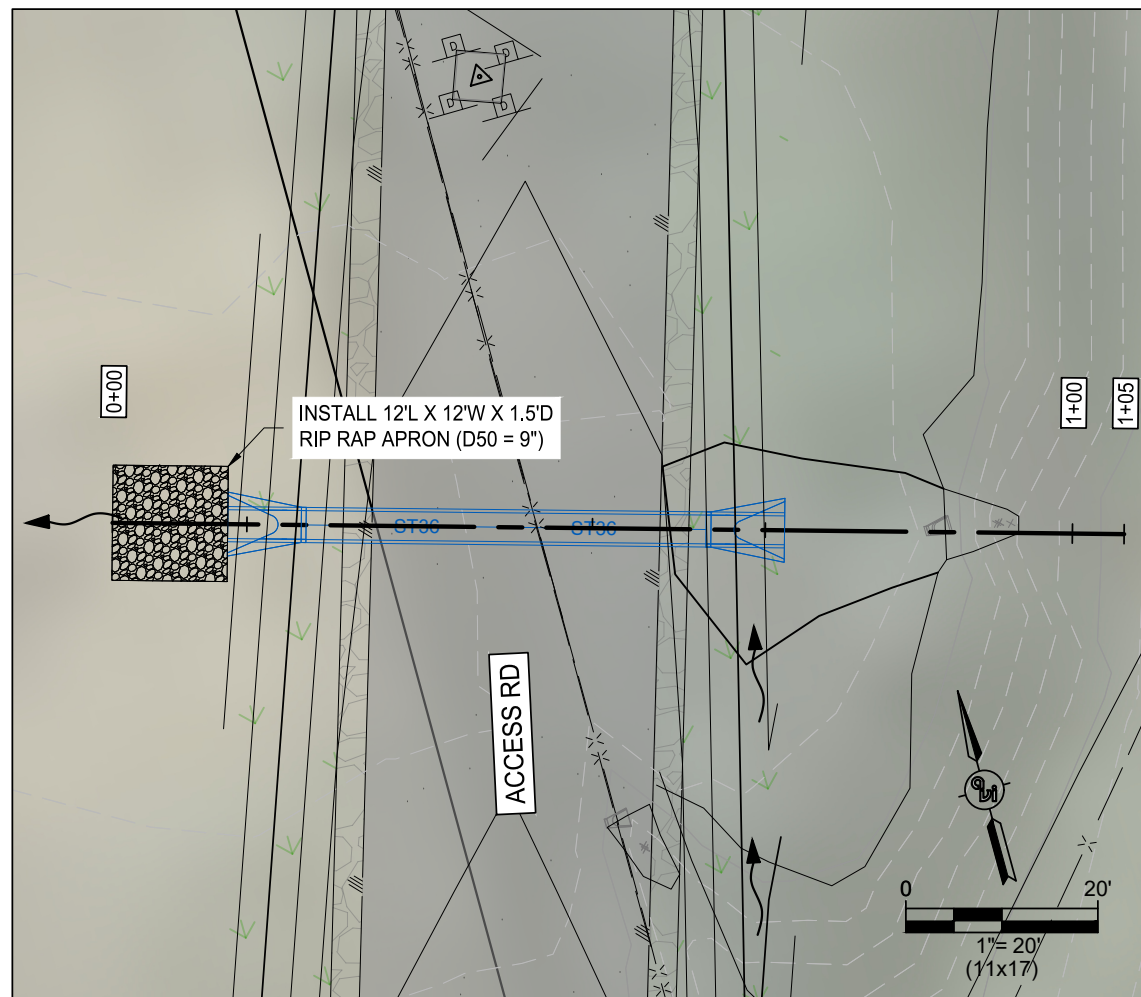
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DESIGNED BY: CK

CHECKED BY: TC

JOB NO.: 5016

DWG NO. CU1 OF



NO.	REVISION	DATE

**90% PLANS**  
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PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
CULVERT PLAN & PROFILES



DATE PLOTTED:  
Dec 17, 2025

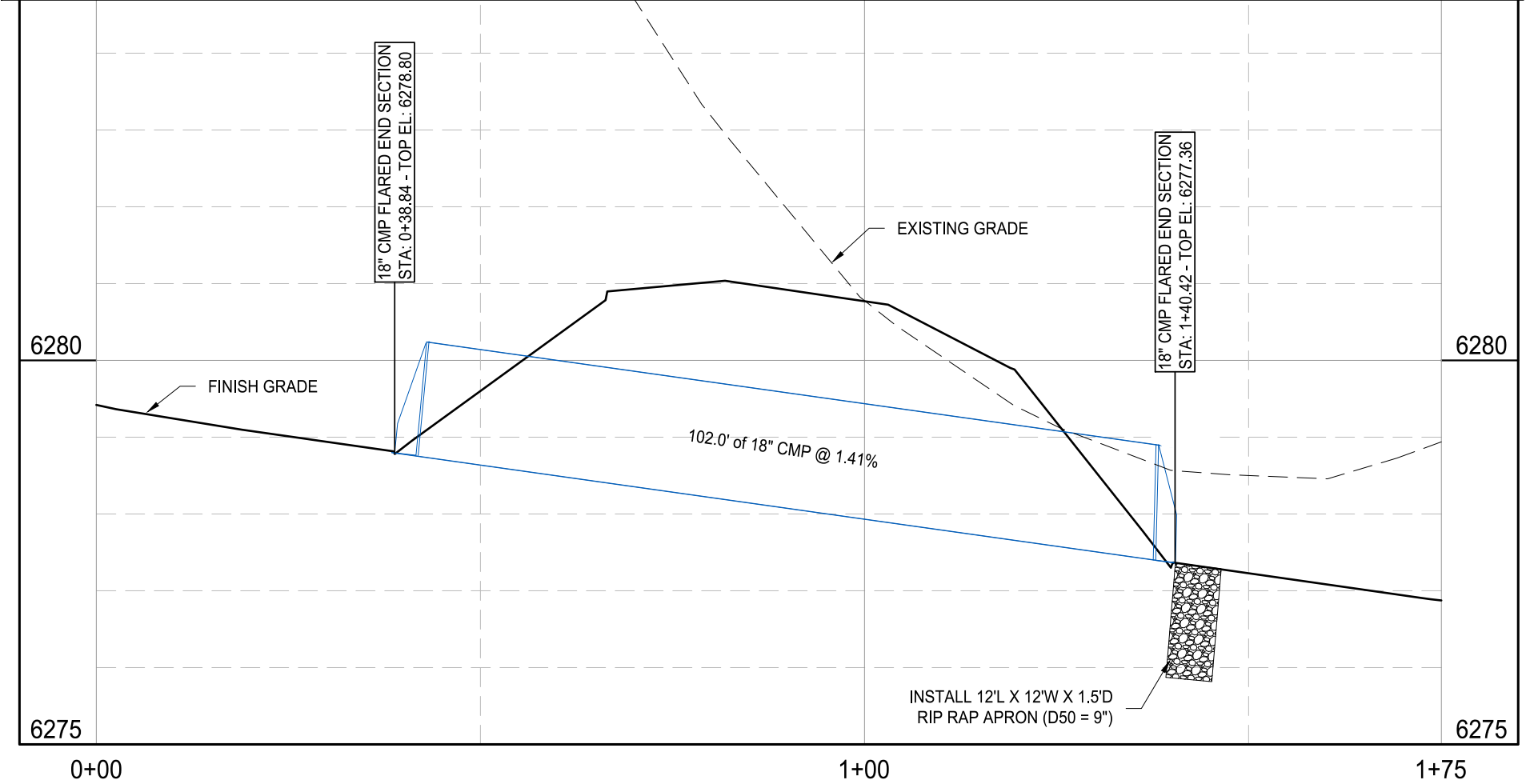
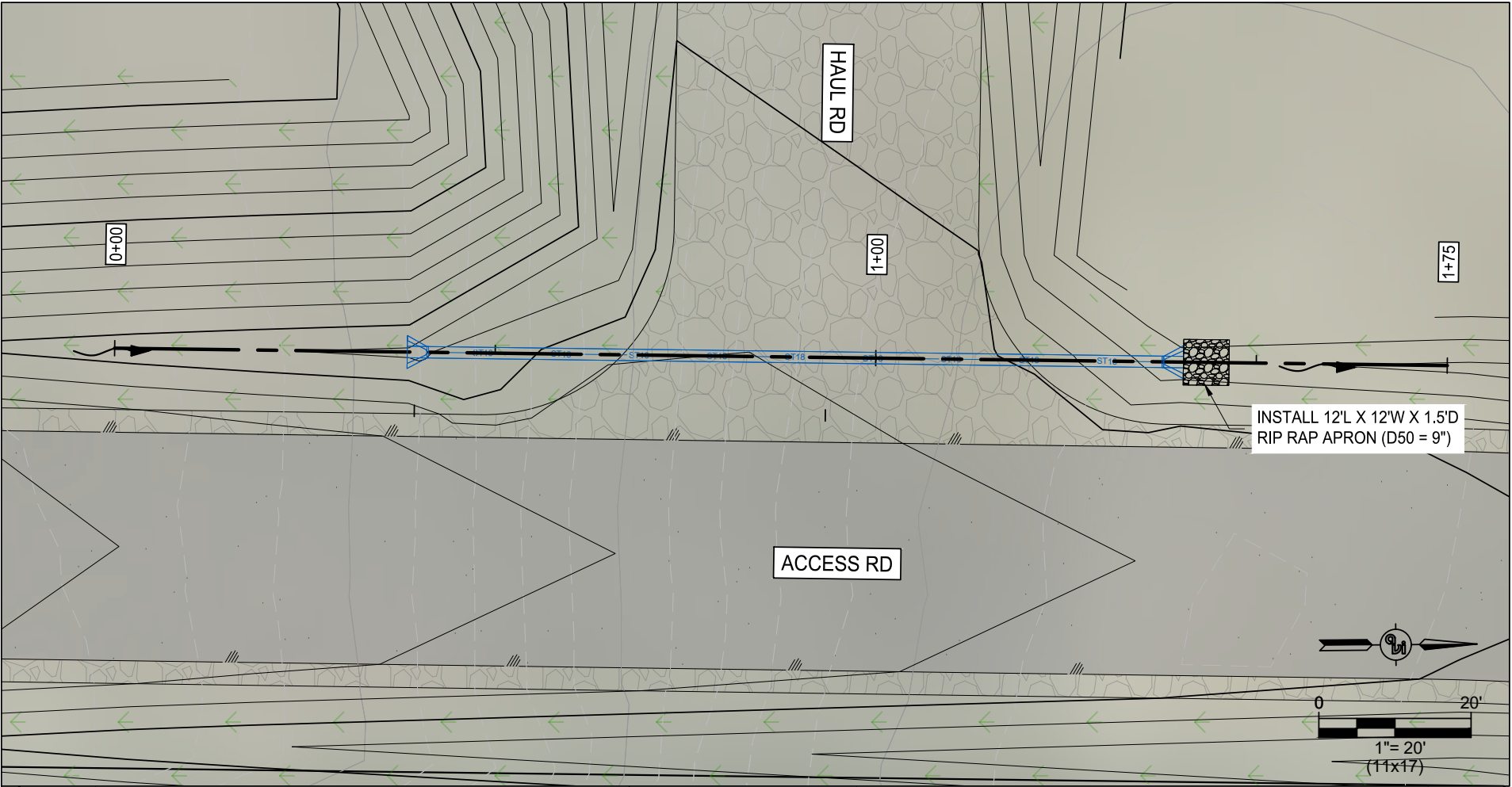
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JOB NO.: 5016

DWG NO. CU2 OF



NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
CULVERT PLAN & PROFILES



ENGINEERING PLANNING SURVEYING

307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

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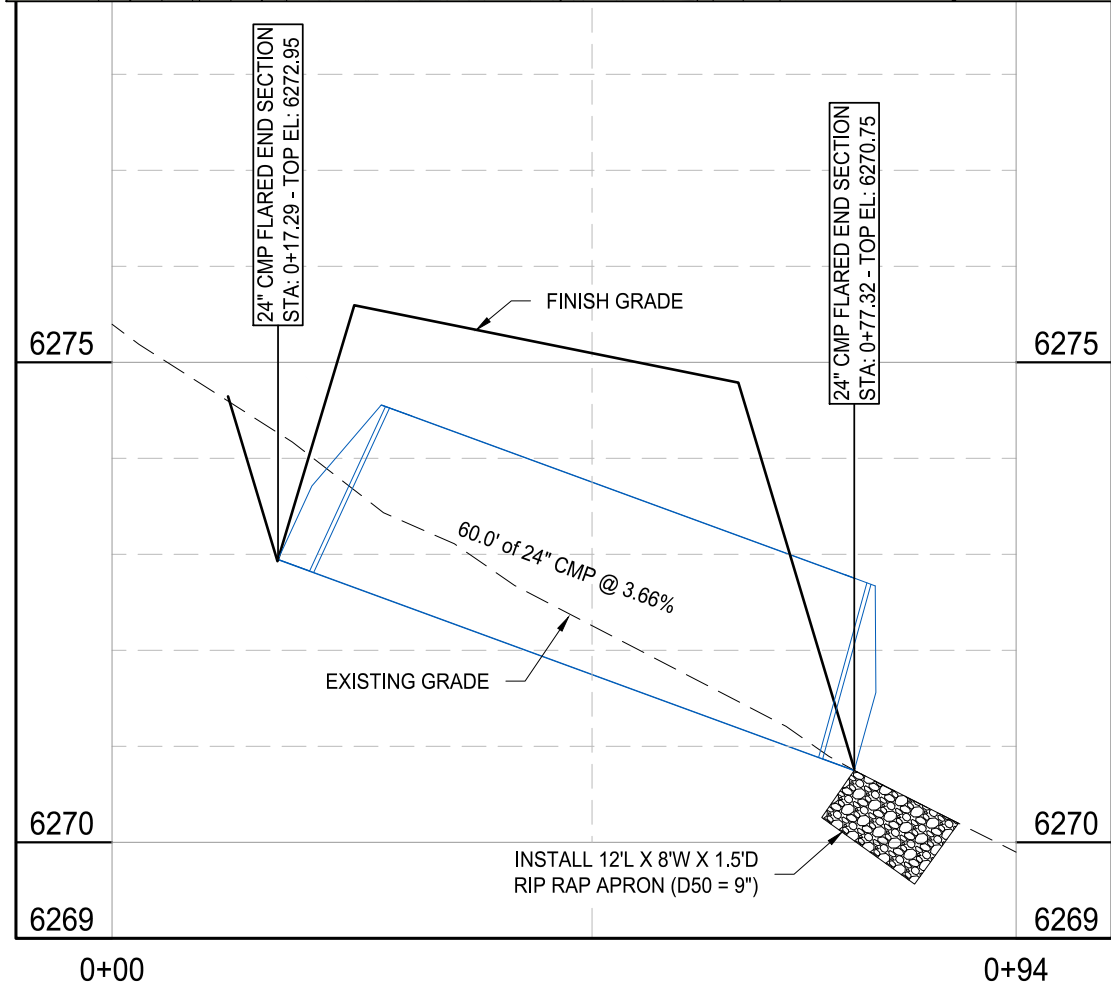
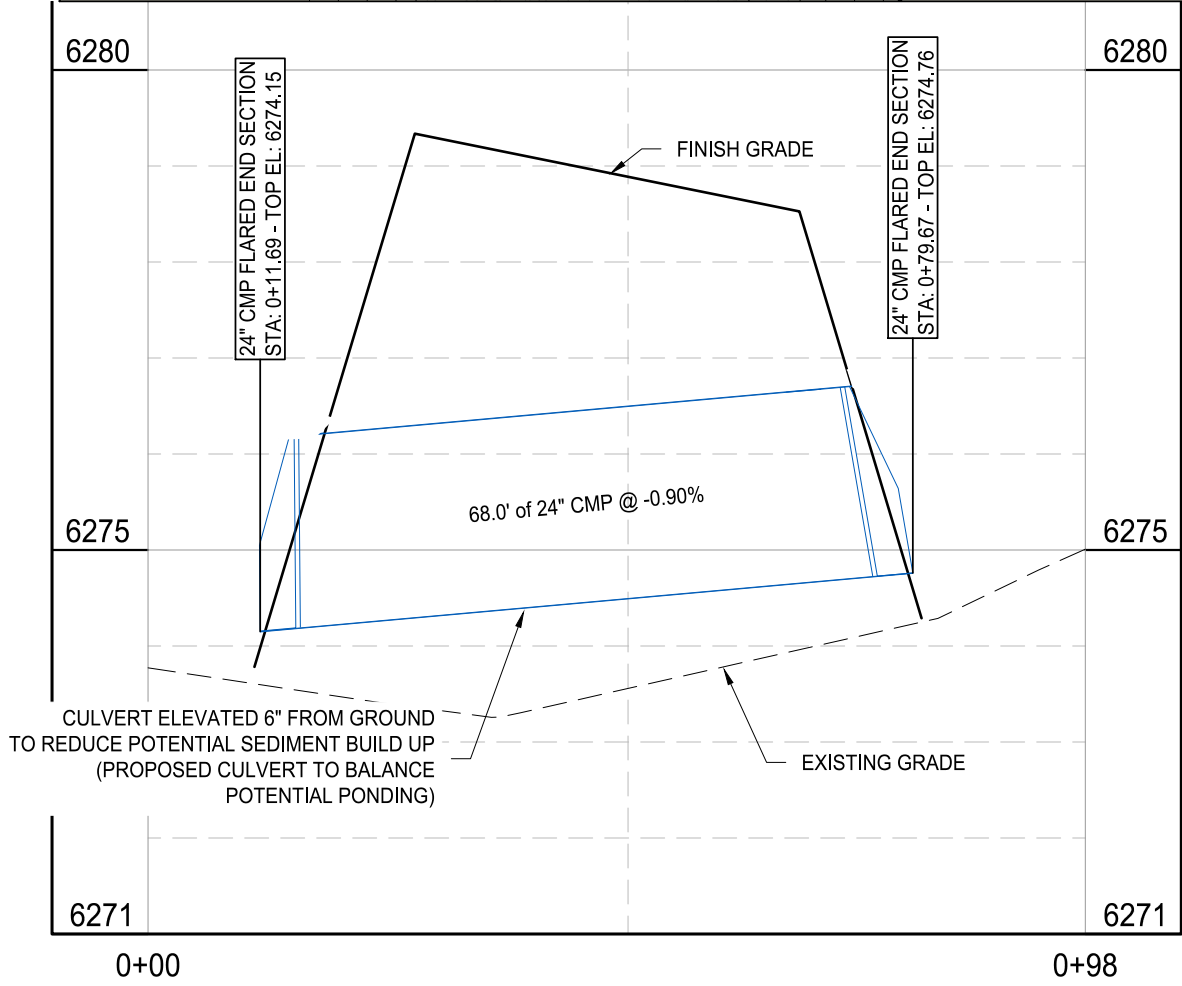
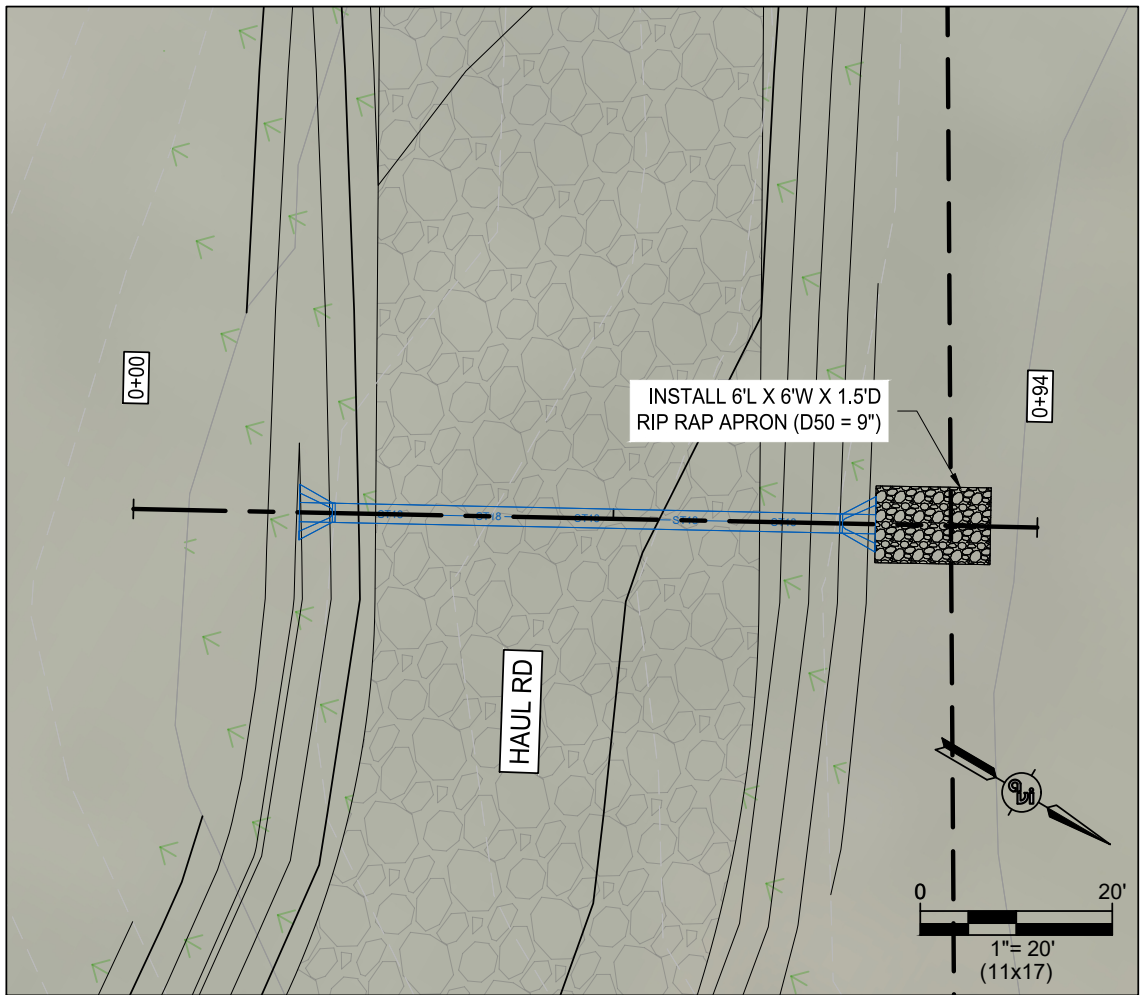
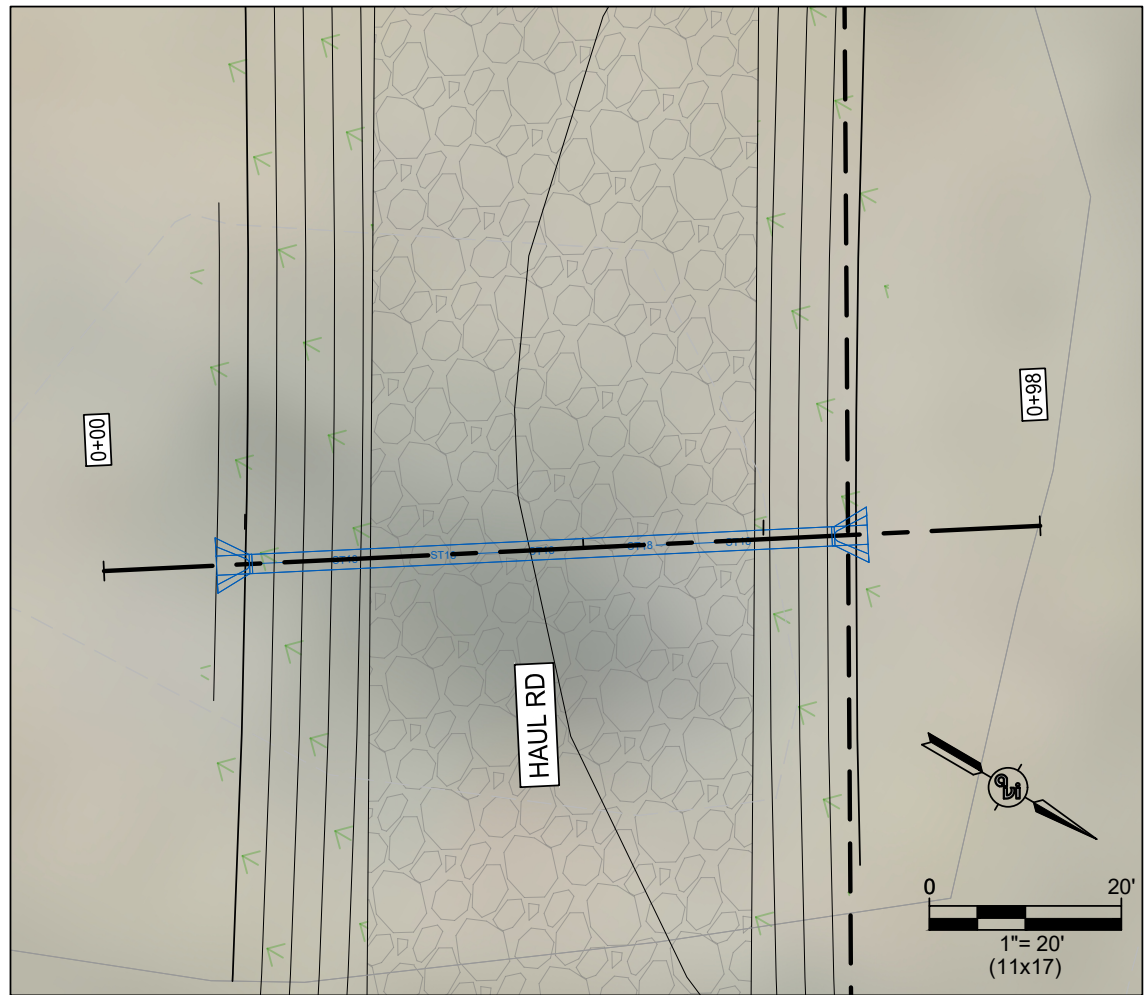
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12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

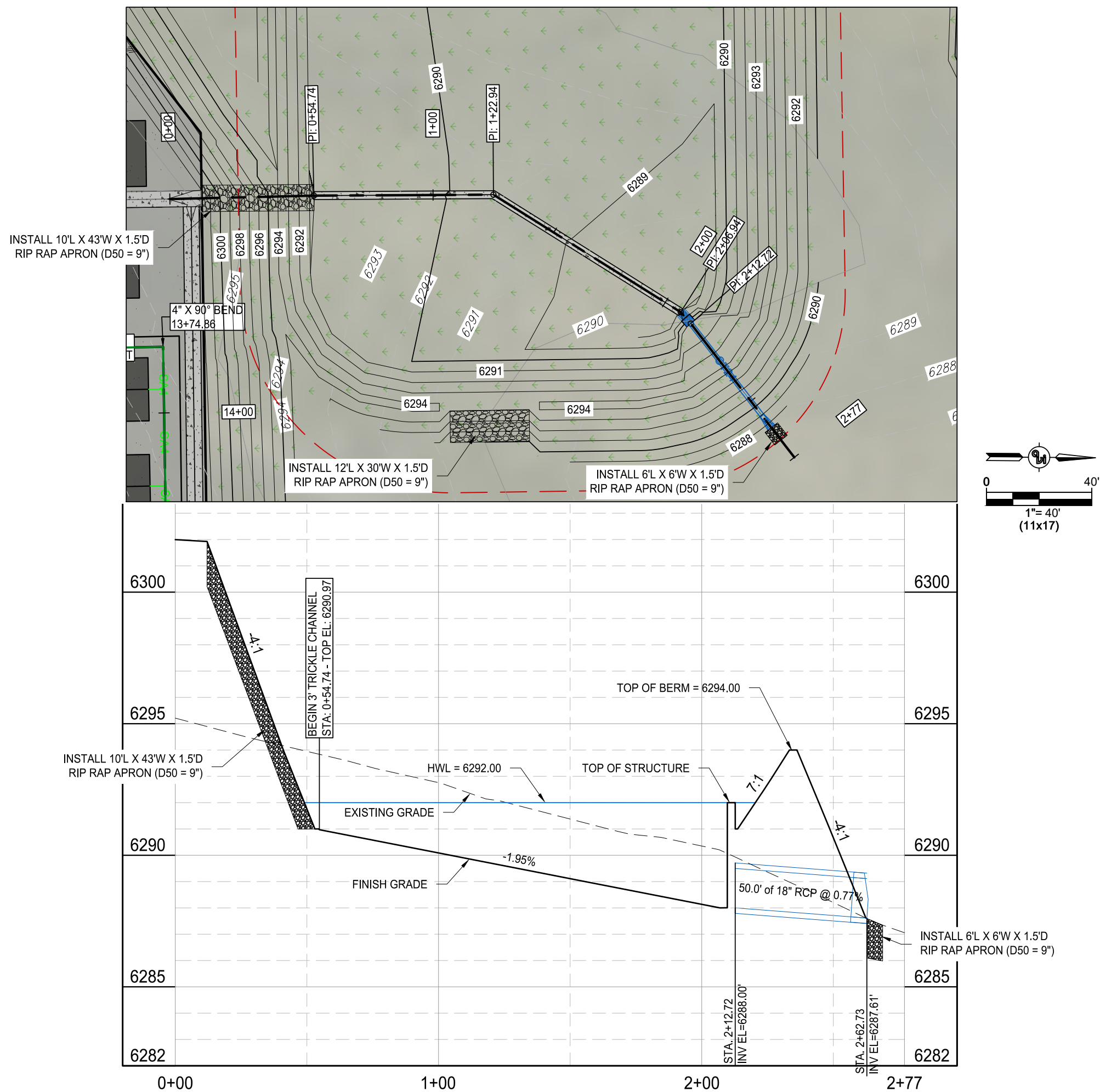
DRAWING TITLE:  
CULVERT PLAN & PROFILES

**avi** 45 YEARS  
ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025  
DRAWN BY: CK  
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JOB NO.: 5016

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12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

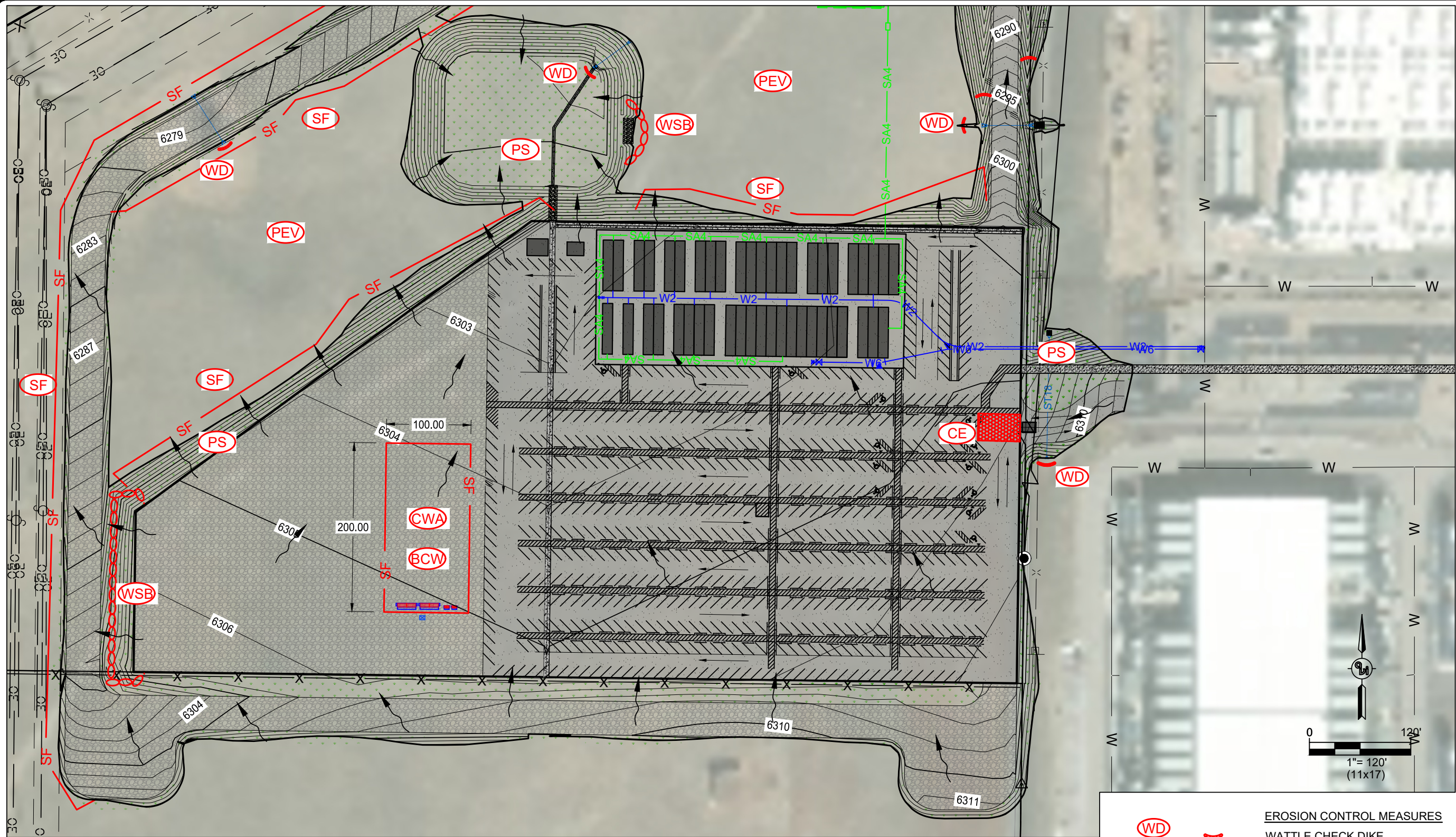
CYS07 STAGING AREA

STORM OUTLET PLAN & PROFILE

ENGINEERING PLANNING SURVEYING  
307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025  
DRAWN BY: CK  
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CHECKED BY: TC  
JOB NO.: 5016  
DWG NO. ST OF





NOTES:

- ANTICIPATED AREA TO BE DISTURBED IS APPROXIMATELY 22.76 ACRES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REQUESTING UTILITY LOCATES AND ARRANGE FOR A REPRESENTATIVE OF THE UTILITY TO BE PRESENT IF THE CONTRACTOR'S OPERATIONS ARE IN CLOSE PROXIMITY TO ANY LINES IN THEIR EXISTING OR RELOCATED POSITION WHICH COULD CREATE A HAZARDOUS CONDITION.
- CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES/DEVICES SO THEY ARE OPERATING PROPERLY AND WILL REPLACE OR FIX ON A NEEDED BASIS, OR AS DIRECTED BY THE ENGINEER.
- THIS SWPPP PLAN IS FOR INFORMATIONAL PURPOSES ONLY, AND EROSION CONTROL FEATURES AND QUANTITIES SHOWN ARE ESTIMATES ONLY. THE CONTRACTOR MAY HAVE TO ADD, AND ADJUST, EROSION CONTROL FEATURES AS REQUIRED BY THE SWPPP, WYPDES PERMIT, REGULATORY INSPECTORS, OWNER'S REPRESENTATIVE, THE ENGINEER, AND/ OR PER GRADING OPERATIONS.
- ALL SEDIMENTS TRACKED OUTSIDE THE PROJECT AREA MUST BE SWEEPED BY CONTRACTOR IN A TIMELY MANNER OR AS DIRECTED BY THE ENGINEER OR OWNER'S REPRESENTATIVE.
- IN THE EVENT THAT CONSTRUCTION PLANS CHANGE AND/OR THE BMPs LISTED IN THE SWPPP ARE DEEMED INEFFICIENT, THE CONTRACTOR WILL BE RESPONSIBLE FOR AMENDING THE SWPPP AND IMPLEMENTING NEW BMPs.
- THE EXTENT OF THE DISTURBANCE WILL BE LIMITED TO THE CONSTRUCTION LIMITS.

LEGEND

- GRADING LIMITS
- - - - - EXISTING 1' MINOR CONTOUR
- EXISTING 5' MAJOR CONTOUR
- PROPOSED 1' MINOR CONTOUR
- PROPOSED 5' MAJOR CONTOUR
- [Pattern] PROPOSED GRAVEL SURFACING
- [Pattern] PROPOSED ASPHALT SURFACING

- (WD) WATTLE CHECK DIKE
- (WSB) WATTLE SLOPE BARRIER
- (SF) SILT FENCE
- (PS) PERMANENT SEEDING
- (CE) VEHICLE TRACKING PAD
- (CWA) CONCRETE WASHOUT AREA
- (BCW) BUILDING MATERIAL WASHOUT AREA
- [Symbol] TEMPORARY RESTROOM STATION
- [Symbol] DUMPSTERS
- [Symbol] DRAINAGE ARROW
- (PEV) PRESERVE EXISTING VEGETATION

EROSION CONTROL MEASURES

- WATTLE CHECK DIKE
- WATTLE SLOPE BARRIER
- SILT FENCE
- PERMANENT SEEDING
- VEHICLE TRACKING PAD
- CONCRETE WASHOUT AREA
- BUILDING MATERIAL WASHOUT AREA
- TEMPORARY RESTROOM STATION
- DUMPSTERS
- DRAINAGE ARROW
- PRESERVE EXISTING VEGETATION

NO.	REVISION	DATE

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
EROSION CONTROL PLAN



307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

DRAWN BY: CK

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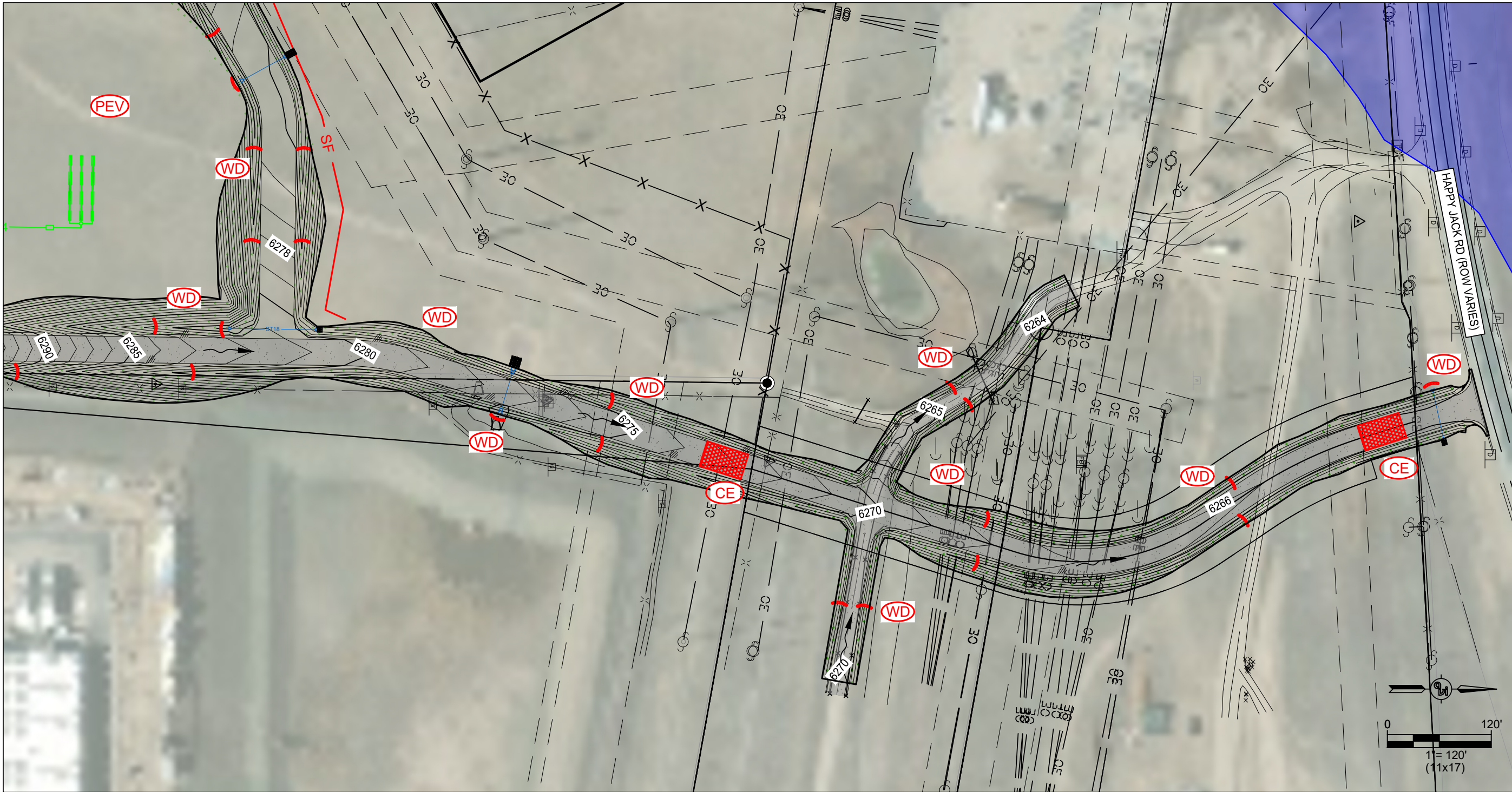
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NOTES:

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LEGEND

- CONSTRUCTION LIMITS
- EXISTING 1' MINOR CONTOUR
- EXISTING 5' MAJOR CONTOUR
- PROPOSED 1' MINOR CONTOUR
- PROPOSED 5' MAJOR CONTOUR

- WD
- WSB
- SF
- PS
- CE
- PEV

- WATTLE CHECK DIKE
- WATTLE SLOPE BARRIER
- SILT FENCE
- PERMANENT SEEDING
- VEHICLE TRACKING PAD
- DRAINAGE ARROW
- PRESERVE EXISTING VEGETATION

EROSION CONTROL MEASURES

- WATTLE CHECK DIKE
- WATTLE SLOPE BARRIER
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- VEHICLE TRACKING PAD
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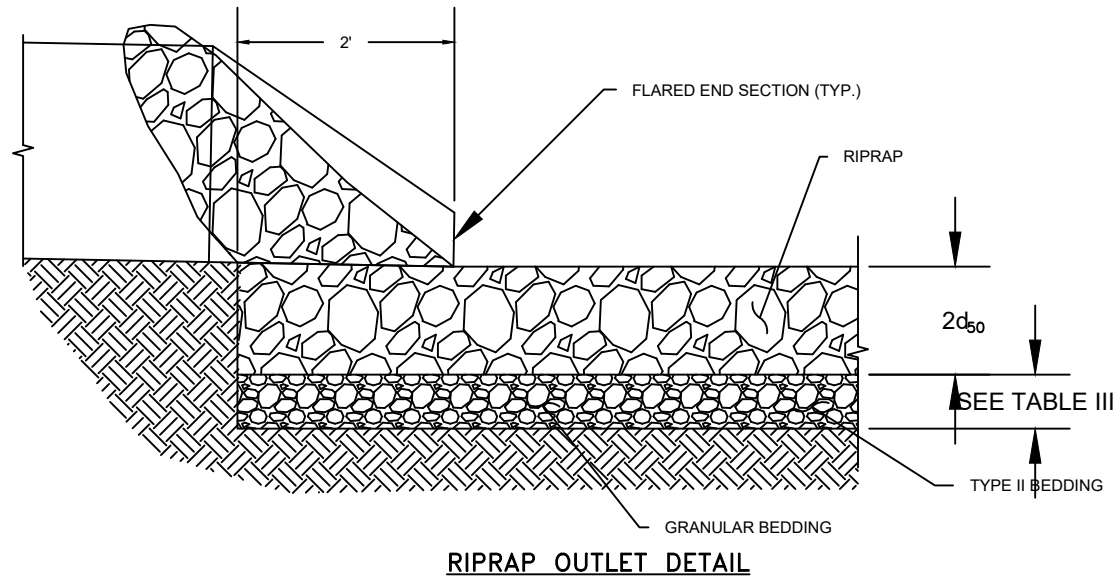
NO.	REVISION	DATE

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THORNTON, CO 80241

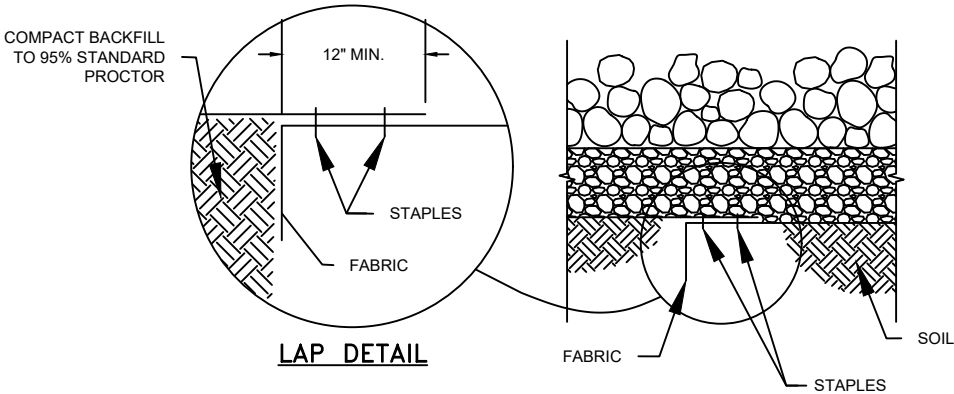
90% PLANS  
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CYS07 STAGING AREA

EROSION CONTROL PLAN



RIPRAP OUTLET DETAIL



LAP DETAIL

FILTER FABRIC PLACEMENT AND LAP DETAIL

TABLE II GRADATION FOR GRANULAR BEDDING		
U.S. STANDARD SIEVE SIZE	PERCENT WEIGHT BY PASSING SQUARE-MESH SIEVES	
	TYPE I	TYPE II
3 INCHES	----	90-100
1 1/2 INCHES	----	----
3/4 INCHES	----	20-90
3/8 INCHES	100	----
#4	95-100	0-20
#16	45-80	----
#50	10-30	----
#100	2-10	----
#200	0-2	0-3

TABLE I CLASSIFICATION AND GRADATION OF ORDINARY RIPRAP			
RIPRAP DESIGNATION	% SMALLER THAN GIVEN SIZE BY WEIGHT	INTERMEDIATE ROCK DIMENSIONS (INCHES)	d <sub>50</sub> (INCHES)*
TYPE VL	70-100	12	6**
	50-70	9	
	35-50	6	
	2-10	2	
TYPE L	70-100	15	9**
	50-70	12	
	35-50	9	
	2-10	3	
TYPE M	70-100	21	12
	50-70	18	
	35-50	12	
	2-10	4	
TYPE H	70-100	30	18
	50-70	24	
	35-50	18	
	2-10	6	
TYPE VH	70-100	42	24
	50-70	33	
	35-50	24	
	2-10	9	

\* d<sub>50</sub> = MEAN PARTIAL SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.  
\*\* MIX VL AND L RIPRAP WITH 30% (BY VOLUME) TOPSOIL AND BURY IT WITH 6+ INCHES OF TOP SOIL, ALL VIBRATION COMPACTED, AND REVEGETATED.

TABLE III THICKNESS REQUIREMENTS FOR GRANULAR BEDDING			
U.S. STANDARD SIEVE SIZE	PERCENT WEIGHT BY PASSING SQUARE-MESH SIEVES		
	FINE-GRAINED SOILS*		COURSE-GRAINED SOILS**
	TYPE I	TYPE II	TYPE II
VL(d <sub>50</sub> = 6IN.), L(d <sub>50</sub> = 9 IN.)	4	4	6
M(d <sub>50</sub> = 12 IN.)	4	4	6
H(d <sub>50</sub> = 18 IN.)	4	6	8
VH(d <sub>50</sub> = 24 IN.)	4	6	8

\* MAY SUBSTITUTE ONE 12-INCH LAYER OF TYPE II BEDDING. THE SUBSTITUTE 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.

\*\* FIFTY PERCENT OR MORE BY WEIGHT RETAINED ON THE #40 SIEVE.

RIPRAP AT PIPE OUTLET

NO.	REVISION	DATE

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HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

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RIPRAP DETAILS

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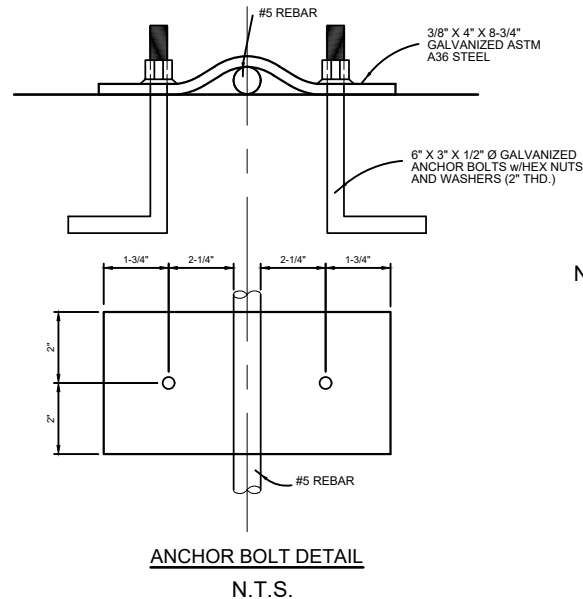
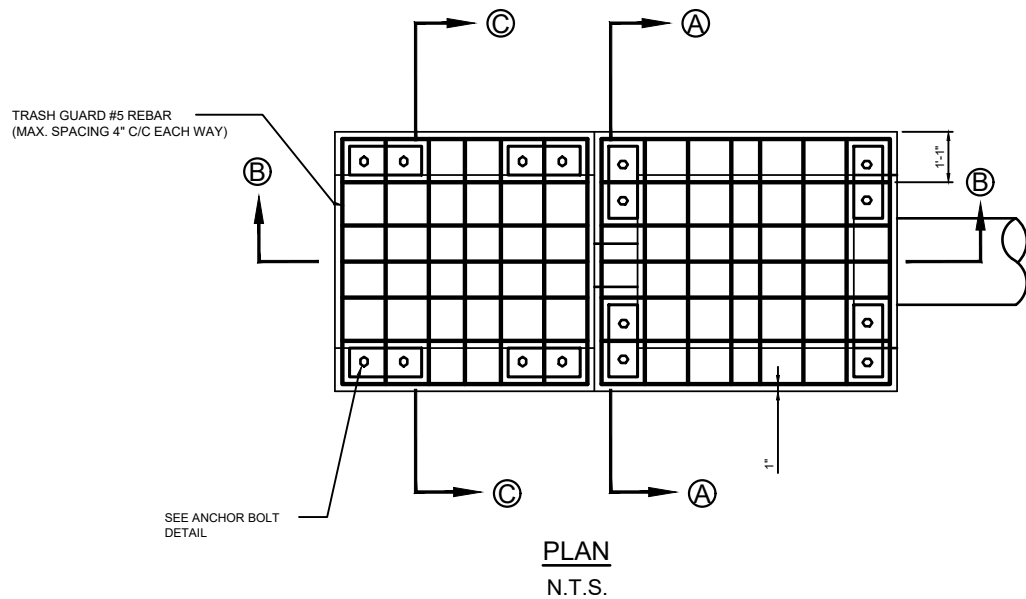
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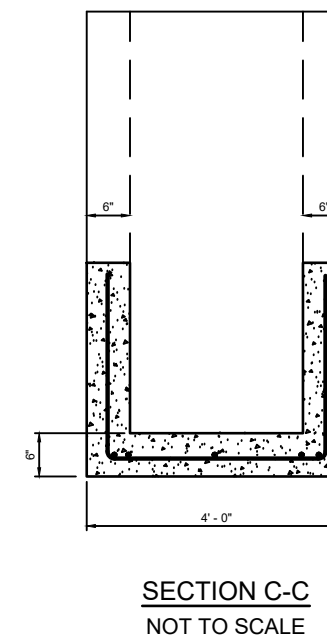
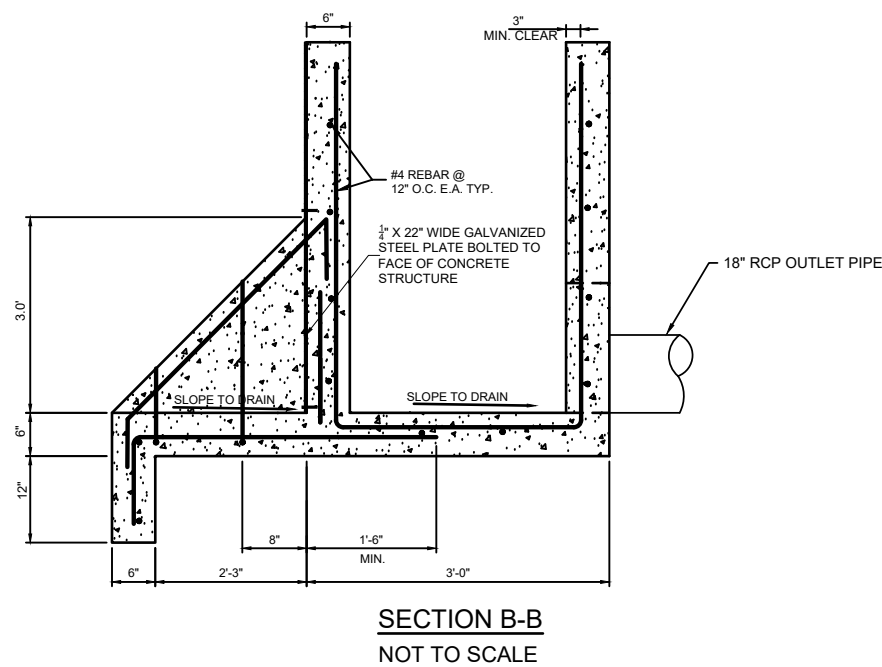
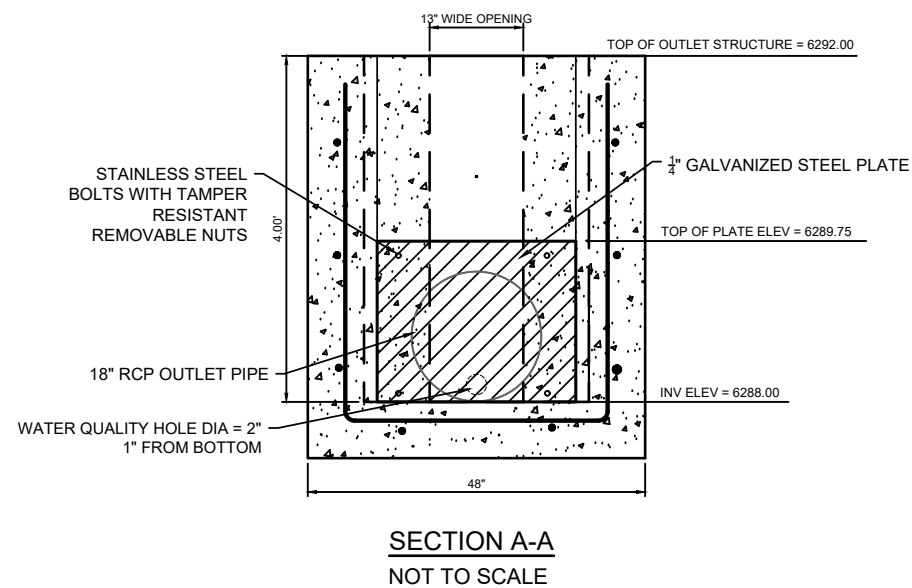




- NOTES:
1. TYPICAL CLEAR SPACE IS 3" MIN.
  2. 90° OVERLAPS CAN BE SUBSTITUTED FOR ONE PIECE BENDS. OVERLAPS SHALL BE 12" MINIMUM
  3. #5 REBAR GRATES TO BE WELDED @ EACH BAR INTERSECTION AND BOTH GRATES TO BE EPOXY COATED.
  4. CONCRETE FOR POND OUTLET STRUCTURE SHALL MEET THE REQUIREMENTS OF CITY OF CHEYENNE SPECIFICATIONS CLASS 4000 CONCRETE.
  5. REINFORCING STEEL SHALL BE CENTERED IN THE 6" THICK WALLS AND SLABS.
  6. FIELD TRIM REBAR AS REQUIRED.
  7. THE FLOOR SLAB OF THE OUTLET STRUCTURE SHALL BE SLOPED A MINIMUM OF  $\frac{1}{2}$ " PER FOOT TOTAL.
  8. THE GALVANIZED STEEL PLATE SHALL BE ATTACHED TO THE OUTLET STRUCTURE W/ STAINLESS STEEL EXPANSION ANCHOR BOLTS AND REMOVABLE STAINLESS STEEL NUTS.
  9. ADD 1 ADDITIONAL 'A' BAR EACH SIDE OF THE 18" OUTLET CULVERT, AND ADD 1 ADDITIONAL 'B' BAR ON THE TOP SIDE OF THE 18" OUTLET CULVERT.

OUTLET STRUCTURE SUMMARY

OUTLET PIPE DIA.	OUTLET INV. ELEV.	TOP OF PLATE ELEV.	TOP OF STRUCTURE ELEV.
18" RCP	6288.00	6289.75	6292.00



DATE	
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NO.	

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THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

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OUTLET STRUCTURE DETAILS

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DATE PLOTTED:  
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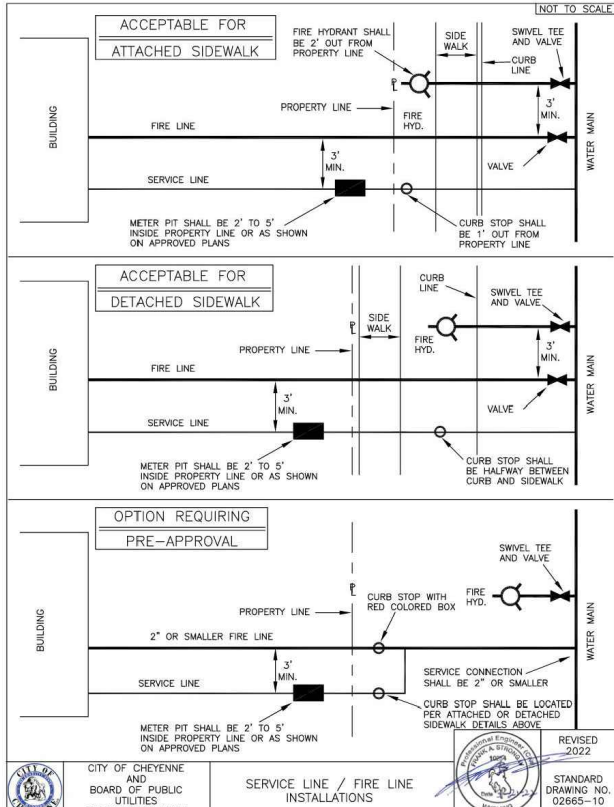
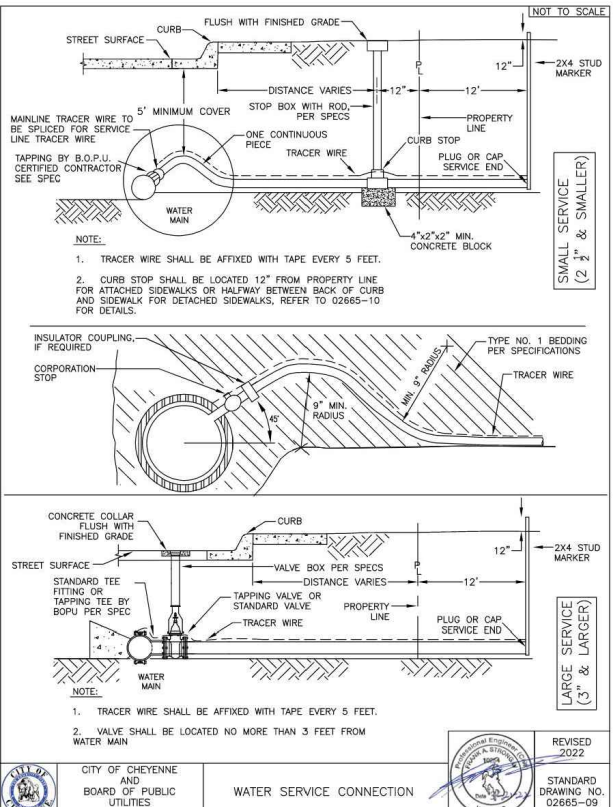
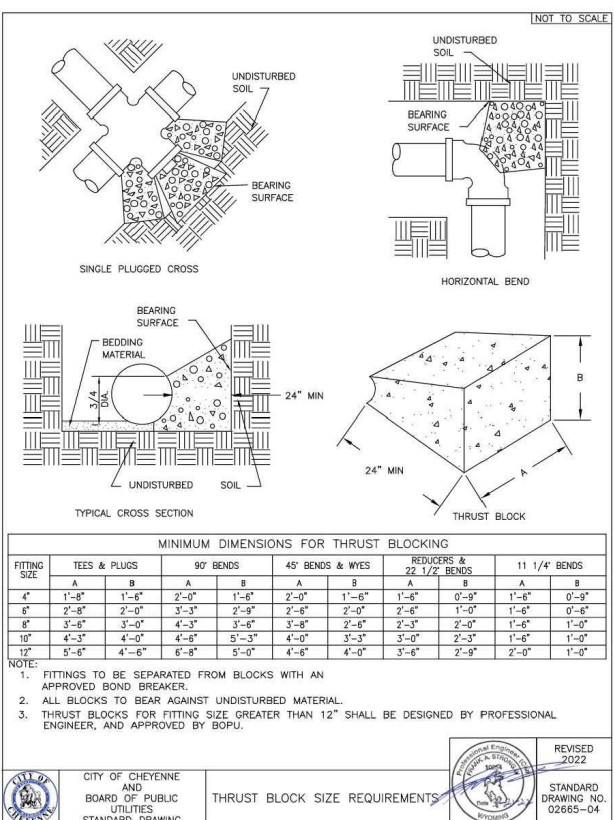
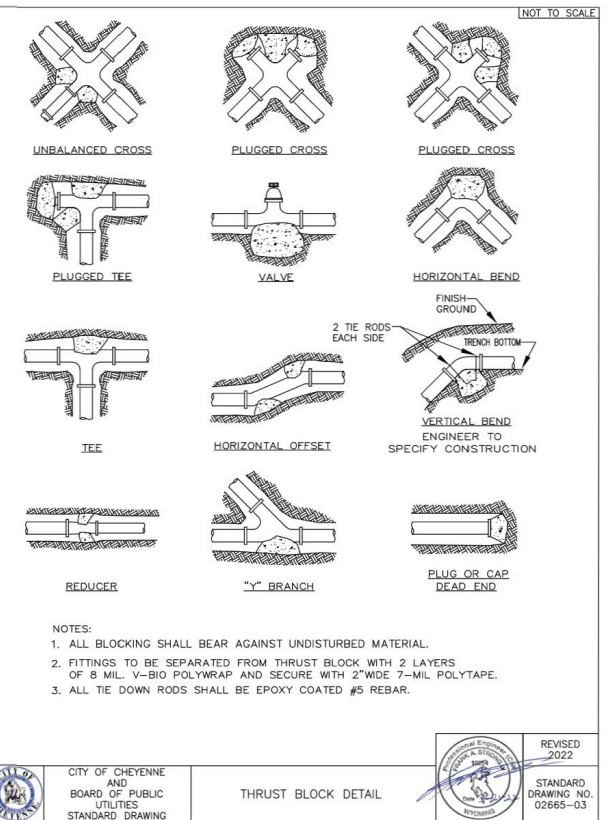
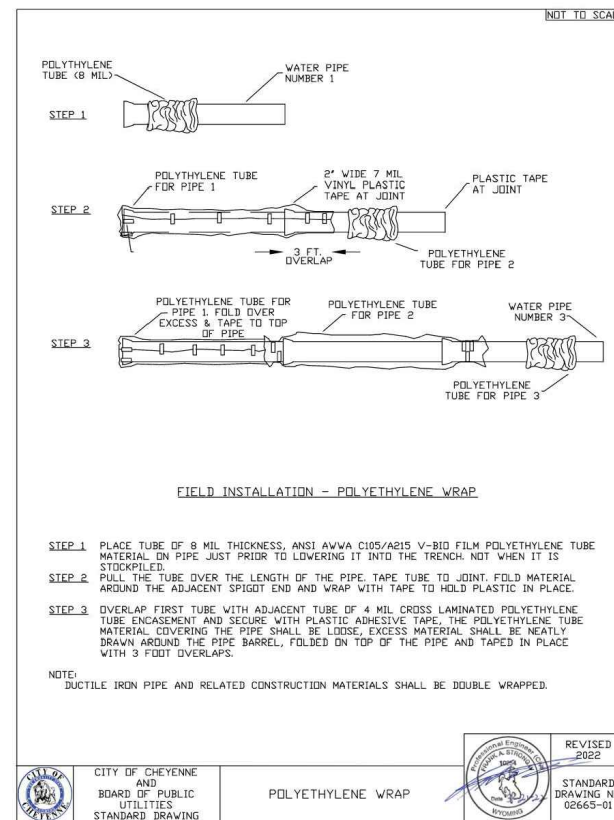
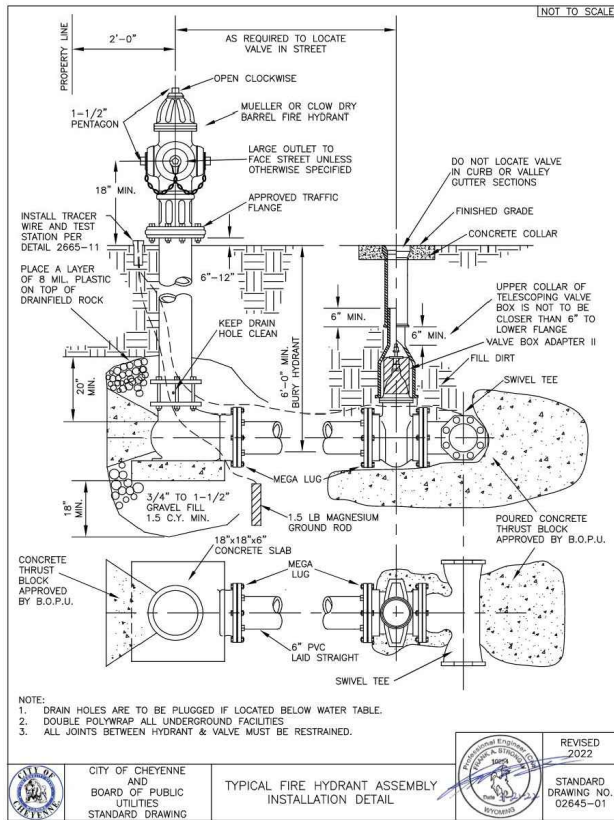
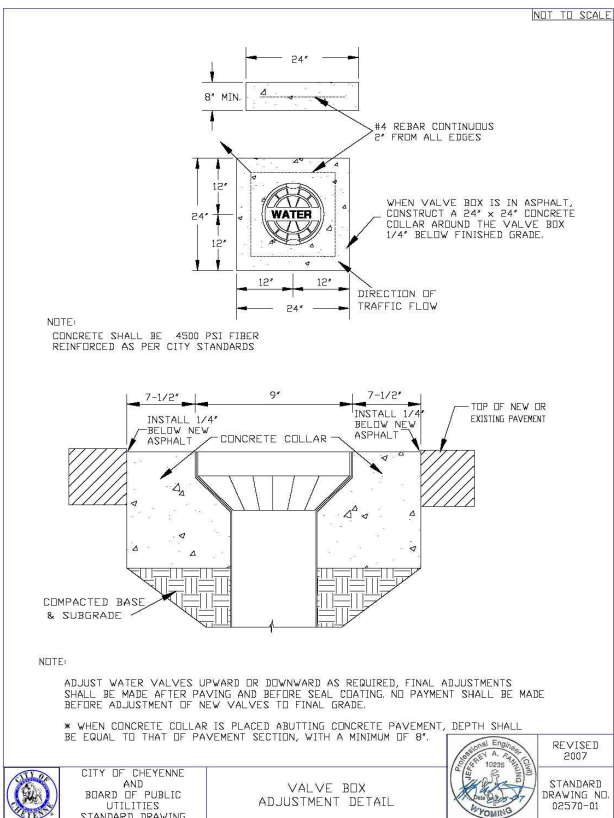
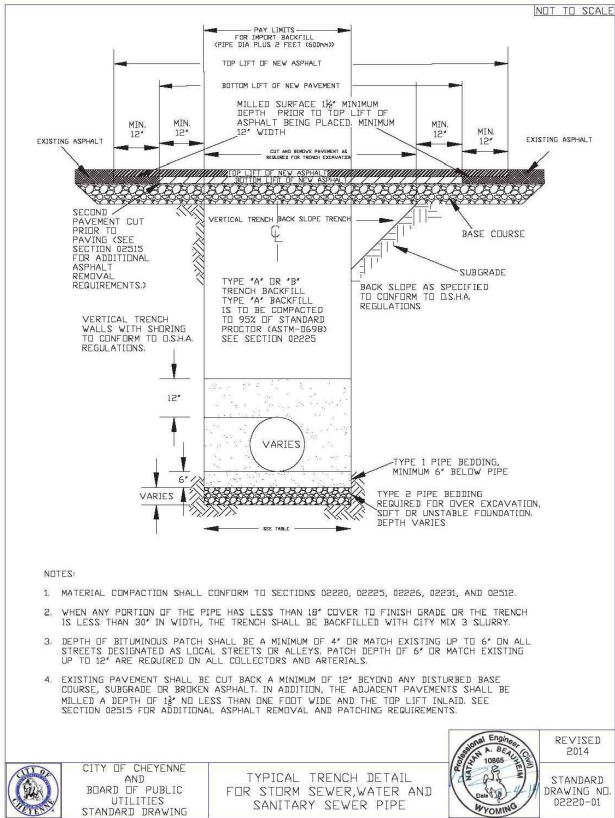
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5016

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DATE

REVISION

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PREPARED FOR:

HENSEL PHELPS

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THORNTON, CO 80241

PROJECT:

CYS07 STAGING AREA

DRAWING TITLE:

STANDARD DETAILS

DATE PLOTTED:

Dec 17, 2025

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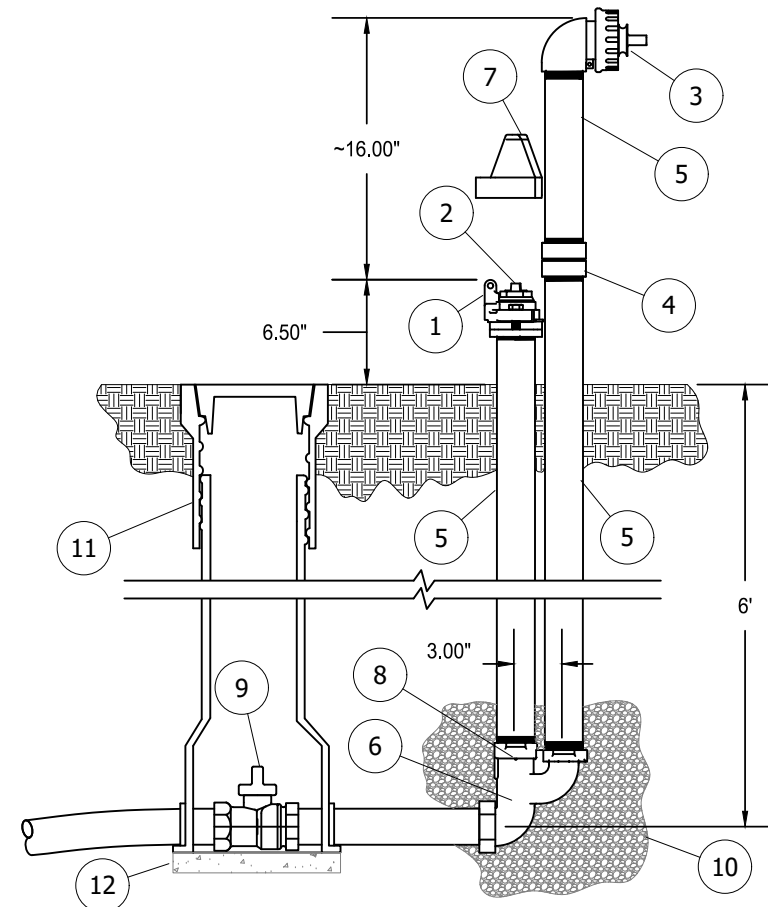
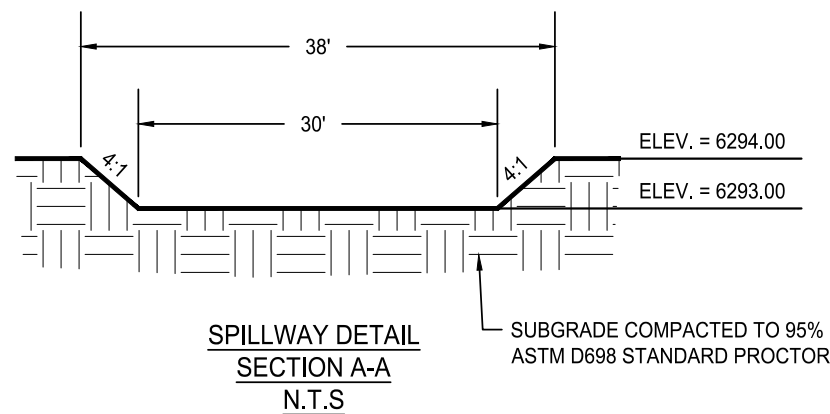
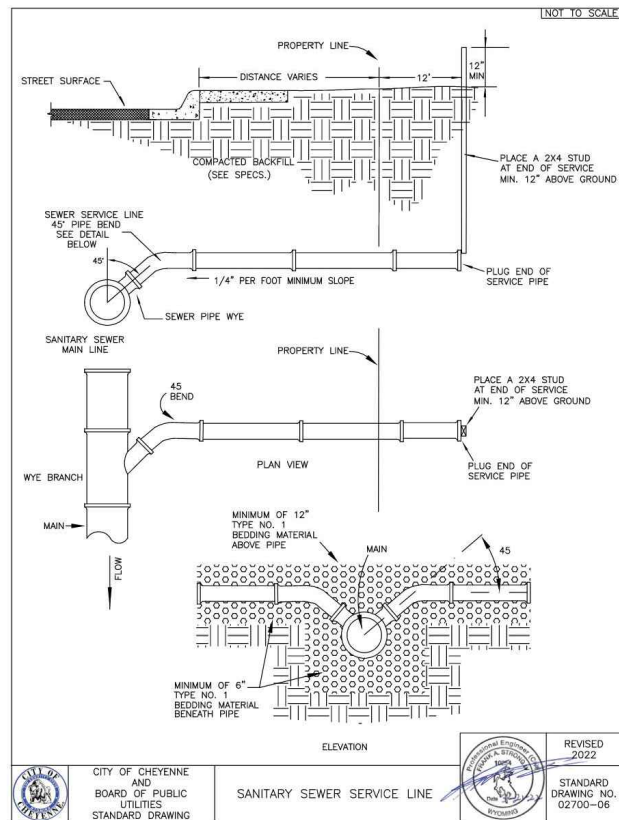
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JOB NO.:

5016

DWG NO. DT3 OF





ITEM	ITEM / DESCRIPTION	NOTES
1	TOP CAP	
2	SLOTTED OPERATING NUT	
3	2-1/2" NST OUTLET	SHOWN WITH CAP
4	2" COUPLING	
5	2" STEEL PIPE	
6	INLET VALVE BODY	
7	LOCKING COVER	
8	DRAIN HOLE	
9	HYDRANT SHUT-OFF VALVE	BY OTHERS
10	CRUSHED ROCK	BY OTHERS
11	VALVE BOX	BY OTHERS
12	SOLID CONCRETE BLOCK	BY OTHERS

BLOW-OFF HYDRANT DETAIL  
N.T.S

[illegible]

**90% PLANS  
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PREPARED FOR:  
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12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

CYS07 STAGING AREA

## STANDARD DETAILS

**PROJECT:**

**DRAWING TITLE:**



307.637.6017  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 18, 2025

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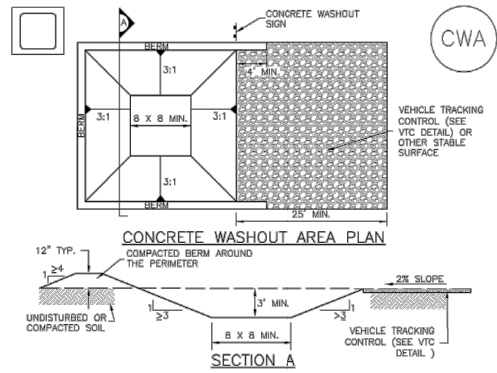
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JOB NO.: 5016

DWG NO. DT4 OF

Concrete Washout Area (CWA)

MM-1

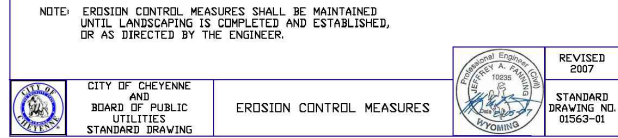
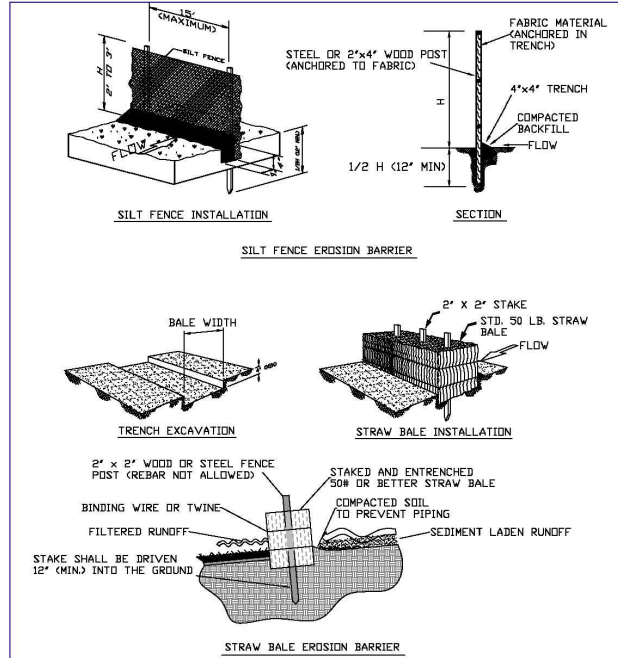


CWA-1. CONCRETE WASHOUT AREA

CWA INSTALLATION NOTES

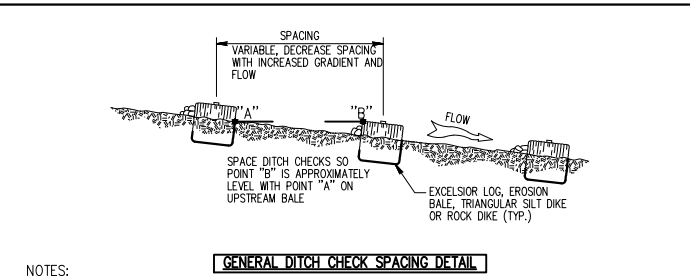
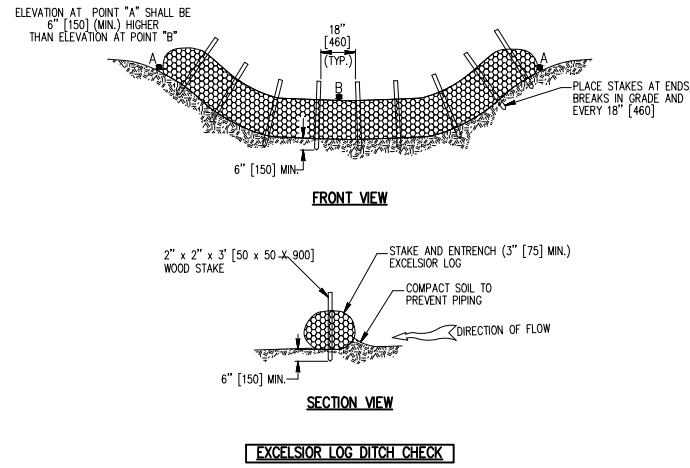
1. SEE PLAN VIEW FOR CWA INSTALLATION LOCATION.
2. DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (18 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
3. THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
4. CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8" BY 8" SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
5. BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
6. VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
7. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
8. USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

November 2010 Urban Drainage and Flood Control District  
Urban Storm Drainage Criteria Manual Volume 3 CWA-3

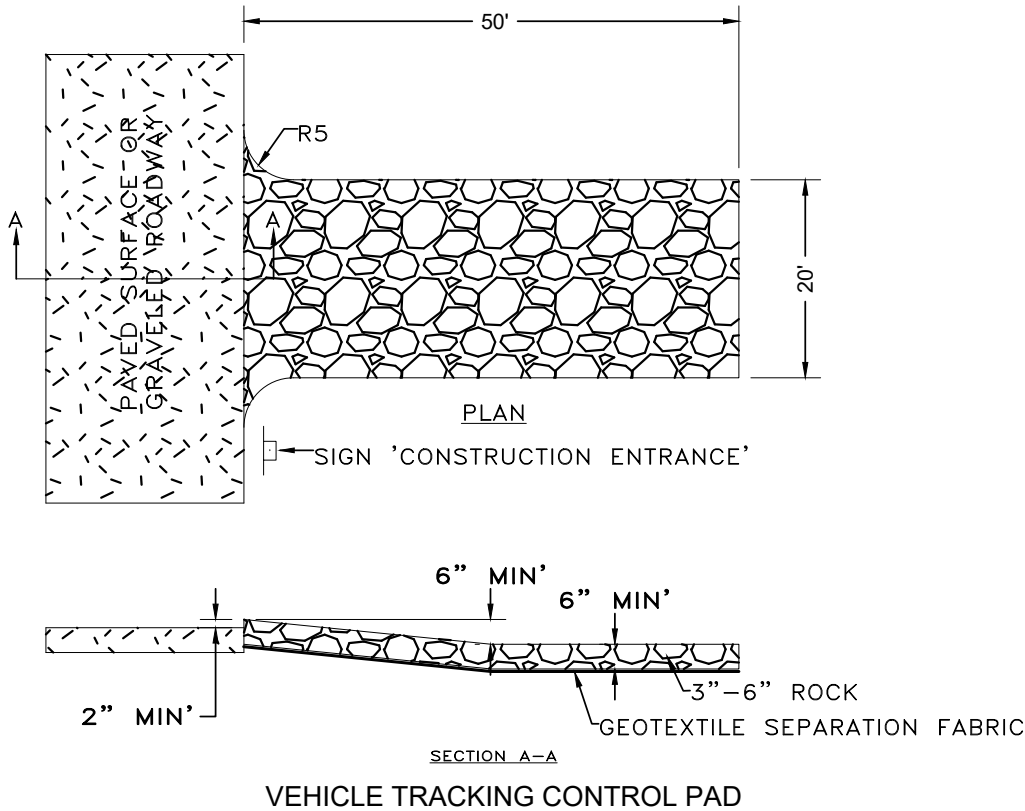


NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL LANDSCAPING IS COMPLETED AND ESTABLISHED, OR AS DIRECTED BY THE ENGINEER.

REVISOR 2007  
STANDARD DRAWING NO. 01563-01



- NOTES:
1. Concentrate the flow of water to the center of the channel.
  2. Place ends of the check dam 6" [150] above the center and curve upstream to prevent flow around the ends.



VEHICLE TRACKING CONTROL PAD

INSTALLATION NOTES:

1. VEHICLE TRACKING CONTROL PAD SHALL BE LOCATED AT EACH ACCESS POINT TO THE CONSTRUCTION SITE.
2. A SIGN SHALL BE PLACED NEXT TO THE VEHICLE TRACKING CONTROL PAD TO DESIGNATE THE LOCATION AS THE CONSTRUCTION ENTRANCE/EXIT.
3. VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE, ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE (i.e. RIVER ROCK AND COBBLES) SHALL NOT BE USED. THE STONES SHALL BE A MINIMUM OF 3" AND A MAXIMUM OF 6" DIAMETER. THE STONES SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTION. ANY DAMAGED PAVEMENTS, CURB & GUTTER AND SIDEWALK SHALL BE REPLACED BY THE CONTRACTOR.

MAINTENANCE NOTES:

1. CONTRACTOR SHALL INSPECT VEHICLE TRACKING CONTROL PAD DAILY. ROCK SURFACE SHALL BE CLEAN AND LOOSE ENOUGH TO RUT SLIGHTLY UNDER WHEEL LOADS AND CAUSE LOOSE ROCK TO DISLodge MUD FROM TIRES. WHEN ROCK BECOMES COMPACTED OR FILLED WITH SEDIMENT SO THAT THE EFFECTIVENESS OF THE PAD IS DIMINISHED, CONTRACTOR SHALL RIP, TURN OVER, OR OTHERWISE LOOSEN ROCK, PLACE ADDITIONAL NEW ROCK, OR REPLACE WITH NEW ROCK AS NECESSARY TO RESTORE EFFECTIVENESS.
2. SEDIMENT AND OTHER MATERIAL SPILLED, DROPPED OR TRACKED ONTO PAVED SURFACES SHALL BE REMOVED IMMEDIATELY OR BY THE END OF EACH WORKING DAY.
3. VEHICLE TRACKING CONTROL PAD SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE AREA SHOULD BE TOPSOILED, SEEDED, AND MULCHED.

DATE	
REVISION	
NO.	

90% PLANS  
NOT FOR CONSTRUCTION

PREPARED FOR:  
HENSEL PHELPS  
12121 GRANT ST, SUITE 410  
THORNTON, CO 80241

PROJECT:  
CYS07 STAGING AREA

DRAWING TITLE:  
STANDARD DETAILS



387.637.6817  
1103 OLD TOWN LANE, SUITE 101  
CHEYENNE, WY 82009  
AVI@AVIPC.COM

DATE PLOTTED:  
Dec 17, 2025

DRAWN BY: CK

DESIGNED BY: CK

CHECKED BY: TC

JOB NO.: 5016

DWG NO. DT5 OF

**RESOLUTION # \_\_\_\_\_**

**A RESOLUTION FOR A CLASS B CONDITIONAL USE PERMIT FOR “MICROSOFT CYS07 PARKING AREA AND LAYDOWN YARD”, SITUATED IN A PORTION OF SECTION 5, T13N, R67W, OF THE 6<sup>TH</sup> P.M., LARAMIE COUNTY, WY.**

**WHEREAS**, Wyoming State Statutes §18-5-101 to 18-5-107; §18-5-201 to 18-5-208; §18-5-301 to 18-5-315 authorize Laramie County, in promoting the public health, safety, morals and general welfare of the county, to regulate the use of land through zoning in unincorporated Laramie County; and

**WHEREAS**, the Laramie County Board of Commissioners have adopted the 2025 Laramie County Land Use Regulations; and

**WHEREAS**, this application meets the criteria for a Class B Conditional Use Permit pursuant to section 2-3-102(d)(ii) of the 2025 Laramie County Land Use Regulations; and

**WHEREAS**, this application meets the criteria for commercial projects pursuant to section 3-1-109 of the 2025 Laramie County Land Use Regulations; and

**WHEREAS**, this application is in conformance with section 2-4-104 of the 2025 Laramie County Land Use Regulations governing the LU – Land Use Zone District.

**NOW THEREFORE BE IT RESOLVED BY THE LARAMIE COUNTY PLANNING COMMISSION**, as follows:

The Laramie County Planning Commission finds that:

- a. This application meets the criteria for a Class B Conditional Use Permit pursuant to section 2-3-102(d)(ii) of the 2025 Laramie County Land Use Regulations.
- b. This application meets the criteria for commercial projects pursuant to section 3-1-109 of the 2025 Laramie County Land Use Regulations.
- c. This application is in conformance with section 2-4-104 of the 2025 Laramie County Land Use Regulations governing the LU – Land Use Zone District.

**and the Planning Commission approves a Class B Conditional Use Permit for the “Microsoft CYS07 Parking Area and Laydown Yard,” situated in a portion of Section 5, T13N, R67W, of the 6<sup>th</sup> P.M., Laramie County WY, with the following conditions:**

1. Comply with Wyoming Game and Fish to avoid development and construction activities at the site between November 15<sup>th</sup> – April 30<sup>th</sup>.
2. All agency comments must be addressed and/or corrected on the site plan prior to a Certificate of Review being issued by Laramie County Planning and Development.

**PRESENTED, READ, AND ADOPTED, this \_\_\_\_\_ day of \_\_\_\_\_, 2025.**

LARAMIE COUNTY PLANNING COMMISSION

\_\_\_\_\_  
Jason Caughey, Chairman

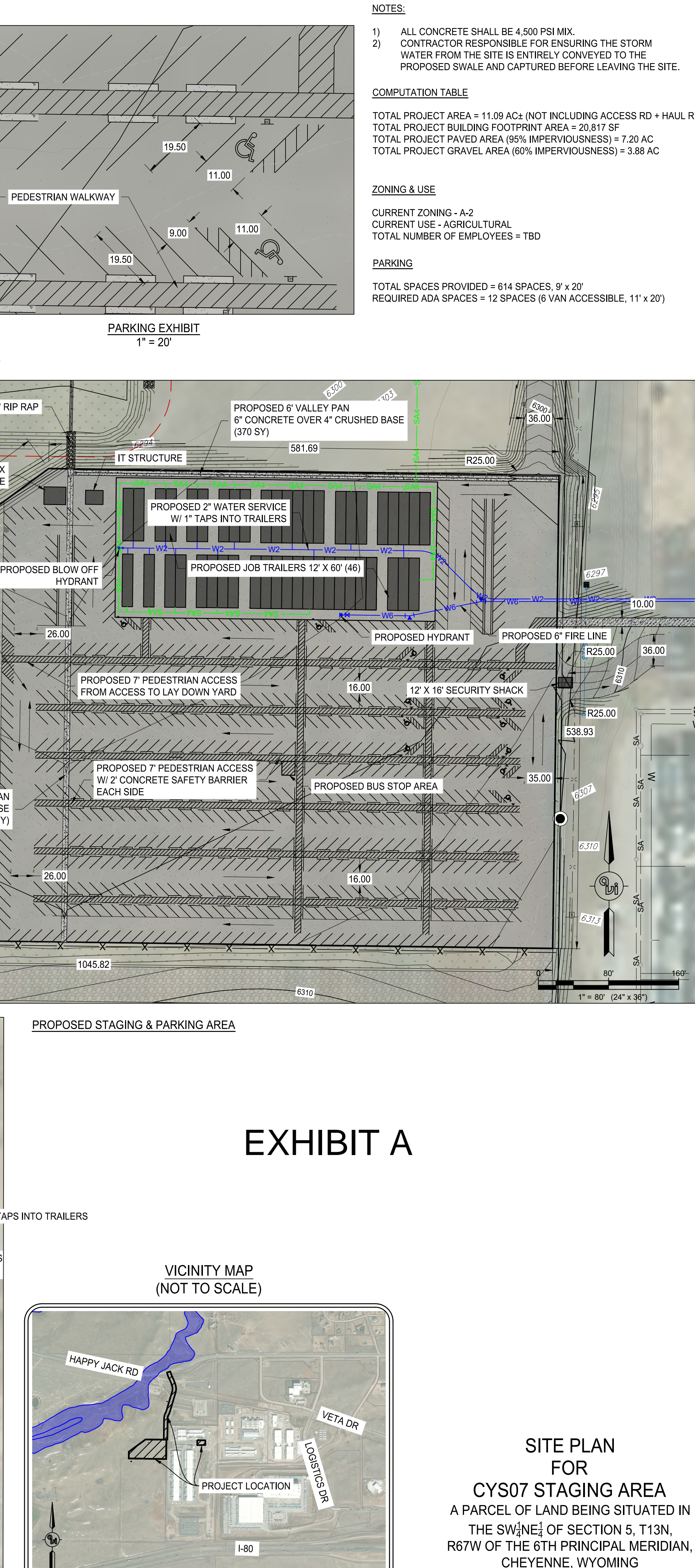
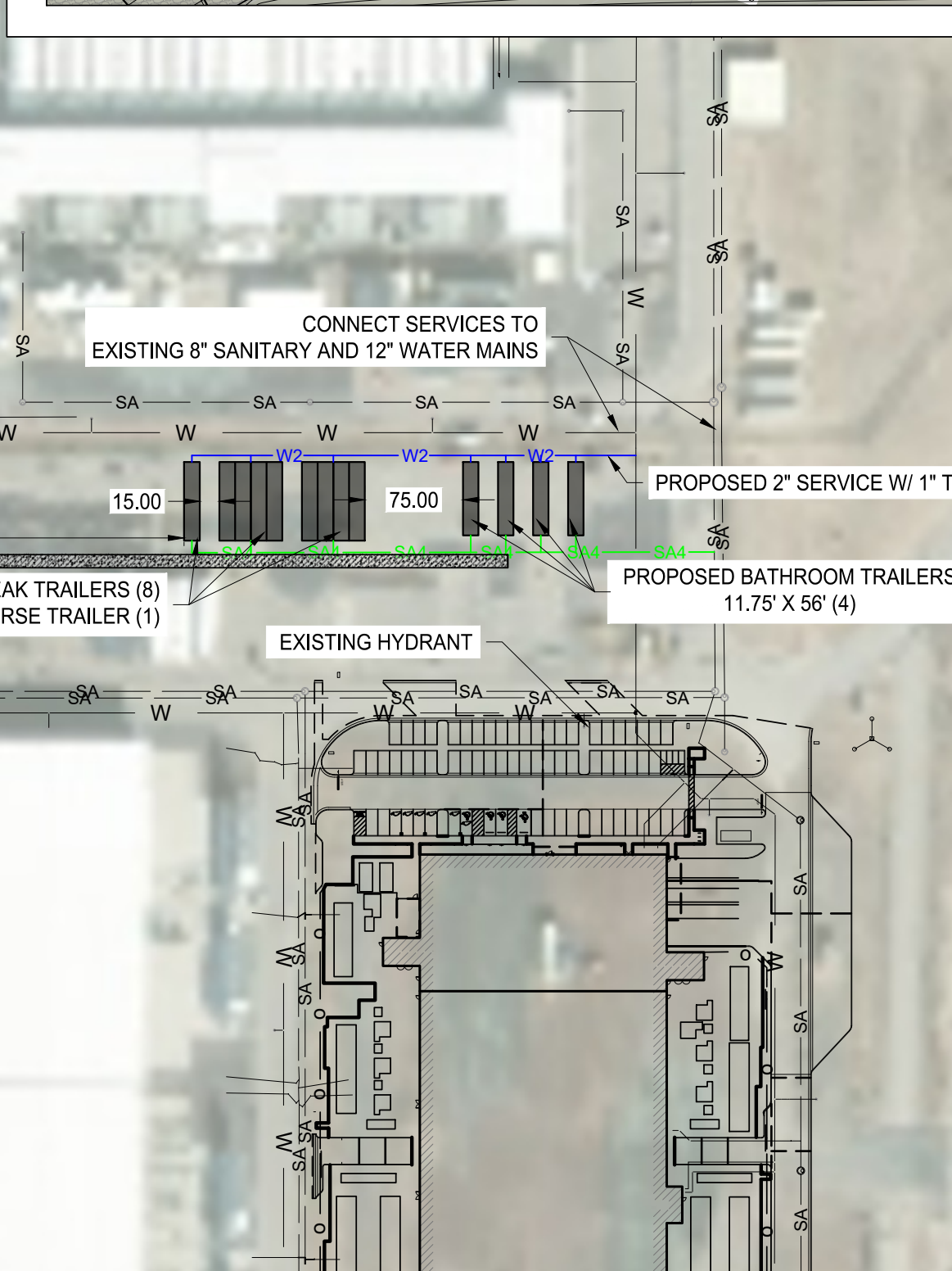
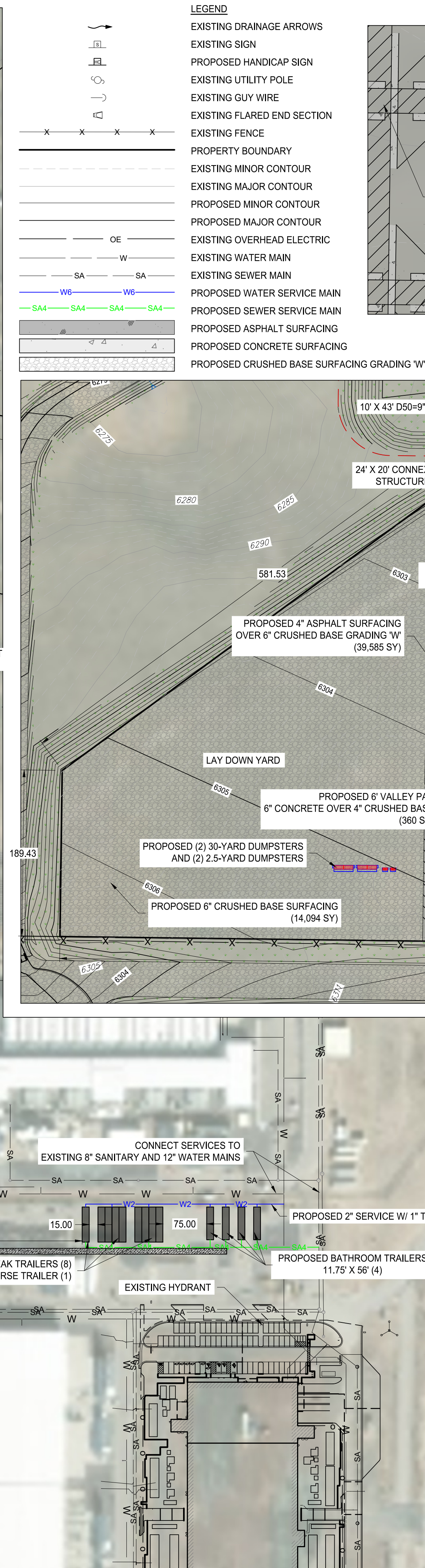
ATTEST:


\_\_\_\_\_  
Cate Cundall, Planning Commission Clerk

Resolution reviewed and approved as to form:

\_\_\_\_\_  
Laramie County Attorney’s Office





 <small>ENGINEERING · PLANNING · SURVEYING</small>	307.637.6817 1103 OLD TOWN LANE, SUITE 101 CHEYENNE, WY 82009 AVI@AVIPC.COM	
	DATE PLOTTED: Dec 18, 2025	
	DRAWN BY:	CK
	DESIGNED BY:	CK
	CHECKED BY:	TC
	JOB NO.:	5016



# EXHIBIT B

RESOLUTION # 091006-32

**RESOLUTION TO ADOPT A CHANGE IN ZONE DISTRICT FROM LI AND CB TO PUD (PLANNED UNIT DEVELOPMENT) FOR NORTH RANGE BUSINESS PARK, 3<sup>RD</sup> FILING, A REPLAT OF LOTS 1,2 & 4, BLOCK ONE; LOTS 1,2,3 & 4, BLOCK TWO; LOTS 1,2,3 & 4, BLOCK THREE; LOTS 1,2 & 3, BLOCK FOUR; LOTS 1,3 & 4, BLOCK FIVE; NORTH RANGE BUSINESS PARK AND LOT 5-6, BLOCK ONE AND LOT 2, BLOCK FIVE, NORTH RANGE BUSINESS PARK 2<sup>ND</sup> FILING, LOCATED AT THE SOUTHWEST CORNER OF HAPPY JACK ROAD AND ROUNDTOP ROAD, LARAMIE COUNTY, WY.**

**WHEREAS**, Wyoming State Statutes §18-5-101 to 18-5-107; §18-5-201 to 18-5-208; §18-5-301 to 18-5-315 authorize Laramie County, in promoting the public health, safety, morals and general welfare of the county, to regulate the use of land through zoning in unincorporated Laramie County; and

**WHEREAS**, the Board of Laramie County Commissioners previously adopted the Cheyenne and Laramie County Zoning Ordinance, 1988; and

**WHEREAS**, The proposed zone change is in accordance with sections 46.000, 81.010 and 81.020 of the Cheyenne and Laramie County Zoning Ordinance, 1988; and

**NOW THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF LARAMIE COUNTY, WYOMING**, that the following actions are hereby made.


The Board of Laramie County Commissioners finds that:

- a. This application is in conformance with section 46.000 of the Cheyenne and Laramie County Zoning Ordinance, 1988 governing the criteria for a Planned Unit Development.
- b. The criteria for public hearings has been met pursuant to section 81.010 of the Cheyenne and Laramie County Zoning Ordinance, 1988.
- c. The PUD regulation is consistent with plans and policies of Laramie County.
- d. Based on plans for uniform development of the North Range Business Park, the future character of the area will evolve beyond the current industrial use projections; the PUD will not detrimentally affect the area involved.

and that the Board approves the final plan of the North Range Business Park, 3<sup>rd</sup> Filing PUD as presented in Exhibit 1.

**PRESENTED, READ AND ADOPTED** this 6<sup>th</sup> day of October, 2009.

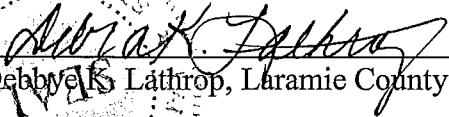
BOARD OF LARAMIE COUNTY COMMISSIONERS

  
Jeff Ketcham, Chairman

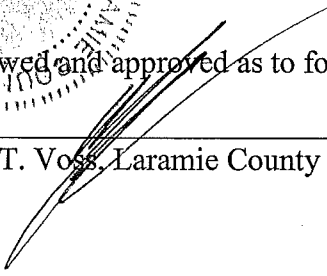




ATTEST:

  
Debra K. Lathrop, Laramie County Clerk

Reviewed and approved as to form:

  
Mark T. Voss, Laramie County Attorney



RECORDED 10/21/2009 AT 11:21 AM REC# 532715 BK# 2136 PG# 475  
DEBRA K. LATHROP, CLERK OF LARAMIE COUNTY, WY PAGE 2 OF 2



## Exhibit 1

### Definitions for this PUD:

Food Service Facilities – any operation that distributes food to the public

Master Preliminary Plat – Commercial Preliminary Plat provided with PUD language that is designed to be further subdivided

Master Final Plat – Commercial Final Plat provided with PUD language that is designed to be further subdivided.

Any other definitions refer to County zoning ordinance

### A. Use Districts:(See Appendix A)

#### 1. Commercial /Industrial (CI) Allowed Uses

- a. Any industrial, manufacturing, fabrication or processing uses, associated offices and accessory commercial activities which do not emit noxious noise, smoke, odor or dust beyond the confines of the property, and which do not emit pollutants to the soil;
- b. Child care center minor and major;
- c. Accessory structures;
- d. Recreational facilities;
- e. Retail uses;
- f. Transportation facilities;
- g. Warehousing.  
Wholesale uses.
- h. Drive-up facilities;
- i. Entertainment facilities and uses;
- j. Food service facilities;
- k. Hotels and motels;
- l. General and Medical Offices;
- m. Service businesses;
- n. Educational Facilities;
- o. Wireless facilities;
- p. Wind Generators;
- q. Solar Generators;

#### 2. Community Open Space (CO)

- a. Open Space/Natural Areas
- b. Detention
- c. Signage/Kiosk
- d. Trails and Park Amenities
- e. Picnic Shelters/Pavilions
- f. Recreational Courts/Facilities
- g. Public Art

### B. Platting Requirements

A new Master Preliminary Plat, Master Final Plat and Subdivision Permit shall be submitted for approval prior to the issuance of any building permit for property within this PUD. All of the property within this PUD shall be platted into appropriate lots, rights of ways and tracts. The requirements for platting as defined in Wyoming State Statute §18-5-306 shall be submitted to the County for approval. The Master Preliminary Plat, Master Final Plat and Subdivision permit shall be processed and administered in accordance with the applicable State Statutes and County regulation.

Subsequent to the approval of the Master Final Plat and Subdivision Permit, each lot or tract created with the Master Final Plat and located in the CI use area may be further subdivided. The provisions required under Wyoming State Statute §18-5-306 shall be waived for said lots and/or tracts up to a maximum of four divisions for each said lot or tract. Each subdivision of said lots and tracts of more than four divisions or for those lots within the CO use area shall require a subdivision permit to be processed and administered in accordance with the applicable State Statutes and County regulation. Applications for subdivision permits of four or less for said lots or tracts shall be accompanied by a final plat drawing and a fee equivalent to the cost of processing the application per County requirements,

1. Upon receipt and acceptance of the application for subdivision permit, the County shall schedule a hearing before the Planning Commission at the next available date, but in no case more than 30 days. The Planning Commission shall make recommendation to the Laramie County Board of Commissioners regarding the application. The Planning Commission shall review the application to find the following:
  - a. That the proposed subdivision permit is in substantial conformance with the approved Master Final Plat
  - b. That public access is provided to all lots and tracts

The recommendation of Planning Commission shall be forwarded to the Board at the next available Board hearing, but in no case more than 30 days. The Board shall hear and act on the subdivision permit as expediently as possible.

#### C. Development Standards

##### A. Maximum Building and Site Coverage:

1. Commercial/Industrial lots shall not exceed 90% coverage of the property area for building, parking and outdoor storage.
2. Open Space, Detention, Signage and Trail lots shall not exceed 20% coverage of the property area for building, parking and outdoor storage.

##### B. Maximum Building Height:

1. There are no height limitations in this district

C. Setbacks:

1. All buildings, parking and outside storage within CI and CO use areas shall be setback a minimum of 30 feet from all dedicated public rights of ways
2. All buildings, parking and outside storage within CI and CO use areas shall be setback a minimum of 10 feet from all other property lines located within this PUD . Setbacks may be reduced to zero (0) if a minimum separation of 20 feet is provided from all other buildings, outdoor storage or parking areas on adjacent lots.
3. All buildings, parking and outside storage within CI and CO use areas shall be setback a minimum of 25 feet from all property lines outside of this PUD.

D. Development Performance Standards:

1. The primary building and any accessory buildings to the primary building shall complement each other in architectural style and materials. A letter from the commercial owners association shall be provided to the County with the site plan approving the architectural style and materials.
2. Monument signing, wayfinding signage and landscaping throughout and/or at entrances to Park shall be allowed. Appendix B illustrates possible locations of these signs.
3. The North Range Business Park shall incorporate a trail system for connectivity of lots. The trail shall be 10' wide and consist of stabilized crusher fines or other approved soft trail system. Appendix C illustrates typical design parameters of trails.

E. Site Plan, Landscaping, Buffering and Screening Requirements:

1. Site Plan Requirements.

A County approved Site Plan is required prior to issuance of any building permit and for any new or change of use of land. All site plans shall be prepared and completed in conformance with these regulations and any items not specified within these regulations must meet the Cheyenne & Laramie County Zoning Ordinance 1988 as amended. Site specific drainage, traffic and construction design plans may be required as part of any site plan submittal.

A site plan shall be valid for a period of two (2) years from the date of approval. If substantial start of construction has not commenced within this two (2) year period, the site plan approval shall expire. A site plan approval may be extended by the Director of Planning for up to 12 months if it is found that the site plan is in substantial conformance with existing and amended regulations and that substantial construction will commence within the 12 month extension period. Substantial start of construction shall mean that

building permits have been issued for principle structures and grading and earthwork has begun.

## 2. Landscape Plan Requirements.

A landscape plan, that includes abutting adjacent right-of-way landscaping, shall be submitted for review and approval as part of any required site plan review.

## 3. Landscape Material Specifications

The minimum planting/installation size and characteristics of plant materials which are required by this Article shall be as follows:

- a. Deciduous shade trees: two inch (1½") caliper measured six inches (6") above ground.
- b. Deciduous ornamental trees: one and one-half inch (1½") caliper measured six inches (6") above ground.
- c. Evergreen trees: six feet (6') in height when measured from the ground to the midpoint between the uppermost whorl and the tip of the leader.
- d. Evergreen and deciduous shrubs: minimum five (5) gallon container.
- e. Ground covers and vines: 2¼ inch container.
- f. All landscape areas shall have the existing soil prepared. Soil preparation and top-dress fertilization shall be consistent with the cultural needs of the plant species proposed for each category. Minimum incorporation requirements are 3 cubic yards of organic matter per 1,000 square feet in landscape planting areas. Acceptable organic matters include aged compost, wood humus from soft/non-toxic trees, sphagnum moss, or aged/treated (minimum two years aged) manures. Fertilizer should be consistent with soil analysis requirements and cultural plant needs. Soil amendments shall be properly prepared (composted manures processed 3-5 years, with carbon to nitrogen ratio of 11-15% to 1.) Tilling of soil to incorporate amendments and counter any compaction or soil consolidation shall be required for all landscape planting areas. Recommended tilling depths are 6-12". Minimum required depth is 4". Prior to issuance of a certificate of occupancy for any structure, the owner shall provide to the County verification that the soil has been prepared as required.
- h. The following minimum requirements shall apply to any development plan:

Number of trees on site	Maximum percentage of any one species
10-19	60%
20-39	45%
40-59	35%
60 or more	25%



#### 4. General Landscape Requirements

##### a. Required minimum perimeter landscaped areas.

###### (i) Minimum depth of perimeter landscaped area:

The required perimeter landscaped area shall be the area defined from the lot line to the building setback line for each lot. The required perimeter landscaped area shall consist of a minimum of ninety-five percent (95%) ground cover by living grass or other plant materials that are listed within this PUD. The remaining five (5%) may be covered with bark, wood chips, rock, stone, or similar materials.

(ii) Percentage in Living Materials: All areas not covered by building or parking must be landscaped with the plant materials listed within this PUD. Required landscape area shall consist of a minimum of ninety-five percent (95%) ground cover by living grass or other plant materials. The foliage crown of deciduous trees shall not be used in the ninety-five percent (95%) or other required percentage calculation. The remaining five percent (5%) of the required landscape area may be covered with bark, wood chips, rock, stone, or similar materials.

(iii) No display of merchandise, goods, equipment for sale or lease, advertising banners, or portable signs shall be allowed within the landscape setback areas unless designed and approved with the site plan.

##### b. Required Internal Landscaping for commercial/industrial lots:

(i) Purpose. "Internal" landscaping requirements are intended to augment the perimeter landscape area requirements and promote the uniqueness and quality of the North Range Business Park. The purpose of "internal" landscaping around the building and parking is to visually soften the mass of buildings and to visually separate building areas from parking areas. Landscaping of large areas away from building and parking is designed to incorporate the look and feel of natural landscape within the area. It is recognized that some flexibility in the design of spaces and tree selection is needed. This flexibility is needed because of:

(a) the diversity of building designs; and

(b) the possible limitations on plant selections due to building foundation problems posed by the root growth of some trees; and

(c) the building foundation problems posed by the irrigation of expansive soils.

(d) Appendix F establishes the overall design intent for the North Range Business Park that is promoted with these landscape regulations.

(ii) The area of a property that requires internal trees is ten percent 10% of the property. These requirements apply to all projects requiring site plan review.

(iii) Minimum number of trees in the internal landscaping area: A minimum of one living tree for every one thousand (1000) square feet of the required minimum internal landscaping area.

(a) Up to ten (10) percent of the required trees may be substituted by shrubs. Ten (10) shrubs with a minimum container size of five (5) gallons shall be provided for each tree that is replaced.

(b) Up to ten (10) percent of the required trees may be substituted by boulders. One (1) tonnage of moss rock shall be provided for each tree that is replaced.

(c) Up to twenty (20) percent of the required trees may be located in CO lots instead of the CI lot.

(iv) Standards for the minimum area: To be credited toward the minimum internal landscaping area requirement, forty (40) percent of the landscaping area shall be located as follows and be on a permanent irrigation system:

(a) Adjacent to those building elevations which form the major public views of the building from adjacent streets and properties and to the users of the building; or

(b) Within a plaza or courtyard between buildings or portions of buildings; or

(c) In a space provided to separate building areas from parking lots; or

(d) Surrounding parking lots;

(v) Design Standards: The minimum required internal landscaping area shall consist of a minimum of ninety-five percent (95%) ground cover by living grass or other plant materials. This percentage provides flexibility where plants and their irrigation should be limited next to building foundations.

(vi) To provide for continuity with the business park the developer may select the types and the planting spaces between the required trees based on the list within the PUD. The planting spacing should allow for the growth characteristics of the trees without adversely affecting the maintenance of structures, walks, or drives. Appendix D provides a list of acceptable plant species, however if a different species is requested a letter from the commercial owners association shall be provided to the County with the site plan approving the plant.

(vii) The minimum planting sizes of trees shall comply with the specifications

provided in this ordinance above except within wind and snow rows.

c. Required Internal Landscaping of open space, detention and signage and trail lots.

(i) Purpose. The landscaping of these areas to create landscaping in the areas that are better suited to support the landscaping with no supplemental irrigation while still providing a inviting area for the users of the park to enjoy.

(ii) The area of a property that requires internal trees is ten percent 10% of the property. These requirements will be required when the subject area is to be used for detention and therefore should be turned in with the Site Plan for the corresponding commercial/industrial site, however the developer may turn a separate site plan for these locations without a corresponding site.

(iii) Minimum number of trees in the open space, detention, signage and trail lots: A minimum of one living tree for every one thousand (1000) square feet of the required minimum internal landscaping area.

(a) Up to ten (10) percent of the required trees may be substituted by shrubs. Ten (10) shrubs with a minimum container size of five (5) gallons shall be provided for each tree that is replaced.

(b) Up to ten (10) percent of the required trees may be substituted by boulders. One (1) tonnage of moss rock shall be provided for each tree that is replaced.

(iii) Any areas not covered with parking, park amenities, signage and trails must be landscaped with the approved types of ground cover within this PUD. Due to the specific type of trees and their location, an irrigation system may not be required on these lots

(iv) The planting spacing and location should allow for the growth characteristics of the trees without adversely affecting the maintenance of structures, walks, or drives.

(vii) The minimum planting sizes of trees shall comply with the specifications provided in this ordinance above except within wind and snow rows.

d. Screening and Buffering:

Parking areas shall not be allowed in screening and buffering areas.

Trash collection areas and trash bins shall not be allowed within screening and

buffering areas.

There shall be no storage of merchandise and supplies within screening and buffering areas.

(e) Other Landscape Regulations:

(i) Landscaping shall not conflict with the traffic visibility requirements as required by County regulations.

(ii) Artificial trees, shrubs, vines, turf, or other plants shall not be considered as outside landscape materials for projects requiring site plan review.

(iii) Clumps of trees (such as (no aspens) *Populus Tremuloides*), where used, shall be credited as only one of the required trees.

(iv) Landscaping should not interfere with the general function, safety or acceptability of any gas, electric, water, sewer, telephone, or other utility easement. Landscaping shall be limited to an eight inch (8") mature height within three feet (3') of a fire hydrant.

(v) The healthy existing indigenous vegetation on a site may be credited toward required landscaping as determined by the Director.

(vi) Where two (2) different landscape requirements apply, the greater requirements shall be met.

5. Maintenance:

a. The landowner is responsible for the maintenance of the landscaping as originally approved.

b. The landowner is responsible for all regular and normal maintenance of landscaping including weeding, irrigation, fertilizing, pruning and mowing.

c. Plant materials which exhibit evidence of insects, pests, disease and/or damage shall be appropriately treated and all dead plant material shall be removed and replaced with living plant material. Trees that expire before July 1 will be replaced by that July 1.

d. Performance Standard for Seeded Areas: Seeded landscape areas shall have no bare areas larger than one hundred forty-four (144) square inches after germination. Ground cover that dies within the growing season must be replaced within thirty (30) days. Ground cover that dies after the growing season shall be replaced by the following June 1.

G. Signage:

Purpose: To provide signage and way finding that is consistent and promotes the uniqueness and quality throughout the North Range Business Park

1. The following temporary signs are allowed and exempt from the design standards set forth for permanent signage:

- a. Construction signs: one construction sign for each street frontage of a construction project, not to exceed sixty-four (64) square feet in area. Such signs may be erected forty-five (45) days prior to construction and shall be removed within ten (10) days following completion of construction;
- b. Real estate signs: one non-illuminated, double-faced real estate sign is allowed per street frontage, not to exceed 48 square feet in area and 10 feet in height; non-illuminated incidental commercial signs not exceeding nine square feet in area;
- c. Holiday, Cheyenne Frontier Days or Other Special Event Signs and Decorations. Such signs and decorations may be erected sixty (60) days prior to a holiday or special event and shall be removed within ten (10) days following the holiday or special event;
- d. Government signs;
- e. Temporary signs identifying an architect, engineer, contractor, subcontractor, financing institution and/or material supplier participating in construction on the property upon which the sign is located. The sign may be placed the day construction commences and shall be removed the day of completion. Signs shall be located on private property and shall not exceed sixteen (16) square feet in area.

2. The following signs are allowed on the individual commercial lots, but designs shall meet the approved design standards of primary entry monuments, way finding, tenant id and street signs and must not be located within the setback area. A letter from the commercial owners association stating the sign meets their requirements must be provided to the County when the developer submits for a sign permit.

- a. Window signs and signs in the interior of buildings;
- b. Drive-up menu boards, provided such signs do not exceed forty (40) square feet in area and eight feet in height;
- c. Flags not exceeding sixty (60) square feet in area and flown from a pole the top of which is not more than forty (40) feet in height. Flags of the US, State of Wyoming, and government flags are exempt. The Stars and Stripes shall be flown in accordance with protocol established by the Congress of the United States;
- d. Works of art that do not include a commercial message;
- e. Banners and pennants;
- f. Electronic message centers



- g. Wall signs;
- h. Awning signs;
- i. Canopy signs;
- j. Integral roof signs;
- k. Projecting signs;
- l. Icon signs;
- m. Lot profile signs;
- n. Changeable signs;
- o. Nameplates: one non-illuminated nameplate, attached to a building, not exceeding two square feet in area, per occupancy;

3. Primary entrance signs, tenant id signs, way finding signs and street signs must comply with the following. These signs may be place within the easements of North Range Business Park 3rd Filing if written approval is granted by the users and grantees of the easements and the County Engineer. Appendix E illustrates the signs listed below:

- a. Primary entrance signs
  - (i) Background consists of Corten Steel Panel. . Stainless steel accents and raised lettering. Include boulder accents.
  - (ii) Sign may not exceed 40' in width or 8' in height. The height of the related boulder shall not exceed 15 feet.
- b. Tenant Id signs and Way Finding Sign
  - (i) Background consists of Corten Steel Panel. Stainless steel accents and raised lettering. Stone base to sign to match primary entrance stone in color.
  - (ii) Tenant Id Sign to not exceed 12' in width and 8' in height including base.
  - (iii) Way Finding Sign to not exceed 10' in width and 8' in height including base.
- c. Street Signs
  - (i) Mounted on 3" x 3" black painted steel post with steel support brackets.
  - (ii) Steel Panel painted brown with white reflective lettering not to exceed 4' in length.
  - (iii) Stop signs to be mounted 8' above ground.

4. Size Restrictions. Signs allowed in the NRBP PUD zone shall comply with size, height and location requirements in Figure 2 below:

Figure 2  
Requirements for Freestanding and Ground Signs

Distance from Street Right-of-Way Line (feet)	Maximum Height Overall (feet)	Maximum Size Allowed per Side (square feet)
0	10	20
5	12	30
10	14	40

15	16	50
20	18	60
25	20	70
30	25	80
35	30	90
40	35	100
45	35	110
50 and more	35	120

a. Ground signs shall not be placed within fifteen (15) feet of any side lot line and shall be at least fifteen (15) feet from the right-of-way.

i.. Business centers with multiple businesses per lot and building complexes are allowed one freestanding or ground sign per street frontage per shopping center or building complex.

b. Wall signs are allowed provided the sign area does not exceed twenty (20) percent of the area of the wall to which the sign is attached, not to exceed four hundred (400) square feet.

c. Awning and canopy signs are allowed, provided they are placed at least eight feet above the sidewalk or grade and do not exceed six feet in awning or canopy height. Illuminated awnings are allowed only with reverse copy with no white or ivory background.

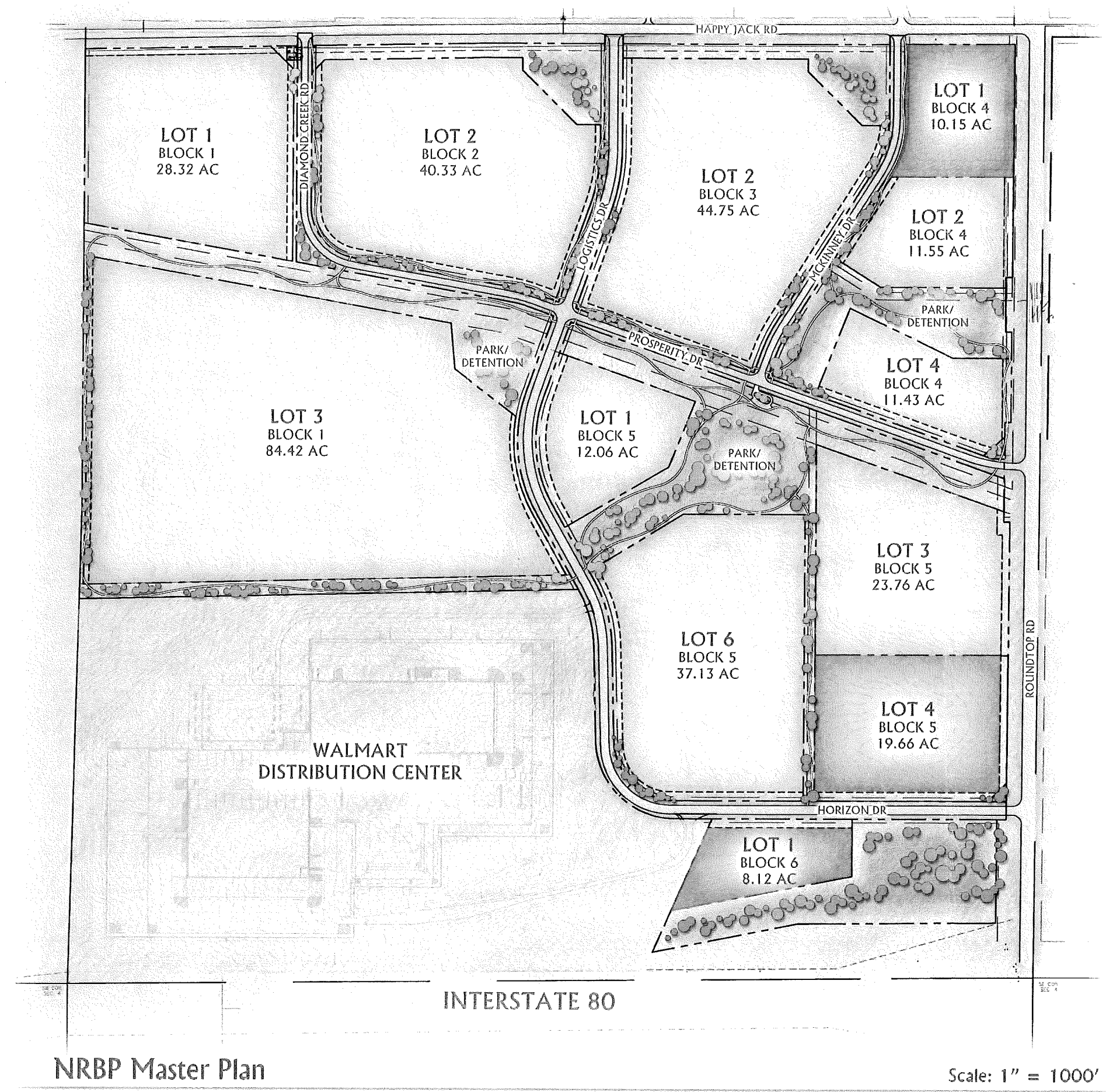
d. Projecting signs shall be designed and installed to accommodate pedestrian traffic. Such signs shall not exceed twenty (20) square feet in area, and shall have a minimum of eight feet of clearance above the sidewalk or grade. The maximum projection (feet), clearance (feet) and thickness (feet) of projecting signs shall be determined by the Uniform Sign Code requirements.

e. Sign cabinets shall be finished. Aluminum sign cabinets shall be painted or anodized and shall not be mill-finished aluminum. Electrical conduit shall not be routed along the outside of walls to a sign, but shall be routed through the wall at the sign location. Indirect lighting shall be shielded so as not to create a glare to vehicle or pedestrian traffic.

#### H. Parking:

Parking requirements for each specific use shall be required in conformance with the most recent edition of the International Traffic Engineers Parking Generation Manual. The Director of Planning may grant a 25% reduction for mixed use areas or for overall reductions related to alternative transportation efforts and combined use areas

NORTH RANGE BUSINESS PARK



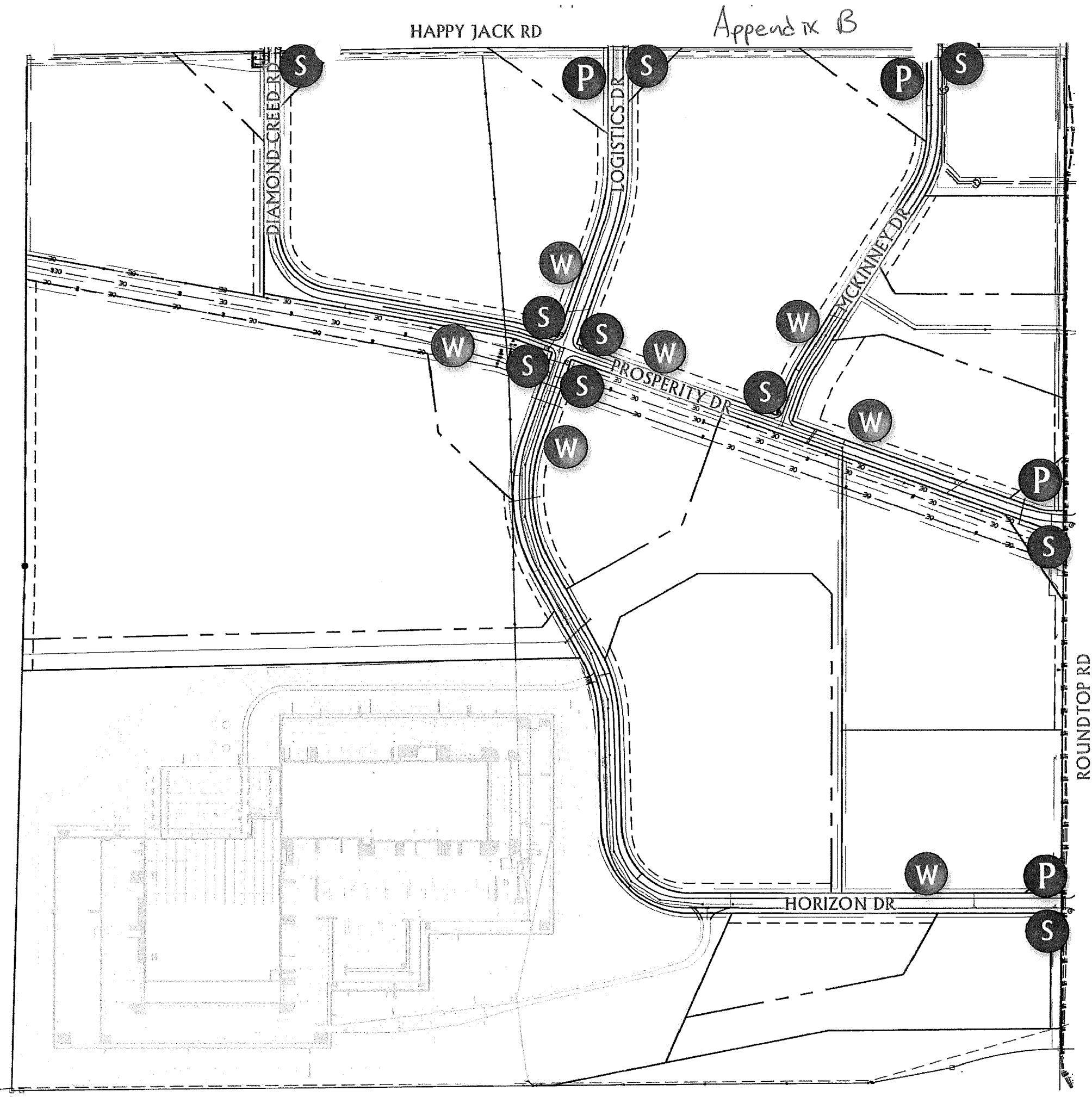
NRBP Master Plan

Scale: 1" = 1000'

NORTH RANGE BUSINESS PARK

bha

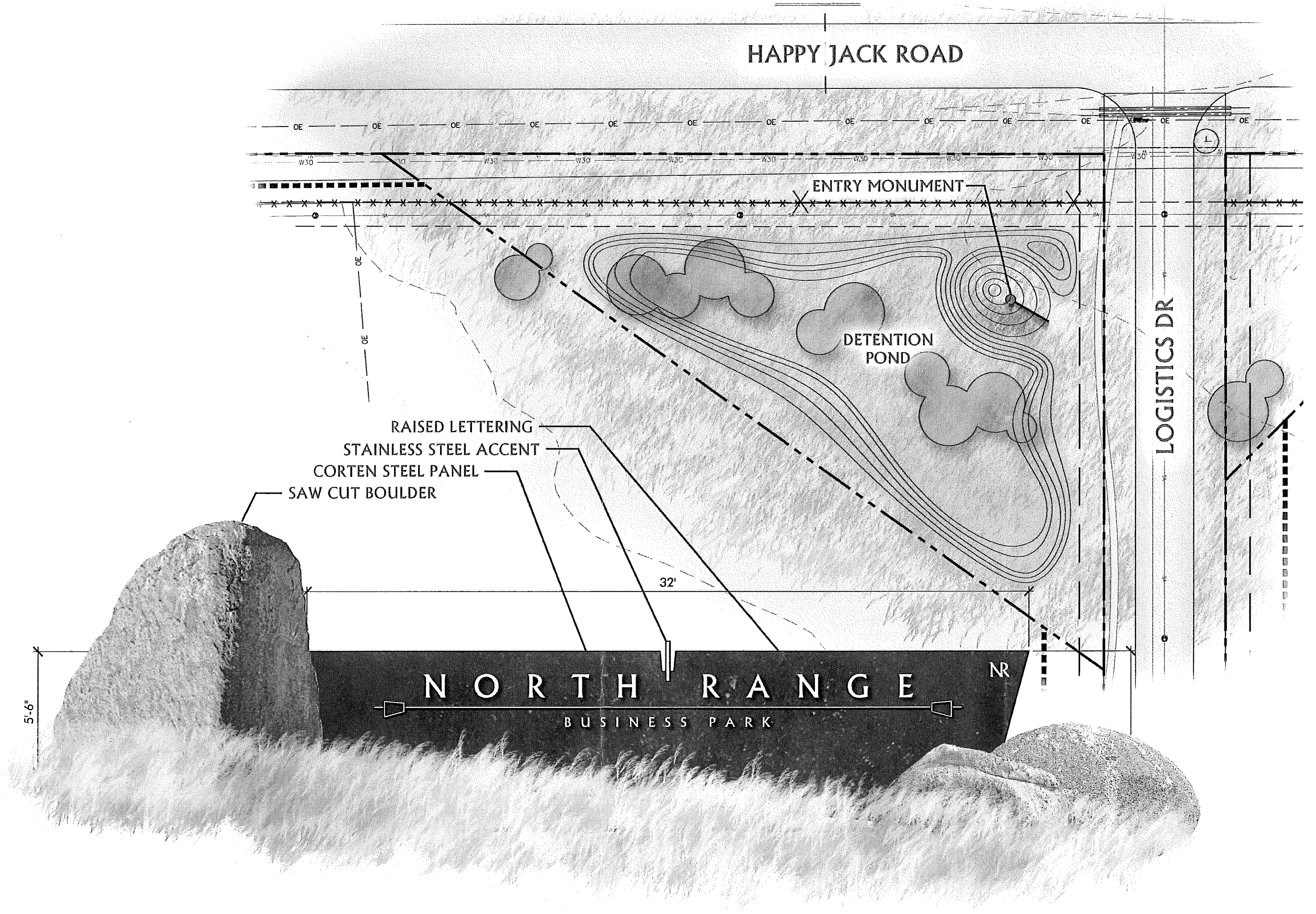
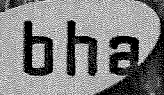
Appendix B



- P** PRIMARY ENTRY MONUMENT
- S** STREET SIGN
- W** WAYFINDING SIGN

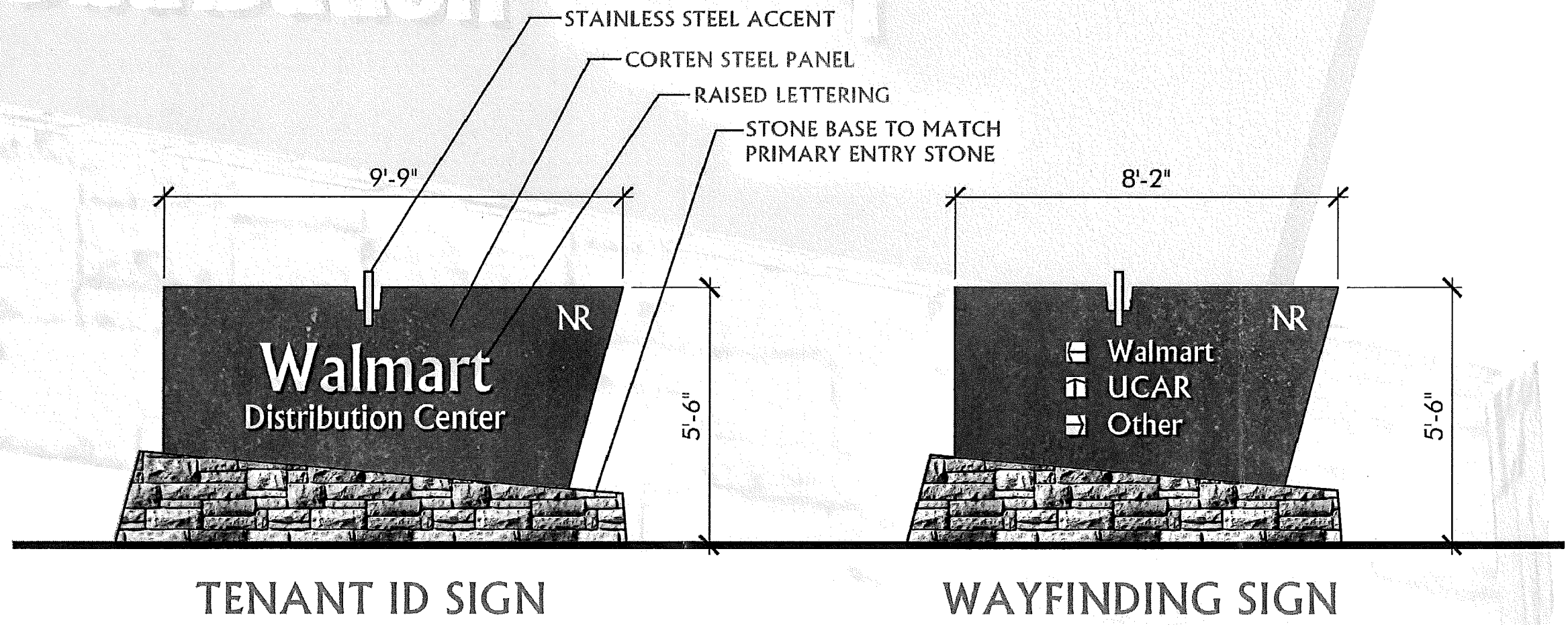


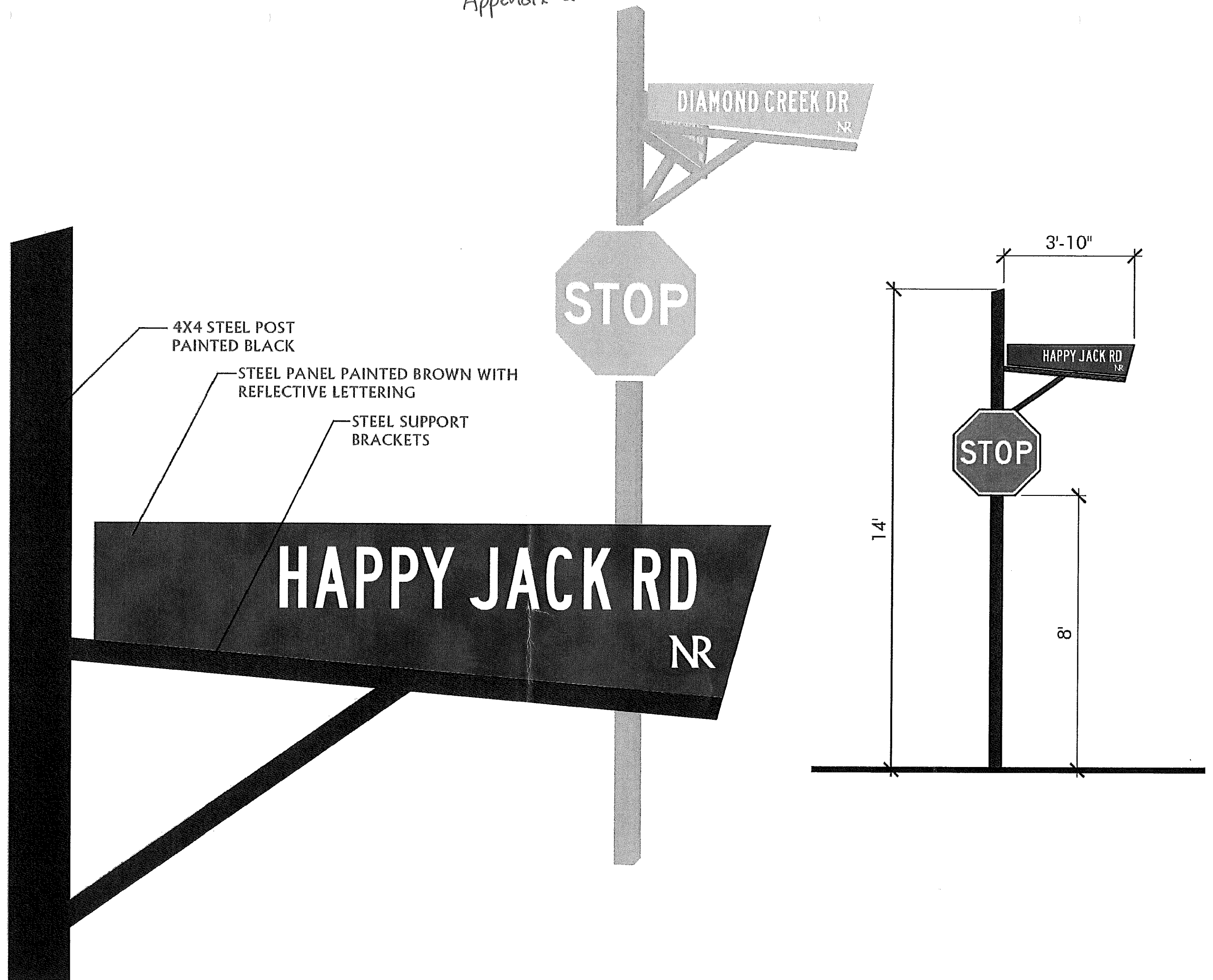
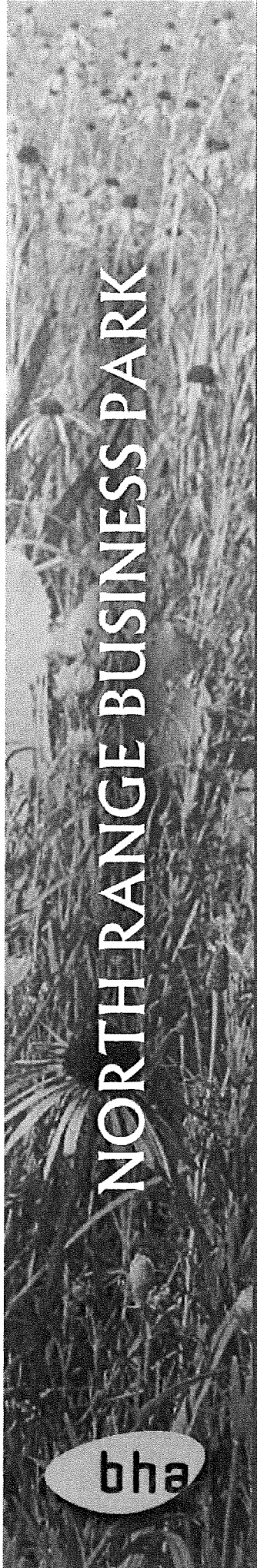
NORTH RANGE BUSINESS PARK





# Walmart Distribution Center



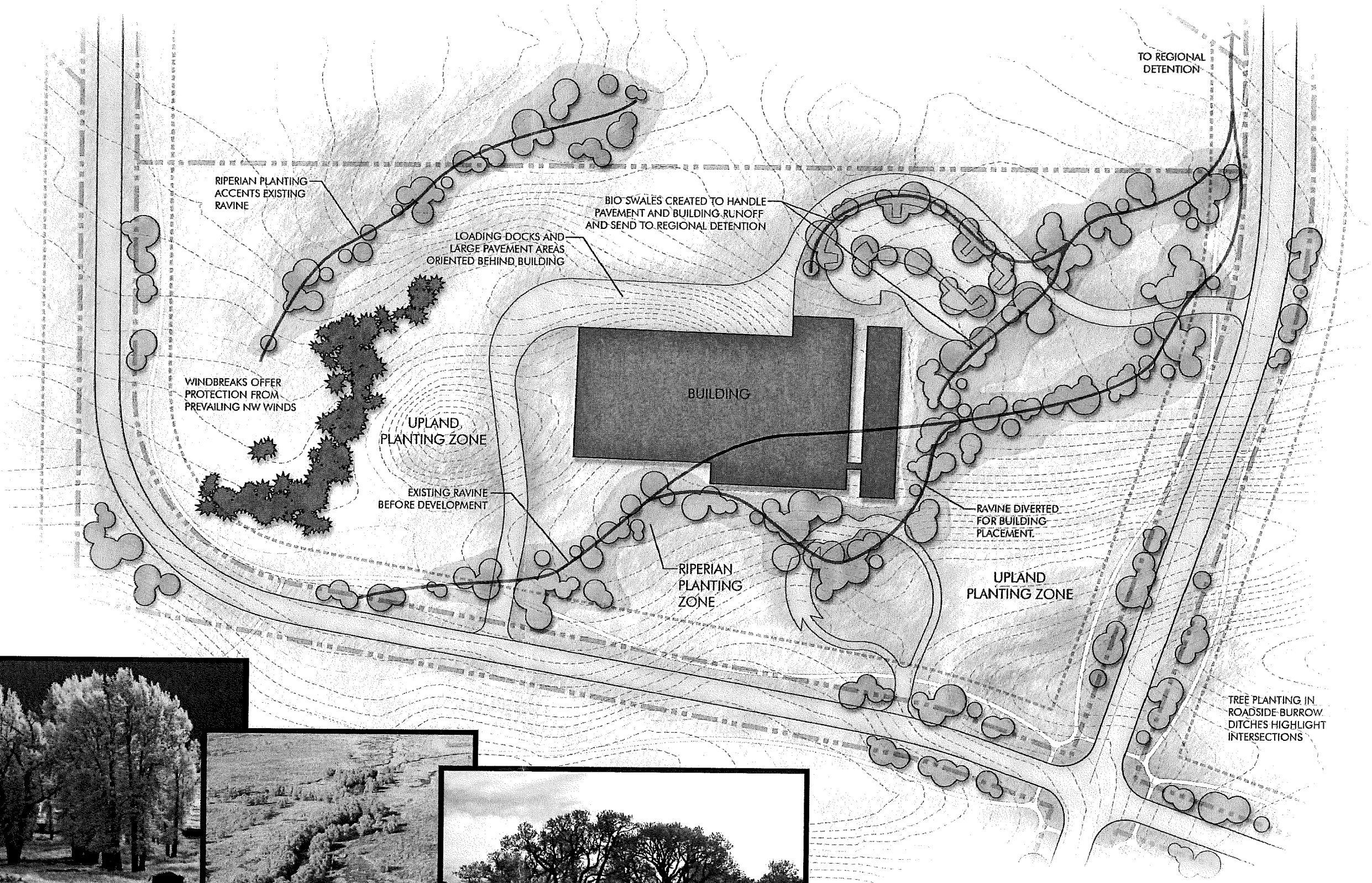




NORTH RANGE BUSINESS PARK

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Appendix B F



A RESOLUTION TO APPROVE A CHANGE IN ZONE DISTRICT FROM A-2 (AGRICULTURAL) AND PUD (PLANNED UNIT DEVELOPMENT) TO PUD (PLANNED UNIT DEVELOPMENT) FOR LOTS 1 THRU 3, BLOCK 13, NORTH RANGE BUSINESS PARK, 6<sup>TH</sup> FILING; LOTS 1 & 2, BLOCK 6; LOT 1, BLOCK 7, LOTS 1 & 2, BLOCK 8, LOTS 1 THRU 5, BLOCK 9, LOTS 1 THRU 6, BLOCK 10, LOTS 1 & 2, BLOCK 11, NORTH RANGE BUSINESS PARK, 3<sup>RD</sup> FILING; LOTS 1 & 2, BLOCK 12, NORTH RANGE BUSINESS PARK, 4<sup>TH</sup> FILING; LOT 3, BLOCK 1, NORTH RANGE BUSINESS PARK, 5<sup>TH</sup> FILING, LARAMIE COUNTY, WY.

WHEREAS, Wyoming State Statutes §18-5-201 to 18-5-208; §18-5-301 to 18-5-315 authorize Laramie County, in promoting the public health, safety, morals and general welfare of the county, to regulate the use of land through zoning in unincorporated Laramie County; and

WHEREAS, the Laramie County Board of Commissioners adopted the Laramie County Land Use Regulations; and

WHEREAS, the proposed zone change is in conformance with the requirements of section 4-2-112 of the Laramie County Land Use Regulations; and

WHEREAS, the proposed zone change is in conformance with the requirements of section 1-2-103 of the Laramie County Land Use Regulations; and

WHEREAS, the Laramie County Board of Commissioners finds that the zoning district maps or regulations are consistent with plans and policies of Laramie County; and

NOW THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF LARAMIE COUNTY, WYOMING, as follows:

The Laramie County Board of Commissioners finds that:

- a. This application meets the criteria for a zone map amendment pursuant to section 1-2-103 (b) of the Laramie County Land Use Regulations.
- b. The proposed change in zone district is in conformance with the requirements of section 4-2-112 of the Laramie County Land Use Regulations.

and that the Board approves a Zone Map Amendment for Lots 1 thru 3, Block 13, North Range Business Park, 6th Filing; Lots 1 & 2, Block 6, Lot 1, Block 7, Lots 1 & 2, Block 8, Lots 1 thru 5, Block 9, Lots 1 Thru 6, Block 10, Lots 1 & 2, Block 11, North Range Business Park, 3rd Filing; Lots 1 & 2, Block 12, North Range Business Park, 4th Filing; Lot 3, Block 1, North Range Business Park, 5th Filing, Laramie County, WY, from A-2 (Agricultural) and PUD (Planned Unit Development) to PUD (Planned Unit Development), as shown on Exhibit A, with the following conditions:

1. The PUD document shall include a section regarding access to state (at a minimum) that "ingress/egress access for commercial lots shall be allowed via private access with review and approval by the Laramie County Planning and Development Department for sufficiency."
2. The Block numbers from previous filings shall continue in sequence for the 6th Filing and be reflected on the associated zone change exhibit map.

PRESENTED, READ AND ADOPTED THIS 14th DAY OF January, 2015.

LARAMIE COUNTY BOARD OF COMMISSIONERS

Amber Ash, Chairman

Debra K. Lathrop, Laramie County Clerk

Reviewed and approved as to form:

Mark T. Voss, Laramie County Attorney



RECP #: 657343  
RECORDED 3/24/2015 AT 10:08 AM BK# 2435 PG# 589  
Debra K. Lathrop, CLERK OF LARAMIE COUNTY, WY PAGE 1 OF 3

COPY OF RECORD



Attachment A

Amendment to Exhibit 1 of the North Range Business Park PUD  
Laramie County Resolution #091006-32

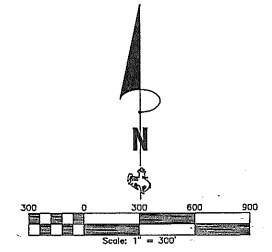
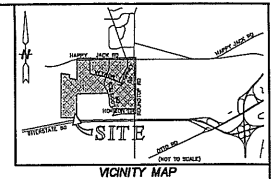
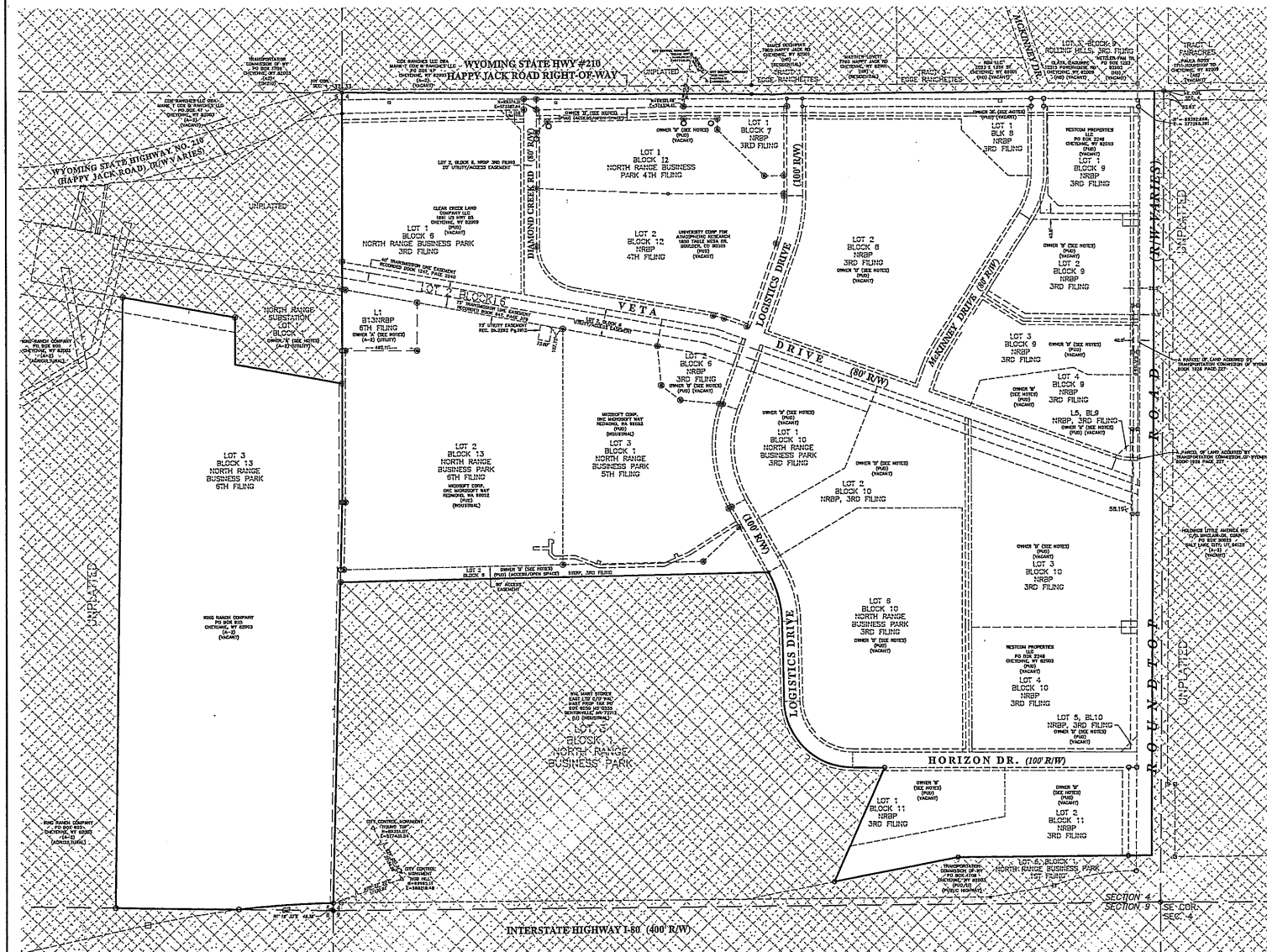
This amendment changes the following platting requirements on page 2 as follows:

1. Upon receipt and acceptance of the application for subdivision permit, the County shall schedule a hearing before the Planning Commission at the next available date, but in no case more than 30 days. The Planning Commission shall make recommendation to the Laramie County Board of Commissioners regarding the application. The Planning Commission shall review the application to find the following:
  - a. That the proposed subdivision permit is in substantial conformance with the approved Master Final Plat
  - b. That public access is provided to all lots and tracts. **INGRESS/EGRESS ACCESS FOR COMMERCIAL LOTS SHALL BE ALLOWED VIA PRIVATE ACCESS WITH REVIEW AND APPROVAL BY THE LARAMIE COUNTY PLANNING AND DEVELOPMENT DEPARTMENT FOR SUFFICIENCY.**
  - c. That drainage is addressed in conformance with the Master Drainage Plan.



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Debra K. Lathrop, CLERK OF LARAMIE COUNTY, WY PAGE 2 OF 3

Exhibit A



**ZONING**  
 EXISTING:  
 A-2 AGRICULTURAL / PUD (NORTH RANGE BUSINESS PARK)  
 PROPOSED:  
 PLANNED UNIT DEVELOPMENT (NORTH RANGE BUSINESS PARK AMENDED)

- LEGEND**
- FOUND 1" ALUMINUM CAP STAMPED "SSS P.L.S. 2200"
  - FOUND 3/4" ALUMINUM CAP STAMPED "STEL SURVEYING SERVICES PLUS 5910" AND APPROPRIATE DATA
  - ✕ FOUND 3/4" ALUMINUM CAP STAMPED "P.L.S. 2222"
  - FOUND W.D.A.T. R/W MONUMENT
  - FOUND 1/4" BRASS CAP WITNESS CORNER STAMPED "LS 510"
  - SET 1" ALUMINUM CAP STAMPED "SSS P.L.S. 5910" ON A 1" x 24" STEEL REBAR
  - FOUND 1/4" x 24" LONG REBAR WITH 2" ALUMINUM CAP STAMPED "SSS P.L.S. 2200" AND APPROPRIATE DATA.
  - A CITY OF CHEYENNE CONTROL MONUMENT
  - NRSP DENOTES "NORTH RANGE BUSINESS PARK"

- GENERAL NOTES**
- 1) BASIS OF BEARINGS -- CITY OF CHEYENNE DATUM REFERENCED FROM CITY CONTROL MONUMENTS "HOB HILL" AND "ROUND TOP".
  - 2) NO PORTION OF THE SUBJECT PROPERTY FALLS WITHIN A FEMA 100-YEAR SPECIAL FLOOD HAZARD AREA AS SHOWN ON FLOOD FLOOD INSURANCE RATE MAPS, DATED JANUARY 17, 2007.
  - 3) OWNER "A":  
 CHEYENNE LIGHT, FUEL AND POWER COMPANY  
 422 NORTH ST. 6TH FL.  
 14TH FLOOR, LARAMIE, WY 82001  
 OWNER "B":  
 CHEYENNE LEADS  
 PO BOX 1040  
 CHEYENNE, WY 82003

- DEPT. OF ENERGY NOTES**
- 1) All construction activities within Western's Cheyenne-Blonde Mts 115-117, Cheyenne-Blonde Mts 115-117, and Happy Jack-Blonde Mts 115-117 Transmission Line easements should be coordinated with the Western Area Power Administration, P.O. Box 3700, Loveland, Colorado 80539-0003.
  - 2) The transmission line easements shown herein, are, "The United States easement, which is a restricted area and all construction activities within said easement should be coordinated with the Western Area Power Administration, P.O. Box 3700, Loveland, Colorado 80539-0003."
  - 3) To erect overhead power lines and conductors of all growing trees, only low growing shrubs and plants (not exceeding 15 feet maximum mature height) are allowed on the easement area.
  - 4) No buildings are allowed within the easement area.
  - 5) A minimum overhead clearance of 12 feet from the conductors of Western Area Power Administration's 115-kV Transmission Lines must be maintained at all times.

**ZONE CHANGE MAP**  
 FOR  
 LOTS 1 THRU 3, BLOCK 13, NORTH RANGE BUSINESS PARK,  
 6TH FILING; LOTS 1 & 2, BLOCK 6, LOT 1, BLOCK 7, LOTS 1  
 & 2, BLOCK 8, LOTS 1 THRU 5, BLOCK 9, LOTS 1 THRU 6,  
 BLOCK 10, LOTS 1 & 2, BLOCK 11, NORTH RANGE BUSINESS  
 PARK, 3RD FILING; LOTS 1 & 2, BLOCK 12, NORTH RANGE  
 BUSINESS PARK, 4TH FILING; LOT 3, BLOCK 1, NORTH  
 RANGE BUSINESS PARK, 5TH FILING, LARAMIE COUNTY,  
 WYOMING

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**STEEL SURVEYING SERVICES, LLC**  
 PROFESSIONAL LAND SURVEYORS  
 1114 WEST 19TH ST. CHEYENNE, WY 82001 • (307) 634-1273  
 776 CLARK STREET, WHEATLAND, WY 82201 • (307) 222-1779  
 www.StellSurvey.com • info@StellSurvey.com