CITY OF CHARLES TOWN
PLANNING COMMISSION
AGENDA • DECEMBER 22, 2025

Commission/Board Meeting **CITY HALL** **7:00 PM**

101 E Washington Street, Charles Town, WV 25414

1. CALL TO ORDER

2. APPROVAL OF MINUTES

: DRAFT Minutes Nov 24 2025
11-24-2025 PC MINUTES_DRAFT.pdf

3. UNFINISHED BUSINESS

4. NEW BUSINESS

: **Public Hearing**: *SLD2025-04* - Vinton Hayes/Augustine Manor - Preliminary Plan
1. Staff Report.pdf
2. Application.pdf
3. Plan Set.pdf
4. Response to KH Comments.pdf
5. Traffic Impact Study.pdf

: **Public Hearing**: *SLD2025-07* - Huntfield Phase 4 - Preliminary Plan
1. Staff Report.pdf
2. Application.pdf
3. Plan Set.pdf
4. KH Review.pdf

: **Public Hearing**: *WV2025-01* - 231 N. Samuel St. - Landscaping waiver
1. Staff Report.pdf
2. Application.pdf
3. Plan Set.pdf

: *Commission Review*: 2026 Draft Calendar
2026-Planning-Commission DRAFT.pdf

5. ADJOURNMENT

6. NOTICE: The Public May View the Meeting Live by Clicking on the Event Link at:

https://www.charlestownwv.us/government/agendas_minutes.php

Planning Commission
101 East Washington Street
Charles Town, WV 25414

Meeting: 12/22/25
Department: Planning Commission
Category: Report
Initiator:

SCHEDULED

AGENDA ITEM (ID #)

DRAFT Minutes Nov 24 2025

ATTACHMENTS:

- 11-24-2025 PC MINUTES_DRAFT.pdf

CITY OF CHARLES TOWN
PLANNING COMMISSION •
MINUTES NOVEMBER 24, 2025

Committee Meeting **CITY HALL** **7:00 PM**

101 E Washington Street, Charles Town, WV 25414

1. CALL TO ORDER

Present: Jessica Derr – Acting Chair
Jeff Hynes
Zakhary Dunning

James Newman, City Staff - Zoning Administrator

Ann Paonessa – Chair, Absent
Kevin Long - Absent

2. APPROVAL OF MINUTES

2.1: Regular Session Minutes of October 27, 2025

Commissioner Derr pointed out one (1) typo; 'Samuel' was misspelled on page 4.

Motion to approve the meeting minutes with corrections:

RESULT:	**Approved**
MOVER:	Hynes
SECONDER:	Dunning
AYES:	Derr, Hynes, Dunning

3. UNFINISHED BUSINESS
None

4. NEW BUSINESS

4.1: Public Hearing: *SLD2025-07: – Huntfield Phase 4 – Sketch Plan*

Staff presentation.

The Commission discussed the project.

Two (2) applicants were present, one in-person and one virtually.

Motion to open public hearing:

RESULT:	**Approved**
MOVER:	Hynes
SECONDER:	Dunning
AYES:	Derr, Hynes, Dunning

No public comment.

DRAFT

Motion to close public hearing:

RESULT:	**Approved**
MOVER:	Hynes
SECONDER:	Dunning
AYES:	Derr, Hynes, Dunning

Motion to approve the sketch plan as presented with the following conditions:

1. Townhomes shall be set back 25' from the front property line in the preliminary plan per the revised Conditions of Annexation.
2. Per the Huntfield Overall Composite Schematic/Master Plan, the trail and berm included in/adjacent to this phase shall be shown on the Preliminary and Final Plans.

RESULT:	**Approved**
MOVER:	Hynes
SECONDER:	Dunning
AYES:	Derr, Hynes, Dunning

5. ADJOURNMENT

Motion to adjourn:

RESULT:	**Approved**
MOVER:	Hynes
SECONDER:	Dunning
AYES:	Derr, Hynes, Dunning

Meeting adjourned at 7:12 pm.

DRAFT

Planning Commission
101 East Washington Street
Charles Town, WV 25414

Meeting: 12/22/25
Department: Planning Commission
Category: Report
Initiator:

SCHEDULED

AGENDA ITEM (ID #)

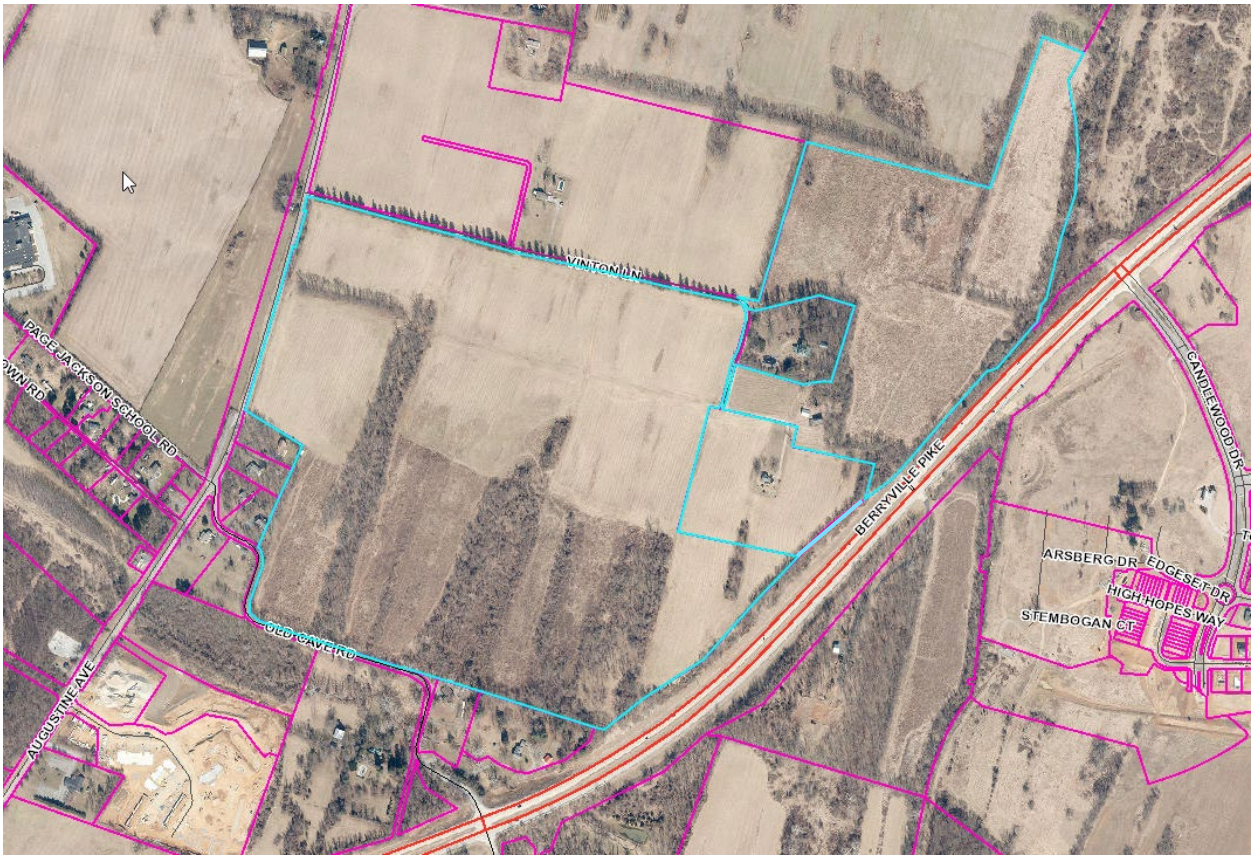
Public Hearing: *SLD2025-04* - Vinton Hayes/Augustine Manor - Preliminary Plan

ATTACHMENTS:

- 1. Staff Report.pdf
- 2. Application.pdf
- 3. Plan Set.pdf
- 4. Response to KH Comments.pdf
- 5. Traffic Impact Study.pdf

Preliminary Plan – Augustine Manor (formerly Vinton-Hayes)
SLD2024-07

Date: For the December 22, 2025 Planning Commission meeting
Applicant: Elm Street Communities
Property Owner: Roscoe Hayes et al.
Report by: James Newman, City Planner, Zoning/Subdivision Administrator.
Proposal: Major Land Development.
Property Location: TD 03 / Map: 12 / Pcls 217 & 218.
Current Zoning: Neighborhood Residential



PROJECT OVERVIEW

For Phase 1 the applicant proposes to build 88 single-family homes and 60 townhomes.

COMPLETENESS REVIEW

This item was deemed complete by the Planning Commission on April 28, 2025. The sketch plan was approved on May 27, 202, subject to three conditions:
1. That a minimum five (5) ft wide sidewalk be installed along Augustine Avenue.
2. The existing tree line along Vinton Lane be kept as a screening buffer, and shall not be removed and for each individual tree that must be replaced, in the same location by the property owner, whether that be the HOA or the developer with a tree of identical species.
3. In Phase 5, the townhomes shall meet the required 200' maximum distance from parking.

ZONING REVIEW

The property is zoned Neighborhood Residential (NR). Per the Zoning Ordinance:

The purpose of the NR District is to provide for a mix of housing types and related services and Uses, including Commercial Uses and office services.

…

The intent is to create a cohesive pattern of primarily residential development that allows a mix of Uses, including neighborhood servicing Commercial and office Uses and/or Commercial and office Uses that complement the primarily residential character of the neighborhood.

For this Phase 1 Preliminary Plan, the applicant proposes to build 88 single-family homes and 60 townhomes.

LOT DIMENSIONS

The proposed typical lot dimensions and setbacks adhere to the requirements of the zoning district/Conditions of Annexation.

SIDEWALKS

Sidewalks of 5 ft. width are provided on both sides of all roads within the development, and will be built to the City's design requirements.

UTILITIES

Provided; all utility lines to be buried underground.

LIGHTING

A photometric plan is provided; each street in the Phase is lit with lights approximately 100 ft. from each other; the maximum permitted separation distance is 200 feet in residential areas. No details on the style of lighting device are provided; the Subdivision Ordinance requires a black pole with an acorn-style top. Lighting could be reduced and the plan set would still conform to the Ordinance requirements.

BUFFERS

A 25 ft. buffer is required between state roads and new residential developments; a vegetated buffer is provided from Augustine Avenue.

LANDSCAPING

The applicant has placed street trees as required except that additional plantings are required in front of the townhome lots 97-104/105-112.

The applicant has provided the required interior landscaping for the parking lots adjacent to the townhomes and has planted shrubs between the lots and homes to provide a screen from headlights.

PARKING

Each single-family detached home is required to have two off-street parking space, and each townhome is required to have 1.8 spots per dwelling, with spaces no further than 200 feet from their unit. These requirements are met via driveways for both housing types and parking lots adjacent to the townhomes.

The driveway for lot 137 is for an end-unit townhome The driveway location had to be shifted to comply with the Ordinance requirements that it be at least 40 ft. from the intersection of two streets; the driveway has an irregular shape. There are no Ordinance requirements that driveways adhere to a certain shape, merely that they be at least 12 ft. wide. Per the applicant's engineer, changing the townhomes that the driveway was the same as all others "would require a substantial redesign effort by their architectural team, as this modification is not typical for their product".

STORMWATER

The City's 3rd party engineering firm, Kimley-Horn, has reviewed the plans and has comments which the applicant is addressing.

OPEN SPACE

Open space has been provided within 250 feet of the townhomes via the large field and play equipment located at the intersection of Worthington Drive and Ellsworth Avenue.

TOWNHOME DEVELOPMENT STANDARDS

A. *The overall density in a townhouse project shall not exceed the Maximum Density specified in the Charles Town Zoning Ordinance… Density shall be calculated using the Net Buildable Land Area.*

   This criterion is met. Maximum permitted density is 10 units/acre; proposed density is 4.6 units/acre for the project overall.

B. *The Net Buildable Land Area of a townhouse Development shall equal at least 3,500 square feet for each dwelling unit. Each dwelling unit shall have a minimum lot size of 2,000 square feet. The difference between the Net Buildable Land Area and the total area of the dwelling unit Lots shall be allocated to open space common area.*

   Not applicable; this is a phase of development within an overall Master Planned community with dedicated areas for open space. Adjacent to this phase is a large grassy and play equipment for recreation.

C. *Each townhouse development shall have at least 50 foot of street frontage. This does not apply to single or multiple contiguous townhouses on an existing platted street.*

   This criterion is met.

D. *The minimum townhouse lot width shall be in accordance with the minimum lot with specified in the Zoning Ordinance... Each Lot on the end of a row of townhouses shall have an additional width necessary to accommodate the required side yard.*

This criterion is met.

E. *There shall be not be more than ten (10) nor less than three (3) contiguously connected townhouse units.*

This criterion is met.

F. Section F covers setbacks requirements. The townhomes adhere to the setback requirements of the Zoning District.

G. *Access Drives and Off-Street Parking. Off-street parking space shall be provided at the rate of 1.8 spaces per dwelling unit. In a Subdivision/Land Development of townhouse Lots, it will not be necessary that off-street parking be provided on a specific Lot so long as the required number of parking spaces are provided in the Subdivision/Land Development for the number of Lots to be served; provided that, no parking area shall be more than 200 feet from the dwelling unit it serves.*

The required parking for 60 townhomes is 108 spaces. 58 spaces are provided in the adjacent parking lots, and the driveways provide the remaining required parking.

H. *Townhouse garages may be attached to or detached from the townhouse unit and may be accessed from either the front or rear yard. When detached the garage structure must be consistent and compatible with the architecture and materials of the respective townhouse unit.*

The proposed design shows front-load garages on the ground floor of the townhomes.

I. *Townhouses abutting each other shall have complimentary but not identical facades.*

This criterion will be verified at the building permit stage of review.

J. *No more than two abutting townhouses shall have a common roof line.*

This criterion will be verified at the building permit stage of review.

K. Section 'K' covers townhomes which do not front on a public road. That is not applicable to this development.

L. Site Coverage. The minimum townhouse lot width shall be in accordance with the minimum lot with specified in the Zoning Ordinance.

This criterion is met.

M. Adequate provision shall be made for storage of collection and refuse where applicants desire a centralized collection point(s) in lieu of curb-side trash pick-up. This area shall be screened and the dumpsters placed on a concrete pad pursuant to Article 1333.23(L) of this Ordinance.

This criterion is met; collection is done on each site rather than at a central location.

N. Permeable areas of the site shall be planted with ground cover, shrubs, and trees as required by this Ordinance.

This criterion is met.

O. Required Open Space.
1. The difference between the Net Buildable Land Area of a townhouse Development and the total area of the dwelling unit Lots shall be allocated to open space common area as specified in Section 1333.20(B) above.

As stated earlier, this is a phase of a Master Planned Community with areas already dedicated to open space; open space is also located adjacent to these units.

2. In the event that the Planning Commission, by waiver, permits dwelling unit Lots of less than the 2,000 square foot minimum specified in Section 1333.20(B), compensating open space must be established and provided within the project site equal to the aggregate area by which such Lots are under the 2,000 square foot minimum.

Not applicable.

3. In a townhouse Development, open space for the Subdivision/Land Development must at least equal 30 percent of the Net Buildable Land Area of the Subdivision/Land Development. To the fullest extent possible, open space for townhouses must be located near the townhomes.

Open space has been provided within 250 feet of the townhomes via the large field and play equipment at Worthington Drive and Ellsworth Avenue.

Section 'O' covers the creation of a Home Owners Association (HOA) to maintain open space. An HOA will be created for this development.

CONDITIONS OF ANNEXATION

The development is subject to Conditions of Annexation. None of the Conditions are applicable to this Phase other than payment of funds per residential unit.

SKETCH PLAN CONDITIONS

1. That a minimum five (5) ft wide sidewalk be installed along Augustine Avenue.

   -This Condition has been met; a sidewalk of sufficient width is provided.

2. The existing tree line along Vinton Lane be kept as a screening buffer, and shall not be removed and for each individual tree that must be replaced, in the same location by the property owner, whether that be the HOA or the developer with a tree of identical species.

   -Not applicable to this Phase.

3. In Phase 5, the townhomes shall meet the required 200' maximum distance from parking.

   -Not applicable to this Phase.

CONCLUSION

The applicant is seeking to develop Phase 1 of the Augustine Manor subdivision. This Phase has 88 single-family homes and 60 townhomes. The Phase is generally in conformance with the requirements of the Ordinances; however, additional review of the Plan Set is required by Kimley-Horn, which may necessitate changes to the plan set.

RECOMMENDATION

Approval subject to conditions:

1. The design of the street and parking lot lights shall conform to Subdivision and Land Development Ordinance Section 1333.14
2. The Preliminary Plan set must be reviewed and approved by Kimley-Horn and the Subdivision Administrator prior to approval of the Final Plan set.

S/LD Application No._____



RECEIVED
OCT 08 2025
BY:

SUBDIVISION AND LAND DEVELOPMENT APPLICATION

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE
ARTICLE 1332, SUBDIVISION AND LAND DEVELOPMENT APPLICATION & APPROVAL REQUIREMENTS

To assist the Subdivision Administrator in the review of a Subdivision and Land Development (S/LD) Application, the Applicant must utilize this form to supply the City with the information prescribed under Section 1332.03 of the Charles Town Subdivision Ordinance. The submission of this form, along with the prescribed information and required fees, shall serve as the Applicant's S/LD Application as required by Ordinance Section 1332.03.

1. DATE September 30, 20 25

2. APPLICATION TYPE

☐ Minor Subdivision | Final S/LD Plan

☒ Major Subdivision Development*
- Preliminary S/LD Plan and Final Plat

☐ Major Land Development**
- Preliminary S/LD Plan

☐ Major Subdivision and Land Development***
- Preliminary S/LD Plan and Final Plat

*Conventional Subdivision – A Preliminary Plan and Plat Approval and a Final Plan and Plat Approval is required.

**No Division/Merger of Land – A Preliminary Plan and Plat Approval is required for the submission of a building or multiple buildings on one lot where there is no subdivision of land (commonly referred to as a site plan).

***A Preliminary Plan and Plat Approval and a Final Plan and Plat Approval is required for the submission of a building or multiple buildings that will require the merger, adjustment or subdivision of land.

3. APPLICANT'S NAME* Vinton Investments, L.L.C. - Attn. Jim Perry

Address: 1355 Beverly Road, Suite 240, McLean, VA 22101

Telephone Number (703) 734-9730 Fax Number ( )

Email Address jperry@elmstreetdev.com

4. PROPERTY OWNER'S NAME Hayes Roscoe A. et al

Address: 245 Vinton Lane, Charles Town, WV 25414

Telephone Number (304) 671-1078 Fax Number ( )

Email Address roscoeahayes@yahoo.com

5. LEGAL DESCRIPTION OF THE SUBJECT PROPERTY (list all parcels that apply)

Property Address: 632 Vinton Lane, Charles Town, WV 25414

Tax Map # and Parcel: Tax Map #: 12 Parcel #: 217 & 218

Deed Book and Page #: Deed Book #: 1250 Page #: 338

Property Area in Square Feet or Acres: 180.11 ACRES

6. DESCRIPTION OF PROJECT AND PROPOSED USE(S) OF THE PROPERTY:

In accordance with the approved Sketch Plan, the project proposes the subdivision of Parcels 0217 and 0218 to complete Phase 1 of the Development. This phase includes 88 single-family detached units and 60 single-family attached units, for a total of 148 units, along with the associated right-of-way infrastructure and appurtenances.

7. DESCRIPTION OF THE EXISTING (OR FORMER) USE(S) OF THE PROPERTY AND CURRENT ZONING:

The property is currently zoned as Neighborhood Residential. It currently has one residence, farm outbuildings, fallow fields, and wooded areas. Prior use is agriculture

*Applicants include: Property owner(s), Engineer(s), Surveyor(s), or Consultant(s)

8. ARE THERE ANY ANTICIPATED WAIVERS OR VARIANCES? IF YES, PROVIDE DETAILS.

No

9. PARCEL HISTORY (List all pending or previously approved applications on the subject parcels inventoried above, including previous site plan applications if this application is a site plan amendment)

Application No.	Project Name and Phase	Status	Approval Date
ZMA2024-04	REZONING VINTON-HAYES	APPROVED	DECEMBER 16, 2024
SLD2025-04	SKETCH PLAN VINTON-HAYES	APPROVED	MAY 27, 2025

10. HAS THE PROPERTY BEEN THE SUBJECT OF ANY COURT ACTION?

☐ Yes (Please specify nature of all proceedings and current status and attach any documents showing court decisions, etc.)

☒ No

11. PLAN/PLAT SUBMISSION TO OTHER AGENCIES (Documentation of all required approvals must be attached to this Application or submitted prior to Preliminary S/LD Application approval)

Agency (Specify others as applicable)	Submittal Date	Approval/Permit Issued	Date of Approval/Issuance
City of Charles Town			
City of Charles Town Utility Board			
Jefferson County Planning and Zoning Department			
Jefferson County Addressing Office			
Jefferson County Board of Education			
WV Department of Environmental Protection			
WV Department of Transportation, Division of Highways			
WV State Historic Preservation Office			
WV Office of Environmental Health Services			
U.S. Army Corps of Engineers			

12. FEE CALCULATION (Per Fee Schedule) _____

_____

_____

_____

AMOUNT PAID $ 8260 for plan application
$2000 for escrow

APPLICANT CERTIFICATION

I certify that, to the best of my knowledge, the submitted information and statements are true and correct. I also certify that I have received and read Section 1332.03 of the Charles Town S/LD Ordinance and relevant provisions of the Charles Town City Code.

Signature of Applicant

_____ Date 10/1/25

Signature of Property Owner (If different than Applicant)

Alice M. Spurlock

_____ Date 9/30/25

as Attorney In Fact for Rosie A Hays

Please submit an original completed Application and specified number of Plan/Plat (Three (3) copies at 24" x 36", Adobe PDF format, and Five (5) copies at 11" x 17") copies to the following:

Subdivision Administrator
City of Charles Town
101 E. Washington Street
Charles Town, WV 25414

FOR CITY USE ONLY

Application Number:_____ Date Application Received:_____

Fee: $_____ Paid:$_____ Check No._____

Receipt No._____

Subdivision Administrator Approval:_____ Date:_____

Planning Commission Approval:_____ Date:_____

Comments/Conditions:_____

Property Owners • • • • • • • • • Cont•nued

Name:	Alice M. Spickler and Donald Spickler Co-Trustees of the Alice M. Spickler Living Trust
Address:	4041 Fairway Drive, Medina, OH 44256
Email Address:	omnirph@zoominternet.net and im4wvu@zoominternet.net
Phone:	330-421-6476 and 330-421-6475

Name:	Joseph R. Gallo
Address:	80 Ridgewood Road, Unit 205, Township of Washington, NJ 07676
Email Address:	joseph.r.gallo@gmail.com
Phone:	201-289-0387

APPLICANT'S CERTIFICATION Continued

Signature of Owners

Alice M. Spickler

Alice M. Spickler

Date 9/30/25

Donald Spickler

Donald Spickler

Date 9/30/25

Joseph R. Gallo

Date _____

APPLICANT'S CERTIFICATION Continued

Signatures of Owners

Alice M. Spickler

Date _____

Donald Spickler

Date _____

Joseph A. Gallo

Date 9/30/2025

SPECIAL LIMITED POWER OF ATTORNEY

STATE OF West Virginia

COUNTY OF Berkley, to-wit:

KNOW ALL MEN BY THESE PRESENTS, that I, Roscoe A. Hayes, the undersigned, do hereby make, constitute and appoint Alice M. Spickler, as my true and lawful attorney-in-fact for me and in my name, place and stead, and on my behalf, to sign, make, execute and deliver any and all documents and instruments, including, but not limited to contracts, a Deed, a Settlement Statement, and any and all other instruments, affidavits and settlement documents required for and incident to the sale of real property described:

approximately 178+/- acres of land, more particularly identified by the Tax Map Nos 19-03-12-0217 and 19-03-12-021

The rights, powers and authority of my said attorney-in-fact granted in this instrument shall commence and be in full force and effect upon the execution hereof, and such rights, powers and authority shall remain in full force and effect thereafter until I the undersigned gives notice in writing that such power is terminated, such written notice to be effective upon its recordation in the Office of the Clerk of the County Commission of Jefferson County, West Virginia.

Dated: The 13 day of December, 2023

Roscoe A. Hayes

The foregoing instrument was acknowledged before me this 13 day of December, 2023, by Roscoe A. Hayes.

(AFFIX NOTARIAL SEAL)

OFFICIAL SEAL
STATE OF WEST VIRGINIA
Jennifer E Gagaby
Kay Casto & Chaney PLLC
400 Foxcroft Ave
Suite 100
Martinsburg WV 25401
My Commission Expires July 14, 2025

Notary Public

My commission expires: 07/14/2025

This document was prepared by Stephen R. Kershner, Attorney at Law, Kay Casto & Chaney PLLC, 400 Foxcroft Avenue, Suite 100, Martinsburg, West Virginia 25401.

AUGUSTINE MANOR

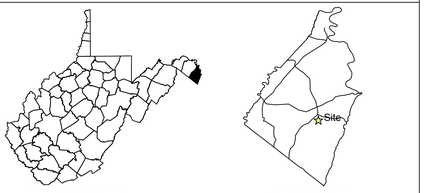
PRELIMINARY SUBDIVISION/LAND DEVELOPMENT PLAT

MAJOR SLD2025-04

CHARLES TOWN CORP. DISTRICT (3) - MAP 9 - PARCEL 67, LOTS 2A & 2B
DEED BOOK 691 - PAGE 432
CITY OF CHARLES TOWN, WEST VIRGINIA
ZONED RESIDENTIAL MEDIUM-HIGH DENSITY (R-15)

No.	DESCRIPTION	DATE

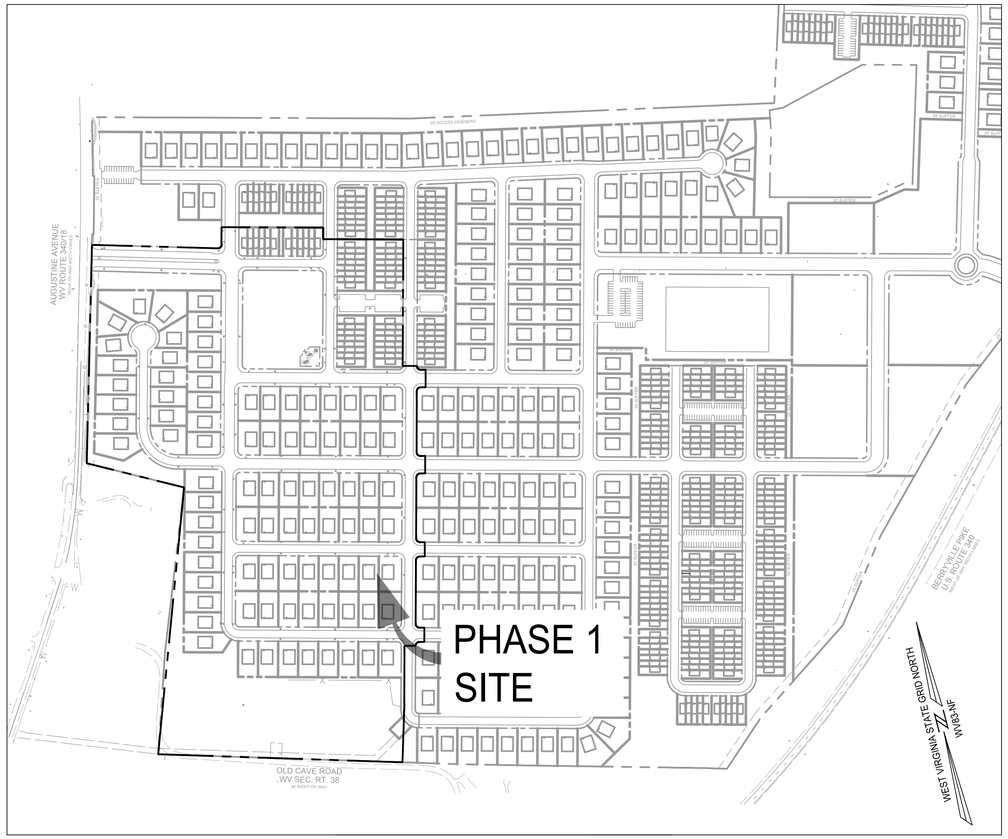
GENERAL LOCATION



NOT TO SCALE

LEGEND

- PROPOSED INDEX CONTOUR MAJOR (260)
- PROPOSED INT. CONTOUR MINOR (258)
- PROPOSED PROPERTY LINE
- PROPOSED PROPERTY SETBACK
- PROPOSED RIGHT-OF-WAY BOUNDARY
- PROPOSED BUILDING OUTLINE
- PROPOSED UTILITY EASEMENT
- PROPOSED STORM PIPE
- PROPOSED WATERLINE
- PROPOSED SANITARY SEWER
- PROPOSED 6' FENCE
- PROP. SIDEWALK
- PROP. ASPHALT
- EX. PROPERTY LINE
- EX. ADJACENT PROPERTY LINE
- EX. PROPERTY SETBACK
- EX. BUILDING OUTLINE
- EX. CURB AND GUTTER
- EX. STORM PIPE
- EX. WATERLINE
- EX. SANITARY SEWER
- EX. SIDEWALK
- EX. UTILITY EASEMENT
- ACCESSIBLE CURB RAMP
- ACCESSIBLE PARKING SPACE
- •0.00 PROPOSED SPOT ELEVATION
- PROPOSED PARKING COUNT
- PROPOSED STORM MANHOLE
- PROPOSED STORM INLET STRUCTURE
- WATER METER
- SANITARY SEWER CLEANOUT
- PROP. STREET LIGHT (TYP.)
- UTILITY POLE
- 8" PVC SDR-26 PROPOSED SANITARY SEWER LABEL
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER VALVE
- PROPOSED WATER FITTINGS
- EX. ACCESSIBLE CURB RAMP
- EX. POST
- EX. STORM GRATE INLET
- EX. TRAFFIC CONTROL SIGNALS
- EX. TRAFFIC SIGNAL POLE
- EX. STORM MANHOLE
- EX. SANITARY MANHOLE
- EX. UTILITY POLE
- EX. PEDESTAL
- EX. VAULT
- EX. FIRE HYDRANT



VICINITY MAP

250 125 0 250 500
GRAPHIC SCALE
1" = 250'

SHEET INDEX

Sheet Number	Sheet Title
C000	COVER SHEET
C100	GENERAL NOTES
C201	EXISTING CONDITIONS & DEMO PLAN
C300	PHASING PLAN
C301	SITE PLAN
C302	SITE PLAN
C303	SITE PLAN
C304	SITE PLAN
C305	SITE PLAN
C306	SITE PLAN
C307	SIGHT DISTANCE PLAN
C308	SIGHT DISTANCE PLAN
C309	SIGHT DISTANCE PLAN
C310	SIGHT DISTANCE PLAN
C311	SIGHT DISTANCE PLAN
C312	SIGHT DISTANCE PLAN
C313	SIGHT DISTANCE PROFILES
C314	SIGHT DISTANCE PROFILES
C315	SIGHT DISTANCE PROFILES
C316	SITE DETAILS
C317	SITE DETAILS
C318	SITE DETAILS
C319	VEHICLE TURNING PLANS
C320	VEHICLE TURNING PLANS
C321	VEHICLE TURNING PLANS
C322	VEHICLE TURNING PLANS
C323	VEHICLE TURNING PLANS
C324	VEHICLE TURNING DETAILS
C401	GRADING AND DRAINAGE PLAN
C402	GRADING AND DRAINAGE PLAN
C402A	GRADING AND DRAINAGE PLAN
C403	GRADING AND DRAINAGE PLAN
C404	GRADING AND DRAINAGE PLAN
C405	GRADING AND DRAINAGE PLAN
C406	GRADING AND DRAINAGE PLAN
C407	SIDEWALK RAMP INSETS
C407A	SIDEWALK RAMP INSETS
C407B	SIDEWALK RAMP INSETS
C407C	SIDEWALK RAMP INSETS
C408	ROAD PROFILES
C409	ROAD PROFILES
C410	ROAD PROFILES
C411	ROAD PROFILES
C412	ROAD PROFILES
C413	ROAD PROFILES
C414	ROAD PROFILES
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C432	STORM PROFILES
C433	STORM PROFILES
C434	STORM PROFILES
C435	STORM PROFILES
C436	STORM PROFILES
C437	STORM PROFILES
C438	STORM PROFILES
C439	STORMWATER SCHEDULES
C440	STORMWATER SCHEDULES
C441	STORMWATER MANAGEMENT DETAIL
C442	PRE DEVELOPMENT DRAINAGE MAP
C443	POST DEVELOPMENT DRAINAGE MAP
C444	STORMWATER INLET DRAINAGE MAP
C445	STORMWATER INLET DRAINAGE MAP
C446	STORMWATER DETAILS
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C502	UTILITY PLAN
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C505	UTILITY PLAN
C506	UTILITY PLAN
C507	UTILITY PLAN
C508	SANITARY SEWER PLAN & PROFILE
C509	SANITARY SEWER PLAN & PROFILE
C510	SANITARY SEWER PLAN & PROFILE
C511	SANITARY SEWER PLAN & PROFILE
C512	SANITARY SEWER PLAN & PROFILE
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C514	SANITARY SEWER PLAN & PROFILE
C515	SANITARY SEWER PLAN & PROFILE
C516	SANITARY SEWER PLAN & PROFILE
C517	SANITARY SEWER PLAN & PROFILE
C518	SANITARY SEWER PLAN & PROFILE
C519	SANITARY SEWER PLAN & PROFILE
C520	SANITARY SEWER PLAN & PROFILE
C521	WATER PLAN & PROFILE
C522	WATER PLAN & PROFILE
C523	WATER PLAN & PROFILE
C524	WATER PLAN & PROFILE
C525	WATER PLAN & PROFILE
C526	WATER PLAN & PROFILE
C527	WATER PLAN & PROFILE
C528	WATER PLAN & PROFILE
C529	WATER PLAN & PROFILE
C530	WATER PLAN & PROFILE
C531	WATER PLAN & PROFILE
C532	SANITARY SEWER SCHEDULES
C533	WATER & SEWER DETAILS
C534	WATER & SEWER DETAILS
C600	SEDIMENTATION & EROSION CONTROL PHI
C601	SEDIMENTATION & EROSION CONTROL PHI
C602	SEDIMENTATION & EROSION CONTROL PHII
C603	SEDIMENTATION & EROSION CONTROL PHII
C604	SEDIMENTATION & EROSION CONTROL PHII
C605	SEDIMENTATION & EROSION CONTROL PHII
C606	SEDIMENTATION & EROSION CONTROL PHII
C607	SEDIMENTATION & EROSION CONTROL PHII
C608	SEDIMENTATION & EROSION CONTROL PHII
C609	SEC NARRATIVE & NOTES
C610	SEC DETAILS
C700	AUGUSTINE AVE IMPROVEMENT PLANS
C701	AUGUSTINE AVE IMPROVEMENT PLANS
C702	AUGUSTINE AVE SIGHT DISTANCE PLAN
C703	AUGUSTINE AVE SIGHT DISTANCE PROFILE
C704	AUGUSTINE AVE CROSS SECTIONS
C705	AUGUSTINE AVE CROSS SECTIONS
C706	AUGUSTINE AVE CROSS SECTIONS
C707	AUGUSTINE AVE CROSS SECTIONS
C708	AUGUSTINE AVE CROSS SECTIONS
C709	AUGUSTINE AVE CROSS SECTIONS
C710	AUGUSTINE AVE CROSS SECTIONS
C711	TRAFFIC CONTROL PLANS
C712	WVDOH DETAILS
C713	WVDOH DETAILS
C714	WVDOH DETAILS
L101	LANDSCAPE PLAN
L102	LANDSCAPE PLAN
L103	LANDSCAPE PLAN
L104	LANDSCAPE PLAN
L105	LANDSCAPE PLAN
L106	LANDSCAPE PLAN
L110	LANDSCAPE CALCULATIONS AND PLANT SCHEDULE
L120	LANDSCAPE SPECIFICATIONS AND DETAILS
-	PHOTOMETRIC PLAN (BY OTHERS)

PRELIMINARY PLAN AND PLAT APPROVAL

"This Preliminary Plan was approved by the City of Charles Town, on the _____ day of _____, 20_____, subject to any conditions specified hereon.

This plan is vested and valid for one (1) year with the possibility of a one (1) year extension per Section 1332.03(C)(2)(F)(5) of the City of Charles Town Subdivision and Land development Ordinance.

All expenses incurred with respect to improvements for all utility services, paving, grading, landscaping, curbs, gutters, sidewalks, road lighting, road signs, flood protection devices, drainage structures and all other improvements that may be required shall be the responsibility of the subdivider and not the City.

_____ _____
Secretary of the Planning Commision Date

ENGINEER/SURVEYOR'S CERTIFICATION

"The plat represents a survey made by him/her; all Monuments and improvements indicated thereon actually exist, and that their location, size and material are correctly shown; his/her best knowledge and belief, all requirements of the Ordinance have been fully complied therewith."

_____ _____
CHRIS LEMON Date
IMEG

STATEMENT OF ACCURACE

"The Engineer and/or Surveyor, in signing this plat/plan, attests to the best of his or her knowledge, is plan is complete and accurate."

_____ _____
CHRIS LEMON Date
IMEG

STATEMENT OF ACCEPTANCE

"The developer, in signing this plat/plan, agrees to abide by all conditions, terms and specifications provided heron; and to complete all the improvements required by the Preliminary Plat and Plan or site plan."

_____ _____
Date
VINTON INVESTMENTS, LLC
1355 BEVERLY ROAD, SUITE 240
McLEAN, VIRGINIA 22101

CALL "MISS UTILITY"

MISS UTILITY OF WEST VIRGINIA (MUWV) AT 811 OR 1-800-245-4848, 48 HOURS PRIOR TO THE START OF WORK. EXCAVATORS MUST NOTIFY ALL PUBLIC UTILITY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH ALL COUNTY REQUIREMENTS, WEST VIRGINIA CODE AND REGULATIONS.

UTILITY NOTICE (AS NEEDED)

Contractors shall notify all public utility operators who maintain underground utility lines in the area of proposed excavating or blasting at least two (2) working days, but not more than ten (10) working days, prior to commencement of excavation or demolition. Names and telephone numbers of the operators of underground utility lines appear below. These numbers shall also be used to serve in an emergency condition.

Water:	Charles Town Utility Board 832 S. George Street Charles Town, WV 25414 (304) 725-2316
Sewer:	Charles Town Utility Board 832 S. George Street Charles Town, WV 25414 (304) 725-2316
Power:	Potomac Edison P.O.Box 3615 Akron, OH 44309 (800) 686-0011
Phone:	Frontier Communications 1108 N. Mildred Street Ranson, WV 25438 (304) 728-8500
Soil Conservation:	Eastern Panhandle Conservation District 151 Aikens Center, Suite 2 Martinsburg, WV 25404 (304) 263-4376
WV DEPARTMENT OF HIGHWAYS:	Joshua Leatherman, TRETSR District 5 Permits Office: (681)320-2039 Cell: (304)590-2841

STATE & LOCAL PERMITS

AGENCY	PERMIT #/APPROVAL DATE

IMEG
4601 Forbes Boulevard, Suite 140
Lanham, MD 20706 P 240.296.1574
engineering • surveying • land planning

STATE OF MARYLAND
ANDREW H. FRISER
6264A
PROFESSIONAL ENGINEER

FINAL PLAN - COVER SHEET
AUGUSTINE MANOR
691/432 MAP 9 PARCEL 67
LOTS 2A (RESIDUE) & 2B
DISTRICT 3, JEFFERSON COUNTY, WV

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: 112742
DATE: 07/26/2024
SCALE: AS SHOWN
DESIGN: AF
DRAWN: KMS
CHECKED: SK

SHEET TITLE:

COVER SHEET

SHEET No.

C000

P:\Projects\23011\000200\113948 Site Plan\C000 Cover Sheet.dwg, 12/17/2025 2:00:04 PM, Tony Zook,

GENERAL NOTES

1. Methods and materials used in the construction of the improvements herein shall conform to current Charles Town Construction Standards and Specifications and/or current WVDOH Standards and Specifications.

2. The Engineer shall not have control over or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures nor for safety precautions and programs in connection with work shown on these plans. The Engineer is not responsible for the contractor's schedules or failure to carry out the work. The Engineer is not responsible for acts or omissions of the contractor, subcontractor, or their agents or employees, or any other person performing portions of the work.

3. The Contractor, Owner or Developer shall be responsible for securing any third party inspection/testing service to insure construction compliance with these plans and specifications. It is IMEG Engineering's recommendation that a third party inspection/testing service be employed to ensure that project is completed and materials installed meet the details and specifications in these plans.

4. The location of existing utilities shown in these plans are taken from existing records and available asbuilt data. It shall be the contractors responsibility to verify the exact horizontal and vertical location of all existing utilities as needed prior to construction. The contractor shall be responsible for the digging of all test holes that may be required, whether recommended or not by these plans, to determine the exact location and elevation of existing utilities. If any conflicts arising from this existing utility verification or if during the course of construction, any object of an unusual nature is encountered, the contractor shall cease work in that area and immediately notify IMEG Engineering at (240) 296-1569 and/or the proper authority. IMEG Engineering or any engineer associated with these plans shall not be responsible or liable for any construction cost that may be associated with the installation or reinstallation any utility or other improvements if not notified of any discrepancies between actual field conditions and the approved plan.

5. The approval of these plans in no way relieve the developer, the contractor, or their agents of any legal responsibility which may be required by the code of West Virginia or any other ordinance enacted by Charles Town nor does it guarantee the issuance of any required permit by Charles Town, WVDOH or any other Agency.

6. The contractor shall provide adequate means of cleaning mud from trucks and/or other equipment prior to entering public streets, and it is the contractors responsibility to clean streets, allay dust, and to take whatever measures are necessary to insure that public streets are maintained in a clean, mud and dust free condition at all times.

7. The developer will be responsible for any damage to the existing streets and utilities which occurs as a result of his construction project within or contiguous to the existing right-of-way.

8. After completion of work, all roads shall be turned over to the City of Charles Town, West Virginia for ownership and maintainance.

9. Warning signs, markers, barricades or flagmen should be in accordance with the State and Federal Manual on Uniform Traffic Control Devices (MUTCD).

10. All pavement sections shown on these approved plans are based on a minimum CBR value of 6 and are for preliminary design only. Final pavement design shall be based upon actual field tested CBR values. The Contractor or Developer shall be responsible for field tests per WVDOH standards to obtain actual CBR values for final design. Final pavement designs will be approved by WVDOH and/or the Owner/Developer, which ever applicable, prior to installation.

11. All springs shall be capped and piped to the nearest storm sewer manholes or curb inlet, The pipe shall be minimum 6" diameter.

12. a. Notification shall be given to the Charles Town Utility Board two weeks prior to construction so they can arrange to have a project representative during construction. The District would like to be in the pre-construction project meetings with the contractor.

    b. Notification shall be given to the Charles Town Utility Board prior to construction of water lines. Information should also be obtained from the appropriate authority concerning permits, cut sheets, and connections to existing lines.

12. The Developer and/or Contractor shall be responsible to supply all utility companies with copies of the approved plans and advise them that all grading shall conform to the approved plans, and further that the utility companies shall be responsible for honoring these plans and the finished grades in the installation of their utility lines.

13. All utilities to be located underground.

14. Contractors shall notify operators who maintain underground utility lines in the area of proposed excavating or blasting at least two (2) working days, but not more than ten (10) working days, prior to commencement of excavation or demolition.

15. The developer will be responsible for the relocation of any utilities which is required as a result of his project.

16. All dry utility design shall be performed and provided separately by others. All dry utility information shown hereon is as specified by others and is included for informational purposes only, as directed by the Owner, Developer and/or public agency requirements. IMEG Engineering has not performed the lighting and/or dry utility design and does not warrant and is not responsible for the degree and/or adequacy of illumination on this project or the adequacy of the dry utility to service the site.

17. All sanitary sewers, water mains and appurtenances shall be constructed in accordance with the current standards and specifications of the Charles Town Utility Board.

18. Controlled fills shall be compacted to 95% of maximum density as determined by method "A" per standard proctor AASHTO-T99, ASTM-D698, or VTM-1 as applicable. If a geotechnical report has been prepared, it should supersede the requirements in this note.

19. Refer to Geotechnical Engineer for methods, materials and details for construction of all earthwork activities.

20. Any retaining wall 2 ft. or greater in height shall require the issuance of a separate building permit.

21. IMEG Engineering, Inc. (IE) issued this plan set based on project criteria dictated by the client and municipal codes. This plan set is not considered complete or appropriate for construction until ALL necessary agencies have given approval AND this plan set is signed and sealed by a licensed professional, Any work, planning, scheduling, material purchases and/or construction prior to approvals and licensed/professional sealing will be performed at the risk of the personnel authorizing work. IE shall be held harmless from any costs, time delay and/or material changes incurred on work started before this plan set receives approvals and seals.

22. Within the limit of Phase 1 development, there are no known FEMA 100-year floodplains, per FEMA Map Number 54037C0139E. Effective December, 18 2009. Within the property boundary outside of Phase 1 developments, there are 12.391 AC (539,765 SF) of 100-year floodplains, per FEMA Map Number 54037C0139E, Effective December, 18 2009.

23. No known wetlands have been identified on the subject property.

24. The HOA or Individual lot owners shall be responsible for trash pick up service to the units. No dumpsters are proposed for this section.

25. The National Oceanic and Atmospheric Administration (NOAA) weather station ID for this site is WXM42 (Frequency - 162.475).

26. Rezoning for Urban Reserve to Neighborhood Residential of 180 acres was Approved with Conditions for this site at the December 16th, 2024 meeting of the City Council of Charles County, West Virginia. Conditions required to meet approval are as follows:

    26.1. Each new residential unit developed on the property shall be subject to a voluntary financial payment of $2,500 paid at the time of building permit issuance. These funds may be used by the City to fund any of its future capital needs. The property will be exempt from any future capital improvement fees implemented by the city; and

    26.2. As part of the owner/developer's compliance with section ***1333.17 Parks, Recreation and Open Space Amenity Standards,*** the owner/developer will construct on a portion of the property to be dedicated to the city:
    a. Full-sized soccer field,
    b. Two (2) pickleball courts,
    These improvements will be completed prior to the issuance of the 291st residential building permit for the property. The owner/developer will be exempt from the in lieu requirement of section ***1333.17***; and

    26.3. In addition to the requirements of section ***1333.17***, the owner/developer agrees to construct the following onsite private recreation amenities for future residents on the property;
    a. Community Pool,
    b. Single Story Pool Bathouse to include restrooms, changing areas, and lockers,
    c. Shade Structure (which may be integrated into the Bathouse),
    d. Picnic tables,
    e. Grills,
    f. Playground,
    The improvements will be completed prior to the issuance of the 351st residential building permit for the property.

WATER AND SEWER NOTES

1. Easements shall be given to the Jefferson County Public Service District for the construction and maintenance of sewer facilities, as depicted herein.

2. Installation and maintenance of water and sewer lines shall be in accordance with the WV Department of Health, Jefferson County Public Sewer District, the City of Charles Town and the Charles Town Utility Board requirements.

3. Complete water lateral prior to final paving.

4. Water lines to have a minimum of forty-two inches (42") of cover to crown of pipe. Water lines to have seal of the National Sanitation Foundation. Mechanical joints or slip-on joints with rubber gaskets are preferred by the Health Department.

5. Provide concrete thrust blocking at all water line intersections and direction changes.

6. All water mains must be AWWA C900, CL235 PVC. All sanitary sewer to be PVC ASTM 3034 SDR-35 unless otherwise specified.

7. Water easements are to be dedicated to the Charles Town Utility Board.

8. Storm drain easements are to be dedicated to the City of Charles Town.

9. Sanitary sewer and force main easements are to be dedicated to the Jefferson County Public Sewer District.

10. A horizontal separation of at least 10 foot must be maintained between sanitary sewer and potable water lines except when they are crossing. When water and sewer lines cross, the water line shall be at least 18 inches above the sewer line.

Summary of Water Requirements - Charles Town Utility Board, Charles Town, WV

1. All water mains must be AWWA C900, CL235 PVC. Line extensions must have permitted approval prior to installation.
2. All service lines to be minimum 200 PSI PVC or copper. Final Line size will depend on the type of service. The City will not allow any galvanized lines or fittings. A standard shut off valve must be installed on the property side of the meter for the owner's use; the meter valve is for the city use only.
3. All meters, vaults, and crooks will be set at the property line; the CTUB will install the meters.
4. All service lines will be no deeper than 36" at the meter location to allow access to the setter by the meter installers. Deeper service lines may be acceptable if a crossing conflict is encountered or site conditions dictate.
5. The CTUB will supply the meters, setter and boxes. All non-metallic lines will be installed with tracer ribbon. (Located 6" above the newly installed service line with 3" wide detectable tape.)
6. All multi-meter installations, such as a business or apartment complex are to be set in an outside vault, or an accessible mechanical room, and are to be supplied by the owner. These areas are to be inspected prior to the availability of water service.
7. Fire Hydrants must be American Darling Mark B62B 5-1/4" valve opening with 6" base or equal.
8. Valves are to be AWWA C515 gate valves resilient seated opening left. Valve boxes must be screw type Tyler #562S or equal. All valve riser sleeves are to be cast iron with cap. PVC risers to be approved on a use basis by the CTUB Water Representatives.
9. All valves, bends (45's, 22's and 90's), tees and elbows shall have mechanical restraints (such as mega lugs) and thrust blocks.
10. The CTUB must inspect all work. The contractor must give 24-hour notice to the CTUB for an inspection request. The CTUB may request as-built sketches, photos etc. (as back up)
11. All West Virginia Public Service Commission and WV Health Department, rules and regulations, applying to water and sewer must be followed, and all local state and federal permits and approvals must be obtained prior to performing any water or sewer extensions or upgraded work.

Submittals
1. Prior to the installation of any material or equipment on the project supplied by the Contractor, the Contractor shall submit to the City, three (3) copies of all shop drawings, laying schedules, manufacturer specifications, certification and drawings in accordance with the General Conditions. (Water/Sewer) One copy is for the application file, One copy is for the final inspection compliance. One copy is for inspection review or comments to be completed prior to beginning work. A copy of a current WV Contractors License and proof of Liability Insurance must accompany the submittal.
2. City will require as-built drawings and a copy of submittals for all pipe and and appurtenances used on the project. As-builts shall be furnished in both PDF and AutoCAD formats. An O&M Manual containing, at a minimum, all submittals is to be furnished.

Field Copies of Construction Information
The Contractor shall keep a minimum of one (1) complete copy of the Contract construction plans and specifications (including all revisions and addendums), and all shop drawings issued at the project site. All information shall be kept in a neat and good order and shall be made available for the City's Representative to use at his request.

Open Excavation
1. The depth of trenches shall be such that the location of the proposed pipes will conform with the lines and grades shown on the plans. The shape of all trenches above and within the pipe zone, the construction methods employed, the general protections requirements, the general excavation requirements, the general trenching requirements, and the minimum regulations for trench shoring, shall conform with the regulations set forth under OSHA Regulations 29CFR part 1926 650, 651 & 652, No trenching excavation work shall be performed which is not in accordance with those regulations.
2. The shape of the trenches in the "pipe zone" (which shall be construed to be that portion of the trench between the trench bottom and an elevation 1 foot above the top of the pipe) shall conform to the configuration identified as "Typical Bedding" on Pipe Bedding Drawing #1. The contractor is herein advised that if trench widths in the pipe zone exceed the outside diameter of the pipe plus two feet, and if the City determines that such excessive widths will result in a structural loading for which the pipe is not designed, he shall be required to bed the pipe on a concrete cradle at no additional cost.
3. The Contractor shall shape trenches which are located adjacent to existing above ground or underground structures and/or facilities or in other confined areas, so that such structures and facilities are properly protected against damage or disturbance from settlement or displacement. Adequate sheeting, shoring and/or bracing shall be installed and maintained to provide such protection and the Contractor shall be responsible for all damages resulting to such proposed and existing structures, pipelines, and/or facilities as the result of his failure to use and maintain adequate trench wall support, as well as a result of any other construction activities. The bottoms of all trenches shall be excavated to a depth of 6 inches below the bottom of the proposed lines to accommodate the bedding hereinafter specified.

Pipe Installation
1. Before any pipe is installed in trenches, it shall be inspected for damage and the inside of the pipe shall be swabbed to remove loose dirt and foreign objects, No damaged pipe will be permitted to be installed.
2. All pipes shall be installed to the lines and grades shown on the drawings. No pipes shall be constructed in trenches in which water flows or is pooled and, all pipes shall be carefully handled in the ditch to keep the jointing ends and materials free from dirt during installation. During shut down periods and at the end of each day, all open ends of pipe shall be suitably plugged to prevent the inflow of water, dirt, foreign objects, etc.

Pipe Bedding and Pipe Zone Backfill Material
All proposed pipelines shall be supported on stone dust or #10's small diameter stone, The material shall be placed to a minimum depth of 6 inches below the bottom of the pipe and 6 inches above of the top of the pipe. The material shall be placed in the pipe zone in such a manner as to not disturb, displace, or otherwise misalign the installed pipelines.

Backfill Material Above the Pipe Zone
The material used above the pipe zone shall be such that a satisfactory compaction can be made. At no time shall material bigger than 2 inches in diameter be used. But any material used must be approved by the City before hand. After approval, the entire depth within the backfilled area shall be compacted to provide the minimum percentage of density specified for each area of classification.

Special Backfill Material Below the Pipe Zone
Where muck, quicksand, soft clay, swampy or other material is encountered in the trench bottom, which in the opinion of the City is unsuitable for pipe foundation subgrade or backfill, such material shall be removed to a depth satisfactory to the City. The trench shall then be backfilled to grade with acceptable City approved material, mechanically compacted in successive layers.

Ductile Iron Pipe and Fittings
Ductile iron pipe and fittings under this Contract shall be furnished by the Contractor. All pipes will be slip type joint unless otherwise noted and all fittings will be mechanical joint.

PVC Pipe and Fittings
No glue joints are to be used within the CTUB water or JCPSD right of way. Onsite sewer laterals are to be schedule 40 PVC Pipe or equivalent.

Fire Hydrants
Hydrants shall be furnished and installed complete where shown on the drawings and as approved by the CTUB. This installation shall be adapted to the location of the hydrant so as to make the best installation possible. (note: hydrants no-more than 500 ft apart)

Service Connections for Water Lines
1. Service connections shall be made as indicated on the Contract Drawings.
2. The Contractor shall furnish all fittings required to make the necessary connections. All service line connections shall be made in the presence of the CTUB representative.

Valves and Boxes
Each valve installed underground shall be equipped with a valve box furnished by the Contractor and installed by the Contractor.

Anchoring and Blocking
1. All bends in excess of 10 deg, plugs, caps, tees, and wyes branches along pipelines shall be adequately blocked or anchored to prevent the lines from pulling apart under pressure (see typical concrete blocking).
2. Lugged fitting and tie rods, clamps collars, restrained joints, and anchoring fittings may be substituted in lieu of blocking after having received the approval of the CTUB. Concrete used for blocking and anchoring pipelines in trenches shall consist of concrete as specified elsewhere in these specifications.

Pressure and Leakage Tests
All pipeline shall be tested by the Contractor according with AWWA and witnessed by the CTUB Representative. The Contractor shall furnish all equipment, apparatus, temporary blocking, pumps, taps and gauges to conduct the tests.

Blow Off
Blow off valves shall not be installed.

Minimum Pipe Size and System Design
1. The minimum size of water pipe shall be six-inch diameter. This may be increased at the discretion of the City if hydraulic modeling indicates that a larger size is needed to provide pressure and/or fireflow in the area.
2. Dead ends shall be minimized by looping of all mains.
3. Where dead-end mains occur they should be provided with a fire hydrant, for flushing purposes.
4. No flushing device shall be directly connected to any sewer.

Separation of Water Services & Mains from Other Utilities
5 foot horizontal separation from all non-sewer utility lines - electric, phone etc.

Parallel Installation
1. Normal conditions - Water mains shall be laid at least ten feet horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible; the distance shall be measured edge-to-edge.
2. Unusual conditions - When local conditions prevent a horizontal separation of 10 feet, a water main may be laid closer to a storm sewer provided that:
A. The bottom of the water main is at least 18 inches above the top of the sewer
B. Where this vertical separation cannot be obtained, the water main will be sleeved and all voids will be filled.

Crossings
1. Normal conditions - Water mains crossing house sewers, storm sewers or sanitary sewer shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer, whenever possible.
2. Unusual conditions - When local conditions prevent a vertical separation as described, Charles Town Utility Board shall be contacted for direction.
3. Water mains passing under sewer shall be protected by providing:
A. A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main.
B. Adequate structural support for the sewers to prevent excessive deflection of the joints and settling on and breaking the water mains;
C. That the length of the water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.
D. Water line shall be sleeved and the void area filled.
4. Sewer manholes - No water pipe shall pass through or come within 5 feet of any part of a sewer manhole.

Private Fire Protection Service
No pipe or fixtures connected with a private fire service served by the CTUB shall be connected with pipes or fixtures supplied with water from any other source.

WVDOH NOTES

WV1. All work, construction methods and materials shall conform with the West Virginia Division of Highways "STANDARD SPECIFICATIONS ROADS AND BRIDGES Adopted January 1, 2017" and Supplemental Specifications dated January 1, 2020. All work on this project shall also conform with The Soil Conservation Service Erosion and Sediment Control Regulations and any other state, federal, or local regulations applicable. In the event of conflict between any of these standards, specifications, or plans, the most stringent shall govern.

WV2. All construction shall comply with the latest U.S. Department of Labor Occupational Safety & Health Administration.

WV3. When working on WVDOH right-of-way, all traffic control, whether permanent or temporary, shall be in accordance with "Manual on Temporary Traffic Control for Streets and highways" 2006 Edition as published by WVDOH.

WV4. Design features relating to construction or to regulation, control, and safety of traffic maybe subject to change as deemed necessary by WVDOH.

WV 5. Prior to initiation of work, Contractor shall be responsible for acquiring all necessary WVDOH land use permits for any work on WVDOH right-of-way.

WV 6. If required by the local WVDOH Residency Office, a preconstruction conference must be arranged and held by the engineer and/or developer with the attendance of the contractor, various County agencies, utility companies and WVDOH prior to initiation of work.

WV 7. Contractor shall notify the local WVDOH Residency Office when work is to begin or cease for any undetermined length of time. WVDOH will also require 48 hours notice for any inspection, Please contact the Burlington, WV field office at 304-289-3521.

WV 8. The Contractor will be responsible for maintaining adequate access to the project from the adjacent public roadway through construction and maintenance of a construction entrance in accordance with the Soil Conservation Service Erosion & Sediment Control Handbook. Furthermore, access to other properties affected by this project shall be maintained through construction.

WV 9. Contractor shall ensure adequate drainage is achieved and maintained on the site during and at the end of construction.

WV 10. All water and sewer lines within existing or proposed WVDOH right-of-way are to have minimum 36" cover and, when possible, to be installed under roadway drainage facilities.

WV 11. Any unusual subsurface conditions encountered during the course of construction shall be immediately brought to the attention of the engineer and WVDOH. Work shall cease in that vicinity until an adequate design can be determined by the engineer and approved by WVDOH.

WV 12. All undercut areas and borrow material shall be inspected and approved by WVDOH Inspector prior to placement of fill.

WV 13. All roadway fill, base, subsurface material and backfill of utility/storm sewer trenches shall be compacted in 6" lifts to 98% of theoretical maximum density as determined by AASHTO T-99 Method A, within plus or minus 2% of optimum moisture for the full width of any dedicated street right-of-way. At the direction of WVDOH Inspector density tests performed by a qualified independent agency shall be conducted as required in the WVDOH Road and Bridge Specifications. A copy of all tests shall be submitted to WVDOH prior to final WVDOH approval.

WV 14. WVDOH Standard CD and UD underdrains shall be installed where indicated on these plans and further where determined necessary by WVDOH Inspector.

WV 15. The installation of any entrances and mailboxes within any dedicated street right-of-wayshall meet WVDOH minimum design standards and is the developer's responsibility.

WV 16. If required by the local WVDOH Residency Office, copies of all invoices for materials within any dedicated street right-of-way must be provided to the WVDOH Inspector prior to acceptance of work. Unit and total prices may be obscured.

WV 17. Prior to acceptance by WVDOH of any streets, any required street signage and/or pavement markings must be installed by the developer.

WV18. Average Daily Traffic (ADT): 896 Trips

WV19. Peak Hour Volume (AM): 63 Trips

WV20. Peak Hour Volume (PM): 76 Trips

GENERAL CTUB SEWER NOTES

- Refer to the Charles Town Utility Board (CTUB) sewer system specifications dated May 2016, and the latest modifications or revisions thereto, for sanitary system construction methods, materials, field quality control, and for all details and specifications for all sanitary sewer systems to be served by the Charles Town Utility Board.
- No gravity sewer shall be less than 8" diameter
- A minimum of 3 feet of earth covering is required on all sewer lines.
- Sewers shall be laid in straight line with uniform slope between manholes. Sewers on 20% slope or greater shall be anchored securely with concrete anchors, or approved equal.
- Bedding - No. 8 or No. 10 limestone shall be used for bedding unless otherwise approved by CTUB.
- There shall be no physical connection between a drinking water supply system and a sewer system
- Horizontal Separation - A minimum of 10 feet separation between sewer lines and water lines must be maintained. In cases where the 10 feet minimum cannot be maintained, the sewer line shall be 18" lower than the water line and constructed of a pressure type pipe. When the lines are placed within 5 feet of each other, permanent identification tape must be buried directly above the lines denoting "Sewer Line" or "Potable Water Line".
- Vertical Separation - A minimum of 18" of separation between the top of the sewer lines and the bottom of the water lines must be maintained. In case where the 18" cannot be maintained, the sewer line shall cross at midpoint of a 20' long joint of the water line and be constructed of pressure type pipe. A sewer line shall not be constructed over top of a water line. If the standard vertical installation requirements cannot be maintained the sewer line shall be encased so that the casing extends at least 15 feet each side of the crossing with a minimum of 18" of vertical separation.
- Manholes - Shall be pre-cast concrete meeting requirement of American Society for Testing and Materials (ASTM). The minimum base diameter shall be 48" (Minimum opening 24"). The inside base of the manhole shall be filled with concrete to form a bench sloping toward the flow channel. Watertight manhole covers are to be used wherever the manhole covers may be flooded by street runoff or high water. Pipe connections to manholes and joints on manholes shall be watertight. Concrete manholes shall be waterproofed on the exterior where groundwater conditions are unfavorable.
- Gravity sewers shall be PVC pipe, schedule SDR-35. All pipes and fittings shall meet or exceed all requirements of ASTM specifications D-3034 and /or other requirements of UNI-BELL UNI B4. Joints shall be either O-ring type "or" mechanical seal joint meeting material requirements of ASTM 1784 and joint requirements of ASTM 3212. No solvent cement joints will be permitted in field construction, except as specifically authorized by CTUB.
- Lateral piping and fittings sizes 4" through 6" for use in lateral piping shall meet the requirements of schedule 40.
- Refer to CTUB Sewer System Specifications and the latest modifications or revisions thereto, for:
  - Gravity sewer construction methods and pipeline testing.
  - Manholes submittals, delivery, storage and handling, inspection, preparation, construction methods and vacuum testing.
  - Cast in-place concrete specifications and requirements.
- The developer shall furnish and install the wye branches, riser pipe, service laterals, transition fittings, and incidentals where shown on the plans or where directed by CTUB.
- Home owner installed service laterals - pipe shall be 4" minimum SDR-35 or schedule 40 installed at 2% minimum slope. Lateral should be placed with 3 feet minimum cover unless otherwise approved by CTUB. Laterals shall be installed with minimum 6" bedding below pipe and 12" over pipe. Connection of home owner lateral to existing lateral shall be fitting of same type of pipe. Bedding shall be No. 8 or No. 10 limestone or other material as approved by CTUB. The lateral and connections shall be inspected and approved by a representative of CTUB prior to covering with bedding.
- Contractor shall contact CTUB at least 48 hours before connecting to the lateral system to allow for CTUB representatives to perform the onsite inspection of the connection.
- Contractor shall notify CTUB prior to installation of any improvements within the water and sewer easements to ensure that no fence posts or other improvements are placed on top of the utilities.
- Charles Town Utility Board
  661 S. George Street
  Charles Town, WV 25414
  (304) 725-2316

AUGUSTINE MANOR

DEVELOPMENT STANDARDS	SF	ACRES		
OVERALL PROPERTY AREA	7,845,591	180.11		
NET BUILDABLE LAND AREA (SF DETACHED)[1]				
SF DETACHED PROPERTY AREA (INCLUDING COMMERCIAL AREA)	6,010,640	137.99		
PUBLIC ROW DEDICATION	996,030	22.87		
FLOODPLAIN/WETLANDS	505,637	11.61		
SWM AREA	396,611	9.10		
NET BUILDABLE LAND AREA	4,112,362	94.41		
NET BUILDABLE LAND AREA (SF ATTACHED)[1]				
SF ATTACHED PROPERTY AREA	1,765,409	40.53		
PUBLIC ROW DEDICATION	374,991	8.61		
FLOODPLAIN/WETLANDS	0	0.00		
SWM AREA	0	0.00		
NET BUILDABLE LAND AREA REQUIRED	1,071,000	24.59		
NET BUILDABLE LAND AREA PROVIDED	1,390,418	31.9		
TOTAL NET BUILDABLE LAND AREA	5,502,780	126.3		

DATA TABLE FOR THE NEIGHBORHOOD RESIDENTIAL (NR) DISTRICT

SEC. 1322.08 BULK & AREA REGULATIONS			REQUIRED/ ALLOWED	PROPOSED
Maximum Density [1]				
Table 1322.08 (All other residential)			10 Units per acre (Max)	4.6 Units Per Acre
		Total:	1,264 Units	596 Units
	Min. % Required	Proposed		
Residential	50%	61%	2,751,390	3,331,187
Commercial	10%	10%	784,559	791,920
Open Space (Entire Community)[9]	10%	21%	550,278	1,150,656
Open Space (SF Attached) [9]	30%	32%	417,125	444,958

SEC. 1322.08 TABLE 1322.04 REGULATIONS		REQUIRED/ ALLOWED	PROPOSED
TOTAL LOTS			596
SINGLE FAMILY LOTS			
SF Dwelling Units TOTAL			290
(Phase 1)			88
(Phase 2)			106
(Phase 3)			0
(Phase 4)			61
(Phase 5)			35
Minimum Lot Size (sf)		6,000	6000
Minimum Lot Width (ft)		60	60
Maximum Lot Coverage (%)	MAX	70	70
TOWNHOME LOTS			
TH Dwelling Units Total			306
(Phase 1)			60
(Phase 2)			84
(Phase 3)			120
(Phase 4)			0
(Phase 5)			42
Minimum Lot Size (sf)			
Interior Lots		2,000	2000
End Lots		2,000	3000
Minimum Lot Width (ft)		18	20
Maximum Lot Coverage (%)	MAX	80	80
BUILDING SETBACKS (Min. ft)			
Front Yard[2]		25	25
Side Yard[3]		10	10
Rear Yard		20	20
Maximum Building Height (ft)		40	40
Maximum Stories [6]	MAX	3 stories	3 Stories

SEC. 1333.23.(J) OFF-STREET PARKING REQUIREMENTS	RATE	REQUIRED	PROPOSED
SINGLE FAMILY (Per du)	2	580	
Off-Street Parking Spaces			580
Additional Street Parking Spaces			
Total Parking Spaces		580	580

SEC. 1333.20.(G) OFF-STREET PARKING REQUIREMENTS	RATE	REQUIRED	PROPOSED
Townhome Units	1.8	551	
Off-Street Parking Spaces			612
Additional Street Parking Spaces			216
Total Parking Spaces		551	828

NOTES

[1] When calculating the density of a development it shall be calculated from the Net Buildable Land Area of all parts of the development in the same Zoning District.

[2] Frontyard setback shall be measured from the face of the curb.

[3] No Side Yard shall be required adjoining any Lot line that coincides with party-wall in an attached Dwelling or other Use.

[4] Section 1322.08(C)1. Corner Lots. A Setback area at least equal to the minimum Front Yard Setback shall be provided along all portions of a Corner Lot abutting any public Street. Except where the applicant is granted an exception under the following provisions for a Front Yard Setback exception with respect to one or more property lines abutting a public Street. The Yard and property line directly opposite (behind) the front facade of the main Building (as reasonably determined by the Zoning Administrator) shall be the designated Rear Yard and rear line, respectively;

[5] Site will comply with open space requirements of Section 1333.20.P.3.

[6] Multi-Family: 55 feet; 4 stories.

[7] Townhouse developments shall meet the requirements of said developments as specified in Section 1333.20 of the Charles Town Subdivision and Land Development Ordinance.

[8] Commercial and office Uses shall meet the minimum requirements of the Neighborhood Commercial District and are excluded from the requirements of Table 1322.08.

[9] Open Space - One or more areas of land and/or bodies of water within a development intended for the use and enjoyment of the residents living within the development. No more than 50% of the required Open Space may be a water body or impervious area. Open Space is calculated as a percentage of the total usable area of land in the development, with the following items excluded in such calculation from both Open Space and the total usable land: Buffer Areas, Streets, Sidewalks, off-Street parking areas, areas dedicated for public use, traditional stormwater management areas, such as stormwater ponds (but stormwater management areas of low impact design, such as bioretention basins (rain gardens) shall be included), and other areas not practically usable by residents.

In a townhouse Development, open space for the Subdivision/Land Development must at least equal 30 percent of the Net Buildable Land Area of the Subdivision/Land Development. To the fullest extent possible, open space for townhouses must be located near the townhomes.

The maximum density (dwelling units per acre) allowed within the NR District shall be determined as follows:

b. The maximum density for all other residential development is determined by dividing the total Net Buildable Land Area in square feet of a parcel or aggregated parcels by one thousand seven hundred and fifty (1,750).

NET BUILDABLE LAND AREA – When determining the allowed density for any given Lot in the City, the Net Buildable Land Area of the Site is used. Net Buildable Land Area, for the purpose of determining the allowed Dwelling Units for a Site, shall be calculated by subtracting areas where building is prohibited or subject to significant restrictions from the gross Lot area. The area remaining after these exclusions from the gross Lot area represents the Net Buildable Land Area. The following shall be deducted from the gross Lot area to determine Net Buildable Land Area:
1.Sensitive areas including: Type I, II, III and IV wetlands, Riparian Buffers, floodplain area, and Sinkholes;
2.Public right-of-ways and public easements, and private Streets and access corridors; and
3.Areas dedicated to stormwater management.

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PRELIMINARY PLANS - NOT FOR CONSTRUCTION
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE:
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

GENERAL NOTES

SHEET No.

C100

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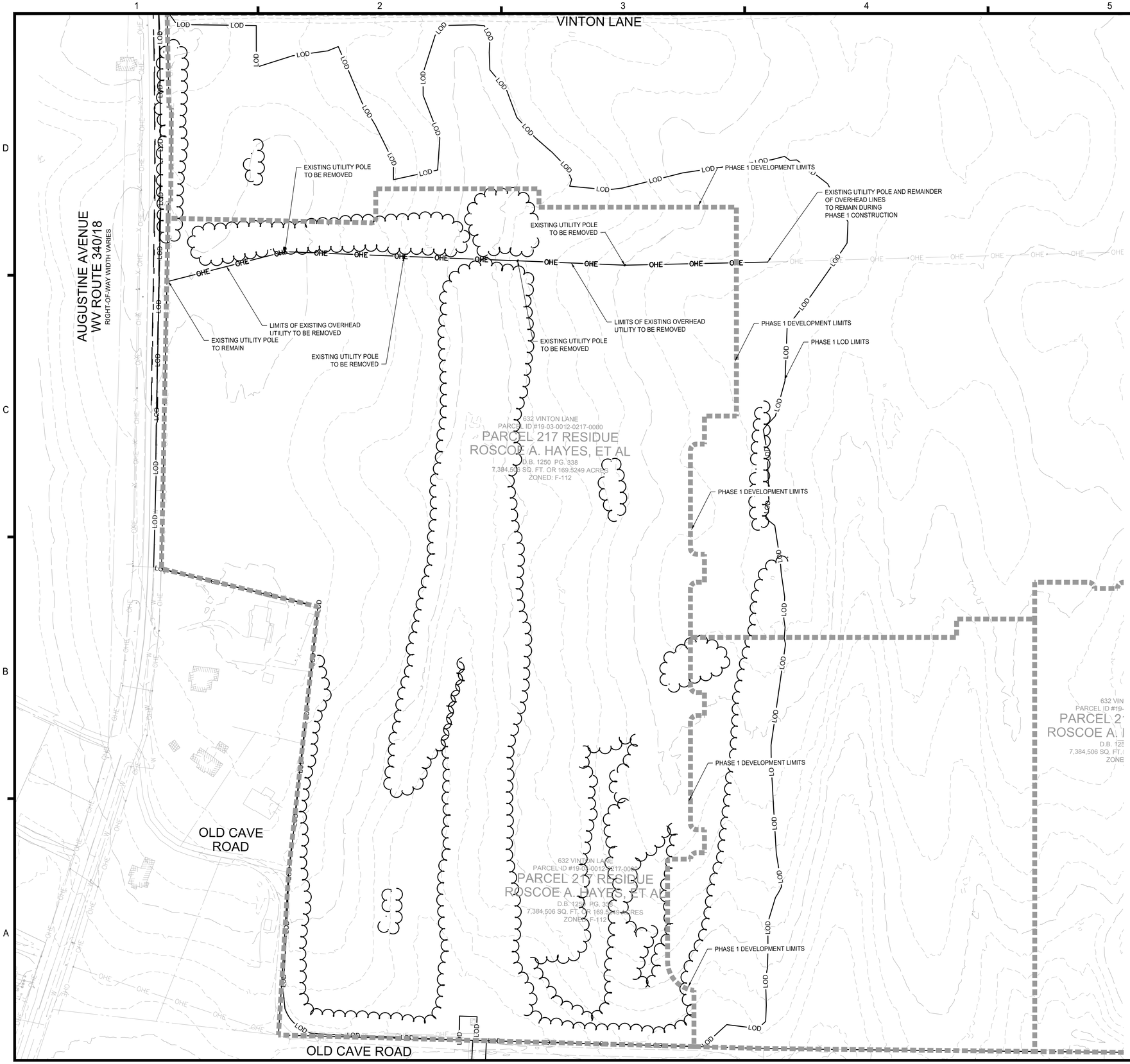

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 100'
DESIGN: TZ
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CHECKED: TZ

SHEET TITLE:

EXISTING CONDITIONS & DEMO PLAN

SHEET No.

C201

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

PHASING PLAN

SHEET No.

C300

P:\Projects\23011\00200\113948 Site Plan\C301 Site Plans.dwg, 12/17/2025 2:01:06 PM, Tony Zook,

FUTURE PHASE OF AUGUSTINE MANOR

SEE AUGUSTINE AVE IMPROVEMENT PLANS

SEE SHEET C303

SEE SHEET C302

W Sovereign Ave

MAJOR COLLECTOR STREET
75' ROW MINIMUM
40MPH DESIGN SPEED

E Sovereign Ave

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Kensington Dr

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Regency Ln

MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Ellsworth Ave

MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

AUGUSTINE AVENUE ROW

25 BUFFER

PHASE 1 LIMITS

PP #L400-P23

PP #L400-P24

PP #L400-P25

PI=11+24.37

PI=12+15.30

PI=15+45.15

PI=16+06.55

R25 (TYP.)

"ALL WAY" (R1-3P) & "STOP" SIGN (R1-1)
STOP BAR (12" WIDE SOLID WHITE)

"STOP" SIGN (R1-1)
STOP BAR (12" WIDE SOLID WHITE)

20.0
SD EASEMENT

30.0 STORM
EASEMENT

LOT 148
2962 SQ. FT.

LOT 147
2000 SQ. FT.

LOT 146
2000 SQ. FT.

LOT 145
2000 SQ. FT.

LOT 144
2000 SQ. FT.

LOT 143
3001 SQ. FT.

LOT 142
3001 SQ. FT.

LOT 149
96537 SQ. FT.

LOT 1
9212 SQ. FT.

LOT 2
8399 SQ. FT.

LOT 73
8812 SQ. FT.

LOT 72
8287 SQ. FT.

LOT 71
8287 SQ. FT.

LOT 70
8287 SQ. FT.

LOT 69
8287 SQ. FT.

LOT 68
8287 SQ. FT.

LOT 81
10933 SQ. FT.

LOT 80
W/O
13643 SQ. FT.

LOT 82
8745 SQ. FT.

LOT 79
W/O
8708 SQ. FT.

LOT 83
8539 SQ. FT.

LOT 78
W/O
8517 SQ. FT.

LOT 84
9558 SQ. FT.

LOT 77
W/O
8636 SQ. FT.

LOT 85
9644 SQ. FT.

LOT 76
W/O
8640 SQ. FT.

LOT 86
9759 SQ. FT.

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)
- PROPOSED LAMP POST

WEST VIRGINIA STATE GRID NORTH
UTM83-MF

GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SITE PLAN

SHEET No.

C301

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FUTURE PHASE OF AUGUSTINE MANOR

PHASE 1 LIMITS

LOT 143 3001 SQ. FT.
LOT 142 3001 SQ. FT.
LOT 141 2001SQ. FT.
LOT 140 2000 SQ. FT.
LOT 139 2000 SQ. FT.
LOT 138 2000 SQ. FT.
LOT 137 2962 SQ. FT.

14.4
30.0 STORM EASEMENT

Sovereign Ave
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

R25 (TYP.)

LOT 136 3002 SQ. FT.
LOT 135 2002 SQ. FT.
LOT 134 2000 SQ. FT.
LOT 133 2000 SQ. FT.
LOT 132 2000 SQ. FT.
LOT 131 2000 SQ. FT.
LOT 130 2000 SQ. FT.
LOT 129 3001 SQ. FT.

LOT 121 2999 SQ. FT.
LOT 122 2000 SQ. FT.
LOT 123 2000 SQ. FT.
LOT 124 2000 SQ. FT.
LOT 125 2000 SQ. FT.
LOT 126 2000 SQ. FT.
LOT 127 2004 SQ. FT.
LOT 128 3001 SQ. FT.

LOT 120 3001 SQ. FT.
LOT 119 2003 SQ. FT.
LOT 118 2000 SQ. FT.
LOT 117 2000 SQ. FT.
LOT 116 2000 SQ. FT.
LOT 115 2000 SQ. FT.
LOT 114 2000 SQ. FT.
LOT 113 2984 SQ. FT.

29.9
20.6
30.0
50.0
100.0
20.0 SD EASEMENT
11.5 13.5 13.5 11.5

PARKING LOT
24.0
20.0 SD & SSEW EASEMENT
9.0
18.0
20.0 SD EASEMENT

LOT 149
96537 SQ. FT.

SEE SHEET C301

Worthington Dr
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Langford Dr
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

LOT 96 3001 SQ. FT.
LOT 95 2002 SQ. FT.
LOT 94 2000 SQ. FT.
LOT 93 2000 SQ. FT.
LOT 92 2000 SQ. FT.
LOT 91 2000 SQ. FT.
LOT 90 2000 SQ. FT.
LOT 89 3001 SQ. FT.

LOT 97 2999 SQ. FT.
LOT 98 2000 SQ. FT.
LOT 99 2000 SQ. FT.
LOT 100 2000 SQ. FT.
LOT 101 2000 SQ. FT.
LOT 102 2000 SQ. FT.
LOT 103 2001 SQ. FT.
LOT 104 3001 SQ. FT.

LOT 112 3001 SQ. FT.
LOT 111 1995 SQ. FT.
LOT 110 2000 SQ. FT.
LOT 109 2000 SQ. FT.
LOT 108 2000 SQ. FT.
LOT 107 2000 SQ. FT.
LOT 106 2000 SQ. FT.
LOT 105 3001 SQ. FT.

29.9

"STOP" SIGN (R1-1)
STOP BAR (12" WIDE SOLID WHITE)
ENTRY PLAZA/ SEATING AREA
PLAY AREA
30.0 STORM EASEMENT

Ellsworth Ave
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED
12.5 18.0 6.10 18.0 2.5

SIGHT EASEMENT

LOT 2 8399 SQ. FT.
LOT 3 8399 SQ. FT.
LOT 4 8399 SQ. FT.
LOT 5 8399 SQ. FT.
LOT 6 8399 SQ. FT.
LOT 7 8399 SQ. FT.
LOT 8 9209 SQ. FT.

SEE SHEET C304

CROSSWALK AND RAMPS TO BE BUILT WITH FUTURE PHASES TO PROMOTE PEDESTRIAN SAFETY AND ACCESSIBILITY

PHASE 1 LIMITS

FUTURE PHASE OF AUGUSTINE MANOR



KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)
- PROPOSED LAMP POST

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SITE PLAN

SHEET No.
C302

P:\Projects\23011\02000\11394B Site Plan\C301 Site Plans.dwg, 12/17/2025 2:01:17 PM, Tony Zook,

SEE AUGUSTINE AVE IMPROVEMENT PLANS

SEE SHEET C301

SEE SHEET C304

SEE SHEET C305

OVERALL PROPERTY LINE

LOT 87
9881 SQ. FT.

LOT 88
12658 SQ. FT.

LOT 75
W/O
8640 SQ. FT.

LOT 74
W/O
10908 SQ. FT.

LOT 67
8287 SQ. FT.

LOT 66
9427 SQ. FT.

LOT 65
SOG
10360 SQ. FT.

LOT 64
SOG
9099 SQ. FT.

LOT 63
SOG
9099 SQ. FT.

LOT 62
SOG
9099 SQ. FT.

LOT 61
SOG
9099 SQ. FT.

LOT 60
SOG
9099 SQ. FT.

LOT 1
9212 SQ. FT.

LOT 2
8399 SQ. FT.

LOT 3
8399 SQ. FT.

LOT 9
9209 SQ. FT.

LOT 10
8399 SQ. FT.

LOT 11
8399 SQ. FT.

LOT 17
W/O
9501 SQ. FT.

LOT 18
W/O
8399 SQ. FT.

LOT 19
W/O
8399 SQ. FT.

LOT 25
9538 SQ. FT.

LOT 26
8399 SQ. FT.

LOT 27
8399 SQ. FT.

LOT 33
W/O
9841 SQ. FT.

LOT 34
W/O
8675 SQ. FT.

LOT 35
W/O
8675 SQ. FT.

AUGUSTINE AVENUE ROW

25 BUFFER

20.0 SSGEP PM EASEMENT

20.0 SD EASEMENT

PC=13+14.85

Mid=14+09.10

R=120.00'

Kensington Dr
NIEGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Kensington Dr
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Regency Ln
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Regency Ln
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Noble Ln
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

PI=15+03.35

PI=16+45.32

PI=18+77.01

PI=17+22.51

R25 (TYP.)

"STOP" SIGN (R1-1)
STOP BAR (12" WIDE SOLID WHITE)

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)
- PROPOSED LAMP POST

WEST VIRGINIA STATE GRID NORTH
UTM13-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
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DRAWN: AF
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SHEET TITLE:

SITE PLAN

SHEET No.

C303

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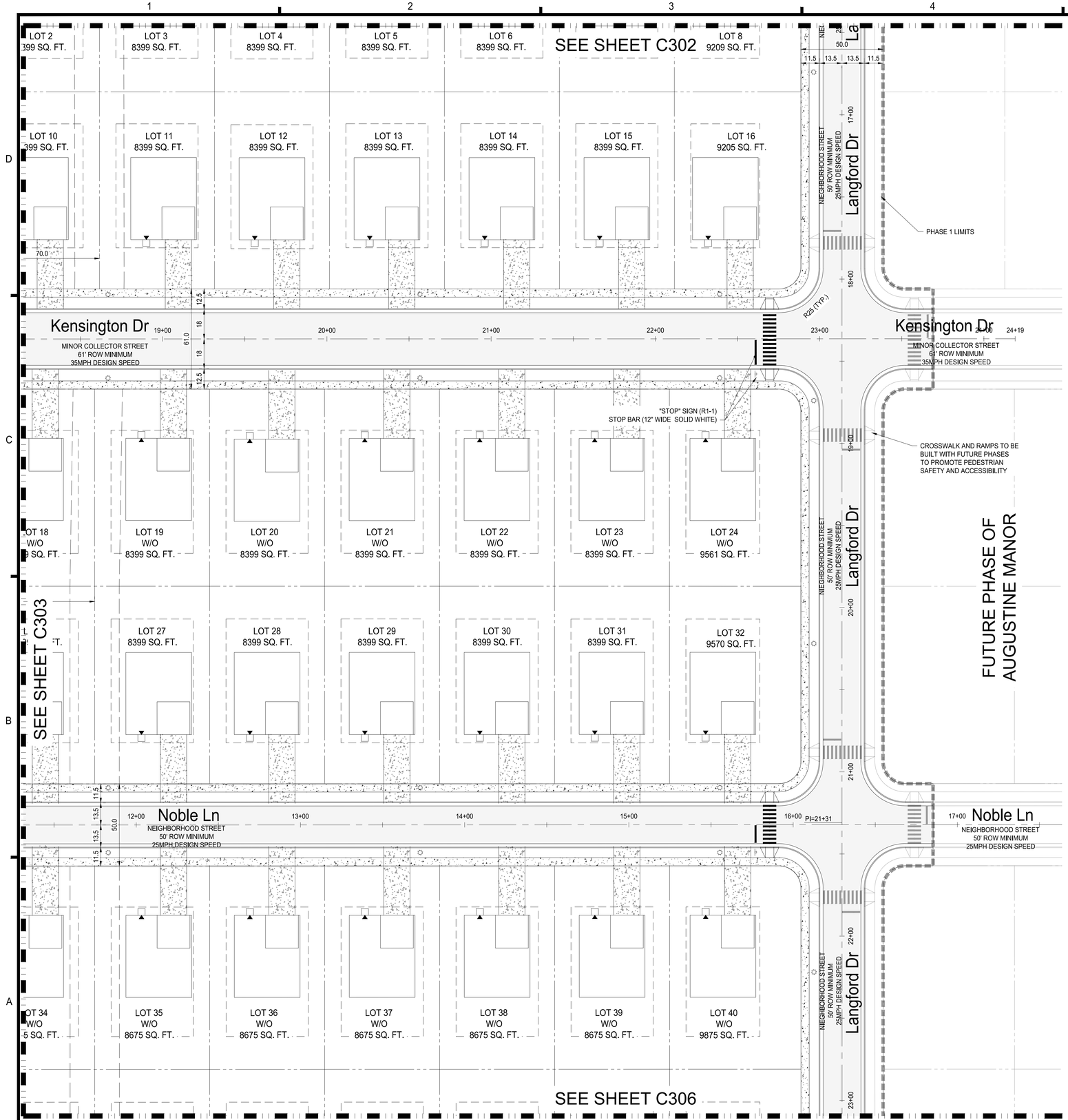



KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)
- PROPOSED LAMP POST

WEST VIRGINIA STATE GRID NORTH
NAD83-WV-NORTH

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS - NOT FOR CONSTRUCTION
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SITE PLAN

SHEET No.

C304

P:\Projects\23011\02000\11139\48 Site Plan\C301 Site Plans.dwg, 12/17/2025 2:01:29 PM, Tony Zook,

SEE SHEET C303

LOT 59
SOG
9099 SQ. FT.

LOT 58
SOG
9196 SQ. FT.

LOT 57
SOG
10555 SQ. FT.

LOT 41
9944 SQ. FT.

LOT 42
8743 SQ. FT.

LOT 56
W/O
8751 SQ. FT.

LOT 55
W/O
8751 SQ. FT.

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Regency Ln

24+00

PC=24+34.69

R=37.00'

RCA (TYP.)

PT=24+92.82

Beaumont Ave

25+00

26+00

11.5

13.5

13.5

11.5

50.0

70.00

125.00

30.0
SD EASEMENT

SEE SHEET C306

PROP SWM DETENTION FACILITY EASEMENT

EX BLOCK RETAINING WALL (TO BE REMOVED)

EX POWER UTILITY EASEMENT AND FEATURES

OHE

OLD CAVE ROAD



KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)
- PROPOSED LAMP POST

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SITE PLAN

SHEET No.

C305

P:\Projects\23011\00200\113948 Site Plan\C301 Site Plans.dwg, 12/17/2025 2:01:32 PM, Tony Zook,

SEE SHEET C304

LOT 42
3 SQ. FT.

LOT 43
8743 SQ. FT.

LOT 44
8743 SQ. FT.

LOT 45
8743 SQ. FT.

LOT 46
8743 SQ. FT.

LOT 47
8743 SQ. FT.

LOT 48
9951 SQ. FT.

30.0
SD EASEMENT

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Langford Dr

23+00

24+00

25+00

26+00

27+00

28+00

29+00

30+00

31+00

Beaumont Ave

Beaumont Ave

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

11.5
13.5
13.5
11.5
50.0

30.00 TYP

R25 (TYP.)

CROSSWALK AND RAMPS TO BE BUILT WITH FUTURE PHASES TO PROMOTE PEDESTRIAN SAFETY AND ACCESSIBILITY

PHASE 1 LIMITS

"STOP" SIGN (R1-1)
STOP BAR (12" WIDE SOLID WHITE)

LOT 55
W/O
751 SQ. FT.

LOT 54
W/O
8751 SQ. FT.

LOT 53
W/O
8751 SQ. FT.

LOT 52
W/O
8751 SQ. FT.

LOT 51
W/O
8751 SQ. FT.

LOT 50
W/O
8751 SQ. FT.

LOT 49
W/O
9961 SQ. FT.

FUTURE PHASE OF AUGUSTINE AVE

SEE SHEET C305

PROP. ±467LF BLOCK RETAINING WALL WITH PEDESTRIAN SAFETY FENCING
SEE GRADING PLANS FOR FURTHER DETAIL

PROP GRAVEL ACCESS PATH FOR ON-SITE PUMP STATION

FUTURE PHASE OF AUGUSTINE MANOR WILL CONSTRUCT FULL ROADWAY IN PLACE OF GRAVEL PATH AS SHOWN

PC=26+94

21+00

28+00

LINE 27+28.06

PT=27+52.12

PROP SWM DETENTION FACILITY EASEMENT

32.6
SD EASEMENT

EX POWER UTILITY EASEMENT AND FEATURES

PROP ON-SITE PUMP STATION LOT
(PERMIT OBTAINED SEPARATELY, PLANS BY OTHERS)

30' OFFSITE STORMWATER EASEMENT (MAINTAINCE/GRADING/ACCESS) TO BE OBTAINED PRIOR TO CONSTRUCTION

OHE

OLD CAVE ROAD

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)
- PROPOSED LAMP POST

WEST VIRGINIA STATE GRID NORTH
UTM13-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SITE PLAN

SHEET No.

C306

P:\Projects\23011\00200\113948 Site Plan\C301 Site Plans.dwg, 12/17/2025 2:01:35 PM, Tony Zook,

FUTURE PHASE OF AUGUSTINE MANOR

SEE SHEET C307 FOR AUGUSTINE AVENUE SIGHT DISTANCE PLAN & PROFILE

SEE SHEET C308

SEE SHEET C309

INTERSECTION SIGHT DISTANCE NOT REQUIRED 4-WAY INTERSECTION WITH STOP SIGNS IN ALL DIRECTIONS.

INTERSECTION SIGHT DISTANCE NOT REQUIRED 3-WAY INTERSECTION WITH STOP SIGNS IN ALL DIRECTIONS.

W Sovereign Ave

MAJOR COLLECTOR STREET
75' ROW MINIMUM
40MPH DESIGN SPEED

E Sovereign Ave

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Regency Ln

Kensington Dr

Ellsworth Ave

LOT 148 2962 SQ. FT.
LOT 147 2000 SQ. FT.
LOT 146 2000 SQ. FT.
LOT 145 2000 SQ. FT.
LOT 144 2000 SQ. FT.
LOT 143 3001 SQ. FT.
LOT 142 3001 SQ. FT.
LOT 149 96537 SQ. FT.
LOT 81 10933 SQ. FT.
LOT 80 W/O 13643 SQ. FT.
LOT 82 8745 SQ. FT.
LOT 79 W/O 8708 SQ. FT.
LOT 73 8812 SQ. FT.
LOT 72 8287 SQ. FT.
LOT 71 8287 SQ. FT.
LOT 70 8287 SQ. FT.
LOT 69 8287 SQ. FT.
LOT 68 8287 SQ. FT.
LOT 83 8539 SQ. FT.
LOT 78 W/O 8517 SQ. FT.
LOT 84 9558 SQ. FT.
LOT 77 W/O 8636 SQ. FT.
LOT 85 9644 SQ. FT.
LOT 76 W/O 8640 SQ. FT.
LOT 86 9759 SQ. FT.
LOT 1 9212 SQ. FT.
LOT 2 8399 SQ. FT.

VINTON LANE
AUGUSTINE AVENUE
OLD CAVE ROAD

KEY MAP
N.T.S.

NOTES:

ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED 7' FROM GROUND LEVEL

WEST VIRGINIA STATE GRID NORTH
UTM 18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS - AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT DISTANCE PLAN

SHEET No.

C307

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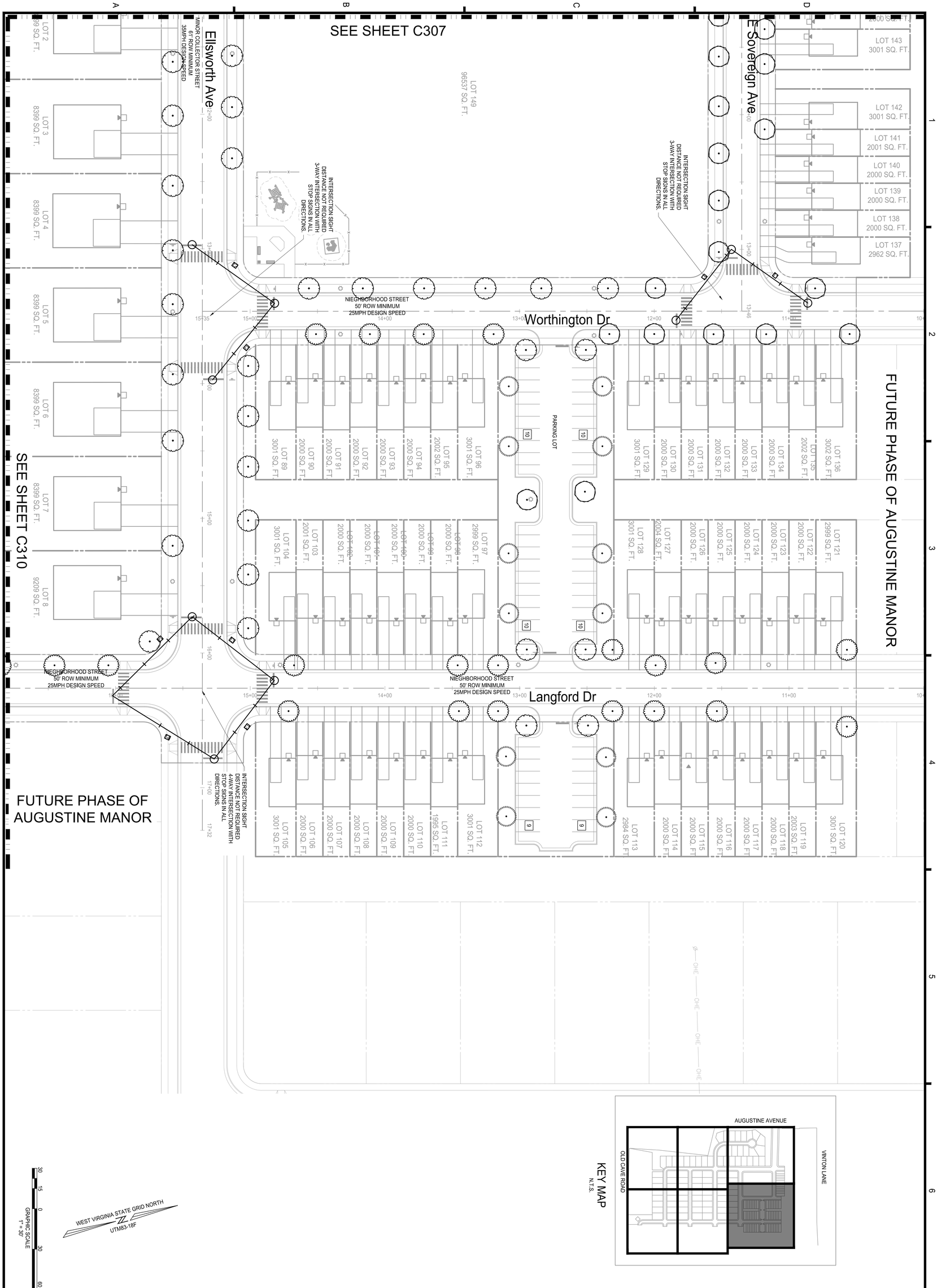

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

GRAPHIC SCALE
1" = 30'
30 15 0 30 60

SHEET No.	C308	
SHEET TITLE:	SIGHT DISTANCE PLAN	
PROJECT No: 23011 DRAWING No: XXXXXX DATE: 09/5/2025 SCALE: 1" = 30' DESIGN: TZ DRAWN: AF CHECKED: TZ		

MARK	DATE	DESCRIPTION

PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

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SEE SHEET C702

SEE SHEET C307

SEE SHEET C310

SEE SHEET C311

AUGUSTINE AVENUE
RIGHT-OF-WAY

LOT 87
9881 SQ. FT.

LOT 88
12658 SQ. FT.

LOT 75
W/O
8640 SQ. FT.

LOT 74
W/O
10908 SQ. FT.

LOT 67
8287 SQ. FT.

LOT 66
9427 SQ. FT.

LOT 65
SOG
10360 SQ. FT.

LOT 64
SOG
9099 SQ. FT.

LOT 63
SOG
9099 SQ. FT.

LOT 62
SOG
9099 SQ. FT.

LOT 61
SOG
9099 SQ. FT.

LOT 60
SOG
9099 SQ. FT.

LOT 1
9212 SQ. FT.

LOT 2
8399 SQ. FT.

LOT 3
8399 SQ. FT.

LOT 9
9209 SQ. FT.

LOT 10
8399 SQ. FT.

LOT 11
8399 SQ. FT.

LOT 17
W/O
9501 SQ. FT.

LOT 18
W/O
8399 SQ. FT.

LOT 19
W/O
8399 SQ. FT.

LOT 25
9538 SQ. FT.

LOT 26
8399 SQ. FT.

LOT 27
8399 SQ. FT.

LOT 33
W/O
9841 SQ. FT.

LOT 34
W/O
8675 SQ. FT.

LOT 35
W/O
8675 SQ. FT.

PC=13+14.85

PT=15+08.35

PC=16+77.01

PT=17+22.51

PC=19+45.32

PT=20+68.82

PC=21+45.32

PT=22+68.82

PC=23+45.32

PT=24+68.82

INTERSECTION SIGHT DISTANCE NOT REQUIRED
4-WAY INTERSECTION
WITH STOP SIGNS IN ALL DIRECTIONS.

INTERSECTION SIGHT DISTANCE NOT REQUIRED
3-WAY INTERSECTION
WITH STOP SIGNS IN ALL DIRECTIONS.

Kensington Dr
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Kensington Dr
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Regency Ln
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Noble Ln
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

OVERALL PROPERTY LINE

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT
DISTANCE
PLAN

SHEET No.
C309

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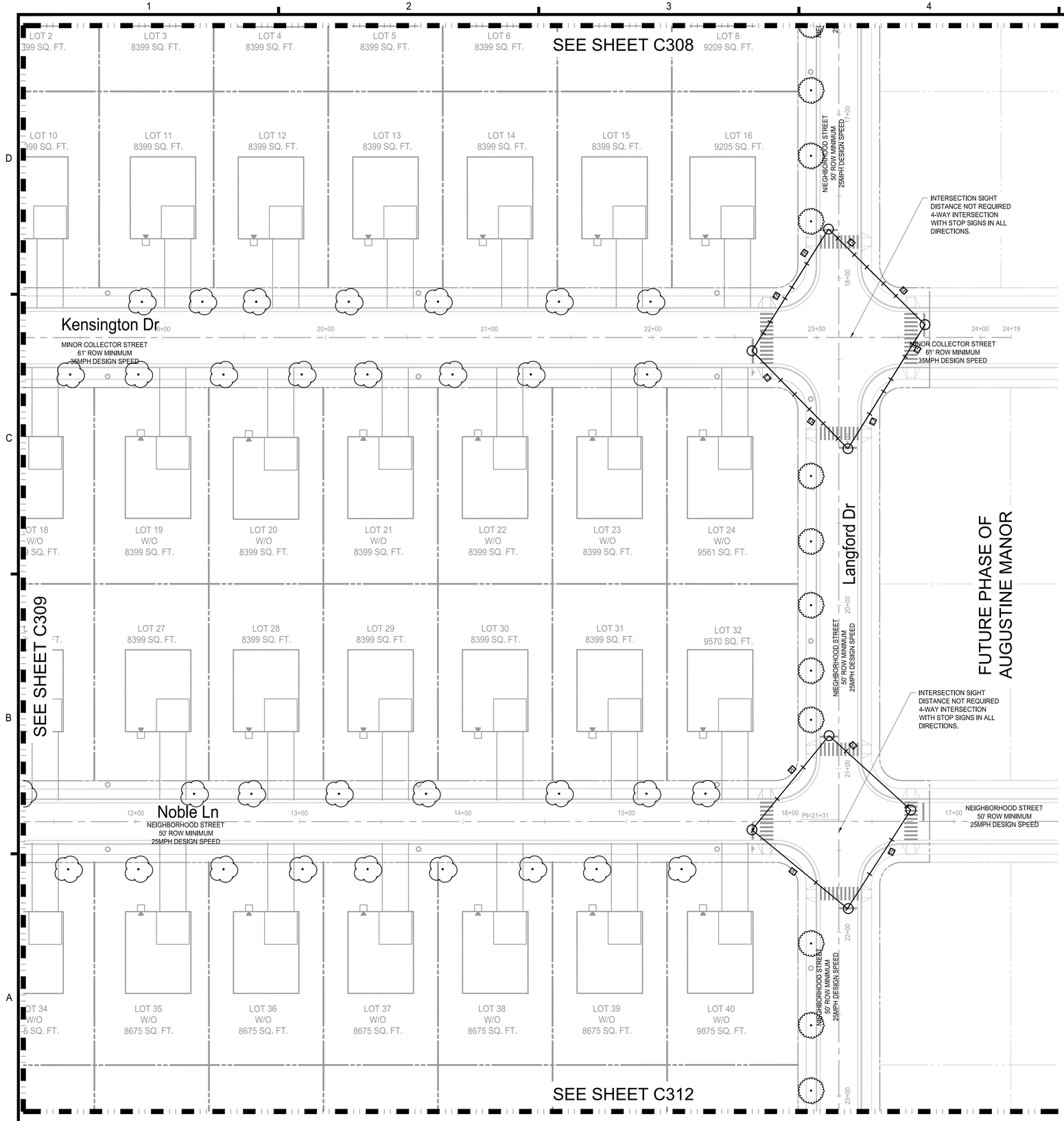

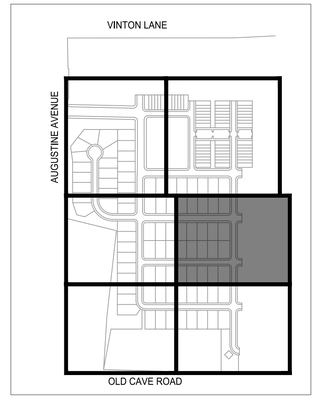

KEY MAP
N.T.S.



30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT
DISTANCE
PLAN

SHEET No.
C310

P:\Projects\23011\02000\11193948 Site Plan\C301 Sight Distance P&P.dwg, 12/17/2025 2:02:26 PM, Tony Zook,

SEE SHEET C309

LOT 59
SOG
9099 SQ. FT.

LOT 58
SOG
9196 SQ. FT.

LOT 57
SOG
10555 SQ. FT.

LOT 41
9944 SQ. FT.

LOT 42
8743 SQ. FT.

LOT 56
W/O
8751 SQ. FT.

LOT 55
W/O
8751 SQ. FT.

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

24+00

PC=24+34.69

25+00

26+00

Beaumont Ave

MC=24+43.75

PT=24+90.82

SEE SHEET C312

OHE

OLD CAVE ROAD

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT
DISTANCE
PLAN

SHEET No.

C311

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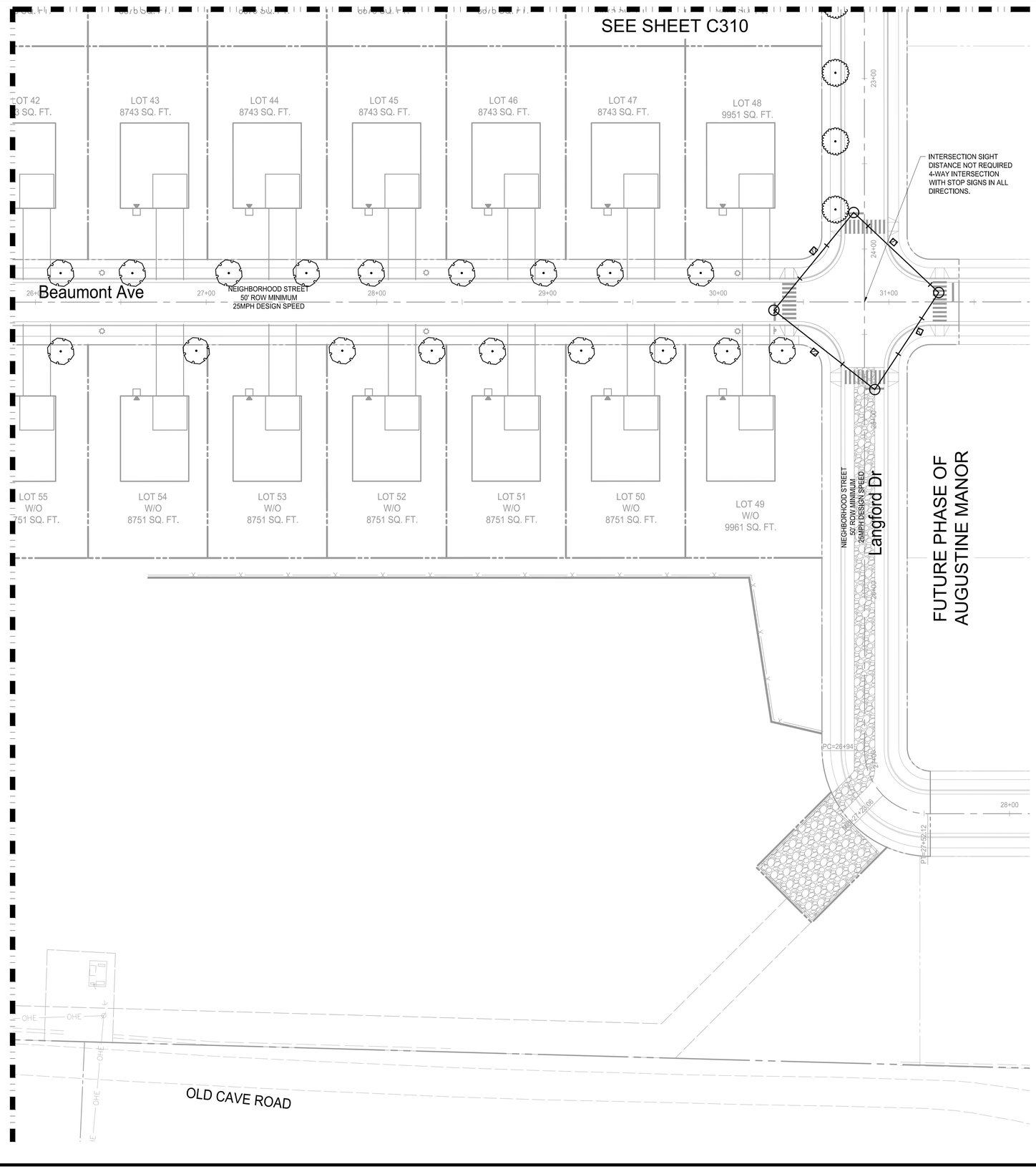

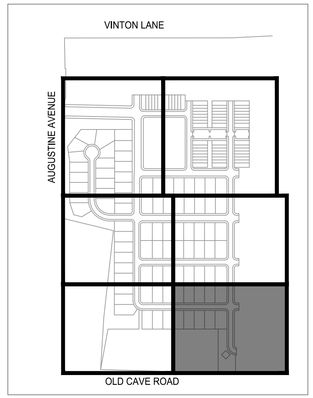

KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTMZ-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS - NOT FOR CONSTRUCTION

AUGUSTINE MANOR PHASE 1

LOT 217

PARCEL I.D.: 120217

CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT DISTANCE PLAN

SHEET No.

C312

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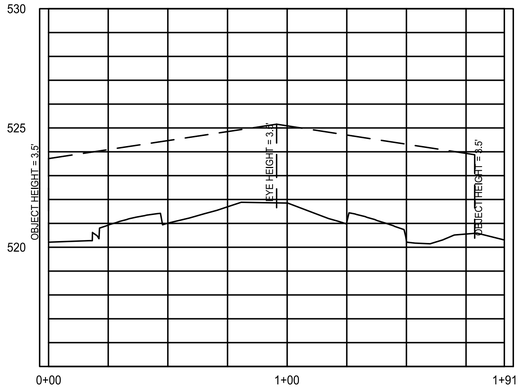
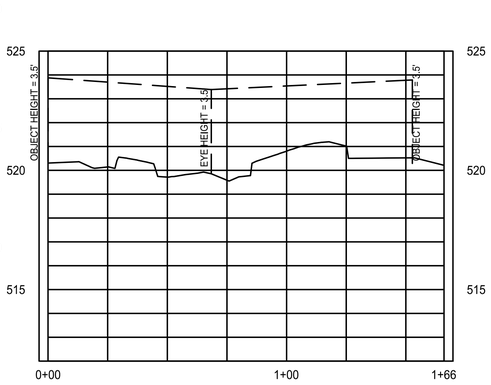


SIGHT DISTANCE PROFILE 1



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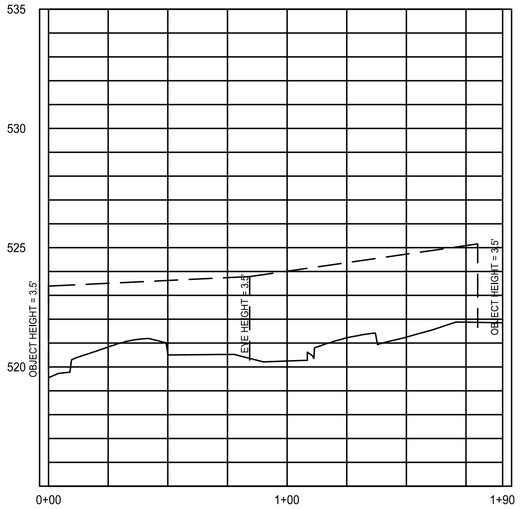

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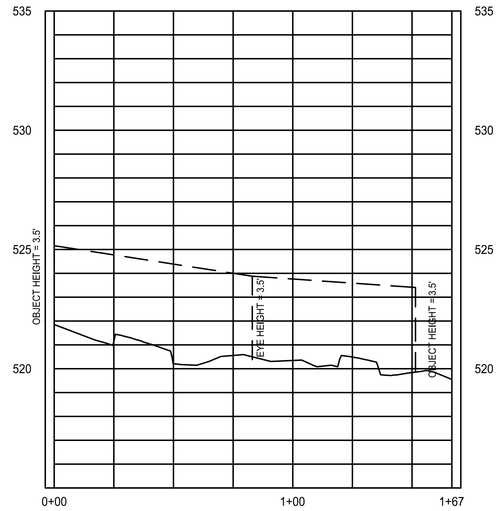

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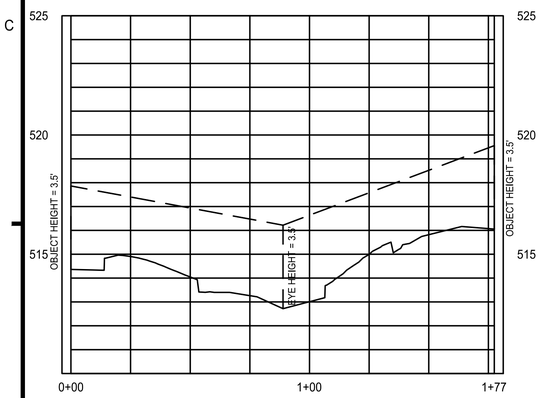
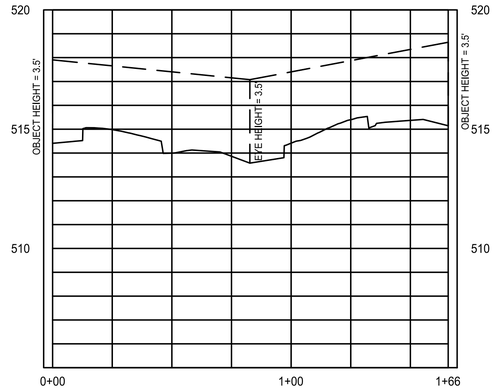
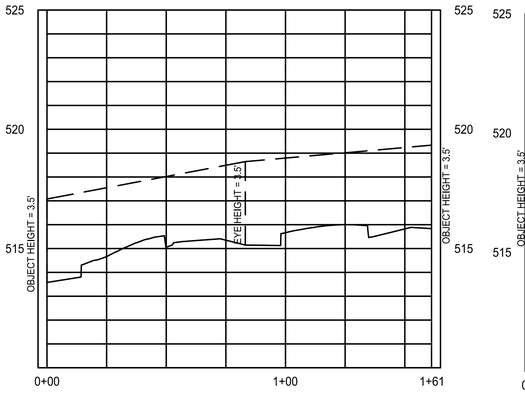


SIGHT DISTANCE PROFILE 5



SIGHT DISTANCE PROFILE 6



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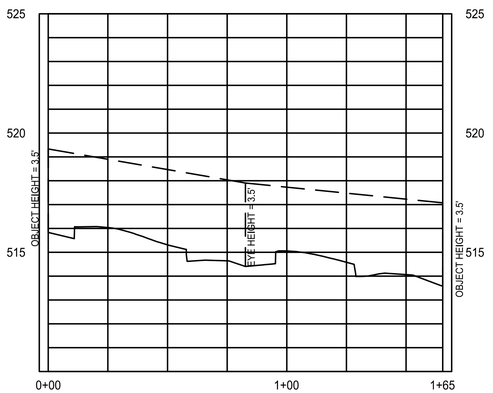

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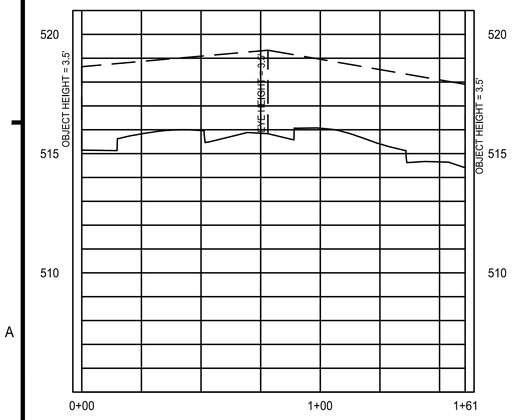

SIGHT DISTANCE PROFILE 9

LEGEND

PROPOSED GRADE

SIGHT LINE

3 1.5 0 3 6
VERT. GRAPHIC SCALE
1" = 3'

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT DISTANCE PROFILES

SHEET No.

C313

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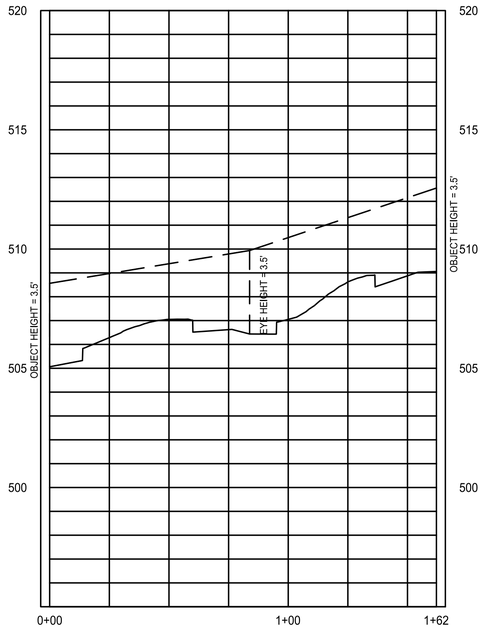
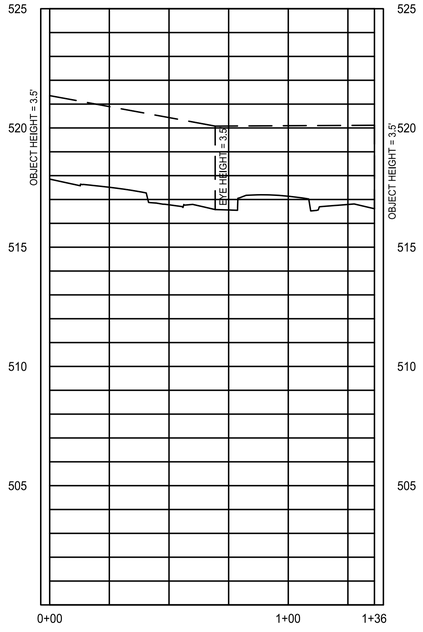
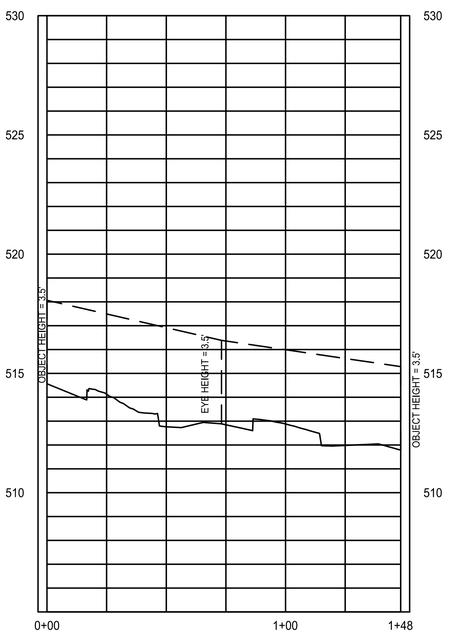


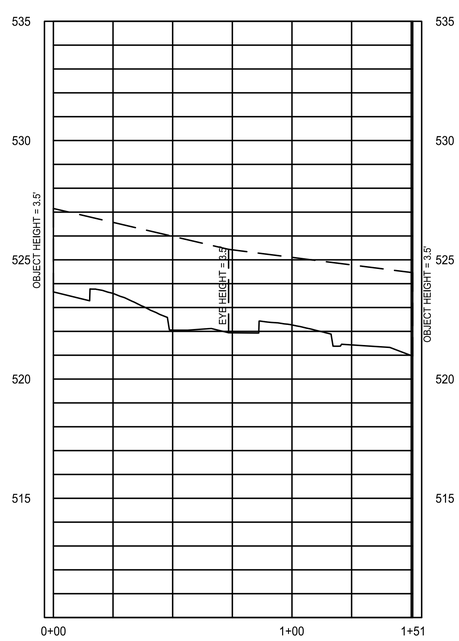
SIGHT DISTANCE PROFILE 10



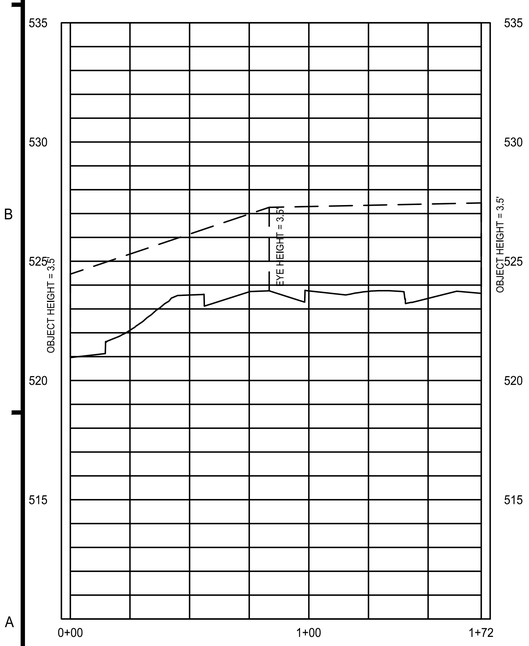
SIGHT DISTANCE PROFILE 11



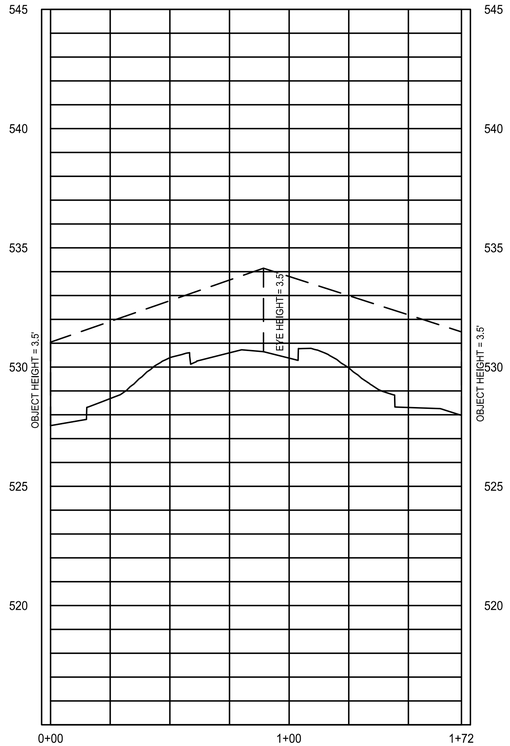
SIGHT DISTANCE PROFILE 12



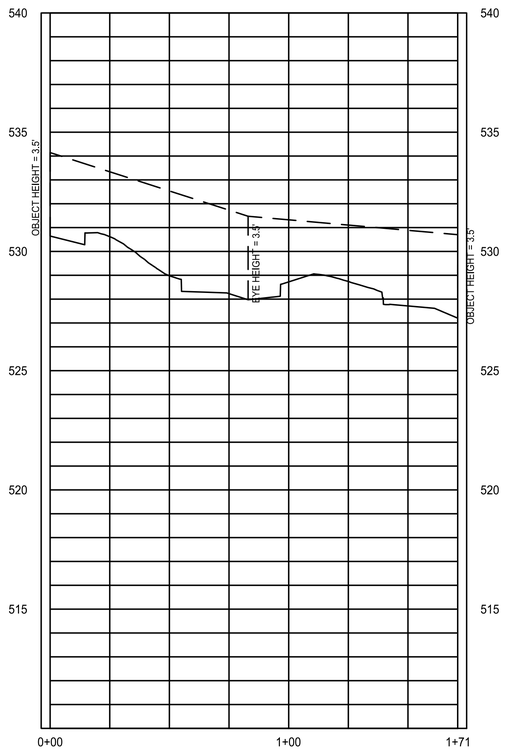
SIGHT DISTANCE PROFILE 13



SIGHT DISTANCE PROFILE 14



SIGHT DISTANCE PROFILE 15



SIGHT DISTANCE PROFILE 16

LEGEND

PROPOSED GRADE

SIGHT LINE

3 1.5 0 3 6
VERT. GRAPHIC SCALE
1" = 3'

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIGHT DISTANCE PROFILES

SHEET No.

C314

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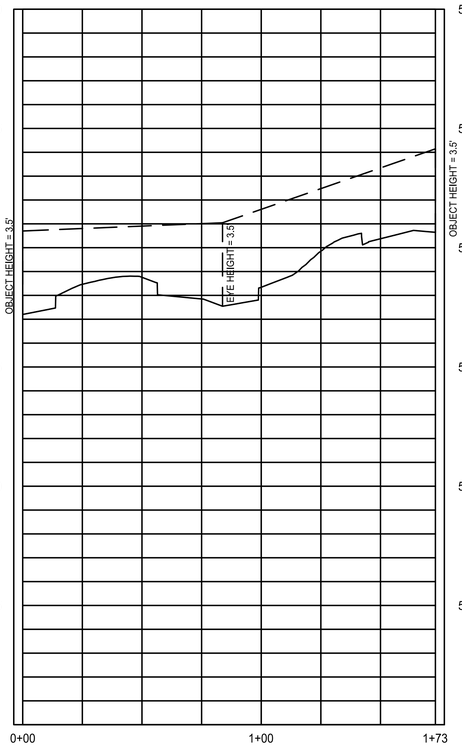
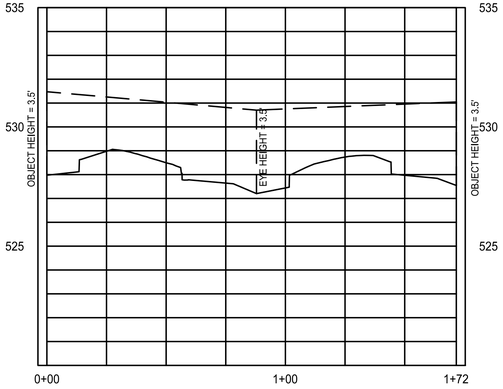
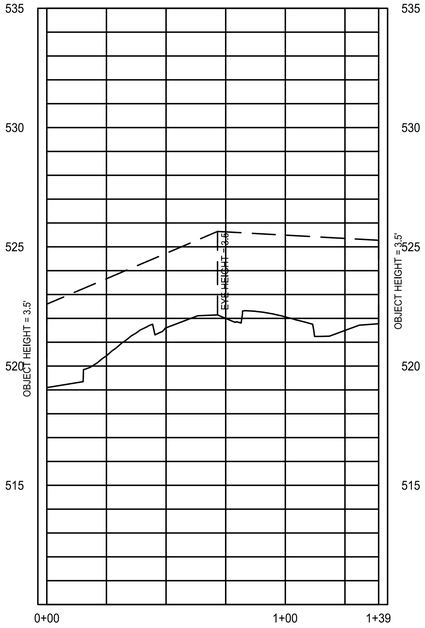


SIGHT DISTANCE PROFILE 17



SIGHT DISTANCE PROFILE 18



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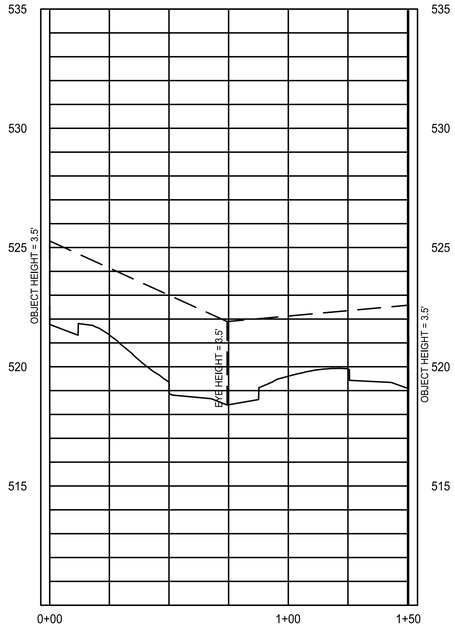
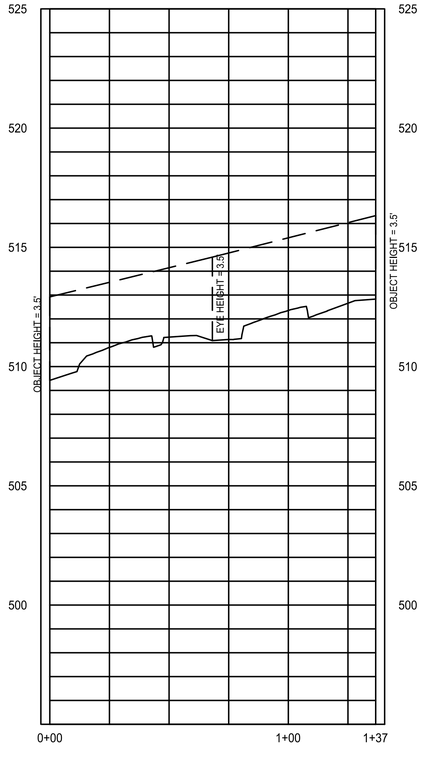
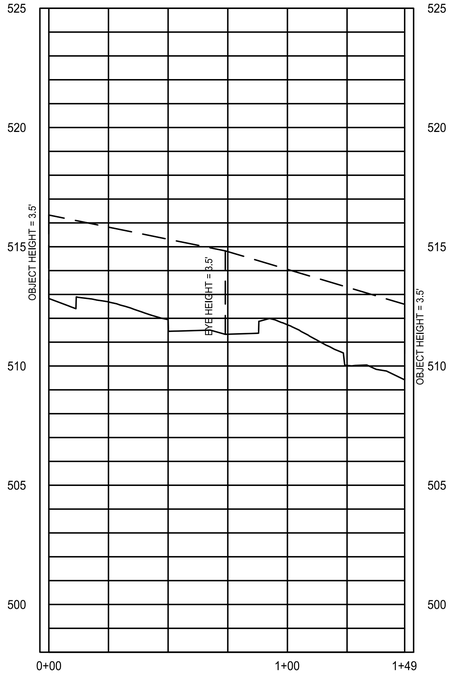


SIGHT DISTANCE PROFILE 20



SIGHT DISTANCE PROFILE 21



SIGHT DISTANCE PROFILE 22

LEGEND

PROPOSED GRADE

SIGHT LINE

3 1.5 0 3 6
VERT. GRAPHIC SCALE
1" = 3'

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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SIGHT DISTANCE PROFILES

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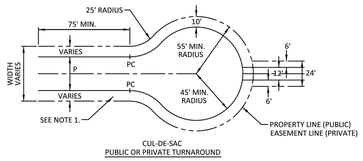
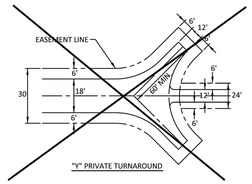


CUL-DE-SAC
PUBLIC OR PRIVATE TURNAROUND



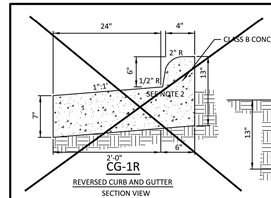
"Y" PRIVATE TURNAROUND

NOTES:

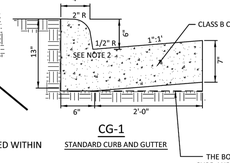
1. SIDEWALKS ON PUBLIC CUL-DE-SAC STREETS SHALL BE PROVIDED WITHIN THE RIGHT-OF-WAY.
2. A MAXIMUM GRADE OF 3% IN ALL DIRECTIONS SHALL BE MAINTAINED ACROSS THE CUL-DE-SAC.
3. THE 45' MINIMUM RADIUS MAY BE REDUCED TO AN ABSOLUTE MINIMUM RADUIS OF 30' ON SHORT LOW VOLUME CUL-DE-SAC'S, WHICH WILL REQUIRE THE APPROVAL OF THE PLANNING COMMISSION.

NOT TO SCALE

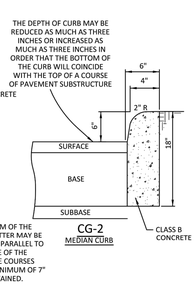
	TYPICAL CUL-DE-SAC AND "Y" TURNAROUND City of Charles Town	



CG-1R
REVERSED CURB AND GUTTER
SECTION VIEW



CG-1
STANDARD CURB AND GUTTER



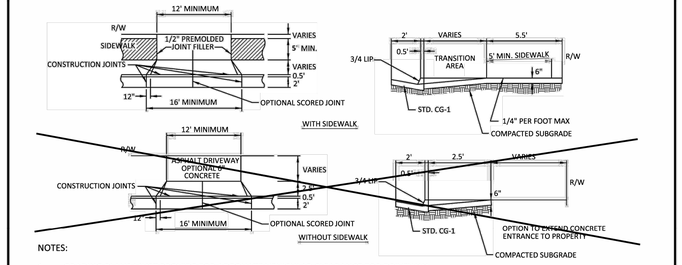
CG-2
MEDIAN CURB

NOTES:

1. THE USE OF CG-1R SHALL NOT BE UTILIZED WITHIN THE LIMITS OF PUBLIC RIGHT OF WAY.
2. A MAXIMUM OF A 2" RADIUS IS ACCEPTABLE WITH CURB AND GUTTER.
3. SUBGRADE FOR ALL CURB AND GUTTER SHALL BE COMPACTED TO 95 PERCENT DENSITY AT OPTIMUM MOISTURE TO THE FULL WIDTH OF RIGHT OF WAY IN ACCORDANCE WITH AASHTO, T99.

NOT TO SCALE

	TYPICAL COMBINATION CURB AND GUTTER City of Charles Town	CG-1 CG-1R CG-2

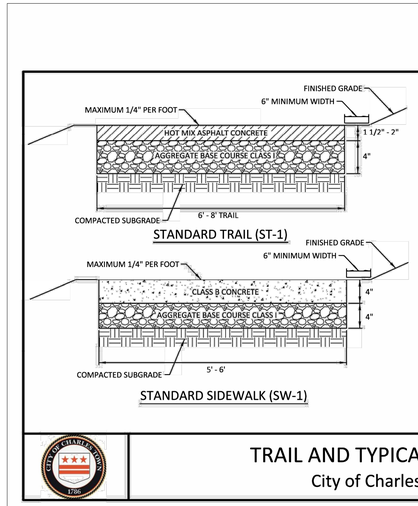


NOTES:

1. GRADING PLANS MUST PROVIDE FOR ADEQUATE VEHICULAR CLEARANCE FOR DRIVEWAY APPROACH, DEPARTURE, AND BREAKOVER TRANSITIONS.

NOT TO SCALE

	DRIVEWAY ENTRACE WITH CURB AND GUTTER City of Charles Town	DE-2



STANDARD TRAIL (ST-1)

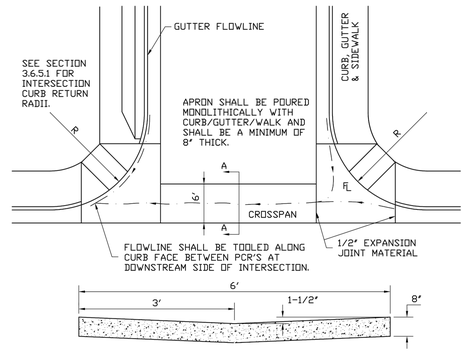
STANDARD SIDEWALK (SW-1)

NOTES:

1. ALL PEDESTRIAN AND BIKE TRAILS LOCATED OUTSIDE OF CITY OF CHARLESTOWN RIGHT OF WAY SHALL BE A MINIMUM OF 5' IN WIDTH FOR SIDEWALKS, 6' FOR ALL PEDESTRIAN TRAILS, AND 8' FOR ALL BIKE TRAILS.
2. A PRIVATE ACCESS EASEMENT SHALL BE PROVIDED FOR ALL SIDEWALKS AND TRAILS OUTSIDE OF CITY OF CHARLES TOWN RIGHT OF WAY AND SHALL INCLUDE A MINIMUM OF 3' OF WIDTH ON BOTH SIDES OF THE TRAIL OR SIDEWALK.
3. THE MAXIMUM GRADE FOR ALL PEDESTRIAN TRAILS SHALL BE 10%.
4. THE MAXIMUM GRADE FOR ALL BIKE TRAILS SHALL BE 8%, EXCEPT UP TO 15% IS ALLOWED FOR DISTANCES OF LESS THAN 150 FEET.
5. APPROPRIATE LIGHTING AND SIGNAGE, LANDSCAPING, BUFFERING AND DRAINAGE MEASURES, ALONG WITH CONSIDERATIONS FOR SECURITY SHALL BE INCORPORATED IN THE DESIGN OF THESE FACILITIES.

NOT TO SCALE

	TRAIL AND TYPICAL SIDEWALK City of Charles Town	ST-1 SW-1



SECTION A – A
6 FOOT CROSSPAN

NOTE:

- SEE STANDARD NO. 10 FOR CONCRETE JOINT DETAILS.
- EXPANSION JOINTS ARE REQUIRED AT P.C.R.'S.
- CROSSPANS ARE NOT PERMITTED ACROSS ARTERIAL/COLLECTOR STREETS.

File: Stand-5
Typical Intersection Crosspan

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CHECKED: TZ

SHEET TITLE:

SITE DETAILS

SHEET No.

C316

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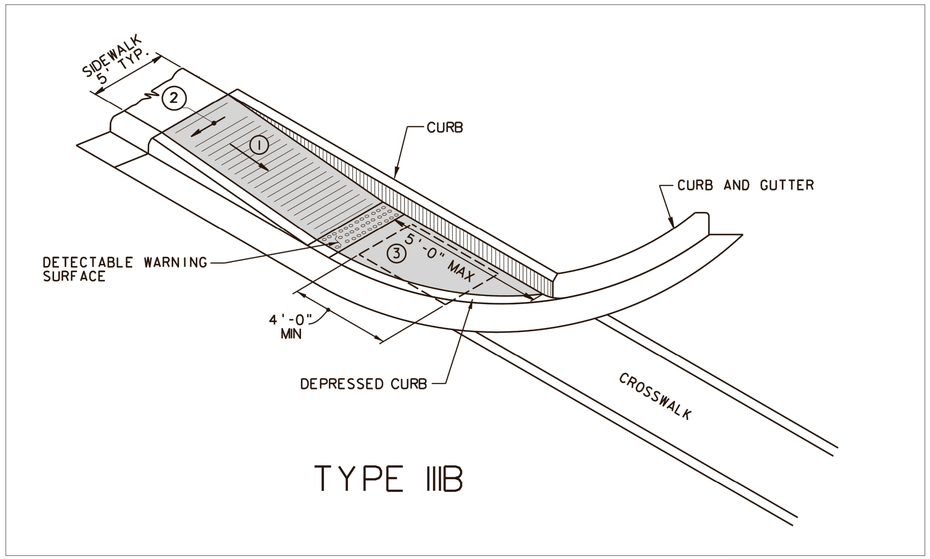
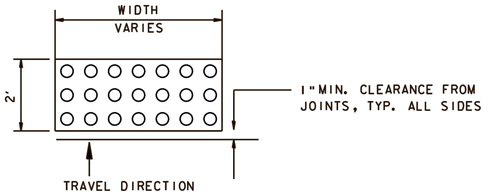
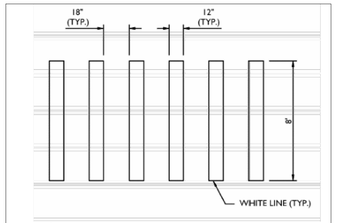


TYPE IIIB



DETECTABLE WARNING SURFACE



NOTE:

1. ALL STOP LINE USED FOR CROSSWALK SHALL BE WVDOH TYPE V (SECTION 715.40.2)

1 CROSSWALK DETAIL
NOT TO SCALE

NOTES

RAMP CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS. RAMP SURFACE SHALL INCLUDE A "DETECTABLE WARNING SURFACE" (SEE PVT7 SHT. 3 OF 3) AS SHOWN FOR EACH RAMP TYPE. A COARSE BROOM FINISH, TRANVERSE TO FLARE SLOPES, OR EQUAL NON-SKID FINISH SHALL BE PROVIDED ON CONCRETE SURFACES.

NORMAL GUTTER FLOW LINE AND PROFILE SHALL BE MAINTAINED THROUGH THE RAMP AREA, UNLESS OTHERWISE SHOWN OR SPECIFIED.

¼" PREFORMED EXPANSION JOINT FILLER, MEETING THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS, SHALL BE PLACED AT ALL LOCATIONS WHERE RAMP CONTACTS CURB, GUTTER, OR CONCRETE PAVEMENT. WHEN THE RAMP IS POURED SEPARATELY FROM THE SIDE WALK, THE EXPANSION MATERIAL SHALL BE PLACED AT ALL LOCATIONS WHERE THE NORMAL SIDEWALK AND THE RAMP ABUT.

DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF THE DRAINAGE STRUCTURE, EXCEPT WHERE EXISTING STRUCTURES ARE BEING UTILIZED FOR CONSTRUCTION OF NEW RAMPS.

ANY GRATE IN PEDESTRIAN AREAS SHALL HAVE OPENINGS NOT GREATER THAN 1/2" AND SHALL BE PLACED WITH LONG DIMENSION OF OPENING PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

IF THE 8.33% (12:1) SLOPE CANNOT BE OBTAINED DUE TO GRADE OF THE ADJACENT ROADWAY, THE SLOPED PORTION OF THE RAMP SHALL BE EXTENDED TO A MAXIMUM LENGTH OF 15'-0".

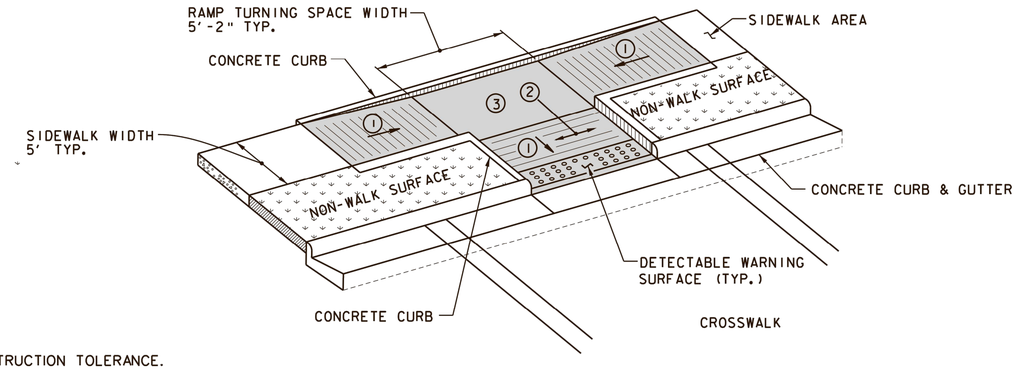
A TURNING SPACE AS DEPICTED IN THE DETAILS SHALL BE PROVIDED AT THE TOP OF APPROPRIATE CURB RAMPS. THE TURNING SPACE SHALL HAVE A MINIMUM WIDTH OF 4 FT. WHEN NO OBSTRUCTIONS EXIST AT THE BACKSIDE OF THE LANDING. WHEN AN OBSTRUCTION EXISTS SUCH AS A BUILDING, LIGHT POLE, ETC. THE MINIMUM DIMENSION OF THE LANDING SHALL BE 5 FEET.

CURB RAMP WIDTH SHALL MATCH SIDEWALK WIDTH PLUS CLEARANCE. TYPICAL SIDEWALK WIDTH IS 5'. MINIMUM WIDTH IS 4'.

THE TYPE OF RAMP TO BE USED SHALL BE AS SPECIFIED ON THE PLANS. THE FOLLOWING CAN BE CONSIDERED GUIDELINES IN SELECTING RAMP TYPES, BUT ARE INCLUDED HERE FOR INFORMATION ONLY.

RAMP TYPES

TYPE I (SHT. 1)	FOR USE WHERE SIDEWALK EXTENDS TO STREET AND WHERE SIDEWALK WIDTH IS ADEQUATE FOR RAMP AND TURNING SPACE.
TYPE II (SHT. 1)	RAMP SHALL ONLY BE USED ON ALTERATION PROJECTS WHERE TWO SEPARATE CURB RAMPS CANNOT BE PROVIDED. THE TYPE II CURB IS NOT SUITABLE FOR NEW CONSTRUCTION.
TYPE III (SHT. 2)	PARALLEL RAMPS ARE FOR USE WHEN ADEQUATE SIDEWALK WIDTH FOR BOTH RAMPS AND TURNING SPACE CANNOT BE PROVIDED.
TYPE IV (SHT. 3)	COMBINES ASPECTS OF TYPE I AND TYPE III RAMPS AS NECESSARY. USE WHERE SIDEWALK IS SET BACK FROM STREET AND A GRASS OR LANDSCAPED STRIP IS PROVIDED BETWEEN SIDEWALK AND STREET.



TYPE IV RAMP

1. 8.33% (12:1) MAX. RAMP SLOPE, INCLUDING CONSTRUCTION TOLERANCE.
2. CROSS SLOPE: 2.00% MAX. INCLUDING CONSTRUCTION TOLERANCE.
3. CURB RAMPS REQUIRE A (4'-0") MINIMUM TURNING SPACE WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SEE NOTE REGARDING OBSTRUCTIONS ON SHEET 1 OF 3. SLOPE TO DRAIN TO CURB.

PAY LIMITS FOR CURB RAMPS

SELECT ROAD PAVEMENT SECTIONS FROM DETAIL A-05B AS FOLLOWS:

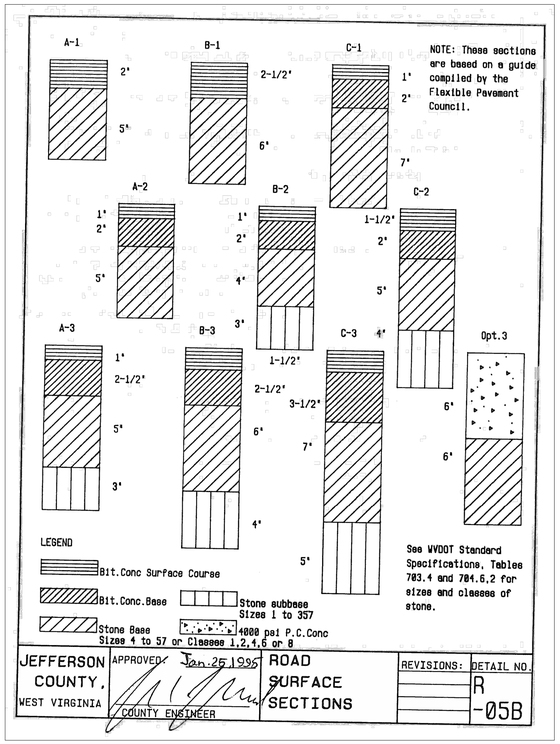
1. **Check Soils Survey to determine soils series of soil to be used in the subgrade.**
2. **Determine the Subgrade Support Class of the soils series from the table below.**

SUBGRADE SUPPORT CLASS	SOILS SERIES
A (good - excellent)	Berks and rock land and Weikert when Weikert when shale content is high (40% or greater retained on the No.4 screen).
B (medium)	Ashton,Berks,Blairton,Braddock,Dekalb, Edgemont,Huntington,Laidig,Landes,Lindside, Melvin,Monongahela,and Weikert, and Frakstown when shale content is medium to high.
C (poor)	Benevola,Chilhowie,Clifton,Duffield,Frankstown, Fedwick,Hagerstown,Opequon

3. Select the appropriate road section based on the proposed use of the pavement and the Subgrade Support Class.

USE	ROAD SECTION
Residential driveways and small parking lots with 50 stalls or less and no trucks	A-1,B-1,C-1
Subdivision roads and large parking lots	A-2,B-2,C-2
State road widening,industrial parking lots, and truck driveways	A-3,B-3,C-3

JEFFERSON COUNTY, WEST VIRGINIA | APPROVED: Jan. 25, 1995 COUNTY ENGINEER | SURFACE SECTION SELECTION | REVISIONS: | DETAIL NO. R-05A



JEFFERSON COUNTY, WEST VIRGINIA | APPROVED: Jan. 25 1995 COUNTY ENGINEER | ROAD SURFACE SECTIONS | REVISIONS: | DETAIL NO. R-05B

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SITE DETAILS

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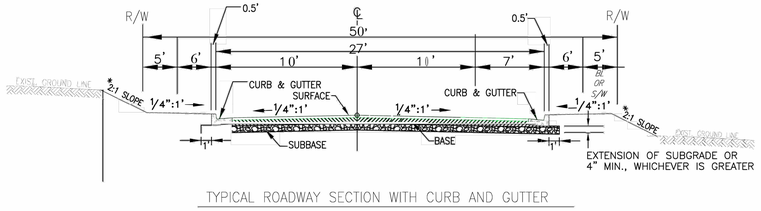
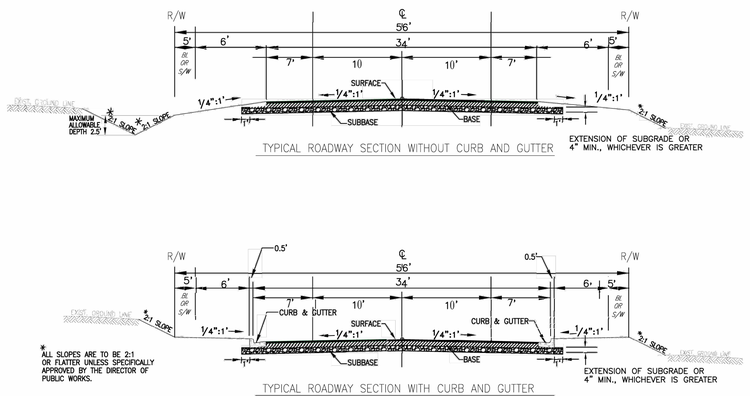


TYPICAL ROADWAY SECTION WITH CURB AND GUTTER

*ALL SLOPES ARE TO BE 2:1 OR FLATTER UNLESS SPECIFICALLY APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

TYPICAL SECTION - NEIGHBORHOOD STREET
(0-500 VPD)
City of Charles Town

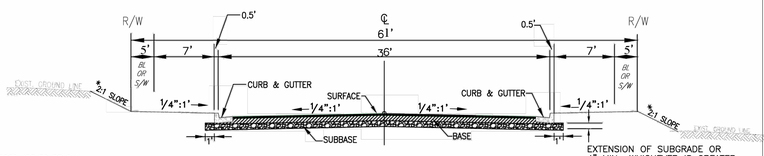


TYPICAL ROADWAY SECTION WITHOUT CURB AND GUTTER

TYPICAL ROADWAY SECTION WITH CURB AND GUTTER

*ALL SLOPES ARE TO BE 2:1 OR FLATTER UNLESS SPECIFICALLY APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

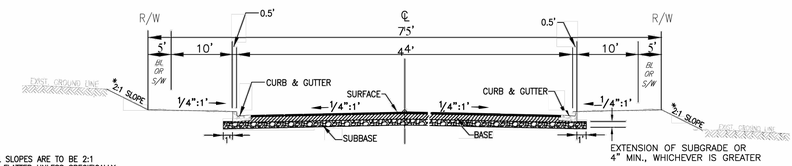
TYPICAL SECTION - NEIGHBORHOOD CENTER STREET
(501-1000 VPD)
City of Charles Town



*ALL SLOPES ARE TO BE 2:1 OR FLATTER UNLESS SPECIFICALLY APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

TYPICAL ROADWAY SECTION WITH CURB AND GUTTER

TYPICAL SECTION - MINOR COLLECTOR
(1000-2001 VPD)
City of Charles Town



*ALL SLOPES ARE TO BE 2:1 OR FLATTER UNLESS SPECIFICALLY APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

TYPICAL ROADWAY SECTION WITH CURB AND GUTTER

TYPICAL SECTION - MAJOR COLLECTOR
(2001+ VPD)
City of Charles Town

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CHECKED: TZ

SHEET TITLE:

SITE DETAILS

SHEET No.

C318

P:\Projects\23011\00200\1113948 Site Plan\C300 Site Plan Details.dwg, 12/17/2025 2:03:28 PM, Tony Zook,

SEE AUGUSTINE AVE IMPROVEMENT PLANS

SEE SHEET C321

SEE SHEET C320

W Sovereign Ave
MAJOR COLLECTOR STREET
75' ROW MINIMUM
40MPH DESIGN SPEED

E Sovereign Ave
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Regency Ln
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Kensington Dr
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Ellsworth Ave
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

AUGUSTINE AVENUE ROW

PI=11+24.37
PI=12+15.30
PI=15+45.15
PI=16+06.55

VINTON LANE
AUGUSTINE AVENUE
OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)

WEST VIRGINIA STATE GRID NORTH
UTM83-MF

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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CHECKED: TZ

SHEET TITLE:

VEHICLE TURNING PLANS

SHEET No.

C319

P:\Projects\23011\00\00\01\13948 Site Plan\C319 Vehicle Turning Exhibits.dwg, 12/17/2025 2:04:18 PM, Tony Zook,

FUTURE PHASE OF AUGUSTINE MANOR

E Sovereign Ave
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Worthington Dr
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Langford Dr
NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Ellsworth Ave
MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

SIGHT EASEMENT

SEE SHEET C319

SEE SHEET C322



KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

VEHICLE TURNING PLANS

SHEET No.

C320

P:\Projects\23011\000200\119348 Site Plan\C319 Vehicle Turning Exhibits.dwg, 12/17/2025 2:04:24 PM, Tony Zook,

SEE SHEET C319

SEE AUGUSTINE AVE IMPROVEMENT PLANS

AUGUSTINE AVENUE ROW

Kensington Dr

NIEGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

MINOR COLLECTOR STREET
61' ROW MINIMUM
35MPH DESIGN SPEED

Regency Ln

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

Noble Ln

NEIGHBORHOOD STREET
50' ROW MINIMUM
25MPH DESIGN SPEED

PC=13+14.85

PI=15+03.35

PI=16+45.32

PI=18+77.01

PI=17+22.51

OVERALL PROPERTY LINE

SEE SHEET C322

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)

WEST VIRGINIA STATE GRID NORTH
UTM83-MF

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

VEHICLE TURNING PLANS

SHEET No.

C321

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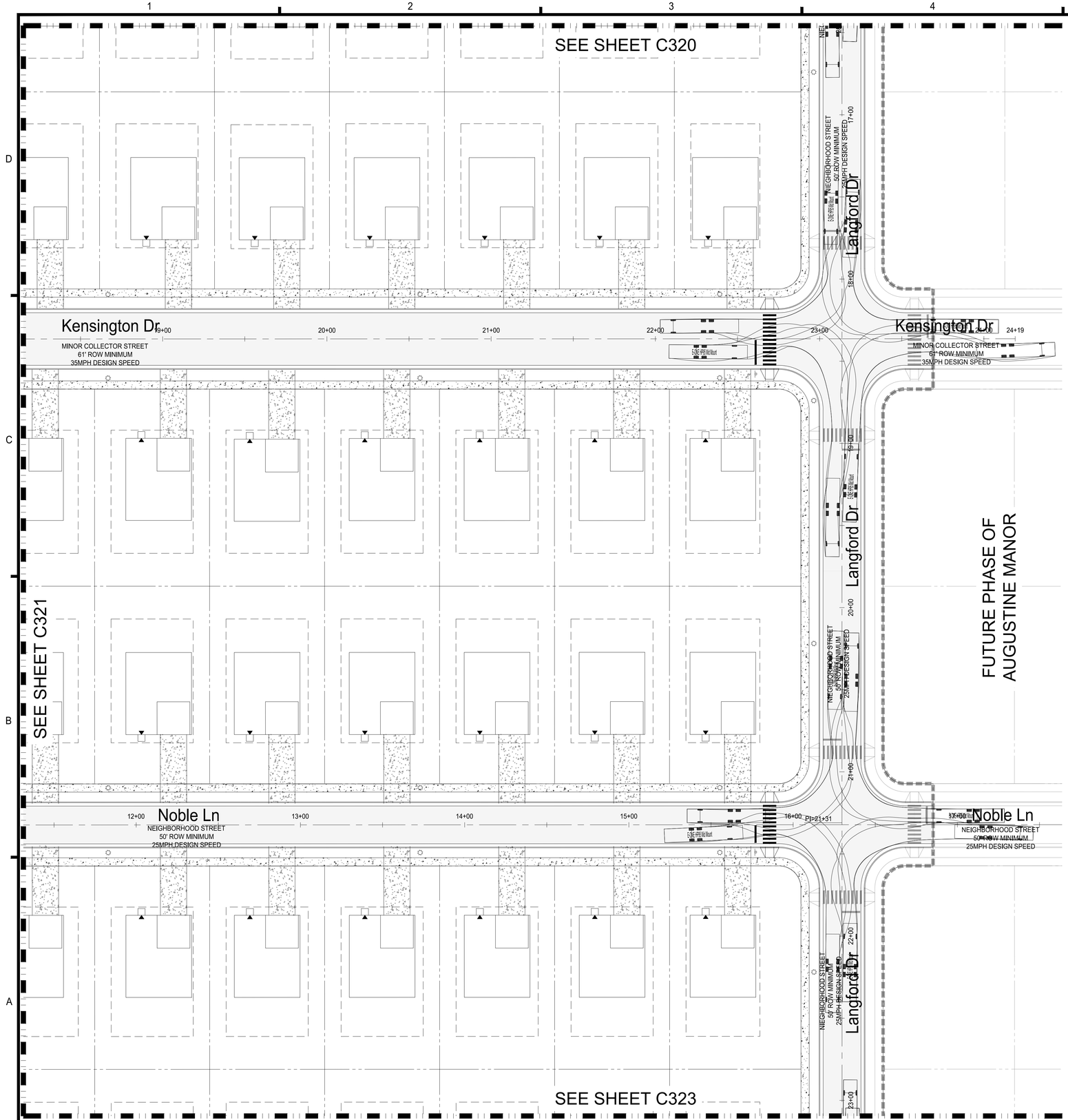

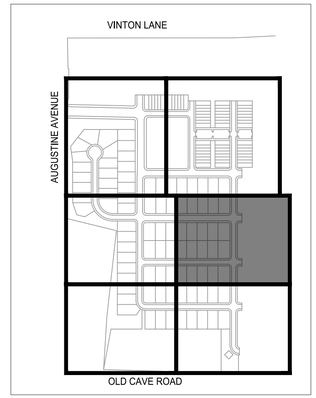

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)

WEST VIRGINIA STATE GRID NORTH
UTM 18N

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

VEHICLE TURNING PLANS

SHEET No.

C322

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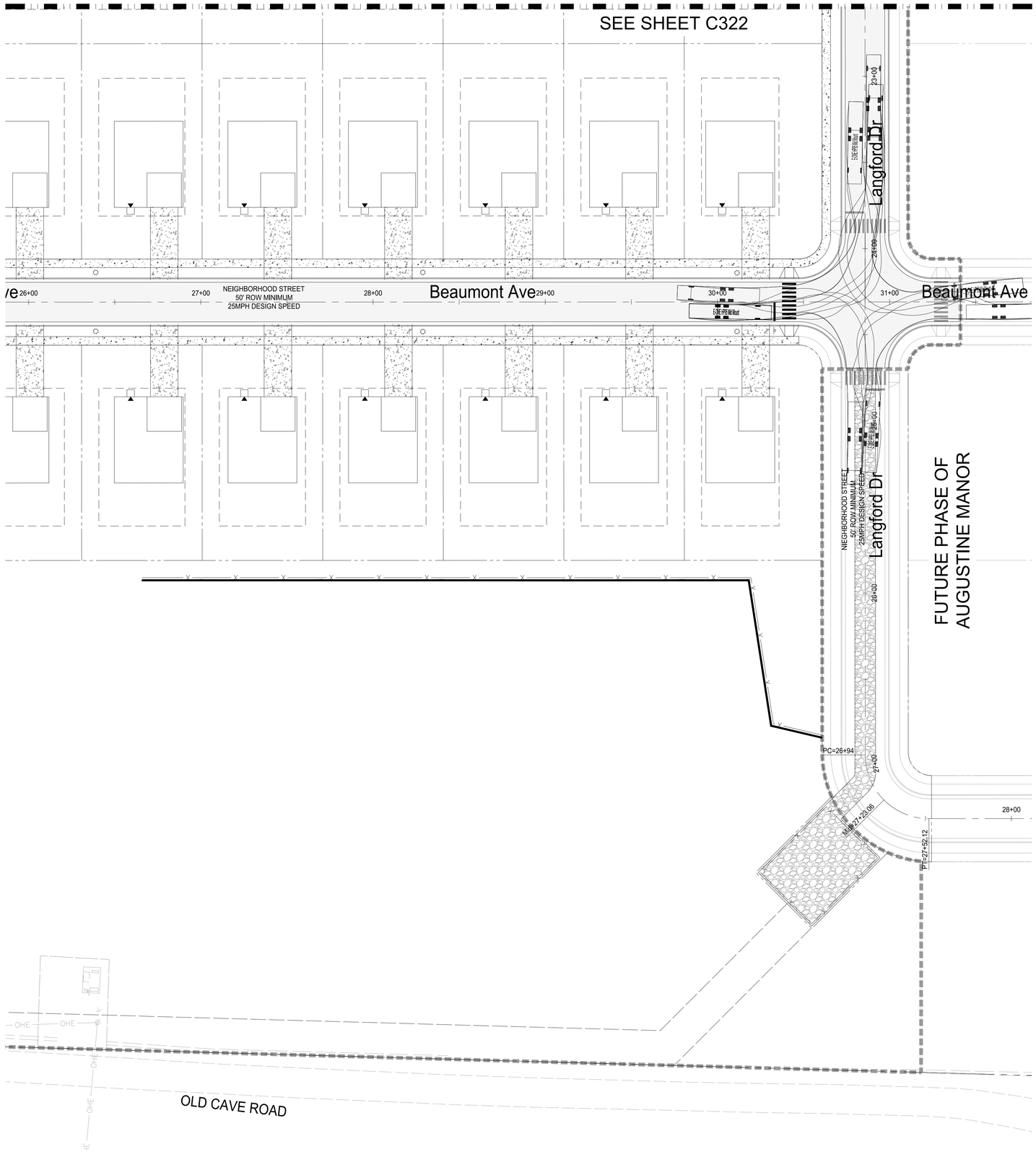

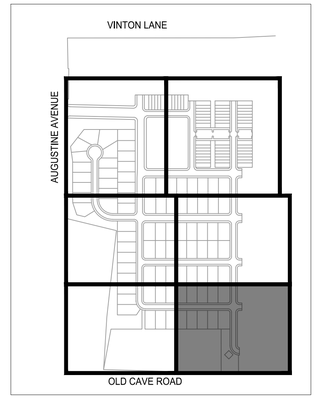

KEY MAP
N.T.S.

LEGEND

- ASPHALT PAVEMENT (ONSITE)
- ASPHALT PAVEMENT (AUGUSTINE AVENUE WVDOT)
- CONCRETE SIDEWALK
- RIPRAP STONE APRON
- CONCRETE DRIVEWAYS
- MILL & OVERLAY (WVDOT)

WEST VIRGINIA STATE GRID NORTH
UTM 83-WF

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

VEHICLE TURNING PLANS

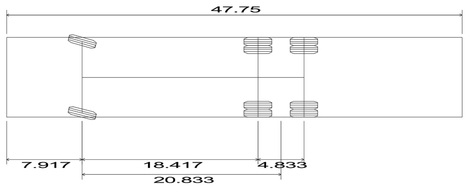
SHEET No.
C323

P:\Projects\23011\00200\119488 Site Plan\C319 Vehicle Turning Exhibits.dwg, 12/17/2025 2:04:37 PM, Tony Zook,



Vehicle Tracking Vehicle Details **Ref:**

Vehicle Name:	**E-ONE HP95 Mid Mount**
Type:	Rigid vehicle
Category	(Unspecified)
Classification	(Unspecified)
Source:	
Description:	Cyclone II Chassis
Notes:	
Unit 1 Name:	E-ONE HP95 Mid Mount Tractor

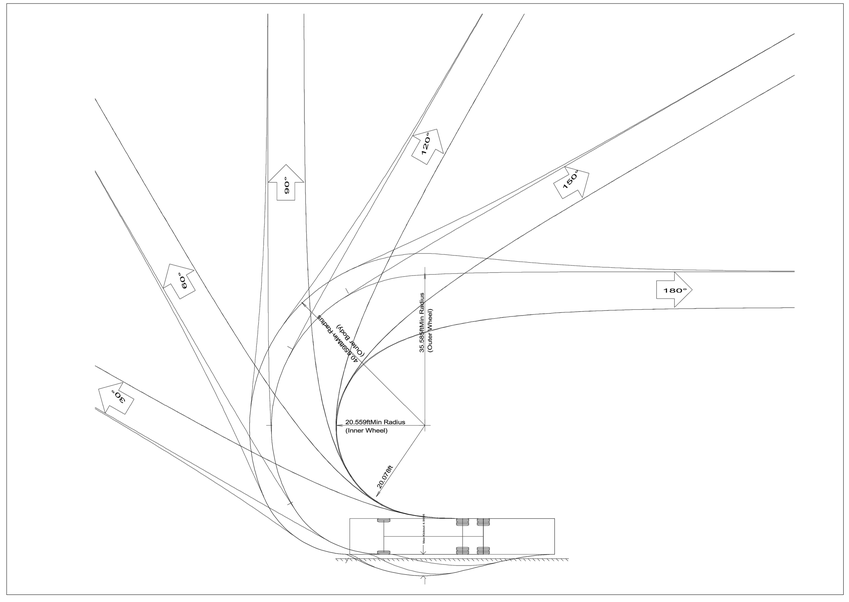


E-ONE HP95 Mid Mount	
Overall Length	47.750ft
Overall Width	8.333ft
Overall Body Height	11.000ft
Min Body Ground Clearance	1.393ft
Track Width	8.333ft
Lock-to-lock time	6.00s
Max Wheel Angle	45.00°

Vehicle Tracking v23.00 - World Wide Real Vehicles

Vehicle Tracking Vehicle Details **Ref:**

Unit Name:	**E-ONE HP95 Mid Mount Tractor**
Type:	Tractor (with driver controlled steering)
Body style:	Fire Tender
Classification	(Unspecified)
Source:	No data
Description:	No data
Notes:	No data
Datum:	Front Primary Axle
Front Axle(s):	1 Ackerman (axles fixed, wheels turn)
Primary Front Axle Offset:	0.000ft
Effective Front Axle Offset:	0.000ft (Auto Calculated)
Maximum Wheel Angle:	45.000deg (Any Front Wheel)
Status:	Active Non Self-Steered
Track Width:	8.333ft
Total Wheels:	2 (positioned at the ends of the axle)
Tire Width:	0.833ft (Auto Calculated - proportion of Track Width)
Tire Diameter:	2.917ft (Auto Calculated - proportion of Track Width)
Rear Axle(s):	2 Fixed (All axles identical)
Primary Rear Axle Offset:	18.417ft (Innermost Axle behind Front Primary Axle)
Effective Rear Axle Offset:	20.833ft (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Rear Axle Spacing:	4.833ft
Status:	Active Non Self-Steered
Track Width:	8.333ft
Total Wheels:	4 (positioned at the ends of the axle)
Tire Width:	0.833ft (Auto Calculated - proportion of Track Width)
Tire Diameter:	2.917ft (Auto Calculated - proportion of Track Width)
Steering:	Front Axle(s):
Maximum Wheel Angle:	See Front Axles: Maximum Wheel Angle
Calculated Maximum Wheel Angle:	45.000deg
Lock-to-Lock Time (Fwd/Rev):	6.0sec / 6.0sec
Driver / Pilot	
Driver Offset Longitudinally:	-2.995ft (in front of Front Primary Axle)
Driver / Pilot Offset Laterally:	-1.969ft (Right of Centerline)
Driver Height:	8.202ft (Above ground level)
Front Coupling:	None
Rear Coupling:	None
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y):	-7.917ft, 0.000ft
Length / Width:	47.750ft / 8.333ft



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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: AS SHOWN
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

VEHICLE TURNING DETAILS

SHEET No.

C324

P:\Projects\23011\00200\113948 Site Plan\C319 Vehicle Turning Exhibits.dwg, 12/17/2025 2:04:38 PM, Tony Zook,

SEE SHEET C402A

SEE SHEET C402

SEE SHEET CXXX

SEE SHEET C403

25' BUFFER

LOT 148 2662 SQ. FT. — FF = 523.83' GF = 522.83'
LOT 147 2000 SQ. FT. — FF = 523.17' GF = 522.17'
LOT 146 2000 SQ. FT. — FF = 522.50' GF = 521.50'
LOT 145 2000 SQ. FT. — FF = 521.83' GF = 520.83'
LOT 144 2000 SQ. FT. — FF = 521.17' GF = 520.17'
LOT 143 3001 SQ. FT. — FF = 520.50' GF = 519.50'
LOT 142 3001 SQ. FT. — FF = 520.00' GF = 519.00'

LOT 149 96537 SQ. FT.

LOT 81 10933 SQ. FT. — FF = 529.50' GF = 528.50' BF = 520.50'
LOT 80 W/O 13643 SQ. FT. — FF = 530.00' GF = 529.00' BF = 521.00'
LOT 82 8745 SQ. FT. — FF = 529.00' GF = 528.00' BF = 520.00'
LOT 79 W/O 8708 SQ. FT. — FF = 528.00' GF = 527.00' BF = 519.00'
LOT 83 8539 SQ. FT. — FF = 528.50' GF = 527.50' BF = 519.50'
LOT 78 W/O 8517 SQ. FT. — FF = 528.50' GF = 527.50' BF = 519.50'
LOT 84 9558 SQ. FT. — FF = 527.50' GF = 526.50' BF = 518.50'
LOT 77 W/O 8636 SQ. FT. — FF = 527.00' GF = 526.00' BF = 518.00'
LOT 85 9644 SQ. FT. — FF = 526.50' GF = 525.50' BF = 517.50'
LOT 76 W/O 8640 SQ. FT. — FF = 526.00' GF = 525.00' BF = 517.00'
LOT 86 9759 SQ. FT. — FF = 525.50' GF = 524.50' BF = 516.50'
FF = 525.00' GF = 524.00' BF = 516.00'
LOT 73 8812 SQ. FT. — FF = 523.50' GF = 522.50' BF = 514.50'
LOT 72 8287 SQ. FT. — FF = 522.50' GF = 521.50' BF = 513.50'
LOT 71 8287 SQ. FT. — FF = 521.25' GF = 520.25' BF = 512.25'
LOT 70 8287 SQ. FT. — FF = 520.25' GF = 519.25' BF = 511.25'
LOT 69 8287 SQ. FT. — FF = 519.25' GF = 518.25' BF = 510.25'
LOT 68 8287 SQ. FT. — FF = 518.00' GF = 517.00' BF = 509.00'
LOT 1 9212 SQ. FT. — FF = 515.75' GF = 514.75' BF = 506.75'
LOT 2 8399 SQ. FT. — FF = 514.50' GF = 513.50' BF = 505.50'

A26.3, A26, A26.1, A26.2, A25.4, A25.2, A25, A25.3, A25.1, A14, A14.2, A14.1, A19.1, A19, A19.2, A10.4, A18, A17.1, A17, A17.2, A20.2, A20.4, A20.1, A20, D6, A20.6, A20.3, C8, A45.2

15" RCP, 18" RCP, 48" RCP, 54" RCP

PP #L400-P23, PP #L400-P24, PP #L400-P25

VINTON LANE
AUGUSTINE AVENUE
OLD CAVE ROAD

KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTM 18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.

C401

P:\Projects\23011\00200\113948 Site Plan\C401 Grading & Drainage Plans.dwg, 12/17/2025 2:05:42 PM, Tony Zook,

SEE SHEET C402A

SEE SHEET C401

SEE SHEET C404

LOT 149
96837 SQ. FT.

LOT 143
3001 SQ. FT.

LOT 142
3001 SQ. FT.

LOT 141
2001 SQ. FT.

LOT 140
2000 SQ. FT.

LOT 139
2000 SQ. FT.

LOT 138
2000 SQ. FT.

LOT 137
2962 SQ. FT.

LOT 136
3002 SQ. FT.

LOT 135
2002 SQ. FT.

LOT 134
2000 SQ. FT.

LOT 133
2000 SQ. FT.

LOT 132
2000 SQ. FT.

LOT 131
2000 SQ. FT.

LOT 130
2000 SQ. FT.

LOT 129
3001 SQ. FT.

LOT 121
2999 SQ. FT.

LOT 122
2000 SQ. FT.

LOT 123
2000 SQ. FT.

LOT 124
2000 SQ. FT.

LOT 125
2000 SQ. FT.

LOT 126
2000 SQ. FT.

LOT 127
2004 SQ. FT.

LOT 128
3001 SQ. FT.

LOT 120
3001 SQ. FT.

LOT 119
2003 SQ. FT.

LOT 118
2000 SQ. FT.

LOT 117
2000 SQ. FT.

LOT 116
2000 SQ. FT.

LOT 115
2000 SQ. FT.

LOT 114
2000 SQ. FT.

LOT 113
2984 SQ. FT.

LOT 96
3001 SQ. FT.

LOT 95
2002 SQ. FT.

LOT 94
2000 SQ. FT.

LOT 93
2000 SQ. FT.

LOT 92
2000 SQ. FT.

LOT 91
2000 SQ. FT.

LOT 90
2000 SQ. FT.

LOT 89
3001 SQ. FT.

LOT 97
2999 SQ. FT.

LOT 98
2000 SQ. FT.

LOT 99
2000 SQ. FT.

LOT 100
2000 SQ. FT.

LOT 101
2000 SQ. FT.

LOT 102
2000 SQ. FT.

LOT 103
2001 SQ. FT.

LOT 104
3001 SQ. FT.

LOT 112
3001 SQ. FT.

LOT 111
1995 SQ. FT.

LOT 110
2000 SQ. FT.

LOT 109
2000 SQ. FT.

LOT 108
2000 SQ. FT.

LOT 107
2000 SQ. FT.

LOT 106
2000 SQ. FT.

LOT 105
3001 SQ. FT.

LOT 2
999 SQ. FT.

LOT 3
8399 SQ. FT.

LOT 4
8399 SQ. FT.

LOT 5
8399 SQ. FT.

LOT 6
8399 SQ. FT.

LOT 7
8399 SQ. FT.

LOT 8
9209 SQ. FT.

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.
C402

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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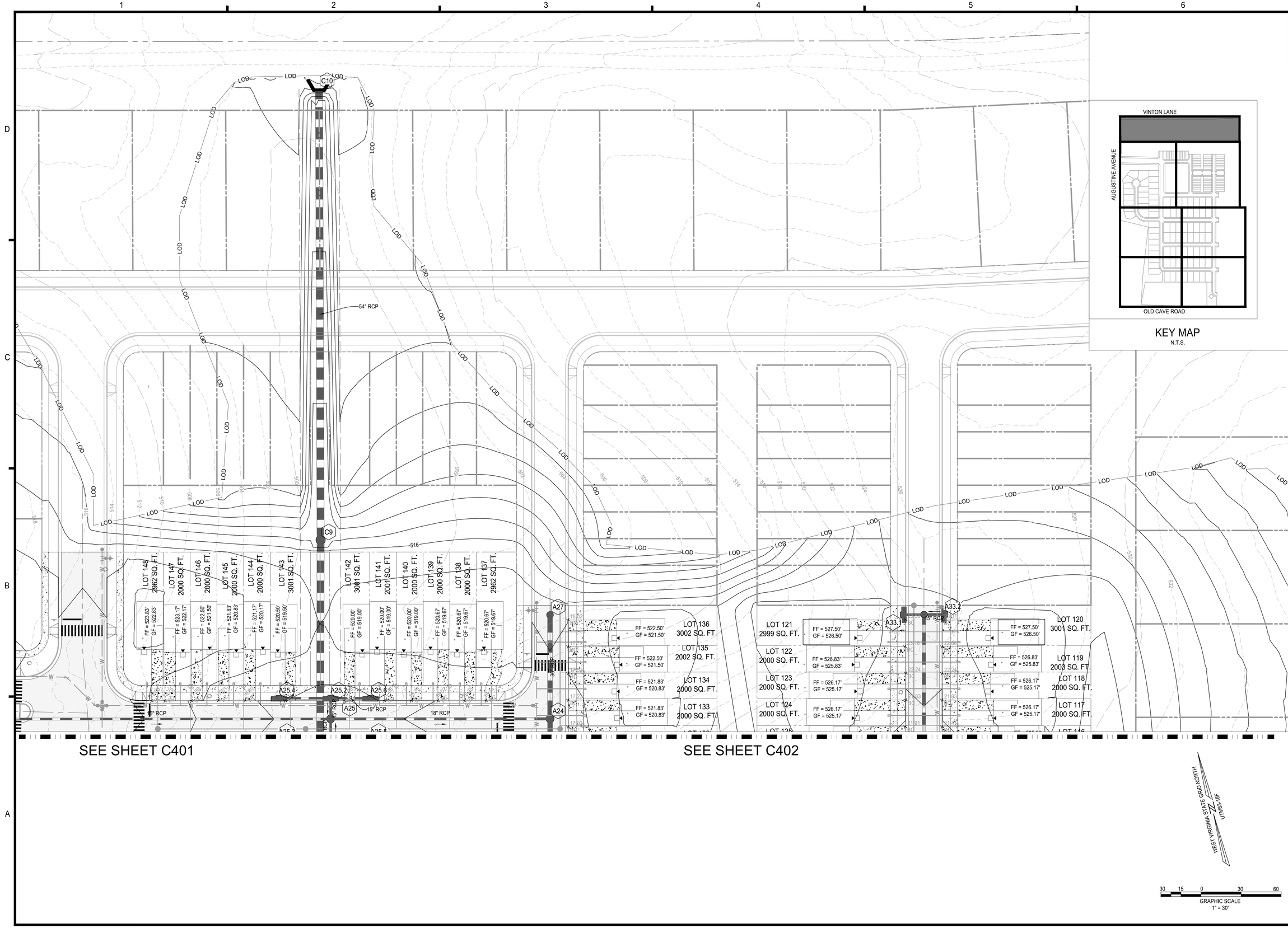

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
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DRAWN: AF
CHECKED: TZ

SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.

C402A

P:\Projects\23011\000200\119348 Site Plan\C401 Grading & Drainage Plans.dwg, 12/17/2025 2:05:58 PM, Tony Zook,

SEE SHEET C702

SEE SHEET C401

SEE SHEET C404

SEE SHEET C405

LOT 87
9881 SQ. FT.

LOT 88
12658 SQ. FT.

LOT 75
W/O
8640 SQ. FT.

LOT 74
W/O
10908 SQ. FT.

LOT 67
8287 SQ. FT.

LOT 66
9427 SQ. FT.

LOT 65
SOG
10360 SQ. FT.

LOT 64
SOG
9099 SQ. FT.

LOT 63
SOG
9099 SQ. FT.

LOT 62
SOG
9099 SQ. FT.

LOT 61
SOG
9099 SQ. FT.

LOT 60
SOG
9099 SQ. FT.

LOT 1
9212 SQ. FT.

LOT 2
8399 SQ. FT.

LOT 3
8399 SQ. FT.

LOT 9
9209 SQ. FT.

LOT 10
8399 SQ. FT.

LOT 11
8399 SQ. FT.

LOT 17
W/O
9501 SQ. FT.

LOT 18
W/O
8399 SQ. FT.

LOT 19
W/O
8399 SQ. FT.

LOT 25
9538 SQ. FT.

LOT 26
8399 SQ. FT.

LOT 27
8399 SQ. FT.

LOT 33
W/O
9841 SQ. FT.

LOT 34
W/O
8675 SQ. FT.

LOT 35
W/O
8675 SQ. FT.

POTOMAC EDISON
#LP400-CT-P27P5

PP #L400-P27

PP #L400-P28

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
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SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.

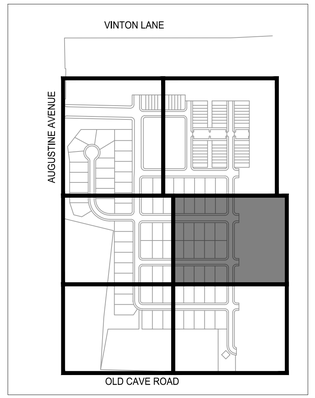
C403

P:\Projects\23011\00200\119348 Site Plan\C401 Grading & Drainage Plans.dwg, 12/17/2025 2:06:08 PM, Tony Zook,

SEE SHEET C402

SEE SHEET C403

SEE SHEET C406



KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTM 83-MD

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

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DATE: 09/05/2025
SCALE: 1" = 30'
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CHECKED: TZ

SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.

C404

P:\Projects\23011\02000\11394B Site Plan\C401 Grading & Drainage Plans.dwg, 12/17/2025 2:06:17 PM, Tony Zook,

SEE SHEET C403

SEE SHEET C406

LOT 59
SOG
9099 SQ. FT.
FF = 505.00'
GF = 504.00'

LOT 58
SOG
9196 SQ. FT.
FF = 502.50'
GF = 501.50'

LOT 57
SOG
10555 SQ. FT.
FF = 502.50'
GF = 501.50'

LOT 41
9944 SQ. FT.
FF = 501.25'
GF = 500.25'
BF = 492.25'

LOT 42
8743 SQ. FT.
FF = 503.00'
GF = 502.00'
BF = 494.00'

LOT 56
W/O
8751 SQ. FT.
FF = 502.75'
GF = 501.75'
BF = 493.75'

LOT 55
W/O
8751 SQ. FT.
FF = 502.75'
GF = 501.75'
BF = 493.75'

RIP RAP APRON
d50 = 6"
LENGTH = 10'
Wf = 11'
THICKNESS = 13.5"

RIP RAP APRON
d50 = 13" (VDOT CLASS I)
LENGTH = 37'
Wf = 42'
THICKNESS = 29.25"

15" RCP
18" RCP
24" RCP
54" RCP
60" RCP



KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
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CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
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DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.

C405

P:\Projects\23011\000200\113948 Site Plan\C401 Grading & Drainage Plans.dwg, 12/17/2025 2:06:23 PM, Tony Zook,

SEE SHEET C404

SEE SHEET C405

LOT 42
3 SQ. FT.
FF = 503.00'
GF = 502.00'
BF = 494.00'

LOT 43
8743 SQ. FT.
FF = 505.00'
GF = 504.00'
BF = 496.00'

LOT 44
8743 SQ. FT.
FF = 507.00'
GF = 506.00'
BF = 498.00'

LOT 45
8743 SQ. FT.
FF = 509.00'
GF = 508.00'
BF = 500.00'

LOT 46
8743 SQ. FT.
FF = 511.00'
GF = 510.00'
BF = 502.00'

LOT 47
8743 SQ. FT.
FF = 513.00'
GF = 512.00'
BF = 504.00'

LOT 48
9951 SQ. FT.
FF = 515.00'
GF = 514.00'
BF = 506.00'

LOT 55
W/O
751 SQ. FT.
FF = 502.75'
GF = 501.75'
BF = 493.75'

LOT 54
W/O
8751 SQ. FT.
FF = 504.38'
GF = 503.38'
BF = 495.38'

LOT 53
W/O
8751 SQ. FT.
FF = 506.50'
GF = 505.50'
BF = 497.50'

LOT 52
W/O
8751 SQ. FT.
FF = 508.50'
GF = 507.50'
BF = 499.50'

LOT 51
W/O
8751 SQ. FT.
FF = 510.25'
GF = 509.25'
BF = 501.25'

LOT 50
W/O
8751 SQ. FT.
FF = 512.25'
GF = 511.25'
BF = 503.25'

LOT 49
W/O
9961 SQ. FT.
FF = 514.00'
GF = 513.00'
BF = 505.00'

60" RCP
54" RCP
15" RCP
18" RCP
D2
A43.1
A43.2
A43
A44.1
A44.2
A44
A45
C1
C2
C3
C4

±395LF GRAVITY BLOCK RETAINING WALL
±10FT HEIGHT MAX.

RIP RAP APPRON
d50 = 13" (VDOT CLASS I)
LENGTH = 40'
Wf = 45'
THICKNESS = 29.25"

VINTON LANE
AUGUSTINE AVENUE
OLD CAVE ROAD

KEY MAP
N.T.S.

WEST VIRGINIA STATE GRID NORTH

GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

GRADING AND DRAINAGE PLAN

SHEET No.
C406

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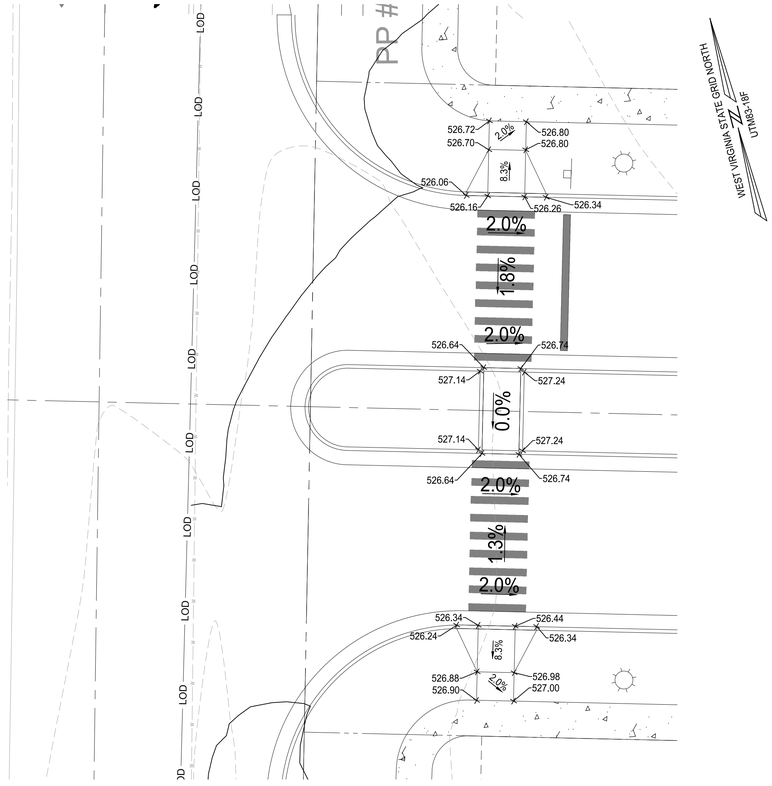
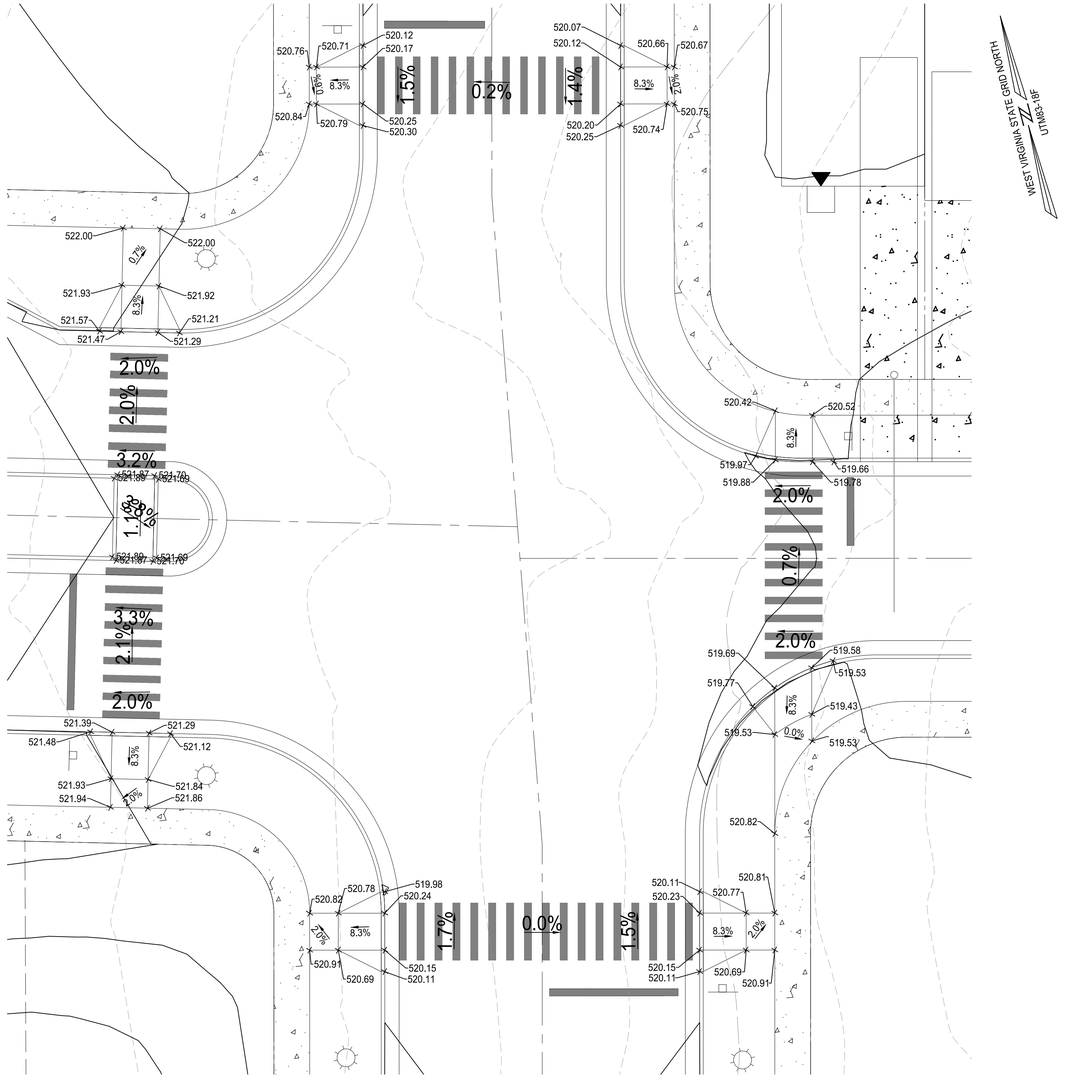


AUGUSTINE AVE AND SOVEREIGN AVE INTERSECTION

SCALE = 1" = 10'



SOVEREIGN AVE AND REGENCY LN INTERSECTION

SCALE = 1" = 10'

10 5 0 10 20
GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIDEWALK
RAMP INSETS

SHEET No.

C407

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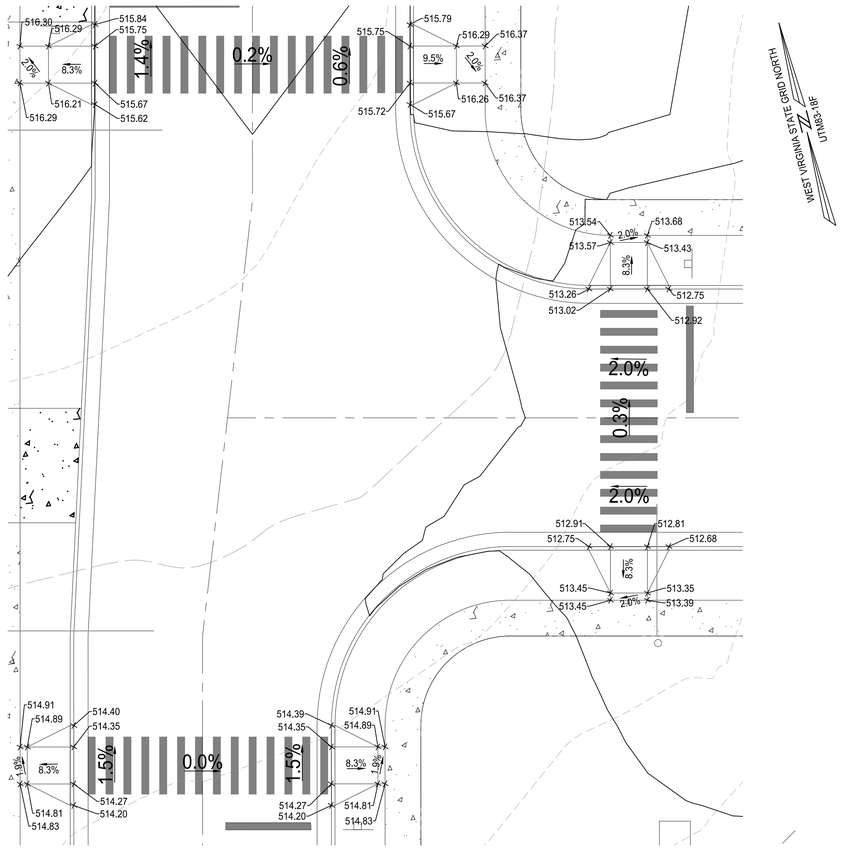
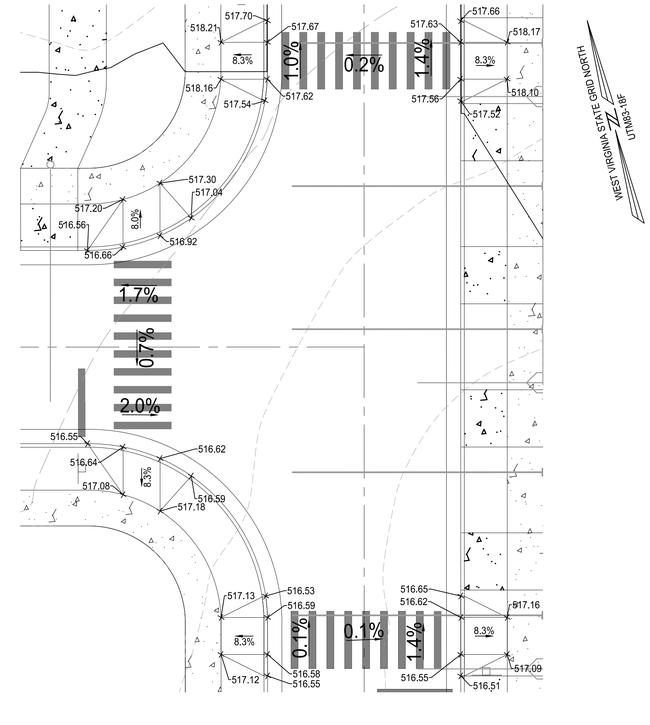


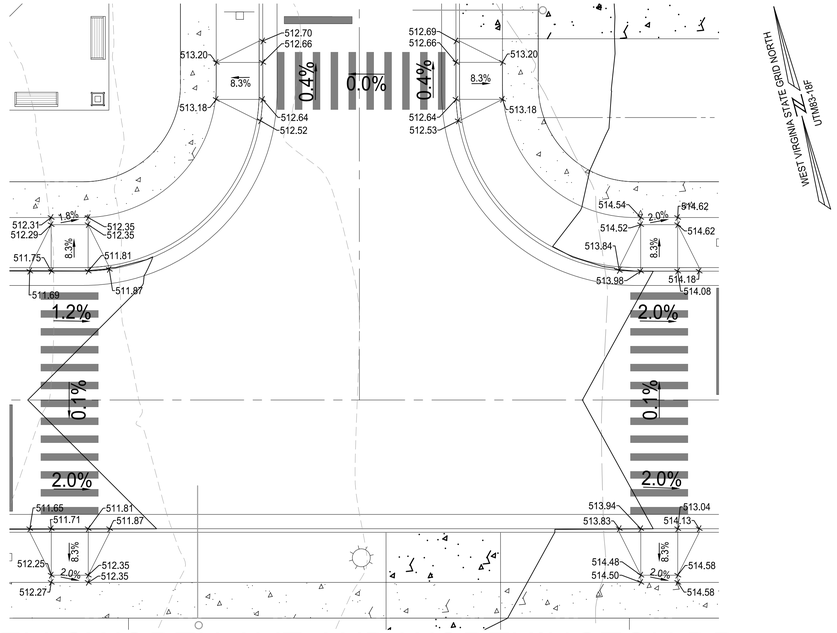
ELLSWORTH AVE AND REGENCY LN INTERSECTION

SCALE = 1" = 10'



SOVEREIGN AVE AND WORTHINGTON DR INTERSECTION

SCALE = 1" = 10'



ELLSWORTH AVE AND WORTHINGTON DR INTERSECTION

SCALE = 1" = 10'

10 5 0 10 20

GRAPHIC SCALE
1" = 10'

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AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIDEWALK
RAMP INSETS

SHEET No.

C407A

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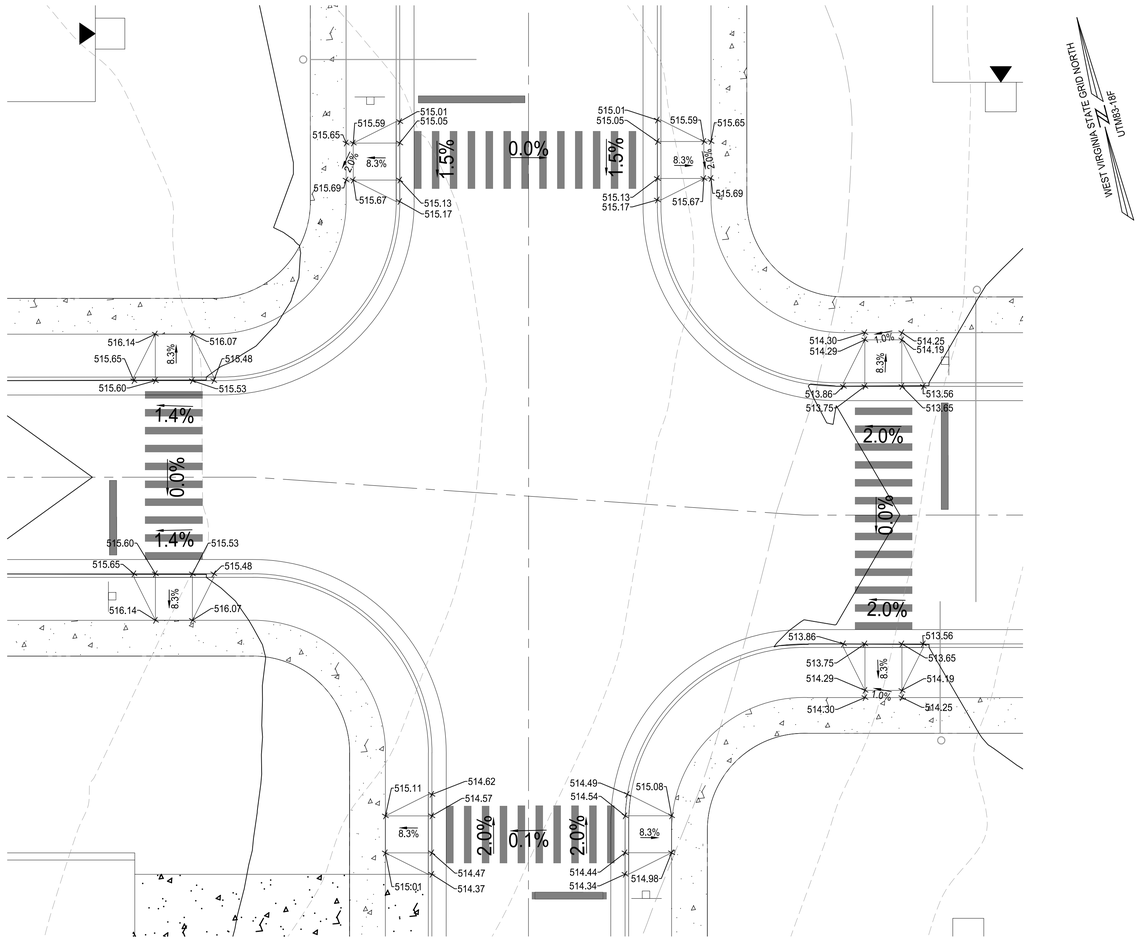
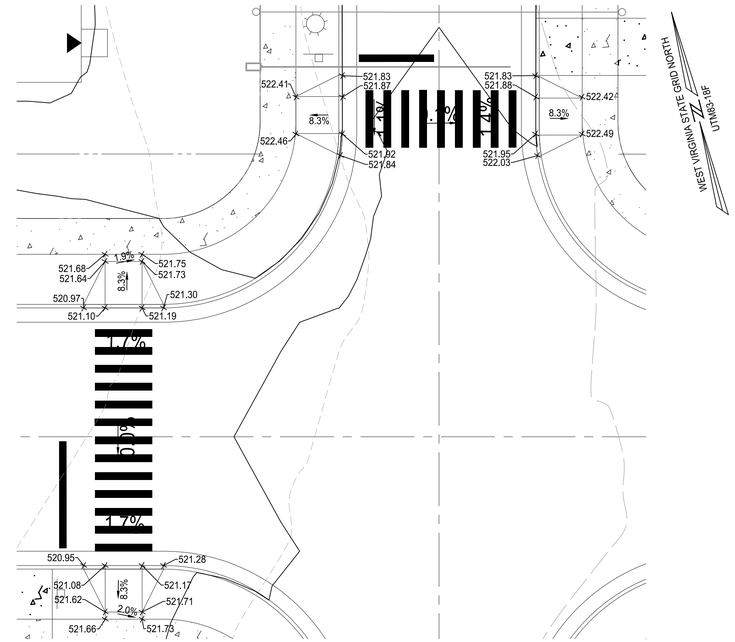


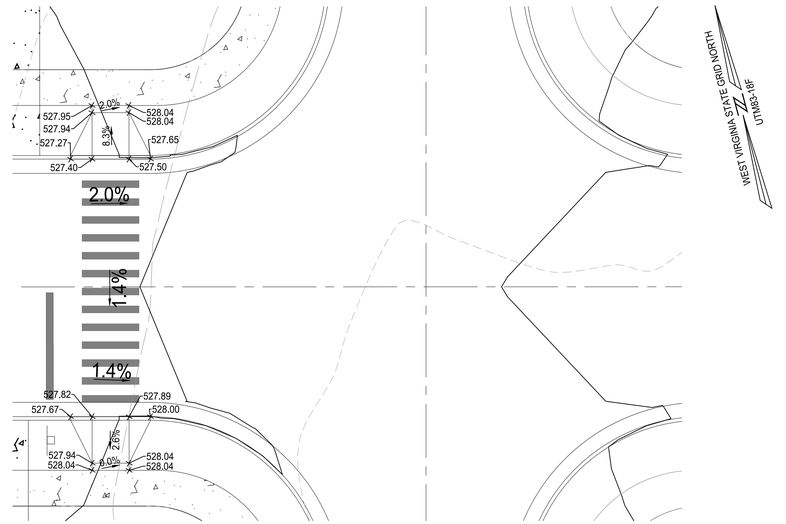
KENSINGTON DR AND REGENCY LN INTERSECTION

SCALE = 1" = 10'



ELLSWORTH AVE AND LANGFORD DR INTERSECTION

SCALE = 1" = 10'



KENSINGTON DR AND LANGFORD DR INTERSECTION

SCALE = 1" = 10'

10 5 0 10 20
GRAPHIC SCALE
1" = 10'

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AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIDEWALK RAMP INSETS

SHEET No.

C407B

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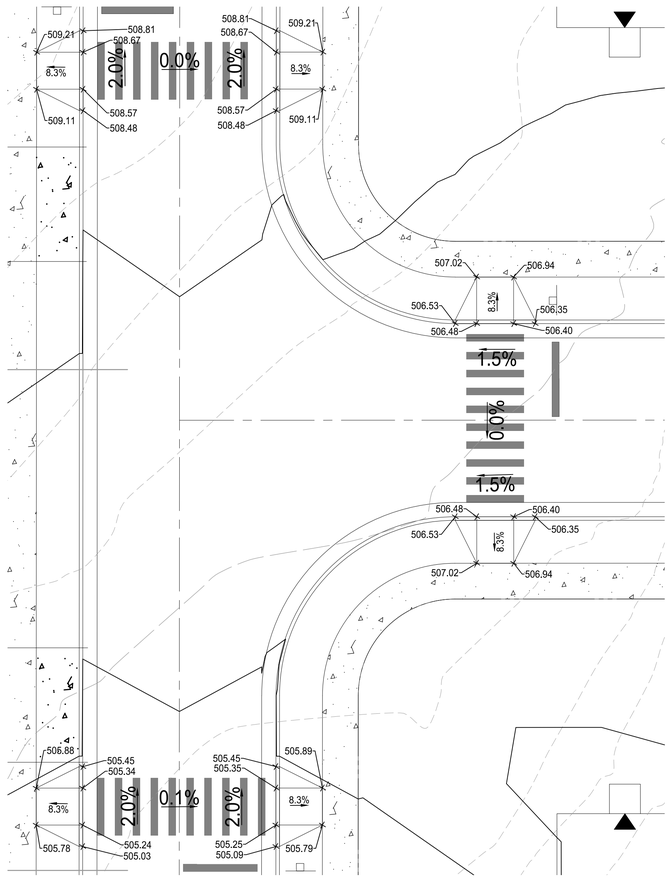
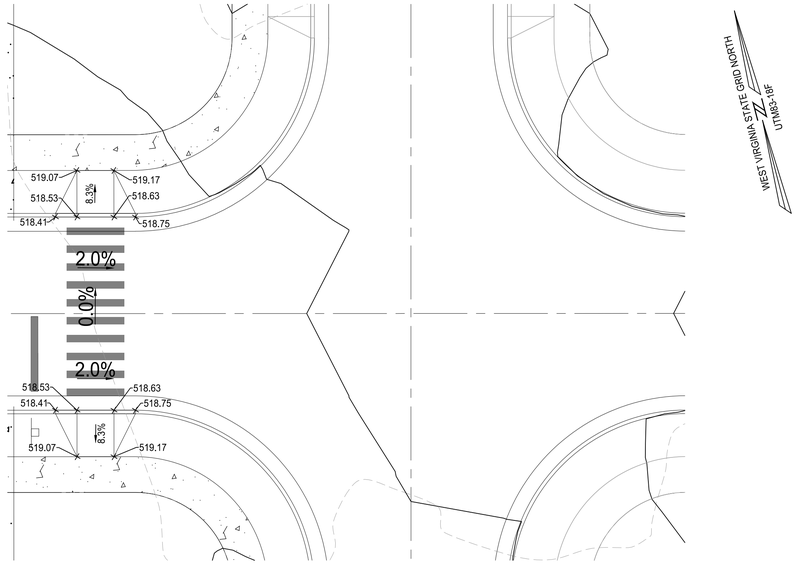


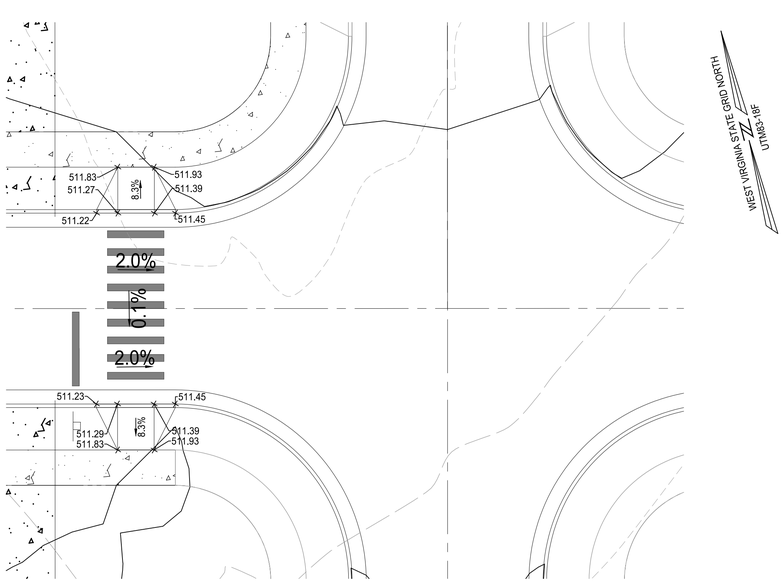
NOBLE LN AND REGENCY LN INTERSECTION

SCALE = 1" = 10'



NOBLE LN AND LANGFORD DR INTERSECTION

SCALE = 1" = 10'



BEAUMONT AVE AND LANGFORD DR INTERSECTION

SCALE = 1" = 10'

10 5 0 10 20
GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SIDEWALK
RAMP INSETS

SHEET No.
C407C

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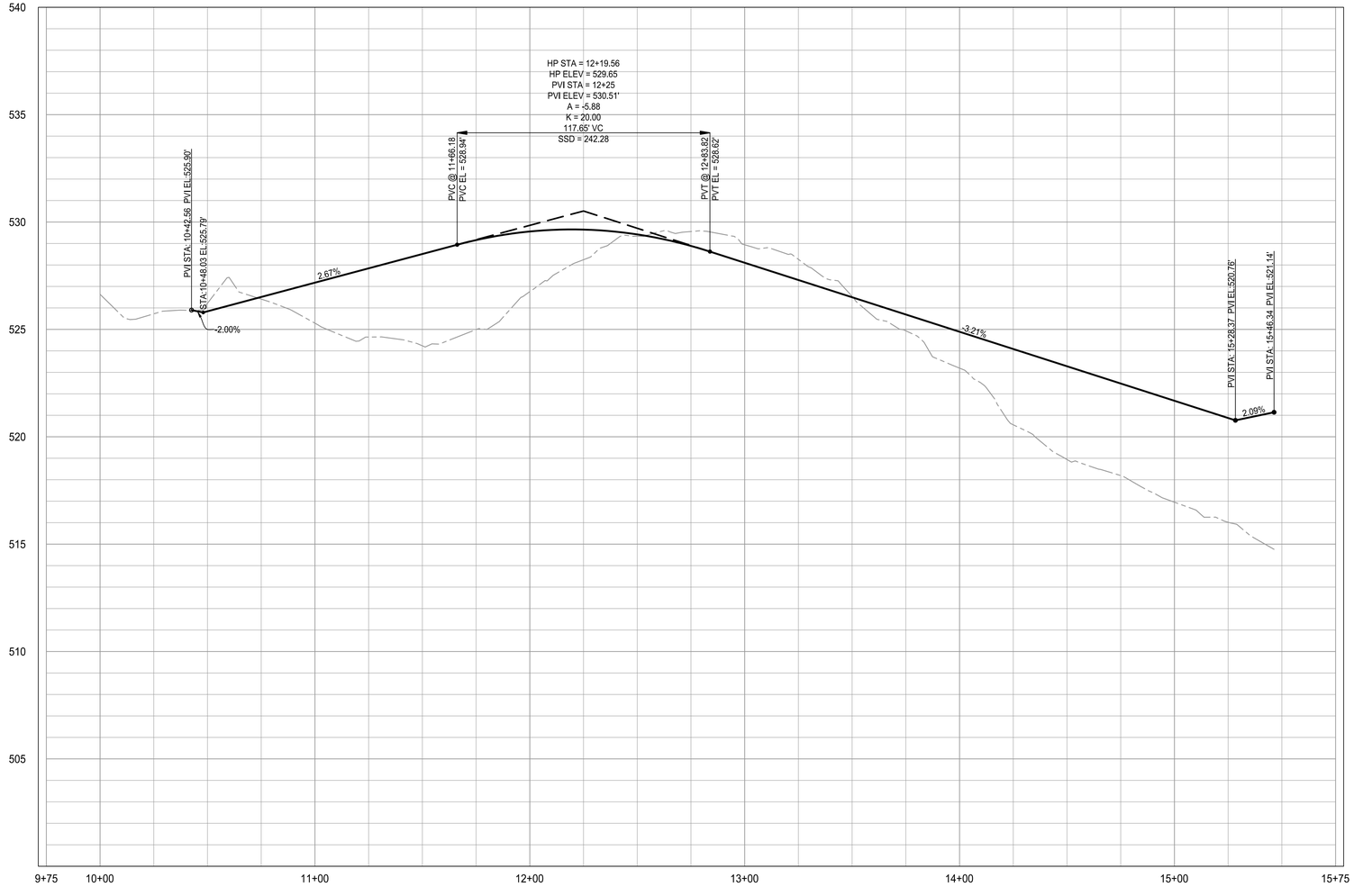

W SOVEREIGN AVE PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C408

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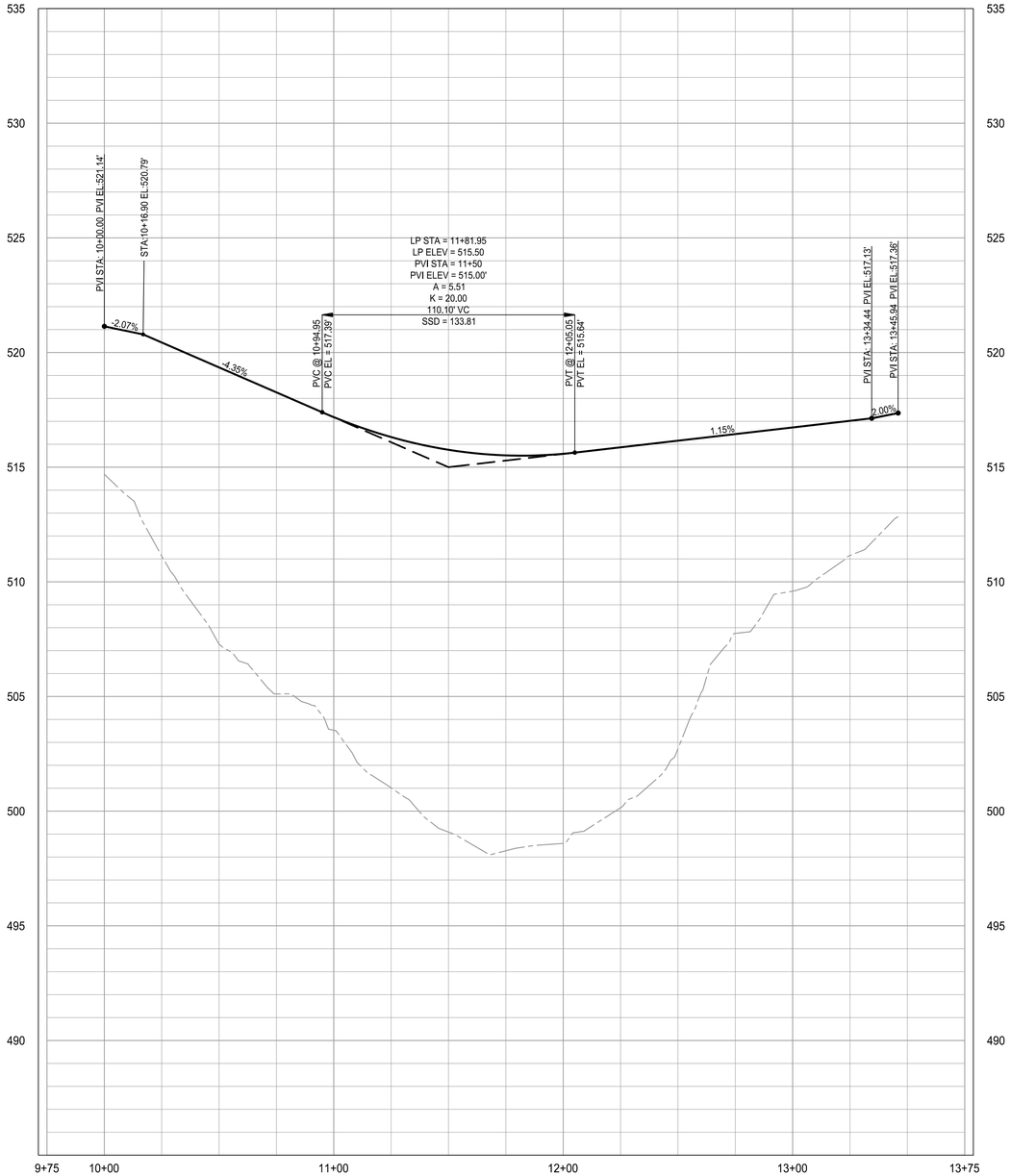

E SOVEREIGN AVE PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C409

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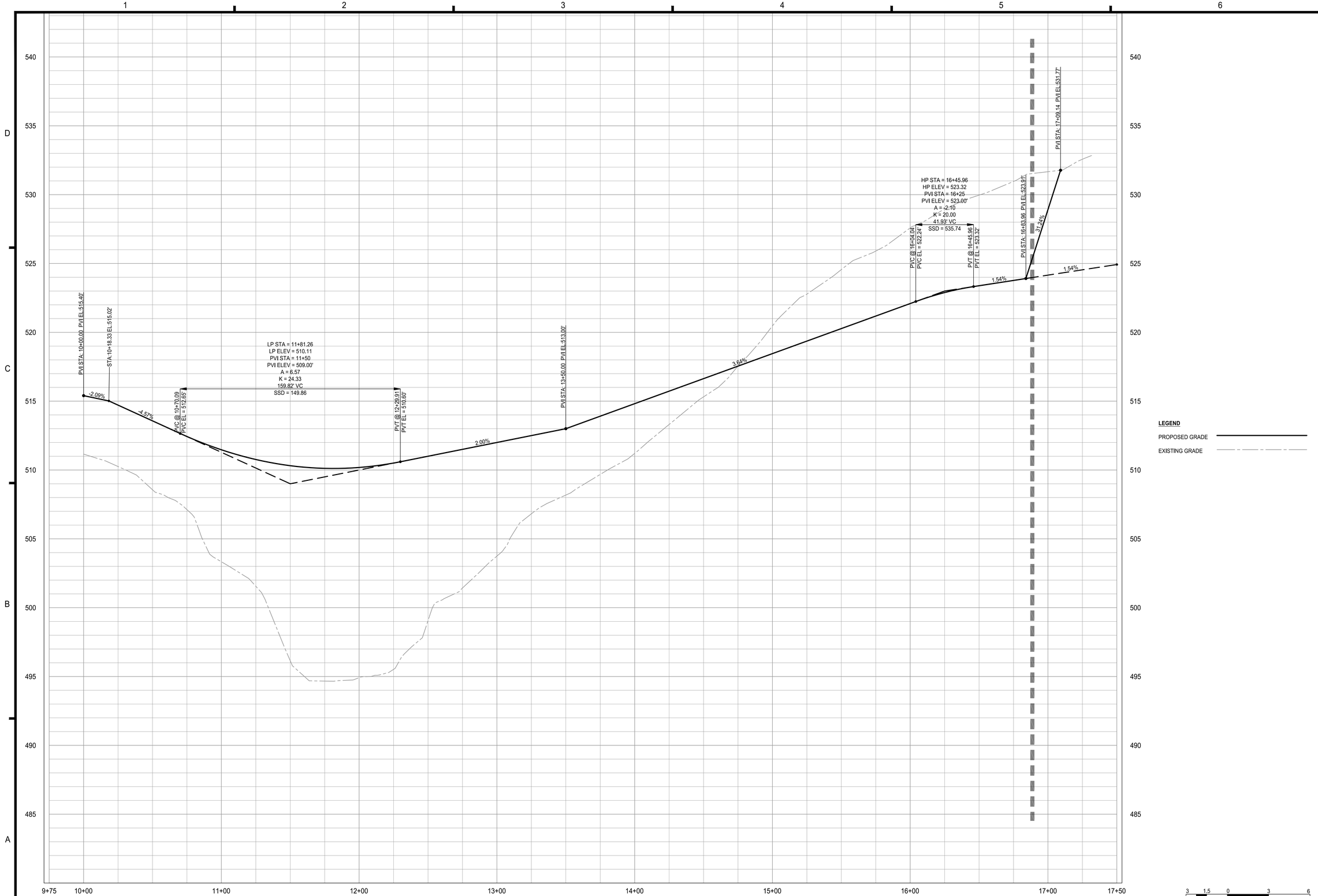

ELLSWORTH AVE PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD PROFILES

SHEET No.

C410

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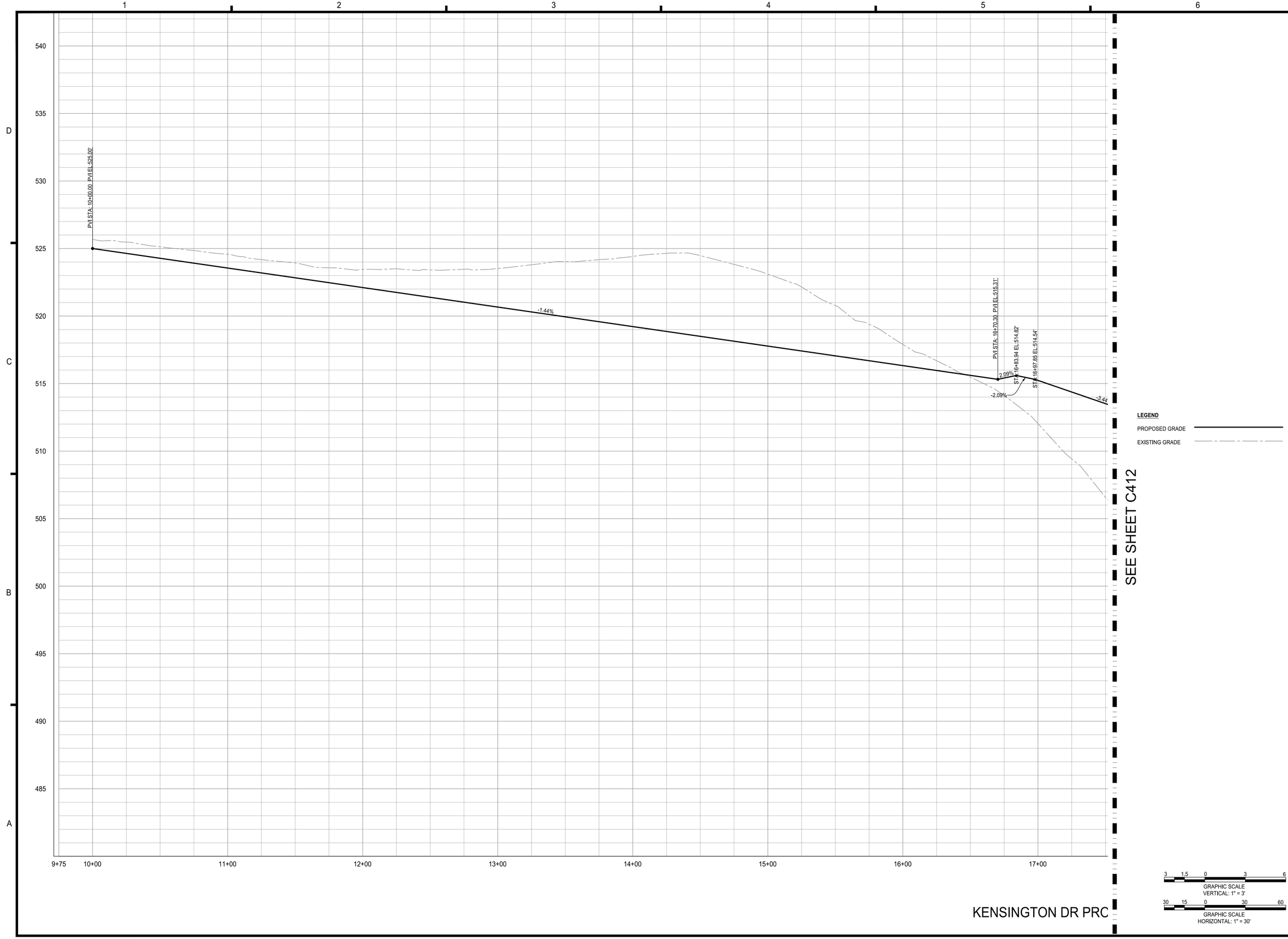

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.
C411

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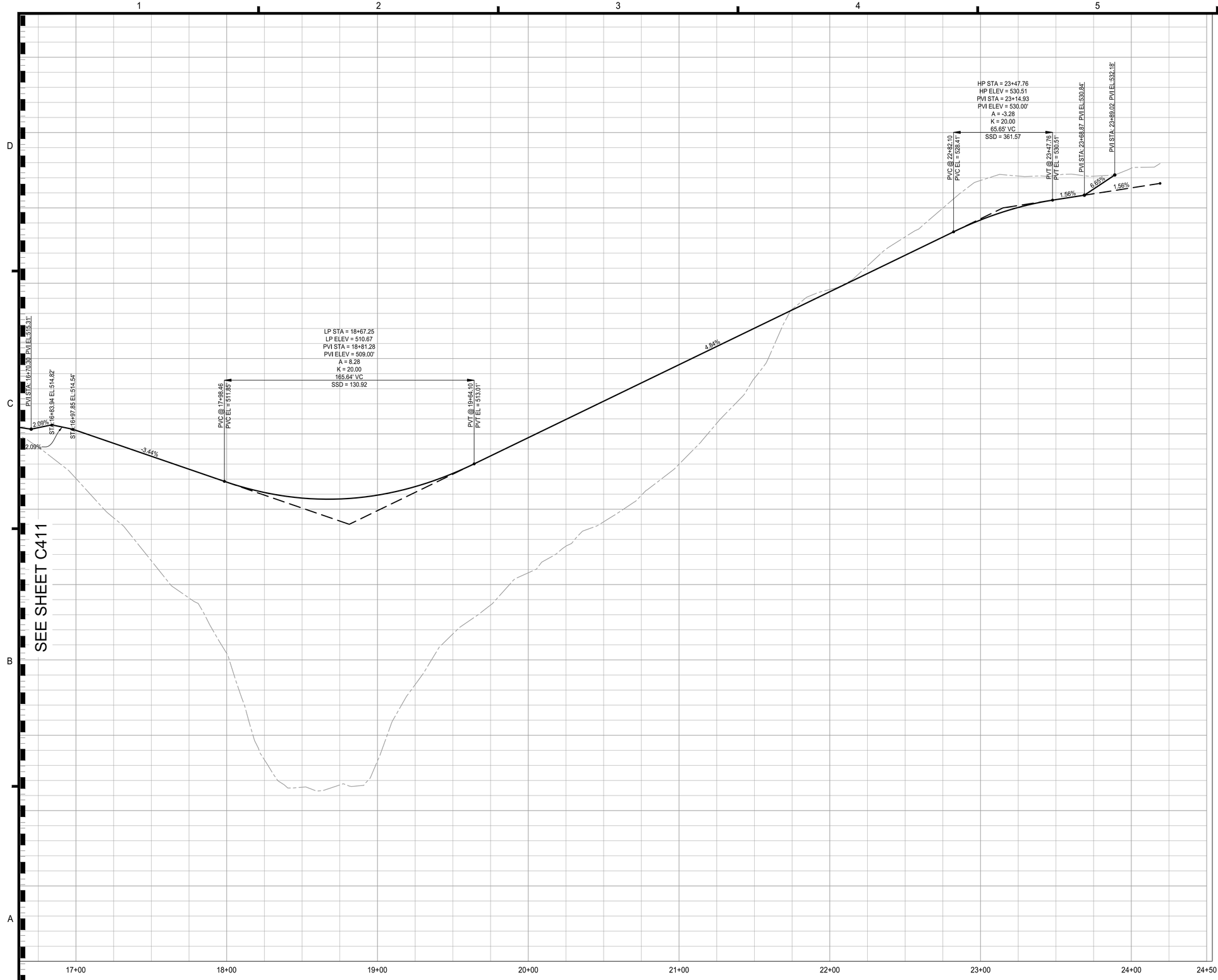

NSINGTON DR PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C412

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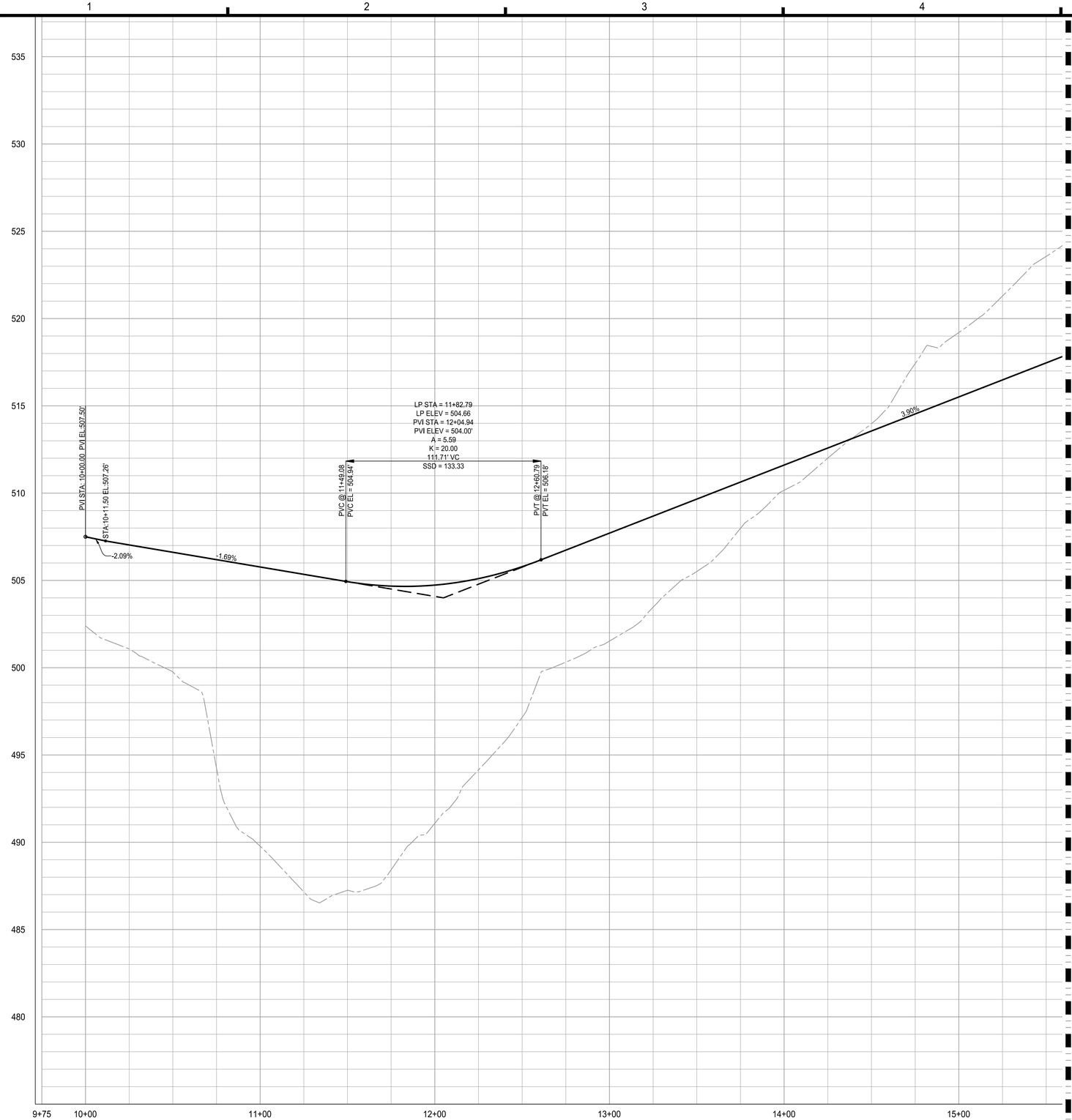

NOBLE LN PROFILE

SEE SHEET C414

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6

GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60

GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD PROFILES

SHEET No.

C413

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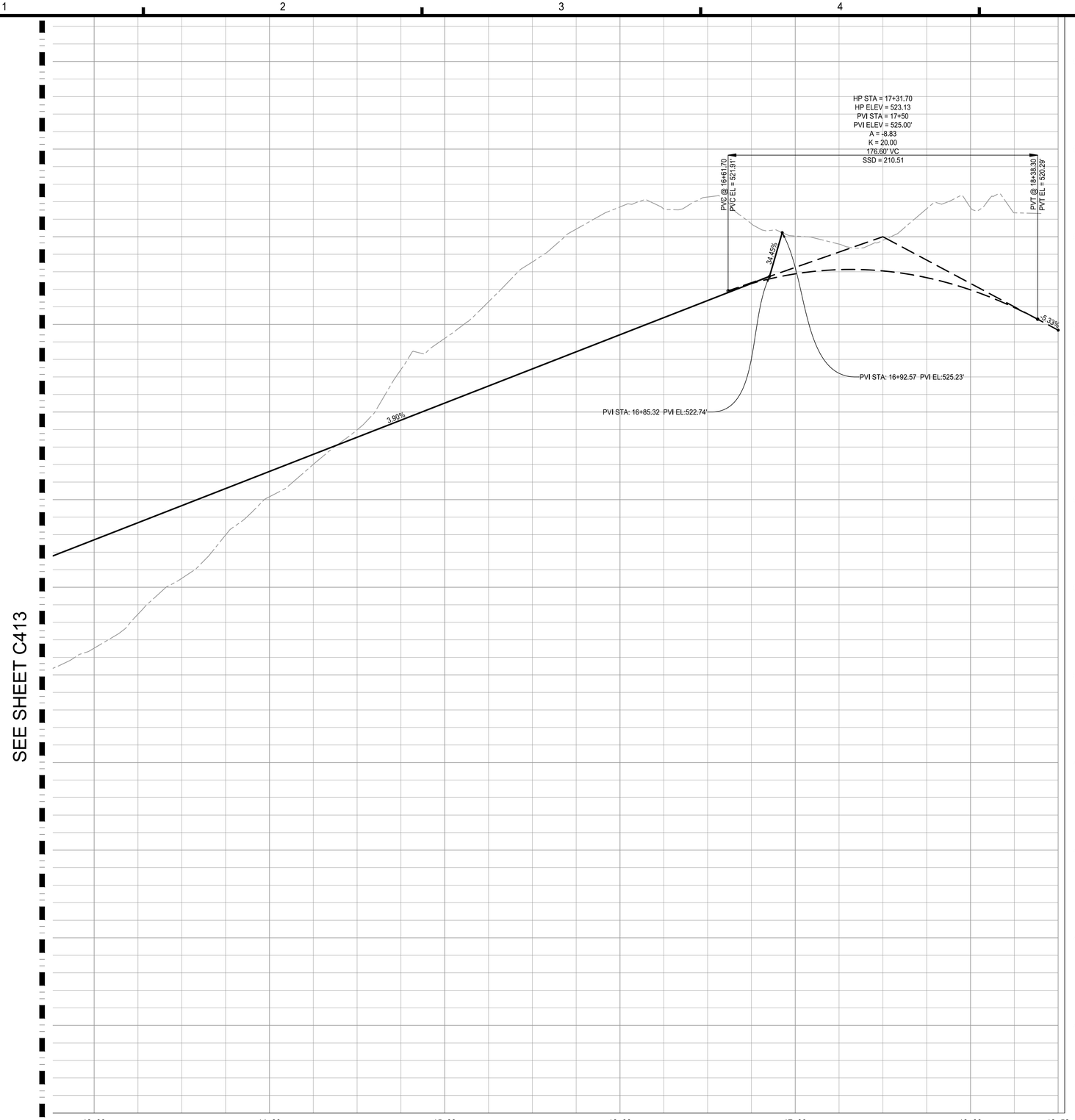

SEE SHEET C413

NOBLE LN PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C414

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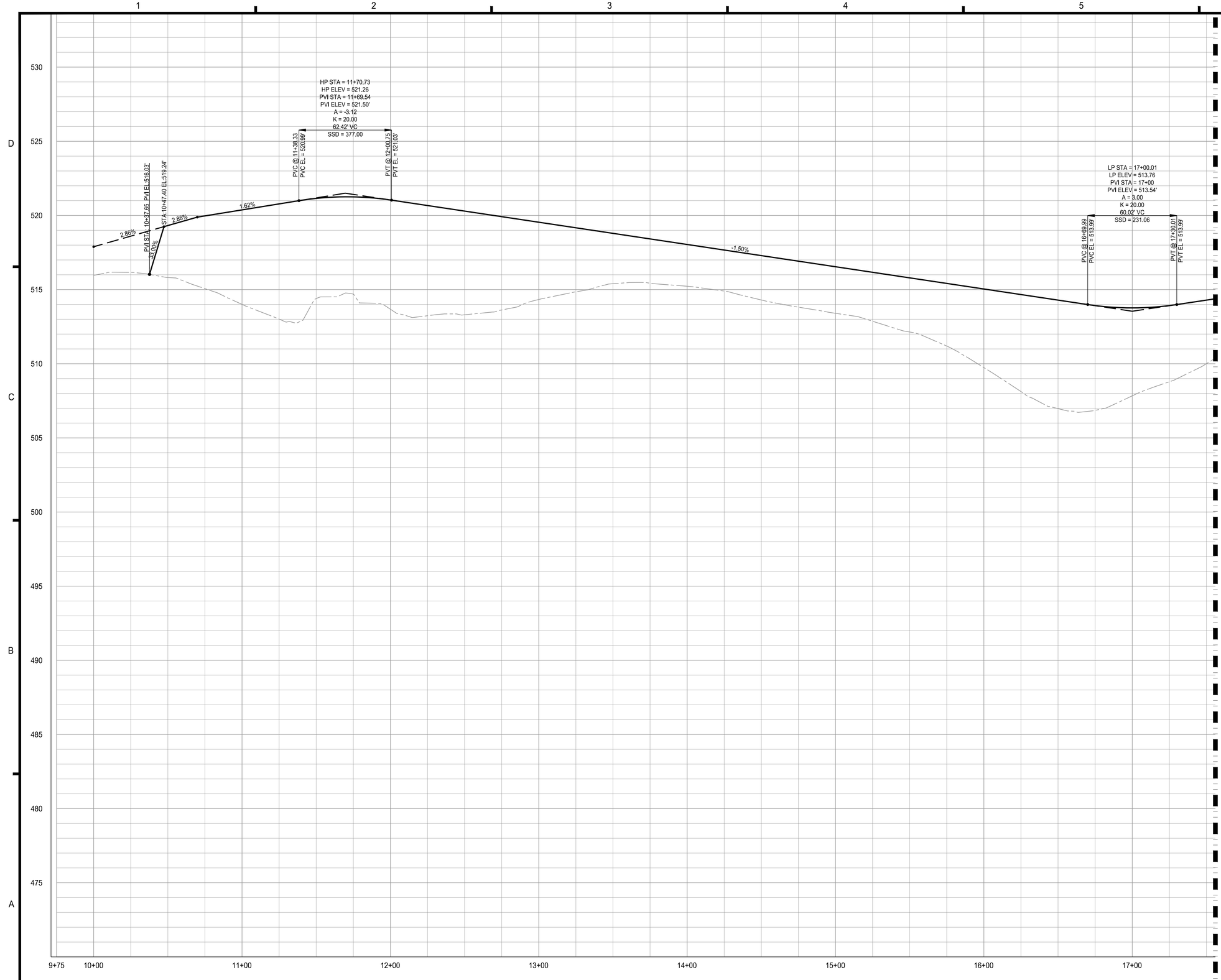

REGENCY LN - BEAUMONT AVE PROFILE

SEE SHEET C416

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C415

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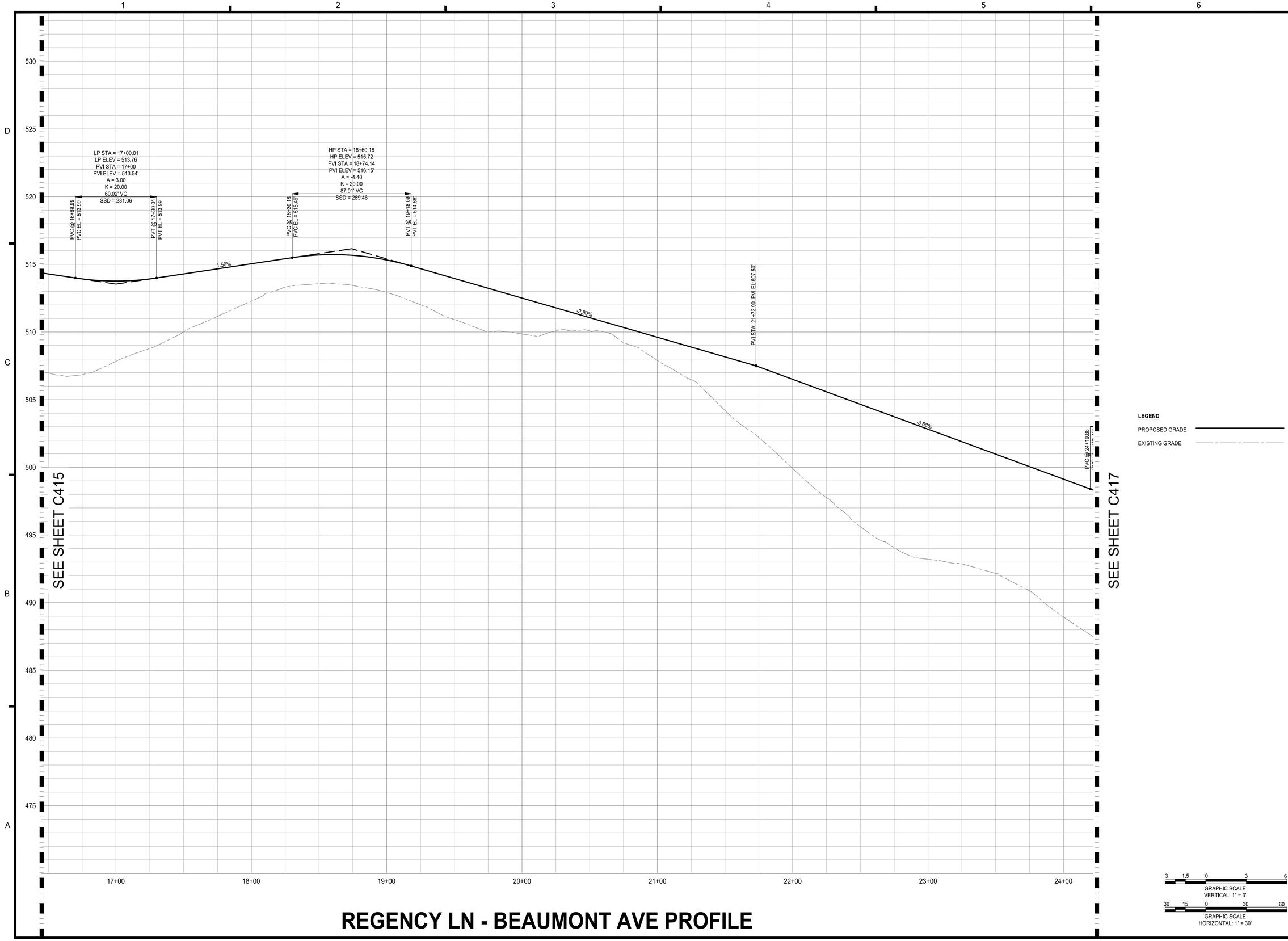

REGENCY LN - BEAUMONT AVE PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C416

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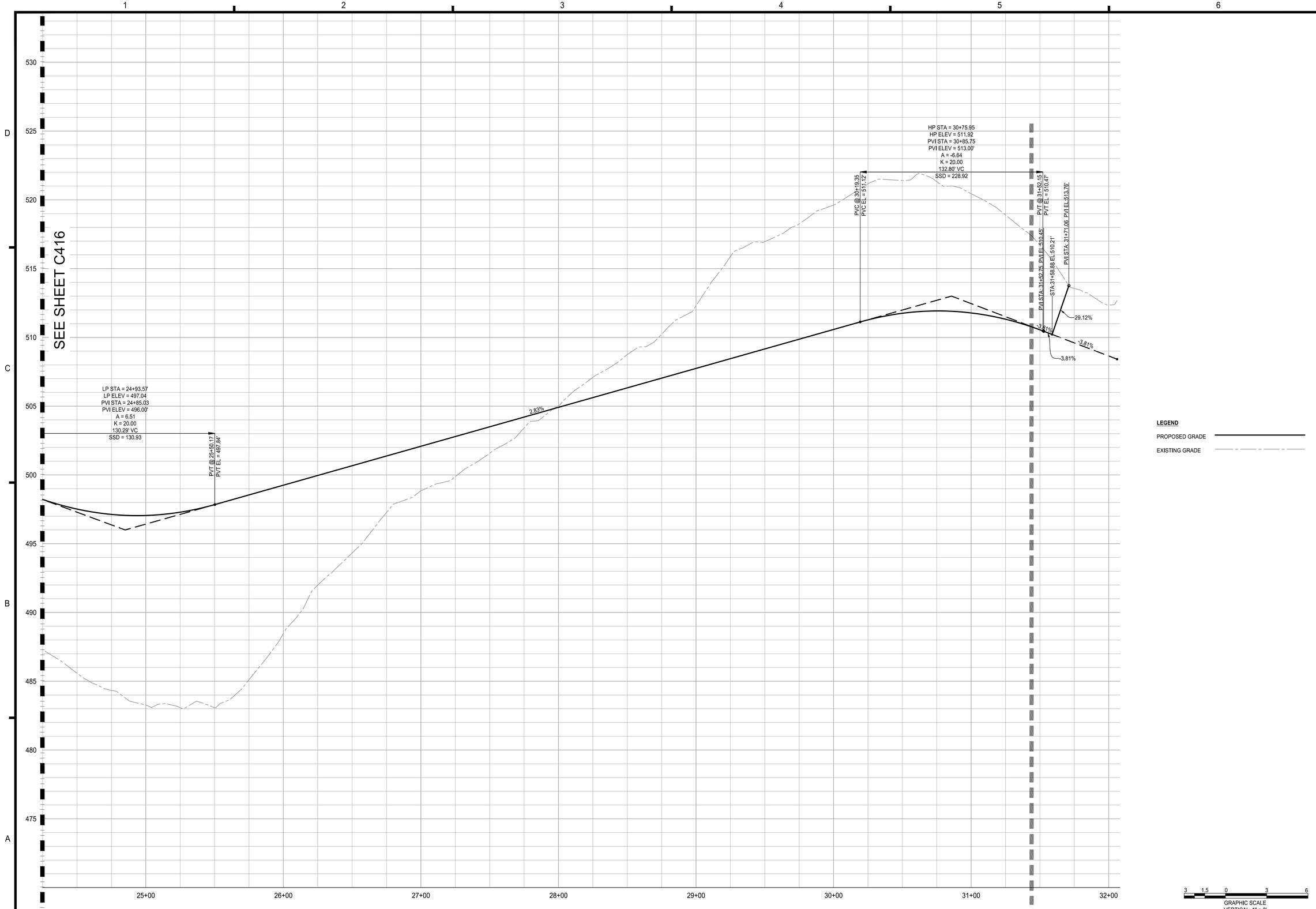

REGENCY LN - BEAUMONT AVE PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.

C417

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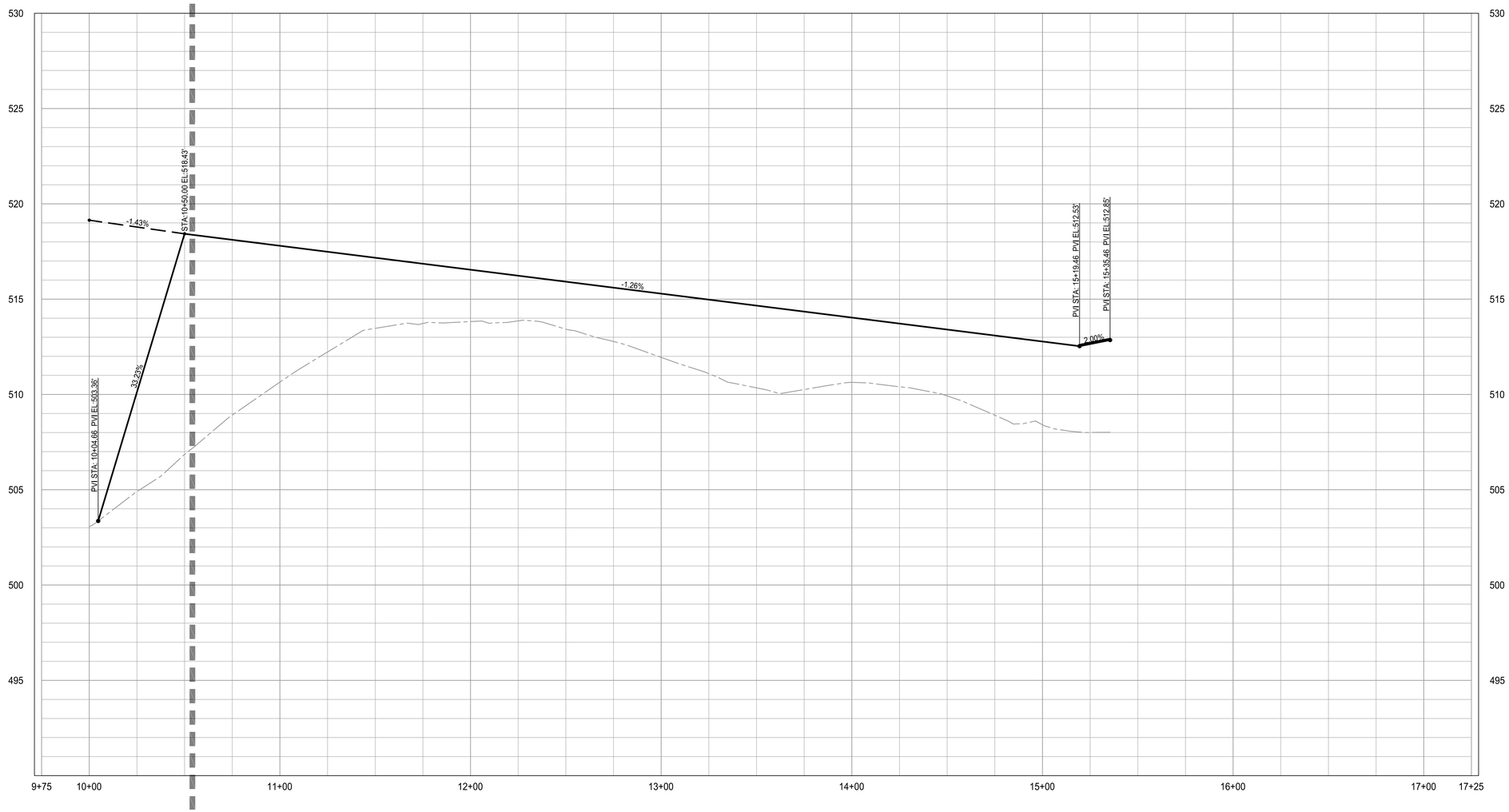

WORTHINGTON DR PROFILE

3 1.5 0 3 6
GRAPHIC SCALE
VERTICAL: 1" = 3'

30 15 0 30 60
GRAPHIC SCALE
HORIZONTAL: 1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

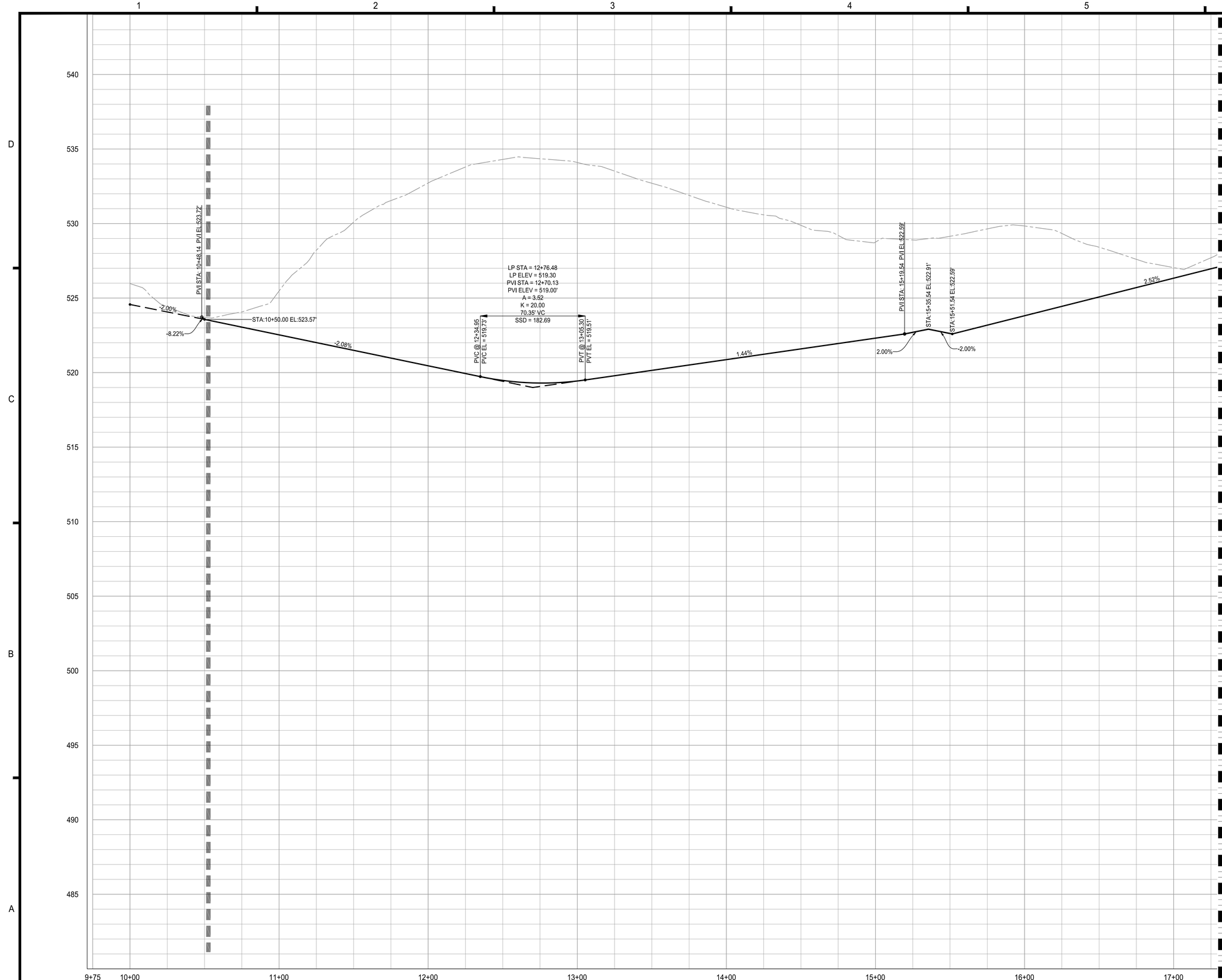
PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD
PROFILES

SHEET No.
C418

P:\Projects\23011\00200\11139\48 Site Plan\C400 Road P&P.dwg, 12/17/2025 2:08:31 PM, Tony Zook,



LANGFORD DR PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

GRAPHIC SCALE
VERTICAL: 1" = 3'
3 1.5 0 3 6

GRAPHIC SCALE
HORIZONTAL: 1" = 30'
30 15 0 30 60

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD PROFILES

SHEET No.

C419

P:\Projects\23011\00200\119485 Site Plan\C400 Road P&P.dwg, 12/17/2025 2:08:33 PM, Tony Zook,



LANGFORD DR PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

GRAPHIC SCALE
VERTICAL: 1" = 3'

3 1.5 0 3 6

GRAPHIC SCALE
HORIZONTAL: 1" = 30'

30 15 0 30 60

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

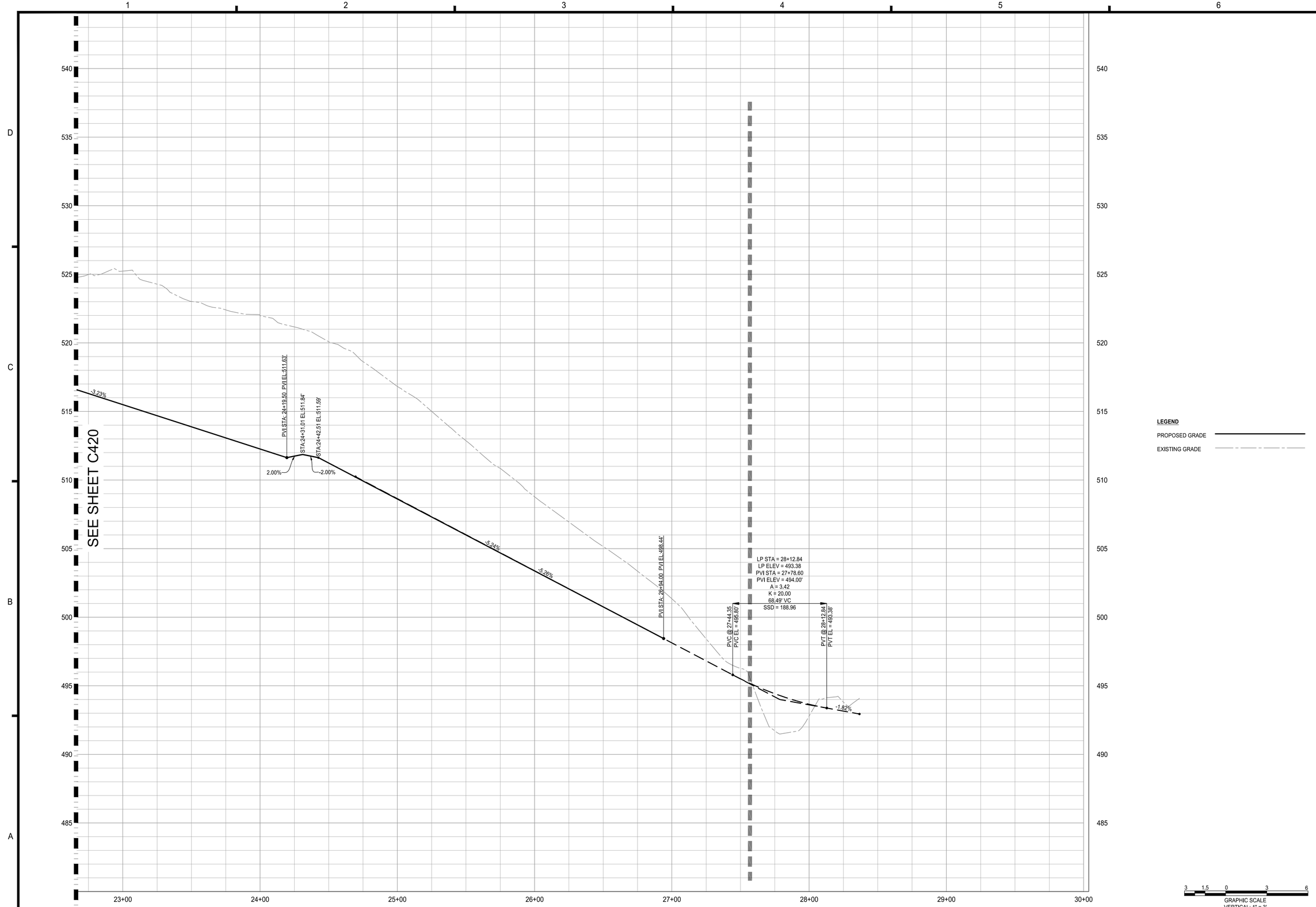
SHEET TITLE:

ROAD PROFILES

SHEET No.

C420

P:\Projects\23011\00200\119485 Site Plan\C400 Road P&P.dwg, 12/17/2025 2:08:36 PM, Tony Zook,



LANGFORD DR PROFILE

LEGEND

PROPOSED GRADE

EXISTING GRADE

GRAPHIC SCALE
VERTICAL: 1" = 3'
3 1.5 0 3 6

GRAPHIC SCALE
HORIZONTAL: 1" = 30'
30 15 0 30 60

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: SEE SHEET
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

ROAD PROFILES

SHEET No.

C421

P:\Projects\23011\00200\119498 Site Plan\C400 Road P&P.dwg, 12/17/2025 2:08:40 PM, Tony Zook,

STORM STRUCTURE SCHEDULE

STRUCTURE NUMBER	STRUCTURE HEIGHT (FT)	INLET / TOP OF CURB ELEVATION	STR TYPE AND INFO.	INVERTS
A1	0.00	483.00	EW-2PC (60")	INV IN = 482.80 (60")
A3	9.46	497.91	96" MANHOLE	INV IN = 488.55 (24") INV IN = 490.43 (15") INV IN = 488.45 (15") INV OUT = 488.45 (30")
A3.1	9.55	498.00	TYPE B (L = 10')	INV OUT = 488.45 (15")
A3.2	8.00	498.42	TYPE B (L = 10')	INV OUT = 490.43 (15")
A5	8.64	502.02	96" MANHOLE	INV IN = 493.73 (24") INV IN = 494.09 (15") INV IN = 496.45 (15") INV OUT = 493.63 (24")
A5.1	5.71	502.28	TYPE B (L = 10')	INV OUT = 496.56 (15")
A5.2	8.02	502.28	TYPE B (L = 10')	INV IN = 494.36 (15") INV OUT = 494.26 (15")
A5.3	3.55	496.32	ES-1 (15") IN	INV OUT = 496.37 (15")
A6	10.95	507.50	96" MANHOLE	INV IN = 501.27 (24") INV OUT = 495.82 (24")
A7	11.72	511.71	96" MANHOLE	INV IN = 504.34 (24") INV IN = 504.44 (15") INV IN = 506.61 (15") INV OUT = 504.24 (24")
A7.1	5.25	511.97	TYPE B (L = 10')	INV OUT = 506.72 (15")
A7.2	7.43	511.97	TYPE B (L = 10')	INV OUT = 504.54 (15")
A8	14.61	515.47	96" MANHOLE	INV IN = 507.02 (24") INV IN = 507.02 (24") INV OUT = 506.92 (24")
A10	9.08	517.26	48" MANHOLE	INV IN = 511.43 (24") INV IN = 508.77 (15") INV IN = 511.29 (15") INV OUT = 508.67 (24")
A10.1	6.03	517.52	TYPE B (L = 10')	INV OUT = 511.49 (15")
A10.2	8.65	517.52	TYPE B (L = 10')	INV IN = 508.97 (15") INV OUT = 508.87 (15")
A10.3	3.71	513.16	DI-7	INV IN = 509.55 (15") INV OUT = 509.45 (15")
A10.4	2.94	513.17	DI-7	INV OUT = 510.27 (15")
A11	8.92	518.18	60" MANHOLE	INV IN = 513.22 (15") INV IN = 512.33 (24") INV OUT = 512.23 (24")
A11.1	8.25	513.03	EW-1 (24")	INV OUT = 513.00 (24")
A12	8.00	519.48	48" MANHOLE	INV IN = 514.45 (15") INV OUT = 514.35 (15")
A13	7.92	520.56	48" MANHOLE	INV IN = 515.60 (15") INV IN = 516.44 (15") INV IN = 516.49 (15") INV OUT = 515.50 (15")
A13.1	4.18	520.83	TYPE B (L = 10')	INV OUT = 516.65 (15")
A13.2	4.23	520.82	TYPE B (L = 10')	INV OUT = 516.59 (15")
A14	7.68	524.12	48" MANHOLE	INV IN = 516.84 (15") INV IN = 520.05 (15") INV OUT = 519.18 (15")
A14.1	7.62	524.38	TYPE B (L = 10')	INV OUT = 516.95 (15")
A14.2	4.23	524.38	TYPE B (L = 10')	INV OUT = 520.15 (15")
A15	9.04	510.67	48" MANHOLE	INV IN = 502.63 (15") INV IN = 503.08 (18") INV IN = 505.43 (15") INV OUT = 501.88 (24")
A15.1	7.54	510.84	TYPE C (L = 12')	INV IN = 507.34 (18") INV IN = 503.40 (15") INV IN = 503.30 (15") INV OUT = 503.74 (18")
A15.2	3.38	508.22	ES-1 (18") IN	INV OUT = 508.46 (18")
A15.3	7.54	510.84	TYPE C (L = 10')	INV IN = 503.40 (15") INV IN = 503.30 (15") INV OUT = 505.53 (15")
A15.4	8.24	511.64	TYPE B (L = 10')	INV OUT = 503.40 (15")
A15.5	8.41	511.71	TYPE B (L = 10')	INV OUT = 503.30 (15")
A15.6	8.24	511.64	TYPE B (L = 10')	INV OUT = 503.40 (15")
A15.7	8.41	511.71	TYPE B (L = 10')	INV OUT = 503.30 (15")
A16	6.74	519.39	48" MANHOLE	INV IN = 512.75 (15") INV IN = 515.75 (15") INV OUT = 512.65 (15")
A16.1	6.61	519.56	TYPE B (L = 10')	INV OUT = 512.95 (15")
A16.2	3.62	519.57	TYPE B (L = 10')	INV OUT = 515.95 (15")
A17	6.46	513.78	96" MANHOLE	INV IN = 508.01 (15") INV IN = 508.80 (15") INV IN = 508.80 (15") INV OUT = 507.91 (24")
A17.1	7.54	513.95	TYPE C (L = 14')	INV IN = 506.52 (15") INV IN = 506.42 (15") INV OUT = 509.20 (15")

STORM STRUCTURE SCHEDULE

STRUCTURE NUMBER	STRUCTURE HEIGHT (FT)	INLET / TOP OF CURB ELEVATION	STR TYPE AND INFO.	INVERTS
A17.2	7.54	513.95	TYPE C (L = 10')	INV IN = 506.52 (15") INV IN = 506.42 (15") INV OUT = 509.00 (15")
A17.3	8.14	514.61	TYPE B (L = 10')	INV OUT = 506.52 (15")
A17.4	8.09	514.61	TYPE B (L = 10')	INV OUT = 506.52 (15")
A17.5	8.08	514.44	TYPE B (L = 10')	INV OUT = 506.42 (15")
A17.6	8.07	514.43	TYPE B (L = 10')	INV OUT = 506.42 (15")
A18	7.38	515.40	96" MANHOLE	INV IN = 508.71 (15") INV OUT = 508.61 (15")
A19	7.73	516.68	48" MANHOLE	INV IN = 512.04 (15") INV IN = 509.24 (15") INV OUT = 509.14 (15")
A19.1	4.46	516.77	TYPE B (L = 10')	INV OUT = 512.32 (15")
A19.2	7.23	516.77	TYPE B (L = 10')	INV OUT = 509.54 (15")
A20	13.51	510.11	96" MANHOLE	INV IN = 497.22 (48") INV IN = 505.34 (15") INV IN = 502.24 (18") INV OUT = 497.12 (48")
A20.1	7.76	510.28	TYPE C (L = 12')	INV IN = 502.62 (18") INV IN = 502.84 (15") INV IN = 502.52 (15") INV OUT = 502.52 (18")
A20.2	6.55	509.40	DI-7	INV OUT = 502.85 (18")
A20.3	7.54	510.28	TYPE C (L = 20')	INV IN = 502.84 (15") INV IN = 502.74 (15") INV OUT = 505.54 (15")
A20.4	8.69	511.06	TYPE B (L = 10')	INV OUT = 502.52 (15")
A20.5	8.13	510.98	TYPE B (L = 10')	INV OUT = 502.84 (15")
A20.6	8.41	511.06	TYPE B (L = 10')	INV OUT = 502.74 (15")
A20.7	8.24	510.98	TYPE B (L = 10')	INV OUT = 502.84 (15")
A21	14.70	512.93	72" MANHOLE	INV IN = 499.17 (42") INV IN = 506.10 (30") INV OUT = 499.07 (48")
A22	13.73	513.10	72" MANHOLE	INV IN = 499.90 (42") INV IN = 506.75 (15") INV IN = 505.83 (15") INV OUT = 499.80 (42")
A22.1	6.45	513.41	TYPE B (L = 10')	INV OUT = 506.96 (15")
A22.2	7.33	513.36	TYPE B (L = 10')	INV OUT = 506.03 (15")
A23	14.09	515.63	72" MANHOLE	INV IN = 502.44 (36") INV IN = 502.44 (30") INV IN = 509.96 (15") INV OUT = 501.97 (42")
A23.1	5.73	515.89	TYPE B (L = 10')	INV OUT = 510.16 (15")
A24	14.31	517.36	60" MANHOLE	INV IN = 505.59 (18") INV IN = 505.40 (36") INV OUT = 503.52 (36")
A25	8.97	515.50	60" MANHOLE	INV IN = 507.20 (15") INV IN = 508.27 (15") INV IN = 510.46 (15") INV OUT = 506.95 (18")
A25.1	7.73	515.76	TYPE C (L = 10')	INV IN = 508.32 (15") INV IN = 508.22 (15") INV OUT = 510.76 (15")
A25.2	8.04	515.76	TYPE C (L = 10')	INV IN = 508.01 (15") INV IN = 508.00 (15") INV OUT = 508.38 (15")
A25.3	7.95	516.17	TYPE B (L = 10')	INV OUT = 508.22 (15")
A25.4	8.35	516.17	TYPE B (L = 10')	INV OUT = 507.00 (15")
A25.5	7.65	515.97	TYPE B (L = 10')	INV OUT = 508.32 (15")
A25.6	7.96	515.97	TYPE B (L = 10')	INV OUT = 508.01 (15")
A26	5.12	522.57	48" MANHOLE	INV IN = 517.55 (15") INV IN = 517.55 (15") INV OUT = 517.22 (15")
A26.1	5.10	522.63	TYPE B (L = 10')	INV IN = 517.84 (15") INV OUT = 517.73 (15")
A26.2	8.25	516.48	ES-1 (15") IN	INV OUT = 518.08 (15")
A26.3	5.05	522.63	TYPE B (L = 10')	INV OUT = 517.77 (15")
A27	12.67	518.34	48" MANHOLE	INV OUT = 506.00 (36")
A28	13.05	515.52	DI-7	INV IN = 505.86 (30") INV OUT = 502.76 (30")
A29	9.95	515.68	DI-7	INV IN = 506.14 (30") INV OUT = 506.04 (30")
A30	10.85	517.71	DI-7	INV IN = 507.28 (30") INV IN = 513.93 (15") INV OUT = 507.18 (30")
A30.1	9.19	516.73	ES-1 (15") IN	INV OUT = 516.00 (15")

STORM STRUCTURE SCHEDULE

STRUCTURE NUMBER	STRUCTURE HEIGHT (FT)	INLET / TOP OF CURB ELEVATION	STR TYPE AND INFO.	INVERTS
A31	11.09	519.04	6' GRATE INLET	INV IN = 508.76 (24") INV IN = 511.61 (15") INV IN = 508.66 (15") INV OUT = 508.27 (30")
A31.1	10.57	519.31	48" MANHOLE	INV IN = 514.71 (24") INV IN = 510.67 (24") INV OUT = 509.09 (24")
A31.2	8.21	519.82	TYPE B (L = 10')	INV OUT = 511.61 (15")
A31.3	11.04	519.70	TYPE B (L = 10')	INV OUT = 508.66 (15")
A32	7.80	519.05	6' GRATE INLET	INV IN = 514.79 (24") INV IN = 511.61 (15") INV IN = 511.51 (15") INV OUT = 514.79 (24")
A32.1	6.47	521.21	DI-7	INV IN = 515.11 (24") INV OUT = 515.01 (24")
A32.2	0.00	515.61	EW-1 (24")	INV OUT = 516.02 (24")
A32.3	8.22	519.82	TYPE B (L = 10')	INV OUT = 511.61 (15")
A32.4	8.24	519.70	TYPE B (L = 10')	INV OUT = 511.51 (15")
A33	8.43	523.43	48" MANHOLE	INV IN = 516.15 (15") INV IN = 517.96 (15") INV OUT = 515.00 (24")
A33.1	5.53	523.68	TYPE B (L = 10')	INV OUT = 518.16 (15")
A33.2	7.44	523.69	TYPE B (L = 10')	INV OUT = 516.25 (15")
A34	8.94	517.59	48" MANHOLE	INV IN = 509.68 (24") INV IN = 512.36 (15") INV OUT = 509.18 (30")
A34.2	9.67	513.64	EW-1 (24")	INV OUT = 512.84 (15")
A35	7.88	522.44	48" MANHOLE	INV IN = 514.82 (24") INV IN = 516.39 (15") INV OUT = 514.84 (24")
A35.1	7.10	523.64	TYPE B (L = 10')	INV IN = 516.83 (15") INV OUT = 516.73 (15")
A35.2	6.84	523.64	TYPE B (L = 10')	INV OUT = 516.99 (15")
A36	7.66	523.71	48" MANHOLE	INV IN = 516.30 (24") INV IN = 516.57 (15") INV IN = 518.07 (15") INV OUT = 516.32 (24")
A36.1	7.57	523.87	TYPE B (L = 10')	INV OUT = 516.67 (15")
A36.2	5.58	523.87	TYPE B (L = 10')	INV OUT = 518.29 (15")
A37	7.67	517.32	EW-1 (24")	INV OUT = 517.06 (24")
A38	6.64	504.66	48" MANHOLE	INV IN = 498.75 (15") INV IN = 499.99 (18") INV IN = 501.34 (15") INV OUT = 498.02 (24")
A38.1	7.54	504.92	TYPE C (L = 10')	INV IN = 500.85 (15") INV IN = 497.48 (15") INV IN = 497.38 (15") INV OUT = 500.60 (18")
A38.2	3.10	503.02	ES-1 (15") IN	INV OUT = 503.00 (15")
A38.3	7.54	504.92	TYPE C (L = 10')	INV IN = 497.48 (15") INV IN = 497.38 (15") INV OUT = 501.44 (15")
A38.4	8.23	505.61	TYPE B (L = 10')	INV OUT = 497.38 (15")
A38.5	8.34	505.74	TYPE B (L = 10')	INV OUT = 497.48 (15")
A38.6	8.29	505.61	TYPE B (L = 10')	INV OUT = 497.38 (15")
A38.7	8.36	505.74	TYPE B (L = 10')	INV OUT = 497.48 (15")
A39	11.23	512.14	48" MANHOLE	INV IN = 504.25 (15") INV IN = 505.04 (15") INV IN = 506.65 (15") INV OUT = 500.91 (15")
A39.1	7.24	512.40	TYPE B (L = 10')	INV OUT = 505.15 (15")
A39.2	5.55	512.40	TYPE B (L = 10')	INV OUT = 506.85 (15")
A40	7.68	519.96	48" MANHOLE	INV IN = 512.28 (15") INV OUT = 512.28 (15")
A41	7.39	521.89	TYPE B (L = 10')	INV IN = 516.99 (15") INV OUT = 514.49 (15")
A41.1	4.29	521.89	TYPE B (L = 10')	INV OUT = 517.60 (15")
A42	8.75	497.04	48" MANHOLE	INV IN = 489.61 (18") INV IN = 491.05 (15") INV OUT = 488.40 (15")
A42.1	13.31	497.30	TYPE C (L = 14')	INV IN = 487.50 (15") INV IN = 484.69 (60") INV IN = 489.87 (15") INV OUT = 484.59 (60")
A42.2	7.44	497.30	TYPE C (L = 10')	INV IN = 489.87 (15") INV OUT = 491.25 (15")
A42.3	8.42	498.29	TYPE B (L = 10')	INV OUT = 489.87 (15")
A42.4	8.42	498.29	TYPE B (L = 10')	INV OUT = 489.87 (15")

STORM STRUCTURE SCHEDULE

STRUCTURE NUMBER	STRUCTURE HEIGHT (FT)	INLET / TOP OF CURB ELEVATION	STR TYPE AND INFO.	INVERTS
A43	7.40	504.09	48" MANHOLE	INV IN = 496.94 (15") INV IN = 497.05 (15") INV IN = 500.19 (15") INV OUT = 496.69 (18")
A43.1	7.08	504.34	TYPE B (L = 10')	INV OUT = 497.26 (15")
A43.2	4.05	504.34	TYPE B (L = 10')	INV OUT = 500.29 (15")
A44	7.39	511.89	48" MANHOLE	INV IN = 504.60 (15") INV IN = 504.60 (15") INV OUT = 504.50 (15")
A44.1	7.01	513.00	TYPE B (L = 10')	INV IN = 506.28 (15") INV OUT = 506.18 (15")
A44.2	6.65	513.00	TYPE B (L = 10')	INV OUT = 506.54 (15")
A45	5.54	510.86	60" MANHOLE	INV OUT = 505.32 (15")
B1	0.00	483.00	ES-1 (24") OUT	INV IN = 482.80 (15")
B2	18.96	486.92	ES-1 (15") IN	INV OUT = 486.67 (15")
C1	467.86	466.51	EW-2PC (60")	INV IN = 463.00 (60")
C2	8.30	469.60	96" MANHOLE	INV IN = 463.90 (60") INV OUT = 463.80 (60")
C3	19.07	482.83	72"x72" OCS	INV IN = 469.03 (54") INV OUT = 468.93 (60")
C4	15.92	491.05	72" MANHOLE	INV IN = 483.43 (54") INV OUT = 475.58 (54")
C5	20.05	505.72	96" MANHOLE	INV IN = 486.47 (54") INV OUT = 486.13 (54")
C6	15.09	502.75	96" MANHOLE	INV IN = 488.32 (54") INV OUT = 488.22 (54")
C7	22.36	511.24	72" MANHOLE	INV IN = 489.44 (54") INV OUT = 489.34 (54")
C8	23.54	514.72	72" MANHOLE	INV IN = 497.24 (54") INV OUT = 491.64 (54")
C9	14.36	513.81	72" MANHOLE	INV IN = 499.54 (54") INV OUT = 499.44 (54")
C10	5.50	501.78	EW-2PC (54")	INV OUT = 501.40 (54")
D1	13.83	497.50	96" MANHOLE	INV IN = 484.27 (60") INV IN = 486.87 (30") INV OUT = 484.17 (60")
D2	14.44	500.15	96" MANHOLE	INV IN = 486.25 (60") INV OUT = 486.15 (60")
D3	15.79	504.76	96" MANHOLE	INV IN = 489.53 (60") INV IN = 496.65 (24") INV OUT = 489.43 (60")
D4	11.89	502.98	96" MANHOLE	INV IN = 491.43 (60") INV OUT = 491.33 (60")
D5	17.42	510.73	96" MANHOLE	INV IN = 493.52 (60") INV IN = 500.96 (24") INV OUT = 493.42 (60")
D6	13.78	510.19	96" MANHOLE	INV IN = 496.94 (48") INV OUT = 496.84 (60")

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

STORMWATER SCHEDULES

SHEET No.

C439

P:\Projects\23011\00200\113948 Site Plan\C400 Stormwater Profiles.dwg, 12/17/2025 2:10:30 PM, Tony Zocik,

GENERAL NOTES

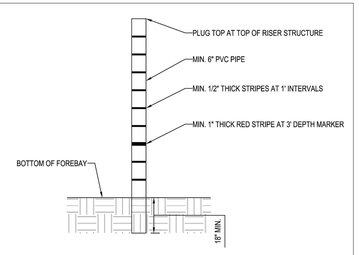
ENGINEERED FILL TO BE CLASS "C" AND COMPACTED PER STANDARDS AND UNDER DIRECT SUPERVISION OF THE GEOTECHNICAL ENGINEER.

SEQUENCE OF CONSTRUCTION: SWM FACILITY POND 'A'

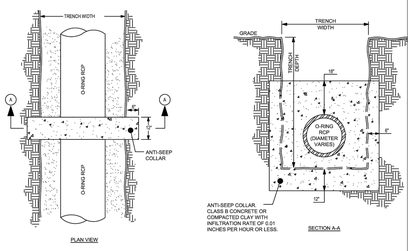
REFER ALSO TO SEDIMENT CONTROL SEQUENCE OF CONSTRUCTION FOR INITIAL GRADING, AND CONSTRUCTION OF BASIN FACILITY.

CONSTRUCTION OF THE WET POND DETENTION FACILITY TO BE DONE UNDER THE DIRECT SUPERVISION OF THE CIVIL AND GEOTECHNICAL ENGINEERS.

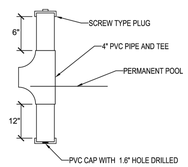
1. FOLLOWING SEDIMENT CONTROL INSTALLATION SITE CONSTRUCTION AND SITE STABILIZATION OF THE ENTIRE CONTRIBUTING DRAINAGE AREA. PROCEED WITH STEP 2.
2. EXCAVATE AND INSTALL OUTLET STRUCTURE (C3), AND CONNECTING PIPES SHOWN UNDERNEATH BASIN AND DISCHARGING INTO FLOOD PLAIN (STRUCTURES C1-C4 AND CORRESPONDING PIPES), AND OUTFALL RIP RAP AT STRUCTURE C1.
3. EXCAVATE AND INSTALL WET DETENTION DETENTION FACILITY (EROSION CONTROL - SEDIMENT BASIN WITH SKIMMER).
4. MAKE WATER TIGHT STORMDRAIN CONNECTIONS AS LOCATIONS SHOWN ON THE STORM DRAIN PROFILES, GRADING & DRAINAGE PLANS AND IN ACCORDANCE WITH THE CIVIL ENGINEER'S SPECIFICATIONS.
5. STABILIZE ALL DISTURBED AREAS.



SEDIMENT DEPTH MARKER
NOT TO SCALE

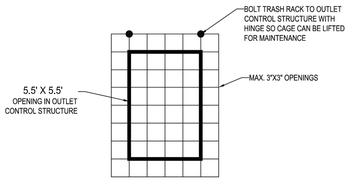


ANTI-SEEP COLLAR
NTS



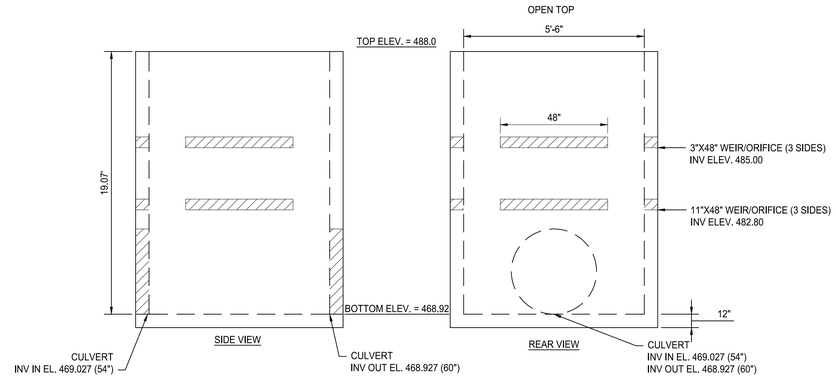
NOTES:
1. DRAW DOWN ASSEMBLY SHALL NOT BE INSTALLED UNTIL WET DETENTION BASIN IS STABILIZED.

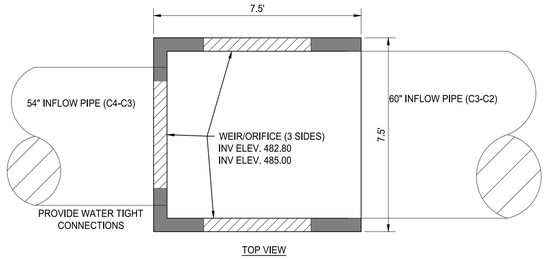
DRAWDOWN ASSEMBLY
NOT TO SCALE



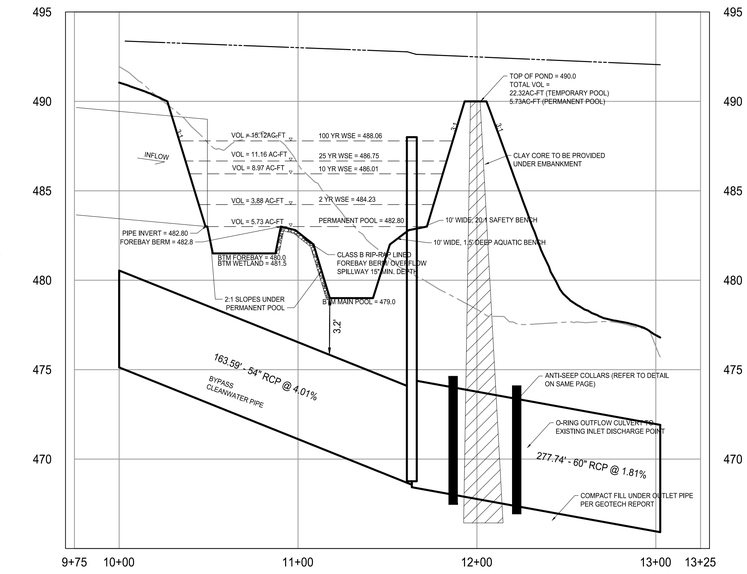
TRASH RACK (TOP OF OCS)
NOT TO SCALE

C3 OUTLET CONTROL STRUCTURE SCHEMATIC



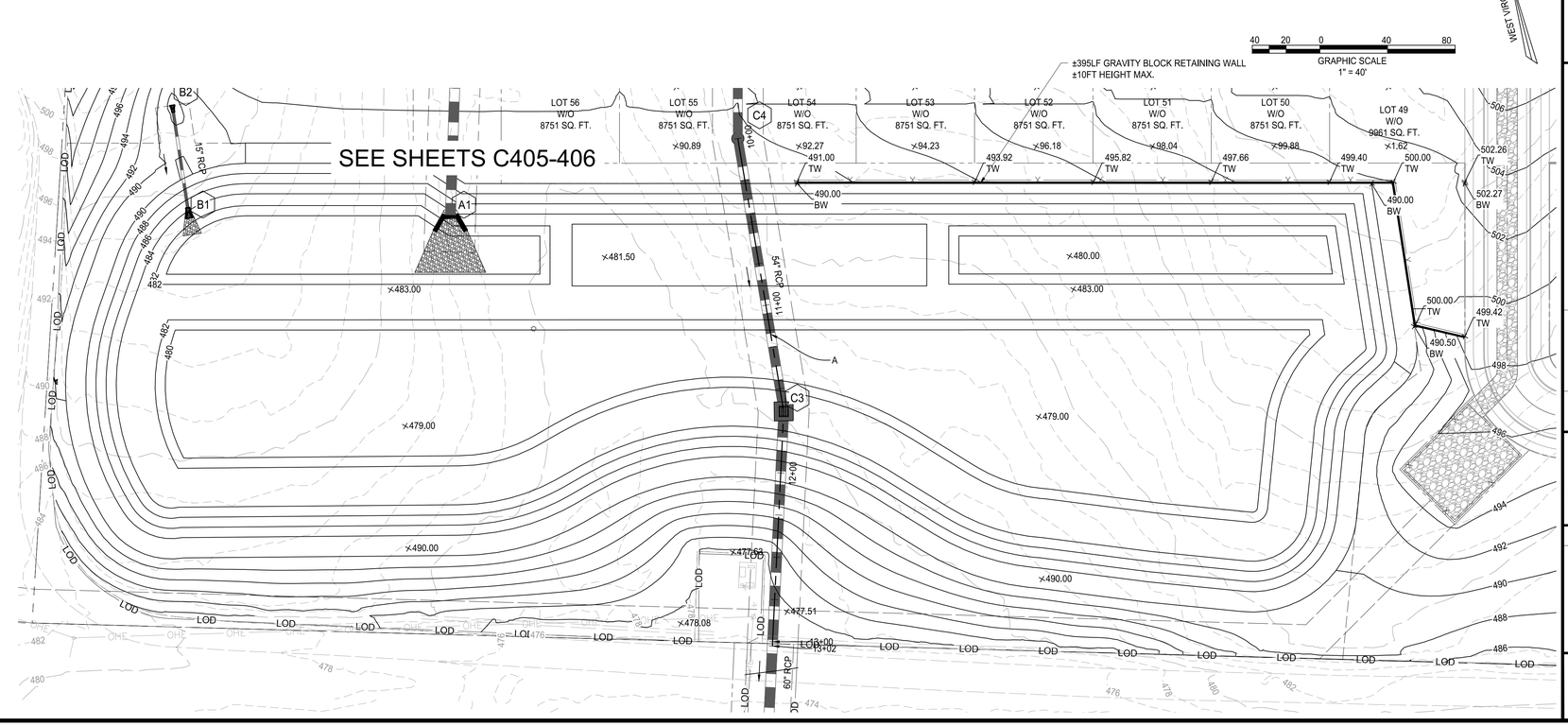


NOTES:
1. STRUCTURE TO HAVE WEIR OPENINGS ON THE REAR SIDE.
2. TRASH RACK TO BE HOT DIPPED GALVANIZED AFTER FABRICATION. PRIOR TO INSTALLATION, NO FIELD WELDING ALLOWED.
3. NO RUST SHALL BE PERMITTED ON REBAR SURFACES TO BE WELDED.



WET POND CROSS SECTION 'A'

1" = 40' (HORIZONTAL)
1" = 4' (VERTICAL)



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PRELIMINARY PLANS - AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 40'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

STORMWATER MANAGEMENT DETAIL

SHEET No.

C441

P:\Projects\23011\02\00\11948 Site Plan\C401 SWM Plans.dwg, 12/17/2025 2:11:46 PM, Tony Zocik,

THELMA A
647/ 417

ZEBRA BROADCASTING CORP
945/ 146

PERRY ROGER J ET AL
1226/ 623

HAYES ROSCOE A & ROSEMARIE
1160/ 290

SMITH RICHARD & ERIN
PARCEL 219

BERRYVILLE PIKE U.S. ROUTE 340
RIGHT-OF-WAY WIDTH VARIES

AUGUSTINE AVENUE
MAJOR COLLECTOR
66' RIGHT-OF-WAY

SHALLOW CONC. FLOW
Tc = 9.5 MINUTES

SHEET FLOW
Tc = 4.6 MINUTES

CHANNEL FLOW
Tc = 13.2 MINUTES

PRE POI 1
AREA = 95.07 AC
CN = 58
Tc = 26.5 MINUTES

BERRYVILLE PIKE
U.S. ROUTE 340
(MAJOR ARTERIAL)

BISHOP BRAD
1238/ 241

OLD CAVE ROAD
WV SEC. RT. 38
33' RIGHT-OF-WAY

CHARLES TOWN BOARD OF PARKS & REC COMM
1029/ 131

CLINE ROBERT D JR & LISA E VIANDS-CLINE
1230/ 83

KIRBY REBECCA J & EARL D ALLARA JR
WB 20/ 538

CORE CONSTRUCTION AND DEVELOPMENT LLC
1200/ 92

KIRBY REBECCA J & ALLARA JR

200 100 0 200 400
GRAPHIC SCALE
1" = 200'

WEST VIRGINIA STATE GRID NORTH
NAD 83 - WVSPN

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 40'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

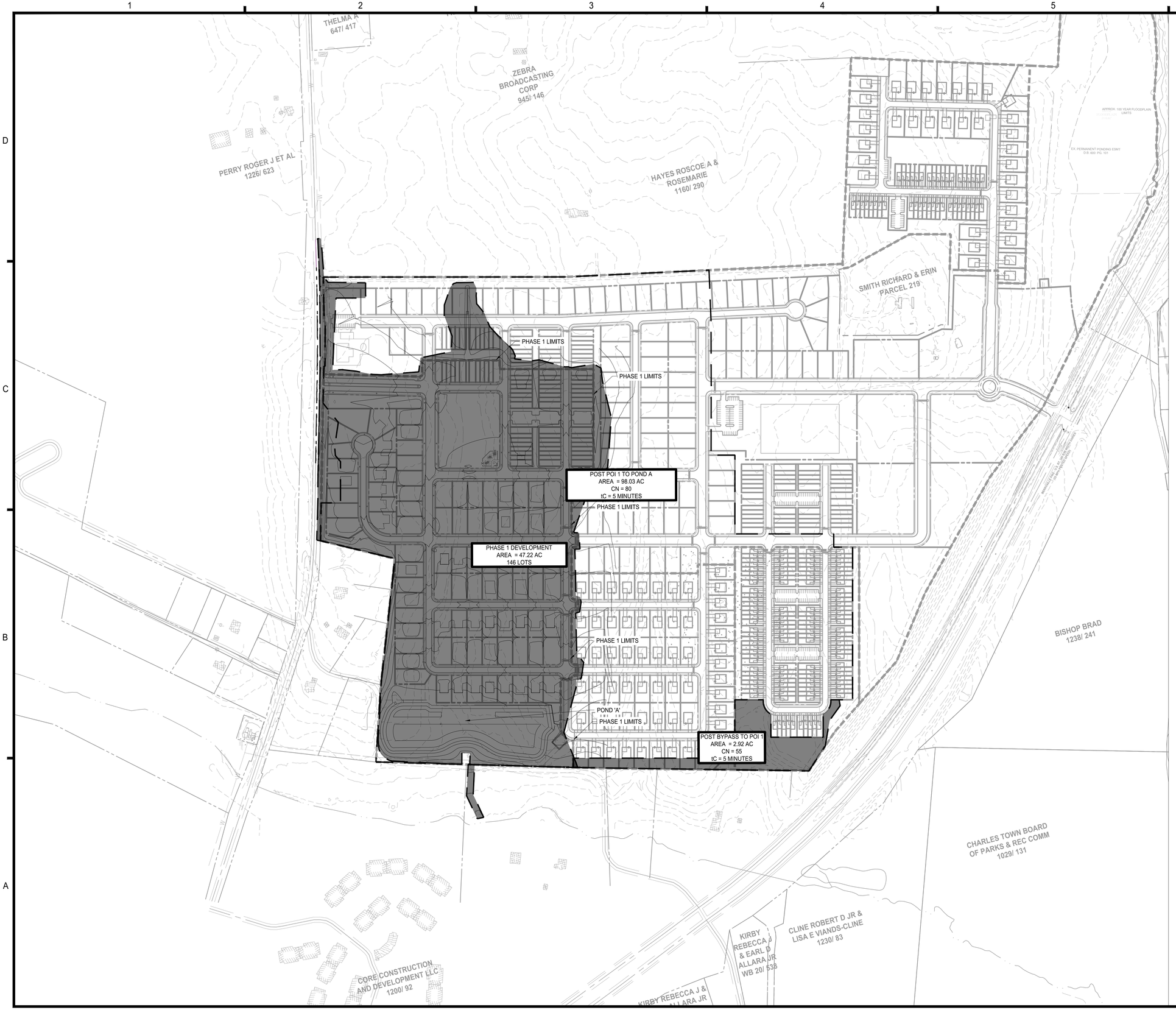
SHEET TITLE:

PRE DEVELOPMENT DRAINAGE MAP

SHEET No.

C442

P:\Projects\23011\00300_Xref\C-DAM.dwg, 12/17/2025 2:12:26 PM, Tony Zook,



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PRELIMINARY PLANS - AUGUSTINE MANOR PHASE 1

LOT 217

PARCEL I.D.: 120217

CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 40'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

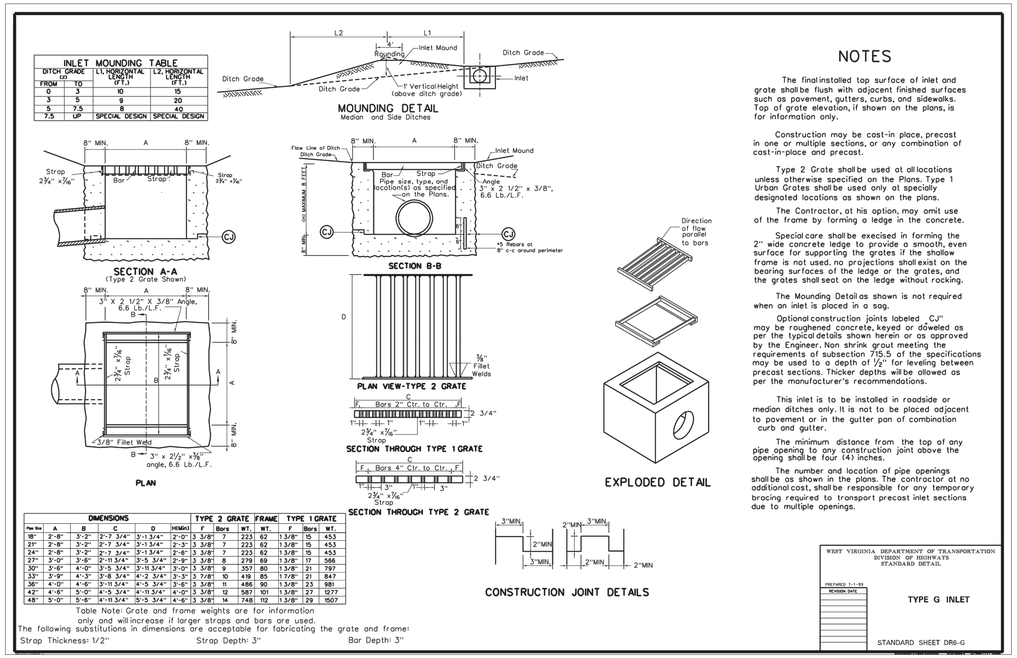
SHEET TITLE:

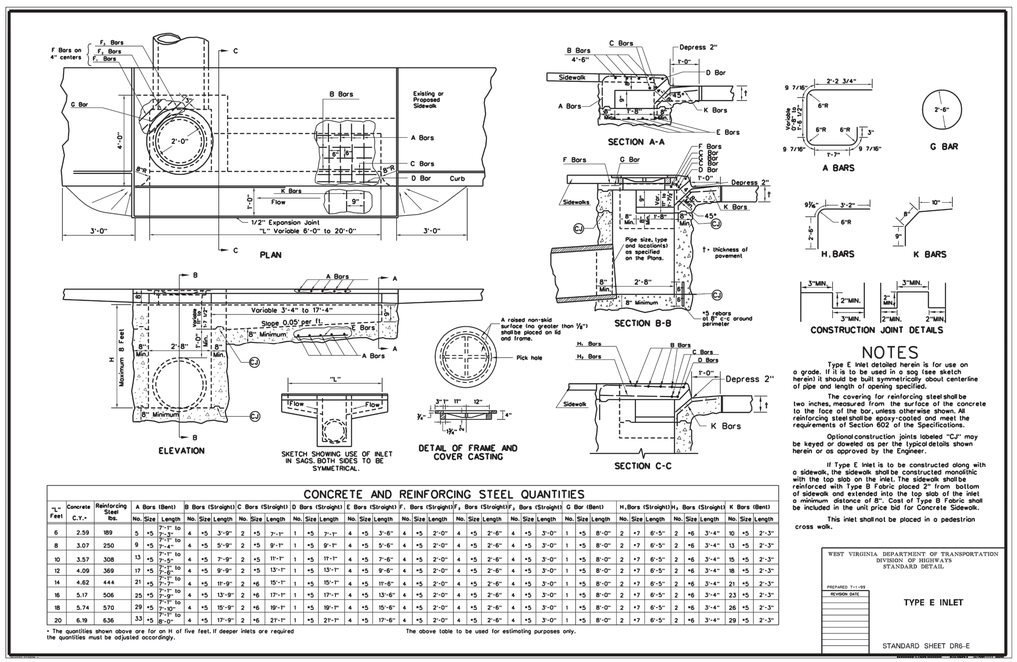
POST DEVELOPMENT DRAINAGE MAP

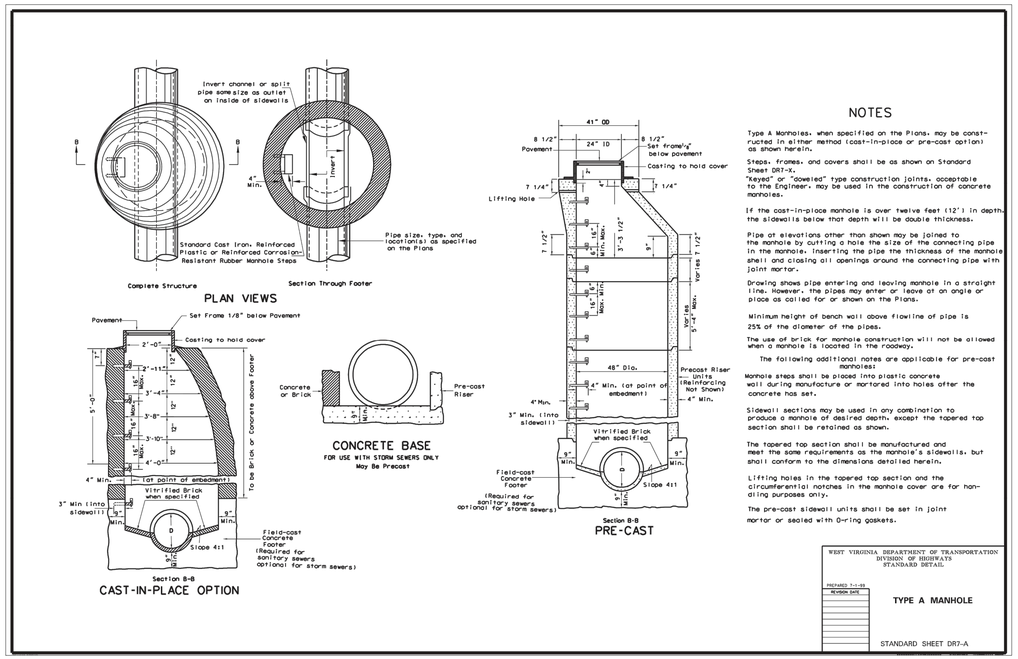
SHEET No.

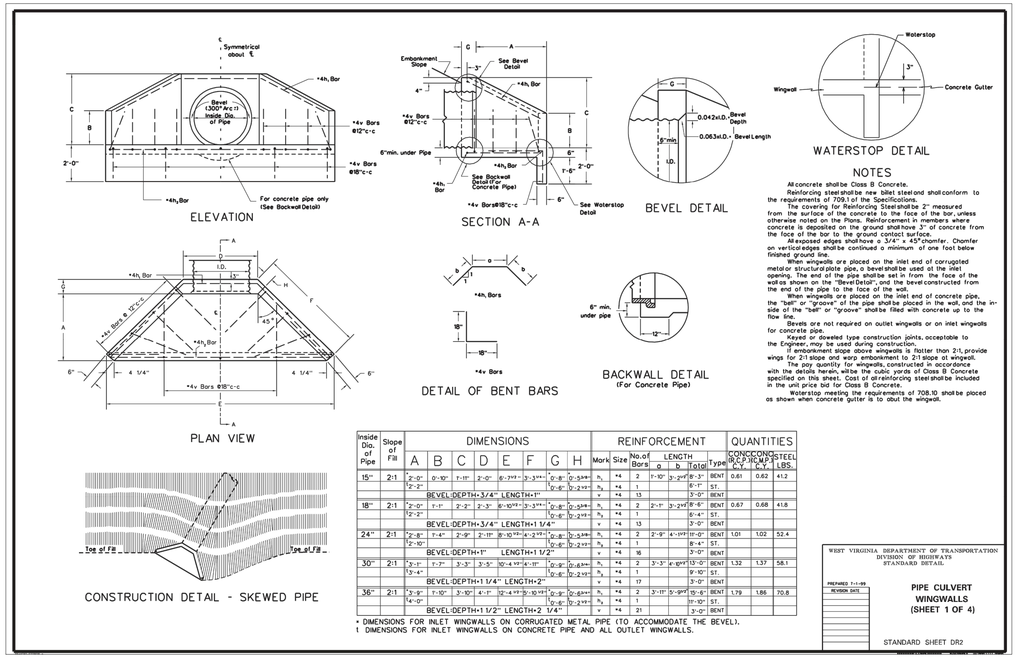
C443

P:\Projects\23011\00200_Xref\C-DAM.dwg, 12/17/2025 2:12:31 PM, Tony Zook,









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PRELIMINARY PLANS - NOT FOR CONSTRUCTION

AUGUSTINE MANOR PHASE 1

LOT 217

PARCEL I.D.: 120217

CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

STORMWATER DETAILS

SHEET No.

C446

P:\Projects\23011\00\00\11\13948 Site Plan\C400 Stormwater Details.dwg, 12/17/2025 2:12:48 PM, Tony Zook,

UTILITY MAIN STUB(S) FOR FUTURE CONNECTION

PHASE 1 LIMITS

12"X8" TAPPING SLEEVE & VALVE

8" WATER MAIN EXTENSION START

8" PVC SDR 35

8" C900 PVC WATER MAIN (TYP.)

8" PVC SDR 26

CTUB MAINTAINED AUGUSTINE AVENUE PUMP STATION

ONSITE PUMP STATION

ONSITE FORCE MAIN CONNECTION TO EXISTING OFFSITE CTUB MAINTAINED PUMP STATION (SEE SEPARATE DESIGN AND PLANS BY OTHERS)

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

100 50 0 100 200
GRAPHIC SCALE
1" = 100'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 100'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

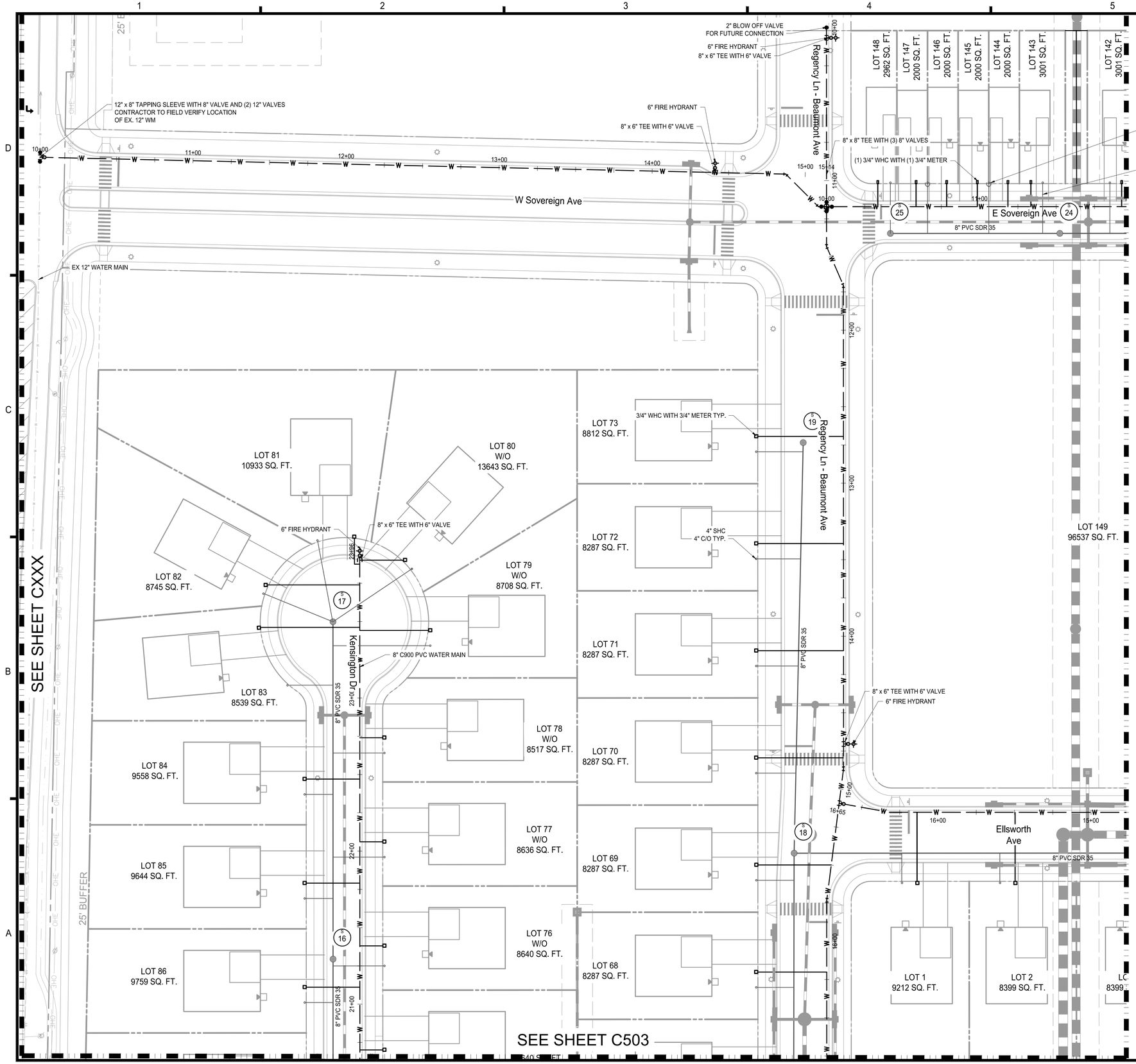
SHEET TITLE:

COMPOSITE UTILITY PLAN

SHEET No.

C500

P:\Projects\23011\000200\113948 Site Plan\C501 Utility Plans.dwg, 12/17/2025 2:14:16 PM, Tony Zook,



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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.

C501

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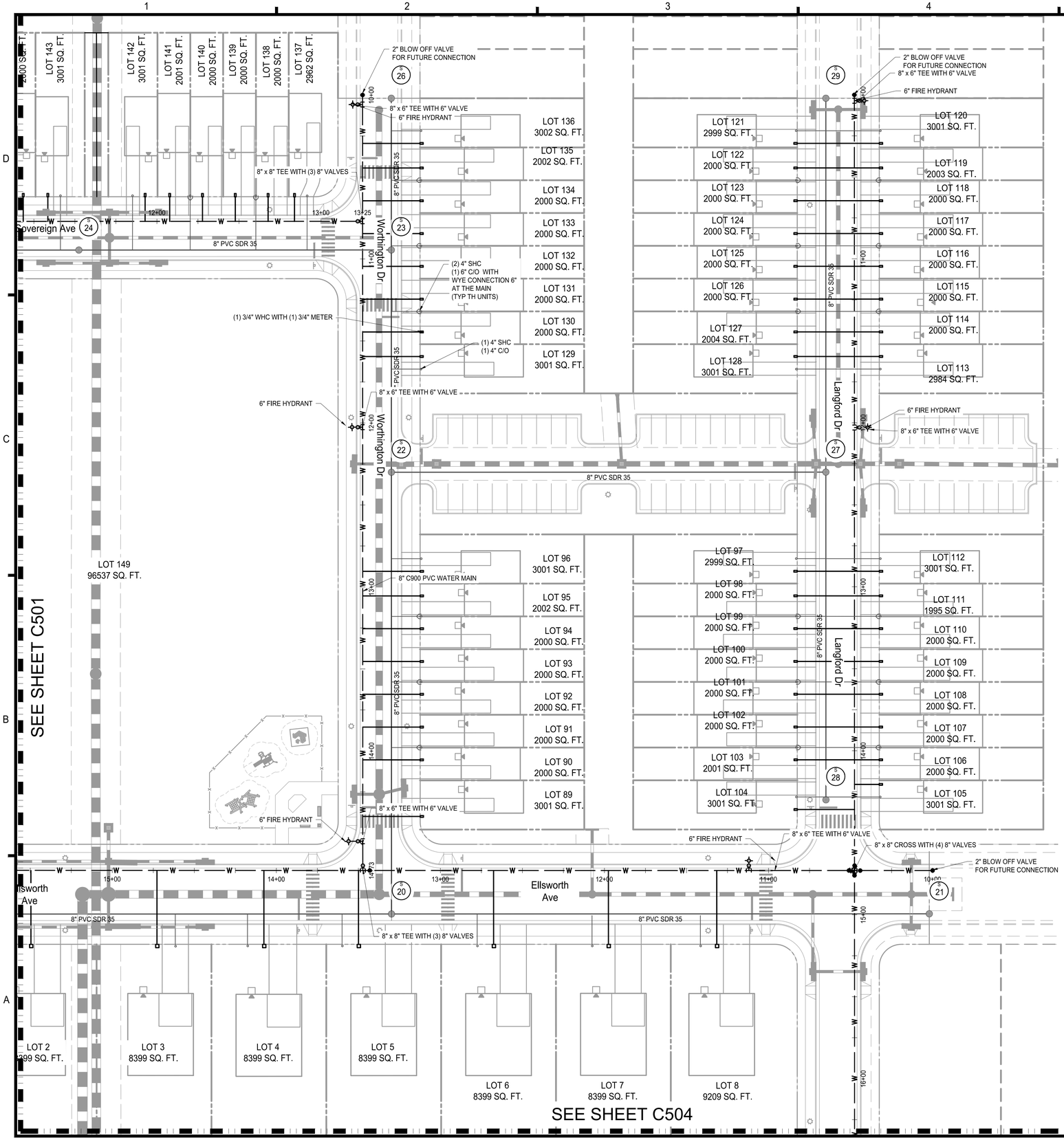



KEY MAP
N.T.S.

NOTE:

1) ALL SEWER HOUSE CONNECTIONS SHALL BE 4" SDR35
2) ALL WATER HOUSE CONNECTIONS SHALL BE 3/4" CTS
3) ALL SANITARY CLEANOUTS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. SEE CLEANOUT COVER FOR VEHICLE TRAFFIC AREAS DETAIL ON SHEET C510.
4) ALL WATER METERS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. ALL WATER METER COVERS LOCATED IN PAVED AREAS SHALL USE HEAVY DUTY H-20 TRAFFIC RATED COVERS.

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.
C502

P:\Projects\23011\000200\113948 Site Plan\C501 Utility Plans.dwg, 12/17/2025 2:14:25 PM, Tony Zook,

SEE SHEET CXXX

SEE SHEET C501

SEE SHEET C504

SEE SHEET C505

LOT 87
9881 SQ. FT.

LOT 88
12658 SQ. FT.

LOT 75
W/O
8640 SQ. FT.

LOT 74
W/O
10908 SQ. FT.

LOT 67
8287 SQ. FT.

LOT 66
9427 SQ. FT.

LOT 65
SOG
10360 SQ. FT.

LOT 64
SOG
9099 SQ. FT.

LOT 63
SOG
9099 SQ. FT.

LOT 62
SOG
9099 SQ. FT.

LOT 61
SOG
9099 SQ. FT.

LOT 60
SOG
9099 SQ. FT.

LOT 9
9209 SQ. FT.

LOT 10
8399 SQ. FT.

LOT 11
8399 SQ. FT.

LOT 17
W/O
9501 SQ. FT.

LOT 18
W/O
8399 SQ. FT.

LOT 19
W/O
8399 SQ. FT.

LOT 25
9538 SQ. FT.

LOT 26
8399 SQ. FT.

LOT 27
8399 SQ. FT.

LOT 33
W/O
9841 SQ. FT.

LOT 34
W/O
8675 SQ. FT.

LOT 35
W/O
8675 SQ. FT.

Regency Ln - Beaumont Ave

Kensington Dr

Noble Ln

Regency Ln

8" PVC SDR 26

8" PVC SDR 35

8" x 8" CROSS WITH (4) 8" VALVES

8" C900 PVC WATER MAIN

8" x 8" TEE WITH (3) 8" VALVES

8" x 6" TEE WITH 6" VALVE

6" FIRE HYDRANT

3/4" WHC WITH 3/4" METER TYP.
4" SHC
4" C/O TYP.

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

NOTE:

1) ALL SEWER HOUSE CONNECTIONS SHALL BE 4" SDR35
2) ALL WATER HOUSE CONNECTIONS SHALL BE 3/4" CTS
3) ALL SANITARY CLEANOUTS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. SEE CLEANOUT COVER FOR VEHICLE TRAFFIC AREAS DETAIL ON SHEET C510.
4) ALL WATER METERS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. ALL WATER METER COVERS LOCATED IN PAVED AREAS SHALL USE HEAVY DUTY H-20 TRAFFIC RATED COVERS.

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.
C503

P:\Projects\23011\000200\113948 Site Plan\C501 Utility Plans.dwg, 12/17/2025 2:14:30 PM, Tony Zook,

SEE SHEET C502

LOT 6
8399 SQ. FT.

LOT 8
9209 SQ. FT.

LOT 10
SQ. FT.

LOT 11
8399 SQ. FT.

LOT 12
8399 SQ. FT.

LOT 13
8399 SQ. FT.

LOT 14
8399 SQ. FT.

LOT 15
8399 SQ. FT.

LOT 16
9205 SQ. FT.

6" FIRE HYDRANT

8" x 6" TEE WITH 6" VALVE

8" C900 PVC WATER MAIN

8" SDR-35 SEWER MAIN

8" PVC SDR 35

8" PVC SDR 35

6" FIRE HYDRANT

8" x 6" TEE WITH 6" VALVE

8" x 8" CROSS WITH (4) 8" VALVES

2" BLOW OFF VALVE
FOR FUTURE CONNECTION

15+00 14+00 13+00 12+00 11+00 10+00

11 12

Kensington Dr

Kensington Dr

16+00 17+00 18+00 19+00 20+00 21+00 22+00

Langford Dr

SEE SHEET C503

LOT 18
W/O
SQ. FT.

LOT 19
W/O
8399 SQ. FT.

LOT 20
W/O
8399 SQ. FT.

LOT 21
W/O
8399 SQ. FT.

LOT 22
W/O
8399 SQ. FT.

LOT 23
W/O
8399 SQ. FT.

LOT 24
W/O
9561 SQ. FT.

LOT 27
8399 SQ. FT.

LOT 28
8399 SQ. FT.

LOT 29
8399 SQ. FT.

LOT 30
8399 SQ. FT.

LOT 31
8399 SQ. FT.

LOT 32
9570 SQ. FT.

4" SHC
4" C/O TYP.

3/4" WHC WITH 3/4" METER TYP.

6" FIRE HYDRANT

8" x 6" TEE WITH 6" VALVE

8" x 8" CROSS WITH (4) 8" VALVES

2" BLOW OFF VALVE
FOR FUTURE CONNECTION

15+00 14+00 13+00 12+00 11+00 10+00

8 9

Noble Ln

Noble Ln

LOT 34
W/O
5 SQ. FT.

LOT 35
W/O
8675 SQ. FT.

LOT 36
W/O
8675 SQ. FT.

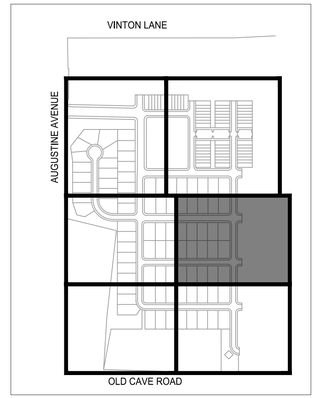
LOT 37
W/O
8675 SQ. FT.

LOT 38
W/O
8675 SQ. FT.

LOT 39
W/O
8675 SQ. FT.

LOT 40
W/O
9875 SQ. FT.

SEE SHEET C506



KEY MAP
N.T.S.

NOTE:

1) ALL SEWER HOUSE CONNECTIONS SHALL BE 4" SDR35
2) ALL WATER HOUSE CONNECTIONS SHALL BE 3/4" CTS
3) ALL SANITARY CLEANOUTS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. SEE CLEANOUT COVER FOR VEHICLE TRAFFIC AREAS DETAIL ON SHEET C510.
4) ALL WATER METERS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. ALL WATER METER COVERS LOCATED IN PAVED AREAS SHALL USE HEAVY DUTY H-20 TRAFFIC RATED COVERS.

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.
C504

P:\Projects\23011\00200\119348 Site Plan\C501 Utility Plans.dwg, 12/17/2025 2:14:34 PM, Tony Zook,

SEE SHEET C503

SEE SHEET C506

Regency Ln - Beaumont Ave

LOT 59
SOG
9099 SQ. FT.

LOT 58
SOG
9196 SQ. FT.

LOT 57
SOG
10555 SQ. FT.

LOT 41
9944 SQ. FT.

LOT 42
8743 SQ. FT.

LOT 56
W/O
8751 SQ. FT.

LOT 55
W/O
8751 SQ. FT.

8" C900 PVC WATER MAIN

8" PVC SDR 35

3/4" WHC WITH 3/4" METER TYP.

4" SHC

4" C/O TYP.

23+00

24+00

25+00

W

PS

OHE

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

NOTE:

1) ALL SEWER HOUSE CONNECTIONS SHALL BE 4" SDR35
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4) ALL WATER METERS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. ALL WATER METER COVERS LOCATED IN PAVED AREAS SHALL USE HEAVY DUTY H-20 TRAFFIC RATED COVERS.

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.
C505

P:\Projects\23011\000200\113948 Site Plan\C501 Utility Plans.dwg, 12/17/2025 2:14:37 PM, Tony Zook,

SEE SHEET C504

LOT 42
3 SQ. FT.

LOT 43
8743 SQ. FT.

LOT 44
8743 SQ. FT.

LOT 45
8743 SQ. FT.

LOT 46
8743 SQ. FT.

LOT 47
8743 SQ. FT.

LOT 48
9951 SQ. FT.

Langford Dr

4" SHC
4" C/O TYP.

3/4" WHC WITH 3/4" METER TYP.

6" FIRE HYDRANT

8" x 6" TEE WITH 6" VALVE

8" C900 PVC WATER MAIN

8" x 8" CROSS WITH (4) 8" VALVES

2" BLOW OFF VALVE
FOR FUTURE CONNECTION

8" x 6" TEE WITH 6" VALVE

6" FIRE HYDRANT

2" BLOW OFF VALVE
FOR FUTURE CONNECTION

3/4" PEX LINE FOR PUMP
STATION HYDRANT

26+00 | 27+00 | 28+00 | 29+00 | 30+00 | 30+82 | 24+00 | 23+00

t Ave — Regency Ln - Beaumont Ave

LOT 55
W/O
751 SQ. FT.

LOT 54
W/O
8751 SQ. FT.

LOT 53
W/O
8751 SQ. FT.

LOT 52
W/O
8751 SQ. FT.

LOT 51
W/O
8751 SQ. FT.

LOT 50
W/O
8751 SQ. FT.

LOT 49
W/O
9961 SQ. FT.

S 3

S 2

8" PVC SDR 35

8" PVC SDR 26

SEE SHEET C505

8" PVC SDR 26

S 1

9" PVC SDR 26

WW

3/4" YARD HYDRANT FOR PUMP STATION

ONSITE PUMP STATION
(DESIGN AND PLANS BY OTHERS)

FORCE MAIN TO CONNECT TO EXISTING
CTUB PUMP STATION ON AUGUSTINE AVE
(DESIGN AND PLANS BY OTHERS)

PS

OHE

OLD CAVE ROAD

VINTON LANE

AUGUSTINE AVENUE

OLD CAVE ROAD

KEY MAP
N.T.S.

NOTE:

1) ALL SEWER HOUSE CONNECTIONS SHALL BE 4" SDR35
2) ALL WATER HOUSE CONNECTIONS SHALL BE 3/4" CTS
3) ALL SANITARY CLEANOUTS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. SEE CLEANOUT COVER FOR VEHICLE TRAFFIC AREAS DETAIL ON SHEET C510.
4) ALL WATER METERS SHALL HAVE TRAFFIC RATED FRAME AND COVERS. ALL WATER METER COVERS LOCATED IN PAVED AREAS SHALL USE HEAVY DUTY H-20 TRAFFIC RATED COVERS.

UTM83-18F
WEST VIRGINIA STATE GRID NORTH

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.
C506

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DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

UTILITY PLAN

SHEET No.

C507

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SEWER STRUCTURE SCHEDULE				
STRUCTURE NUMBER	STRUCTURE HEIGHT (FT)	RIM ELEVATION	TYPE	INVERTS
WW	13.25	495.53	48" MANHOLE	INV IN = 482.28' (8")
1	15.55	498.22	48" MANHOLE	INV IN = 482.78' (8") INV OUT = 482.68' (8")
2	17.93	501.32	48" MANHOLE	INV IN = 483.49' (8") INV OUT = 483.39' (8")
3	9.83	494.60	48" MANHOLE	INV IN = 484.87' (8") INV OUT = 484.77' (8")
4	3.89	490.22	48" MANHOLE	INV IN = 486.45' (8") INV OUT = 486.35' (8")
5	5.83	496.89	48" MANHOLE	INV IN = 491.18' (8") INV IN = 491.18' (8") INV OUT = 491.08' (8")
6	6.06	497.47	48" MANHOLE	INV IN = 491.51' (8") INV OUT = 491.41' (8")
7	8.45	507.08	48" MANHOLE	INV IN = 498.73' (8") INV IN = 498.73' (8") INV OUT = 498.63' (8")
8	7.30	507.56	48" MANHOLE	INV IN = 500.36' (8") INV OUT = 500.26' (8")
9	6.66	517.46	48" MANHOLE	INV OUT = 510.80' (8")
10	14.30	515.12	48" MANHOLE	INV IN = 500.91' (8") INV IN = 502.86' (8") INV IN = 508.84' (8") INV OUT = 500.81' (8")
11	9.25	513.64	48" MANHOLE	INV IN = 506.89' (8") INV OUT = 504.39' (8")
12	6.74	526.07	48" MANHOLE	INV OUT = 519.33' (8")
13	6.56	515.59	48" MANHOLE	INV IN = 509.12' (8") INV OUT = 509.02' (8")
14	8.81	518.94	48" MANHOLE	INV IN = 510.23' (8") INV OUT = 510.13' (8")
15	7.46	520.05	48" MANHOLE	INV IN = 512.69' (8") INV OUT = 512.59' (8")
16	7.06	521.66	48" MANHOLE	INV IN = 514.70' (8") INV OUT = 514.60' (8")
17	6.86	524.96	48" MANHOLE	INV OUT = 518.10' (8")
18	12.62	515.04	48" MANHOLE	INV IN = 508.19' (8") INV IN = 502.52' (8") INV OUT = 502.42' (8")
19	6.82	519.09	48" MANHOLE	INV OUT = 512.27' (8")
20	8.56	512.90	48" MANHOLE	INV IN = 504.44' (8") INV IN = 506.70' (8") INV OUT = 504.34' (8")
21	6.93	523.63	48" MANHOLE	INV OUT = 516.70' (8")
22	9.26	515.41	48" MANHOLE	INV IN = 506.25' (8") INV IN = 509.14' (8") INV OUT = 506.15' (8")
23	9.67	517.12	48" MANHOLE	INV IN = 507.45' (8") INV IN = 507.55' (8") INV OUT = 507.45' (8")
24	6.98	515.48	48" MANHOLE	INV IN = 508.60' (8") INV OUT = 508.50' (8")
25	7.00	519.10	48" MANHOLE	INV OUT = 512.10' (8")
26	10.39	518.28	48" MANHOLE	INV OUT = 507.91' (8")
27	7.15	519.16	48" MANHOLE	INV IN = 512.11' (8") INV IN = 512.12' (8") INV OUT = 512.01' (8")
28	6.85	521.84	48" MANHOLE	INV OUT = 514.99' (8")
29	6.95	523.43	48" MANHOLE	INV OUT = 516.48' (8")
30	7.04	503.52	48" MANHOLE	INV IN = 496.50' (8") INV OUT = 496.50' (8")
31	6.72	510.70	48" MANHOLE	INV OUT = 504.00' (8")

STORM PIPING SCHEDULE						
START STR. / END STR.	LENGTH (LF)	SIZE (IN)	MATERIAL	SLOPE	INV. IN	INV. OUT
1 TO WW	61.20	8	PVC SDR 35	0.64%	482.68	482.28
2 TO 1	123.48	8	PVC SDR 35	0.50%	483.39	482.78
3 TO 2	255.96	8	PVC SDR 35	0.50%	484.77	483.49
4 TO 3	295.31	8	PVC SDR 35	0.50%	486.35	484.87
5 TO 4	142.50	8	PVC SDR 35	3.25%	491.08	486.45
6 TO 5	45.34	8	PVC SDR 35	0.50%	491.41	491.18
7 TO 6	266.36	8	PVC SDR 35	2.67%	498.63	491.51
8 TO 7	307.27	8	PVC SDR 35	0.50%	500.26	498.73
9 TO 8	253.81	8	PVC SDR 35	4.11%	510.80	500.36
10 TO 7	291.29	8	PVC SDR 35	0.72%	500.81	498.73
11 TO 10	305.60	8	PVC SDR 35	0.50%	504.39	502.86
12 TO 11	256.64	8	PVC SDR 35	4.85%	519.33	506.89
13 TO 10	36.63	8	PVC SDR 35	0.50%	509.02	508.84
14 TO 13	201.74	8	PVC SDR 35	0.50%	510.13	509.12
15 TO 14	89.59	8	PVC SDR 35	2.63%	512.59	510.23
16 TO 15	158.73	8	PVC SDR 35	1.20%	514.60	512.69
17 TO 16	220.42	8	PVC SDR 35	1.54%	518.10	514.70
18 TO 10	300.98	8	PVC SDR 35	0.50%	502.42	500.91
19 TO 18	268.34	8	PVC SDR 35	1.52%	512.27	508.19
20 TO 18	364.15	8	PVC SDR 35	0.50%	504.34	502.52
21 TO 20	327.80	8	PVC SDR 35	3.05%	516.70	506.70
22 TO 20	269.39	8	PVC SDR 35	0.64%	506.15	504.44
23 TO 22	135.55	8	PVC SDR 35	0.88%	507.45	506.25
24 TO 23	190.48	8	PVC SDR 35	0.50%	508.50	507.55
25 TO 24	110.68	8	PVC SDR 35	3.17%	512.10	508.60
26 TO 23	92.50	8	PVC SDR 35	0.50%	507.91	507.45
27 TO 22	264.81	8	PVC SDR 35	1.08%	512.01	509.14
28 TO 27	199.85	8	PVC SDR 35	1.43%	514.99	512.12
29 TO 27	227.99	8	PVC SDR 35	1.92%	516.48	512.11
30 TO 5	275.58	8	PVC SDR 35	1.93%	496.50	491.18
31 TO 30	253.81	8	PVC SDR 35	2.96%	504.00	496.50

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PRELIMINARY PLANS -
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CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SANITARY SEWER SCHEDULES

SHEET No.

C532

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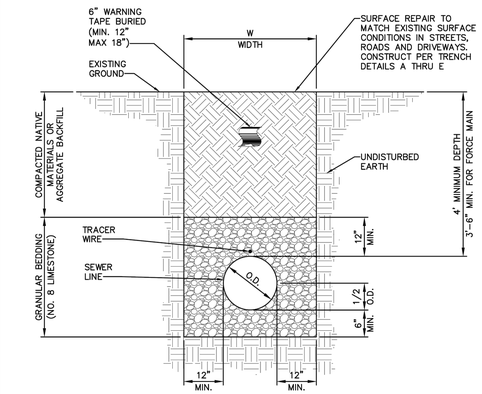

NOTES:

1. W = MAXIMUM PERMISSIBLE TRENCH WIDTH, BASED UPON, W = O.D. + 24", UNLESS APPROVED BY THE ENGINEER.
2. CONTRACTOR IS FULLY RESPONSIBLE FOR ALL MEANS, METHODS AND SAFETY FOR TRENCH EXCAVATIONS.
3. PROVIDE BEARING FOR FULL LENGTH OF BARREL, DIG HOLES FOR THE BELL.
4. BACKFILL ON SIDES TO 1/2 O.D. OF PIPE TO HOLD PIPE IN PLACE PRIOR TO PLACING ADDITIONAL BEDDING.
5. BACKFILL TO BE COMPACTED IN 6" LAYERS TO 95% OF MAXIMUM DENSITY (MODIFIED PROCTOR) AT OPTIMUM MOISTURE (+2%) IN ROADS AND STREETS. COMPACT TO MATCH EXISTING OR PROPOSED GRADE IN OTHER AREAS.
6. A CASING PIPE SHALL BE REQUIRED IN ROAD CROSSINGS WHERE SHOWN ON PLANS.

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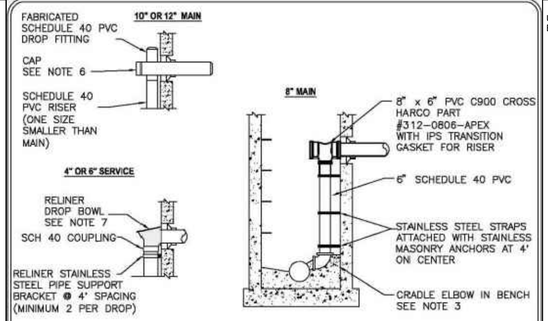
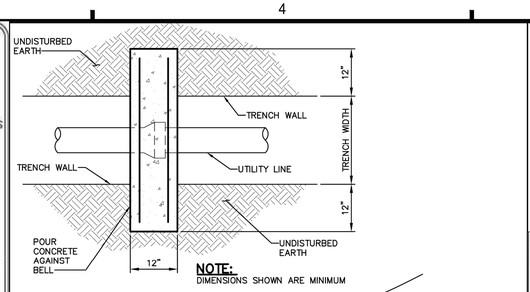
SEWER LINE TRENCH DETAIL

STANDARD DETAIL NO. **S-1**
NOT TO SCALE
JULY 2025



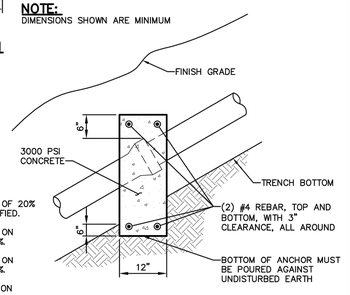
NOTES:
1. INSIDE DROP CONNECTION SHALL NOT BE USED, EXCEPT WHERE APPROVED BY **CHARLES TOWN UTILITY BOARD** FOR THE SPECIFIC APPLICATION.
2. MAXIMUM SLOPE OF INCOMING LINE IS 2.0%.
3. THE ELBOW AT THE BOTTOM OF THE STACK MAY BE EITHER A 45 OR 90-DEGREE BEND, TURNED IN THE DIRECTION OF FLOW. CONSTRUCT CHANNEL TO CONFORM TO THE MANHOLE BENCH.
4. MANHOLE PENETRATIONS TO BE BY CORE BORE AND APPROVED PIPE CONNECTOR. CORE IS TO BE AT LEAST 1" CLEAR OF MANHOLE JOINT.
5. ALL COMPONENTS TO BE IN ACCORDANCE **WITH CHARLES TOWN UTILITY BOARD'S** APPROVED MATERIALS LIST.
6. THE CAP SHALL BE SECURED TO THE DROP CONNECTION FITTING WITH 2' OF STAINLESS STEEL CHAIN, SECURED WITH STAINLESS MACHINE SCREWS, NUTS, AND WASHERS. THE PIPE SHALL BE BEVELED TO ACCEPT THE CAP.
7. WHERE INCOMING LINE IS TO BE UNDER PRESSURE INSTALL OPTIONAL HOOD FROM RELINER.

NOV. 2017 | INSIDE DROP CONNECTION | S-5



NOTE: DIMENSIONS SHOWN ARE MINIMUM

PLAN



SECTION

NOTES:
1. PROVIDE ANCHORS ON GRADES OF 20% AND GREATER OR WHERE SPECIFIED.
2. PROVIDE ANCHORS 36 FT. O.C. ON GRADES BETWEEN 20% AND 34%.
3. PROVIDE ANCHORS 24 FT. O.C. ON GRADES BETWEEN 34% AND 50%.
4. PROVIDE ANCHORS 16 FT. O.C. ON GRADES 50% OR GREATER.
5. WHEN NECESSARY, EXTEND ANCHOR TO 12" BELOW FINISH GRADE TO PREVENT WASHOUT OF BACKFILL BY SURFACE WATER.
6. ANCHORS SHALL BE PLACED AT JOINTS NOT TO EXCEED O.C. DISTANCES.
7. CONCRETE ANCHORS TO BE PLACED AGAINST DOWNGRADE SIDE OF PIPE JOINTS.

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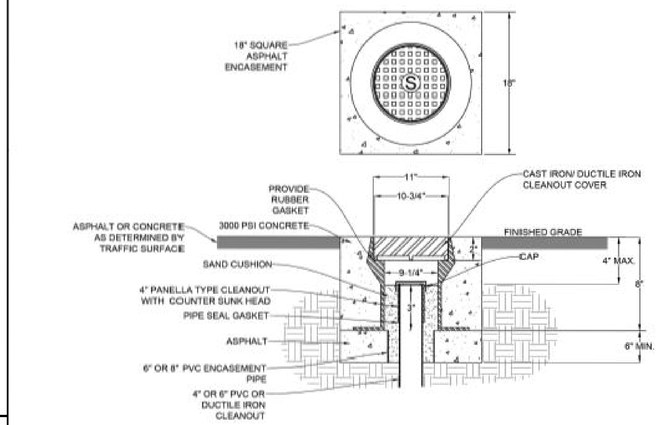
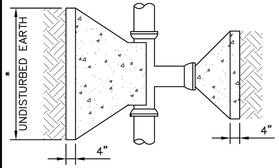
CONCRETE SLOPE ANCHOR DETAIL

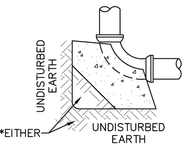
STANDARD DETAIL NO. **S-6**
NOT TO SCALE
JULY 2025



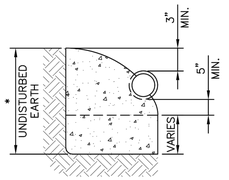
CLEANOUT COVER FOR VEHICLE TRAFFIC AREAS



PLAN-TEES, WYES AND PLUGS



PLAN-BENDS



ELEVATION-TEES, WYES AND PLUGS

NOTES:
1. ALL CONCRETE SHALL BE MINIMUM 3,000 P.S.I.
2. THRUST BLOCKS SHALL BE IMBEDDED IN UNDISTURBED SOIL.
3. SOIL BEARING CAPACITY IS ASSUMED AT 3000 LB. SQ. FT. FOR WEAKER SOILS THRUST BLOCK AREAS SHALL BE INCREASED AS REQUIRED.
4. WRAP PIPE WITH POLYETHYLENE TO PREVENT CONTACT BETWEEN PIPE AND CONCRETE.
5. WITH APPROVAL OF ENGINEER, MEGA-LUG JOINT RESTRAINTS MAY BE SUBSTITUTED FOR THRUST BLOCKS PER MANUFACTURER'S RECOMMENDATION (TO BE FURNISHED BY CONTRACTOR). FOR DUCTILE IRON, USE UNIFLANGE 1400 OR EBBA 1100 AND FOR C900 PVC, USE UNIFLANGE 1500 OR EBBA 2000PV.
6. THRUST BLOCKING GENERALLY ONLY APPLIES TO PIPE FITTINGS 4" IN DIAMETER OR LESS.

PIPE SIZE (IN.)	AREA (SQ IN.)	TOTAL FORCE (LBS.)	AREA OF BLOCK IN SQ. FT.				
			TEES & PLUGS	90° BENDS	45° BENDS	22 1/2° BENDS	11 1/4° BENDS
4	12.57	2,827	1.0	1.0	1.0	1.0	1.0
6	28.27	6,361	1.6	2.3	1.2	1.0	1.0
8	50.26	11,308	2.8	4.0	2.2	1.1	1.0
10	75.54	17,672	4.4	6.3	3.4	1.7	1.0
12	113.16	25,461	6.4	9.0	4.9	3.0	1.3
14	153.94	34,637	8.7	12.3	6.6	3.4	1.7
16	201.06	45,239	11.3	16.0	8.7	4.4	2.2
18	254.47	57,256	14.3	20.3	11.0	5.6	2.8
20	314.16	70,686	17.7	25.0	13.5	6.9	3.5
24	452.39	101,788	25.4	36.0	19.5	9.9	5.0

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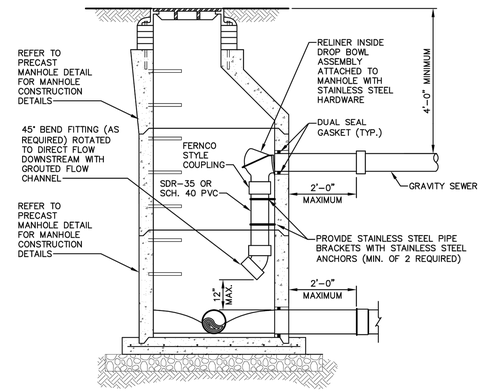
PIPE BUTTRESS DETAIL

STANDARD DETAIL NO. **S-7**
NOT TO SCALE
JULY 2025



NOTE:
1. OUTSIDE DROP MANHOLES ARE PROHIBITED.

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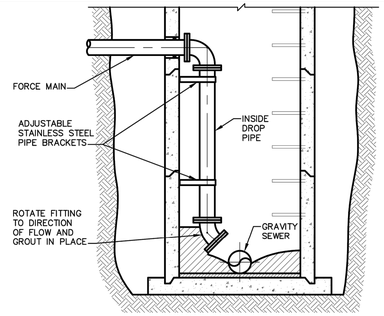
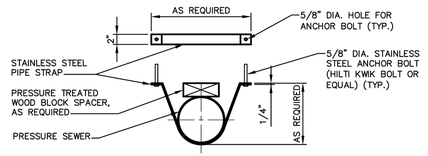
INSIDE DROP MANHOLE DETAIL

STANDARD DETAIL NO. **S-12**
NOT TO SCALE
JULY 2025



FORCE MAIN MANHOLE

NOTES:
1. FORCE MAIN CONNECTIONS WITHIN MANHOLE SHALL BE RESTRAINED.
2. ANCHOR FORCE MAIN TO MANHOLE USING ADJUSTABLE STAINLESS STEEL PIPE BRACKETS. (2) BRACKETS MINIMUM AND 3' MAX. SPACING.
3. FOR IRREGULAR HOLES, SEAL PIPE ON BOTH SIDES WITH HYDRAULIC CEMENT.
4. ALL FORCE MAIN INLET MANHOLES SHALL RECEIVE SPECIAL COATING SYSTEM.



FORCE MAIN ANCHOR STRAP DETAIL

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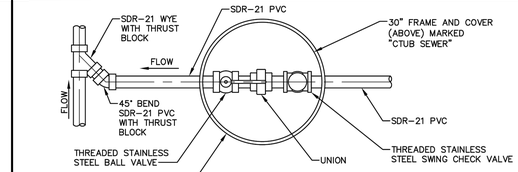
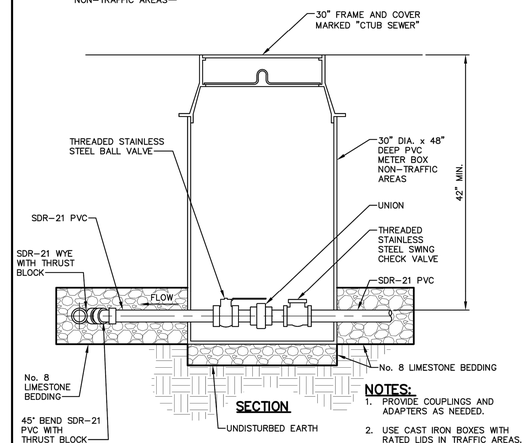
FORCE MAIN MANHOLE FORCE MAIN ANCHOR STRAP DETAIL

STANDARD DETAIL NO. **S-13**
NOT TO SCALE
JULY 2025



PLAN



SECTION

NOTES:
1. PROVIDE COUPLINGS AND ADAPTERS AS NEEDED.
2. USE CAST IRON BOXES WITH RATED LIDS IN TRAFFIC AREAS.

Charles Town Utility Board
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FORCE MAIN LATERAL CONNECTION DETAIL

STANDARD DETAIL NO. **S-23**
NOT TO SCALE
JULY 2025

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

WATER & SEWER DETAILS

SHEET No.

C533

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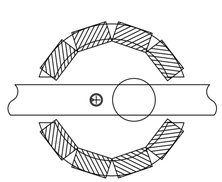
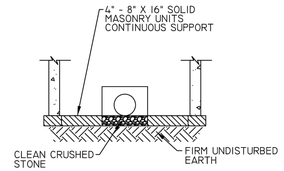
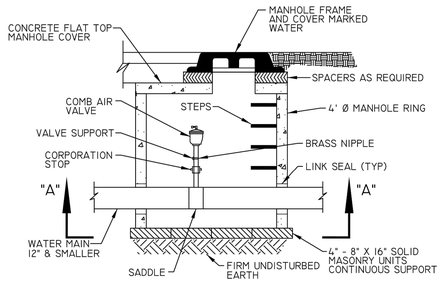


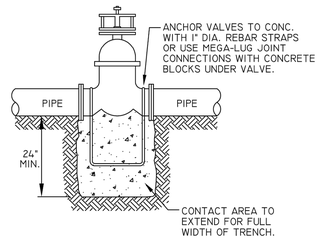
PLAN



SECTION A - A

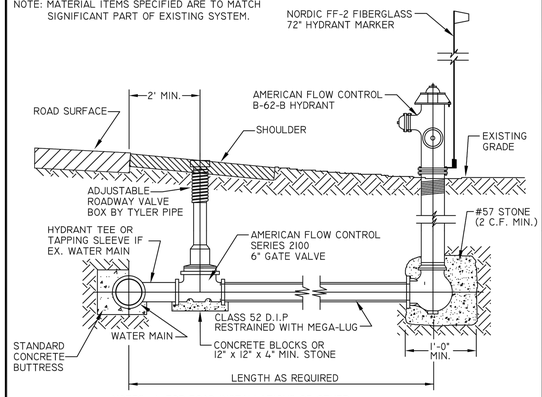


Charles Town Utility Board	AIR RELEASE & VALVE DETAIL	Standard Detail No. W-2
832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313		NOT TO SCALE
		APRIL 2015

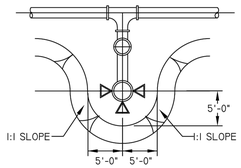


Charles Town Utility Board	WATER VALVES DETAIL	Standard Detail No. W-3
832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313		NOT TO SCALE
		APRIL 2015

NOTE: MATERIAL ITEMS SPECIFIED ARE TO MATCH SIGNIFICANT PART OF EXISTING SYSTEM.

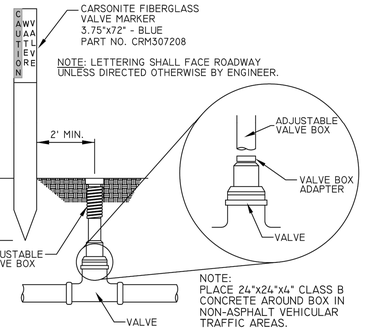


NOTES: 1. FOR ROAD INSTALLATIONS OR OTHER INTERFERENCES VALVE LOCATION MAY VARY.
2. VALVE BOX TO BE SET PLUMB AND CENTERED ON VALVE.



BANK CUTTING DETAIL

Charles Town Utility Board	FIRE HYDRANT WITH TAPPING SLEEVE AND VALVE DETAIL	Standard Detail No. W-5
832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313		NOT TO SCALE
		APRIL 2015

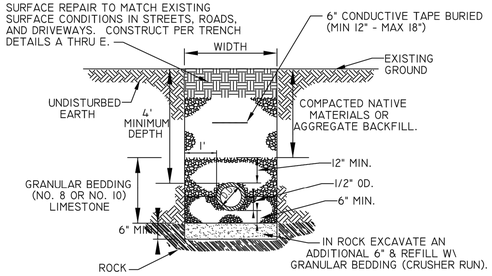


VALVE MARKER DETAIL

NOT TO SCALE

Charles Town Utility Board	VALVE MARKER DETAIL	Standard Detail No. W-8
832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313		NOT TO SCALE
		APRIL 2015

SURFACE REPAIR TO MATCH EXISTING SURFACE CONDITIONS IN STREETS, ROADS, AND DRIVEWAYS. CONSTRUCT PER TRENCH DETAILS A THRU E.

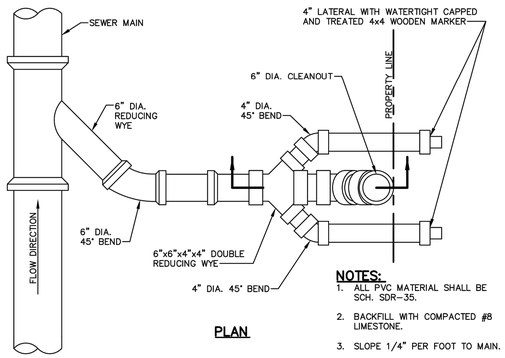


WATER LINE TRENCH

NOTES:

1. W = MAXIMUM PERMISSIBLE TRENCH WIDTH, BASED UPON, W = O.D. + 24", UNLESS APPROVED BY THE ENGINEER.
2. TRENCHES TO BE SHEETED AND BRACED AS REQUIRED.
3. PROVIDE BEARING FOR FULL LENGTH OF BARREL, DIG HOLES FOR THE BELL.
4. BACKFILL TO BE COMPACTED IN 6" LAYERS TO 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE (+2%) IN ROADS AND STREETS. COMPACT TO MATCH EXISTING GROUND IN OTHER AREAS.
5. MAINTAIN MINIMUM OF 4' OF COVER TO THE TOP OF PIPE.
6. A CASING PIPE SHALL BE REQUIRED IN ROAD CROSSINGS WHERE SHOWN ON PLANS
7. ALL WATER LINES REQUIRE PERMIT FROM APPLICABLE REGULATORY ENTITIES. PERMIT REQUIREMENTS SUPERCEDE WHAT IS SHOWN ON THIS DETAIL.

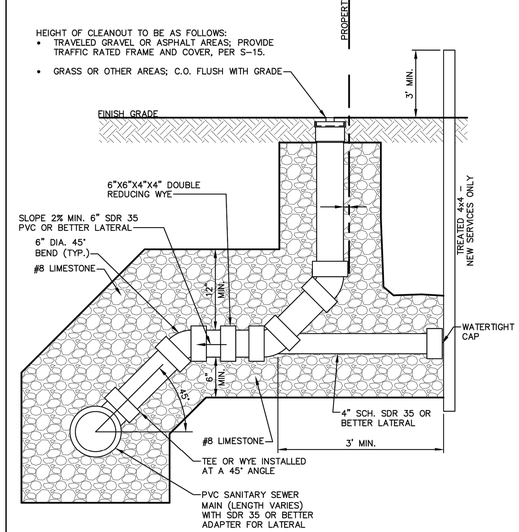
Charles Town Utility Board	WATER LINE TRENCH DETAIL	Standard Detail No. W-9
832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313		NOT TO SCALE
		APRIL 2015



PLAN

NOTES:
1. ALL PVC MATERIAL SHALL BE SCH. SDR-35.
2. BACKFILL WITH COMPACTED #8 LIMESTONE.
3. SLOPE 1/4" PER FOOT TO MAIN.

Charles Town Utility Board	NEW DOUBLE LATERAL CONNECTION DETAIL (PLAN)	STANDARD DETAIL NO. S-17
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414 PHONE: (304) 725-2316 FAX: (304) 725-4313		NOT TO SCALE
		JULY 2025



ELEVATION

Charles Town Utility Board	NEW DOUBLE LATERAL CONNECTION DETAIL (ELEVATION)	STANDARD DETAIL NO. S-17A
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414 PHONE: (304) 725-2316 FAX: (304) 725-4313		NOT TO SCALE
		JULY 2025

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

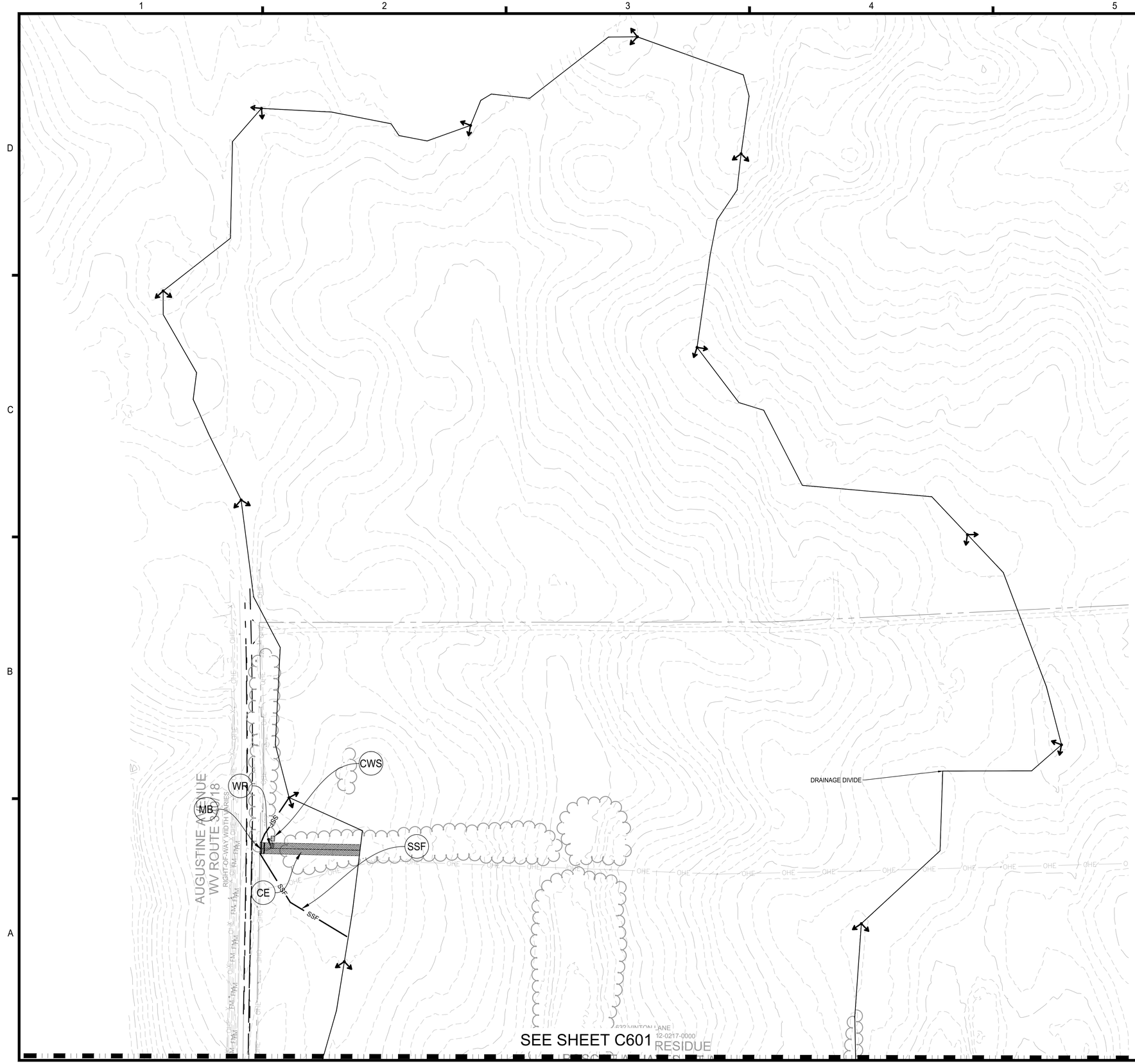
SHEET TITLE:

WATER & SEWER DETAILS

SHEET No.

C534

P:\Projects\23011\00200\113948 Site Plan\CS00 Utility Details.dwg, 12/17/2025 2:15:51 PM, Tony Zook,



LEGEND

- CE — TEMPORARY CONSTRUCTION ENTRANCE
- CIP — CURB INLET PROTECTION
- DIP — DROP INLET PROTECTION
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- DD — DIVERSION DIKE
- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

WEST VIRGINIA STATE GRID NORTH

100 50 0 100 200
GRAPHIC SCALE
1" = 100'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEDIMENTATION
& EROSION
CONTROL PHI

SHEET No.

C600

P:\Projects\23011\00200\113948 Site Plan\C600 ESC Plans PH1.dwg, 12/17/2025 2:16:40 PM, Tony Zook,

SEDIMENT BASIN KEY DESIGN ASPECTS

BASIN NUMBER	1	2	3	4	5	6
TYPE (stone weir/pipe)	Pipe					
DRAINAGE AREA	88.81 AC					
WET STORAGE REQ	159,858 CF					
WET STORAGE PROV	364,246 CF					
DRY STORAGE REQ	159,858 CF					
DRY STORAGE PROV	187,685 CF					
WEIR WIDTH	N/A					
PIPE DIAMETER	24 in					
WEIR/PIPE ELEVATIONS	N/A					
STORAGE DEPTH	8 ft					
CLEANOUT ELE	479.94 ft					
EMBANKMENT ELE	490.00 ft					
BASIN BOTTOM ELE	479.00 ft					

LEGEND

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- DD — DIVERSION DIKE
- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

SEE SHEET C600



WEST VIRGINIA STATE GRID NORTH
UTMS-18F

100 50 0 100 200
GRAPHIC SCALE
1" = 100'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEDIMENTATION & EROSION CONTROL PHI

SHEET No.

C601

P:\Projects\23011\00200\119348 Site Plan\C600 ESC Plans PH1.dwg, 12/17/2025 2:16:43 PM, Tony Zook,

SEE SHEET C608

SEE SHEET C603

SEE SHEET C604

LOT 148 2662 SQ. FT.
LOT 147 2000 SQ. FT.
LOT 146 2000 SQ. FT.
LOT 145 2000 SQ. FT.
LOT 144 2000 SQ. FT.
LOT 143 3001 SQ. FT.
LOT 142 3001 SQ. FT.

LOT 81 10933 SQ. FT.
LOT 80 W/O 8643 SQ. FT.
LOT 73 8812 SQ. FT.
LOT 82 8745 SQ. FT.
LOT 79 W/O 8708 SQ. FT.
LOT 72 8287 SQ. FT.
LOT 83 8579 SQ. FT.
LOT 78 W/O 8517 SQ. FT.
LOT 71 8287 SQ. FT.
LOT 84 9553 SQ. FT.
LOT 77 W/O 8636 SQ. FT.
LOT 70 8287 SQ. FT.
LOT 85 9644 SQ. FT.
LOT 76 W/O 8640 SQ. FT.
LOT 69 8287 SQ. FT.
LOT 86 9759 SQ. FT.
LOT 68 8287 SQ. FT.
LOT 149 9637 SQ. FT.
LOT 1 9212 SQ. FT.
LOT 2 8399 SQ. FT.

DA = 0.25 AC
C = 0.80
TO A26.3

DA = 0.25 AC
C = 0.80
TO A26.1

DA = 0.56 AC
C = 0.71
TO A25.2

DA = 0.32 AC
C = 0.62
TO A25.1

DA = 0.31 AC
C = 0.74
TO A14.2

DA = 0.27 AC
C = 0.71
TO A14.1

DA = 0.23 AC
C = 0.78
TO A19.2

DA = 0.57 AC
C = 0.72
TO A19.1

DA = 1.90 AC
C = 0.50
TO A20.2

DA = 1.09 AC
C = 0.43
TO A10.4

DA = 0.84 AC
C = 0.65
TO A17.1

DA = 0.41 AC
C = 0.70
TO A13.1

DA = 0.48 AC
C = 0.64
TO A13.2

DA = 0.15 AC
C = 0.91

CIP
DIP
SSF
25' BUFFER
PP #L400-P23
PP #L400-P24
PP #L400-P25
OHE
LOD

VINTON LANE
AUGUSTINE AVENUE
OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- CE — TEMPORARY CONSTRUCTION ENTRANCE
- CIP — CURB INLET PROTECTION
- DIP — DROP INLET PROTECTION
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- SSF — SUPER SILT FENCE
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- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEDIMENTATION & EROSION CONTROL PHII

SHEET No.
C602

P:\Projects\23011\00200\113948 Site Plan\C602 ESC Plan Ph2.dwg, 12/17/2025 2:17:41 PM, Tony Zocik,

SEE SHEET C608

SEE SHEET C602

SEE SHEET C605

632 VINTON LANE
PARCEL ID#19-08-001250217-0000
PARCEL 217 RESIDUE
ROSCOE A HAYES, ET AL
D.B. 1250 PG. 338
7,384,506 SQ. FT. OR 169.5249 ACRES
ZONED: F-112

DA = 0.56 AC
C = 0.78
TO A25.2

DA = 0.32 AC
C = 0.62
TO A25.1

DA = 0.31 AC
C = 0.49
TO A23.1

DA = 0.33 AC
C = 0.77
TO A28

DA = 0.19 AC
C = 0.71
TO A29

DA = 0.25 AC
C = 0.65
TO A30

DA = 0.61 AC
C = 0.78
TO A31

DA = 0.70 AC
C = 0.74
TO A32

DA = 0.31 AC
C = 0.68
TO A33.2

DA = 0.18 AC
C = 0.72
TO A32.1

DA = 0.10 AC
C = 0.80
TO A22.2

DA = 0.45 AC
C = 0.73
TO A22.1

DA = 1.90 AC
C = 0.50
TO A20.2

DA = 0.38 AC
C = 0.83
TO A20.1

DA = 1.06 AC
C = 0.72
TO A20.3

DA = 0.16 AC
C = 0.67
TO A34.1

DA = 0.01 AC
C = 0.68
TO A36.1

DA = 0.01 AC
C = 0.68
TO A36.2

DA = 0.36 AC
C = 0.69
TO A35.2

DA = 0.12 AC
C = 0.79
TO A35.1

LOT 149 90037 SQ. FT.
LOT 143 3001 SQ. FT.
LOT 142 3001 SQ. FT.
LOT 141 2001 SQ. FT.
LOT 140 2000 SQ. FT.
LOT 139 2000 SQ. FT.
LOT 138 2000 SQ. FT.
LOT 137 2962 SQ. FT.
LOT 136 3002 SQ. FT.
LOT 135 2002 SQ. FT.
LOT 134 2000 SQ. FT.
LOT 133 2000 SQ. FT.
LOT 132 2000 SQ. FT.
LOT 131 2000 SQ. FT.
LOT 130 2000 SQ. FT.
LOT 129 3001 SQ. FT.
LOT 121 2999 SQ. FT.
LOT 122 2000 SQ. FT.
LOT 123 2000 SQ. FT.
LOT 124 2000 SQ. FT.
LOT 125 2000 SQ. FT.
LOT 126 2000 SQ. FT.
LOT 127 2004 SQ. FT.
LOT 128 3001 SQ. FT.
LOT 120 3001 SQ. FT.
LOT 119 2003 SQ. FT.
LOT 118 2000 SQ. FT.
LOT 117 2000 SQ. FT.
LOT 116 2000 SQ. FT.
LOT 115 2000 SQ. FT.
LOT 114 2000 SQ. FT.
LOT 113 2984 SQ. FT.
LOT 96 3001 SQ. FT.
LOT 95 2002 SQ. FT.
LOT 94 2000 SQ. FT.
LOT 93 2000 SQ. FT.
LOT 92 2000 SQ. FT.
LOT 91 2000 SQ. FT.
LOT 90 2000 SQ. FT.
LOT 89 3001 SQ. FT.
LOT 97 2999 SQ. FT.
LOT 98 2000 SQ. FT.
LOT 99 2000 SQ. FT.
LOT 100 2000 SQ. FT.
LOT 101 2000 SQ. FT.
LOT 102 2000 SQ. FT.
LOT 103 2001 SQ. FT.
LOT 104 3001 SQ. FT.
LOT 112 3001 SQ. FT.
LOT 111 1995 SQ. FT.
LOT 110 2000 SQ. FT.
LOT 109 2000 SQ. FT.
LOT 108 2000 SQ. FT.
LOT 107 2000 SQ. FT.
LOT 106 2000 SQ. FT.
LOT 105 3001 SQ. FT.
LOT 2 99 SQ. FT.
LOT 3 8399 SQ. FT.
LOT 4 8399 SQ. FT.
LOT 5 8399 SQ. FT.
LOT 6 8399 SQ. FT.
LOT 7 8399 SQ. FT.
LOT 8 9209 SQ. FT.

CIP CURB INLET PROTECTION
DIP DROP INLET PROTECTION
SSF SUPER SILT FENCE
LOD LIMIT OF DISTURBANCE
OHE OVERHEAD ELECTRIC

VINTON LANE
AUGUSTINE AVENUE
OLD CAVE ROAD

KEY MAP
N.T.S.

LEGEND

- CE — TEMPORARY CONSTRUCTION ENTRANCE
- CIP — CURB INLET PROTECTION
- DIP — DROP INLET PROTECTION
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- SSF — SUPER SILT FENCE
- DD — DIVERSION DIKE
- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

WEST VIRGINIA STATE GRID NORTH
UTMS-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEDIMENTATION & EROSION CONTROL PHII

SHEET No.

C603

P:\Projects\23011\000200\113948 Site Plan\C602 ESC Plan Ph2.dwg, 12/17/2025 2:17:45 PM, Tony Zook,

SEE SHEET CXXX

SEE SHEET C602

SEE SHEET C605

SEE SHEET C606

LOT 87
9831 SQ. FT.

LOT 75
W/O
8640 SQ. FT.

LOT 67
8287 SQ. FT.

LOT 74
W/O
10908 SQ. FT.

LOT 66
9427 SQ. FT.

POTOMAC
EDISON
#LR400-CT-P27P5

LOT 88
12658 SQ. FT.

LOT 65
SOG
10360 SQ. FT.

LOT 64
SOG
9099 SQ. FT.

LOT 63
SOG
9099 SQ. FT.

LOT 62
SOG
9099 SQ. FT.

LOT 61
SOG
9099 SQ. FT.

LOT 60
SOG
9099 SQ. FT.

LOT 1
9212 SQ. FT.

LOT 2
8399 SQ. FT.

LOT 3
8399 SQ. FT.

LOT 9
9209 SQ. FT.

LOT 10
8399 SQ. FT.

LOT 11
8399 SQ. FT.

LOT 17
W/O
9501 SQ. FT.

LOT 18
W/O
8399 SQ. FT.

LOT 19
W/O
8399 SQ. FT.

LOT 25
9538 SQ. FT.

LOT 26
8399 SQ. FT.

LOT 27
8399 SQ. FT.

LOT 33
W/O
8641 SQ. FT.

LOT 34
W/O
8675 SQ. FT.

LOT 35
W/O
8675 SQ. FT.

PP #L400-P28

IRF W/ CAP

TOP

TOE

SSF

CIP

DIP

W

OHE

X

P

KEY MAP
N.T.S.

LEGEND

- CE — TEMPORARY CONSTRUCTION ENTRANCE
- CIP — CURB INLET PROTECTION
- DIP — DROP INLET PROTECTION
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- DD — DIVERSION DIKE
- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

UTM 18F
WEST VIRGINIA STATE GRID NORTH

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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Lanham, MD 20706 P 240.296.1574
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PRELIMINARY PLANS - AUGUSTINE MANOR PHASE 1

LOT 217

PARCEL I.D.: 120217

CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

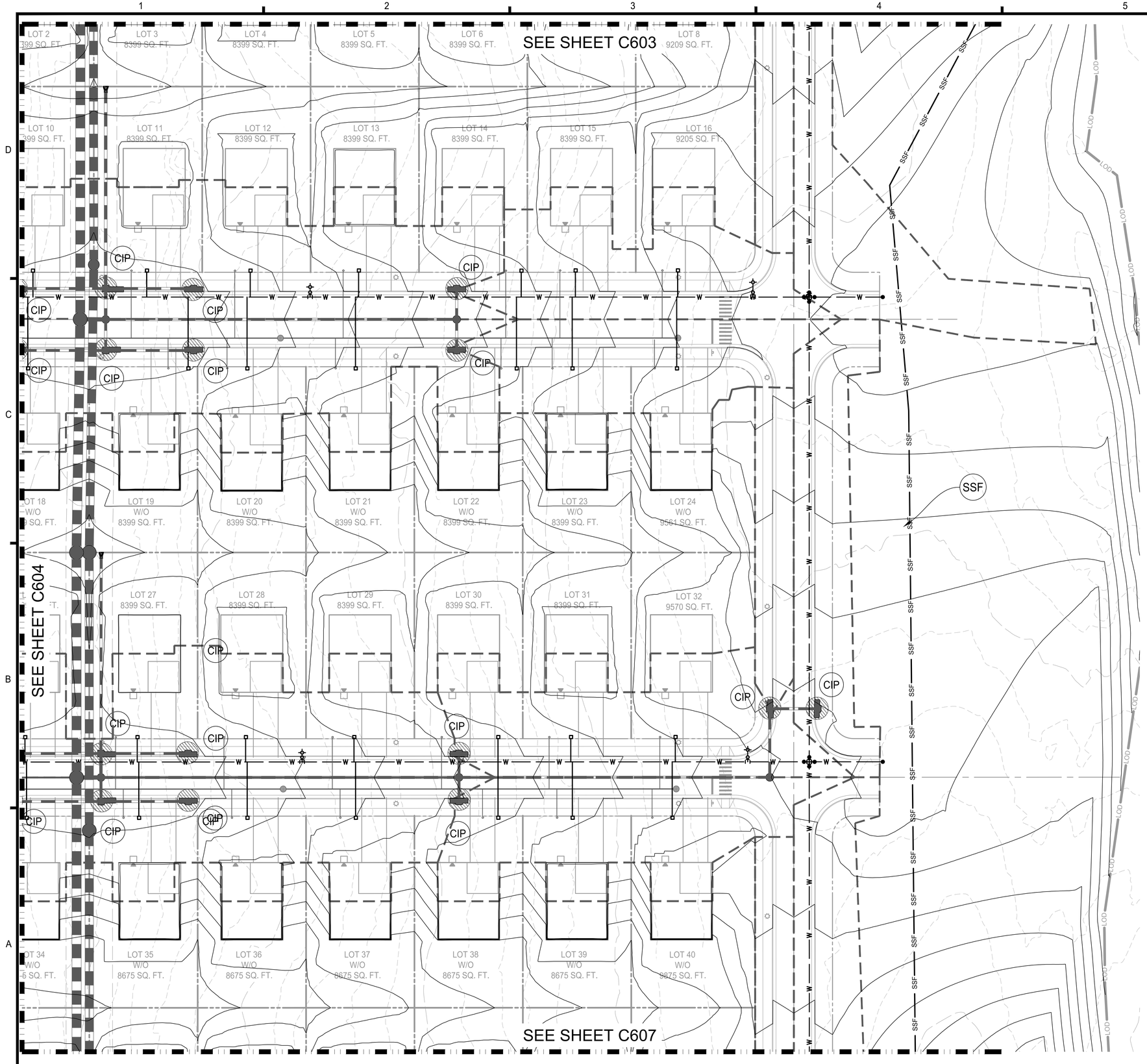
SHEET TITLE:

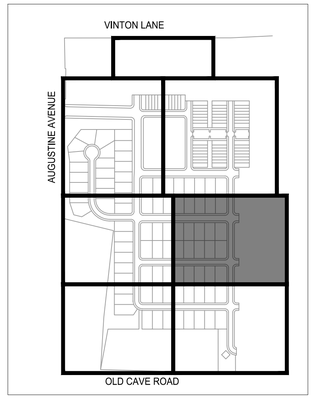
SEDIMENTATION & EROSION CONTROL PHII

SHEET No.

C604

P:\Projects\23011\02\05\11\13948 Site Plan\C602 ESC Plan Ph2.dwg, 12/17/2025 2:17:48 PM, Tony Zook,





KEY MAP
N.T.S.

LEGEND

- CE — TEMPORARY CONSTRUCTION ENTRANCE
- CIP — CURB INLET PROTECTION
- DIP — DROP INLET PROTECTION
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- DD — DIVERSION DIKE
- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

UTM 83-98 WEST VIRGINIA STATE GRID NORTH

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEDIMENTATION & EROSION CONTROL PHII

SHEET No.
C605

P:\Projects\23011\02000\11394B Site Plan\C602 ESC Plan Ph2.dwg, 12/17/2025 2:17:52 PM, Tony Zook,

SEE SHEET C604

SEE SHEET C607

LOT 59
SOG
9099 SQ. FT.

LOT 58
SOG
9196 SQ. FT.

LOT 57
SOG
10555 SQ. FT.

LOT 41
9944 SQ. FT.

LOT 42
8743 SQ. FT.

LOT 56
W/O
8751 SQ. FT.

LOT 55
W/O
8751 SQ. FT.

DA = 0.58 AC
C = 0.68
TO A42.2

DA = 0.80 AC
C = 0.66
TO A42.1



KEY MAP
N.T.S.

LEGEND

- CE — TEMPORARY CONSTRUCTION ENTRANCE
- CIP — CURB INLET PROTECTION
- DIP — DROP INLET PROTECTION
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- DD — DIVERSION DIKE
- WR — WASH RACK
- CWS — CONCRETE WASHOUT STRUCTURE

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEDIMENTATION
& EROSION
CONTROL PHII

SHEET No.
C606

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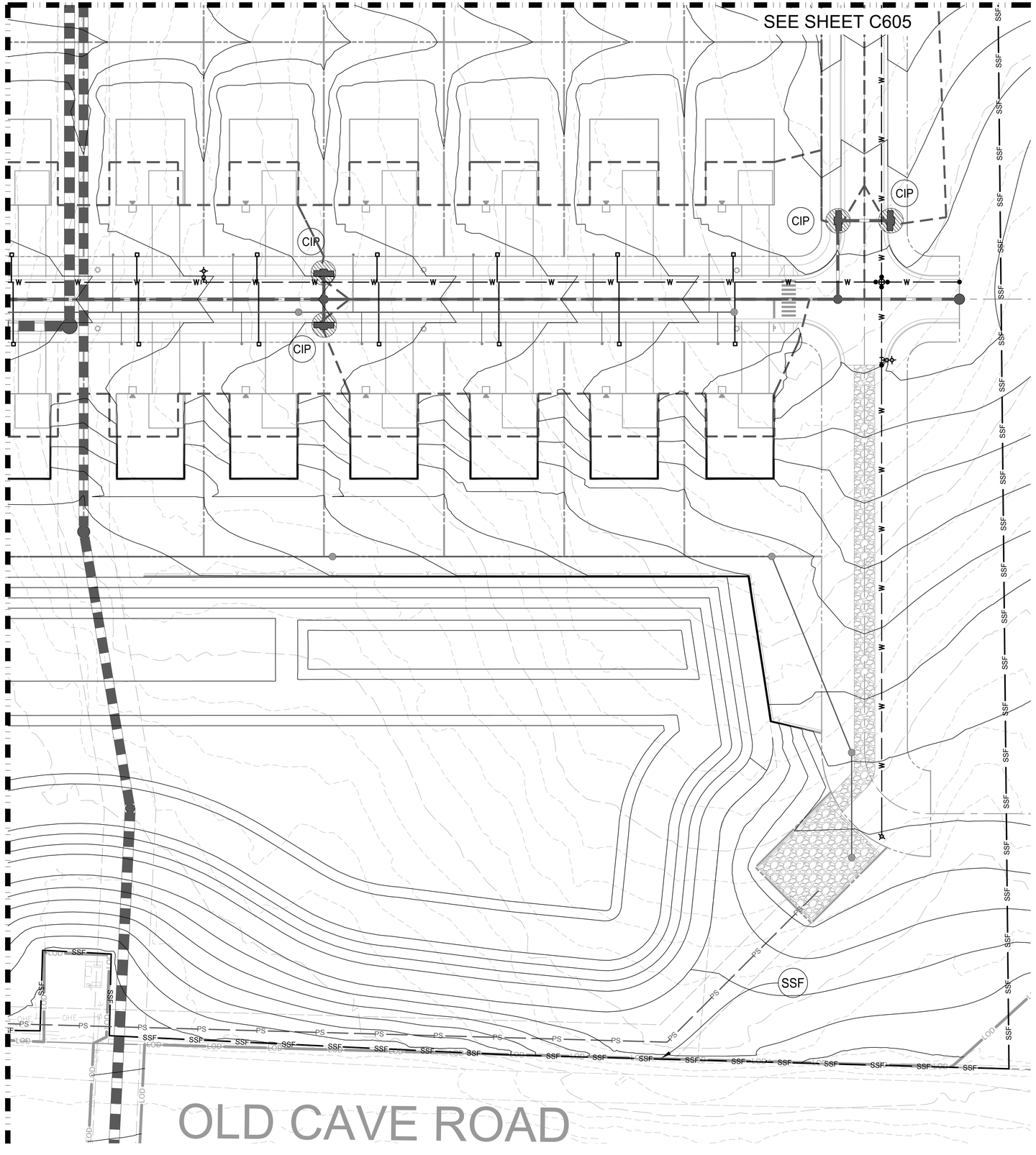

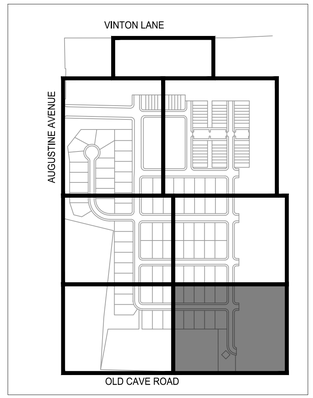

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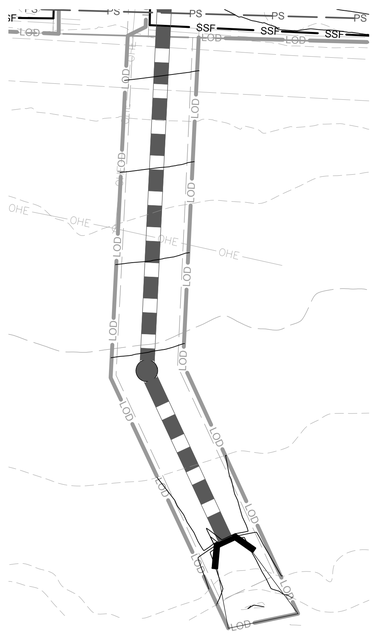



30 15 0 30 60
GRAPHIC SCALE
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SEDIMENTATION & EROSION CONTROL PHII

SHEET No.
C607

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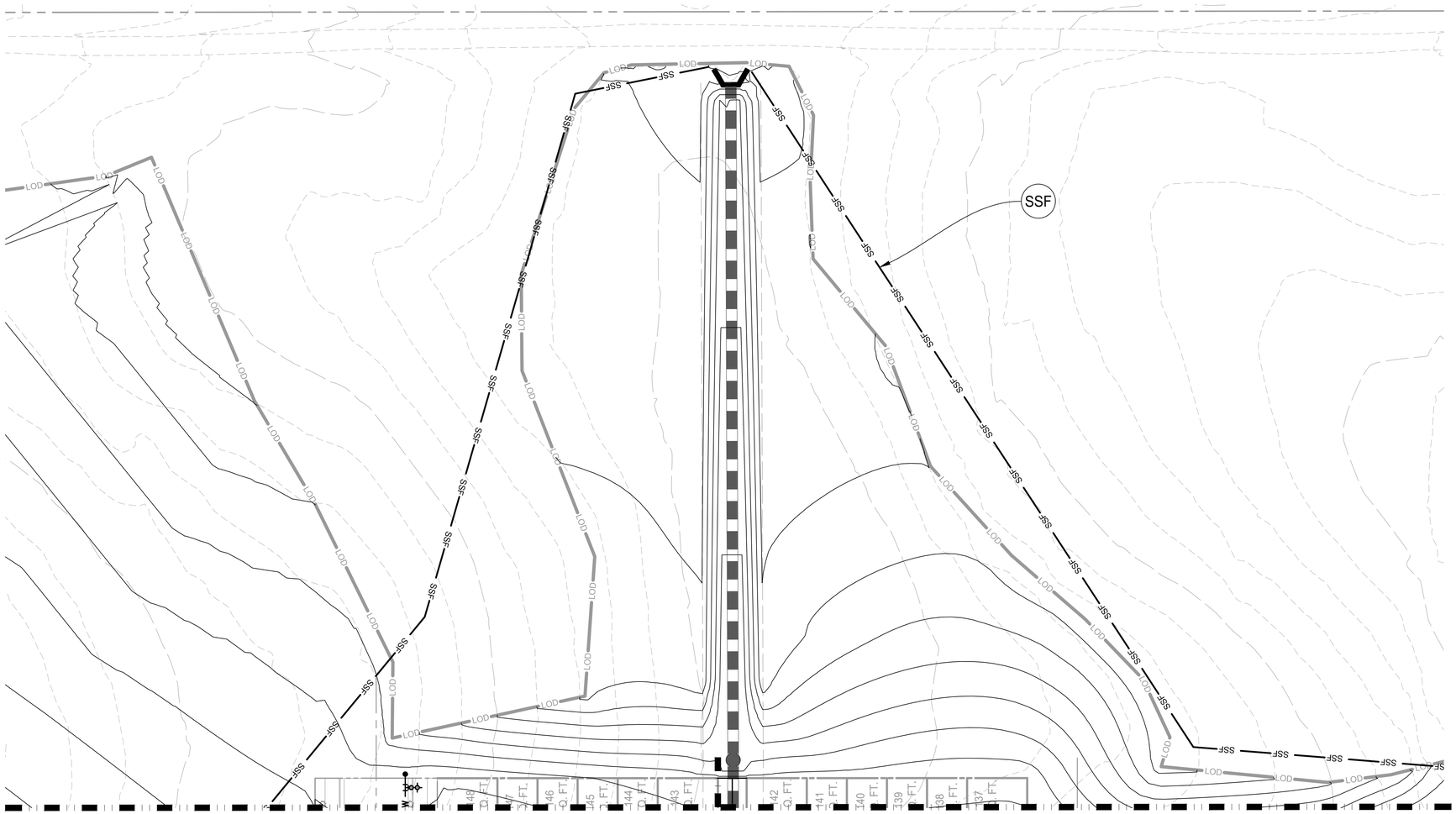
SSF
LOD
SSF
LOD
SSF
LOD

EROSION AND SEDIMENT CONTROL NARRATIVE

Description: The Project delineated hereon is located in the City of Charles Town, WV. This plan proposes construction of 148 residential lots, both single family and town homes, and associated roads and utilities. Approximately 47.23 acres will be disturbed for construction.

Date of construction: Construction will begin following plan approval and is estimated to take up to 6 Months to complete the initial sitework and infrastructure and 1.5 years to complete the project.

Offsite areas: Top soil will be stripped from graded areas and stockpiled for use in final grading and permanent stabilization. Stockpiles will be kept on site and clear of all construction activities. The stockpiles will be be stabilized with temporary seeding and protected with silt fence or earthern berms.

Erosion And Sediment Control Measures: Unless otherwise indicated, all vegetative and structural erosion and sediment control measures shall be constructed and maintained according to the minimum standards and specifications of the West Virginia Erosion and Sediment Control Handbook.

Management Strategies:

Construction shall be sequenced such that grading operations will begin and end as quickly as possible.

The site superintendent shall be responsible for the installation and maintenance of all erosion and sediment control measures. Maintenance of these measures throughout the project is critical to the effectiveness of the program.

After areas above controls have been stabilized, the controls shall be cleaned up and removed.

Electric power, telephone, storm, sanitary, water & gas supply trenches (as applicable) are to be compacted, seeded and mulched within seven (7) days after backfilling. No more than 500 feet are to be open at any one time.

All cut and fill slopes are to be seeded and mulched within seven (7) days of completion of grading.

Drainage swales shall be stabilized with check dams until vegetation has been well established, at which time the temporary check dams shall be removed.

Devices listed above are considered minimum erosion and sediment controls. Additional control measures may be necessary due to contractor phasing or other unforeseen conditions. It is the contractor's responsibility to provide additional measures to those shown, as needed, in order to control erosion and contain sediment on site. All measures shall be installed according to the standards and specifications in the West Virginia erosion and sediment control handbook.

Maintenance Program:

All control measures shall be inspected daily by the site superintendent or his representative and within 24 hours after any storm event greater than 0.25 inches of rain per 24-hour period. Any damaged structural measures are to be repaired by the end of the day. Seeded areas shall be checked regularly to ensure that a good stand of grass is maintained. All areas shall be fertilized and reseeded as needed until grass is established.

Trapped sediment is to be removed as required to maintain 50% trap efficiency and disposed of by spreading on site.

Inlet protection shall be checked regularly for sediment build-up. If the gravel outlet is clogged by sediment, it shall be removed and cleaned or replaced immediately.

The contractor is responsible for keeping existing public roads in a clean, dust and mud free, condition at all times.

Erosion and sediment control program:

1. Hold pre-construction meeting on site with inspector.
2. Install construction entrance.
3. Clearing and grubbing for sediment control devices only.
4. Placement of sediment control devices.
5. Obtain inspector's approval prior to beginning grading operations.
6. Clear and grub remainder of site.
7. Rough grade site.
8. Install drainage devices with sediment control. This includes drainage swales with RIP-RAP.
9. Final grading.
10. Restoration and stabilization of disturbed areas.
11. Convert trap to Bio-retention (see Bio-retention Sequence of Construction for details).
12. Remove erosion and sediment control measures with the approval of the inspector.

Note: City of Charles Town Public Officials retain the right to add and/or modify these erosion and sediment control measures during the construction process, within reason, to ensure adequate protection to the public and the environment.

Seeding schedule (soil stabilization):

All permanent seeding shall be in accordance with the West Virginia Erosion & Sediment Control Manual.

Dust control:

1. Temporary seeding shall be applied to all disturbed areas subject to little or no construction traffic.
2. All haul roads and other heavy traffic routes shall be sprinkled with water until the surface is wet and repeated as needed to control dust.

Stormwater Management Narrative:

The proposed Stormwater Management Facility was designed to service the full build out of the development within its drainage area including future phases. The proposed pond, as designed, meets the 1999 Virginia Stormwater Management Handbook, which is one of the practices allowable by the City of Charles Town Code. Chapter 2 of the VSMH states sites are allowed to use the Technology-based water quality criteria so that for land development, "the post developed stormwater runoff from the impervious cover shall be treated by an appropriate BMP as required by the post-developed condition percent impervious cover as specified in Table 2-3." Table 2-3 allows an Extended Detention facility to be utilized when the impervious cover is from 22-37%.

MINIMUM CONSTRUCTION STANDARDS

An erosion and sediment control program adopted with this plan must be consistent with the VSECH for 9VAC25-840-40 minimum standards:

1. **Permanent or temporary soil stabilization shall be applied to denuded areas within four days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within four days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.**
2. **During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.**
3. **A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.**
4. **Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.**
5. **Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.**
6. **Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.**
   a. **The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.**
   b. **Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 100-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.**
7. **Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.**
8. **Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.**
9. **Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.**
10. **All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.**
11. **Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.**
12. **When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.**
13. **When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.**
14. **All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.**
15. **The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.**
16. **Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:**
    a. **No more than 500 linear feet of trench may be opened at one time.**
    b. **Excavated material shall be placed on the uphill side of trenches.**
    c. **Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.**
    d. **Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.**
    e. **Restabilization shall be accomplished in accordance with this chapter.**
    f. **Applicable safety requirements shall be complied with.**
17. **Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.**
18. **All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the City of Charles Town authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.**
19. **Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels:**
    a. **Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.**
    b. **Adequacy of all channels and pipes shall be verified in the following manner:**
       (1) **The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or**
       (2) **(a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.**
       (b) **All previously constructed man-made channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and**
       (c) **Pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.**
    c. **If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:**
       (1) **Improve the channels to a condition where a 10-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel, the bed, or the banks; or**
       (2) **Improve the pipe or pipe system to a condition where the 10-year storm is contained within the appurtenances;**
       (3) **Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a 10-year storm to increase when runoff outfalls into a man-made channel; or**
       (4) **Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the City of Charles Town authority to prevent downstream erosion.**
    d. **The applicant shall provide evidence of permission to make the improvements.**
    e. **All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.**
    f. **If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the City of Charles Town of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.**
    g. **Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.**
    h. **All on-site channels must be verified to be adequate.**
    i. **Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.**
    j. **In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.**
    k. **All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.**
    l. **Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 62.1-44.15:54 or 62.1-44.15:65 of the Act.**
    m. **For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities are in accordance with 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMP) Regulation or are exempt pursuant to subdivision C 7 of § 62.1-44.15:34 of the Act.**
    n. **Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulation shall be deemed to satisfy the requirements of this subdivision 19.**

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR TO NOTIFY MISS UTILITY (WV811.COM, DIAL 811 OR 1-800-245-4848) 72 HOURS PRIOR TO ANY EXCAVATION.
2. CONTRACTOR TO CONTACT CITY OF CHARLES TOWN 48 HOURS BEFORE BEGINNING CONSTRUCTION.
3. ESTABLISH THE LIMIT OF DISTURBANCE AND CLEAR AND GRUB THE SITE TO THE EXTENT NECESSARY TO INSTALL PERIMETER SEDIMENT & EROSION CONTROLS. UTILIZE THE STOCKPILE AREA AS SHOWN ON THE PLAN, AS NEEDED.
4. CONSTRUCT SUPER SILT FENCE, STABILIZE CONSTRUCTION ENTRANCE, AND A SEDIMENT BASIN AS SHOWN ON PLANS.
5. BEGIN SITE DEMOLITION AS SHOWN ON THE DEMOLITION PLAN.
6. AFTER SITE DEMOLITION, BEGIN MASS GRADING, UTILITY AND STORM DRAIN INSTALLATION. INSTALL INLET PROTECTION AS STORM DRAIN INSTALLATION IS COMPLETED AS SHOWN ON THE PLAN.
7. CONSTRUCT CURB AND GUTTER.
8. UPON COMPLETION OF CURB AND GUTTER, INSTALL BASE PAVING. DELAY INSTALLATION OF TOP COURSE UNTIL ALL HEAVY EQUIPMENT HAS BEEN REMOVED FROM THE SITE.
9. UPON COMPLETION OF ALL SITE WORK AND BUILDING CONSTRUCTION, REPAIR ANY DAMAGED PAVING AND INSTALL TOP COURSE PAVING AND MILL AND OVERLAY PAVING AS NECESSARY.
10. APPLY PAVEMENT MARKINGS UPON COMPLETION OF PAVING WORK. STABILIZE ALL LANDSCAPE AREAS WITH GRASS OR PLANT MATERIALS AS SHOWN ON THE PLANS AND INSTALL LIGHTING.
11. UPON COMPLETE STABILIZATION OF ALL AREAS, OBTAIN INSPECTOR APPROVAL AND REMOVE SEDIMENT CONTROL DEVICES. STABILIZE ANY REMAINING AREAS. INSPECTOR MAY APPROVE PHASES STABILIZATION BASED ON BUILDING COMPLETION PHASING.

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NARRATIVE &
NOTES

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C609

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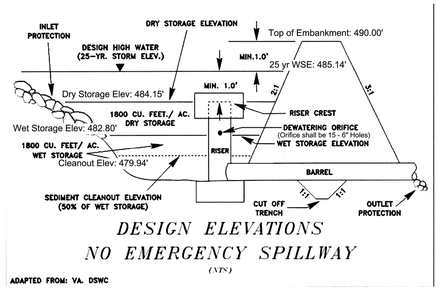
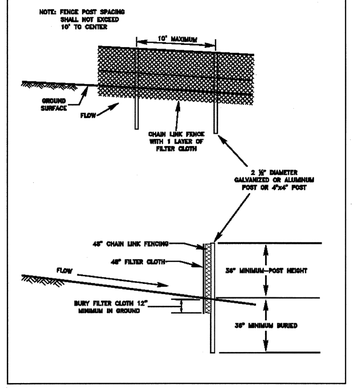


DESIGN ELEVATIONS
NO EMERGENCY SPILLWAY
(NTS)

ADAPTED FROM: VA. DSWC

FIGURE 3.28.1

SUPER SILT FENCE



3.28-3

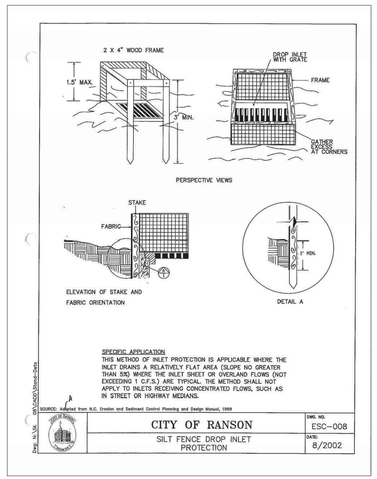
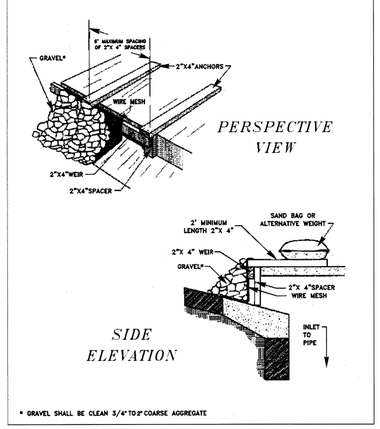


FIGURE 3.33.7

CURB INLET PROTECTION WITH 2" x 4" WOODEN WEIR



3.33-13

C-1 STANDARDS AND SPECIFICATIONS

FOR

EARTH DIKE

Definition

A temporary berm or ridge of soil, compacted, stabilized, and located in such a manner as to direct water to a desired location.

Purpose

To direct sediment-laden runoff to a sediment trapping practice or to intercept and divert clear water away from disturbed areas.

Conditions Where Practice Applies

Along the limit of disturbance (LOD) or across disturbed areas. Generally, earth dikes remain in place until the disturbed contributory drainage areas are permanently stabilized.

Appropriate uses of earth dikes include the following:

1. To divert sediment-laden runoff from a disturbed area to a sediment trapping practice.
2. To segment drainage areas to reduce acreage to sediment control practices.
3. To divert clear water from an undisturbed area to a stabilized outlet at non-erosive velocity.

There are two standard sizes of earth dikes and three types of flow channel stabilization.

Design Criteria

Table C.1: Earth Dike Design Criteria

	Dike A	Dike B
Drainage Area	(See Table C.2)	(See Table C.2)
Slope (of dike)	(See Table C.2)	(See Table C.2)
Dike Height (a)	18 inches	30 inches
Dike Width (b)	24 inches	36 inches
Flow Width (c)	4 feet	6 feet
Flow Depth in Channel (d)	12 inches	24 inches
Side Slopes	2:1 or flatter	2:1 or flatter

Design Criteria (continued)

Flow Channel Stabilization

1	Seed with straw mulch and tack.
2	Seed with soil stabilization matting or sod.
3	Four (4) to seven (7) inch stone or equivalent recycled concrete pressed flush a minimum of seven (7) inches into ground.

1. Determine the longitudinal slopes of the earth dike. Determine the drainage area to various design points along the proposed earth dike alignment.
2. Design points are located where changes in slope and/or increases in drainage area may alter the type and stabilization of earth dike.
3. Use Table C.2 to select the appropriate earth dike type (A or B) and flow channel stabilization (1, 2, or 3) for the earth dike alignment between the design points. **Flow channel stabilization 1 (seed and mulch) is not allowed for diverting clear water.**
4. Review the slopes along the earth dike alignment between the design points to ensure that the slope/drainage area relationship does not exceed the selected flow channel stabilization.
5. Maintain positive drainage along the entire length of the earth dike. Spot elevations must be provided for earth dikes having longitudinal slopes flatter than 1%.
6. For drainage areas other than specified in Table C.2, an engineering design is required.
7. Show earth dike type (A or B) and flow channel stabilization (1, 2, or 3) on the plans using the standard symbol and A-1 or B-3, etc. Place designation (e.g., A-1) on flow channel side of dike. Earth dike type and stabilization may vary along the dike's length.
8. Discharge velocities from an earth dike must be non-erosive.
9. Where an earth dike is used to convey runoff from disturbed areas, the discharge must be to a sediment control practice suitable for concentrated flow. Silt fence and super silt fence are unacceptable for receiving discharges from earth dikes.
10. Where an earth dike is used to convey clear water runoff, the discharge must be to an undisturbed, stable area at a non-erosive velocity (4 fps); otherwise, provide outlet protection.
11. When an earth dike is used in conjunction with a sediment trapping device, sequence construction so that the earth dike installation follows completion of the sediment trapping device(s).

Table C.2: Earth Dike Selection

Slope % **	Drainage Area (acres) 1	2	3	4	5	6	7	8	9	10
1	SEED &	MULCH	4					B-2		
2	A-1	4	SEED	AND						
3			SOIL	STABILI	ZATION	MATT	ING	6	6	6
4	4*		A-2	OR	SOD		6			
5					6	6			B-3	
6				6		4 TO 7	INCH	STONE		
7			6							
8						A-3				
9										
10		6								

"A" Dike — "B" Dike

*Velocity of discharge in feet per second
** For earth dike slopes steeper than 10 percent refer to Section D - Erosion Control

Notes:
If the slope of the earth dike or drainage area to the dike falls between values on Table C.2, round to the next higher slope or drainage area.

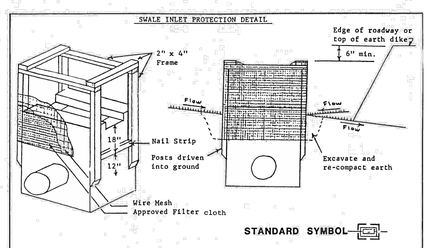
A-1 earth dikes are not allowed for diverting clear water.

Stabilization

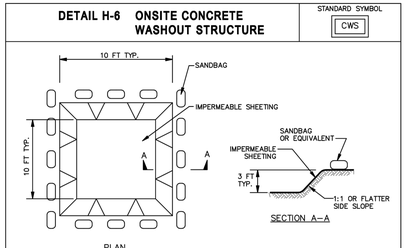
A-1: Seed with mulch and tack

A-2/B-2: Seed and soil stabilization matting or sod

A-3/B-3: 4 to 7 inch stone pressed flush into ground a minimum of 7 inches



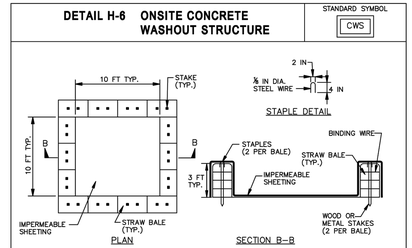
JEFFERSON COUNTY, WEST VIRGINIA	APPROVED: March 10,1980 COUNTY ENGINEER	INLET PROTECTION DETAIL	REVISIONS:	DETAIL No. SC -13



1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

H.24



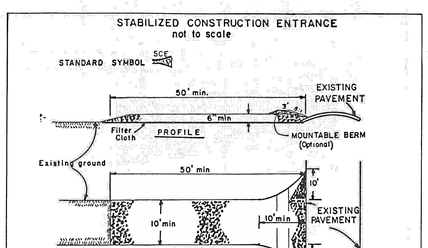
CONSTRUCTION SPECIFICATIONS

1. LOCATE WASHOUT STRUCTURE A MINIMUM OF 50 FEET AWAY FROM OPEN CHANNELS, STORM DRAIN INLETS, SENSITIVE AREAS, WETLANDS, BUFFERS AND WATER COURSES AND AWAY FROM CONSTRUCTION TRAFFIC.
2. SIZE WASHOUT STRUCTURE FOR VOLUME NECESSARY TO CONTAIN WASH WATER AND SOLIDS AND MAINTAIN AT LEAST 4 INCHES OF FREEBOARD. TYPICAL DIMENSIONS ARE 10 FEET X 10 FEET X 3 FEET DEEP.
3. PREPARE SOIL BASE FREE OF ROCKS OR OTHER DEBRIS THAT MAY CAUSE TEARS OR HOLES IN THE LINER. FOR LINER, USE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING, FREE OF HOLES AND TEARS OR OTHER DEFECTS THAT COMPROMISE IMPERMEABILITY OF THE MATERIAL.
4. PROVIDE A SIGN FOR THE WASHOUT IN CLOSE PROXIMITY TO THE FACILITY.
5. KEEP CONCRETE WASHOUT STRUCTURE WATER TIGHT. REPLACE IMPERMEABLE LINER IF DAMAGED (E.G., RIPPED OR PUNCTURED). EMPTY OR REPLACE WASHOUT STRUCTURE THAT IS 75 PERCENT FULL, AND DISPOSE OF ACCUMULATED MATERIAL PROPERLY. DO NOT REUSE PLASTIC LINER. WET-VACUUM STORED LIQUIDS THAT HAVE NOT EVAPORATED AND DISPOSE OF IN AN APPROVED MANNER. PRIOR TO FORECASTED RAINSTORMS, REMOVE LIQUIDS OR COVER STRUCTURE TO PREVENT OVERFLOWS. REMOVE HARDENED SOLIDS, WHOLE OR BROKEN UP, FOR DISPOSAL OR RECYCLING. MAINTAIN RUNOFF DIVERSION AROUND EXCAVATED WASHOUT STRUCTURE UNTIL STRUCTURE IS REMOVED.

2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

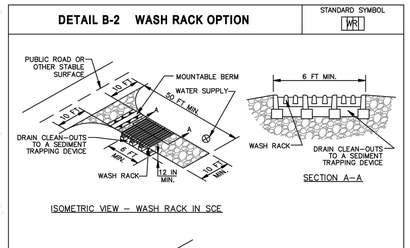
H.25



CONSTRUCTION SPECIFICATIONS

1. Stone Size - Use 2" stone, or reclaimed or recycled concrete equivalent.
2. Length - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness - Not less than six (6) inches.
4. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Filter Cloth - Will be placed over the entire area prior to placing of stone. Filter will not be required on a single family residence lot.
6. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing - Wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Periodic inspection and needed maintenance shall be provided after each rain.

JEFFERSON COUNTY, WEST VIRGINIA	APPROVED: March 10,1980 COUNTY ENGINEER	STABILIZED CONSTRUCTION ENTRANCE	REVISIONS:	DETAIL No. SC -10



CONSTRUCTION SPECIFICATIONS

1. USE A WASH RACK DESIGNED AND CONSTRUCTED/MANUFACTURED FOR THE ANTICIPATED TRAFFIC LOADS. CONCRETE, STEEL, OR OTHER MATERIALS ARE ACCEPTABLE. PRE-FABRICATED UNITS SUCH AS CATTLE GUARDS ARE ACCEPTABLE. USE MINIMUM DIMENSION OF 6 FEET x 10 FEET. ORIENT DIRECTION OF RIBS AS SHOWN ON THE DETAIL.
2. INSTALL PRIOR TO, ALONG SIDE OF, OR AS PART OF THE SCE.
3. DIRECT WASH WATER TO AN APPROVED SEDIMENT TRAPPING DEVICE.
4. KEEP AREA UNDER WASH RACK FREE OF ACCUMULATED SEDIMENT. IF DAMAGED, REPAIR OR REPLACE WASH RACK.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

B.4

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

SEC DETAILS

SHEET No.

C610

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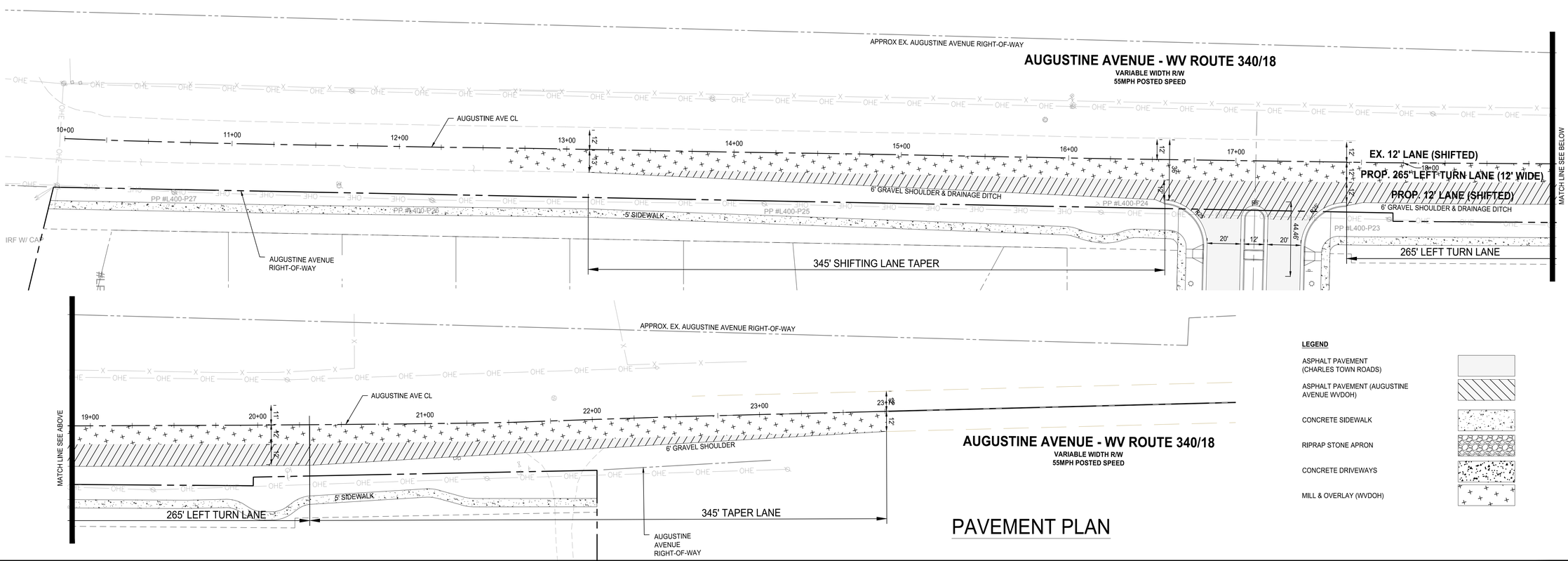
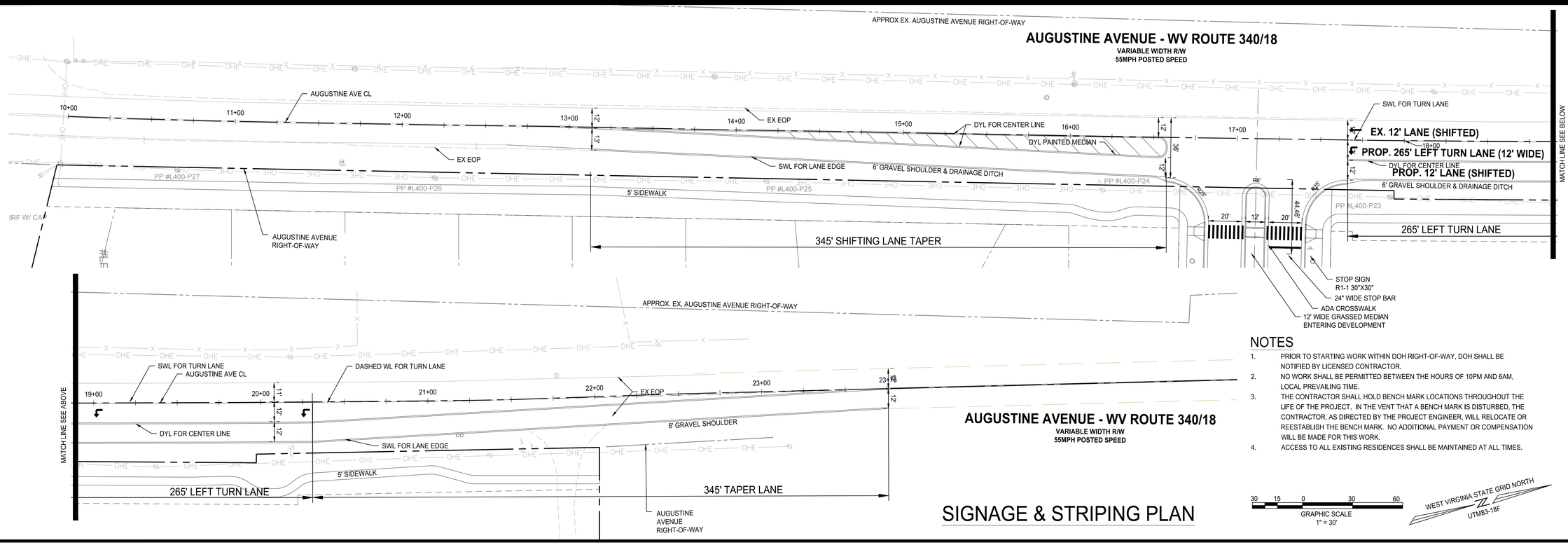


PAVEMENT PLAN



SIGNAGE & STRIPING PLAN

NOTES

1. PRIOR TO STARTING WORK WITHIN DOH RIGHT-OF-WAY, DOH SHALL BE NOTIFIED BY LICENSED CONTRACTOR.
2. NO WORK SHALL BE PERMITTED BETWEEN THE HOURS OF 10PM AND 6AM, LOCAL PREVAILING TIME.
3. THE CONTRACTOR SHALL HOLD BENCH MARK LOCATIONS THROUGHOUT THE LIFE OF THE PROJECT. IN THE VENT THAT A BENCH MARK IS DISTURBED, THE CONTRACTOR, AS DIRECTED BY THE PROJECT ENGINEER, WILL RELOCATE OR REESTABLISH THE BENCH MARK. NO ADDITIONAL PAYMENT OR COMPENSATION WILL BE MADE FOR THIS WORK.
4. ACCESS TO ALL EXISTING RESIDENCES SHALL BE MAINTAINED AT ALL TIMES.

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

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PRELIMINARY PLANS - NOT FOR CONSTRUCTION

AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
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CHECKED: TZ

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AUGUSTINE AVE IMPROVEMENT PLANS

SHEET No.

C700

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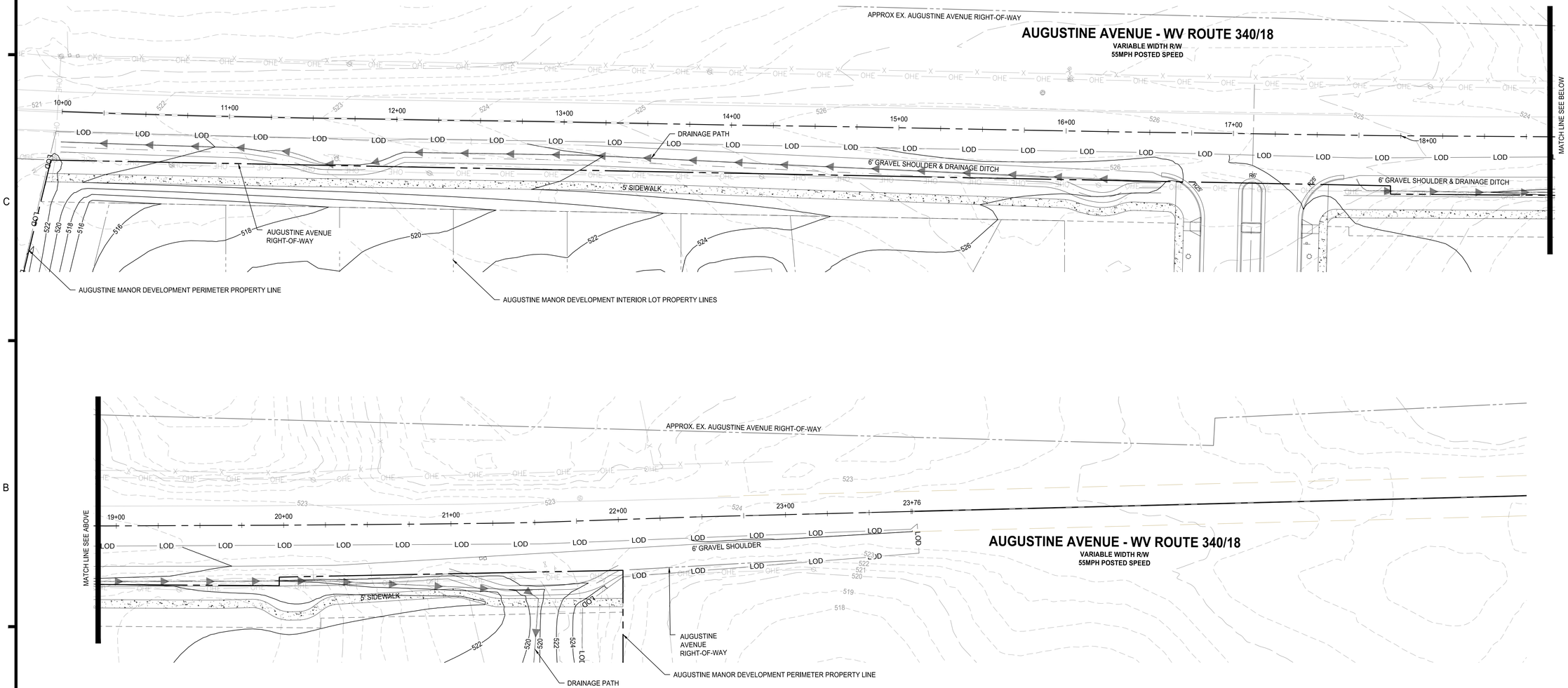

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
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SHEET TITLE:

AUGUSTINE AVE IMPROVEMENT PLANS

SHEET No.

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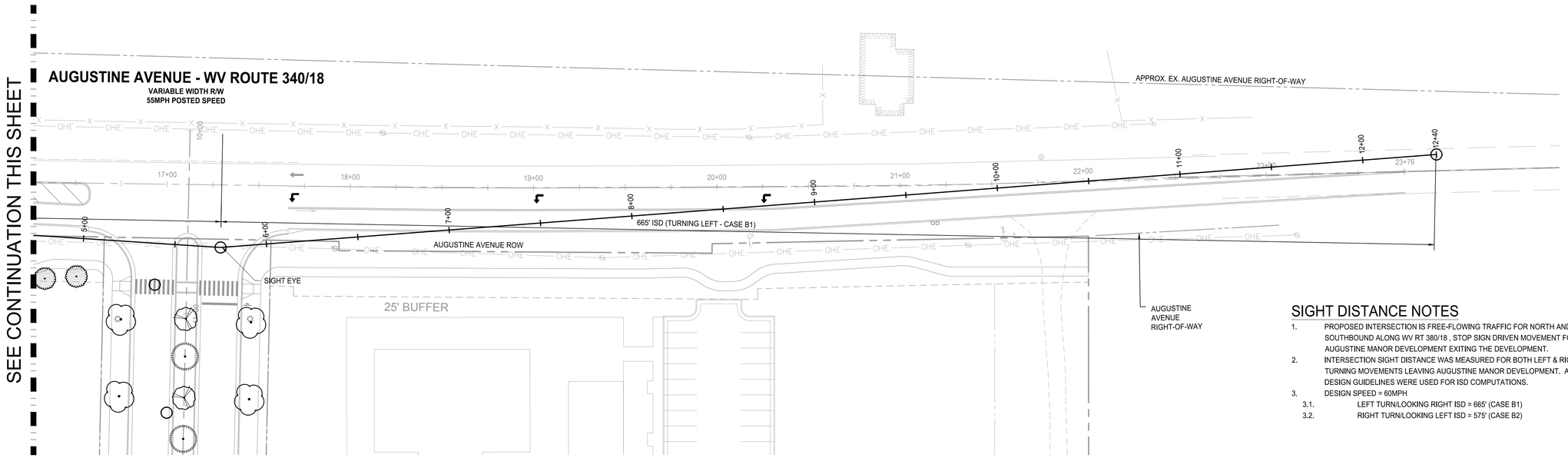
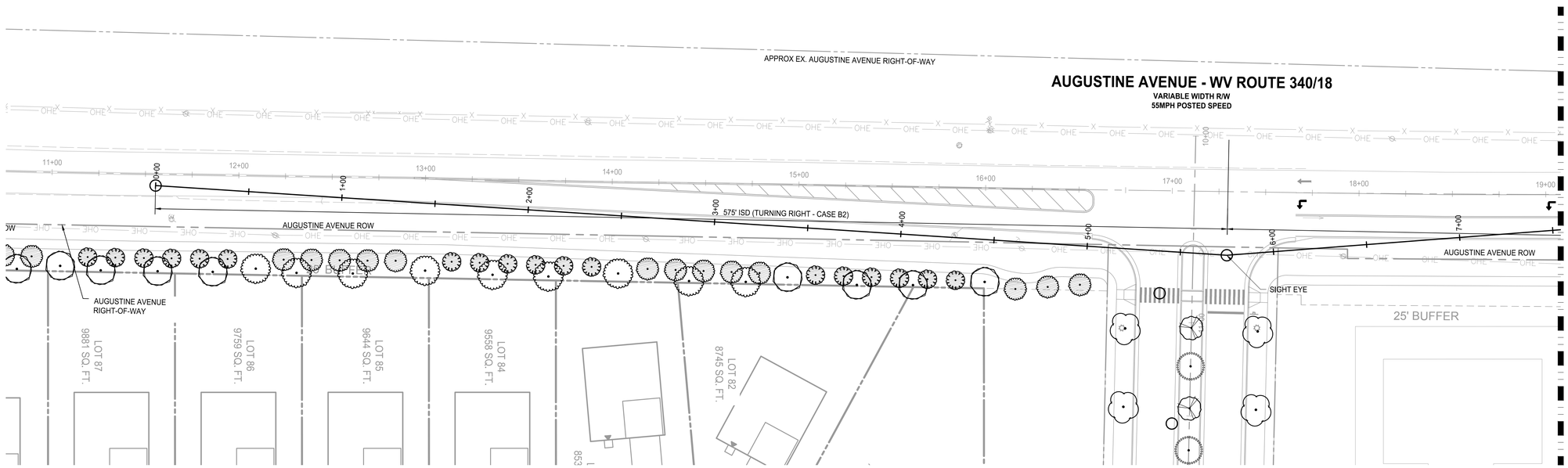


SEE CONTINUATION THIS SHEET

SIGHT DISTANCE NOTES

1. PROPOSED INTERSECTION IS FREE-FLOWING TRAFFIC FOR NORTH AND SOUTHBOUND ALONG WV RT 380/18 , STOP SIGN DRIVEN MOVEMENT FOR AUGUSTINE MANOR DEVELOPMENT EXITING THE DEVELOPMENT.
2. INTERSECTION SIGHT DISTANCE WAS MEASURED FOR BOTH LEFT & RIGHT TURNING MOVEMENTS LEAVING AUGUSTINE MANOR DEVELOPMENT. AASHTO DESIGN GUIDELINES WERE USED FOR ISD COMPUTATIONS.
3. DESIGN SPEED = 60MPH
   - 3.1. LEFT TURN/LOOKING RIGHT ISD = 665' (CASE B1)
   - 3.2. RIGHT TURN/LOOKING LEFT ISD = 575' (CASE B2)



SEE CONTINUATION THIS SHEET

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

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PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

AUGUSTINE AVE SIGHT DISTANCE PLAN

SHEET No.

C702

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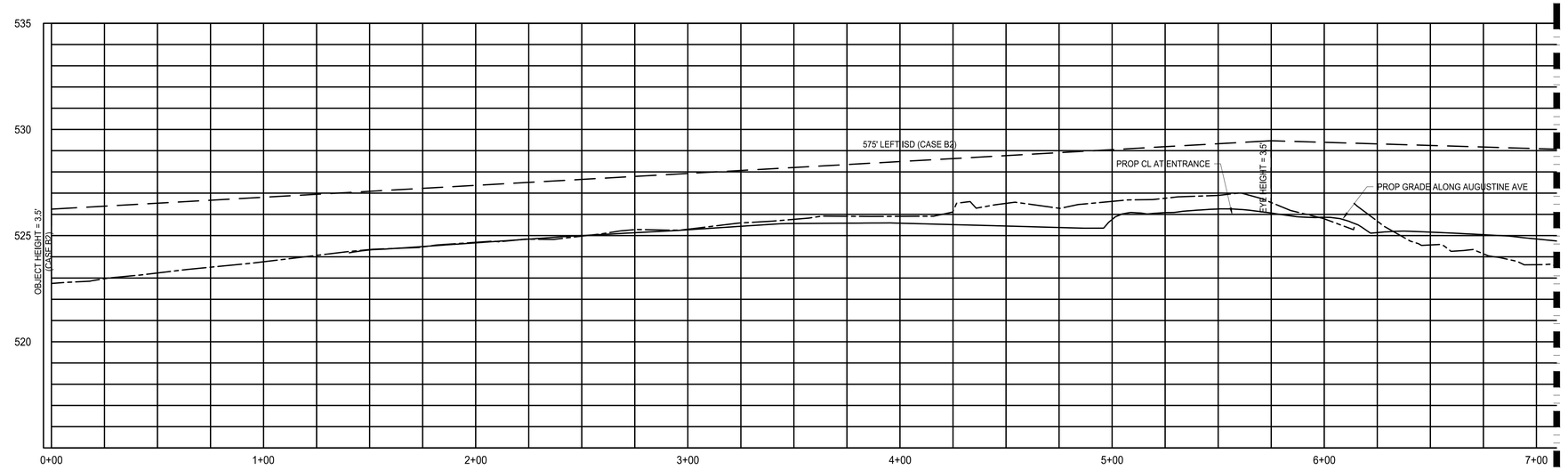
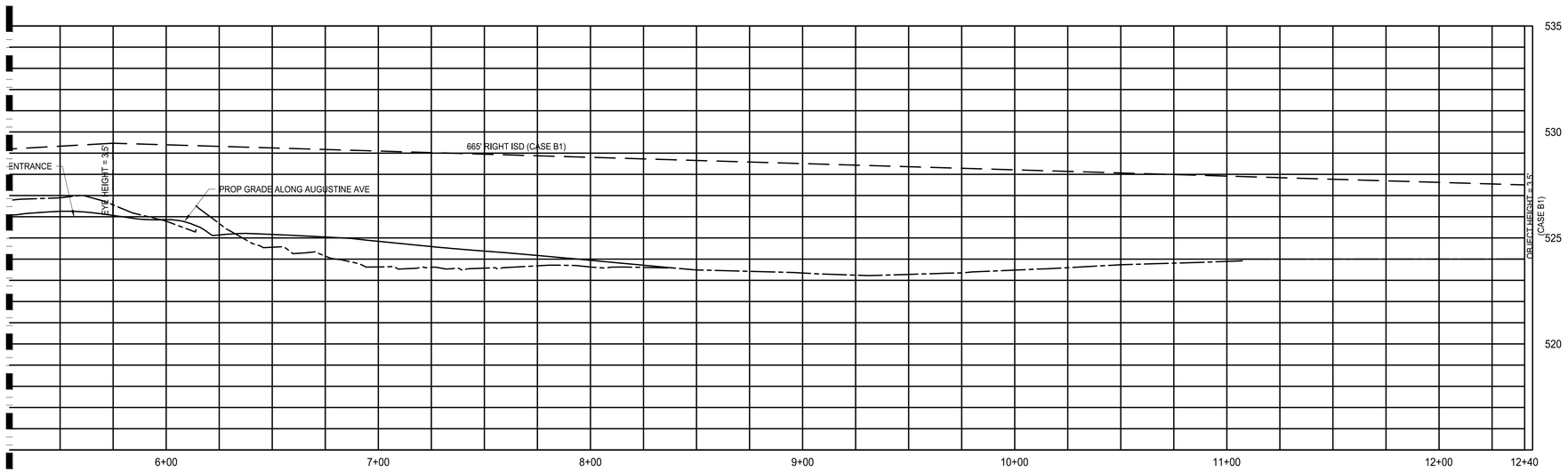


SEE PROFILE CONTINUATION THIS SHEET

SIGHT DISTANCE AUGUSTINE AVE



SEE PROFILE CONTINUATION THIS SHEET

SIGHT DISTANCE AUGUSTINE AVE

LEGEND

PROPOSED GRADE

EXISTING GRADE

3 1.5 0 3 6
VERT. GRAPHIC SCALE
1" = 3'

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
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CHECKED: TZ

SHEET TITLE:

AUGUSTINE AVE SIGHT DISTANCE PROFILE

SHEET No.

C703

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GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
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DRAWN: AF
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AUGUSTINE AVE CROSS SECTIONS

SHEET No.
C704

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GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
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AUGUSTINE AVE CROSS SECTIONS

SHEET No.

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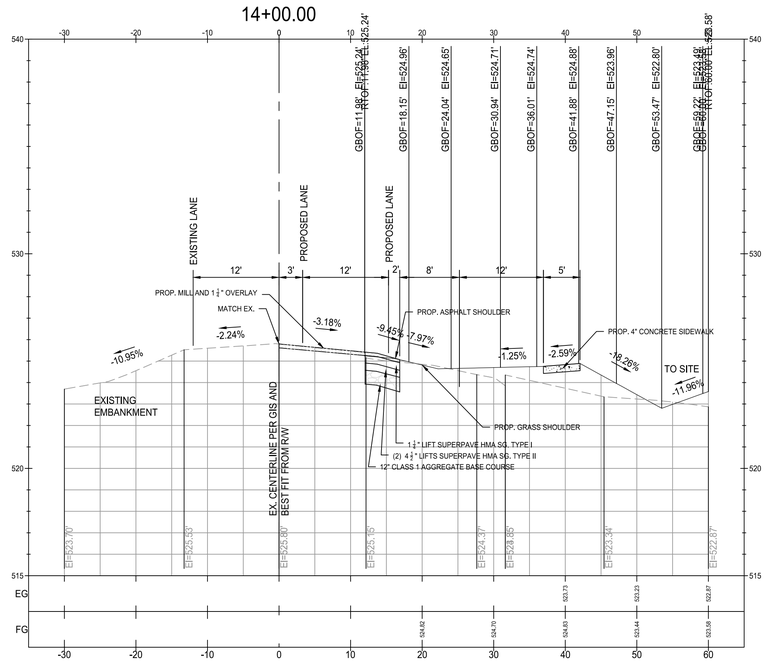

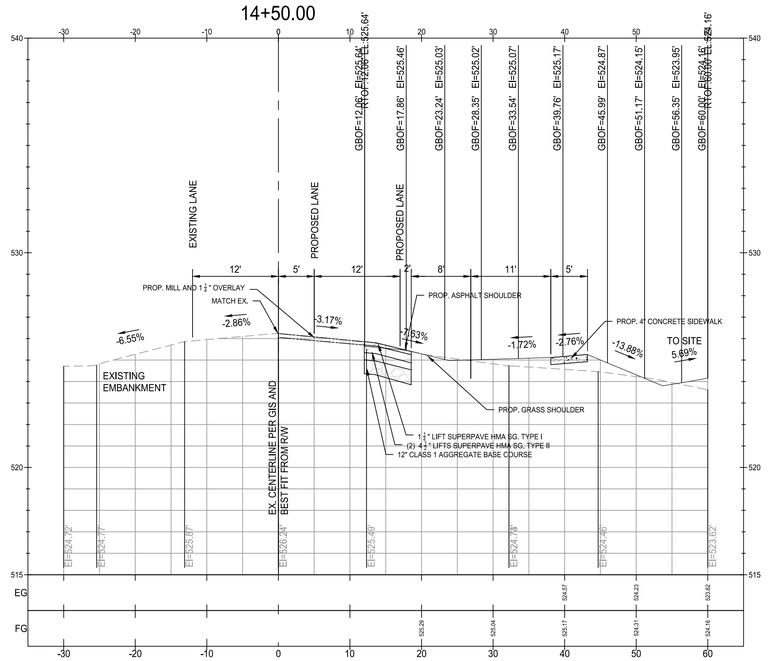

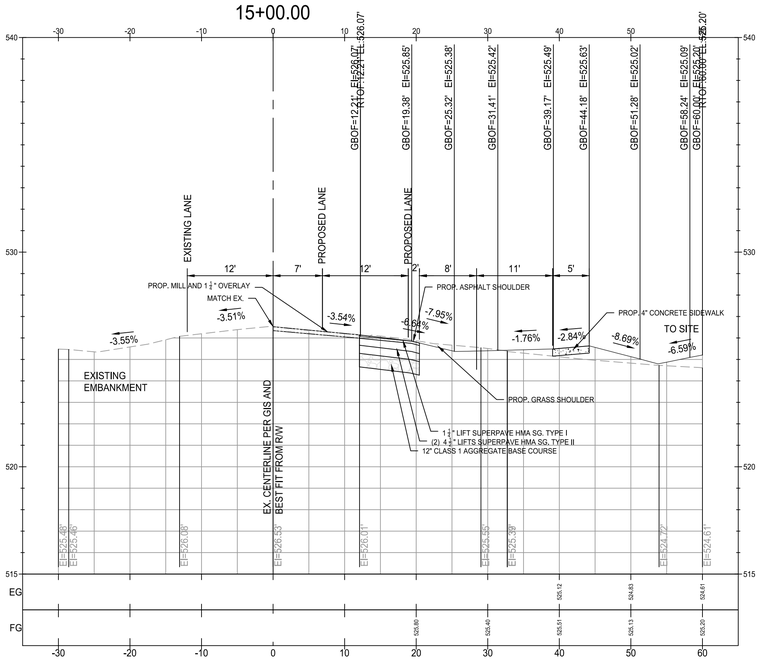

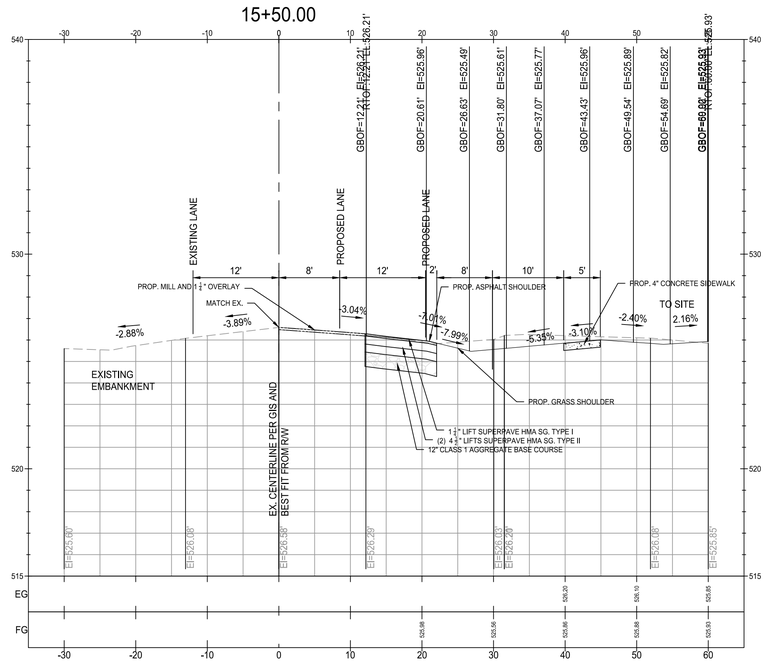

GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS - AUGUSTINE MANOR PHASE 1

LOT 217

PARCEL I.D.: 120217

CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
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AUGUSTINE AVE CROSS SECTIONS

SHEET No.

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GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
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SHEET TITLE:

AUGUSTINE AVE CROSS SECTIONS

SHEET No.
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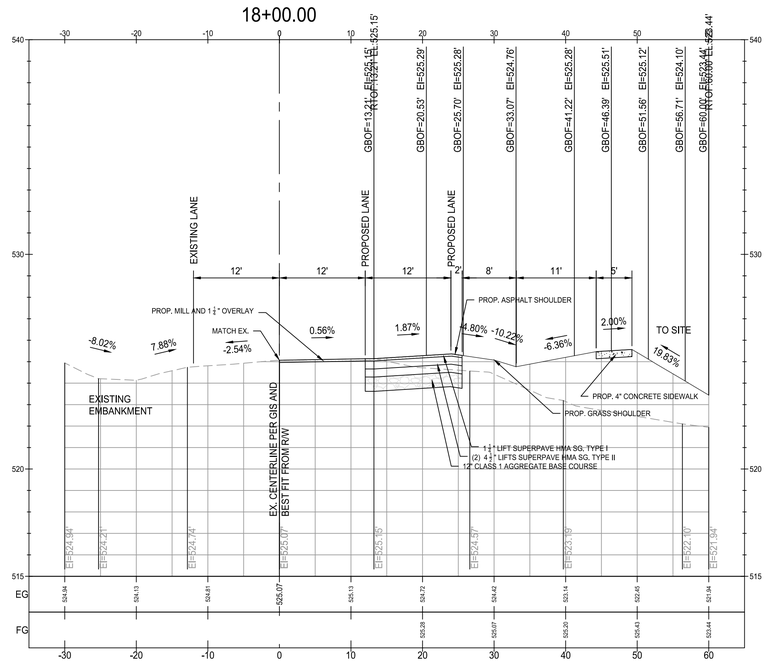

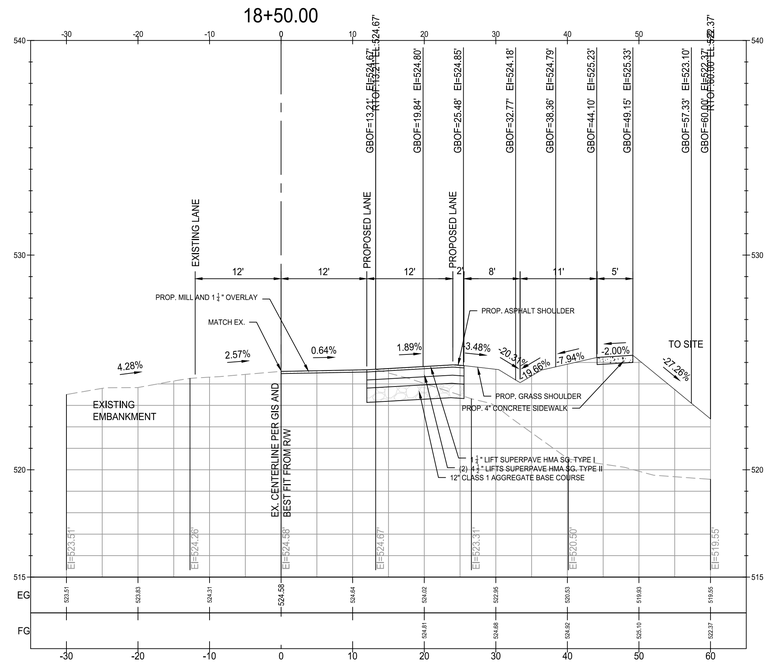

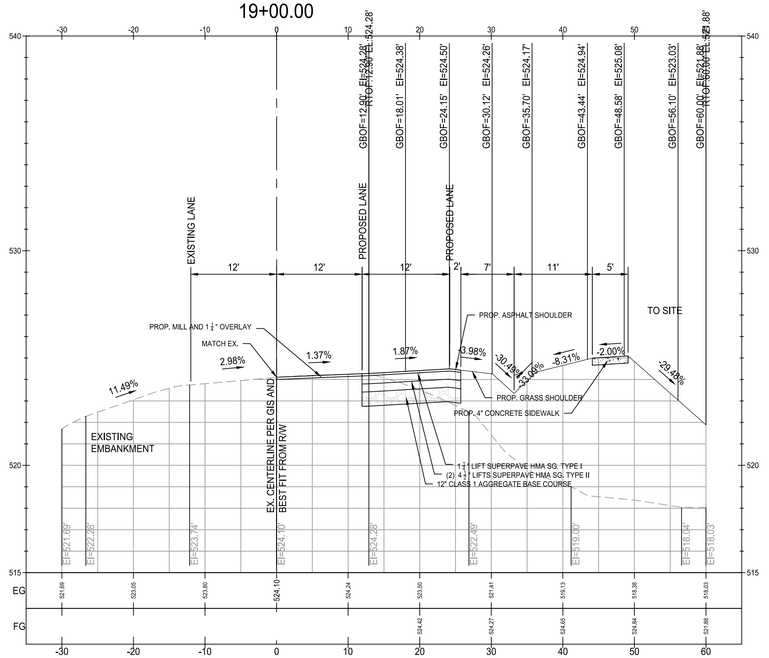

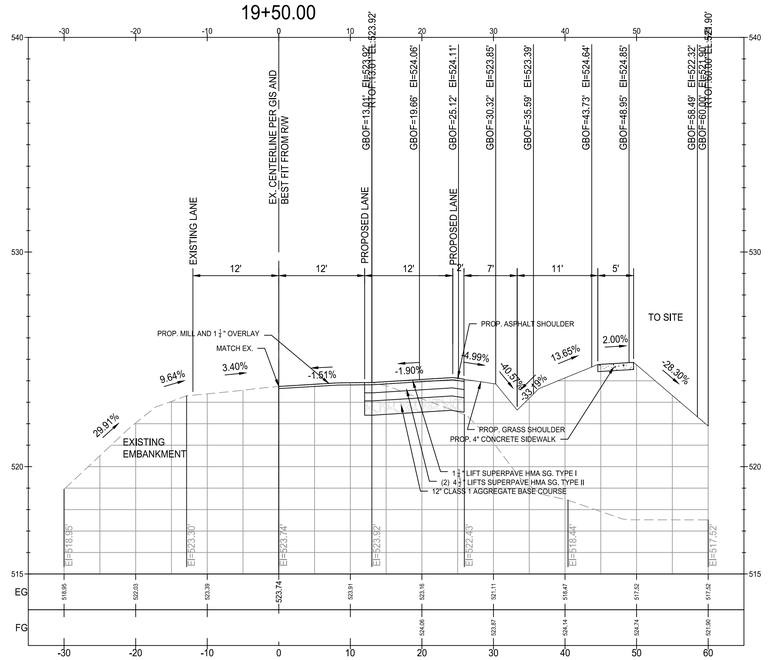

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GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
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SHEET TITLE:

AUGUSTINE AVE CROSS SECTIONS

SHEET No.
C708

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GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
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SHEET TITLE:

AUGUSTINE AVE CROSS SECTIONS

SHEET No.
C709

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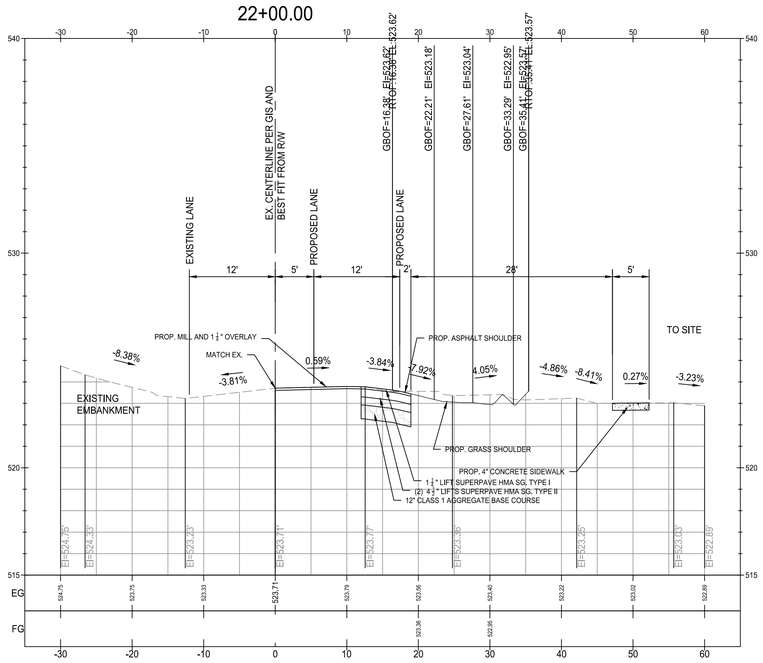

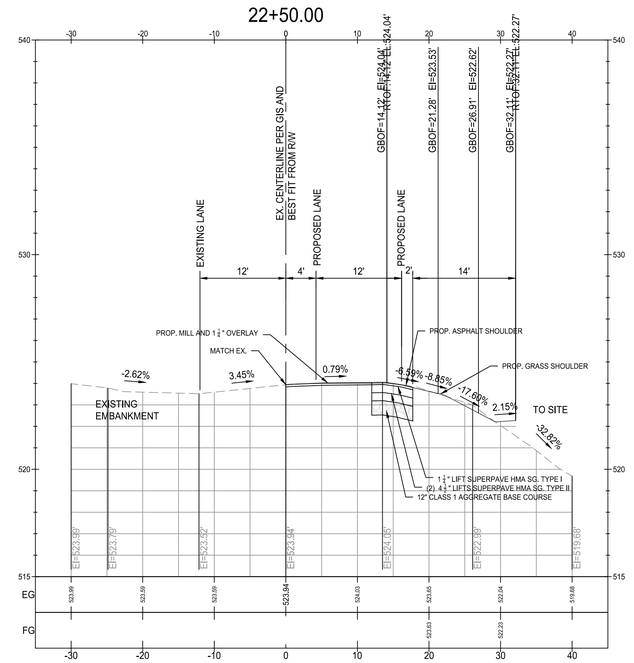

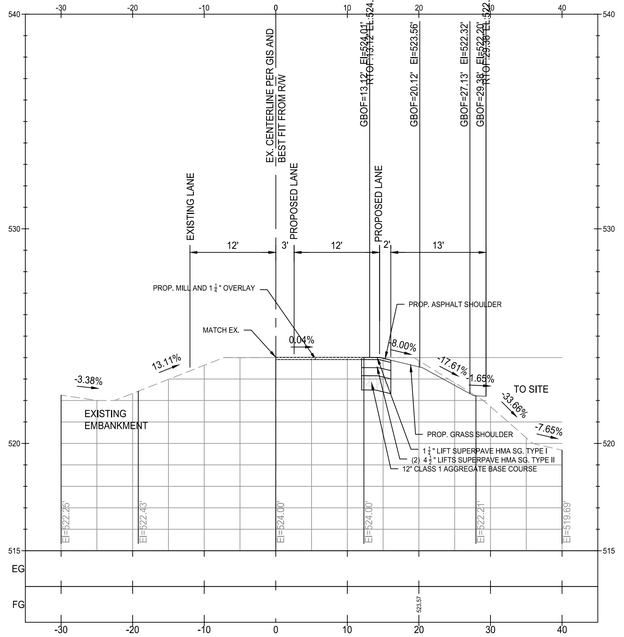

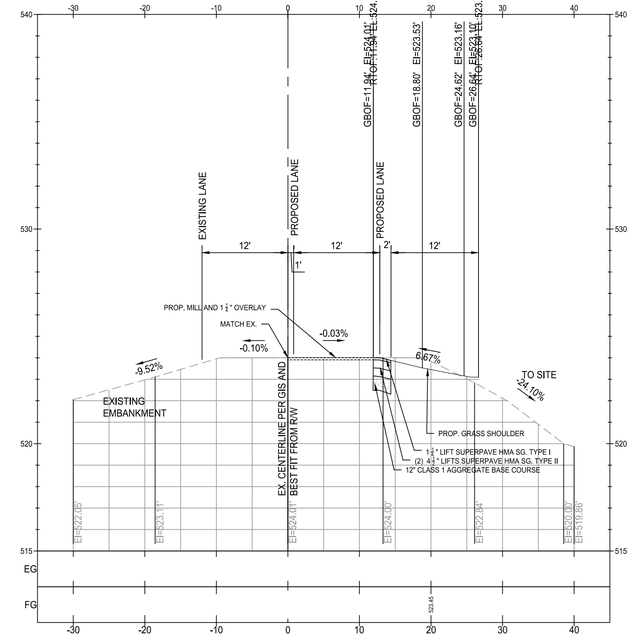

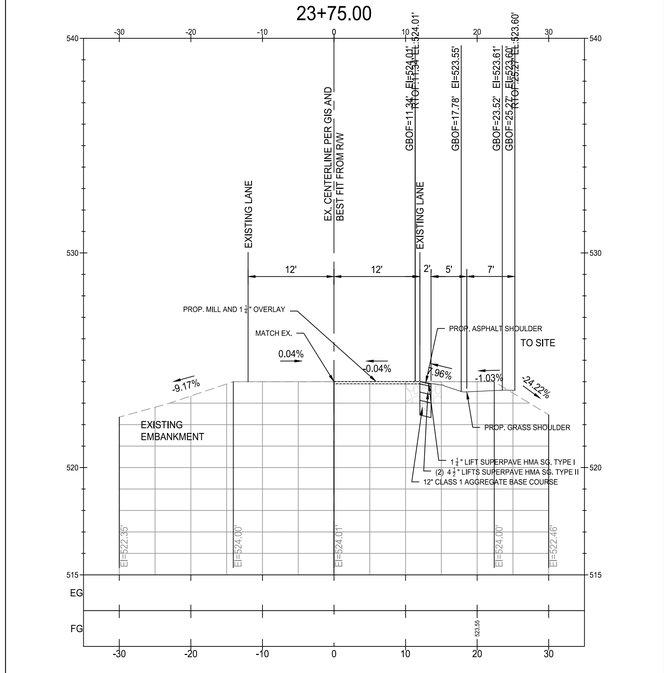

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GRAPHIC SCALE
1" = 10'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 10'
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CHECKED: TZ

SHEET TITLE:

AUGUSTINE AVE CROSS SECTIONS

SHEET No.
C710

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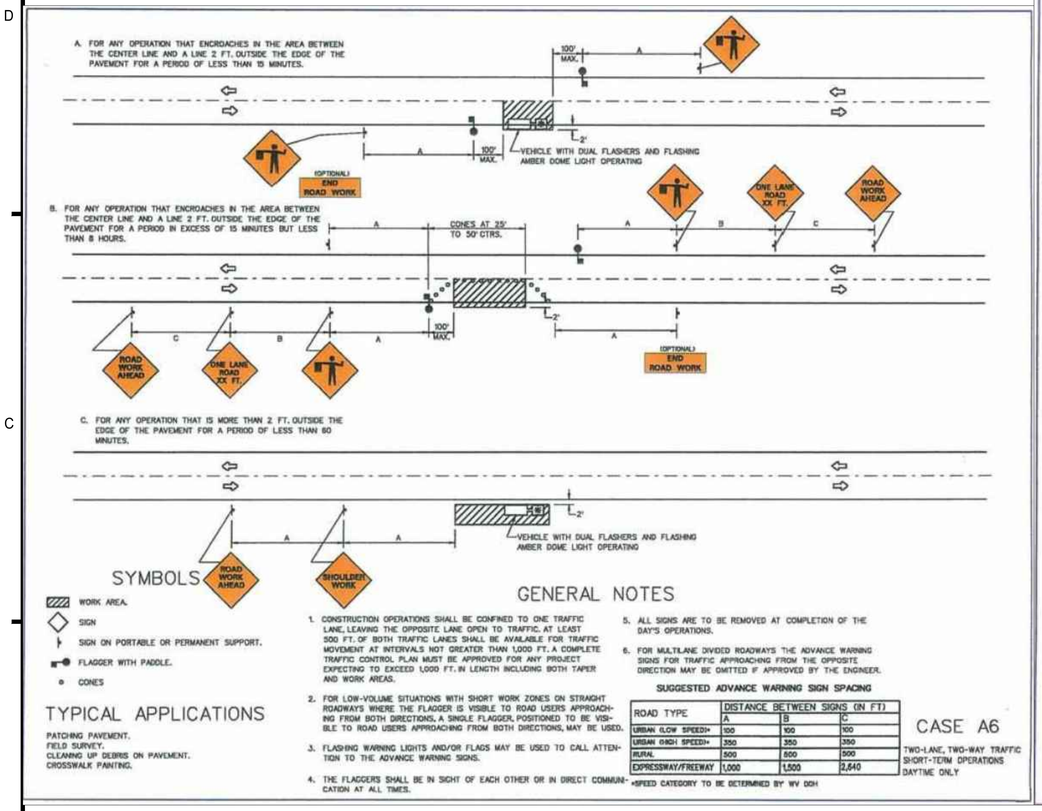


SYMBOLS

- WORK AREA.
- SIGN
- SIGN ON PORTABLE OR PERMANENT SUPPORT.
- FLAGGER WITH PADDLE.
- CONES

TYPICAL APPLICATIONS

PATCHING PAVEMENT.
FIELD SURVEY.
CLEANING UP DEBRIS ON PAVEMENT.
CROSSWALK PAINTING.

GENERAL NOTES

1. CONSTRUCTION OPERATIONS SHALL BE CONFINED TO ONE TRAFFIC LANE, LEAVING THE OPPOSITE LANE OPEN TO TRAFFIC, AT LEAST 500 FT. OF BOTH TRAFFIC LANES SHALL BE AVAILABLE FOR TRAFFIC MOVEMENT AT INTERVALS NOT GREATER THAN 1,000 FT. A COMPLETE TRAFFIC CONTROL PLAN MUST BE APPROVED FOR ANY PROJECT EXPECTING TO EXCEED 1,000 FT. IN LENGTH INCLUDING BOTH TAPER AND WORK AREAS.
2. FOR LOW-VOLUME SITUATIONS WITH SHORT WORK ZONES ON STRAIGHT ROADWAYS WHERE THE FLAGGER IS VISIBLE TO ROAD USERS APPROACHING FROM BOTH DIRECTIONS, A SINGLE FLAGGER, POSITIONED TO BE VISIBLE TO ROAD USERS APPROACHING FROM BOTH DIRECTIONS, MAY BE USED.
3. FLASHING WARNING LIGHTS AND/OR FLAGS MAY BE USED TO CALL ATTENTION TO THE ADVANCE WARNING SIGNS.
4. THE FLAGGERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES.
5. ALL SIGNS ARE TO BE REMOVED AT COMPLETION OF THE DAY'S OPERATIONS.
6. FOR MULTILANE DIVIDED ROADWAYS THE ADVANCE WARNING SIGNS FOR TRAFFIC APPROACHING FROM THE OPPOSITE DIRECTION MAY BE OMITTED IF APPROVED BY THE ENGINEER.

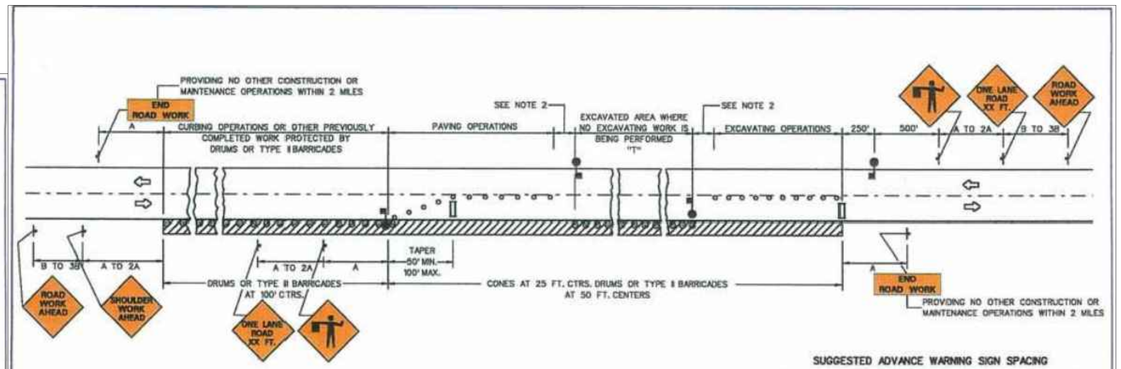
SUGGESTED ADVANCE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS (IN FT)		
	A	B	C
URBAN (LOW SPEED)*	100	100	100
URBAN (HIGH SPEED)*	350	350	350
RURAL	500	500	500
EXPRESSWAY/FREEWAY	1,000	1,500	2,640

*SPEED CATEGORY TO BE DETERMINED BY WV DOH

CASE A6

TWO-LANE, TWO-WAY TRAFFIC
SHORT-TERM OPERATIONS
DAYTIME ONLY



SYMBOLS

- WORK AREA.
- SIGN
- CONES OR DRUMS. (TYPE II BARRICADES OPTIONAL) AS APPLICABLE
- SIGN ON PORTABLE OR PERMANENT SUPPORT.
- FLAGGER WITH PADDLE.
- TYPE III BARRICADE.
- CHANNELIZATION DEVICES (DRUMS OR CONES).

TYPICAL APPLICATIONS

PAVEMENT WIDENING.
SHOULDER WORK.

GENERAL NOTES

1. WHERE DISTANCE "T" EXCEEDS 1,500 FT. ADDITIONAL ONE LANE ROAD 1,000 FT., AND FLAGGER SIGNS (AS NECESSARY) SHALL BE INSTALLED. THE CONES, DRUMS, OR BARRICADES MAY BE REMOVED THROUGH THE "T" AREA, AN ADDITIONAL TAPER SHALL BE FORMED BY CONES OR DRUMS IN ADVANCE OF THE EXCAVATING OPERATIONS, ADDITIONAL FLAGGER WILL BE REQUIRED AND THE EXCAVATED AREA SHALL BE PROTECTED BY DRUMS OR TYPE II BARRICADES AT 50 FT. CENTERS.
2. MINIMUM DISTANCE IS 100 FT. WHEN "T" EXCEEDS 1,500 FT., DISTANCE SHALL BE 250 FT.
3. NO PAVING OR EXCAVATING OPERATIONS SHALL BE PERFORMED AT NIGHT UNLESS AUTHORIZED BY THE ENGINEER. WHEN THESE OPERATIONS ARE SUSPENDED ALL VEHICLES AND EQUIPMENT INCLUDING APPROPRIATE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE PAVEMENT AND THE EXCAVATED AREA SHALL BE PROTECTED BY DRUMS OR TYPE II BARRICADES AT 50-FOOT CENTERS. ROAD WORK AHEAD AND SHOULDER WORK AHEAD SIGNS SHALL BE INSTALLED AS SHOWN TO PROTECT THE CURING OPERATIONS) ROAD WORK AHEAD AND ROAD WORK 1000 FT. SIGNS SHALL BE INSTALLED FOR TRAFFIC IN THE OPPOSITE DIRECTION.
4. CONSTRUCTION OPERATIONS SHALL BE CONFINED TO ONE TRAFFIC LANE AT A TIME LEAVING THE OPPOSITE LANE OPEN TO TRAFFIC. AT LEAST 500 FT. OF BOTH TRAFFIC LANES SHALL BE AVAILABLE FOR TRAFFIC MOVEMENT AT INTERVALS NOT GREATER THAN 2,500 FT. A COMPLETE TRAFFIC CONTROL PLAN MUST BE APPROVED FOR ANY PROJECT EXPECTED TO EXCEED 5,000 FT. IN LENGTH INCLUDING BOTH TAPER AND WORK AREA.
5. THE FLAGGERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES.
6. ALL SIGNS SHALL BE POST MOUNTED IF THE CLOSURE TIME EXCEEDS THREE DAYS.
7. WHEN A SIDE ROAD INTERSECTS THE HIGHWAY ON WHICH WORK IS BEING PERFORMED ADDITIONAL TRAFFIC CONTROL DEVICES SHALL BE ERECTED AS DIRECTED BY THE ENGINEER.
8. FLASHING WARNING LIGHTS AND/OR FLAGS MAY BE USED TO CALL ATTENTION TO THE ABOVE WARNING SIGNS, AS NEEDED ON THE PLANS, AND/OR AS DIRECTED BY THE ENGINEER.

SUGGESTED ADVANCE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS (IN FT)		
	A	B	C
URBAN (LOW SPEED)*	100	100	100
URBAN (HIGH SPEED)*	350	350	350
RURAL	500	500	500
EXPRESSWAY/FREEWAY	1,000	1,500	2,640

*SPEED CATEGORY TO BE DETERMINED BY WV DOH

CASE A9

TWO-LANE, TWO-WAY TRAFFIC
WIDENING OF PAVEMENT
DAY OR NIGHT OPERATIONS

WHERE, AT ANY TIME, ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON THE PAVEMENT DURING PAVEMENT WIDENING OPERATIONS.

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

TRAFFIC CONTROL PLANS

SHEET No.

C711

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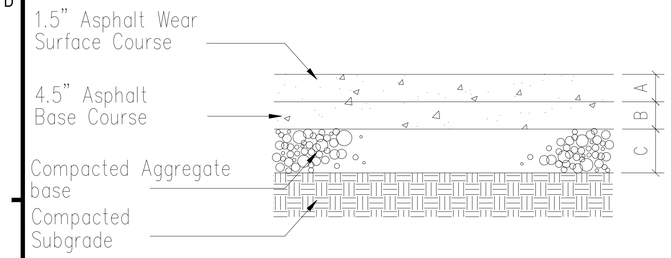
DIMENSION & TYPE

Asphalt Section	A	B	C
WVDOH ROUTE ROAD	1.5"	4.5"	12"

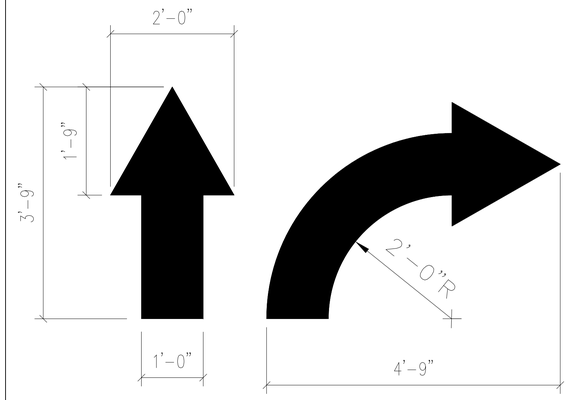


NOTE:
1. Compacted subgrade should be as specified in soils report.
2. Section shown is based on CBR listed in Geotechnical Report prepared by GTA. Final design to be provided once Final CBR's are available on compacted sub-base.

NO SCALE

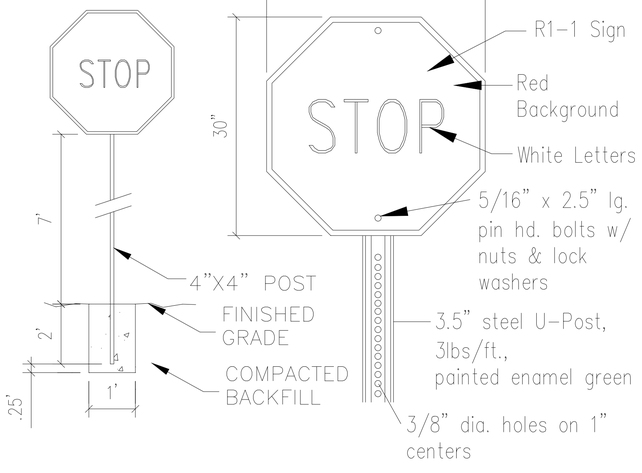
ASPHALT PAVING SECTION (WV RT 340)

Note: All traffic flow arrows to be solid white reflective traffic paint as per dimensions below.



NO SCALE

TYPICAL PAVEMENT MARKINGS



Note: All regulatory and warning signs shall be high intensity reflective sheeting.

NO SCALE

STOP SIGN DETAIL

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
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PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

WVDOH DETAILS

SHEET No.

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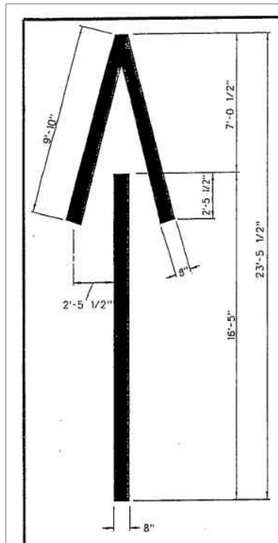
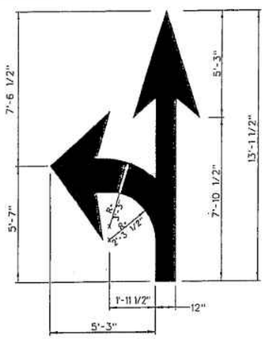
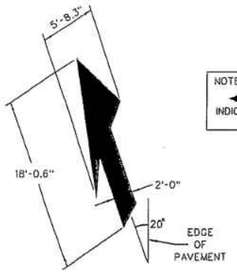


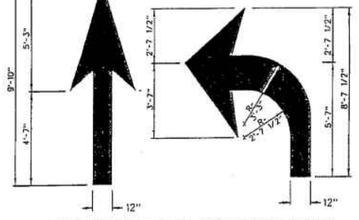
RAMP WRONG WAY ARROW
SEE NOTE 7



MULTI-DIRECTIONAL LANE ASSIGNMENT ARROW

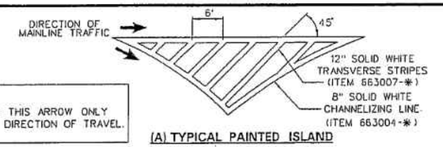


LANE DROP ARROW

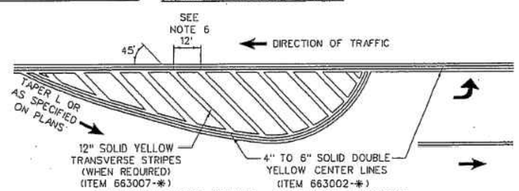


ONE DIRECTION LANE ASSIGNMENT ARROW

NOTE:
← THIS ARROW ONLY INDICATES DIRECTION OF TRAVEL.



(A) TYPICAL PAINTED ISLAND

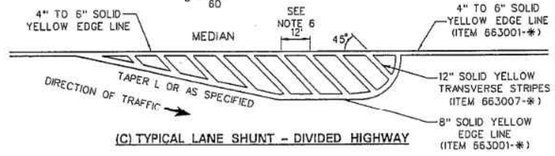


(B) TYPICAL LANE SHUNT – UNDIVIDED HIGHWAY

TAPER L DIMENSIONS

FOR SPEEDS 45 MPH OR MORE
$L = S \times W$
FOR SPEEDS 40 MPH OR LESS
$L = \frac{WS^2}{60}$

WHERE:
L = LENGTH IN FEET
S = 85TH PERCENTILE SPEED IN MPH
W = OFFSET WIDTH IN FEET



(C) TYPICAL LANE SHUNT – DIVIDED HIGHWAY

PUBLIC HIGHWAYS DIV.	STATE DIST. NO.	STATE PROJECT NO.	FEDERAL PROJECT NO.	FISCAL YEAR	COUNTY	SHEET NO.	TOTAL SHEETS

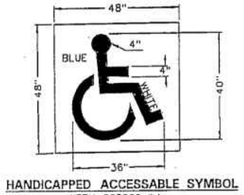
GENERAL NOTES

1. LOCATION OF WORDS AND SYMBOLS SHALL BE AS SHOWN ON THE PLANS OR AS OTHERWISE SPECIFIED.
2. TYPICAL PLACEMENT OF WORD AND SYMBOL MARKINGS IS SHOWN ON STANDARD SHEET TEM-2.
3. IF MESSAGES ON PAVEMENT CONSIST OF MORE THAN ONE WORD IT SHOULD BE READ "UP", THAT IS THE FIRST WORD SHOULD BE NEAREST THE DRIVER.
4. ALL WORD AND SYMBOL MARKINGS SHALL BE WHITE IN COLOR. (EXCEPTION: MARKINGS VISIBLE ONLY TO TRAFFIC PROCEEDING IN THE WRONG DIRECTION MAY BE RED).
5. WORD AND SYMBOL MARKINGS SHALL BE MADE OF TYPE V MARKINGS AS INDICATED ON THE CONTRACT PLANS.
6. THIS DIMENSION SHALL BE 12 FEET UNLESS OTHERWISE SPECIFIED. IN NO CASE SHALL THIS DIMENSION BE LESS THAN 8 FEET OR GREATER THAN 12 FEET.
7. WHERE LENGTH WILL PERMIT, TWO (2) FREEWAY RAMP ARROWS SHALL BE PLACED ON EXIT RAMPS. THE NO. 1 ARROW SHOULD BE PLACED NEAR THE INTERSECTION OF THE RAMP AND THE INTERSECTING CROSSROAD (50' MIN.), BUT PRIOR TO THE BEGINNING OF ANY LANE SEPERATION CHANNELIZING LINES AT THE END OF THE RAMP. THE NO. 2 ARROW SHOULD BE PLACED NOT LESS THAN 100 FEET, BUT NOT MORE THAN 250 FEET PRIOR TO THE NO. 1 ARROW, WITH 150'-200' DESIRABLE. NO. 2 ARROW SHALL NOT BE PLACED ON RAMP IN FRONT OF "EXIT" SIGN. ARROWS SHOULD BE LOCATED IN FIELD WITHIN LIMITS MENTIONED ABOVE, TAKING ADVANTAGE OF RAMP GRADE AND ALIGNMENT. ARROWS SHALL BE CENTERED BETWEEN THE EDGE LINES, AND SHALL POINT IN THE DIRECTION OF THE INTENDED TRAFFIC FLOW.
8. YIELD MARKINGS SHOULD BE PLACED AT THE DESIRED YIELD POINT AS NEAR AS POSSIBLE TO THE INTERSECTING ROADWAY, BUT IN NO CASE MORE THAN 30 FEET OR LESS THAN 4 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY.

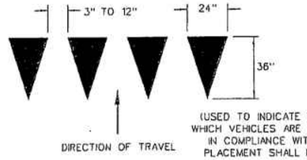
TYPICAL PAVEMENT MARKING ARROWS
(ITEM 663010-*)



ALL LETTERS SHALL HAVE A MIN. HEIGHT OF 8'-0"
TYPICAL PAVEMENT MARKING LEGENDS
(ITEM 663011-*)

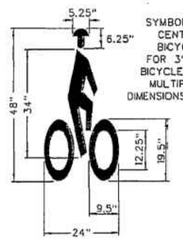


HANDICAPPED ACCESSABLE SYMBOL
(ITEM 663009-*)

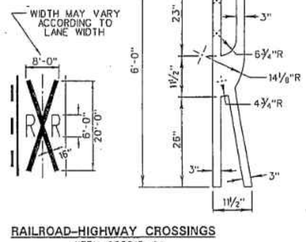


(USED TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO YIELD IN COMPLIANCE WITH A YIELD SIGN; PLACEMENT SHALL FOLLOW NOTE 8)

YIELD TRIANGLES
(ITEM 663008-*)



BICYCLE SYMBOL
(ITEM 663009-*)



RAILROAD–HIGHWAY CROSSINGS
(ITEM 663015-*)

WEST VIRGINIA DIVISION OF HIGHWAYS

SPECIAL DETAIL

CHANNELIZATION, WORD AND SYMBOL MARKINGS

PREPARED 12/2/10

REVISIONS

REPLACES STANDARD DETAILS BOOK
VOL. II SHEET TEM-3

TRAFFIC ENGINEERING DIVISION

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:
WVDOH DETAILS

SHEET No.
C713

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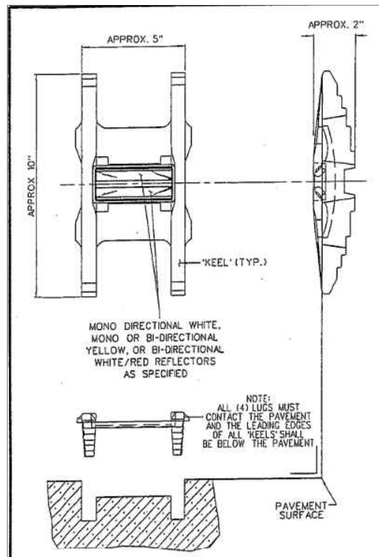
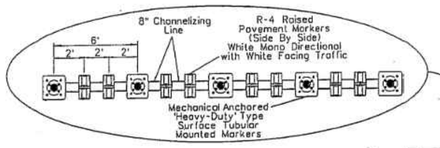
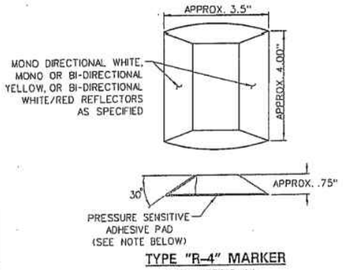


TYPICAL TYPE "P-2" MARKER

(ITEM 663012-*)



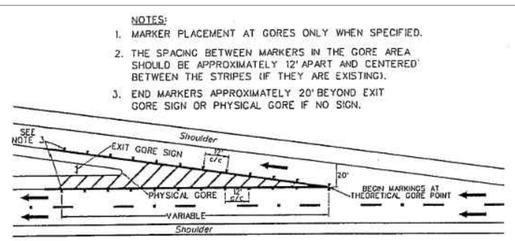


TYPE "R-4" MARKER

(ITEM 663012-*)

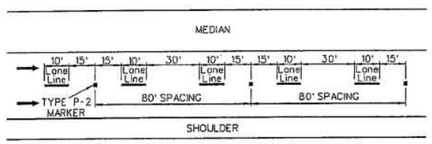
OPTION: R-4 MARKERS WITHOUT PRESSURE SENSITIVE ADHESIVE PAD MAY BE INSTALLED USING ADHESIVE RECOMMENDED BY THE MANUFACTURER

NOTES:
1. MARKER PLACEMENT AT GORES ONLY WHEN SPECIFIED.
2. THE SPACING BETWEEN MARKERS IN THE GORE AREA SHOULD BE APPROXIMATELY 12' APART AND CENTERED BETWEEN THE STRIPES (IF THEY ARE EXISTING).
3. END MARKERS APPROXIMATELY 20' BEYOND EXIT GORE SIGN OR PHYSICAL GORE IF NO SIGN.



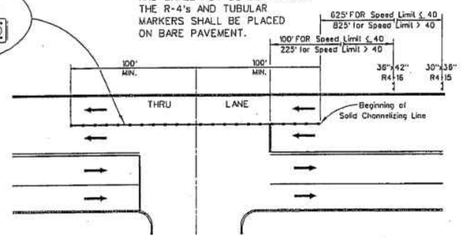
GORE AREA

NOTES:
1. MARKINGS FOR DIVIDED ROADWAY IS SHOWN. USE MONO-DIRECTIONAL (WHITE) FOR UNDIVIDED APPLICATIONS.



LANE LINE OF DIVIDED HIGHWAY

NOTES:
1. SEE THE APPROVED PRODUCTS LIST (APL) FOR APPROVED TUBULAR MARKERS.
2. CHANNELIZING LINE SHALL ONLY BE PLACED BETWEEN R-4's AND TUBULAR MARKERS AND SHALL NOT BE CONTINUOUS. THE R-4's AND TUBULAR MARKERS SHALL BE PLACED ON BARE PAVEMENT.

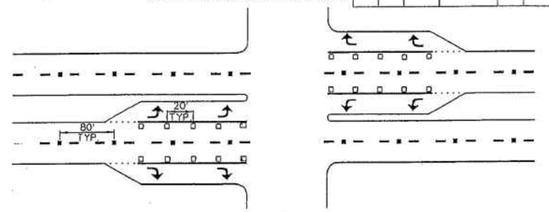


CONTINUOUS THRU LANE SIGNING AND DELINEATION

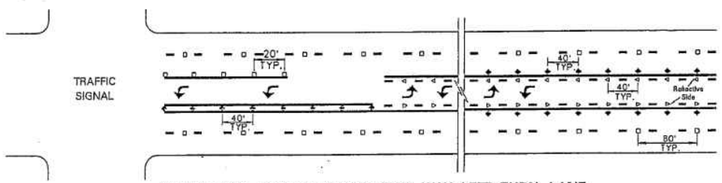
GENERAL NOTES
1. LOCATION OF MARKERS ARE SHOWN ON THE PLANS.
2. TYPE R-4 MARKERS ARE NOT TO BE APPLIED OVER PAINT STRIPING.
3. ALL TYPE P-2 AND R-4 MARKER SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
4. THE R-4 MARKERS UTILIZED SHALL BE EITHER 3M MODEL PSA/290/291 OR ENNIS PAINT MODEL CBO.

NOTES:
1. MARKINGS FOR DIVIDED ROADWAY IS SHOWN. USE MONO-DIRECTIONAL (WHITE) FOR UNDIVIDED APPLICATIONS.

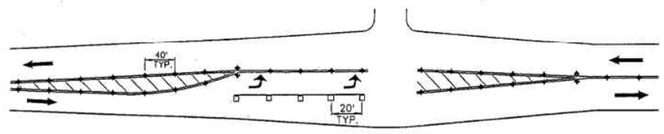
PUBLIC ROADS DIV.	STATE DIST. NO.	STATE PROJECT NO.	FEDERAL PROJECT NO.	FISCAL YEAR	COUNTY	SHEET NO.	TOTAL SHEETS



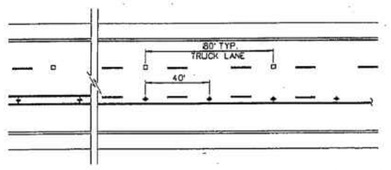
MULTI-LANE ROADWAY WITH AT-GRADE INTERSECTION



MULTI-LANE ROADWAY WITH TWO-WAY LEFT TURN LANE



TWO LANE HIGHWAY WITH LEFT TURN BAY



TWO LANE HIGHWAY WITH TRUCK CLIMBING LANE

LEGEND
- ■ - BI-DIRECTIONAL (WHITE/RED) WITH WHITE REFLECTOR FACING TRAFFIC
- □ - MONO-DIRECTIONAL (WHITE)
- ◆ - BI-DIRECTIONAL (YELLOW)
- ▷ - MONO-DIRECTIONAL (YELLOW)

NOTE: ← THIS ARROW ONLY INDICATES DIRECTION OF TRAVEL.

WEST VIRGINIA DIVISION OF HIGHWAYS

SPECIAL DETAIL PAVEMENT MARKERS TYPES "P" and "R"

PREPARED 12/10

REVISIONS

REPLACES STANDARD DETAILS BOOK VOL. II SHEET TEM-4

TRAFFIC ENGINEERING DIVISION

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PRELIMINARY PLANS - NOT FOR CONSTRUCTION

AUGUSTINE MANOR PHASE 1

LOT 217

PARCEL I.D.: 120217

CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: TZ
DRAWN: AF
CHECKED: TZ

SHEET TITLE:

WVDOH DETAILS

SHEET No.

C714

P:\Projects\23011\00\20011\1948 Site Plan\C300 Site Plan Details.dwg, 12/17/2025 2:24:08 PM, Tony Zook,

FUTURE PHASE OF AUGUSTINE MANOR

AUGUSTINE AVENUE

25' BUFFER

LOT 81
10933 SQ. FT.

LOT 80
W/O
13643 SQ. FT.

LOT 82
8745 SQ. FT.

LOT 79
W/O
8708 SQ. FT.

LOT 83
8539 SQ. FT.

LOT 78
W/O
8517 SQ. FT.

LOT 84
9558 SQ. FT.

LOT 77
W/O
8636 SQ. FT.

LOT 85
9644 SQ. FT.

LOT 76
W/O
8640 SQ. FT.

LOT 86
9759 SQ. FT.

LOT 73
8812 SQ. FT.

LOT 72
8287 SQ. FT.

LOT 71
8287 SQ. FT.

LOT 70
8287 SQ. FT.

LOT 69
8287 SQ. FT.

LOT 68
8287 SQ. FT.

LOT 148
2962 SQ. FT.

LOT 147
2000 SQ. FT.

LOT 146
2000 SQ. FT.

LOT 145
2000 SQ. FT.

LOT 144
2000 SQ. FT.

LOT 143
3001 SQ. FT.

LOT 142
3001 SQ. FT.

LOT 149
96537 SQ. FT.

LOT 1
9212 SQ. FT.

LOT 2
8399 SQ. FT.

SEE SHEET L103

SEE SHEET L102

No.	DESCRIPTION	DATE



KEY MAP
N.T.S.

STREET TREE NOTE:
ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED AND MAINTAINED TO A CLEAR HEIGHT OF 7' TO AVOID ANY CANOPY ENCROACHMENT.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
EVERGREEN TREES		
	Juniperus virginiana	Eastern Redcedar
	Picea abies	Norway Spruce
ORNAMENTAL TREES		
	Prunus x 'Okame'	Okame Flowering Cherry
CANOPY TREES		
	Acer rubrum 'October Glory'	October Glory Maple
	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo
	Gleditsia triacanthos inermis	Thornless Honeylocust
	Platanus x acerifolia 'Bloodgood'	London Planetree
	Quercus phellos	Willow Oak
	Tilia cordata 'Greenspire'	Littleleaf Linden
SHRUBS		
	Taxus canadensis	American Yew

WEST VIRGINIA STATE GRID NORTH
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: PG
DRAWN: PG
CHECKED: DL

SHEET TITLE:

LANDSCAPE PLAN

SHEET No.
L101

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FUTURE PHASE OF AUGUSTINE MANOR

LOD LOD LOD LOD

LOT 143 3001 SQ. FT.
LOT 142 3001 SQ. FT.
LOT 141 2001 SQ. FT.
LOT 140 2000 SQ. FT.
LOT 139 2000 SQ. FT.
LOT 138 2000 SQ. FT.
LOT 137 2962 SQ. FT.

LOT 136 3002 SQ. FT.
LOT 135 2002 SQ. FT.
LOT 134 2000 SQ. FT.
LOT 133 2000 SQ. FT.
LOT 132 2000 SQ. FT.
LOT 131 2000 SQ. FT.
LOT 130 2000 SQ. FT.
LOT 129 3001 SQ. FT.

LOT 121 2999 SQ. FT.
LOT 122 2000 SQ. FT.
LOT 123 2000 SQ. FT.
LOT 124 2000 SQ. FT.
LOT 125 2000 SQ. FT.
LOT 126 2000 SQ. FT.
LOT 127 2004 SQ. FT.
LOT 128 3001 SQ. FT.

LOT 120 3001 SQ. FT.
LOT 119 2003 SQ. FT.
LOT 118 2000 SQ. FT.
LOT 117 2000 SQ. FT.
LOT 116 2000 SQ. FT.
LOT 115 2000 SQ. FT.
LOT 114 2000 SQ. FT.
LOT 113 2984 SQ. FT.

LOT 149 96537 SQ. FT.

LOT 96 3001 SQ. FT.
LOT 95 2002 SQ. FT.
LOT 94 2000 SQ. FT.
LOT 93 2000 SQ. FT.
LOT 92 2000 SQ. FT.
LOT 91 2000 SQ. FT.
LOT 90 2000 SQ. FT.
LOT 89 3001 SQ. FT.

LOT 97 2999 SQ. FT.
LOT 98 2000 SQ. FT.
LOT 99 2000 SQ. FT.
LOT 100 2000 SQ. FT.
LOT 101 2000 SQ. FT.
LOT 102 2000 SQ. FT.
LOT 103 2001 SQ. FT.
LOT 104 3001 SQ. FT.

LOT 112 3001 SQ. FT.
LOT 111 1995 SQ. FT.
LOT 110 2000 SQ. FT.
LOT 109 2000 SQ. FT.
LOT 108 2000 SQ. FT.
LOT 107 2000 SQ. FT.
LOT 106 2000 SQ. FT.
LOT 105 3001 SQ. FT.

LOT 2 9399 SQ. FT.
LOT 3 8399 SQ. FT.
LOT 4 8399 SQ. FT.
LOT 5 8399 SQ. FT.
LOT 6 8399 SQ. FT.
LOT 7 8399 SQ. FT.
LOT 8 9209 SQ. FT.

SEE SHEET L101

SEE SHEET L104

FUTURE PHASE OF AUGUSTINE MANOR

STEPPER CLUSTER M4, DETAIL 3/L110
MULTI DECK PLAYHOUSE DETAIL 1/L110
PLAY AREA SURFACING, DETAIL 4/L110
MOUNT VERNON, DETAIL 2/L110
BENCH, DETAIL 5/L110
LITTER RECEPTACLE, DETAIL 6/L110

OHE

No.	DESCRIPTION	DATE



KEY MAP
N.T.S.

STREET TREE NOTE:
ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED AND MAINTAINED TO A CLEAR HEIGHT OF 7' TO AVOID ANY CANOPY ENCROACHMENT.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
EVERGREEN TREES		
	Juniperus virginiana	Eastern Redcedar
	Picea abies	Norway Spruce
ORNAMENTAL TREES		
	Prunus x 'Okame'	Okame Flowering Cherry
CANOPY TREES		
	Acer rubrum 'October Glory'	October Glory Maple
	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo
	Gleditsia triacanthos inermis	Thornless Honeylocust
	Platanus x acerifolia 'Bloodgood'	London Planetree
	Quercus phellos	Willow Oak
	Tilia cordata 'Greenspire'	Littleleaf Linden
SHRUBS		
	Taxus canadensis	American Yew

NORTH
WEST VIRGINIA ESTATE GRID
UTM83-18F

30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS - NOT FOR CONSTRUCTION
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: PG
DRAWN: PG
CHECKED: DL

SHEET TITLE:
LANDSCAPE PLAN

SHEET No.
L102

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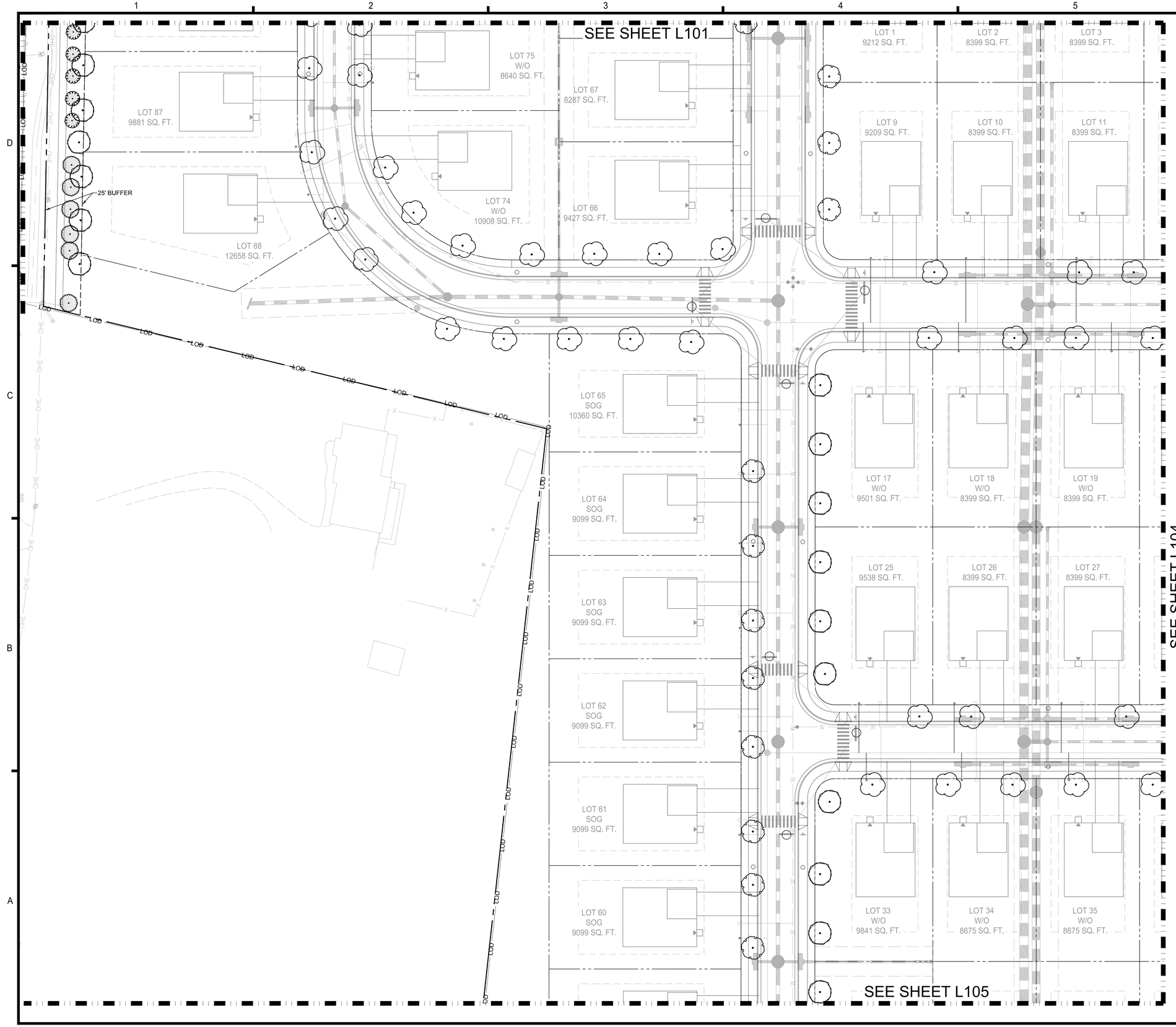


No.	DESCRIPTION	DATE

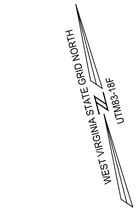


KEY MAP
N.T.S.

STREET TREE NOTE:
ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED AND MAINTAINED TO A CLEAR HEIGHT OF 7' TO AVOID ANY CANOPY ENCROACHMENT.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
EVERGREEN TREES		
	Juniperus virginiana	Eastern Redcedar
	Picea abies	Norway Spruce
ORNAMENTAL TREES		
	Prunus x 'Okame'	Okame Flowering Cherry
CANOPY TREES		
	Acer rubrum 'October Glory'	October Glory Maple
	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo
	Gleditsia triacanthos inermis	Thornless Honeylocust
	Platanus x acerifolia 'Bloodgood'	London Planetree
	Quercus phellos	Willow Oak
	Tilia cordata 'Greenspire'	Littleleaf Linden
SHRUBS		
	Taxus canadensis	American Yew



30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: PG
DRAWN: PG
CHECKED: DL

SHEET TITLE:

LANDSCAPE PLAN

SHEET No.
L103

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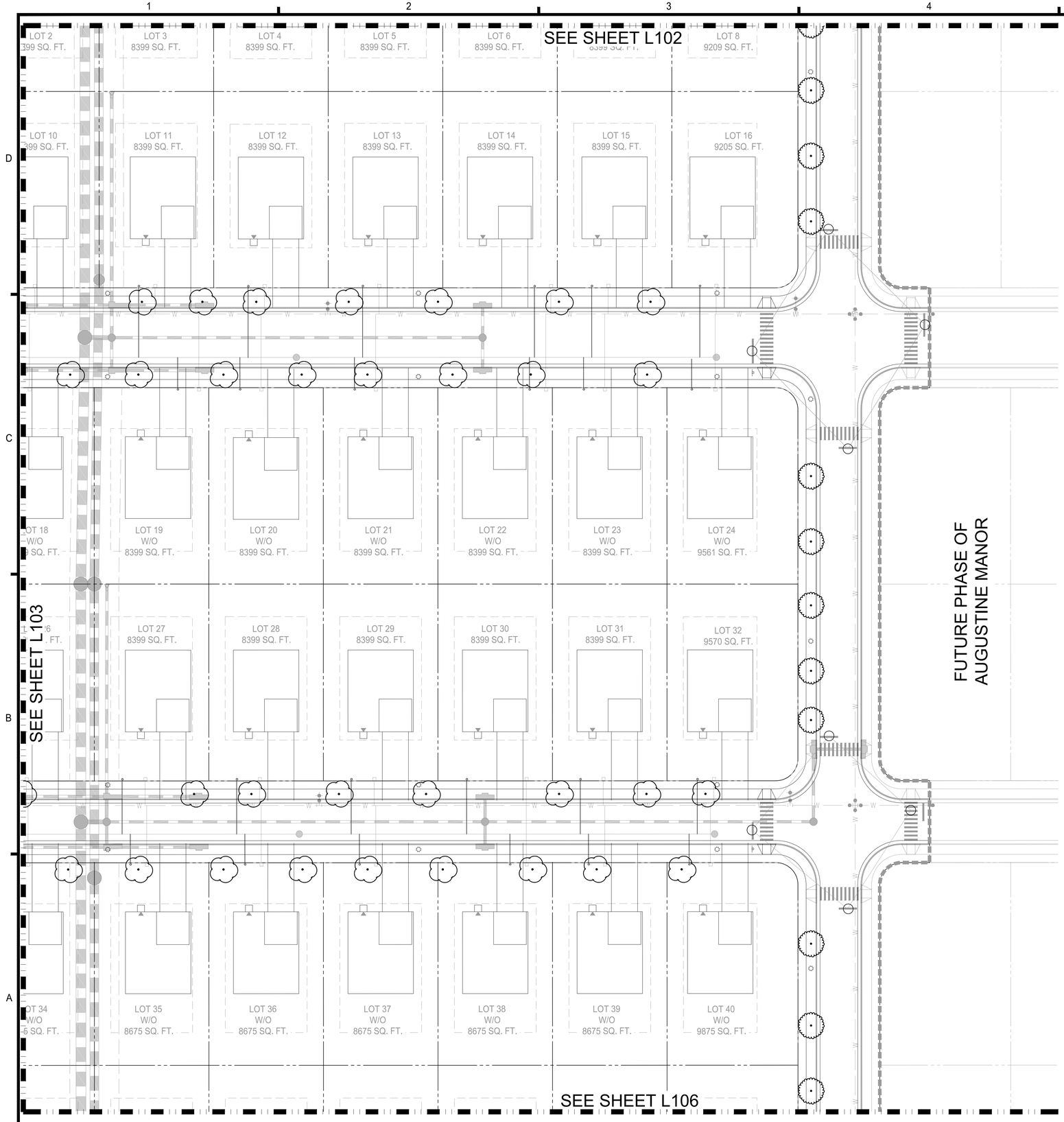


No.	DESCRIPTION	DATE

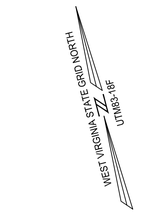


KEY MAP
N.T.S.

STREET TREE NOTE:
ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED AND MAINTAINED TO A CLEAR HEIGHT OF 7' TO AVOID ANY CANOPY ENCROACHMENT.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
EVERGREEN TREES		
	Juniperus virginiana	Eastern Redcedar
	Picea abies	Norway Spruce
ORNAMENTAL TREES		
	Prunus x 'Okame'	Okame Flowering Cherry
CANOPY TREES		
	Acer rubrum 'October Glory'	October Glory Maple
	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo
	Gleditsia triacanthos inermis	Thornless Honeylocust
	Platanus x acerifolia 'Bloodgood'	London Planetree
	Quercus phellos	Willow Oak
	Tilia cordata 'Greenspire'	Littleleaf Linden
SHRUBS		
	Taxus canadensis	American Yew



30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: PG
DRAWN: PG
CHECKED: DL

SHEET TITLE:

LANDSCAPE PLAN

SHEET No.
L104

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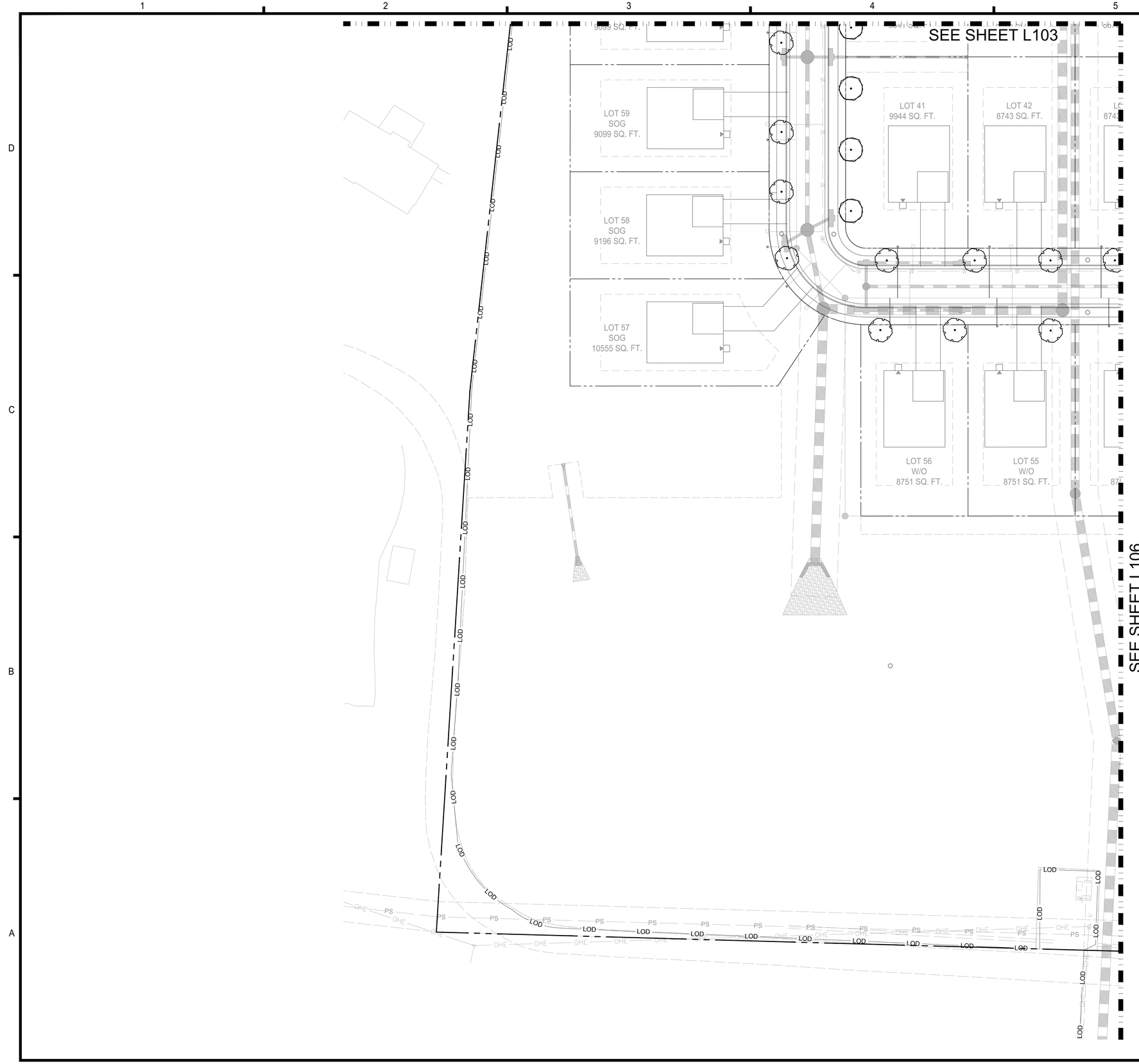

No.	DESCRIPTION	DATE



KEY MAP
N.T.S.

STREET TREE NOTE:
ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED AND MAINTAINED TO A CLEAR HEIGHT OF 7' TO AVOID ANY CANOPY ENCROACHMENT.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
EVERGREEN TREES		
	Juniperus virginiana	Eastern Redcedar
	Picea abies	Norway Spruce
ORNAMENTAL TREES		
	Prunus x 'Okame'	Okame Flowering Cherry
CANOPY TREES		
	Acer rubrum 'October Glory'	October Glory Maple
	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo
	Gleditsia triacanthos inermis	Thornless Honeylocust
	Platanus x acerifolia 'Bloodgood'	London Planetree
	Quercus phellos	Willow Oak
	Tilia cordata 'Greenspire'	Littleleaf Linden
SHRUBS		
	Taxus canadensis	American Yew



30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
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DRAWN: PG
CHECKED: DL

SHEET TITLE:

LANDSCAPE PLAN

SHEET No.
L105

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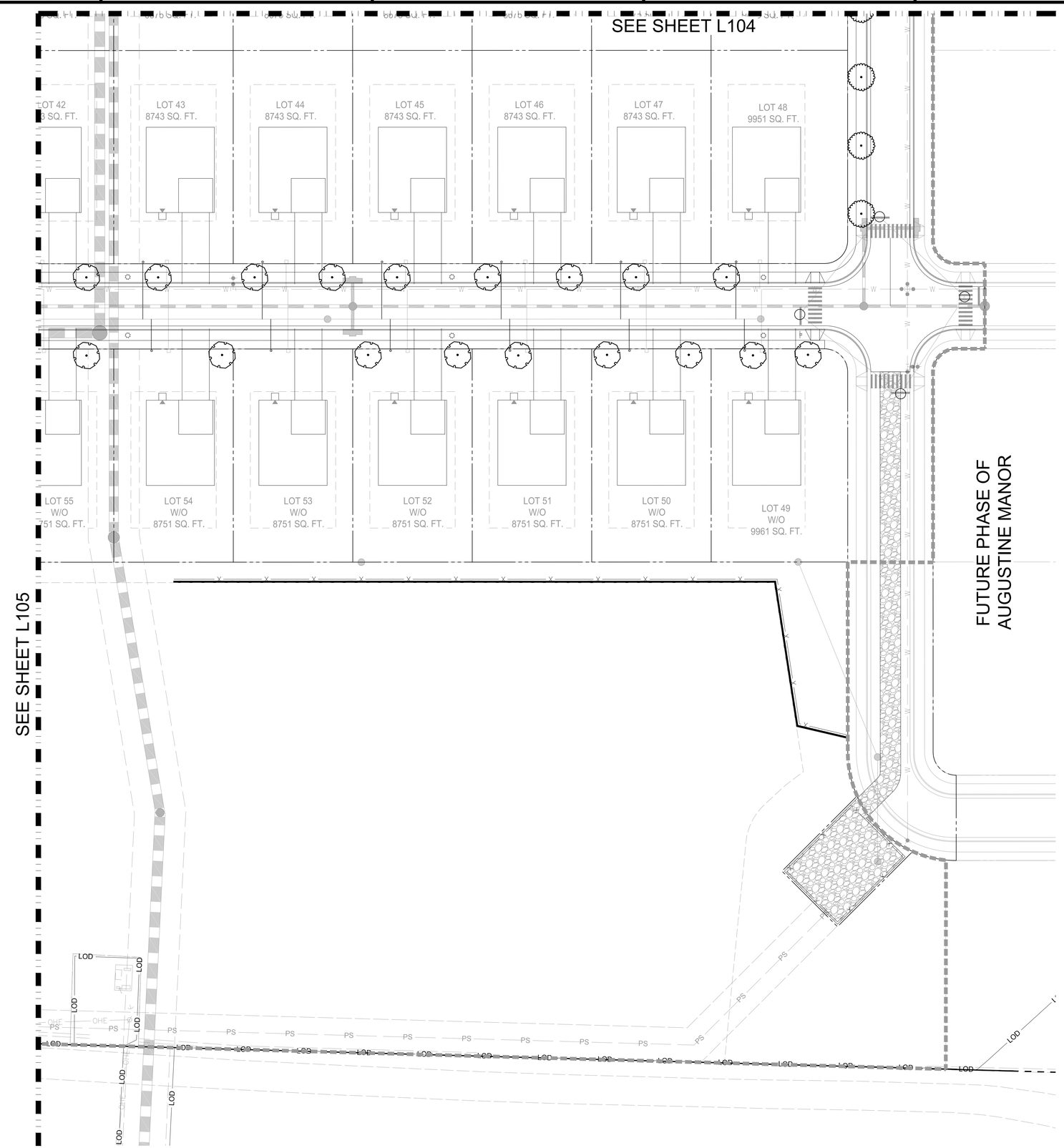
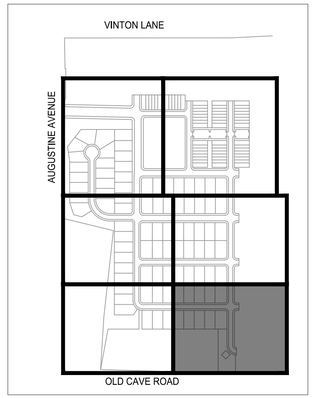


No.	DESCRIPTION	DATE

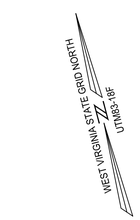


KEY MAP
N.T.S.

STREET TREE NOTE:
ALL STREET TREES WITHIN THE SIGHT DISTANCE SHALL BE PRUNED AND MAINTAINED TO A CLEAR HEIGHT OF 7' TO AVOID ANY CANOPY ENCROACHMENT.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME
EVERGREEN TREES		
	Juniperus virginiana	Eastern Redcedar
	Picea abies	Norway Spruce
ORNAMENTAL TREES		
	Prunus x 'Okame'	Okame Flowering Cherry
CANOPY TREES		
	Acer rubrum 'October Glory'	October Glory Maple
	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo
	Gleditsia triacanthos inermis	Thornless Honeylocust
	Platanus x acerifolia 'Bloodgood'	London Planetree
	Quercus phellos	Willow Oak
	Tilia cordata 'Greenspire'	Littleleaf Linden
SHRUBS		
	Taxus canadensis	American Yew



30 15 0 30 60
GRAPHIC SCALE
1" = 30'

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: 1" = 30'
DESIGN: PG
DRAWN: PG
CHECKED: DL

SHEET TITLE:

LANDSCAPE PLAN

SHEET No.
L106

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No.	DESCRIPTION	DATE

STREET TREES SECTION 1333.16(A)(2)		
Street Tree Requirement:	*1 tree per 50 l.f.*	
Linear feet of frontage:	12,350	l.f.
Street Trees Required:	247	
Street Trees Provided:	247	

INTERIOR PARKING LOT LANDSCAPING SECTION 1333.16(A)(3)(b)		
REQUIRED		
Gross area of parking lot:	12,335	s.f.
% landscape area required:	5%	
Landscape area required:	617	s.f.
PROVIDED		
Landscape Area Provided:	1,680	s.f.
Total number of parking spaces provided:	40	
Number of trees required:	4	
Trees Provided:	6	
Number of shrubs required:	8	
Shrubs Provided:	8	

* *TREE COUNTED TOWARDS INTERIOR PARKING LOT LANDSCAPE REQUIREMENT*

PERIMETER PARKING LOT LANDSCAPING SECTION 1333.16(A)(3)(a)		
REQUIRED		
Gross area of parking lot:	12,335	s.f.
Perimeter landscaping required:	*1 tree for every 2,000 s.f. of Impervious Area*	
Number of trees required:	7	
PROVIDED		
Trees Provided:	8	

PLANT SCHEDULE

SYMBOL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
EVERGREEN TREES					
	JV	18	Juniperus virginiana	Eastern Redcedar	6` HT.
	PC	19	Picea abies	Norway Spruce	6` HT.
ORNAMENTAL TREES					
	PR	5	Prunus x 'Okame'	Okame Flowering Cherry	2" Cal.
CANOPY TREES					
	AR	41	Acer rubrum 'October Glory'	October Glory Maple	2" Cal.
	GB	16	Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo	2" Cal.
	GT	41	Gleditsia triacanthos inermis	Thornless Honeylocust	2" Cal.
	PA	84	Platanus x acerifolia 'Bloodgood'	London Planetree	2" Cal.
	QW	63	Quercus phellos	Willow Oak	2" Cal.
	TC	44	Tilia cordata 'Greenspire'	Littleleaf Linden	2" Cal.
SHRUBS					
	TAC	20	Taxus canadensis	American Yew	3 gal.

INSTALLATION AND MAINTENANCE NOTES:

1. PLANT SIZES OR SPECIES SHOWN ON PLANS MAY NOT BE AVAILABLE AT THE TIME OF IMPLEMENTATION DUE TO CURRENT NURSERY STOCK. ANY REQUEST FOR SUBSTITUTION SHALL BE SUBMITTED TO LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL.
2. ANY PLANTINGS IN CONSTRUCTION EASEMENTS SHALL BE PLANTED AFTER NEED FOR CONSTRUCTION ACCESS IS OVER.
3. ALL PLANTS SHALL BE PRUNED/MAINTAINED IN THE SPRING AND FALL, AND GRASSES SHALL BE CUT BI-WEEKLY EXCEPT WHEN NOT NECESSARY.
4. THE OWNER, DEVELOPER, AND/OR BUILDER WHO IS RESPONSIBLE FOR PLANTING REQUIRED LANDSCAPING SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF THE APPROVED PLANT MATERIAL, AS REQUIRED BY THE ORDINANCE.



MULTI DECK PLAYHOUSE

PRODUCT: PCM002531-0605

MANUFACTURED BY:
KOMPAN
TEL: 800.426.9788
WEB: www.kompan.com

NOTE:
TO BE INSTALLED PER MANUFACTURER'S GUIDELINES.

1 MULTI DECK PLAYHOUSE



GT IMPAX ENGINEERED WOOD FIBER
(OR APPROVED EQUAL)

NOTE:
TO BE INSTALLED PER MANUFACTURER'S GUIDELINES.

4 PLAY AREA SURFACING



MOUNT VERNON

PRODUCT: ZZXX1326

MANUFACTURED BY:
PLAYWORLD
TEL: 800.233.8404
WEB: www.playworld.com

NOTE:
TO BE INSTALLED PER MANUFACTURER'S GUIDELINES.

2 MOUNT VERNON



TRIO BENCH

6 FT. BACKED
CUMARU HARDWOOD
COLOR: SLATE TEXTURE
FINISH: POWDER COAT

MANUFACTURED BY:
FORMS + SURFACES
TEL: 410.458.1234
WEB: www.forms-surfaces.com

NOTE:
TO BE INSTALLED PER MANUFACTURER'S GUIDELINES.

5 BENCH

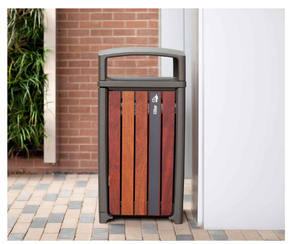


STEPPER CLUSTER M4

MANUFACTURED BY:
EARTHSCAPE PLAY
TEL: 519.804.6854
WEB: www.earthscapeplay.com

NOTE:
TO BE INSTALLED PER MANUFACTURER'S GUIDELINES.

3 STEPPER CLUSTER M4



CORDIA RECEPTACLE

36 GAL. SINGLE STREAM
CUMARU HARDWOOD
COLOR: SLATE TEXTURE
FINISH: POWDER COAT

MANUFACTURED BY:
FORMS + SURFACES
TEL: 410.458.1234
WEB: www.forms-surfaces.com

NOTE:
TO BE INSTALLED PER MANUFACTURER'S GUIDELINES.

6 LITTER RECEPTACLE

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PRELIMINARY PLANS -
AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: NOT TO SCALE
DESIGN: PG
DRAWN: PG
CHECKED: DL

SHEET TITLE:

LANDSCAPE CALCULATIONS AND PLANT SCHEDULE

SHEET No.

L110

P:\Projects\23011\000200\113948 Site Plan\L100 Landscape Plans.dwg, 12/17/2025 2:26:12 PM, Tony Zook,

General Landscape Specification Summary

Specification: This is a summary of IMEG, Corp. general landscape specification. All work shall follow the procedures outlined in the specifications and details contained herein, which are designed to exceed current industry standards. Should there exist a discrepancy between this specification and the included construction details, the written specification shall take precedence.

References: In lieu of providing comprehensive proprietary specifications, the following are referenced to be general default specifications with the following modifications. These modifications and the construction details shown in this plan set shall take precedence over the general referenced specifications.

- "Landscape Specification Guidelines" Landscape Contractors Association of MD, DC, VA - Most current edition.
- "American Standard for Nursery Stock - ANSI Z60.1" by AmericanHort - Most Current Edition
- "TT-77 Recommended Turfgrass Cultivars for Certified Sod Production in Maryland" - Maryland Turfgrass Council
- "Landscape Architecture/Design Specifications for Compost Use" - US Composting Council

If there are discrepancies or contradictions in specification sections or details, the stricter specification shall take precedence. A Request for Information (RFI) can also be submitted for clarification.

List of Plant Material: The contractor will verify plant quantities prior to bidding and any discrepancies shall be brought to the attention of the Owner's Representative. The Contractor shall furnish and install all plant materials required to complete the work as shown on the drawings. Quantities in the planting schedule shall take precedence over quantities graphically shown on the plan. Substitutions shall not be made without the written approval of the Owner's Representative.

Plant Identification: All trees shall be true to name as on plant schedule or shown on planting plans and shall be correctly labeled individually or in groups by genus, species, variety and cultivar. Labels are to remain intact until site is approved through agency inspection, substantial completion approval, or per Owner's Representative's instruction.

Plant Quality: All plant materials shall conform to the size and form standards set forth in the latest edition of AmericanHort's "American Standard for Nursery Stock - ANSI Z60.1". Above Ground: Trees shall be healthy with the color, shape, size, and distribution of trunk, stems, branches, buds and leaves typical of the plant specified. Any signs of stress, improper handling (wounds or broken branches), insect or disease damage, or dead/distorted branches should not be present. Trees shall have one central leader (unless otherwise specified) and grafts should be fully closed and visible above the soil line. Below Ground: A minimum of 3 structural roots should be reasonably distributed around the trunk (reject a tree with structural roots only on one side), the root crown should not be more than 2 inches below the soil line, the top 2 structural roots should not be more than 3 inches below the soil line when measured 4 inches away from the trunk. The top of the other structural root should not be more than 5 inches below the surface. The root system should be free of potentially stem-girdling or kinked roots above the root collar and main structural roots.

Inspection: Plants are to be inspected upon delivery to contractor by a contractor's representative and/or owner's representative. Trees not presenting proper form, incorrect variety, signs of poor health or over-stress, and girdling roots are to be rejected.

Storage & Transport: Plant materials should be protected from dessication during transport via breathable fabric covering the canopy and by watering rootball/pot thoroughly immediately prior to transport. Plant materials should be installed on day of delivery to site. If that is not possible, a temporary storage area can be constructed on-site. Plants are not to be stored on bare asphalt. If storage area is asphalt, cover bare asphalt with a layer of woodchips. Storage should be in shade, and plants be regularly watered at root-ball level, and spaced so foliage from one plant does not interfere with foliage of another. Tall plant materials are to remain upright during storage. Longer term storage plants are to be heeled-in or stored in mulch to the top of the container/root ball. Plant materials shall not be stored on-site for more than two weeks. Plants stored improperly or for too long may be subject to rejection and replacement dependent on ultimate planting condition.

Planting: Plantings shall be installed in accordance with details and specifications on this sheet. Details and specifications for other specific landscape items, such as tree preservation or erosion control may be found elsewhere in this drawing set on their own respective sheet. For items not specifically addressed by this plan set, refer to the latest edition of the "Landscape Specification Guidelines" developed by the Landscape Contractors Association of MD, DC, and VA. Should there be any ambiguities or questions, please utilize the formal RFI/Submittal process.

Trees: The planting hole diameter is to be at a minimum three times the diameter of the root ball. The depth of the planting hole shall be dug so that the shoulder of the root ball is level with the existing grade leaving the root flare slightly higher. When planting on a slope, the depth of the hole shall be dug so that the bottom of the root flare is at the level of the existing grade at the sides of the hole. If the planting hole is mechanically dug, the hole is to be scarified by slightly enlarging hole by hand digging the sides and bottom to prevent glazing. The sides of the hole should be vertical or sloping outwards. Holes are not to be dug when soil is saturated. For balled and burlapped trees, the wire root ball cage is to be removed and burlap is to be cut and completely removed from the top and a minimum of 8" to 12" down the side of the root ball. Do not fold burlap down into hole, it must be removed. Any synthetic materials are to be completely removed from the trunk and root ball. Backfill in lifts using the same soil dug to create the hole, being careful not to over-compact the soil. Inoculate backfill soil or rootball with an approved balanced (Endo/Ecto) commercial mycorrhizae application. Do not amend or add fertilizer unless expressly specified to do so or is part of the approved mycorrhizae innoculant product. Do not place any soil on top of root ball. Trees are to be mulched to full depth specified immediately after planting. A ½" layer of approved compost is to be placed under the mulch layer. Do not place mulch against tree trunk.

Staking: Staking (if any) is to be installed per the accompanying details, utilizing tree webbing straps with grommets to prevent wire from coming in contact with the tree. While not preferred, full tree webbing systems are also permissible if approved through submittal, and installed per manufacturer's instructions. Wire is to be tensioned to allow for 1/2 inch of deflection up or down, and tension shall be rechecked and adjusted on a regular basis. Staking is to be removed as soon as possible after one year. GARDEN HOSE IS NOT TO BE UTILIZED FOR STAKING.

Irrigation: For permanent systems, irrigation should be largely installed prior to plant installation to avoid having to disturb planting beds or move plants to accommodate the installation of the irrigation system. For sites with no permanent irrigation system, Trees are to be irrigated until established by the use of temporary water bags through one growing year or until established. Shrubs, perennial beds, and lawns are to be thoroughly hand-watered or by movable temporary irrigation (sprinklers or drip hose) as necessary to reflect local weather conditions. Watering is to be deep into the soil and infrequent, as opposed to light surficial watering performed often.

Shrubs: For container shrubs, the planting hole is to be dug 3 times the width of the intact container. The container is to be completely removed and the sides of the soil/root clump scarified with a sterile sharp knife. They shall be planted so that the top of the soil level of the container is no more than 1.5" above the original grade. For balled and burlapped shrubs, remove as much burlap as possible from the top and sides of the rootball. Do not fold burlap into hole. Plant with the root flare slightly higher than the surrounding grade. Backfill with soil dug to create the hole. Do not cover top of root ball/clump.

Ground Covers/Perennials: Beds are to be prepared by tilling well to a minimum depth of 6", and soils shall be amended by incorporating 1" of compost meeting the US Composting Council reference specification, 1" of worm castings and/or well decomposed commercially produced compost, or a Class A biosolid also meeting the referenced US Composting Council specification prior to planting. Apply 3" of shredded non-dyed hardwood mulch immediately after planting.

Compacted or Poorly Drained Soils: For sites with heavily compacted or poorly draining soils, alternate planting methods will need to be employed. Contact project Landscape Architect for additional planting details and specifications should either unforeseen condition be encountered.

Conflicts with Existing Roots: Proposed landscape may be shown to be planted in the Critical Root Zones of existing large trees. Should, in the course of planting, large woody roots be discovered belonging to adjacent large trees that are to be preserved, shift the planting location of the tree to be planted to avoid cutting the woody root. Should a suitable planting location not be found within the proximity of where a proposed tree is to be planted, contact the project landscape architect for alternate planting location and recording of the discrepancy for landscape inspection/approval purposes.

Irrigation: New plant materials are to be watered as necessary to maintain health. If no permanent irrigation system is installed, trees are to be watered until established through the use of temporary water bags, Shrubs, perennials, and ground covers shall be hand-watered. Infrequent deep watering is preferred to more frequent quick/shallow watering.

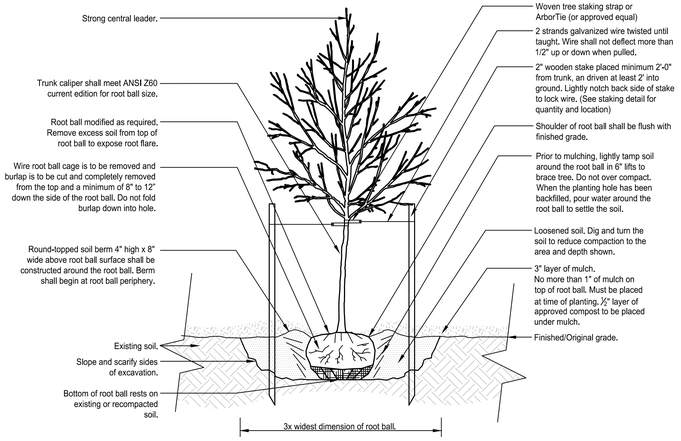
Lawn Areas:

Seeded Lawn Area: Areas to be seeded shall have planting soil tilled to a depth of 6" and free of stones greater than 1" diameter or length. Any amendments that are to be added should be tilled into soil prior to seeding. A seed mix composition chart shall be submitted for review prior to installation. Unless specified by the Owner's Representative, the seed mix must contain a minimum of three cultivars or types of grass in the blend, chosen from the recommended cultivars list of the most recent "TT-77 Recommended Turfgrass Cultivars for Certified Sod Production in Maryland" document produced by the University of Maryland and the Maryland Turfgrass Council. Use of cultivars also appearing on the Turfgrass Water Conservation Alliance approved list is encouraged. Seeds coatings that aid in germination, moisture retention and prevent loss to bird consumption are acceptable. Seeded areas are to be covered by a light and loose layer of rapidly degradable mulch such as straw or hydraulically applied cellulose. Use of erosion control blankets or any synthetic webbing is not permissible for lawn areas unless specified by the Owner's Representative.

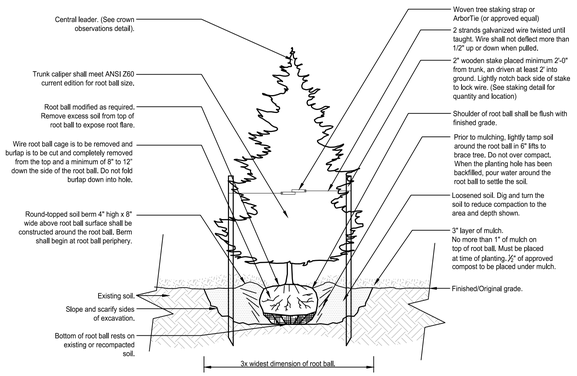
Sodded Lawn Area: Unless a proprietary sod is specified by the Owner's Representative, sod must be of a Maryland or Virginia certified variety suited to the specific growing requirements of where it is to be installed. Grower and variety to be submitted to Owner's Representative for review prior to ordering. Certification documentation for all sod is to be provided to the Owner's Representative upon delivery. For installation on slopes, the Contractor shall use biodegradable sod spikes to secure sod in place. Metal sod staples are not to be utilized for installation.

Invasive Species: Existing invasive species are to be removed utilizing appropriate approved methods including in the invasive species management plan (if applicable) prior to the installation of new plant materials, and is subject to inspection, and is a factor in the Certification of Installation.

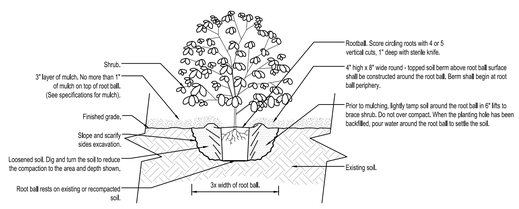
NOTE: These specifications and details are based on those developed by the Urban Tree Foundation, and have been improved to reflect current research and in planting. The ISA has also accepted and reference the UTF details in place of their own. The specifications and details illustrated in this plan set exceed the standards set in the ISA, LCA, and local jurisdictional planting details and specifications.



DECIDUOUS TREE PLANTING DETAIL
SCALE: NOT TO SCALE

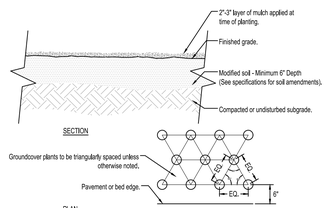


EVERGREEN TREE PLANTING DETAIL
SCALE: NOT TO SCALE



Notes:
1. For ball and burlapped shrubs, remove completely as much burlap as possible, minimum halfway down the side of the rootball. Do not fold burlap down into hole.
2. See specifications for further requirements related to this detail.

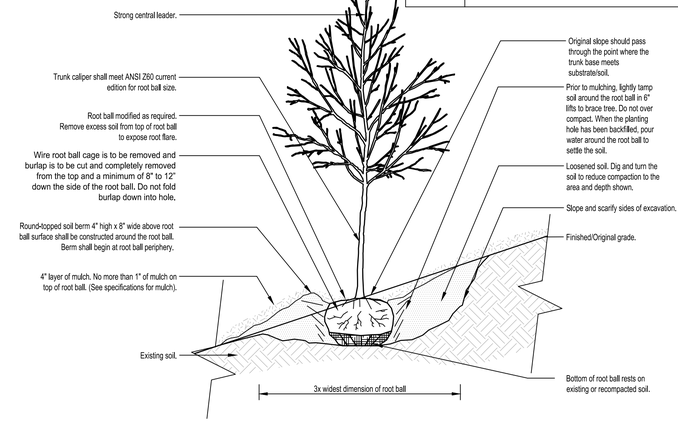
SHRUB PLANTING DETAIL
SCALE: NOT TO SCALE



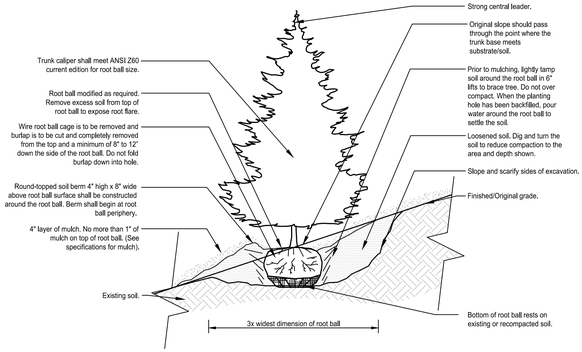
Notes:
1. Plant in triangular arrangement unless otherwise noted on plan.
2. See planting schedule for groundcover species, size, and spacing dimension.
3. Small roots (¼" or less) that grow around, up, or down the root ball periphery are considered a normal condition in container production and are acceptable however they should be eliminated at the time of planting. Roots on the periphery can be removed at the time of planting. (See root ball shaving container detail).
4. Settle soil around root ball of each groundcover prior to mulching.

PERENNIAL/GROUNDCOVER DETAIL
SCALE: NOT TO SCALE

No.	DESCRIPTION	DATE



DECIDUOUS TREE SLOPE PLANTING DETAIL
SCALE: NOT TO SCALE



EVERGREEN TREE SLOPE PLANTING DETAIL
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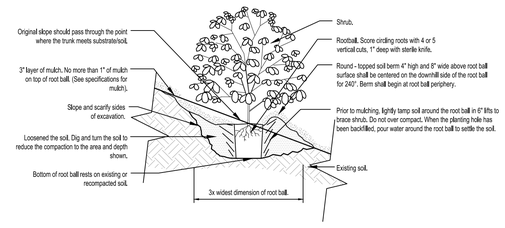
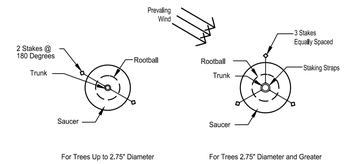


Notes:
1. For ball and burlapped shrubs, remove completely as much burlap as possible, minimum halfway down the side of the rootball. Do not fold burlap down into hole.
2. See written specifications for further requirements related to this detail.

SHRUB SLOPE PLANTING DETAIL
SCALE: NOT TO SCALE



Notes:
1. Utilize only Arbor-tie or approved equal or staking straps against tree trunks.
2. Reference manufacturer's detail of approved system for installation instructions.
3. Wire tension (if used) should not allow greater than 1/2" of play in any direction.
4. Staking should be removed on year after planting or as instructed.

TREE STAKING DETAIL
SCALE: NOT TO SCALE

IMEG
4601 Forbes Boulevard, Suite 140
Lanham, MD 20706 P 240.296.1574
engineering • surveying • land planning

PRELIMINARY PLANS - NOT FOR CONSTRUCTION

AUGUSTINE MANOR PHASE 1
LOT 217
PARCEL I.D.: 120217
CITY OF CHARLES TOWN, WEST VIRGINIA

MARK	DATE	DESCRIPTION

PROJECT No.: 23011
DRAWING No.: XXXXXX
DATE: 09/05/2025
SCALE: NOT TO SCALE
DESIGN: PG
DRAWN: PG
CHECKED: DL

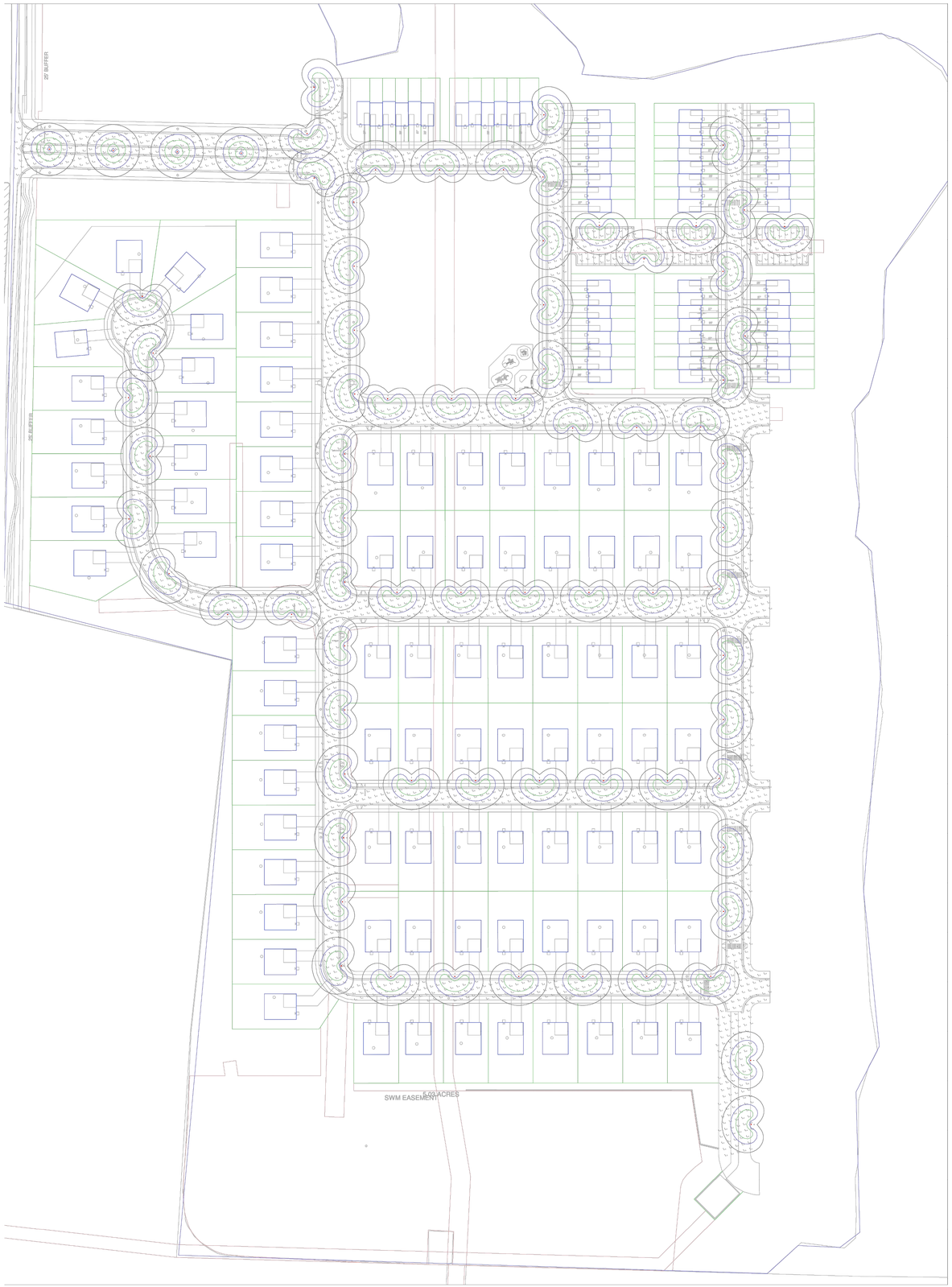
SHEET TITLE:

LANDSCAPE SPECIFICATIONS AND DETAILS

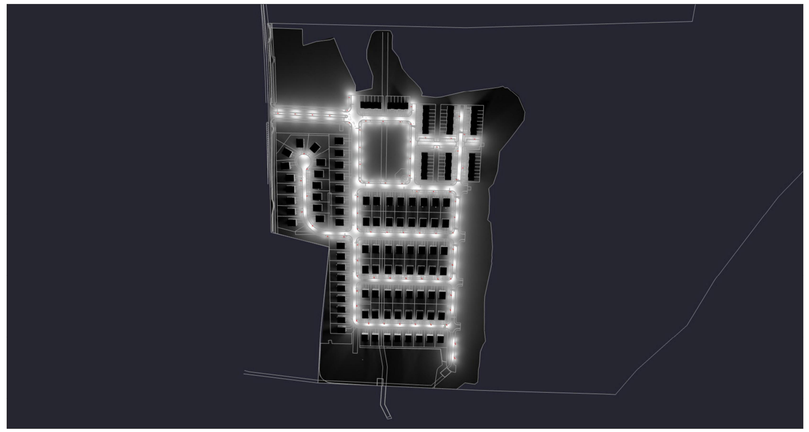
SHEET No.

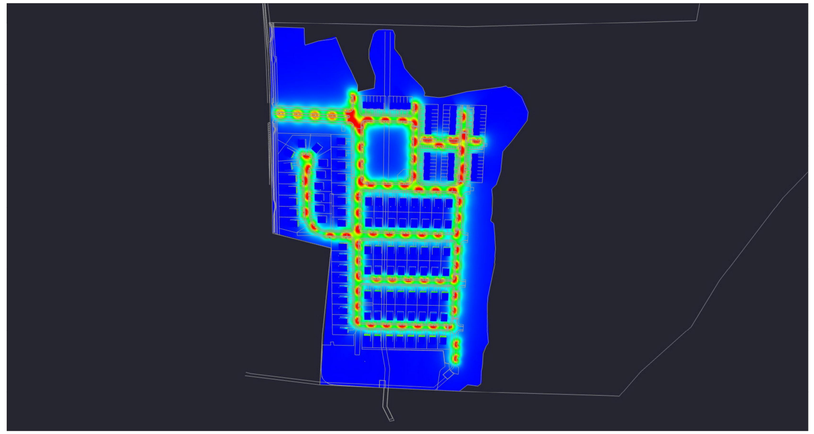
L120

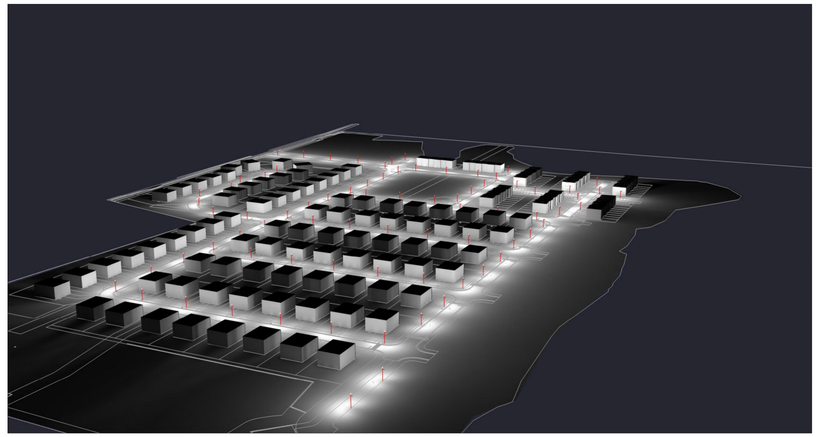
P:\Projects\23011\00200\113948 Site Plan\L100 Landscape Plans.dwg, 12/17/2025 2:26:13 PM, Tony Zook,



ale: 1 inch= 90 Ft.







Luminaire Schedule								
Symbol	Tag	Qty	[MANUFAC]	[LUMCAT]	Description	Arrangement Luminaire Lumens	Arrangement Watts	LLF
	A1	4	COOPER LIGHTING SOLUTIONS - STREETWORKS (FORMERLY EATON)	ULA-A6-D-U-SYM-VMx-7030-BK	ULA-A6-D-U-SYM-VMx-7030-BK	5748	44.4	0.900
	A	73	COOPER LIGHTING SOLUTIONS - STREETWORKS (FORMERLY EATON)	ULA-A6-D-U-ASYM-VMx-7030-BK	ULA-A6-D-U-ASYM-VMx-7030-BK	5301	45.5	0.900

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
AREA_Planar	Illuminance	Fc	0.24	0.5	0.0	N.A.	N.A.

CHESAPEAKE LIGHTING

9740 Patuxent Woods Dr
Suite 100
Columbia, MD 21046

410-792-2266

PROJECT:

VINTON HAYES
LIGHTING CALCS

Date:12/17/2025

Drawn By: N.P.

Revision #: 0

Page # 1 of 1

Schedules

DISCLAIMER: Chesapeake Lighting makes no representation of the completeness or accuracy of the photometric analysis presented. The user of this data takes full responsibility for the accuracy and completeness of all information used in this analysis. This light level analysis is an estimate only, and is based on estimated reflectance values for interior applications or estimated pole locations based on specified light levels for exterior applications. Any variance from reflectance values, obstructions, light loss factors or otherwise could affect the actual light levels obtained. This analysis is only as accurate as is permitted by third party software. Calculated values may vary from actual measurements in certain situations due to variances, such as but not limited to, lamp output, input voltage, ballast variances, manufacturing tolerances and application variances.

December 17, 2025

City of Charles Town, West Virginia
Mark Phillips, PE (Kimley Horn)
101 E Washington St.
Charles Town, WV 25414

RE: SLD2025-04
Augustine Manor Phase 1
1st Review Comment Letter

To Whom It May Concern:

We are responding to the review comments, dated December 2nd, 2025, for the subject application addressing the written comments as requested.

1. Please extend the median nose along Road B at the intersection of Street 1 to encompass the pedestrian crossing to provide a refuge. Further please verify that an all-way stop is warranted as opposed to Road B and Road F being free flow with Street 1 being the stop-controlled side street.

   Response: Noted, median nose will be extended so as to provide refuge. Reviewer has agreed all-way stops are acceptable at all on-site intersections.

2. Please modify the geometry at the intersection of Road B and Street 1 to reduce the intersection , size and improve visibility and operations. I would suggest that Road B narrow through curb extensions at the intersection to provide better guidance to drivers before opening up to the full 4-lane section. Additionally the sight easements as shown will likely be encumbered with obstacles given they are through the front yards of Lots 143-148 and will be hard to enforce.

   Response: Geometry has been modified to reduce the intersection and improve safety/visibility..

   Reviewer notes the conditions near lot 143-148 are satisfactory, given the intersection is an all-way stop.

3. Please explain the varying design speed on Street 1 (Varies 35-mph to 40mph) A consistent design speed would be preferred. ‘

   Response: This is based on the document “Vinton Hayes Internal ADT – Balanced Minor Collectors” dated 01/30/2025, which was reviewed by Charles Town during the sketch plan/rezoning process for the site. The VPD noted for several roads did change between certain intersections, which is backed by traffic generation computations. Although preferred, keeping a consistent higher or lower design speed negates the Charles Town road design code that specifies the road classification change. Note that in the site plans, it is clearly noted that those design speed changes correlate to a change in the road classification.

   Reviewer has agreed this satisfies the comment.

4. Please provide curb ramps and a pedestrian crossing all intersections. (comments 4-8)

Response: These have been added, see site plan sheets.

9. Please narrow the intersection of Road D and Street 1 by bringing the curb ramps and stop bars closer to the intersection to improve sight distance, pedestrian visibility, and operations.

   Response: This has been corrected, see site plan sheets.

10. The sight distance plans provided clearly depict landscaping within the sight triangles. As mentioned in comments above please tighten up the intersections to improve sight distance. Additionally remove any landscaping, or other obstacles to sight distance from within the sight triangles.

    Response: All intersections are now all-way stops, and sight distance is only from the stop bars, such that visibility is not a concern. Reviewer has found this approach acceptable.

11. Please provide curb ramp grading details for all proposed curb ramps to verify ADA/PROWAG compliance.

    Response: This has been added, see C407 sheets for detail.

12. Please provide the horizontal alignment data and radii for the centerline to confirm minimum radii are met based on design speed.

    Response: This has been added, see site plan sheets.

13. It appears all inlets are being proposed as sag inlets. Please modify the curb inlets to the appropriate type (A,B,C) based upon the location and adjacent profile and flow direction.

    Response: inlet type has been revised see stormwater structure schedules sheet.

14. Please update all sag inlets to include flanking inlets within .5’ of elevation or 50’ of the sag inlet to provide relief (For example at inlets A20.1 and A20.3 flanking inlets are required on either side.

    Response: flanking inlets have been placed at all SAG conditions, see grading and drainage plan sheets

15. Please label the 10-year HGL on all storm profiles.

    Response: this will be corrected on the profile sheets with the next full submittal.

16. Please improve the cover between the 60” Storm Sewer and the 54” Storm Sewer to a minimum of 1’ as shown in the profile on sheet C435.

    Response: this will be corrected on the profile sheets with the next full submittal.

17. Please correct the structures on the storm sewer profiles. Many of them show “???” for missing information.

    Response: this will be corrected on the profile sheets with the next full submittal.

18. Please provide a lighting plan that depicts the location of proposed light poles along with

photometric calculations.

Response: a photometric plan is provided with this submittal, the final sheet in the plans.

19. Please provide turning movement exhibits to depict truck turning movement and operations through the development.

Response: turning movement plan sheets are provided showing compliance per Reviewer request. See turning movement plans C319-324.

With the above responses and resubmitted plans, we believe that we have satisfied all review comments. Should you have any questions or require additional information, please reach out to this office.

Sincerely,

Matthew Pohlhaus
Senior Project Manager
MP

Traffic Impact Study

Vinton Hayes

Charles Town, West Virginia



February 26, 2025

Prepared for:

Elm Street Development, Inc.

1355 Beverly Road, Suite 240

McLean, VA 22101

Prepared by:

GOROVE SLADE
Transportation Planners and Engineers

Fairfax, VA

Alexandria, VA

Richmond, VA

Washington, DC

Bethesda, MD

www.goroveslade.com

This document, together with the concepts and designs presented herein, as an instrument of services, is intended for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization by Gorove/Slade Associates, Inc., shall be without liability to Gorove/Slade Associates, Inc.

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Executive Summary

This report presents the findings of a Traffic Impact Study (TIS) conducted for the proposed Vinton Hayes development (the Site / the Development / the Property) situated in Charles Town, West Virginia. The Site is located north of Berryville Pike (U.S. 340), south of Vinton Lane, and east of Augustine Avenue in Charles Town, West Virginia.

This study was developed in accordance with the West Virginia Department of Highways (WVDOH) and the City of Charles Town (Charles Town, or the City) transportation impact study procedures. The document was prepared in accordance with best professional practices and standards that assess the impact of a proposed development on the transportation system. Traffic operational analyses, as presented in this TIS, involve the evaluation of anticipated roadway conditions with and without the proposed development.

Site Location and Study Area

The proposed development will be located north of Berryville Pike (U.S. 340), south of Vinton Lane, and east of Augustine Avenue in Charles Town, West Virginia. The vehicular study area includes the following eight (8) existing and two (2) future intersections at the site access points. Based on coordination with WVDOH, the following scenarios were analyzed:

- Existing Conditions (2024)
- Future without Development Conditions (2031)
- Future with Development Conditions (2031) [Residential + Partial Commercial Buildout Development]
- Future with Development Conditions (2035) [Complete Development]

The weekday AM and PM peak hours were studied for the following intersections:

1. U.S. 340 at Augustine Avenue / Private Driveway
2. Augustine Avenue at Huyett Road
3. Augustine Avenue at Washington Patriots Drive / Sheetz Driveway
4. Augustine Avenue at Prospect Hill Boulevard
5. Augustine Avenue at Page Jackson School Road / Old Cave Road
6. Augustine Avenue at Craighill Drive
7. U.S. 340 at Old Cave Road
8. U.S. 340 at Candlewood Drive

Description of Proposed Development

The development spans two parcels totaling approximately 180.11 acres in Charles Town, West Virginia, identifiable on the Jefferson County, West Virginia Tax Maps by the following parcel IDs: 03-12021700000000 and 03-12021800000000. The parcels are currently zoned as Neighborhood Residential and General Commercial.

The development plan analyzed in this report includes 581 dwelling units (307 single family dwellings and 274 townhomes), 5,000 SF of fast-food restaurant space with a drive-thru, a convenience store/gas station with up to 16 fueling positions, and 105,000 SF of inline retail space. It should be noted that the number of residential units and the unit mix in latest plans may differ slightly from the development program analyzed in this report. For a conservative analysis, this report is based on the residential unit mix found to have higher peak hour trip generation as detailed in the Projected Site Trip Generation section of this report.

As the commercial development is expected to take additional time to absorb, an interim development phase is proposed consisting of the full residential buildout and a partial buildout of the inline retail as follows:

- **Interim Phase by 2031:**
  - Full Residential Buildout
  - Partial Commercial Buildout
    - 5,000 SF of fast-food restaurant space with a drive-thru
    - a convenience store/gas station with up to 16 fueling positions
    - 15,000 SF of inline retail space
- **Complete Buildout by 2035:**
  - Full Residential Buildout
  - Full Commercial Buildout
    - 5,000 SF of fast-food restaurant space with a drive-thru
    - a convenience store/gas station with up to 16 fueling positions
    - 105,000 SF of inline retail space

The development is proposed to be served by two full-access driveways, one each on Augustine Avenue and Berryville Pike. The access on Berryville Pike will utilize an existing median break.

Summary of Findings

2024 Existing Conditions

- Based on the capacity analysis, the overall signalized study intersections operate at acceptable overall levels of service (D or better) during either peak hour.
- Based on the capacity analysis, all approaches of the study intersections operate at acceptable approach levels of service (D or better) except for the Westbound approach at the intersection of Augustine Avenue and Washington Patriots Drive / Sheetz Entrance during the AM peak hour.
- Based on the analysis of the 95th percentile queue lengths from Synchro, all turning movements have queue lengths that were accommodated within the available storage length of the turn bays.

2031 Future Conditions without Development

- Based on the capacity analysis, the overall signalized study intersections operate at acceptable overall levels of service (D or better) during either peak hour.
- Similar to the existing conditions, all approaches of the study intersections operate at acceptable levels of service with improvements from background developments.
- Based on the analysis of the 95th percentile queue lengths from Synchro, all turning movements are anticipated to have queue lengths that are accommodated within the available storage length of the turn bays.

2031 Future Conditions with Development [Residential and Partial Commercial Buildout]

- The residential portion, along with the partial commercial buildout phase of the site, is expected to generate approximately 441 new AM peak hour trips, 510 new PM peak hour trips, and 6,446 new trips on a typical weekday.
- With the addition of Site traffic and proposed roadway improvement and mitigation, all signalized intersections are anticipated to operate at acceptable levels of service (D or better).
- Similar to the existing and 2031 future without development conditions, all approaches of the study intersections operate at acceptable levels of service.
- Based on the queuing analysis performed for 2031 future with development conditions and the suggested mitigation strategy, all turning movements at the study intersections had 95th percentile queue lengths that were accommodated within the available storage lengths of the turn bays.
- Based on an assessment of turn lanes at the site entrances using 2031 volumes:
    - A left turn lane and taper is warranted for the southbound approach at the intersection of Augustine Avenue and the proposed site entrance.
        - Capacity analysis indicates that the approach operates within acceptable level of service standards without the left turn lane.
    - An eastbound left turn lane is also warranted at the intersection of Berryville Pike and the proposed site entrance.
        - There is an existing eastbound left turn lane at the intersection of Berryville Pike and the proposed site entrance which is recommended to be extended to meet storage length requirements.
    - A right turn lane and taper is warranted for the westbound approach of Berryville Pike at the proposed site entrance.

- Based on a preliminary signal warrant assessment, a traffic signal is warranted at the intersection of Berryville Pike and the proposed site entrance under 2031 future with development conditions.
    - The following should be noted regarding the installation of the traffic signal at the intersection of Berryville Pike and the proposed site entrance:
        - **The completion of the full residential portion of the development plan consisting of up to 581 dwelling units, without any commercial development, is not likely to trigger a traffic signal to be warranted.**
        - The completion of the full residential portion of the development plan with any of the commercial development meets the preliminary traffic signal warrant.
        - The completion of the gas station / convenience store along with the completion of either the fast-food restaurant with drive-through or the 15,000 SF of retail without any residential dwelling units is likely to meet traffic signal warrants.

2035 Future Conditions with Development – [Complete Development]

- Based on the capacity analysis, the overall signalized study intersections operate at acceptable overall levels of service (D or better) during either peak hour.
- Two unsignalized intersections are found to have approaches with delays that exceed the threshold for levels of service "D":
    - Southbound approach at the intersection of Berryville Pike and Old Cave Road during the AM and PM peak hours.
    - Northbound approach at the intersection of Berryville Pike and Candlewood Drive during the PM peak hour.
    - The delays associated with the side streets at these unsignalized intersections are a result of limited gaps along Berryville Pike, a major commuter corridor. The minor approach delays are consistent with delays expected on side streets at intersections with major thoroughfares.
    - The 2018 City of Charles Town Comprehensive Plan includes a future boulevard connection at the Berryville Pike and Candlewood Drive intersection that is anticipated to be implemented as part of the Comprehensive Plan Roadway Network beyond the study timeframe of this analysis.
- Based on the analysis of the 95th percentile queue lengths from Synchro, all turning movements are anticipated to have queue lengths that are accommodated within the available storage length of the turn bays.
- Based on an assessment of turn lanes at the site entrances using 2035 volumes:
    - A left turn lane and taper is warranted for the southbound approach at the intersection of Augustine Avenue and the proposed site entrance.
        - Capacity analysis indicates that the approach operates within acceptable level of service standards in 2035 without the left turn lane.
    - An eastbound left turn lane is also warranted at the intersection of Berryville Pike and the proposed site entrance.
        - There is an existing eastbound left turn lane at the intersection of Berryville Pike and the proposed site entrance which is recommended to be extended to meet storage length requirements.
    - A right turn lane and taper is warranted for the westbound approach of Berryville Pike at the proposed site entrance.
- Based on a preliminary signal warrant assessment, a traffic signal is warranted under 2035 future with development (full residential and fully commercial buildout) conditions.

Overall Conclusion

Based on the capacity and queueing analysis results, **the proposed development will not have a substantial impact to the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the preferred concept plan and that the potential mitigation measure is constructed as proposed.**

Introduction

This report presents the findings of a Traffic Impact Study (TIS) conducted for the proposed Vinton Hayes development (the Site / the Development / the Property) situated in the City of Charles Town, West Virginia.

The development spans two parcels totaling approximately 180.11 acres in Charles Town, West Virginia, identifiable on the Jefferson County, West Virginia Tax Maps by the following parcel IDs: 03-12021700000000 and 03-12021800000000. The parcels are currently zoned as Neighborhood Residential and General Commercial.

The development program analyzed in this report consists of 581 dwelling units (307 single-family detached units and 274 single-family attached units), 105,000 SF of inline retail, 5,000 SF of fast-food restaurant with drive-thru window, and a convenience store/gas station with up to 16 fueling positions. The proposed development consists of two phases as follows:

- **Interim Phase - 2031:**
  - Full Residential Buildout
  - Partial Commercial Buildout
    - 5,000 SF of fast-food restaurant space with a drive-thru
    - a convenience store/gas station with up to 16 fueling positions
    - 15,000 SF of inline retail space
- **Complete Buildout (+90,000 SF of retail) - 2035:**
  - Full Residential Buildout
  - Full Commercial Buildout
    - 5,000 SF of fast-food restaurant space with a drive-thru
    - a convenience store/gas station with up to 16 fueling positions
    - 105,000 SF of inline retail space

The interim phase consisting of the full residential buildout with a partial buildout of the commercial development is expected to be completed by 2031 and the complete buildout phase was analyzed to be completed by 2035.

It should be noted that the number of residential units and the unit mix in latest plans may differ slightly from the development program analyzed in this report. For a conservative analysis, this report is based on the residential unit mix found to have higher peak hour trip generation as detailed in the Projected Site Trip Generation section of this report.

Access to the site will be provided via two future full-movement entrances, one on Augustine Avenue and one on Berryville Pike. The access on Berryville Pike will utilize an existing median break.

This report analyzes the trips generated by the Vinton Hayes development and its impact on traffic operations on the surrounding road network. This study was performed based on the TIS scope meeting with the WVDOH on August 29, 2024 and confirmed scope via email correspondence on December 2, 2024.

The following tasks were completed as part of this study effort:

- Scoping discussions were held with the West Virginia Department of Highways (WVDOH) and the City of Charles Town (Charles Town, or the City) staff on the parameters of this study as well as any relevant background information during a meeting held on Thursday, August 29, 2024. The scoping letter included in Appendix A details the study assumptions and relevant background information discussed.
- Existing conditions were observed in the field to verify roadway geometry and traffic flow characteristics.
- Traffic counts were collected at the existing study intersections on Tuesday, September 10, 2024 from the hours of 6:00 AM to 9:00 AM and 3:30 PM to 6:30 PM and on Thursday, November 2, 2023 from the hours of 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM.

- The Future Conditions without Development scenarios were projected based on the existing traffic volumes, an inherent growth to account for regional growth on the roadway network, and approved background developments in the vicinity of the site.
- Proposed site traffic volumes were derived based on the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, publication and were assigned to the road network based on the agreed upon direction of approach discussed during the aforementioned scoping meeting.
- The Future Conditions with Development scenarios were projected based on the existing traffic volumes, regional growth, and proposed development traffic volumes and associated trip assignments.
- Intersection capacity and queueing analyses were performed for the identified study intersections for the 2024 Existing Conditions, 2031 Future Conditions without Development, 2031 Future Conditions with Development, 2035 Future Conditions without Development, and 2035 Future Conditions with Development scenarios during the weekday morning (AM), and weekday afternoon (PM) peak hours.
- Intersection capacity and queuing analyses were performed using *Synchro*, version 11, with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodology.
- Sources of data for this study include the Institute of Transportation Engineers (ITE), WVDOH, Jefferson County, the City of Charles Town (Charles Town, or, the City), and the office files and field reconnaissance efforts of Gorove Slade.

Background Information: Proposed Development (Site & Nearby)

Description of the Existing Site

Site Location

The proposed development will be located north of Berryville Pike (U.S. 340), south of Vinton Lane, and east of Augustine Avenue in Charles Town, West Virginia. An aerial of the study vicinity is provided in Figure 1.

A description of the proposed development is provided in the *Introduction* section of this report.



Figure 1: Site Location

Location within Jurisdiction and Region

The Site is located in the City of Charles Town, West Virginia. A regional aerial of the Site is provided in Figure 2.



Figure 2: Regional Location

Description of the Parcel

The development spans two parcels totaling approximately 180.11 acres in Charles Town, West Virginia, identifiable on the Jefferson County, West Virginia Tax Maps by the following parcel IDs: 03-12021700000000 and 03-12021800000000 as illustrated in Figure 3.

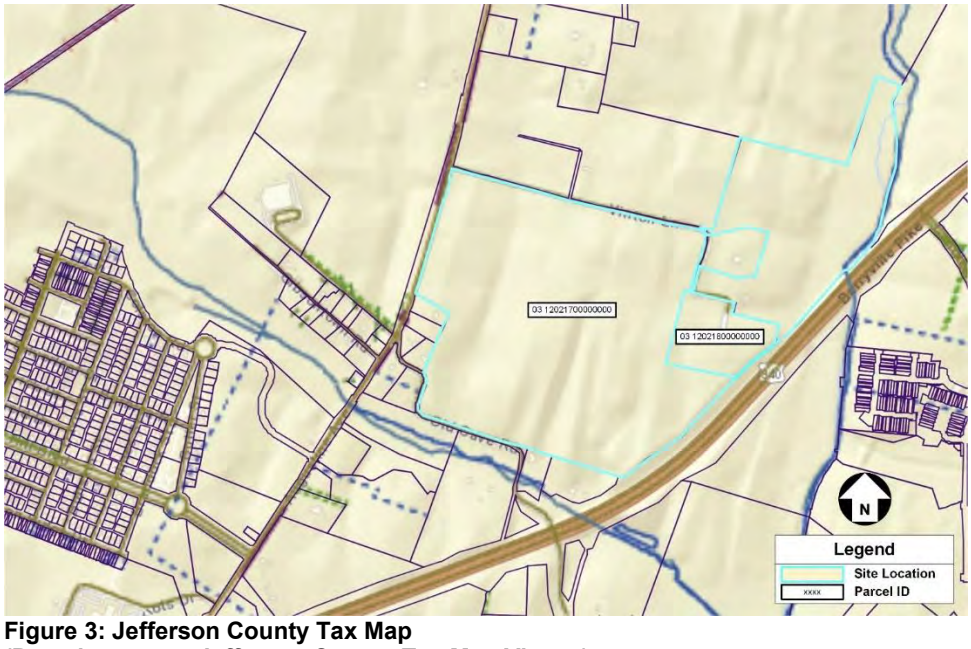


Figure 3: Jefferson County Tax Map
(Parcels source: Jefferson County Tax Map Viewer)

Existing Zoning and Long-Range Land-Use

The parcels are currently zoned as Neighborhood Residential and General Commercial. The Site has a Future Land-Use designated as Mixed Use Residential and General Commercial. The existing zoning is presented in Figure 4, the long-range land-use is presented in Figure 5.

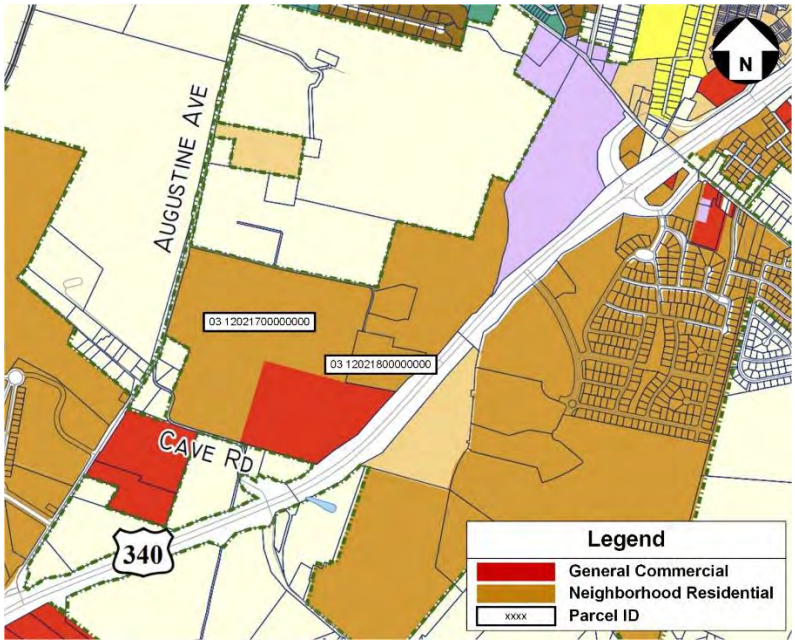


Figure 4: Existing Zoning
(Source: Charles Town Zoning Map)

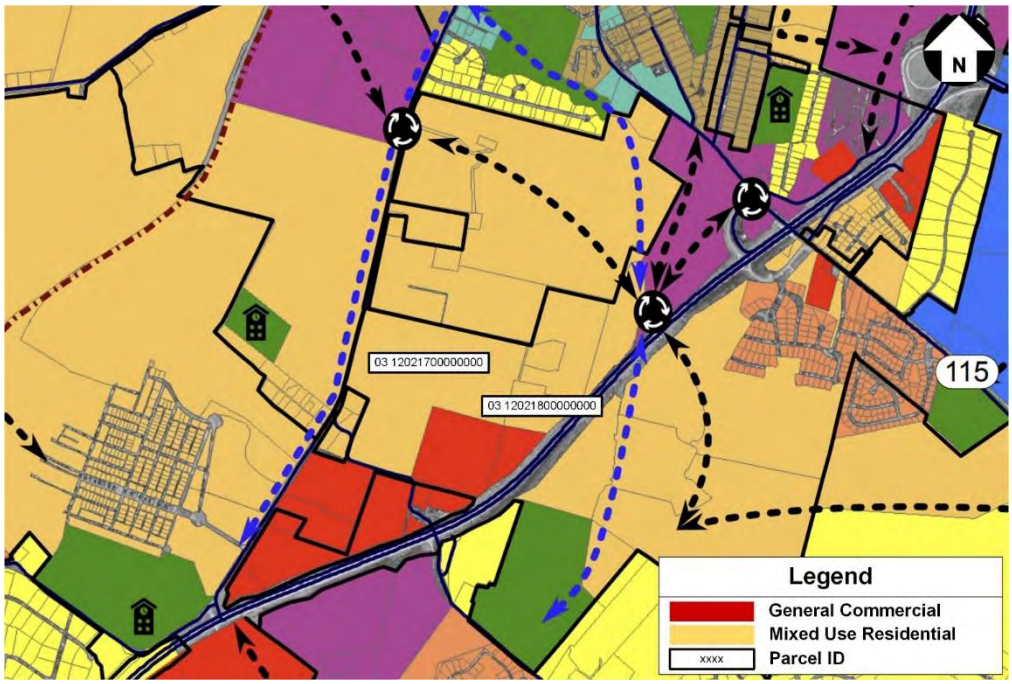


Figure 5: Future Land-Use (Source: Charles Town Comprehensive Plan 2040)

Descriptions of Geographic Scope of Study and Limits of the Study Area

The proposed development site is situated primarily in the southeast quadrant of the intersection of Augustine Avenue and Vinton Lane and the northwest quadrant of the intersection of Berryville Pike and Old Cave Road. The geographic scope of the study area was developed in accordance with WVDOH and City guidance. The vehicular study area includes the following eight (8) existing and two (2) future study intersections. The existing study intersections are as follows:

Intersection 1: Augustine Avenue & Berryville Pike (U.S. 340), existing full-movement, signalized

Intersection 2: Augustine Avenue & Huyett Road / Sheetz Entrance, existing partial-movement (RI only at Sheetz Entrance), unsignalized

Intersection 3: Augustine Avenue & Washington Patriots Drive / Sheetz Entrance existing full-movement, unsignalized

Intersection 4: Augustine Avenue & Prospect Hill Boulevard, existing full-movement, unsignalized

Intersection 5: Augustine Avenue & Page-Jackson School Road / Old Cave Road, existing full-movement, unsignalized

Intersection 6: Augustine Avenue & Craighill Drive, existing full-movement, unsignalized

Intersection 7: Berryville Pike (U.S. 340) & Old Cave Road, existing full-movement, unsignalized

Intersection 8: Berryville Pike (U.S. 340) & Candlewood Drive, existing full-movement, unsignalized

The future study intersections are as follows:

Intersection 9: Augustine Avenue & Craighill Drive, full-movement

Intersection 10: Berryville Pike (U.S. 340) & Candlewood Drive, full-movement

Intersections 9 & 10 will provide access points to the development. An aerial of the study intersections is provided in Figure 6.



Figure 6: Aerial of Study Boundaries (Study Intersections)

2024 Existing Conditions

2024 Existing Traffic Volumes

In order to determine the weekday morning (AM) and weekday afternoon (PM) peak hour turning movement traffic volumes, turning movement counts (TMC) were collected. Traffic volumes from these counts were assessed in order to develop 2024 'baseline' traffic volumes.

The following assumptions were made in order to develop the 2024 'baseline' traffic volumes:

- Turning movement counts were collected at the following existing study intersections on Tuesday, September 10, 2024 from the hours of 6:00 AM to 9:00 AM and 3:30 PM to 6:30 PM:
    - Study Intersection 1: Augustine Avenue & Berryville Pike (U.S. 340)
    - Study Intersection 2: Augustine Avenue & Huyett Road / Sheetz Entrance
    - Study Intersection 3: Augustine Avenue & Washington Patriots Drive / Sheetz Entrance
    - Study Intersection 4: Augustine Avenue & Prospect Hill Boulevard
    - Study Intersection 5: Augustine Avenue & Page-Jackson School Road / Old Cave Road
    - Study Intersection 6: Augustine Avenue & Craighill Drive
- Turning movement counts were collected at the following existing study intersections on Thursday, November 2, 2023 from the hours of 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM:
    - Study Intersection 7: Berryville Pike (U.S. 340) & Old Cave Road
    - Study Intersection 8: Berryville Pike (U.S. 340) & Candlewood Drive
- From the turning movement counts, the following system peak hours were determined.
    - AM Peak Hour: 7:00 AM to 8:00 AM
    - PM Peak Hour: 4:30 PM to 5:30 PM
- The heavy vehicle percentages (HV%) for the existing study intersections, by turning movement, were determined based on the traffic counts collected. Similarly, peak hour factors, in the range of 0.85 to 1.00 for existing conditions were also determined based on the traffic counts collected.

The 2024 existing road network configuration is presented in Figure 7. The 2024 'baseline' existing peak-hour traffic volumes for the intersections within the study area are illustrated in Figure 8. The average daily traffic (ADT) volumes, depicted in this figure and in subsequent volume graphics, were calculated based on the PM peak hour turning movement volumes and multiplied by a k-factor of 0.10.

The existing traffic count data is provided in Appendix B.

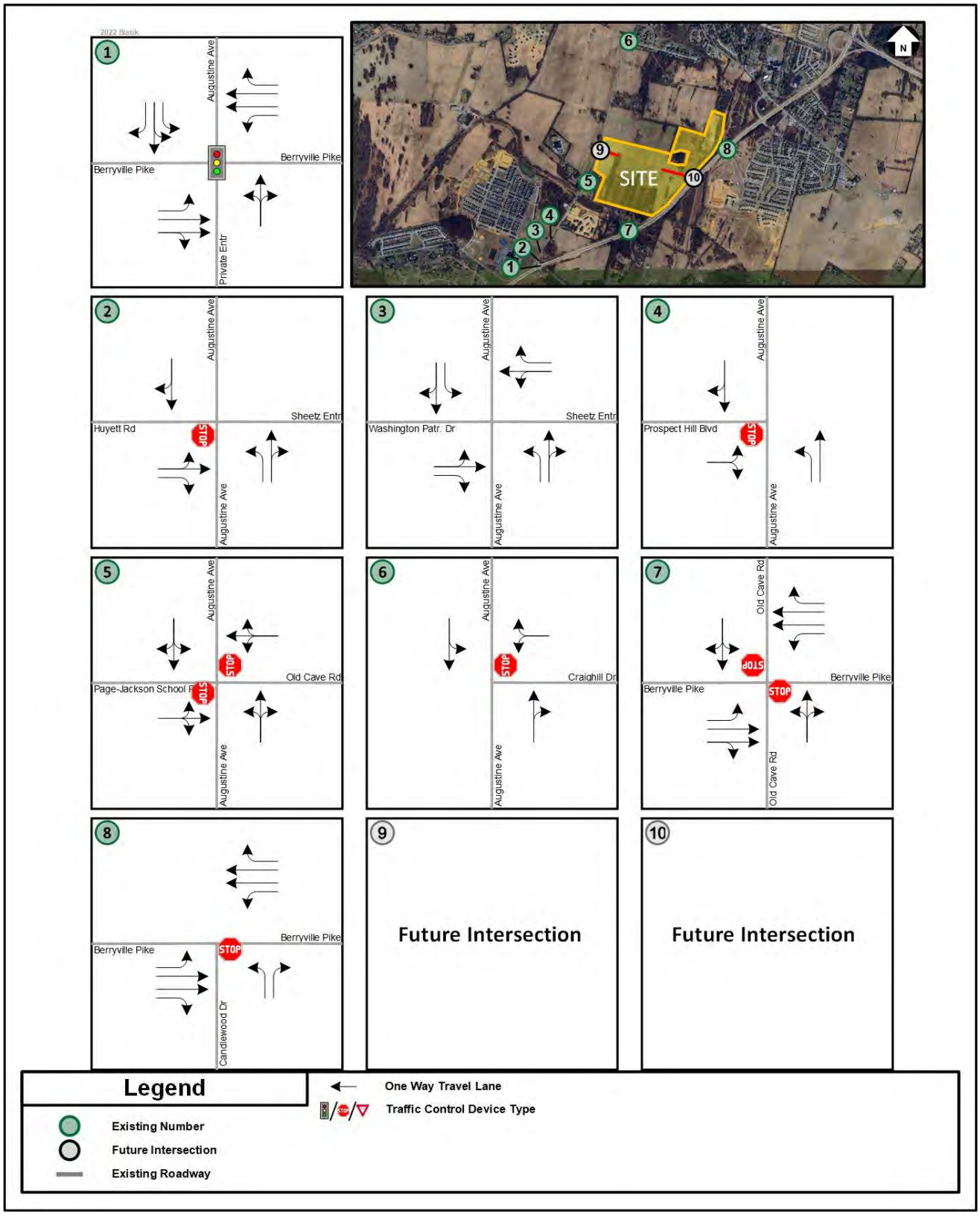


Figure 7: 2024 Existing Conditions – Roadway Network Geometric Configuration and Traffic Control Devices

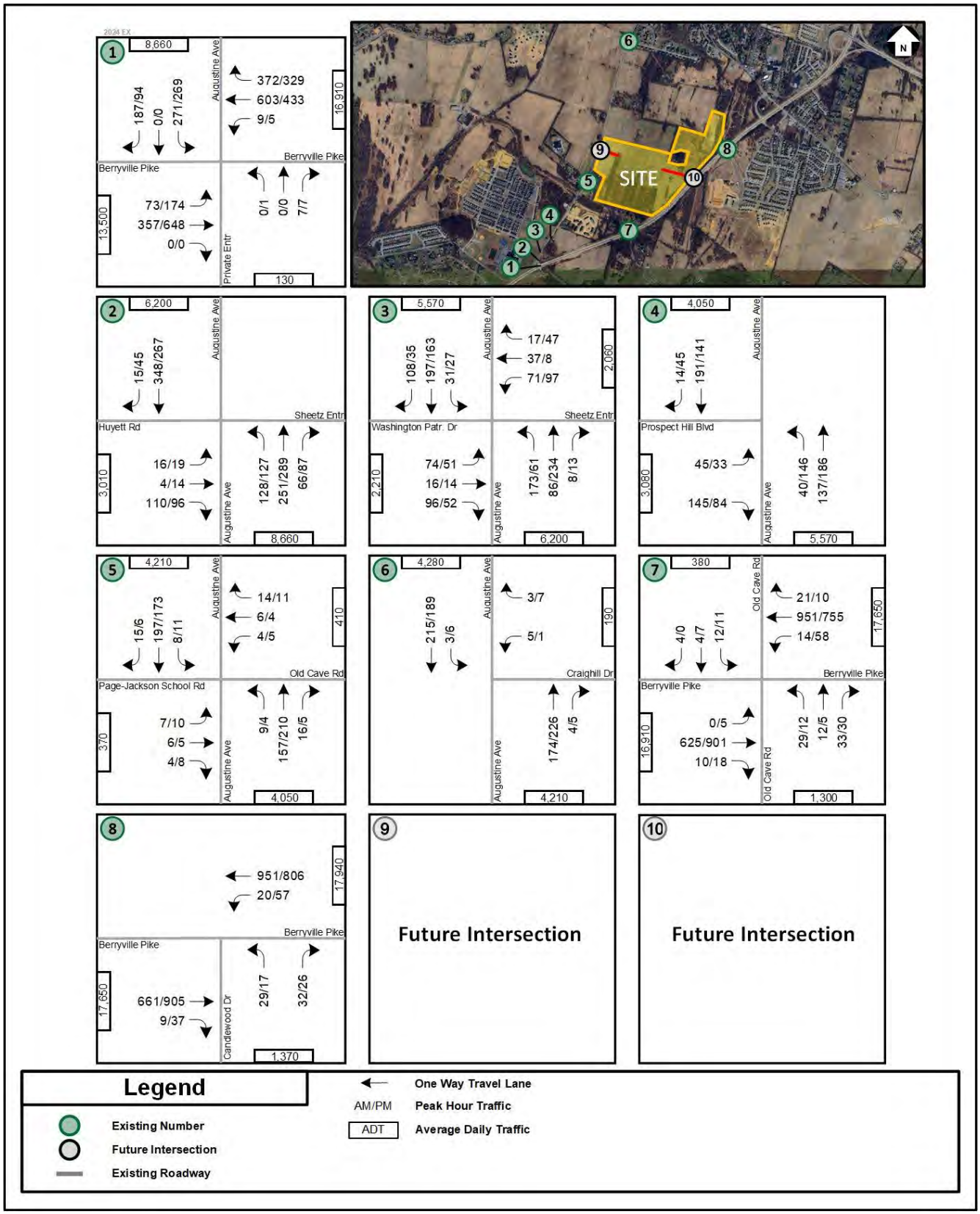


Figure 8: 2024 Existing Conditions – Vehicular Traffic Volumes

Existing Intersection Capacity and Queueing Analysis

Intersection capacity and queuing analyses were performed for the 2024 Existing Conditions scenario at the study area intersections during AM, and PM peak hours. *Synchro,* version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) 6th methodology[1] and include level of service (LOS), delay, and queue length comparisons for the turning movements analyzed. Signal timings were obtained by WVDOH, and the lane configurations at study intersections along the road network were field-verified, and the existing traffic volumes discussed in the aforementioned section as well as other relevant data were entered into the analysis models.

For the purposes of this analysis, the existing peak hour factors (PHF) utilized in the analysis of existing conditions were based on the traffic count data and were modeled in the *Synchro* network on a by-intersection basis.

It is considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in Table 1. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized study intersections, and per approach and lane group for all study intersections.

The 95th percentile queue lengths were also determined from *Synchro* and are expressed in feet.

The description of different LOS and delay are included in Appendix C. The detailed analysis worksheets of 2024 Existing Conditions are contained in Appendix D.

Table 1: 2024 Existing Conditions – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue (ft.) [2]
			Synchro			Synchro		
1	**Augustine Avenue (N/S) & Berryville Pike (E/W) (Signalized)**							
	Overall Intersection		**C**	**28.1**		**C**	**24.7**	
	Eastbound Approach		***C***	***23.9***		***C***	***22.1***	
	Eastbound Left	660	D	45.9	#99	D	38.0	159
	Eastbound Thru/Right		B	19.4	126	B	17.8	198
	Westbound Approach		***C***	***34.9***		***C***	***31.0***	
	Westbound Left	155	F	359.9	21	F	385.4	14
	Westbound Thru		C	26.1	226	C	24.0	165
	Westbound Right	265	D	41.3	60	D	35.3	64
	Northbound Approach		***B***	***15.4***		***B***	***15.5***	
	Northbound Left/Thru/Right		B	15.4	12	B	15.5	14
	Southbound Approach		***B***	***17.6***		***B***	***17.7***	
	Southbound Left/Thru		C	20.2	224	C	20.2	237
	Southbound Right		B	13.9	101	B	10.4	45
2	**Augustine Avenue (N/S) & Huyett Road (E/W) (TWSC)**							
	Eastbound Approach		***B***	***14.3***		***B***	***14.3***	
	Eastbound Left-Thru	25	D	25.7	10	C	23.9	15
	Eastbound Right		B	12.2	20	B	11.0	13
	Northbound Approach							
	Northbound Left		A	8.7	13	A	8.4	10

[1] It should be noted that HCM 2000 methodology was used in lieu of HCM 6th if the HCM 6th methodology was not applicable. HCM 6th could not be applicable in such cases as nonstandard National Electrical Manufacturers Association (NEMA) configurations, shared lane configurations, placement of loop detectors, U-turns, etc.

Table 1: 2024 Existing Conditions – Intersection Capacity Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue (ft.) [2]
			Synchro			Synchro		
3	**Augustine Avenue (N/S) & Washington Patriots Drive / Sheetz Driveway (E/W) (TWSC)**							
	Eastbound Approach		***D***	***25.9***		***C***	***15.7***	
	Eastbound Left		E	44.4	60	C	20.9	20
	Eastbound Thru/Right		B	13.7	23	B	11.6	10
	Westbound Approach		***E***	***38.6***		***C***	***21.2***	
	Westbound Left		F	51.4	65	D	26.8	48
	Westbound Right/Thru		C	21.7	23	B	11.3	8
	Northbound Approach							
	Northbound Left	215	A	8.8	15	A	7.9	5
	Southbound Approach							
	Southbound Left	225	A	7.5	3	A	7.9	3
4	**Augustine Avenue (N/S) & Prospect Hill Boulevard (E/W) (TWSC)**							
	Eastbound Approach		***B***	***12.4***		***B***	***13.0***	
	Eastbound Left-Right		B	12.4	33	B	13.0	23
	Northbound Approach							
	Northbound Left	225	A	8.0	3	A	8.1	10
5	**Augustine Avenue (N/S) & Page-Jackson Road/Old Cave Road (E/W) (TWSC)**							
	Eastbound Approach		***B***	***12.5***		***B***	***11.9***	
	Eastbound Left-Thru-Right		B	12.5	3	B	11.9	5
	Westbound Approach		***B***	***10.9***		***B***	***11.5***	
	Westbound Left-Thru-Right		B	10.9	3	B	11.5	3
	Northbound Approach							
	Northbound Left		A	8.1	0	A	7.7	0
	Southbound Approach							
	Southbound Left		A	7.7	0	A	7.8	0
6	**Augustine Avenue (N/S) & Craighill Dr (E/W) (TWSC)**							
	Westbound Approach		***B***	***10.8***		***B***	***10.0***	
	Westbound Left-Right		B	10.8	0	B	10.0	0
	Southbound Approach							
	Southbound Thru-Left		A	8.0	0	A	7.8	0
7	**Berryville Pike (E/W) & Old Cave Road (N/S) (TWSC)**							
	Eastbound Approach							
	Eastbound Left	160	A	0.0	0	B	10.6	0
	Westbound Approach							
	Westbound Left	490	A	9.7	3	B	11.3	10
	Northbound Approach		***C***	***18.7***		***C***	***19.3***	
	Northbound Left-Thru-Right		C	18.7	25	C	19.3	15
	Southbound Approach		***C***	***23.7***		***D***	***26.6***	
	Southbound Left-Thru-Right		C	23.7	10	D	26.6	10
8	**Berryville Pike (E/W) & Candlewood Drive (N/S) (TWSC)**							
	Westbound Approach							
	Westbound Left	440	B	10.4	3	B	11.3	8
	Northbound Approach		***C***	***15.4***		***C***	***18.0***	
	Northbound Left-Thru		C	19.9	10	D	25.9	8
	Northbound Right		B	11.4	5	B	12.9	5

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two cycles.

Based on the capacity analysis of existing conditions, the signalized study intersections operate at acceptable overall levels of service (LOS D or better). All approaches of the study intersections operate at acceptable levels of service except for the Westbound approach at the intersection of Augustine Avenue and Washington Patriots Drive / Sheetz Entrance during the AM peak hour.

Based on the queuing analysis performed for existing conditions, all turning movements at the study intersections had 95th percentile queue lengths that were accommodated within the available storage lengths of the turn bays.

2031 Future Conditions Without Development

For the purposes of this study, the residential portion with partial commercial buildout of the Development is anticipated to be constructed by 2031; this scenario analyzes the future without development conditions for the year 2031.

Future without Development Traffic Volumes

The derivation of the future without development traffic volumes was based on assumptions and parameters discussed with WVDOH and the City during the scoping process for this study. The future conditions include anticipated inherent regional growth, the inclusion of any potential background developments in the pipeline around the vicinity of the Site, and any anticipated roadway improvements, as applicable.

Inherent Regional Growth

In order to account for the increased demand on the traffic network between 2024 and 2031, an inherent growth rate of 2.0399%, compounded annually over a seven-year period, between 2024 to 2031 (and totaling 15.18% growth of the existing volumes) was applied to mainline through movements along Berryville Pike. An inherent growth rate of 1.8197%, compounded annually over a seven-year period, between 2024 to 2031 (and totaling 13.45% growth of the existing volumes) was applied to mainline through movements along Augustine Avenue as well.

The inherent regional growth volumes (for the period between 2024 and 2031) are illustrated in Figure 10.

Potential Background Development(s)

There are five known approved but unbuilt developments in the vicinity of the Site. Location of background developments is shown in Figure 10. It should be noted that traffic impact studies were not available for four out of the five developments and therefore, the site trip distribution and assignment was assumed based on engineering judgement.

- The Washington Landing development is approved along Augustine Avenue north of Prospect Hill Boulevard. The development is expected to include 194 Multifamily Housing Units. Access to the approved development consists of a full-access driveway along Augustine Avenue.
- The Huntfield development is approved to add 35 Single Family Detached Homes and 48 Townhomes with existing access via Prospect Hill Boulevard along Augustine Avenue.
- The Norborne-Glebe development is approved to add 155 Single Family Detached Homes and 187 Townhomes with existing access via Candlewood Drive along U.S. 340.
- The Hillside development is approved along Hillside Drive and is expected to include 128 Townhomes with existing access via Hillside Drive to Charles Town Road.
- The Stone Spring Development is approved along Keyes Ferry Road and U.S. 340. The development is expected to include 62 Single Family Detached Homes and 77 Single Family Attached Homes.

Table 2 shows the trip potential of the background developments based on the Institute of Transportation Engineers (ITE) Trip Generation Manual – 11th Edition. Figure 11 through Figure 15 show the background development trips.



Figure 9: Location of Background Developments

Table 2: Background Trip Generation (ITE, 11th Ed.)

Land Use	ITE Code	Size	Weekday AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	Weekday PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily Total
Washington Landing									
Multifamily Housing (Mid-Rise) (Apartments, Townhomes, Cond	221	194 DU	17	57	74	46	30	76	879
Subtotal without Reductions			**17**	**57**	**74**	**46**	**30**	**76**	**879**
Huntfield									
Single-Family Detached Housing (EQUATIONS)	210	35 DU	7	22	29	23	14	37	384
Single-Family Attached Housing (EQUATIONS)	215	48 DU	5	14	19	15	10	25	315
Subtotal without Reductions			**12**	**36**	**48**	**38**	**24**	**62**	**699**
Norborne-Glebe									
Single-Family Detached Housing (EQUATIONS)	210	155 DU	28	83	111	94	56	150	1,510
Single-Family Attached Housing (EQUATIONS)	215	187 DU	23	69	92	64	44	108	1,374
Subtotal without Reductions			**51**	**152**	**203**	**158**	**100**	**258**	**2,884**
Hillside									
Single-Family Attached Housing (EQUATIONS)	215	128 DU	15	46	61	43	30	73	925
Subtotal without Reductions			**15**	**46**	**61**	**43**	**30**	**73**	**925**
Stone Spring									
Single-Family Detached Housing (EQUATIONS)	210	62 DU	12	36	48	40	23	63	650
Single-Family Attached Housing (EQUATIONS)	215	77 DU	8	26	34	25	17	42	536
Subtotal without Reductions			**20**	**62**	**82**	**65**	**40**	**105**	**1,186**

Potential Roadway Improvement(s)

A portion of Augustine Avenue is planned for road geometric upgrades. This includes a new lane configuration for the southbound approach at the intersection of Augustine Avenue and Berryville Pike. A new signal at Augustine Avenue and Washington Patriots Drive is to be funded by the adjacent Sheetz development. Figure 16 presents the roadway network, lane use, and traffic control at the study intersections in the 2031 Future without Development scenario.

Future without Development Traffic Volumes

In order to forecast future roadway traffic volumes for the year 2031, the 2024 ‘baseline’ traffic volumes were combined with the inherent regional growth traffic volumes (2024 to 2031) and background development trips. The 2031 Future Conditions without Development scenario traffic volumes are illustrated in Figure 17.

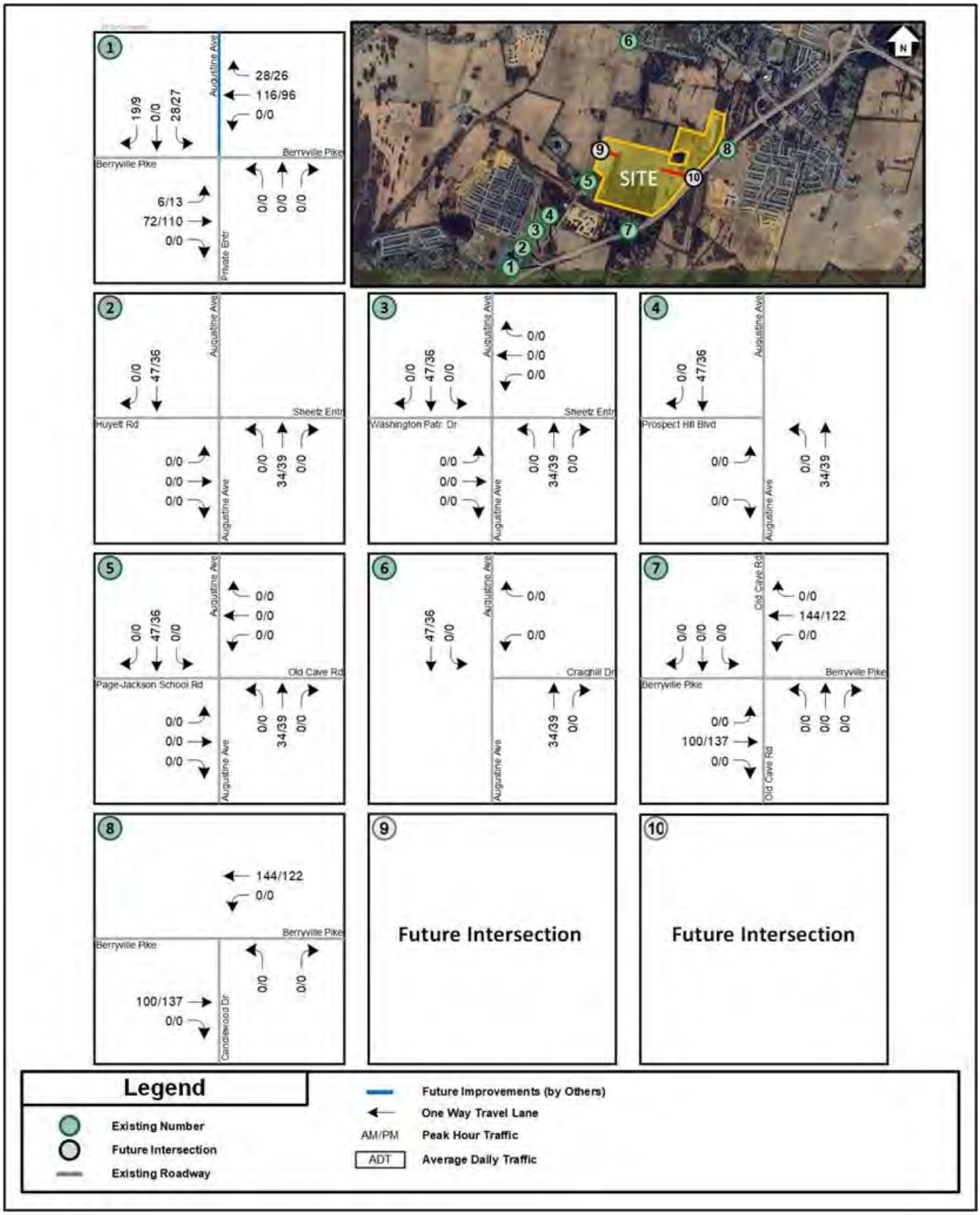


Figure 10: Projected Inherent Regional Growth Traffic Volumes (2024 to 2031)

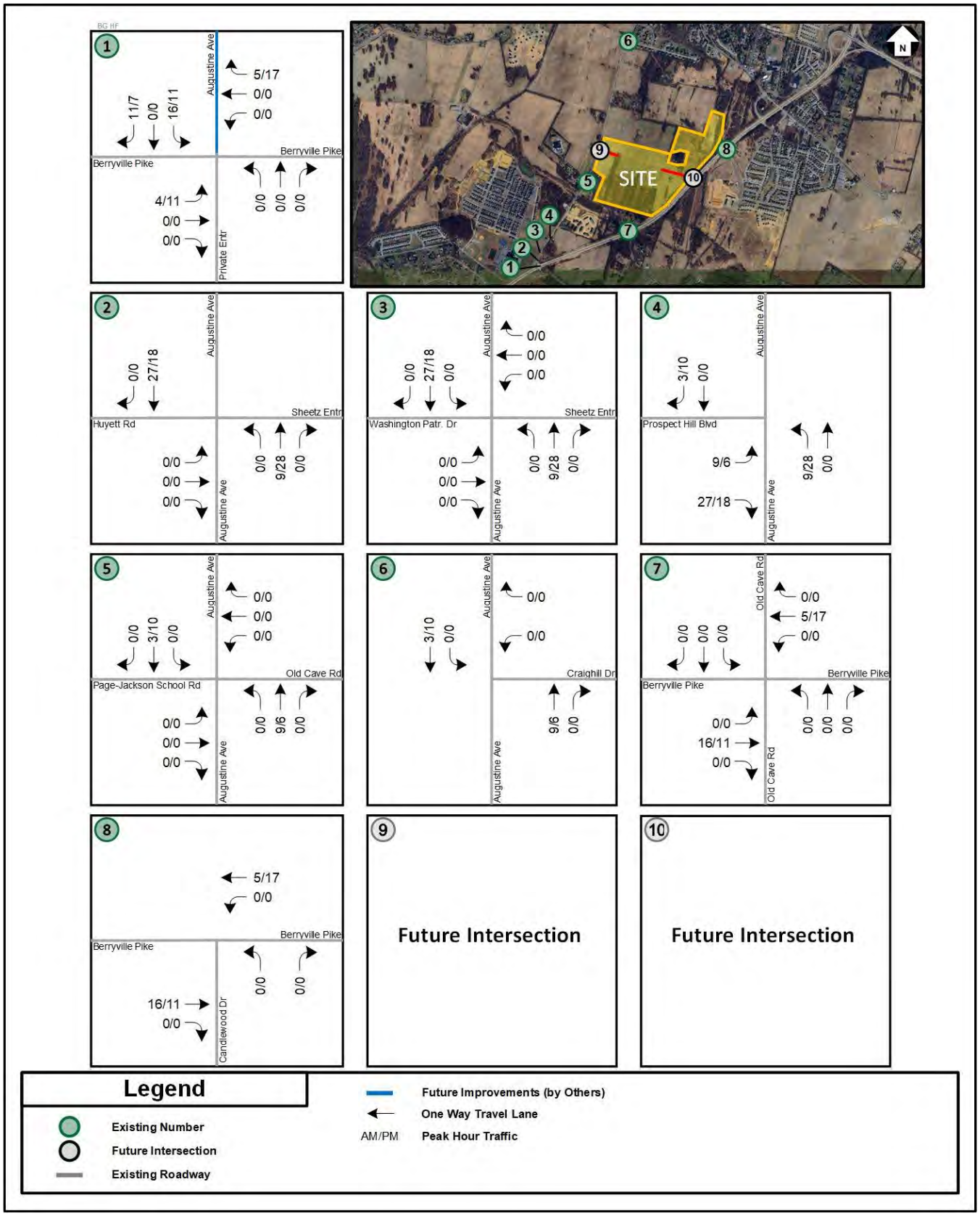


Figure 11: Background Development Trips - Huntfield

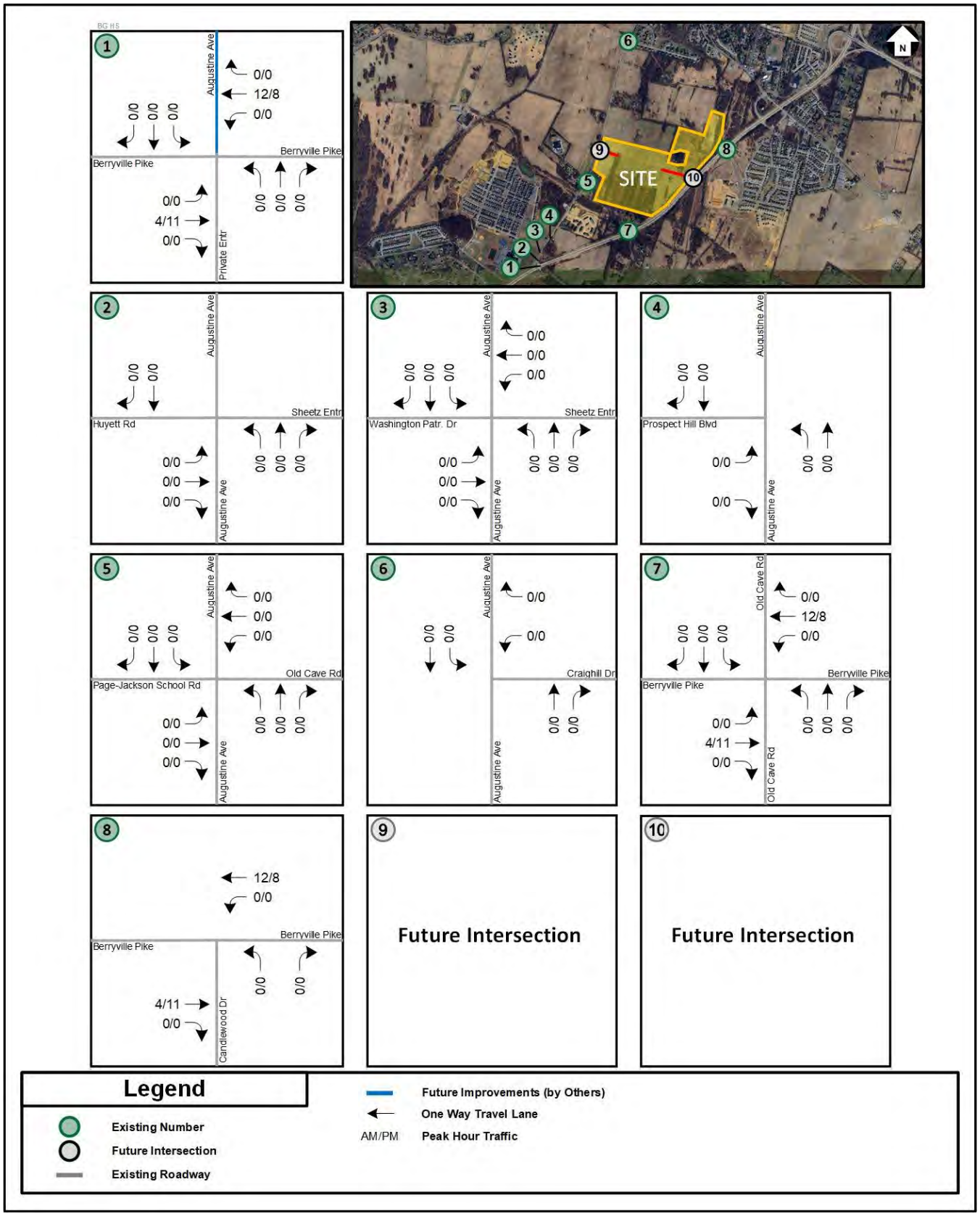


Figure 12: Background Development Trips - Hillside

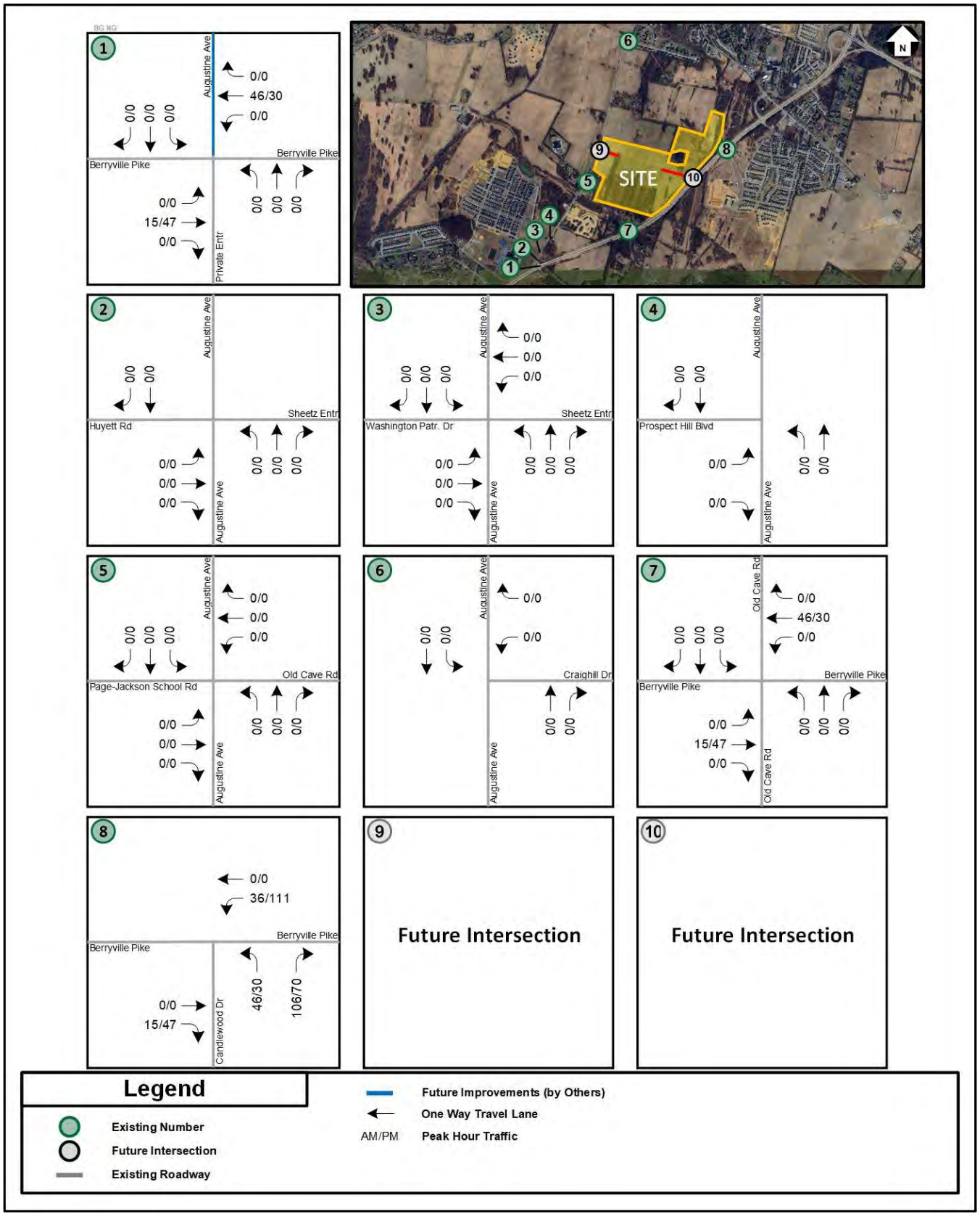


Figure 13: Background Development Trips - Norborne-Glebe

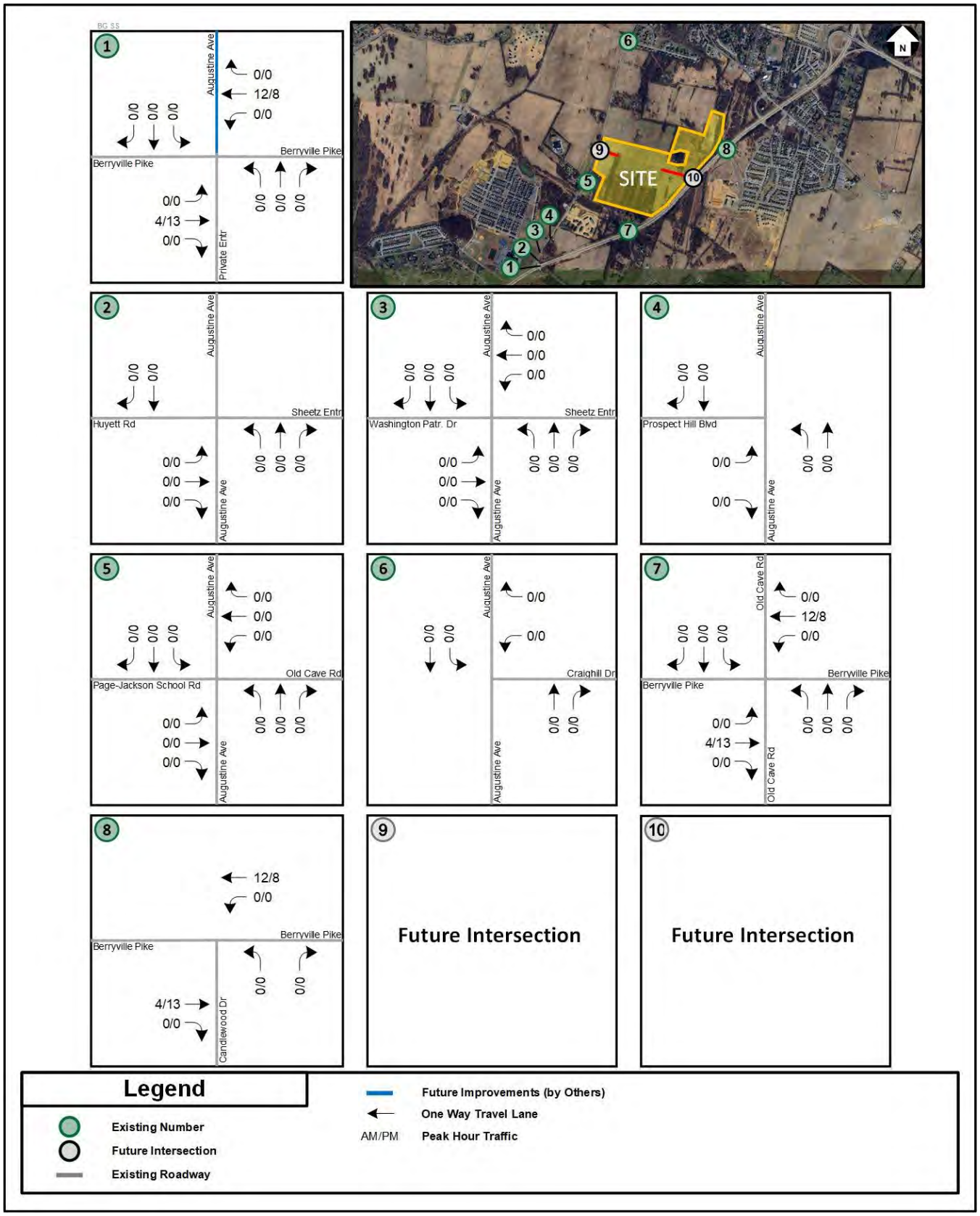


Figure 14: Background Development Trips - Stone Spring

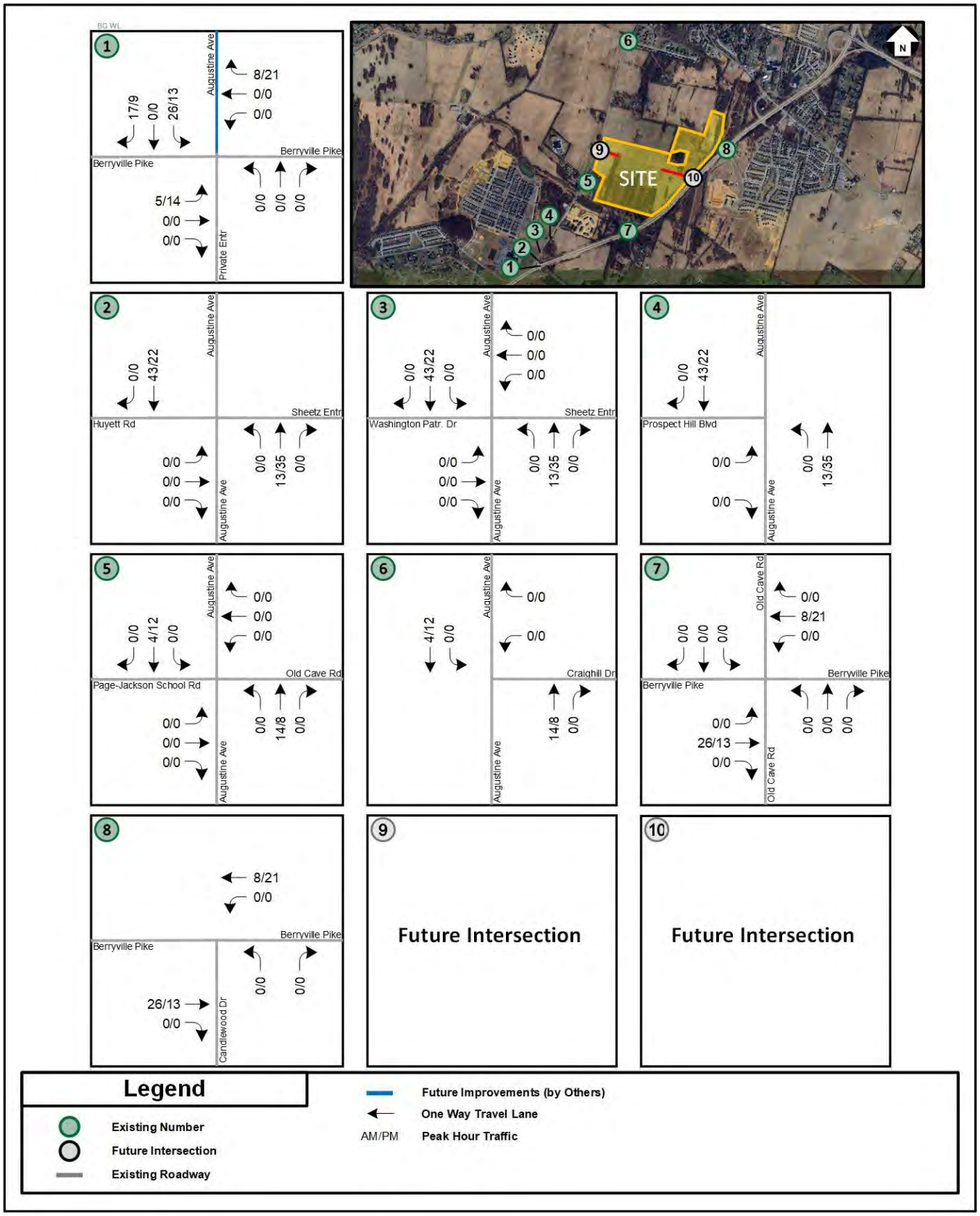


Figure 15: Background Development Trips - Washington Landing

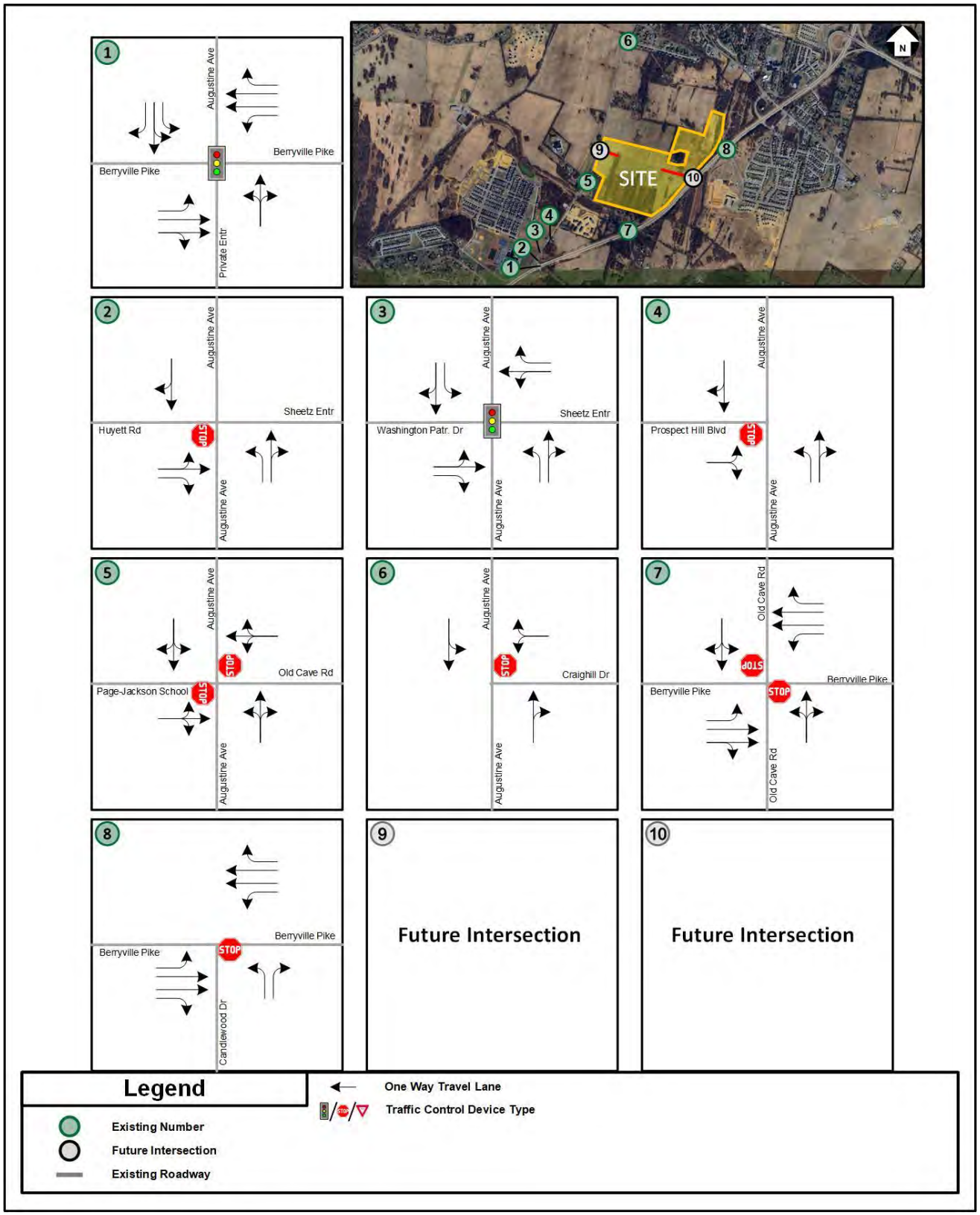


Figure 16: 2031 Future Conditions without Development – Roadway Network Geometric Configuration and Traffic Control Devices

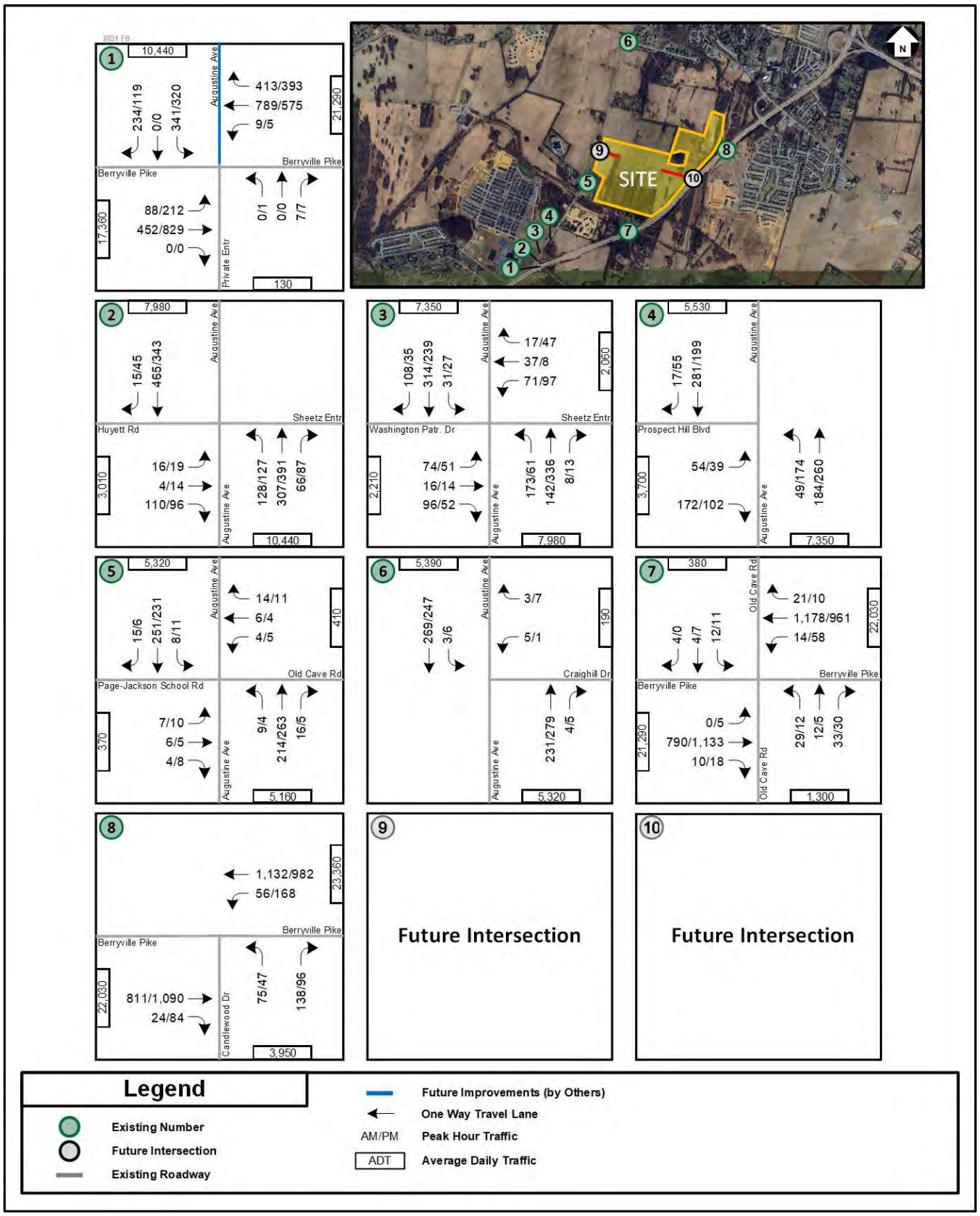


Figure 17: 2031 Future Conditions without Development – Vehicular Traffic Volumes

Future without Development Intersection Capacity and Queuing Analysis

Intersection capacity and queueing analyses were performed for the 2031 Future Conditions without Development scenario at the study area intersections during the AM and PM peak hours. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and includes LOS, delay, and queue length comparisons for the turning movements analyzed.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92. The HV% were based on existing traffic count data.

It is considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented Table 3. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized study intersections, and per approach and lane group for all study intersections.

The 95th percentile queue lengths were also determined from *Synchro* and are expressed in feet.

The detailed analysis worksheets of the 2031 Future Conditions without Development scenario are contained in Appendix E.

Table 3: 2031 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue (ft.)
			Synchro			Synchro		
1	**Augustine Avenue (N/S) & Berryville Pike (E/W) (Signalized)**							
	Overall Intersection		**C**	**30.8**		**C**	**28.9**	
	Eastbound Approach		***C***	***23.4***		***C***	***22.7***	
	Eastbound Left	660	E	65.6	124	E	58.5	240
	Eastbound Thru/Right		B	15.1	163	B	13.6	318
	Westbound Approach		***C***	***26.7***		***C***	***26.3***	
	Westbound Left	155	F	408.2	26	F	427.6	17
	Westbound Thru		C	22.6	361	C	22.4	283
	Westbound Right	265	C	26.1	66	C	27.2	76
	Northbound Approach		***D***	***50.5***		***D***	***50.6***	
	Northbound Left/Thru/Right		D	50.5	22	A	0.0	24
	Southbound Approach		***D***	***46.3***		***D***	***49.0***	
	Southbound Thru/Left		D	47.7	221	D	54.2	203
	Southbound Right		D	44.3	167	C	34.9	67
2	**Augustine Avenue (N/S) & Huyett Road (E/W) (TWSC)**							
	Eastbound Approach		***C***	***15.6***		***C***	***15.8***	
	Eastbound Left-Thru	25	D	28.0	10	D	27.9	18
	Eastbound Right		B	13.3	20	B	11.6	15
	Northbound Approach							
	Northbound Left		A	9.0	13	A	8.6	10
3	**Augustine Avenue (N/S) & Washington Patriots Drive / Sheetz Driveway (E/W) (Signalized)**							
	Overall Intersection		**C**	**25.0**		**C**	**22.1**	
	Eastbound Approach		***D***	***45.7***		***D***	***38.6***	
	Eastbound Left		D	38.9	88	D	37.9	66
	Eastbound Thru/Right		D	50.2	60	D	39.1	47
	Westbound Approach		***D***	***38.6***		***D***	***39.5***	
	Westbound Left		D	39.1	85	D	40.3	107
	Westbound Right/Thru		D	38.0	57	D	38.2	40
	Northbound Approach		***B***	***14.0***		***B***	***15.4***	
	Northbound Left	215	B	14.1	78	B	11.0	34
	Northbound Thru/Right		B	13.9	95	B	16.2	233
	Southbound Approach		***C***	***20.8***		***B***	***16.1***	
	Southbound Left	225	B	11.8	19	B	11.8	18
	Southbound Thru/Right		C	21.4	274	B	16.5	175

Table 3: 2031 Future Conditions without Development – Intersection Capacity Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue (ft.)
			Synchro			Synchro		
4	**Augustine Avenue (N/S) & Prospect Hill Boulevard (E/W) (TWSC)**							
	Eastbound Approach		***B***	***14.5***		***C***	***15.1***	
	Eastbound Left-Right		B	14.5	48	C	15.1	33
	Northbound Approach							
	Northbound Left	225	A	8.2	3	A	8.3	13
5	**Augustine Avenue (N/S) & Page-Jackson Road/Old Cave Road (E/W) (TWSC)**							
	Eastbound Approach		***B***	***13.4***		***B***	***12.7***	
	Eastbound Left-Thru-Right		B	13.4	3	B	12.7	5
	Westbound Approach		***B***	***11.5***		***B***	***12.1***	
	Westbound Left-Thru-Right		B	11.5	3	B	12.1	3
	Northbound Approach							
	Northbound Left		A	8.3	0	A	7.8	0
	Southbound Approach							
	Southbound Left		A	7.8	0	A	7.9	0
6	**Augustine Avenue (N/S) & Craighill Dr (E/W) (TWSC)**							
	Westbound Approach		***B***	***11.4***		***B***	***10.3***	
	Westbound Left-Right		B	11.4	0	B	10.3	0
	Southbound Approach							
	Southbound Thru-Left		A	8.1	0	A	7.9	0
7	**Berryville Pike (E/W) & Old Cave Road (N/S) (TWSC)**							
	Eastbound Approach							
	Eastbound Left	160	A	0.0	0	B	11.5	0
	Westbound Approach							
	Westbound Left	490	B	10.3	3	B	12.4	10
	Northbound Approach		***C***	***21.3***		***C***	***22.5***	
	Northbound Left-Thru-Right		C	21.3	28	C	22.5	18
	Southbound Approach		***D***	***28.5***		***D***	***32.2***	
	Southbound Left-Thru-Right		D	28.5	10	D	32.2	10
8	**Berryville Pike (E/W) & Candlewood Drive (N/S) (TWSC)**							
	Westbound Approach							
	Westbound Left	440	B	11.5	8	C	15.0	38
	Northbound Approach		***C***	***19.7***		***D***	***28.3***	
	Northbound Left-Thru		D	30.3	40	F	53.6	45
	Northbound Right		B	13.9	28	C	15.9	23

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

Based on the capacity analysis of 2031 Future Conditions without Development scenario, the signalized study intersections operate at acceptable overall levels of service (LOS D or better). Similar to the existing conditions, all approaches of the study intersections operate at acceptable levels of service.

It should be noted that future signal timings at the intersection of Augustine Avenue and Washington Patriots Drive / Sheetz Entrance are not available, and, for the purposes of this analysis, are optimized based on 2031 future without development conditions.

Based on the queuing analysis performed for existing conditions, all turning movements at the study intersections had 95th percentile queue lengths that were accommodated within the available storage lengths of the turn bays (similar to existing conditions).

2031 Future Conditions with Development (Complete Residential and Partial Commercial)

For the purposes of this study, the residential portion and partial commercial buildout of the Development is anticipated to be constructed by 2031; this scenario analyzes the future with development conditions for the year 2031.

Site Description

The development spans two parcels totaling approximately 180.11 acres in Charles Town, West Virginia, identifiable on the Jefferson County, West Virginia Tax Maps by the following parcel IDs: 03-12021700000000 and 03-12021800000000. The parcels are currently zoned as Neighborhood Residential and General Commercial. The proposed development is comprised of two phases, a residential and partial commercial buildout phase to be completed by 2031 and a complete buildout phase to be completed by 2035. The residential portion of the development includes 307 single-family detached units and 274 single-family attached units. The commercial portion of the development is anticipated to be comprised of 105,000 SF of retail space, 5,000 SF of fast-food restaurant with drive-thru window, and a convenience store/gas station with up to 16 fueling positions.

A conceptual plan for the Site is illustrated in Figure 18.

Proposed Site Access

Access to the site will be provided via two future full-movement entrances, one on Augustine Avenue and one on Berryville Pike. The access on Berryville Pike will utilize an existing median break. Figure 20 presents the roadway network, lane use, and traffic control at the study intersections in the 2031 and 2035 Future with Development scenario.



Figure 18: Conceptual Development Plan
Note: Plan is for conceptual purposes only.

2031 Projected Site Trip Generation

In order to calculate the trips generated by the proposed Development, the ITE Trip Generation Manual, 11th Edition, was used to determine the total trips generated by the project during the AM and PM peak hours as well as the typical number of weekday daily trips.

It should be noted that the residential units of the development program analyzed in this report and detailed in the aforementioned scoping letter differs slightly from the latest plans showing 582 dwelling units (300 single-family detached units and 282 single-family attached units). Table 4 below shows the proposed trip generation of the residential portion of the scoped development program compared to the residential portion in the latest plans.

Table 4: Residential Trip Generation Comparison (Scoped vs. Latest) (Peak Hour of the Adjacent Street; ITE 11th Ed.)

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Residential Portion of Scoped Development Program									
Single-Family Detached Housing (EQUATIONS)	210	307 DU	52	155	207	180	105	285	2,832
Single-Family Attached Housing (EQUATIONS)	215	274 DU	34	103	137	94	66	160	2,037
Residential Subtotal without Reductions			86	258	344	274	171	445	4,869
Residential Portion of Current Development Program									
Single-Family Detached Housing (EQUATIONS)	210	300 DU	50	152	202	176	103	279	2,772
Single-Family Attached Housing (EQUATIONS)	215	282 DU	35	106	141	97	68	165	2,098
Residential Subtotal without Reductions			85	258	343	273	171	444	4,870
Difference (Scoped - Current)			**1**	**0**	**1**	**1**	**0**	**1**	**-1**

As shown in the table above, the scoped residential development program generates more trips during the peak hours. To provide conservative results, this report is based on 581 dwelling units (307 single-family detached units and 274 single-family attached units).

The trip generation for the interim phase of the development is depicted in Table 5.

Table 5: 2031 Proposed Trip Generation (Peak Hour of the Adjacent Street; ITE 11th Ed.)

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Residential Use									
Single-Family Detached Housing (EQUATIONS)	210	307 DU	52	155	207	180	105	285	2,832
Single-Family Attached Housing (EQUATIONS)	215	274 DU	34	103	137	94	66	160	2,037
Residential Subtotal without Reductions			86	258	344	274	171	445	4,869
Internal Trip Reductions - Residential to Restaurant [1]		*20%/14%/9% AM/PM/Daily*	-4	-23	-27	-13	-14	-27	-257
Internal Trip Reductions - Residential to Retail [1]		*17%/10%/5% AM/PM/Daily*	-2	-41	-43	-27	-17	-44	-243
Residential Subtotal with Reductions			**80**	**194**	**274**	**234**	**140**	**374**	**4,369**
Restaurant Use									
Fast Food Restaurant with Drive-Thru Window	934	5.0 kSF of GFA	114	109	223	86	79	165	2,337
Restaurant Subtotal without Reductions			114	109	223	86	79	165	2,337
Internal Trip Reductions - Restaurant to Residential [1]		*5%/16%/11% AM/PM/Daily*	-23	-4	-27	-14	-13	-27	-257
Internal Trip Reductions - Restaurant to Retail [1]		*8%/50%/45% AM/PM/Daily*	-9	-55	-64	-43	-40	-83	-1,052
Restaurant Subtotal with Internal Reductions			82	50	132	29	26	55	1,028
Pass-by Trip Reductions - FF Restaurant w Drive-Through [2]		*50%/55%/45% AM/PM/Daily*	-41	-25	-66	-16	-14	-30	-463
Restaurant Subtotal with Reductions			**41**	**25**	**66**	**13**	**12**	**25**	**565**
Retail Use									
Convenience Store/Gas Station - GFA (4-5.5k)	945	16.0 Fueling Positions	216	217	433	182	182	364	4,114
Shopping Center (<40 kSF)	822	15.0 kSF of GFA	23	15	38	52	52	104	863
Convenience Store/Gas Station Subtotal without Reductions			239	232	471	234	234	468	4,977
Internal Trip Reductions - Retail to Residential [1]		*2%/46%/41% AM/PM/Daily*	-41	-2	-43	-17	-27	-44	-243
Internal Trip Reductions - Retail to Restaurant [1]		*50%/29%/24% AM/PM/Daily*	-55	-9	-64	-40	-43	-83	-1,052
Retail Subtotal with Internal Reductions			143	221	364	177	164	341	3,682
Pass-by Trip Reductions - Convenience Store / Gas Station [3]		*76%/75%/65% AM/PM/Daily*	-98	-157	-255	-104	-96	-200	-1,979
Pass-by Trip Reductions - Shopping Center (w/o Supermarket) [4]		*30%/40%/30% AM/PM/Daily*	-4	-4	-8	-16	-14	-30	-191
Retail Subtotal with Reductions			**41**	**60**	**101**	**57**	**54**	**111**	**1,512**
Overall Net New External Trips Total without Reductions			**439**	**599**	**1,038**	**594**	**484**	**1,078**	**12,183**
Overall Net New External Trips Total with Reductions			**162**	**279**	**441**	**304**	**206**	**510**	**6,446**

Notes on Assumptions:

[1] *Internal capture rates were based on NHCRP Report 684, NCHRP does not have daily internal capture rates, as such, the PM rate minus 5% was assumed.*

[2] *Pass-by rates for the fast food restaurant uses were based on ITE LUC 934 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[3] *Pass-by rates for the convenience store/gas station uses were based on ITE LUC 945 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[4] *Pass-by rates for the shopping center uses were based on ITE LUC 821 for the PM peak hour. ITE does not have pass-by rates for the AM and Daily period, as such, both were assumed to be the PM peak hour rate minus 10%.*

As illustrated in the table above, the proposed Vinton Hayes project with partial buildout of the commercial component will generate approximately 441 new AM peak hour trips, 510 new PM peak hour trips, and approximately 6,446 new trips during a typical weekday.

2031 Distribution and Assignment of Site Traffic

The distribution and assignment of the site generated trips were based on the existing traffic patterns, engineering judgement, the nature of the proposed development, and with the guidance and input from the WVDOH and City staff. The site direction of approach and trip distribution are illustrated in Figure 19.

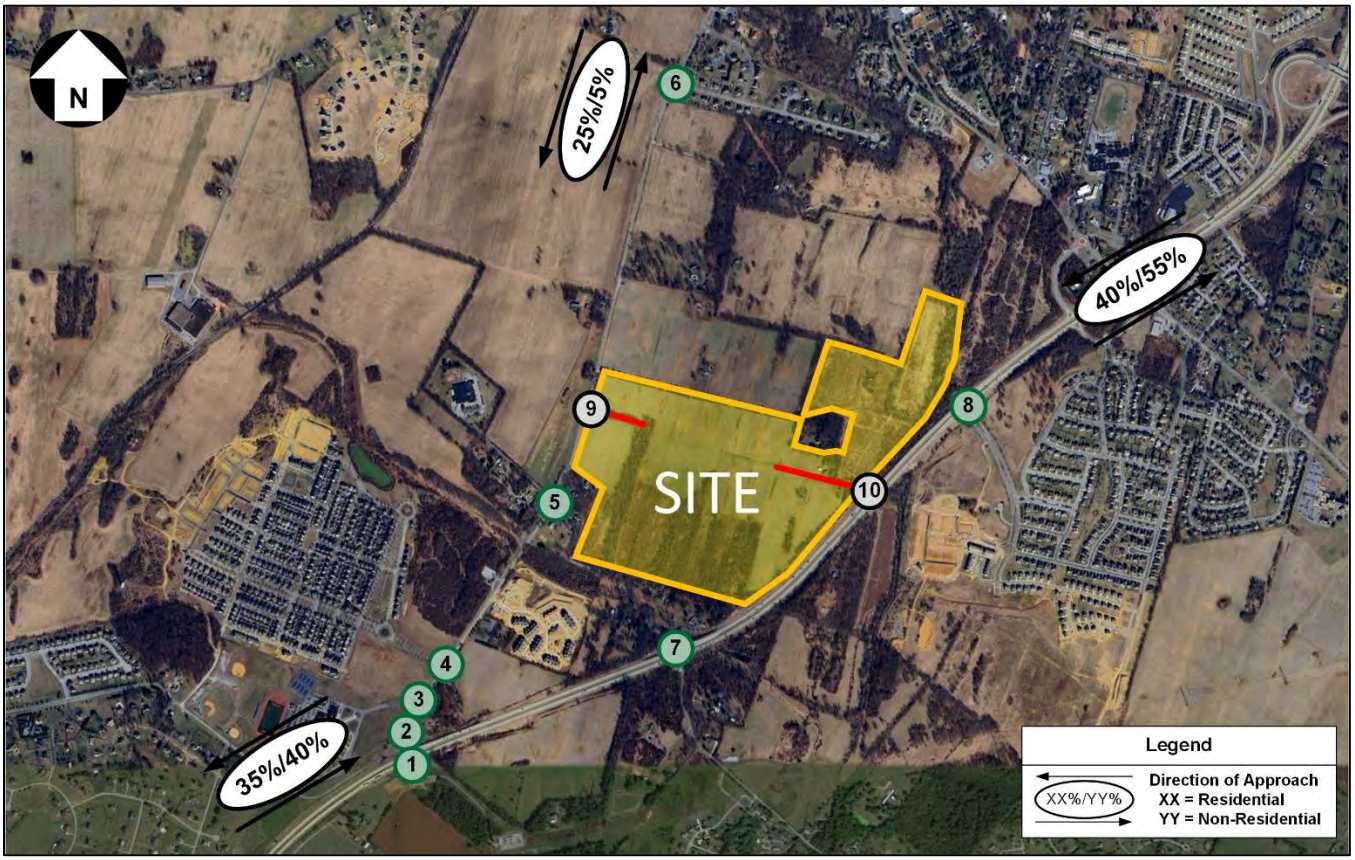


Figure 19: Global Vehicular Direction of Approach (Site Trip Distribution)

2031 Future with Development Traffic Volumes

In order to project future traffic volumes on the roadways in the vicinity of the development, trips generated from the development were assigned to the road network based on the previously mentioned direction of approach. The site traffic assignment is illustrated for the AM and PM peak hours in Figure 21.

The 2031 Future Conditions with Development scenario traffic volumes were determined by adding the assigned site generated traffic volumes to the 2031 Future Conditions without Development scenario traffic volumes. The 2031 Future Conditions with Development traffic volumes are depicted in Figure 22.

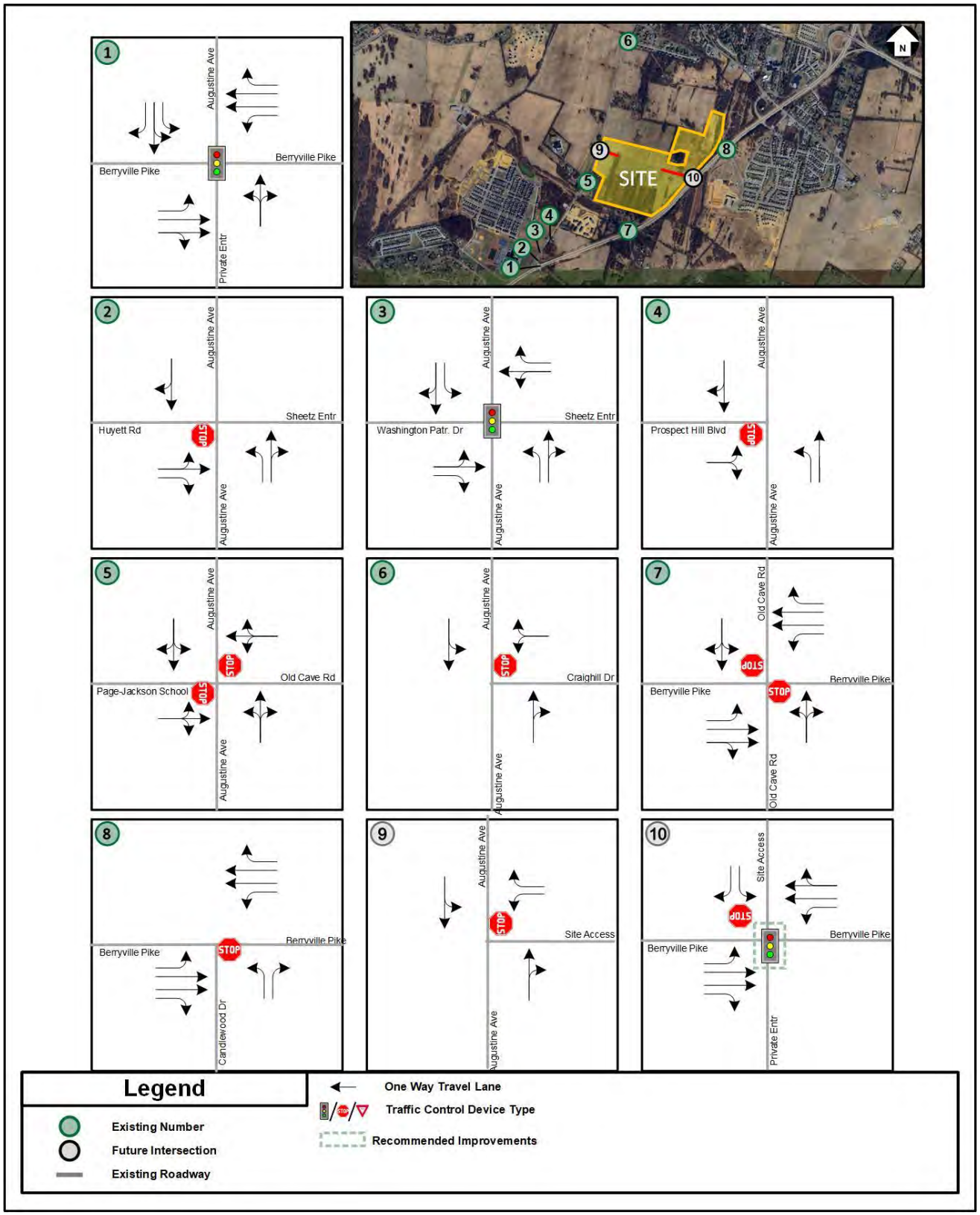


Figure 20: 2031 and 2035 Future Conditions with Development – Roadway Network Geometric Configuration and Traffic Control Devices

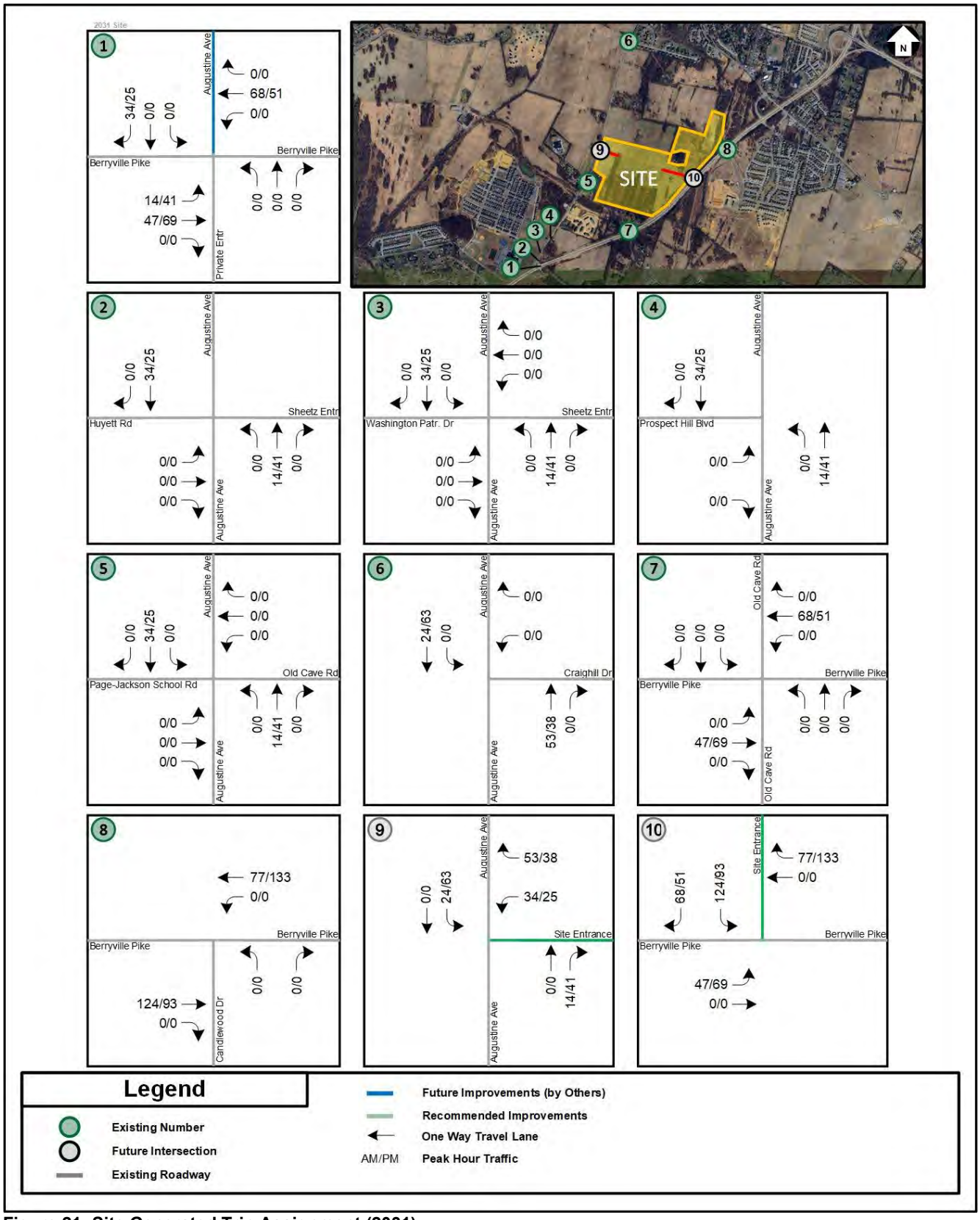


Figure 21: Site Generated Trip Assignment (2031)

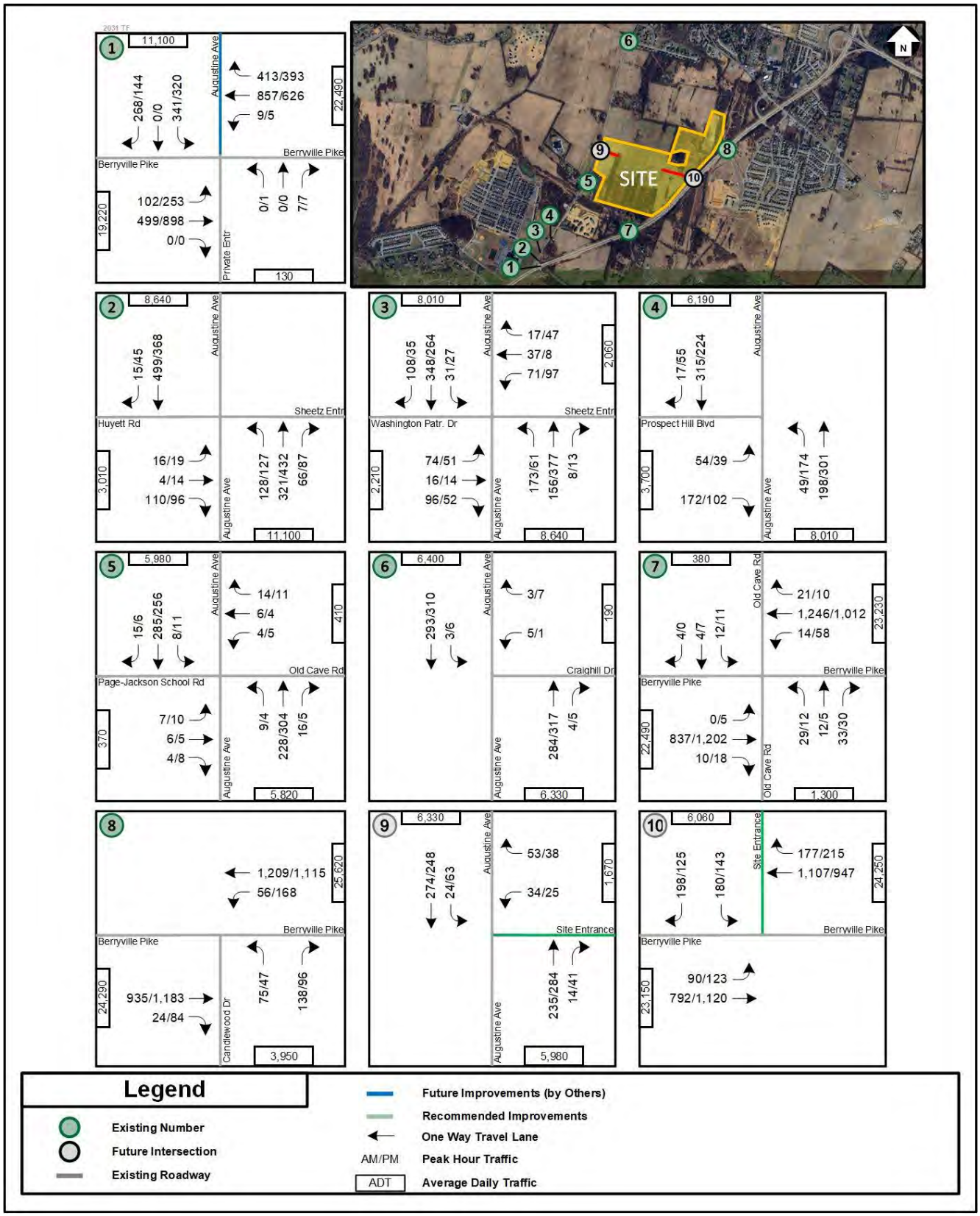


Figure 22: 2031 Future Conditions with Development – Vehicular Traffic Volumes

2031 Future with Development Intersection Capacity and Queuing Analysis

Intersection capacity and queuing analyses were performed for the 2031 Future Conditions with Development scenario at the study area intersections during the AM and PM peak hours. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and includes LOS, delay, and queue length comparisons for the turning movements analyzed.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92, and 0.92 by intersection for any new intersections. The HV% were based on existing traffic count data, with any new intersections utilizing a default *Synchro* value of 2.0% per movement.

It is considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in Table 6. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized study intersections, and per approach and lane group for all study intersections.

The 95th percentile queues were also determined from *Synchro* and are expressed in feet.

The detailed analysis worksheets of the 2031 Future Conditions with Development scenario are contained in Appendix F.

Table 6: 2031 Future Conditions with Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue (ft.)
			Synchro			Synchro		
1	**Augustine Avenue (N/S) & Berryville Pike (E/W) (Signalized)**							
	Overall Intersection		**C**	**32.4**		**C**	**30.1**	
	Eastbound Approach		***C***	***24.6***		***C***	***23.8***	
	Eastbound Left	660	E	64.3	138	E	58.0	276
	Eastbound Thru/Right		B	16.5	181	B	14.1	354
	Westbound Approach		***C***	***30.1***		***C***	***29.1***	
	Westbound Left	155	F	408.2	26	F	427.6	17
	Westbound Thru		C	26.6	431	C	25.3	326
	Westbound Right	265	C	29.2	108	C	30.4	81
	Northbound Approach		***D***	***50.5***		***D***	***50.6***	
	Northbound Left/Thru/Right		D	50.5	22	D	50.6	24
	Southbound Approach		***D***	***44.6***		***D***	***47.5***	
	Southbound Thru/Left		D	45.5	221	D	54.1	203
	Southbound Right		D	43.5	189	C	33.0	73
2	**Augustine Avenue (N/S) & Huyett Road (E/W) (TWSC)**							
	Eastbound Approach		***C***	***16.3***		***C***	***16.8***	
	Eastbound Left-Thru	25	D	30.3	10	D	31.0	18
	Eastbound Right		B	13.8	23	B	11.9	15
	Northbound Approach							
	Northbound Left		A	9.1	13	A	8.7	10
3	**Augustine Avenue (N/S) & Washington Patriots Drive / Sheetz Driveway (E/W) (Signalized)**							
	Overall Intersection		**C**	**25.4**		**C**	**22.2**	
	Eastbound Approach		***D***	***45.7***		***D***	***38.6***	
	Eastbound Left		D	38.9	88	D	37.9	66
	Eastbound Thru/Right		D	50.2	60	D	39.1	47
	Westbound Approach		***D***	***38.6***		***D***	***39.5***	
	Westbound Left		D	39.1	85	D	40.3	107
	Westbound Right/Thru		D	38.0	57	D	38.2	40
	Northbound Approach		***B***	***14.4***		***B***	***16.2***	
	Northbound Left	215	B	14.7	78	B	11.1	34
	Northbound Thru/Right		B	14.1	104	B	17.0	265
	Southbound Approach		***C***	***21.8***		***B***	***16.5***	
	Southbound Left	225	B	11.8	19	B	12.0	18
	Southbound Thru/Right		C	22.5	304	B	16.9	193

Table 6: 2031 Future Conditions with Development – Intersection Capacity Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue (ft.)
			Synchro			Synchro		
4	**Augustine Avenue (N/S) & Prospect Hill Boulevard (E/W) (TWSC)**							
	Eastbound Approach		***C***	***15.4***		***C***	***16.3***	
	Eastbound Left-Right		C	15.4	53	C	16.3	35
	Northbound Approach							
	Northbound Left	225	A	8.3	3	A	8.4	13
5	**Augustine Avenue (N/S) & Page-Jackson Road/Old Cave Road (E/W) (TWSC)**							
	Eastbound Approach		***B***	***14.0***		***B***	***13.5***	
	Eastbound Left-Thru-Right		B	14.0	3	B	13.5	5
	Westbound Approach		***B***	***11.8***		***B***	***12.8***	
	Westbound Left-Thru-Right		B	11.8	3	B	12.8	3
	Northbound Approach							
	Northbound Left		A	8.4	0	A	7.8	0
	Southbound Approach							
	Southbound Left		A	7.8	0	A	8.0	0
6	**Augustine Avenue (N/S) & Craighill Dr (E/W) (TWSC)**							
	Westbound Approach		***B***	***12.1***		***B***	***10.7***	
	Westbound Left-Right		B	12.1	3	B	10.7	0
	Southbound Approach							
	Southbound Thru-Left		A	8.3	0	A	8.0	0
7	**Berryville Pike (E/W) & Old Cave Road (N/S) (TWSC)**							
	Eastbound Approach							
	Eastbound Left	160	A	0.0	0	B	11.9	0
	Westbound Approach							
	Westbound Left	490	B	10.6	3	B	12.9	10
	Northbound Approach		***C***	***23.2***		***C***	***24.4***	
	Northbound Left-Thru-Right		C	23.2	30	C	24.4	20
	Southbound Approach		***D***	***32.4***		***E***	***35.3***	
	Southbound Left-Thru-Right		D	32.4	13	E	35.3	13
8	**Berryville Pike (E/W) & Candlewood Drive (N/S) (TWSC)**							
	Westbound Approach							
	Westbound Left	440	B	12.6	10	C	16.5	43
	Northbound Approach		***C***	***23.4***		***D***	***33.9***	
	Northbound Left-Thru		E	38.1	50	F	68.2	55
	Northbound Right		C	15.4	33	C	17.1	25
9	**Augustine Avenue (N/S) & Proposed Site Entrance (E/W) (TWSC)**							
	Westbound Approach		***B***	***11.5***		***B***	***12.5***	
	Westbound Left		B	10.0	5	B	10.4	5
	Westbound Right		B	13.8	8	C	15.8	5
	Southbound Approach							
	Southbound Left		A	7.8	3	A	8.2	5
10	**Berryville Pike (E/W) & Proposed Site Entrance (N/S) (TWSC)**							
	Eastbound Approach							
	Eastbound Left	175	B	14.3	18	B	13.7	25
	Southbound Approach		***F***	***108.6***		***F***	***64.5***	
	Southbound Left		F	199.7	278	F	105.5	173
	Southbound Right		D	25.8	83	C	17.5	35
10	**Berryville Pike (E/W) & Proposed Site Entrance (N/S) (Signalized) Proposed Mitigation: Install Traffic Signal**							
	Overall Intersection		**B**	**16.8**		**B**	**13.0**	
	Eastbound Approach		***A***	***9.2***		***A***	***8.0***	
	Eastbound Left	225	D	51.3	103	D	48.2	123
	Eastbound Thru		A	4.4	117	A	3.6	182
	Westbound Approach		***B***	***13.5***		***B***	***11.0***	
	Westbound Thru		B	13.5	391	B	10.9	383
	Westbound Right		B	13.6		B	11.0	
	Southbound Approach		***D***	***45.6***		***D***	***44.9***	
	Southbound Left		D	39.2	170	D	44.7	138
	Southbound Right		D	51.3	57	D	45.0	46

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

As mentioned previously, it would be considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. Furthermore, if an approach was operating at an unacceptable LOS under future without development conditions, it was assumed acceptable to achieve non-degradation.

Based on the capacity analysis of 2031 future with development conditions, the signalized study intersections operate at acceptable overall levels of service (LOS D or better). Similar to the existing and 2031 future without development conditions, all approaches of the study intersections operate at acceptable levels of service with the exception of the southbound approach at the proposed site access on Berryville Pike (intersection 10).

The following roadway improvement and mitigation is recommended as a potential improvement to be implemented in 2031 with the proposed development in order to accommodate future roadway demand due to the changes in traffic patterns and increased vehicular traffic demand along the network:

- Study Intersection 10: Berryville Pike & Proposed Site Entrance
    - Install Traffic Signal
    - Extend Eastbound Left Turn Lane

The road network with the proposed roadway improvement is illustrated in Figure 20. With the recommended improvements, all movements at all study intersections operate at LOS D or better: A preliminary signal warrant assessment is provided in this report to review whether future volumes meet signal warrant thresholds.

Based on the queuing analysis performed for 2031 future with development conditions, all turning movements at the study intersections had 95th percentile queue lengths that were accommodated within the available storage lengths of the turn bays.

2035 Future Conditions with Development (Complete Buildout)

For the purposes of this study, the complete Development is anticipated to be constructed by 2035; this scenario analyzes the future with development conditions for the year 2035 to account for full buildout of the residential and commercial land uses which includes an additional 90,000 SF of inline retail beyond the development program analyzed under 2031.

2035 Inherent Regional Growth

In order to account for the increased demand on the traffic network between 2024 and 2035, an inherent growth rate of 2.0399%, compounded annually over an eleven-year period, between 2024 to 2035 was applied to mainline through movements along Berryville Pike. An inherent growth rate of 1.8197%, compounded annually over an eleven-year period, between 2024 to 2035 was applied to mainline through movements along Augustine Avenue as well.

The total inherent regional growth volumes (for the period between 2024 and 2035) are illustrated in Figure 23.

2035 Potential Background Development(s)

There are no additional background developments to be included between 2031 and 2035 future conditions without development.

2035 Potential Roadway Improvement(s)

There are no additional potential roadway improvements to be included between 2031 and 2035 future conditions without development.

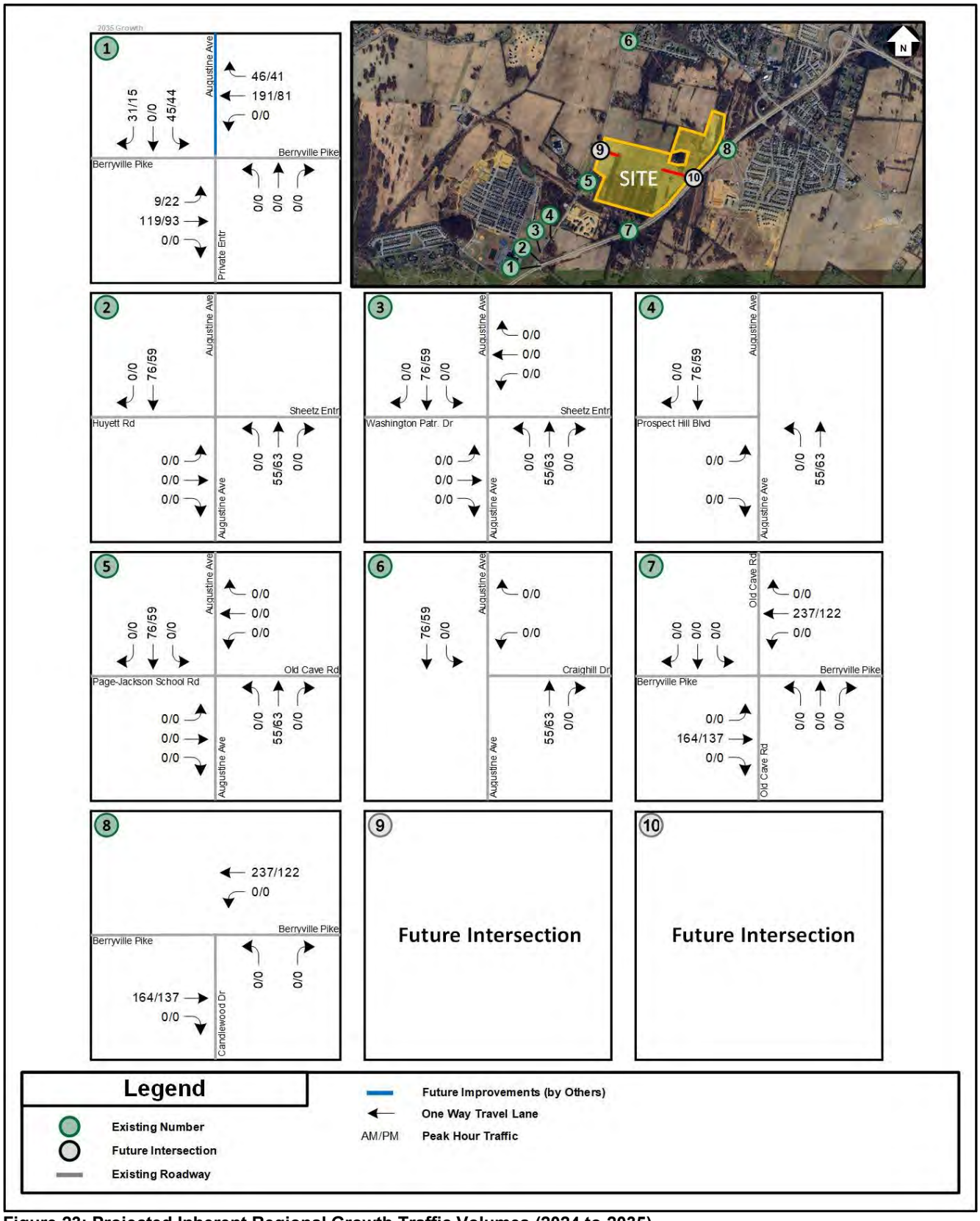


Figure 23: Projected Inherent Regional Growth Traffic Volumes (2024 to 2035)

2035 Projected Site Trip Generation

In order to calculate the trips generated by the complete buildout of the proposed Development, the ITE Trip Generation Manual, 11th Edition, publication was used to determine the total trips going into and out of the subject study site during the AM and PM peak hours as well as the typical number of weekday daily trips.

The projected trip generation for the proposed development is depicted in Table 7.

Table 7: 2035 Proposed Trip Generation (Peak Hour of the Adjacent Street; ITE 11th Ed.)

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Residential Use									
Single-Family Detached Housing (EQUATIONS)	210	307 DU	52	155	207	180	105	285	2,832
Single-Family Attached Housing (EQUATIONS)	215	274 DU	34	103	137	94	66	160	2,037
Residential Subtotal without Reductions			86	258	344	274	171	445	4,869
Internal Trip Reductions - Residential to Restaurant [1]		*20%/14%/9% AM/PM/Daily*	-4	-23	-27	-13	-14	-27	-257
Internal Trip Reductions - Residential to Retail [1]		*17%/10%/5% AM/PM/Daily*	-2	-44	-46	-27	-17	-44	-243
Residential Subtotal with Reductions			**80**	**191**	**271**	**234**	**140**	**374**	**4,369**
Restaurant Use									
Fast Food Restaurant with Drive-Thru Window	934	5.0 kSF of GFA	114	109	223	86	79	165	2,337
Restaurant Subtotal without Reductions			114	109	223	86	79	165	2,337
Internal Trip Reductions - Restaurant to Residential [1]		*5%/16%/11% AM/PM/Daily*	-23	-4	-27	-14	-13	-27	-257
Internal Trip Reductions - Restaurant to Retail [1]		*8%/50%/45% AM/PM/Daily*	-9	-55	-64	-43	-40	-83	-1,052
Restaurant Subtotal with Internal Reductions			82	50	132	29	26	55	1,028
Pass-by Trip Reductions - FF Restaurant w Drive-Through [2]		*50%/55%/45% AM/PM/Daily*	-41	-25	-66	-16	-14	-30	-463
Restaurant Subtotal with Reductions			**41**	**25**	**66**	**13**	**12**	**25**	**565**
Retail Use									
Convenience Store/Gas Station - GFA (4-5.5k)	945	16.0 Fueling Positions	216	217	433	182	182	364	4,114
Shopping Center (40 kSF<X<150 kSF) (without Supermarket)	821	105.0 kSF of GFA	113	69	182	267	278	545	7,090
Convenience Store/Gas Station Subtotal without Reductions			329	286	615	449	460	909	11,204
Internal Trip Reductions - Retail to Residential [1]		*2%/46%/41% AM/PM/Daily*	-44	-2	-46	-17	-27	-44	-243
Internal Trip Reductions - Retail to Restaurant [1]		*50%/29%/24% AM/PM/Daily*	-55	-9	-64	-40	-43	-83	-1,052
Retail Subtotal with Internal Reductions			230	275	505	392	390	782	9,909
Pass-by Trip Reductions - Convenience Store / Gas Station [3]		*76%/75%/65% AM/PM/Daily*	-115	-159	-274	-119	-116	-235	-2,365
Pass-by Trip Reductions - Shopping Center (w/o Supermarket) [4]		*30%/40%/30% AM/PM/Daily*	-24	-20	-44	-93	-94	-187	-1,881
Retail Subtotal with Reductions			**91**	**96**	**187**	**180**	**180**	**360**	**5,663**
Overall Net New External Trips Total without Reductions			**529**	**653**	**1,182**	**809**	**710**	**1,519**	**18,410**
Overall Net New External Trips Total with Reductions			**212**	**312**	**524**	**427**	**332**	**759**	**10,597**

Notes on Assumptions:

[1] *Internal capture rates were based on NHCRP Report 684, NCHRP does not have daily internal capture rates, as such, the PM rate minus 5% was assumed.*

[2] *Pass-by rates for the fast food restaurant uses were based on ITE LUC 934 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[3] *Pass-by rates for the convenience store/gas station uses were based on ITE LUC 945 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[4] *Pass-by rates for the shopping center uses were based on ITE LUC 821 for the PM peak hour. ITE does not have pass-by rates for the AM and Daily period, as such, both were assumed to be the PM peak hour rate minus 10%.*

As illustrated in the table above, the total Site is expected to generate approximately 524 new total trips during the AM peak hour, 759 new total trips during the PM peak hour, and 10,597 new total daily trips on a typical weekday.

2035 Distribution and Assignment of Site Traffic

The distribution and assignment of the site generated trips were based on the existing traffic patterns, engineering judgement, the nature of the proposed development, and with the guidance and input from the WVDOH and City staff. The site direction of approach and trip distribution is consistent with 2031 future with development conditions and are illustrated in Figure 19.

2035 Future with Development Traffic Volumes

In order to project future traffic volumes on the roadways in the vicinity of the development, trips generated from the development were assigned to the road network based on the previously mentioned direction of approach. The 2035 site traffic assignment is illustrated for the AM and PM peak hours in Figure 24. Pass-by trips are shown in Figure 25.

The 2035 Future Conditions with Development scenario traffic volumes were determined by adding the assigned site generated traffic volumes and pass-by trips to the 2031 Future Conditions without Development scenario traffic volumes. The 2035 Future Conditions with Development traffic volumes are depicted in Figure 26.

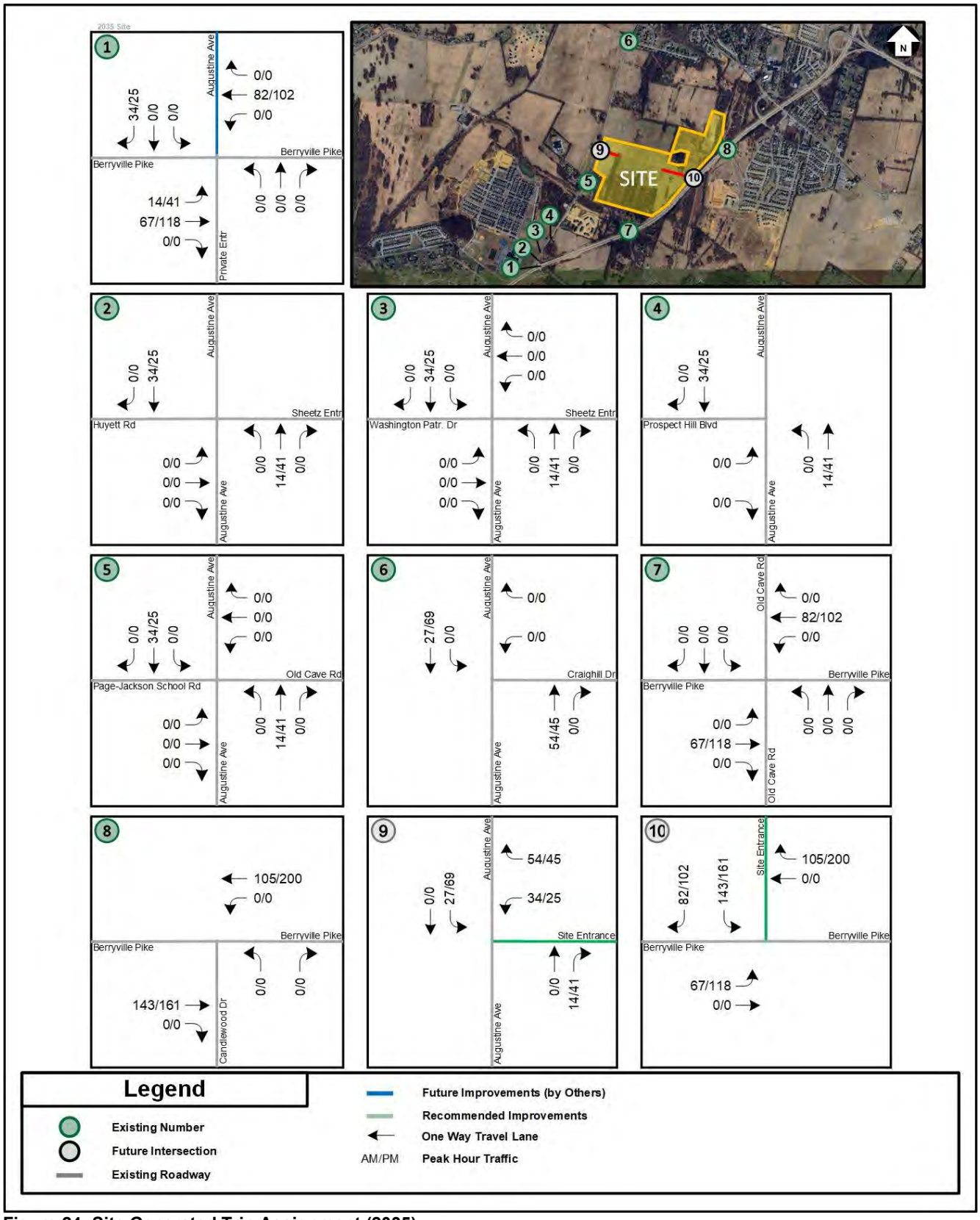


Figure 24: Site Generated Trip Assignment (2035)

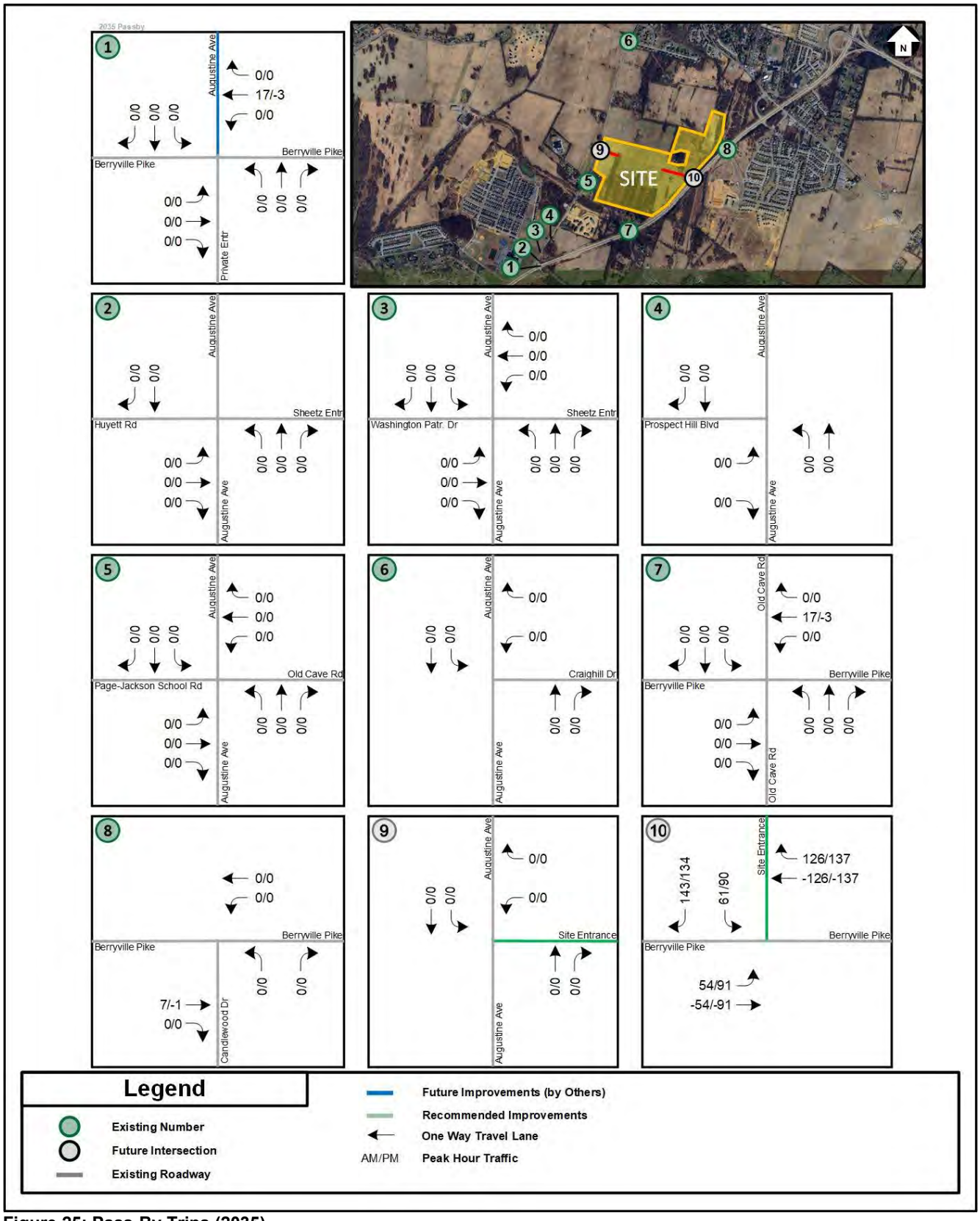


Figure 25: Pass-By Trips (2035)

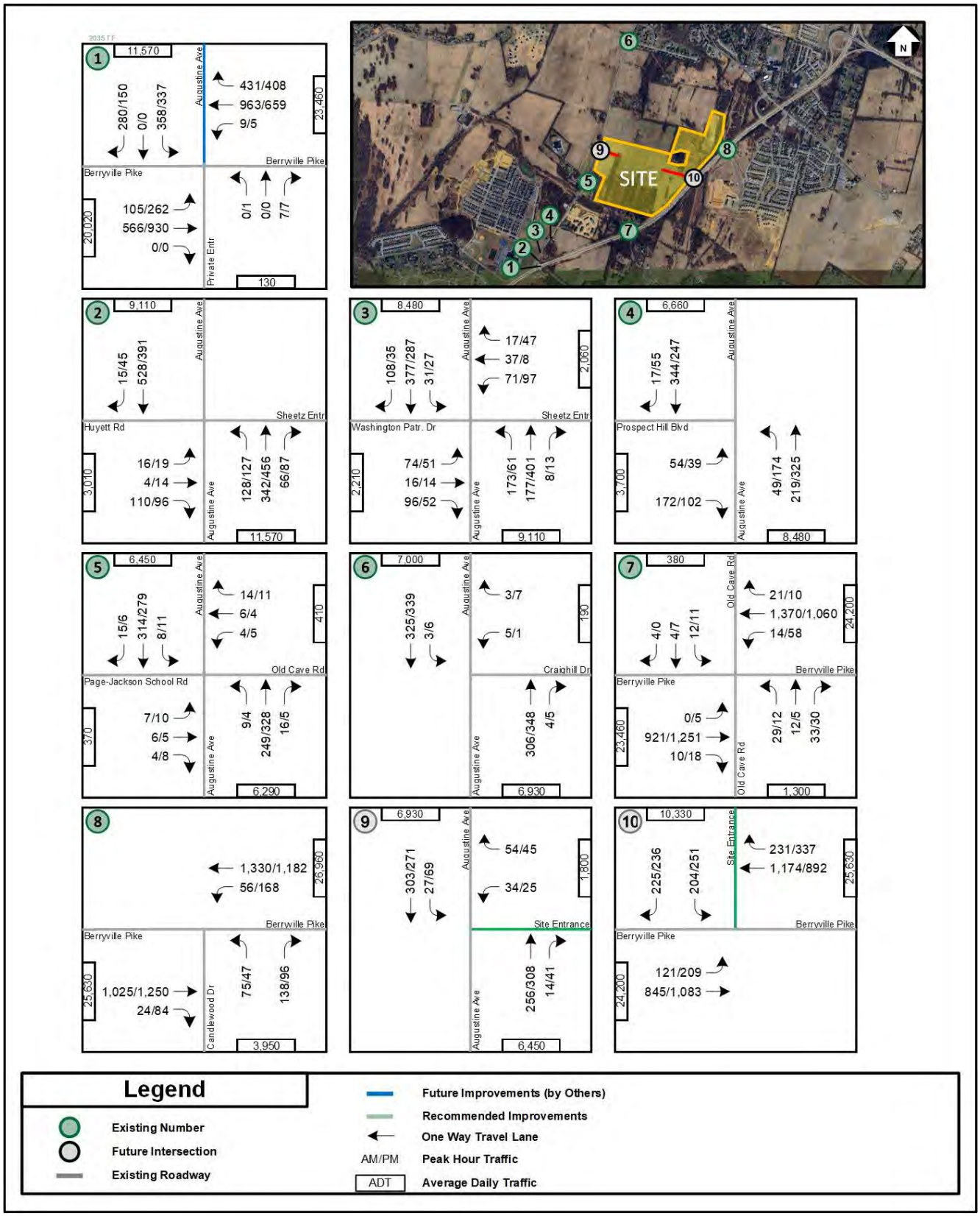


Figure 26: 2035 Future Conditions with Development – Vehicular Traffic Volumes

2035 Future with Development Intersection Capacity and Queuing Analysis

Intersection capacity and queuing analyses were performed for the 2035 Future Conditions with Development scenario at the study area intersections during the AM and PM peak hours. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and includes LOS, delay, and queue length comparisons for the turning movements analyzed.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92, and 0.92 by intersection for any new intersections. The HV% were based on existing traffic count data, with any new intersections utilizing a default *Synchro* value of 2.0% per movement.

It is considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in Table 6. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized study intersections, and per approach and lane group for all study intersections.

The 95th percentile queues were also determined from *Synchro* and are expressed in feet.

The detailed analysis worksheets of the 2035 Future Conditions with Development scenario are contained in Appendix G.

Table 8: 2035 Future Conditions with Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh) [2]	95th % Queue (ft.) [3]	LOS	Delay (sec/veh) [2]	95th % Queue (ft.) [3]
			Synchro			Synchro		
1	**Augustine Avenue (N/S) & Berryville Pike (E/W) (Signalized)**							
	Overall Intersection		**C**	**33.2**		**C**	**31.0**	
	Eastbound Approach		***C***	***24.7***		***C***	***24.4***	
	Eastbound Left	660	E	64.1	141	E	58.6	284
	Eastbound Thru/Right		B	17.5	208	B	14.7	373
	Westbound Approach		***C***	***31.9***		***C***	***30.8***	
	Westbound Left	155	F	408.2	26	F	427.6	17
	Westbound Thru		C	28.6	473	C	26.9	#370
	Westbound Right	265	C	31.2	136	C	32.6	85
	Northbound Approach		***D***	***50.5***		***D***	***50.6***	
	Northbound Left/Thru/Right		D	50.5	22	D	50.6	24
	Southbound Approach		***D***	***44.6***		***D***	***47.2***	
	Southbound Left/Thru		D	45.4	231	D	53.9	213
	Southbound Right		D	43.6	197	C	32.1	74
2	**Augustine Avenue (N/S) & Huyett Road (E/W) (TWSC)**							
	Eastbound Approach		***C***	***17.1***		***C***	***17.5***	
	Eastbound Left-Thru	25	D	32.8	13	D	33.4	20
	Eastbound Right		B	14.3	23	B	12.1	15
	Northbound Approach							
	Northbound Left		A	9.3	13	A	8.8	10
3	**Augustine Avenue (N/S) & Washington Patriots Drive / Sheetz Driveway (E/W) (Signalized)**							
	Overall Intersection		**C**	**25.7**		**C**	**22.3**	
	Eastbound Approach		***D***	***45.7***		***D***	***38.6***	
	Eastbound Left		D	38.9	88	D	37.9	66
	Eastbound Thru/Right		D	50.2	60	D	39.1	47
	Westbound Approach		***D***	***38.6***		***D***	***39.5***	
	Westbound Left		D	39.1	85	D	40.3	107
	Westbound Right/Thru		D	38.0	57	D	38.2	40
	Northbound Approach		***B***	***14.9***		***B***	***16.7***	
	Northbound Left	215	B	15.4	78	B	11.2	34
	Northbound Thru/Right		B	14.4	116	B	17.5	286
	Southbound Approach		***C***	***22.9***		***B***	***16.9***	
	Southbound Left	225	B	11.9	19	B	12.1	18
	Southbound Thru/Right		C	23.6	333	B	17.3	210

Table 8: 2035 Future Conditions with Development – Intersection Capacity Analysis Results (Continued)

No.	Intersection (Movement)	Effective Storage Length (ft.) [1]	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh) [2]	95th % Queue (ft.) [3]	LOS	Delay (sec/veh) [2]	95th % Queue (ft.) [3]
			Synchro			Synchro		
4	**Augustine Avenue (N/S) & Prospect Hill Boulevard (E/W) (TWSC)**							
	Eastbound Approach		***C***	***16.5***		***C***	***17.2***	
	Eastbound Left-Right		C	16.5	55	C	17.2	38
	Northbound Approach							
	Northbound Left	225	A	8.4	5	A	8.5	13
5	**Augustine Avenue (N/S) & Page-Jackson Road/Old Cave Road (E/W) (TWSC)**							
	Eastbound Approach		***B***	***14.8***		***B***	***14.1***	
	Eastbound Left-Thru-Right		B	14.8	3	B	14.1	5
	Westbound Approach		***B***	***12.3***		***B***	***13.3***	
	Westbound Left-Thru-Right		B	12.3	5	B	13.3	3
	Northbound Approach							
	Northbound Left		A	8.5	0	A	7.9	0
	Southbound Approach							
	Southbound Left		A	7.8	0	A	8.0	0
6	**Augustine Avenue (N/S) & Craighill Dr (E/W) (TWSC)**							
	Westbound Approach		***B***	***12.6***		***B***	***11.0***	
	Westbound Left-Right		B	12.6	3	B	11.0	0
	Southbound Approach							
	Southbound Thru-Left		A	8.4	0	A	8.1	0
7	**Berryville Pike (E/W) & Old Cave Road (N/S) (TWSC)**							
	Eastbound Approach							
	Eastbound Left	160	A	0.0	0	B	12.2	0
	Westbound Approach							
	Westbound Left	490	B	11.1	3	B	13.4	10
	Northbound Approach		***D***	***26.0***		***D***	***26.0***	
	Northbound Left-Thru-Right		D	26.0	33	D	26.0	23
	Southbound Approach		***E***	***36.7***		***E***	***38.1***	
	Southbound Left-Thru-Right		E	36.7	15	E	38.1	13
8	**Berryville Pike (E/W) & Candlewood Drive (N/S) (TWSC)**							
	Westbound Approach							
	Westbound Left	440	B	13.3	10	C	17.7	48
	Northbound Approach		***D***	***26.6***		***E***	***38.5***	
	Northbound Left-Thru		E	45.6	58	F	80.3	60
	Northbound Right		C	16.3	35	C	18.0	28
9	**Augustine Avenue (N/S) & Proposed Site Entrance (E/W) (TWSC)**							
	Westbound Approach		***B***	***11.9***		***B***	***13.0***	
	Westbound Left		B	10.2	8	B	10.7	5
	Westbound Right		B	14.7	8	C	17.0	8
	Southbound Approach							
	Southbound Left		A	7.9	3	A	8.3	5
10	**Berryville Pike (E/W) & Proposed Site Entrance (N/S) (TWSC)**							
	Eastbound Approach							
	Eastbound Left	175	C	16.9	33	C	17.5	58
	Southbound Approach		***F***	***237.8***		***F***	***$ 334.9***	
	Southbound Left		F	$ 459.2	433	F	$ 622.9	575
	Southbound Right		E	37.0	128	D	28.6	108
10	**Berryville Pike (E/W) & Proposed Site Entrance (N/S) (Signalized) Proposed Mitigation: Install Traffic Signal**							
	Overall Intersection		**C**	**20.8**		**C**	**23.7**	
	Eastbound Approach		***B***	***11.6***		***B***	***13.9***	
	Eastbound Left	225	E	56.5	#148	D	54.6	#220
	Eastbound Thru		A	5.1	127	A	6.1	177
	Westbound Approach		***B***	***18.8***		***C***	***22.7***	
	Westbound Thru		B	18.6	457	C	22.3	414
	Westbound Right		B	19.1		C	23.0	
	Southbound Approach		***D***	***47.8***		***D***	***52.5***	
	Southbound Left		D	39.6	191	D	48.6	#262
	Southbound Right		E	55.2	67	E	56.5	62

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] $: Delays (reported from Synchro) exceed 300 seconds in TWSC.

Consistent with the recommendations under the 2031 Future Conditions with Development, the following roadway improvement and mitigation are also recommended in 2035 with the proposed development in order to accommodate future roadway demand due to the changes in traffic patterns and increased vehicular traffic demand along the network:

- Study Intersection 10: Berryville Pike & Proposed Site Entrance
    - Install Traffic Signal
    - Extend Eastbound Left Turn Lane

The road network with the proposed roadway improvement is illustrated in Figure 20.

As mentioned previously, it would be considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. Furthermore, if an approach was operating at an unacceptable LOS under future without development conditions, it was assumed acceptable to achieve non-degradation.

Based on the capacity analysis of 2035 future with development conditions and the suggested mitigation strategy, the signalized study intersections operate at acceptable overall levels of service (LOS D or better). All approaches of the study intersections operate at acceptable levels of service, similar to the existing and 2031 future without development conditions, except for the following:

- Southbound approach at the intersection of Berryville Pike and Old Cave Road during the AM and PM peak hours.
- Northbound approach at the intersection of Berryville Pike and Candlewood Drive during the PM peak hour.

For unsignalized intersections, the average delays for the minor street left-turn movement are described as short delays (less than 25 seconds), moderate delays (between 25 and 50 seconds), and long delays (greater than 50 seconds). **Delays over 50 seconds are not uncommon for side street left-turn movements at intersections with major thoroughfares**. Traffic volumes at this intersection are not expected to meet any MUTCD traffic signal warrants.

Additionally, note that delays on the southbound approach of Old Cave Road are 3.1 seconds or less beyond the threshold for acceptable levels of service while the northbound approach of Candlewood Drive is 3.5 seconds beyond the threshold for acceptable levels of service, which should be considered a negligible difference and will not significantly degrade the driver experience.

It should also be noted that no additional traffic volumes are expected along these approaches due to the proposed development and the increased delay is associated with inherent growth and increase in mainline volumes along Berryville Pike. Furthermore, signalization of the intersection of Berryville Pike and the proposed site entrance is expected to improve operations at the adjacent intersections due to platooning of traffic and creating additional gaps for vehicles at these approaches, which is not represented in the analysis results due to the limitations of Synchro.

Based on the queuing analysis performed for 2035 future with development conditions and the suggested mitigation strategy, all turning movements at the study intersections had 95th percentile queue lengths that were accommodated within the available storage lengths of the turn bays.

Regarding the Berryville Pike and Candlewood Drive intersection, the 2018 City of Charles Town Comprehensive Plan includes a future boulevard connector that extends from WV-51 to US-340 primarily to reduce commercial/truck traffic through Old Town. While this connection was not assumed as a background improvement in this analysis, it is anticipated that as demand for alternative connectors grow in the area, the City and WVDOH will advance improvements to implement the Comprehensive Plan Roadway Network beyond the study timeframe of this analysis.

Overall Comparison of Analysis Scenarios

A level of service and delay comparison for all scenarios is presented in Table 9. The 95th percentile queue length comparison is presented in Table 10.

Table 9: Intersection Level of Service and Delay Comparison

No.	Intersection (Movement)	Level of Service (LOS) (Sec./Veh.)									
		AM Peak Hour					PM Peak Hour				
		2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT	2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT
1	**(E/W) (Signalized)**										
	Overall Intersection	**C (28.1)**	**C (30.8)**	**C (32.4)**	**C (33.3)**		**C (24.7)**	**C (28.9)**	**C (30.1)**	**C (31)**	
	Eastbound Approach	*C (23.9)*	*C (23.4)*	*C (24.6)*	*C (24.7)*		*C (22.1)*	*C (22.7)*	*C (23.8)*	*C (24.4)*	
	Eastbound Left	D (45.9)	E (65.6)	E (64.3)	E (64.1)		D (38)	E (58.5)	E (58)	E (58.6)	
	Eastbound Thru/Right	B (19.4)	B (15.1)	B (16.5)	B (17.5)		B (17.8)	B (13.6)	B (14.1)	B (14.7)	
	Westbound Approach	*C (34.9)*	*C (26.7)*	*C (30.1)*	*C (32.2)*		*C (31)*	*C (26.3)*	*C (29.1)*	*C (30.8)*	
	Westbound Left	F (359.9)	F (408.2)	F (408.2)	F (408.2)		F (385.4)	F (427.6)	F (427.6)	F (427.6)	
	Westbound Thru	C (26.1)	C (22.6)	C (26.6)	C (29)		C (24)	C (22.4)	C (25.3)	C (26.8)	
	Westbound Right	D (41.3)	C (26.1)	C (29.2)	C (31.2)		D (35.3)	C (27.2)	C (30.4)	C (32.6)	
	Northbound Approach	*B (15.4)*	*D (50.5)*	*D (50.5)*	*D (50.5)*		*B (15.5)*	*D (50.6)*	*D (50.6)*	*D (50.6)*	
	Northbound Left/Thru/Right	B (15.4)	D (50.5)	D (50.5)	D (50.5)		B (15.5)	A (0)	D (50.6)	D (50.6)	
	Southbound Approach	*B (17.6)*	*D (46.3)*	*D (44.6)*	*D (44.6)*		*B (17.7)*	*D (49)*	*D (47.5)*	*D (47.2)*	
	Southbound Thru/Left	C (20.2)	D (47.7)	D (45.5)	D (45.4)		C (20.2)	D (54.2)	D (54.1)	D (53.9)	
	Southbound Right	B (13.9)	D (44.3)	D (43.5)	D (43.6)		B (10.4)	D (34.9)	C (33)	C (32.1)	
2	**Augustine Avenue (N/S) & Huyett Road (E/W) (TWSC)**										
	Eastbound Approach	*B (14.3)*	*C (15.6)*	*C (16.3)*	*C (17.1)*		*B (14.3)*	*C (15.8)*	*C (16.8)*	*C (17.5)*	
	Eastbound Left-Thru	D (25.7)	D (28)	D (30.3)	D (32.8)		D (23.9)	D (27.9)	D (31)	D (33.4)	
	Eastbound Right	B (12.2)	B (13.3)	B (13.8)	B (14.3)		B (11)	B (11.6)	B (11.9)	B (12.1)	
	Northbound Approach										
	Northbound Left	A (8.7)	A (9)	A (9.1)			A (8.4)	A (8.6)	A (8.7)		
3	**Augustine Avenue (N/S) & Washington Patriots Drive / Sheetz Driveway (E/W) (EX.**										
	Overall Intersection		**C (25)**	**C (25.4)**	**C (25.7)**			**C (22.1)**	**C (22.2)**	**C (22.3)**	
	Eastbound Approach	*D (25.9)*	*D (45.7)*	*D (45.7)*	*D (45.7)*		*D (15.7)*	*D (38.6)*	*D (38.6)*	*D (38.6)*	
	Eastbound Left	E (44.4)	D (38.9)	D (38.9)	D (38.9)		E (20.9)	D (37.9)	D (37.9)	D (37.9)	
	Eastbound Thru/Right	B (13.7)	D (50.2)	D (50.2)	D (50.2)		B (11.6)	D (39.1)	D (39.1)	D (39.1)	
	Westbound Approach	*E (38.6)*	*D (38.6)*	*D (38.6)*	*D (38.6)*		*E (21.2)*	*D (39.5)*	*D (39.5)*	*D (39.5)*	
	Westbound Left	F (51.4)	D (39.1)	D (39.1)	D (39.1)		F (26.8)	D (40.3)	D (40.3)	D (40.3)	
	Westbound Right/Thru	C (21.7)	D (38)	D (38)	D (38)		C (11.3)	D (38.2)	D (38.2)	D (38.2)	
	Northbound Approach		*B (14)*	*B (14.4)*	*B (14.9)*			*B (15.4)*	*B (16.2)*	*B (16.7)*	
	Northbound Left	A (8.8)	B (14.1)	B (14.7)	B (15.4)		A (7.9)	B (11)	B (11.1)	B (11.2)	
	Northbound Thru/Right		B (13.9)	B (14.1)	B (14.4)			B (16.2)	B (17)	B (17.5)	
	Southbound Approach		*C (20.8)*	*C (21.8)*	*C (22.9)*			*B (16.1)*	*B (16.5)*	*B (16.9)*	
	Southbound Left	A (7.5)	B (11.8)	B (11.8)	B (11.9)		A (7.9)	B (11.8)	B (12)	B (12.1)	
	Southbound Thru/Right		C (21.4)	C (22.5)	C (23.6)			B (16.5)	B (16.9)	B (17.3)	
4	**Augustine Avenue (N/S) & Prospect Hill Boulevard (E/W) (TWSC)**										
	Eastbound Approach	*B (12.4)*	*B (14.5)*	*C (15.4)*	*C (16.5)*		*B (13)*	*C (15.1)*	*C (16.3)*	*C (17.2)*	
	Eastbound Left-Right	B (12.4)	B (14.5)	C (15.4)	C (16.5)		B (13)	C (15.1)	C (16.3)	C (17.2)	
	Northbound Approach										
	Northbound Left	A (8)	A (8.2)	A (8.3)	A (8.4)		A (8.1)	A (8.3)	A (8.4)	A (8.5)	
5	**Augustine Avenue (N/S) & Page-Jackson Road/Old Cave Road (E/W) (TWSC)**										
	Eastbound Approach	*B (12.5)*	*B (13.4)*	*B (14)*	*B (14.8)*		*B (11.9)*	*B (12.7)*	*B (13.5)*	*B (14.1)*	
	Eastbound Left-Thru-Right	B (12.5)	B (13.4)	B (14)	B (14.8)		B (11.9)	B (12.7)	B (13.5)	B (14.1)	
	Westbound Approach	*B (10.9)*	*B (11.5)*	*B (11.8)*	*B (12.3)*		*B (11.5)*	*B (12.1)*	*B (12.8)*	*B (13.3)*	
	Westbound Left-Thru-Right	B (10.9)	B (11.5)	B (11.8)	B (12.3)		B (11.5)	B (12.1)	B (12.8)	B (13.3)	
	Northbound Approach										
	Northbound Left	A (8.1)	A (8.3)	A (8.4)	A (8.5)		A (7.7)	A (7.8)	A (7.8)	A (7.9)	
	Southbound Approach										
	Southbound Left	A (7.7)	A (7.8)	A (7.8)	A (7.8)		A (7.8)	A (7.9)	A (8)	A (8)	
6	**Augustine Avenue (N/S) & Craighill Dr (E/W) (TWSC)**										
	Westbound Approach	*B (10.8)*	*B (11.4)*	*B (12.1)*	*B (12.6)*		*B (10)*	*B (10.3)*	*B (10.7)*	*B (11)*	
	Westbound Left-Right	B (10.8)	B (11.4)	B (12.1)	B (12.6)		B (10)	B (10.3)	B (10.7)	B (11)	
	Southbound Approach										
	Southbound Thru-Left	A (8)	A (8.1)	A (8.3)	A (8.4)		A (7.8)	A (7.9)	A (8)	A (8.1)	
7	**Berryville Pike (E/W) & Old Cave Road (N/S) (TWSC)**										
	Eastbound Approach										
	Eastbound Left	A (0)	A (0)	A (0)	A (0)		B (10.6)	B (11.5)	B (11.8)	B (12.2)	
	Westbound Approach										
	Westbound Left	A (9.7)	B (10.3)	B (10.6)	B (11.1)		B (11.3)	B (12.4)	B (12.9)	B (13.4)	
	Northbound Approach	*C (18.7)*	*C (21.3)*	*C (23.2)*	*D (26)*		*C (19.3)*	*C (22.5)*	*C (24.3)*	*D (26)*	
	Northbound Left-Thru-Right	C (18.7)	C (21.3)	C (23.2)	D (26)		C (19.3)	C (22.5)	C (24.3)	D (26)	
	Southbound Approach	*C (23.7)*	*D (28.5)*	*D (32.4)*	*E (36.7)*		*D (26.6)*	*D (32.2)*	*D (34.8)*	*E (38.1)*	
	Southbound Left-Thru-Right	C (23.7)	D (28.5)	D (32.4)	E (36.7)		D (26.6)	D (32.2)	D (34.8)	E (38.1)	

Table 9: Intersection Level of Service and Delay Comparison (Continued)

No.	Intersection (Movement)	Level of Service (LOS) (Sec./Veh.)									
		AM Peak Hour					PM Peak Hour				
		2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT	2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT
8	**Berryville Pike (E/W) & Candlewood Drive (N/S) (TWSC)**										
	Westbound Approach										
	Westbound Left	B (10.4)	B (11.5)	B (12.6)	B (13.3)		B (11.3)	C (15)	C (16.5)	C (17.7)	
	Northbound Approach	*C (15.4)*	*C (19.7)*	*C (23.4)*	*D (26.6)*		*C (18)*	*D (28.3)*	*D (33.9)*	*E (38.5)*	
	Northbound Left-Thru	C (19.9)	D (30.3)	E (38.1)	E (45.6)		D (25.9)	F (53.6)	F (68.2)	F (80.3)	
	Northbound Right	B (11.4)	B (13.9)	C (15.4)	C (16.3)		B (12.9)	C (15.9)	C (17.1)	C (18)	
9	**Augustine Avenue (N/S) & Proposed Site Entrance (E/W) (TWSC)**										
	Westbound Approach			*B (11.5)*	*B (11.9)*				*B (12.5)*	*B (13)*	
	Westbound Left			B (10)	B (10.2)				B (10.4)	B (10.7)	
	Westbound Right			B (13.8)	B (14.7)				C (15.8)	C (17)	
	Southbound Approach										
	Southbound Left			A (7.8)	A (7.9)				A (8.2)	A (8.3)	
10	**Berryville Pike (E/W) & Proposed Site Entrance (N/S) (TWSC) [Proposed Mitigation: Install Traffic Signal]**										
	Overall Intersection					**C (20.8)**					**C (23.7)**
	Eastbound Approach					*B (11.6)*					*B (13.9)*
	Eastbound Left			B (14.3)	C (16.9)	E (56.5)			B (13.7)	C (17.5)	D (54.6)
	Eastbound Thru					A (5.1)					A (6.1)
	Westbound Approach					*B (18.8)*					*C (22.7)*
	Westbound Thru					B (18.6)					C (22.3)
	Westbound Right					B (19.1)					C (23)
	Southbound Approach			*F (108.6)*	*F (237.8)*	*D (47.8)*			*F (64.5)*	*F (334.9)*	*D (52.5)*
	Southbound Left			F (199.7)	F (459.2)	D (39.6)			F (105.5)	F (622.9)	D (48.6)
	Southbound Right			D (25.8)	E (37)	E (55.2)			C (17.5)	D (28.6)	E (56.5)

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two cycles.

The delay and level of service for 2031 Future Conditions with Development and 2035 Future Conditions with Development and potential mitigation are within acceptable standards.

Table 10: Intersection 95th Percentile Queue Length Comparison

No.	Intersection (Movement)	95th Percentile Queues (ft.)									
		Effective Storage Length (ft.)	AM Peak Hour					PM Peak Hour				
			2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT	2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT
1	**Augustine Avenue (N/S) & Berryville Pike (E/W) (Signalized)**											
	Overall Intersection											
	Eastbound Approach											
	Eastbound Left	660	#99	124	138	141		159	240	276	284	
	Eastbound Thru/Right		126	163	181	208		198	318	354	373	
	Westbound Approach											
	Westbound Left	155	21	26	26	26		14	17	17	17	
	Westbound Thru		226	361	431	485		165	283	326	#359	
	Westbound Right	265	60	66	108	142		64	76	81	85	
	Northbound Approach											
	Northbound Left/Thru/Right		12	22	22	22		14	24	24	24	
	Southbound Approach											
	Southbound Thru/Left			221	221	231			203	203	213	
	Southbound Right		101	167	189	197		45	67	73	74	
2	**Augustine Avenue (N/S) & Huyett Road (E/W) (TWSC)**											
	Eastbound Approach											
	Eastbound Left-Thru	25	10	10	10	13		15	18	18	20	
	Eastbound Right		20	20	23	23		13	15	15	15	
	Northbound Approach											
	Northbound Left		13	13	13			10	10	10		
3	**Augustine Avenue (N/S) & Washington Patriots Drive / Sheetz Driveway (E/W) (EX. TWSC / 2028 Signalized)**											
	Overall Intersection											
	Eastbound Approach											
	Eastbound Left		60	88	88	88		20	66	66	66	
	Eastbound Thru/Right		23	60	60	60		10	47	47	47	
	Westbound Approach											
	Westbound Left		65	85	85	85		48	107	107	107	
	Westbound Right/Thru		23	57	57	57		8	40	40	40	
	Northbound Approach											
	Northbound Left	215	15	78	78	78		5	34	34	34	
	Northbound Thru/Right			95	104	116			233	265	286	
	Southbound Approach											
	Southbound Left	225	3	19	19	19		3	18	18	18	
	Southbound Thru/Right			274	304	333			175	193	210	

Table 10: Intersection 95th Percentile Queue Length Comparison (Continued)

No.	Intersection (Movement)	95th Percentile Queues (ft.)									
		Effective Storage Length (ft.)	AM Peak Hour					PM Peak Hour			
			2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT	2024 Existing	2031 w/o Dev.	2031 with Dev.	2035 with Dev.	2035 with Dev. MIT
4	**Augustine Avenue (N/S) & Prospect Hill Boulevard (E/W) (TWSC)**											
	Eastbound Approach											
	Eastbound Left-Right		33	48	53	55		23	33	35	38	
	Northbound Approach											
	Northbound Left	225	3	3	3	5		10	13	13	13	
5	**Augustine Avenue (N/S) & Page-Jackson Road/Old Cave Road (E/W) (TWSC)**											
	Eastbound Approach											
	Eastbound Left-Thru-Right		3	3	3	3		5	5	5	5	
	Westbound Approach											
	Westbound Left-Thru-Right		3	3	3	5		3	3	3	3	
	Northbound Approach											
	Northbound Left		0	0	0	0		0	0	0	0	
	Southbound Approach											
	Southbound Left		0	0	0	0		0	0	0	0	
6	**Augustine Avenue (N/S) & Craighill Dr (E/W) (TWSC)**											
	Westbound Approach											
	Westbound Left-Right		0	0	3	3		0	0	0	0	
	Southbound Approach											
	Southbound Thru-Left		0	0	0	0		0	0	0	0	
7	**Berryville Pike (E/W) & Old Cave Road (N/S) (TWSC)**											
	Eastbound Approach											
	Eastbound Left	160	0	0	0	0		0	0	0	0	
	Westbound Approach											
	Westbound Left	490	3	3	3	3		10	10	10	10	
	Northbound Approach											
	Northbound Left-Thru-Right		25	28	30	33		15	18	20	23	
	Southbound Approach											
	Southbound Left-Thru-Right		10	10	13	15		10	10	13	13	
8	**Berryville Pike (E/W) & Candlewood Drive (N/S) (TWSC)**											
	Westbound Approach											
	Westbound Left	440	3	8	10	10		8	38	43	48	
	Northbound Approach											
	Northbound Left-Thru		10	40	50	58		8	45	55	60	
	Northbound Right		5	28	33	35		5	23	25	28	
9	**Augustine Avenue (N/S) & Proposed Site Entrance (E/W) (TWSC)**											
	Westbound Approach											
	Westbound Left				5	8				5	5	
	Westbound Right				8	8				5	8	
	Southbound Approach											
	Southbound Left				3	3				5	5	
10	**Berryville Pike (E/W) & Proposed Site Entrance (N/S) (TWSC) [Proposed Mitigation: Install Traffic Signal] Overall Intersection**											
	Eastbound Approach											
	Eastbound Left	225			18	33	#139			25	58	#220
	Eastbound Thru						116					177
	Westbound Approach											
	Westbound Thru						#410					414
	Westbound Right											
	Southbound Approach											
	Southbound Left				278	433	138			173	575	#262
	Southbound Right				83	128	88			35	108	62

The 95th percentile queue lengths for 2031 Future Conditions with Development and 2035 Future Conditions with Development and potential mitigation presented in the table above are accommodated within the storage lengths of the turn bays.

Based on the capacity and queueing analysis results, **the proposed development will not have a substantial impact on the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the preferred concept plan and that the potential mitigation measure is constructed as proposed.**

Turn Lane Warrant Assessment

The need for right-turn lanes was evaluated at the site driveways based on the guidelines outlined in the Kentucky Transportation Committee *Highway Design Manual*. The need for left-turn lanes was evaluated at the study intersections based on the guidelines outlined in the *AASHTO Green Book*.

The results of the turn lane warrant analyses are summarized in Table 11 and Table 12. For a conservative analysis, the lane use at the site access intersections in our Synchro models are based on the existing lane use save for the new site driveway legs.

Table 11: Left-Turn Lane Warrant Summary

Study Scenario	Opposing Volume (VPH)	Advancing Volume (VPH)	Left Turn Volume (VPH)	Left Turn %	Treatment
INT 9 - Augustine Avenue - SBL - AM Peak TF 2031	249	298	24	8%	Warranted
INT 9 - Augustine Avenue - SBL - PM Peak TF 2031	325	311	63	20%	Warranted
INT 9 - Augustine Avenue - SBL - AM Peak TF 2035	1284	882	90	10%	Warranted
INT 9 - Augustine Avenue - SBL - PM Peak TF 2035	1162	1243	123	10%	Warranted
INT 10 - Berryville Pike - EBL - AM Peak TF 2031	270	330	27	8%	Warranted
INT 10 - Berryville Pike - EBL - PM Peak TF 2031	349	340	69	20%	Warranted
INT 10 - Berryville Pike - EBL - AM Peak 2035	1405	966	121	13%	Warranted
INT 10 - Berryville Pike - EBL - PM Peak 2035	1229	1292	209	16%	Warranted

Based on the left-turn lane warrant analysis, a left turn lane and taper are warranted for the southbound approach at the intersection of Augustine Avenue and the proposed site entrance. An eastbound left turn lane is also warranted at the intersection of Berryville Pike and the proposed site entrance.

Although a left turn lane is warranted at the southbound approach at the intersection of Augustine Avenue and the proposed site entrance, capacity analysis indicates that the approach operates within acceptable level of service standards. Therefore, a left turn lane is only proposed at the eastbound approach at the intersection of Berryville Pike and the proposed site entrance. It should be noted that there is an existing eastbound left turn lane at the intersection of Berryville Pike and the proposed site entrance which may need to be extended to meet storage length requirements.

Table 12: Right Turn Lane Warrant Summary

Study Scenario	Approach Volume (VPH)	Right Turn Volume (VPH)	Right Turn %	Treatment
INT 9 - Augustine Avenue - NBR - AM Peak TF 2031	249	14	6%	Not Warranted
INT 9 - Augustine Avenue - NBR - PM Peak TF 2031	325	41	13%	Not Warranted
INT 9 - Augustine Avenue - NBR - AM Peak TF 2035	270	14	5%	Not Warranted
INT 9 - Augustine Avenue - NBR - PM Peak TF 2035	349	41	12%	Not Warranted
INT 10 - Berryville Pike - WBR - AM Peak TF 2031	1284	177	14%	Warranted
INT 10 - Berryville Pike - WBR - PM Peak TF 2031	1162	215	19%	Warranted
INT 10 - Berryville Pike - WBR - AM Peak 2035	1405	231	16%	Warranted
INT 10 - Berryville Pike - WBR - PM Peak 2035	1229	337	27%	Warranted

Based on the right-turn lane warrant analysis, a right turn lane is not warranted for the northbound approach at the intersection of Augustine Avenue and the proposed site entrance. A right turn lane and taper is warranted for the westbound approach of Berryville Pike at the proposed site entrance.

Preliminary Signal Warrant Assessment

Signal warrant analyses are typically based off procedures outlined in the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD). The reference provides 9 criteria based upon which a signal can be installed and requires only one warrant to be satisfied to justify the installation of a traffic signal. For the purposes of this report, only a preliminary warrant analysis was conducted. Only Warrant 2 - Four Hour Vehicular Volumes was evaluated to determine the need of a signal at the intersection of Berryville Pike and the proposed site driveway. Warrant 2 was evaluated for Intersection 10 (Berryville Pike and the proposed site driveway) under the future conditions.

Warrant 2: Four-Hour Vehicular Volume

Warrant 2 is satisfied when the plotted points representing the vehicles per hour on the major-street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only), for each of any four hours of an average day, all fall above either MUTCD Figure 4C-1 or Figure 4C-2 (depending on applicability) for the future combination of approach lanes. In the absence of 24-hour traffic volume counts, the trips generated during the peak hour were used to determine the satisfaction of Warrant 2.

Since Berryville Pike has a posted speed of 60 mph, Figure 4C-2 was used and a traffic volume of 80 VPH or more on side streets is required for each of four hours in order to meet the warrant threshold. Note that the southbound right-turn volume on the site driveway was reduced by 75% based on Pagone's Theorem because the applicant is proposing to construct a dedicated right-turn lane, and this is reflected in the projected side street volumes. Similarly, the westbound right turn volume on Berryville Pike was reduced by 30% based on the existing shared through/right lane use; however, it should be noted that even with an exclusive right turn lane along the westbound approach volumes meet signalization thresholds.

The following scenarios were analyzed in this preliminary assessment of Warrant 2:

- 2031 Future with Interim Phase Development
- 2035 Future with Development Conditions (Complete Buildout)

Figure 27 presents the peak hour minor street volume plotted against the combined volume on both major approaches for both scenarios.

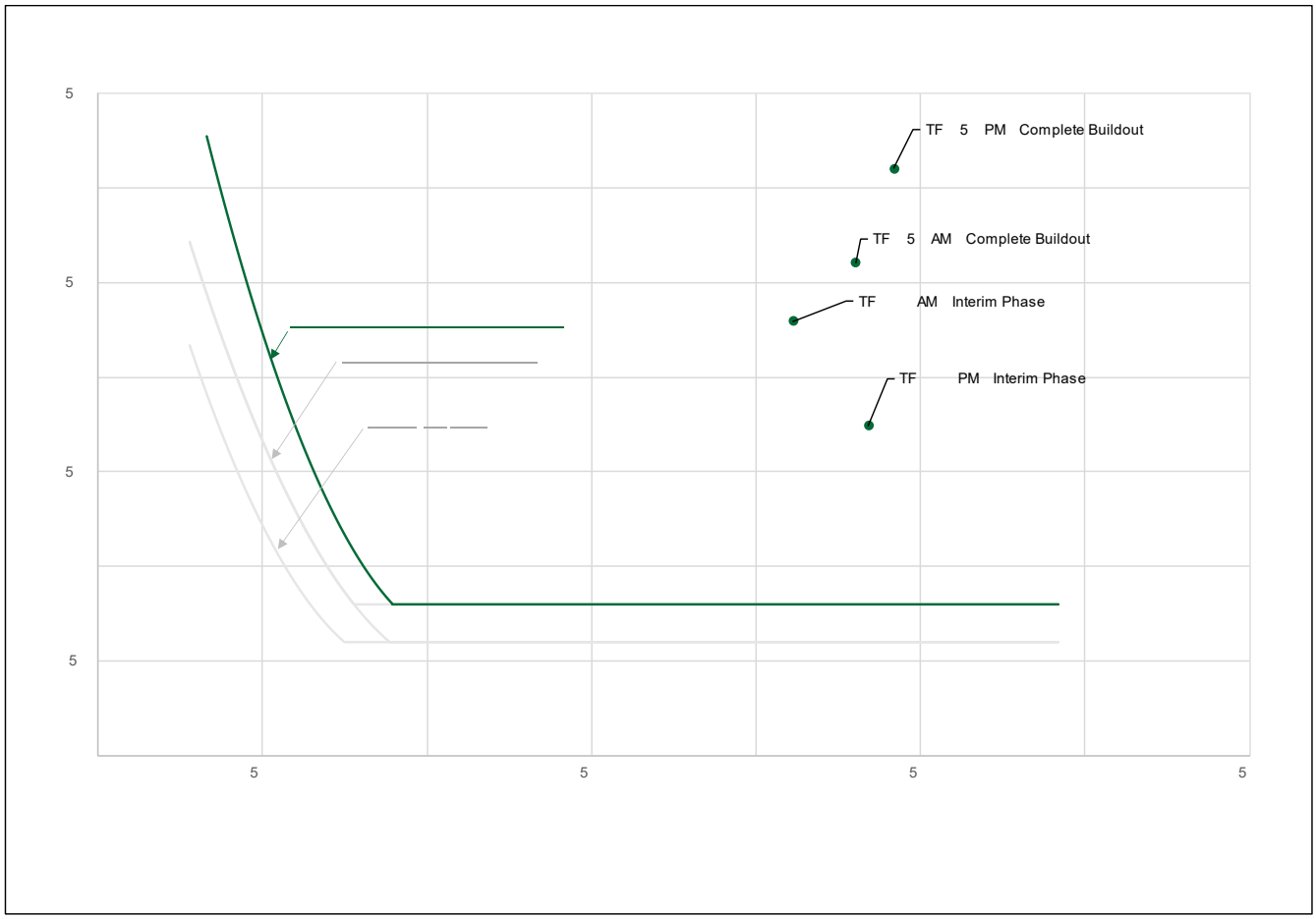


Figure 27: Warrant 2, Four-Hour Vehicular Volume (2031 Interim Phase & 2035 Complete Buildout)
Note: Results might change based on different trip distribution assumptions per WVDOH staff.

As Figure 27 shows, the AM and PM peak periods in the 2031 Interim Phase and 2035 Complete Buildout future with development scenarios satisfy the 4-hour signal warrant threshold based on proposed trip distribution assumptions. It is anticipated that both of the next two hours with the highest traffic volumes of each of the above scenarios will also meet the warrant threshold based on the proximity of the two peak hours data points in the figure above. Since both peak periods and the next two hours with the highest volume for the aforementioned scenarios are anticipated to meet the warrant threshold, it is anticipated that a traffic signal at the site entrance along Berryville Pike would be warranted in each of the scenarios.

Staff indicated that due to this intersection's proximity to the interchange and the desire to keep through traffic on U.S. 340 flowing, a signal would be not approved at this location if appropriate signal warrants are not met. Therefore, a **2031 Residential Buildout Only** scenario was also evaluated to determine the level of residential traffic necessary to meet the preliminary signal warrant thresholds. Figure 28 presents the Residential Buildout Only scenario's minor street volume plotted against the combined volume on both major approaches during the peak hours and next two hours with the highest volumes.

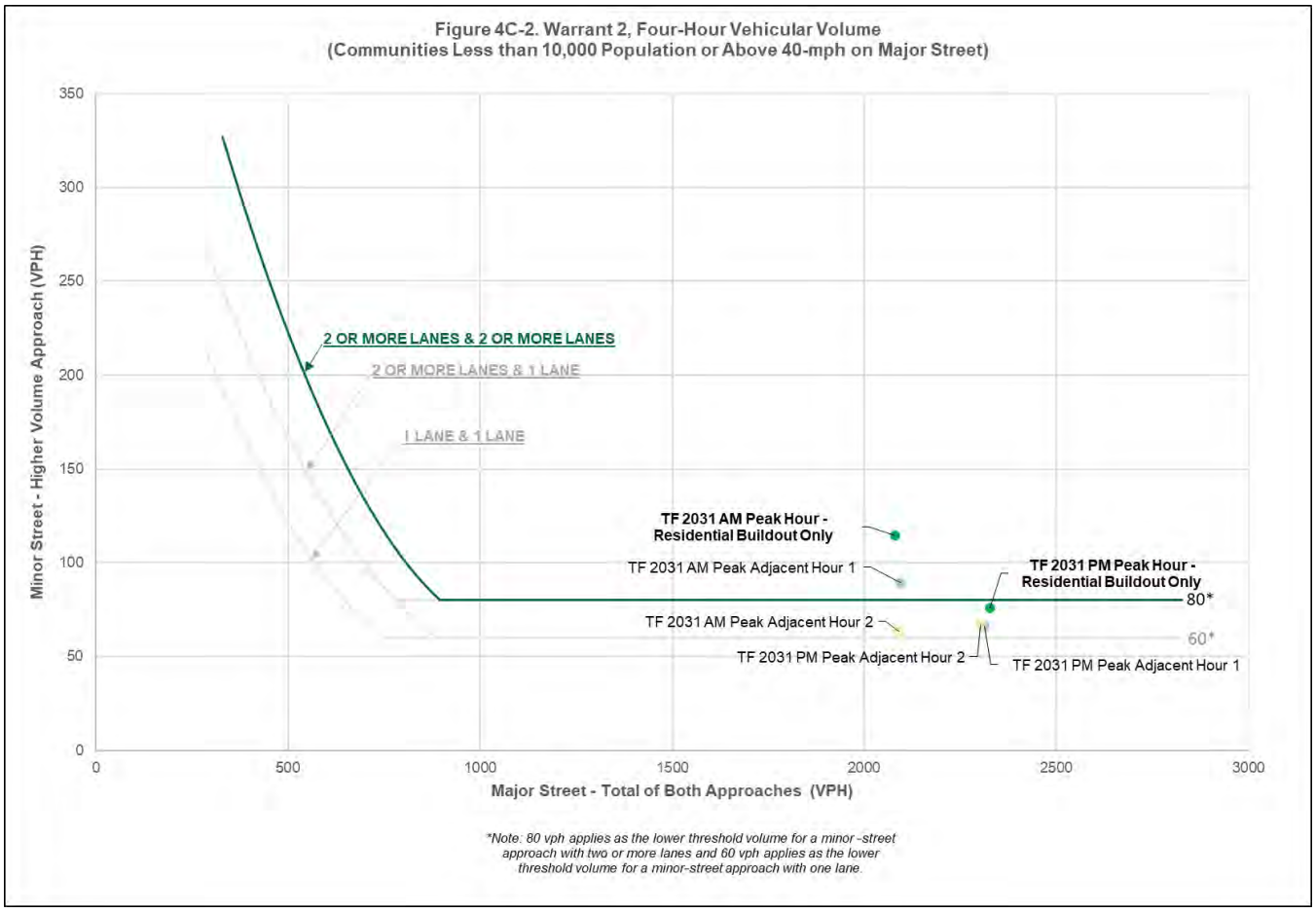


Figure 28: Warrant 2, Four-Hour Vehicular Volume (2031 Residential Buildout Only)
Note: Results might change based on different trip distribution assumptions per WVDOH staff.

As Figure 28 shows, **the 2031 Residential Buildout Only scenario does not satisfy the 4-hour signal warrant threshold based on proposed trip distribution assumptions.** Based on these results, it is also anticipated that the completion of the full residential portion of the development plan with any of the commercial development would meet the preliminary traffic signal warrant given the proximity of the PM volumes to the warrant threshold in Figure 28.

Warrant 2 Results Summary

Based on the results discussed above, the residential portion of the development can be completed without triggering signalization while the Interim Phase and Complete Buildout developments satisfy signalization thresholds. However, convenient and direct access to the commercial uses will be key to the viability of tenants in those spaces and to maintain consistency with the City's vision for the corridor. Thus, coordination with both WVDOH and the City will be required in order to arrive at a consensus on the access configuration.

Conclusions

This report presented the findings of a Traffic Impact Study (TIS) conducted for the proposed Vinton Hayes development (the Site / the Development / the Property) situated in the City of Charles Town, West Virginia. The Site is located north of Berryville Pike (U.S. 340), south of Vinton Lane, and east of Augustine Avenue in Charles Town, West Virginia.

The proposed development consists of two phases: a residential and partial commercial buildout phase to be completed by 2031, and a full residential and commercial phase to be completed by 2035. The residential portion of the development includes 307 single-family detached units and 274 single-family attached units. The commercial portion of the development is anticipated to be comprised of 105,000 SF of retail space, 5,000 SF of fast-food restaurant with drive-thru window, and a convenience store/gas station with up to 16 fueling positions. Access to the site will be provided via two future full-movement entrances, one on Augustine Avenue and one on Berryville Pike. The access on Berryville Pike will utilize an existing median break.

The analysis presented in this report supports the following major findings:

2024 Existing Conditions

- Based on the capacity analysis, the overall signalized study intersections operate at acceptable overall levels of service (D or better) during either peak hour.
- Based on the capacity analysis, all approaches of the study intersections operate at acceptable approach levels of service (D or better) except for the Westbound approach at the intersection of Augustine Avenue and Washington Patriots Drive / Sheetz Entrance during the AM peak hour.
- Based on the analysis of the 95th percentile queue lengths from Synchro, all turning movements have queue lengths that were accommodated within the available storage length of the turn bays.

2031 Future Conditions without Development

- Based on the capacity analysis, the overall signalized study intersections operate at acceptable overall levels of service (D or better) during either peak hour.
- Similar to the existing conditions, all approaches of the study intersections operate at acceptable levels of service with improvements from background developments.
- Based on the analysis of the 95th percentile queue lengths from Synchro, all turning movements are anticipated to have queue lengths that are accommodated within the available storage length of the turn bays.

2031 Future Conditions with Development [Residential and Partial Commercial Buildout]

- The residential portion, along with the partial commercial buildout phase of the site, is expected to generate approximately 441 new AM peak hour trips, 510 new PM peak hour trips, and 6,446 new trips on a typical weekday.
- With the addition of Site traffic and proposed roadway improvement and mitigation, all signalized intersections are anticipated to operate at acceptable levels of service (D or better).
- Similar to the existing and 2031 future without development conditions, all approaches of the study intersections operate at acceptable levels of service.

- Based on the queuing analysis performed for 2031 future with development conditions and the suggested mitigation strategy, all turning movements at the study intersections had 95th percentile queue lengths that were accommodated within the available storage lengths of the turn bays.
- Based on an assessment of turn lanes at the site entrances using 2031 volumes:
    - A left turn lane and taper is warranted for the southbound approach at the intersection of Augustine Avenue and the proposed site entrance.
        - Capacity analysis indicates that the approach operates within acceptable level of service standards without the left turn lane.
    - An eastbound left turn lane is also warranted at the intersection of Berryville Pike and the proposed site entrance.
        - There is an existing eastbound left turn lane at the intersection of Berryville Pike and the proposed site entrance which is recommended to be extended to meet storage length requirements.
    - A right turn lane and taper is warranted for the westbound approach of Berryville Pike at the proposed site entrance.
- Based on a preliminary signal warrant assessment, a traffic signal is warranted at the intersection of Berryville Pike and the proposed site entrance under 2031 future with development conditions.
    - The following should be noted regarding the installation of the traffic signal at the intersection of Berryville Pike and the proposed site entrance:
        - **The completion of the full residential portion of the development plan consisting of up to 581 dwelling units, without any commercial development, is not likely to trigger a traffic signal to be warranted.**
        - The completion of the full residential portion of the development plan consisting of up to 581 dwelling units with any of the commercial development meets the preliminary traffic signal warrant.
        - The completion of the gas station / convenience store along with the completion of either the fast-food restaurant with drive-through or the 15,000 SF of retail without any residential dwelling units is likely to meet traffic signal warrants.

2035 Future Conditions with Development – [Complete Development]

- Based on the capacity analysis, the overall signalized study intersections operate at acceptable overall levels of service (D or better) during either peak hour.
- Two unsignalized intersections are found to have approaches with delays that exceed the threshold for levels of service “D”:
    - Southbound approach at the intersection of Berryville Pike and Old Cave Road during the AM and PM peak hours.
    - Northbound approach at the intersection of Berryville Pike and Candlewood Drive during the PM peak hour.
    - The delays associated with the side streets at these unsignalized intersections are a result of limited gaps along Berryville Pike, a major commuter corridor. The minor approach delays are consistent with delays expected on side streets at intersections with major thoroughfares.
    - The 2018 City of Charles Town Comprehensive Plan includes a future boulevard connection at the Berryville Pike and Candlewood Drive intersection that is anticipated to be implemented as part of the Comprehensive Plan Roadway Network beyond the study timeframe of this analysis.
- Based on the analysis of the 95th percentile queue lengths from Synchro, all turning movements are anticipated to have queue lengths that are accommodated within the available storage length of the turn bays.

- Based on an assessment of turn lanes at the site entrances using 2035 volumes:
    - A left turn lane and taper is warranted for the southbound approach at the intersection of Augustine Avenue and the proposed site entrance.
        - Capacity analysis indicates that the approach operates within acceptable level of service standards in 2035 without the left turn lane.
    - An eastbound left turn lane is also warranted at the intersection of Berryville Pike and the proposed site entrance.
        - There is an existing eastbound left turn lane at the intersection of Berryville Pike and the proposed site entrance which is recommended to be extended to meet storage length requirements.
    - A right turn lane and taper is warranted for the westbound approach of Berryville Pike at the proposed site entrance.
- Based on a preliminary signal warrant assessment, a traffic signal is warranted under 2035 future with development (full residential and fully commercial buildout) conditions.

Overall Conclusion

Based on the capacity and queueing analysis results, **the proposed development will not have a substantial impact to the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the preferred concept plan and that the potential mitigation measure is constructed as proposed**.

I DIX

APPENDIX A: SCOPING DOCUMENT

APPENDIX B: EXISTING TRAFFIC COUNT DATA

APPENDIX C: LEVEL OF SERVICE & DELAY DEFINITIONS

APPENDIX D: ANALYSIS WORKSHEETS OF 2024 EXISTING CONDITIONS

APPENDIX E: ANALYSIS WORKSHEETS OF 2031 FUTURE CONDITIONS WITHOUT DEVELOPMENT

APPENDIX F: ANALYSIS WORKSHEETS OF 2031 FUTURE CONDITIONS WITH DEVELOPMENT

APPENDIX G: ANALYSIS WORKSHEETS OF 2035 FUTURE CONDITIONS WITH DEVELOPMENT

APPENDIX H: TURN LANE WARRANTS

APPENDIX I: INTERSECTION APPROACH PHOTOS

APPENDIX A: SCOPING DOCUMENT

November 14, 2024

Mr. Perry Keller
West Virginia Division of Highways
1900 Kanawha Boulevard East
Building 5, Room 129
Charleston, West Virginia 25305
Phone: (304) 414-6925

Subject: Vinton Hayes – Traffic Impact Study (TIS) Scoping Document
City of Charles Town, WV

Dear Mr. Keller:

Elm Street Development, Inc. is proposing to construct a mixed-use development to be located west of Berryville Pike (Route 340), east of Augustine Avenue and north of Old Cave Road in Jefferson County, West Virginia. The development plan includes 581 dwelling units (307 single family dwellings and 274 townhomes), 5,000 SF of fast-food restaurant space with a drive-thru, a convenience store/gas station with up to 16 fueling positions, and 105,000 SF of inline retail space. The development is proposed to be served by two full-access driveways, one each on Augustine Avenue and Berryville Pike.

As the commercial development is expected to take additional time to absorb, we propose an interim phase with partial buildout of the inline retail as follows:

- **Interim Phase:**
  - Full Residential Buildout
  - Partial Commercial Buildout
    - 5,000 SF of fast-food restaurant space with a drive-thru
    - a convenience store/gas station with up to 16 fueling positions
    - 15,000 SF of inline retail space
- **Complete Buildout (+90,000 SF of retail):**
  - Full Residential Buildout
  - Full Commercial Buildout
    - 5,000 SF of fast-food restaurant space with a drive-thru
    - a convenience store/gas station with up to 16 fueling positions
    - 105,000 SF of inline retail space

The purpose of this letter is to confirm the scope of the TIS.

Study Area

We understand that WVDOH will require us to analyze the following intersections:

1. U.S. 340 at Augustine Avenue / Private Driveway
2. Augustine Avenue at Huyett Road
3. Augustine Avenue at Washington Patriots Drive / Sheetz Driveway
4. Augustine Avenue at Prospect Hill Boulevard
5. Augustine Avenue at Page Jackson School Road / Old Cave Road
6. Augustine Avenue at Craighill Drive
7. U.S. 340 at Old Cave Road
8. U.S. 340 at Candlewood Drive

The following 2 future intersections are to be included as study intersections.

9. Augustine Avenue at Site Driveway
10. U.S. 340 at Site Driveway

Figure 1 shows the proposed site location and study intersections.

Traffic Counts

Recently collected weekday AM peak hour (6:00 to 9:00 AM) and PM peak hour (3:30 to 6:30 PM) turning movement counts will be used at the following intersections:

1. U.S. 340 at Augustine Avenue / Private Driveway
2. Augustine Avenue at Huyett Road
3. Augustine Avenue at Washington Patriots Drive / Sheetz Driveway
4. Augustine Avenue at Prospect Hill Boulevard
5. Augustine Avenue at Page Jackson School Road / Old Cave Road
6. Augustine Avenue at Craighill Drive
7. U.S. 340 at Old Cave Road
8. U.S. 340 at Candlewood Drive

Analysis

We will perform weekday AM and PM peak hour traffic capacity analysis of the study intersections for the following conditions:

- Existing Conditions (2024) *
- Future without Development Conditions (2031)
- Future with Development Conditions (2031) [Residential + Partial Commercial Buildout Development]
- Future with Development Conditions (2035) [Complete Development]

**As noted above, recently collected traffic counts will be used for all study intersections. At intersections 1-6, counts were collected on Tuesday, September 10, 2024. Counts for intersections 7 and 8 were collected on Thursday, November 2, 2023.*

The results of this analysis will determine if transportation improvements will be necessary to mitigate the impacts of the proposed development.

Background Traffic Growth Rate

Future peak hour traffic volumes will be estimated by applying an annual 2.0399% growth rate to existing mainline through volumes along U.S. 340 and an annual 1.8197% growth rate to existing mainline through volumes along Augustine Avenue from 2024 to 2031.

Future Roadway Improvement Projects to Include

A portion of Augustine Avenue is planned for road geometric upgrades. This includes a new lane configuration for the southbound approach at the intersection of Augustine Avenue and U.S. 340. A new signal at Augustine Avenue and Washington Patriots Drive is to be funded by the adjacent Sheetz development.

Approved Development Projects to Include

There are five approved developments in the vicinity of the site to be included in this analysis.

- Washington Landing
- Huntfield
- Norborne-Glebe
- Hillside
- Stone Spring Development

Table 1 shows the trip potential of the background developments based on the Institute of Transportation Engineers (ITE) Trip Generation Manual – 11th Edition.

Table 1: Background Trip Generation (ITE, 11th Ed.)

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Washington Landing									
Multifamily Housing (Mid-Rise) (Apartments, Townhomes, Cond	221	194 DU	17	57	74	46	30	76	879
Subtotal without Reductions			**17**	**57**	**74**	**46**	**30**	**76**	**879**
Huntfield									
Single-Family Detached Housing (EQUATIONS)	210	35 DU	7	22	29	23	14	37	384
Single-Family Attached Housing (EQUATIONS)	215	48 DU	5	14	19	15	10	25	315
Subtotal without Reductions			**12**	**36**	**48**	**38**	**24**	**62**	**699**
Norborne-Glebe									
Single-Family Detached Housing (EQUATIONS)	210	155 DU	28	83	111	94	56	150	1,510
Single-Family Attached Housing (EQUATIONS)	215	187 DU	23	69	92	64	44	108	1,374
Subtotal without Reductions			**51**	**152**	**203**	**158**	**100**	**258**	**2,884**
Hillside									
Single-Family Attached Housing (EQUATIONS)	215	128 DU	15	46	61	43	30	73	925
Subtotal without Reductions			**15**	**46**	**61**	**43**	**30**	**73**	**925**
Stone Spring									
Single-Family Detached Housing (EQUATIONS)	210	62 DU	12	36	48	40	23	63	650
Single-Family Attached Housing (EQUATIONS)	215	77 DU	8	26	34	25	17	42	536
Subtotal without Reductions			**20**	**62**	**82**	**65**	**40**	**105**	**1,186**

Proposed Trip Generation

Table 2 shows the trip potential of the proposed development with partial buildout of the commercial component based on the Institute of Transportation Engineers (ITE) Trip Generation Manual – 11th Edition. Table 3 shows the trip potential of the proposed development with complete buildout of the commercial component.

Table 2: Proposed Partial Buildout Trip Generation (ITE, 11th Ed.)

Land Use	ITE Code	Size	Weekday						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Residential Use									
Single-Family Detached Housing (EQUATIONS)	210	307 DU	52	155	207	180	105	285	2,832
Single-Family Attached Housing (EQUATIONS)	215	274 DU	34	103	137	94	66	160	2,037
Residential Subtotal without Reductions			86	258	344	274	171	445	4,869
Internal Trip Reductions - Residential to Restaurant [1]		*20%/14%/9% AM/PM/Daily*	-4	-23	-27	-13	-14	-27	-257
Internal Trip Reductions - Residential to Retail [1]		*17%/10%/5% AM/PM/Daily*	-2	-41	-43	-27	-17	-44	-243
Residential Subtotal with Reductions			**80**	**194**	**274**	**234**	**140**	**374**	**4,369**
Restaurant Use									
Fast Food Restaurant with Drive-Thru Window	934	5.0 kSF of GFA	114	109	223	86	79	165	2,337
Restaurant Subtotal without Reductions			114	109	223	86	79	165	2,337
Internal Trip Reductions - Restaurant to Residential [1]		*5%/16%/11% AM/PM/Daily*	-23	-4	-27	-14	-13	-27	-257
Internal Trip Reductions - Restaurant to Retail [1]		*8%/50%/45% AM/PM/Daily*	-9	-55	-64	-43	-40	-83	-1,052
Restaurant Subtotal with Internal Reductions			82	50	132	29	26	55	1,028
Pass-by Trip Reductions - FF Restaurant w Drive-Through [2]		*50%/55%/45% AM/PM/Daily*	-41	-25	-66	-16	-14	-30	-463
Restaurant Subtotal with Reductions			**41**	**25**	**66**	**13**	**12**	**25**	**565**
Retail Use									
Convenience Store/Gas Station - GFA (4-5.5k)	945	16.0 Fueling Positions	216	217	433	182	182	364	4,114
Shopping Center (<40 kSF)	822	15.0 kSF of GFA	23	15	38	52	52	104	863
Convenience Store/Gas Station Subtotal without Reductions			239	232	471	234	234	468	4,977
Internal Trip Reductions - Retail to Residential [1]		*2%/46%/41% AM/PM/Daily*	-41	-2	-43	-17	-27	-44	-243
Internal Trip Reductions - Retail to Restaurant [1]		*50%/29%/24% AM/PM/Daily*	-55	-9	-64	-40	-43	-83	-1,052
Retail Subtotal with Internal Reductions			143	221	364	177	164	341	3,682
Pass-by Trip Reductions - Convenience Store / Gas Station [3]		*76%/75%/65% AM/PM/Daily*	-98	-157	-255	-104	-96	-200	-1,979
Pass-by Trip Reductions - Shopping Center (w/o Supermarket) [4]		*30%/40%/30% AM/PM/Daily*	-4	-4	-8	-16	-14	-30	-191
Retail Subtotal with Reductions			**41**	**60**	**101**	**57**	**54**	**111**	**1,512**
Overall Net New External Trips Total without Reductions			**439**	**599**	**1,038**	**594**	**484**	**1,078**	**12,183**
Overall Net New External Trips Total with Reductions			**162**	**279**	**441**	**304**	**206**	**510**	**6,446**

Notes on Assumptions:

[1] *Internal capture rates were based on NHCRP Report 684, NCHRP does not have daily internal capture rates, as such, the PM rate minus 5% was assumed.*

[2] *Pass-by rates for the fast food restaurant uses were based on ITE LUC 934 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[3] *Pass-by rates for the convenience store/gas station uses were based on ITE LUC 945 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[4] *Pass-by rates for the shopping center uses were based on ITE LUC 821 for the PM peak hour. ITE does not have pass-by rates for the AM and Daily period, as such, both were assumed to be the PM peak hour rate minus 10%.*

As shown in the table above, the proposed Vinton Hayes project with partial buildout of the commercial component will generate approximately 441 new AM peak hour trips, 510 new PM peak hour trips, and approximately 6,446 new trips during a typical weekday.

Table 3: Proposed Complete Buildout Trip Generation (ITE, 11th Ed.)

Land Use	ITE Code	Size		Weekday AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily Total
Residential Use										
Single-Family Detached Housing (EQUATIONS)	210	307	DU	52	155	207	180	105	285	2,832
Single-Family Attached Housing (EQUATIONS)	215	274	DU	34	103	137	94	66	160	2,037
Residential Subtotal without Reductions				86	258	344	274	171	445	4,869
Internal Trip Reductions - Residential to Restaurant [1]		*20%/14%/9%*	*AM/PM/Daily*	-4	-23	-27	-13	-14	-27	-257
Internal Trip Reductions - Residential to Retail [1]		*17%/10%/5%*	*AM/PM/Daily*	-2	-44	-46	-27	-17	-44	-243
Residential Subtotal with Reductions				**80**	**191**	**271**	**234**	**140**	**374**	**4,369**
Restaurant Use										
Fast Food Restaurant with Drive-Thru Window	934	5.0	kSF of GFA	114	109	223	86	79	165	2,337
Restaurant Subtotal without Reductions				114	109	223	86	79	165	2,337
Internal Trip Reductions - Restaurant to Residential [1]		*5%/16%/11%*	*AM/PM/Daily*	-23	-4	-27	-14	-13	-27	-257
Internal Trip Reductions - Restaurant to Retail [1]		*8%/50%/45%*	*AM/PM/Daily*	-9	-55	-64	-43	-40	-83	-1,052
Restaurant Subtotal with Internal Reductions				82	50	132	29	26	55	1,028
Pass-by Trip Reductions - FF Restaurant w Drive-Through [2]		*50%/55%/45%*	*AM/PM/Daily*	-41	-25	-66	-16	-14	-30	-463
Restaurant Subtotal with Reductions				**41**	**25**	**66**	**13**	**12**	**25**	**565**
Retail Use										
Convenience Store/Gas Station - GFA (4-5.5k)	945	16.0	Fueling Positions	216	217	433	182	182	364	4,114
Shopping Center (40 kSF<X<150 kSF) (without Supermark	821	105.0	kSF of GFA	113	69	182	267	278	545	7,090
Convenience Store/Gas Station Subtotal without Reductions				329	286	615	449	460	909	11,204
Internal Trip Reductions - Retail to Residential [1]		*2%/46%/41%*	*AM/PM/Daily*	-44	-2	-46	-17	-27	-44	-243
Internal Trip Reductions - Retail to Restaurant [1]		*50%/29%/24%*	*AM/PM/Daily*	-55	-9	-64	-40	-43	-83	-1,052
Retail Subtotal with Internal Reductions				230	275	505	392	390	782	9,909
Pass-by Trip Reductions - Convenience Store / Gas Station [3]		*76%/75%/65%*	*AM/PM/Daily*	-115	-159	-274	-119	-116	-235	-2,365
Pass-by Trip Reductions - Shopping Center (w/o Supermarket) [4]		*30%/40%/30%*	*AM/PM/Daily*	-24	-20	-44	-93	-94	-187	-1,881
Retail Subtotal with Reductions				**91**	**96**	**187**	**180**	**180**	**360**	**5,663**
Overall Net New External Trips Total without Reductions				**529**	**653**	**1,182**	**809**	**710**	**1,519**	**18,410**
Overall Net New External Trips Total with Reductions				**212**	**312**	**524**	**427**	**332**	**759**	**10,597**

Notes on Assumptions:

[1] *Internal capture rates were based on NHCRP Report 684, NCHRP does not have daily internal capture rates, as such, the PM rate minus 5% was assumed.*

[2] *Pass-by rates for the fast food restaurant uses were based on ITE LUC 934 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[3] *Pass-by rates for the convenience store/gas station uses were based on ITE LUC 945 for the AM and PM peak hour. ITE does not have pass-by rates for the Daily period, as such, it was assumed to be the PM peak hour rate minus 10%.*

[4] *Pass-by rates for the shopping center uses were based on ITE LUC 821 for the PM peak hour. ITE does not have pass-by rates for the AM and Daily period, as such, both were assumed to be the PM peak hour rate minus 10%.*

As shown in the table above, the proposed Vinton Hayes project with partial buildout of the commercial component will generate approximately 524 new AM peak hour trips, 759 new PM peak hour trips, and approximately 10,597 new trips during a typical weekday.

As compared to the partial commercial buildout, the additional commercial build generates 83 additional new AM peak hour trips, 249 additional new PM peak hour trips, and approximately 4,151 additional new trips during a typical weekday.

Primary Site Trip Distribution

Figure 1 shows the proposed primary site trip distribution based on a review of the surrounding roadway network, and discussion with Staff on August 29th, 2024:

Residential Uses:

- 25% to / from the north on Augustine Avenue
- 40% to / from the north on U.S. 340
- 35% to / from the south on U.S. 340

Non-Residential Uses:

- 5% to / from the north on Augustine Avenue
- 55% to / from the north on U.S. 340
- 40% to / from the south on U.S. 340

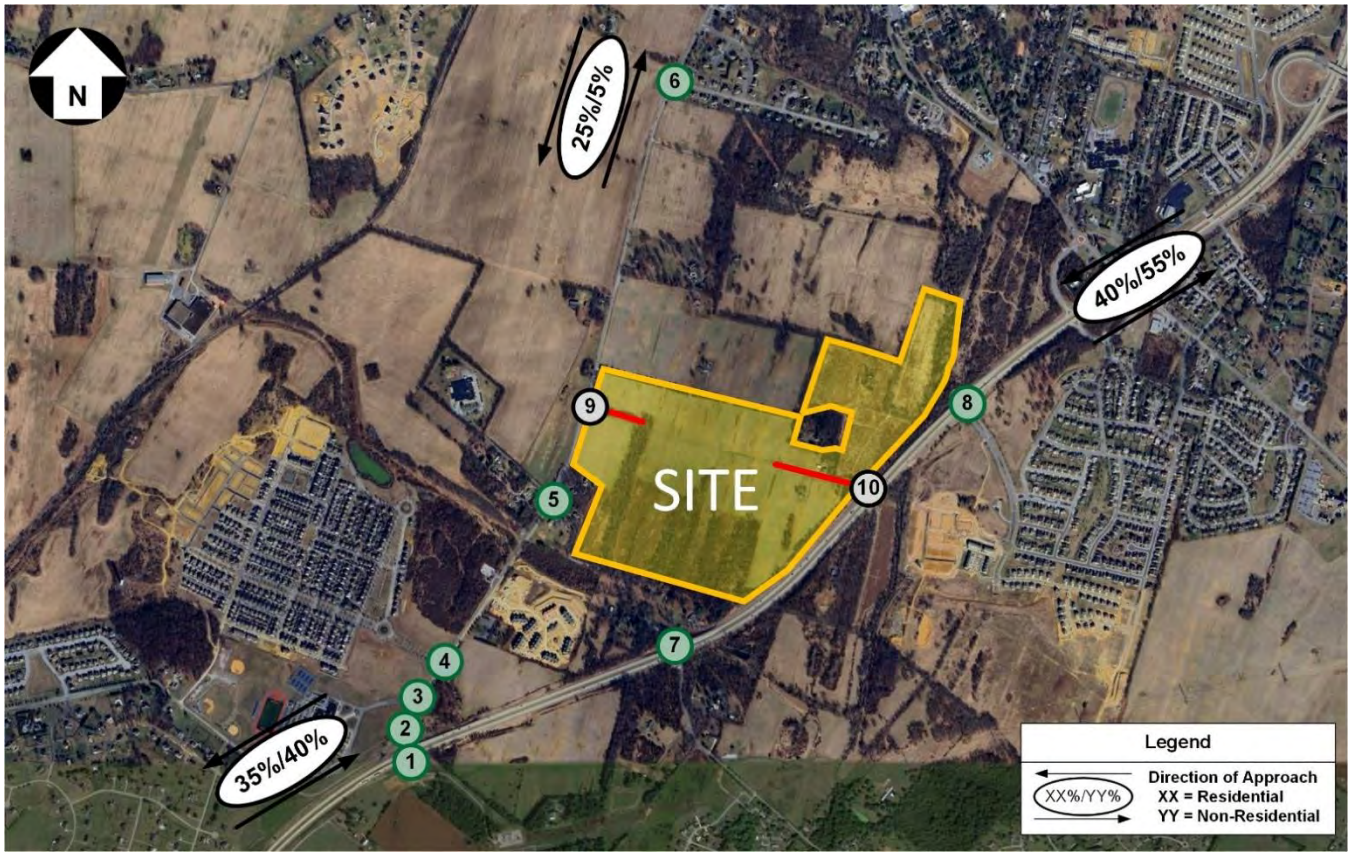


Figure 1: Site Location Map and Primary Site Trip Distribution

We appreciate your assistance!

Sincerely,

Kevin D. Sitzman
Vice President

Copy to: Stefanie Smith, Elm Street Development, Inc.
Jim Perry, Elm Street Development, Inc.

APPENDIX B: EXISTING TRAFFIC COUNT DATA

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Berryville Pike/US 340
City: Charles Town
Control: Signalized

Project ID: 24-290004-001
Date: 9/10/2024

Data - Total

NS/EW Streets:	Augustine Ave				Augustine Ave				Berryville Pike/US 340				Berryville Pike/US 340				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	37	0	51	0	3	53	0	0	1	106	22	0	273
6:15 AM	0	0	1	0	30	0	36	0	8	61	0	0	1	107	20	0	264
6:30 AM	0	1	0	0	36	0	52	0	6	80	0	0	1	142	23	0	341
6:45 AM	0	0	1	0	44	0	48	0	8	77	0	1	1	145	44	0	369
7:00 AM	0	0	0	0	37	0	60	0	17	73	0	1	0	137	67	0	392
7:15 AM	0	0	2	0	75	0	49	0	22	77	0	0	4	134	126	1	490
7:30 AM	0	0	4	0	86	0	45	0	18	104	0	2	3	108	130	0	500
7:45 AM	0	0	1	0	73	0	33	0	16	100	0	0	1	134	48	0	406
8:00 AM	0	0	3	0	37	0	23	0	18	106	1	0	2	123	42	0	355
8:15 AM	0	0	5	0	61	0	26	0	24	97	0	0	5	101	47	0	366
8:30 AM	0	0	2	0	55	0	21	0	27	97	0	0	1	75	48	1	327
8:45 AM	0	0	0	0	72	0	28	0	18	86	0	0	0	81	37	1	323
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	19	0	643	0	472	0	185	1011	1	4	20	1393	654	3	4406
APPROACH %'s :	0.00%	5.00%	95.00%	0.00%	57.67%	0.00%	42.33%	0.00%	15.40%	84.18%	0.08%	0.33%	0.97%	67.29%	31.59%	0.14%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	0	10	0	225	0	98	0	87	386	1	0	8	380	174	2	1371
PEAK HR FACTOR :	0.000	0.000	0.500	0.000	0.781	0.000	0.875	0.000	0.806	0.910	0.250	0.000	0.400	0.772	0.906	0.500	0.936
	0.500				0.808				0.948				0.844				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	0	7	0	67	0	23	0	30	132	0	0	1	87	61	0	408
3:45 PM	0	0	2	0	48	0	24	0	44	154	0	1	2	117	68	0	460
4:00 PM	0	0	2	0	89	0	28	0	41	150	0	0	4	118	60	0	492
4:15 PM	0	0	3	0	62	0	28	0	25	167	0	0	2	111	73	0	471
4:30 PM	1	0	1	0	59	0	18	0	43	165	0	0	3	116	90	0	496
4:45 PM	0	0	4	0	62	0	25	0	41	155	0	0	2	90	85	0	464
5:00 PM	0	0	2	0	80	0	33	0	56	162	0	0	0	110	76	0	519
5:15 PM	0	0	0	0	68	0	18	0	34	143	0	0	0	117	78	0	458
5:30 PM	0	0	0	0	74	0	24	1	42	136	0	0	0	88	77	0	442
5:45 PM	0	0	0	0	61	0	14	0	28	127	0	0	0	105	79	0	414
6:00 PM	0	0	0	0	35	0	10	0	30	103	0	0	0	93	69	0	340
6:15 PM	0	0	0	0	48	0	23	0	45	91	0	0	0	80	62	0	349
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	21	0	753	0	268	1	459	1685	0	1	14	1232	878	0	5313
APPROACH %'s :	4.55%	0.00%	95.45%	0.00%	73.68%	0.00%	26.22%	0.10%	21.40%	78.55%	0.00%	0.05%	0.66%	58.00%	41.34%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	0	6	0	284	0	100	1	173	596	0	0	2	405	316	0	1883
PEAK HR FACTOR :	0.000	0.000	0.375	0.000	0.888	0.000	0.758	0.250	0.772	0.920	0.000	0.000	0.250	0.865	0.929	0.000	0.907
	0.375				0.852				0.882				0.927				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Berryville Pike/US 340
City: Charles Town
Control: Signalized

Project ID: 24-290004-001
Date: 9/10/2024

Data - Cars

NS/EW Streets:	Augustine Ave				Augustine Ave				Berryville Pike/US 340				Berryville Pike/US 340				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	36	0	49	0	3	45	0	0	1	95	21	0	250
6:15 AM	0	0	0	0	28	0	34	0	8	49	0	0	1	99	19	0	238
6:30 AM	0	1	0	0	36	0	49	0	6	67	0	0	0	128	21	0	308
6:45 AM	0	0	0	0	41	0	47	0	8	66	0	1	1	132	43	0	339
7:00 AM	0	0	0	0	35	0	59	0	17	64	0	1	0	121	64	0	361
7:15 AM	0	0	0	0	69	0	46	0	18	65	0	0	0	113	114	1	426
7:30 AM	0	0	0	0	72	0	43	0	17	95	0	2	0	94	121	0	444
7:45 AM	0	0	0	0	71	0	32	0	15	87	0	0	0	121	43	0	369
8:00 AM	0	0	0	0	36	0	21	0	16	88	0	0	0	110	39	0	310
8:15 AM	0	0	0	0	59	0	24	0	20	82	0	0	0	89	45	0	319
8:30 AM	0	0	0	0	52	0	20	0	24	78	0	0	0	57	45	1	277
8:45 AM	0	0	0	0	61	0	27	0	18	67	0	0	0	69	31	1	274
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	0	0	596	0	451	0	170	853	0	4	3	1228	606	3	3915
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	56.92%	0.00%	43.08%	0.00%	16.55%	83.06%	0.00%	0.39%	0.16%	66.74%	32.93%	0.16%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	0	0	0	208	0	92	0	78	315	0	0	0	325	160	2	1180
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.852	0.000	0.852	0.000	0.813	0.895	0.000	0.000	0.000	0.739	0.889	0.500	0.925
					0.852				0.945				0.817				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	0	0	0	67	0	22	0	28	115	0	0	0	73	61	0	366
3:45 PM	0	0	0	0	44	0	23	0	40	138	0	1	0	103	63	0	412
4:00 PM	0	0	0	0	86	0	28	0	41	138	0	0	0	106	58	0	457
4:15 PM	0	0	0	0	60	0	28	0	24	152	0	0	0	97	70	0	431
4:30 PM	0	0	0	0	57	0	17	0	38	155	0	0	0	103	88	0	458
4:45 PM	0	0	0	0	60	0	25	0	38	140	0	0	0	81	82	0	426
5:00 PM	0	0	1	0	80	0	31	0	55	149	0	0	0	98	75	0	489
5:15 PM	0	0	0	0	68	0	18	0	34	139	0	0	0	105	78	0	442
5:30 PM	0	0	0	0	74	0	21	1	41	130	0	0	0	74	74	0	415
5:45 PM	0	0	0	0	60	0	14	0	28	115	0	0	0	94	78	0	389
6:00 PM	0	0	0	0	34	0	10	0	29	94	0	0	0	79	67	0	313
6:15 PM	0	0	0	0	47	0	22	0	45	83	0	0	0	71	60	0	328
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	1	0	737	0	259	1	441	1548	0	1	0	1084	854	0	4926
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	73.92%	0.00%	25.98%	0.10%	22.16%	77.79%	0.00%	0.05%	0.00%	55.93%	44.07%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	0	1	0	282	0	95	1	168	558	0	0	0	358	309	0	1772
PEAK HR FACTOR :	0.000	0.000	0.250	0.000	0.881	0.000	0.766	0.250	0.764	0.936	0.000	0.000	0.000	0.852	0.942	0.000	0.906
			0.250		0.851				0.890				0.911				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Berryville Pike/US 340
City: Charles Town
Control: Signalized

Project ID: 24-290004-001
Date: 9/10/2024

Data - HT

NS/EW Streets:	Augustine Ave				Augustine Ave				Berryville Pike/US 340				Berryville Pike/US 340				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	1	0	2	0	0	8	0	0	0	11	1	0	23
6:15 AM	0	0	1	0	2	0	2	0	0	12	0	0	0	8	1	0	26
6:30 AM	0	0	0	0	0	0	3	0	0	13	0	0	1	14	2	0	33
6:45 AM	0	0	1	0	3	0	1	0	0	11	0	0	0	13	1	0	30
7:00 AM	0	0	0	0	2	0	1	0	0	9	0	0	0	16	3	0	31
7:15 AM	0	0	2	0	6	0	3	0	4	12	0	0	4	21	12	0	64
7:30 AM	0	0	4	0	14	0	2	0	1	9	0	0	3	14	9	0	56
7:45 AM	0	0	1	0	2	0	1	0	1	13	0	0	1	13	5	0	37
8:00 AM	0	0	3	0	1	0	2	0	2	18	1	0	2	13	3	0	45
8:15 AM	0	0	5	0	2	0	2	0	4	15	0	0	5	12	2	0	47
8:30 AM	0	0	2	0	3	0	1	0	3	19	0	0	1	18	3	0	50
8:45 AM	0	0	0	0	11	0	1	0	0	19	0	0	0	12	6	0	49
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	19	0	47	0	21	0	15	158	1	0	17	165	48	0	491
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	69.12%	0.00%	30.88%	0.00%	8.62%	90.80%	0.57%	0.00%	7.39%	71.74%	20.87%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	0	10	0	17	0	6	0	9	71	1	0	8	55	14	0	191
PEAK HR FACTOR :	0.000	0.000	0.500	0.000	0.386	0.000	0.750	0.000	0.563	0.934	0.250	0.000	0.400	0.764	0.583	0.000	0.955
	0.500				0.479				0.920				0.875				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	0	7	0	0	0	1	0	2	17	0	0	1	14	0	0	42
3:45 PM	0	0	2	0	4	0	1	0	4	16	0	0	2	14	5	0	48
4:00 PM	0	0	2	0	3	0	0	0	0	12	0	0	4	12	2	0	35
4:15 PM	0	0	3	0	2	0	0	0	1	15	0	0	2	14	3	0	40
4:30 PM	1	0	1	0	2	0	1	0	5	10	0	0	3	13	2	0	38
4:45 PM	0	0	4	0	2	0	0	0	3	15	0	0	2	9	3	0	38
5:00 PM	0	0	1	0	0	0	2	0	1	13	0	0	0	12	1	0	30
5:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	12	0	0	16
5:30 PM	0	0	0	0	0	0	3	0	1	6	0	0	0	14	3	0	27
5:45 PM	0	0	0	0	1	0	0	0	0	12	0	0	0	11	1	0	25
6:00 PM	0	0	0	0	1	0	0	0	1	9	0	0	0	14	2	0	27
6:15 PM	0	0	0	0	1	0	1	0	0	8	0	0	0	9	2	0	21
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	20	0	16	0	9	0	18	137	0	0	14	148	24	0	387
APPROACH %'s :	4.76%	0.00%	95.24%	0.00%	64.00%	0.00%	36.00%	0.00%	11.61%	88.39%	0.00%	0.00%	7.53%	79.57%	12.90%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	0	5	0	2	0	5	0	5	38	0	0	2	47	7	0	111
PEAK HR FACTOR :	0.000	0.000	0.313	0.000	0.250	0.000	0.417	0.000	0.417	0.633	0.000	0.000	0.250	0.839	0.583	0.000	0.730
	0.313				0.583				0.597				0.824				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Huyett Rd/CR 13/3/Sheetz Dwy
City: Charles Town
Control: 1-Way Stop(EB)

Project ID: 24-290004-002
Date: 9/10/2024

Data - Total

NS/EW Streets:	Augustine Ave				Augustine Ave				Huyett Rd/CR 13/3/Sheetz Dwy				Huyett Rd/CR 13/3/Sheetz Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	4	10	11	0	0	66	3	0	1	3	22	0	0	0	0	0	120
6:15 AM	4	13	12	0	0	54	1	0	1	3	12	0	0	0	0	0	100
6:30 AM	3	17	9	0	0	67	2	0	2	4	22	0	0	0	0	0	126
6:45 AM	10	33	10	0	0	66	3	0	3	3	25	0	0	0	0	0	153
7:00 AM	19	44	21	0	0	72	3	0	0	2	26	0	0	0	0	0	187
7:15 AM	31	92	21	0	0	92	6	0	7	2	32	0	0	0	0	0	283
7:30 AM	56	85	11	0	0	107	2	0	4	0	24	0	0	0	0	0	289
7:45 AM	22	29	13	0	1	77	4	0	5	0	28	0	0	0	0	0	179
8:00 AM	15	33	12	0	0	49	5	0	6	2	12	0	0	0	0	0	134
8:15 AM	25	34	10	0	0	60	13	0	3	4	26	0	0	0	0	0	175
8:30 AM	21	39	15	0	0	51	8	0	8	4	26	0	0	0	0	0	172
8:45 AM	14	32	11	0	0	72	7	0	8	6	27	0	0	0	0	0	177
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	224	461	156	0	1	833	57	0	48	33	282	0	0	0	0	0	2095
APPROACH %'s :	26.63%	54.82%	18.55%	0.00%	0.11%	93.49%	6.40%	0.00%	13.22%	9.09%	77.69%	0.00%					
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	75	138	48	0	0	232	33	0	25	16	91	0	0	0	0	0	658
PEAK HR FACTOR :	0.750	0.885	0.800	0.000	0.000	0.806	0.635	0.000	0.781	0.667	0.843	0.000	0.000	0.000	0.000	0.000	0.929
		0.870				0.839				0.805							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	24	50	18	0	0	67	13	0	7	4	25	0	0	0	0	0	208
3:45 PM	30	55	25	0	0	47	20	0	5	5	23	0	0	0	0	0	210
4:00 PM	24	66	13	0	0	80	10	0	3	7	38	0	0	0	0	0	241
4:15 PM	28	52	18	0	0	67	6	0	9	4	24	0	0	0	0	0	208
4:30 PM	29	70	32	0	0	51	9	0	3	5	24	0	0	0	0	0	223
4:45 PM	30	73	24	0	0	69	12	0	6	0	20	0	0	0	0	0	234
5:00 PM	30	83	20	0	0	86	12	0	5	5	25	0	0	0	0	0	266
5:15 PM	38	61	11	0	0	59	12	0	5	4	27	0	0	0	0	0	217
5:30 PM	24	77	19	0	0	75	9	0	3	2	25	0	0	0	0	0	234
5:45 PM	30	61	18	0	0	49	10	0	3	2	25	0	0	0	0	0	198
6:00 PM	33	51	15	0	0	34	8	0	5	3	17	0	0	0	0	0	166
6:15 PM	21	63	21	0	0	44	3	0	6	4	21	0	0	0	0	0	183
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	341	762	234	0	0	728	124	0	60	45	294	0	0	0	0	0	2588
APPROACH %'s :	25.50%	56.99%	17.50%	0.00%	0.00%	85.45%	14.55%	0.00%	15.04%	11.28%	73.68%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	122	294	74	0	0	289	45	0	19	11	97	0	0	0	0	0	951
PEAK HR FACTOR :	0.803	0.886	0.771	0.000	0.000	0.840	0.938	0.000	0.792	0.550	0.898	0.000	0.000	0.000	0.000	0.000	0.894
		0.921				0.852				0.882							

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Huyett Rd/CR 13/3/Sheetz Dwy
City: Charles Town
Control: 1-Way Stop(EB)

Project ID: 24-290004-002
Date: 9/10/2024

Data - Cars

NS/EW Streets:	Augustine Ave				Augustine Ave				Huyett Rd/CR 13/3/Sheetz Dwy				Huyett Rd/CR 13/3/Sheetz Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	4	9	10	0	0	64	3	0	1	3	21	0	0	0	0	0	115
6:15 AM	4	13	11	0	0	51	1	0	1	2	11	0	0	0	0	0	94
6:30 AM	3	15	9	0	0	64	1	0	2	3	22	0	0	0	0	0	119
6:45 AM	9	33	10	0	0	63	3	0	3	2	24	0	0	0	0	0	147
7:00 AM	18	43	20	0	0	69	3	0	0	2	26	0	0	0	0	0	181
7:15 AM	31	78	19	0	0	84	6	0	6	2	30	0	0	0	0	0	256
7:30 AM	55	76	11	0	0	95	2	0	4	0	21	0	0	0	0	0	264
7:45 AM	21	26	11	0	1	74	3	0	4	0	28	0	0	0	0	0	168
8:00 AM	14	30	11	0	0	45	5	0	6	2	12	0	0	0	0	0	125
8:15 AM	22	31	10	0	0	58	12	0	3	4	25	0	0	0	0	0	165
8:30 AM	21	34	14	0	0	48	7	0	8	4	24	0	0	0	0	0	160
8:45 AM	12	28	11	0	0	62	7	0	8	5	26	0	0	0	0	0	159
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	214	416	147	0	1	777	53	0	46	29	270	0	0	0	0	0	1953
APPROACH %'s :	27.54%	53.54%	18.92%	0.00%	0.12%	93.50%	6.38%	0.00%	13.33%	8.41%	78.26%	0.00%					
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	69	123	46	0	0	213	31	0	25	15	87	0	0	0	0	0	609
PEAK HR FACTOR :	0.784	0.904	0.821	0.000	0.000	0.859	0.646	0.000	0.781	0.750	0.837	0.000	0.000	0.000	0.000	0.000	0.923
		0.862				0.871				0.814							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	24	48	18	0	0	66	13	0	7	4	25	0	0	0	0	0	205
3:45 PM	25	52	24	0	0	44	20	0	5	5	21	0	0	0	0	0	196
4:00 PM	23	66	12	0	0	77	10	0	3	7	38	0	0	0	0	0	236
4:15 PM	27	50	17	0	0	67	6	0	9	4	22	0	0	0	0	0	202
4:30 PM	26	66	32	0	0	49	9	0	3	5	23	0	0	0	0	0	213
4:45 PM	29	70	23	0	0	67	12	0	6	0	20	0	0	0	0	0	227
5:00 PM	29	81	20	0	0	84	12	0	5	5	25	0	0	0	0	0	261
5:15 PM	38	61	11	0	0	59	12	0	5	4	27	0	0	0	0	0	217
5:30 PM	23	76	19	0	0	72	9	0	3	2	25	0	0	0	0	0	229
5:45 PM	29	59	18	0	0	49	10	0	3	2	24	0	0	0	0	0	194
6:00 PM	31	50	15	0	0	34	8	0	5	3	16	0	0	0	0	0	162
6:15 PM	21	63	21	0	0	43	3	0	6	4	20	0	0	0	0	0	181
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	325	742	230	0	0	711	124	0	60	45	286	0	0	0	0	0	2523
APPROACH %'s :	25.06%	57.21%	17.73%	0.00%	0.00%	85.15%	14.85%	0.00%	15.35%	11.51%	73.15%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	119	288	73	0	0	282	45	0	19	11	97	0	0	0	0	0	934
PEAK HR FACTOR :	0.783	0.889	0.793	0.000	0.000	0.839	0.938	0.000	0.792	0.550	0.898	0.000	0.000	0.000	0.000	0.000	0.895
		0.923				0.852				0.882							

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Huyett Rd/CR 13/3/Sheetz Dwy
City: Charles Town
Control: 1-Way Stop(EB)

Project ID: 24-290004-002
Date: 9/10/2024

Data - HT

NS/EW Streets:	Augustine Ave				Augustine Ave				Huyett Rd/CR 13/3/Sheetz Dwy				Huyett Rd/CR 13/3/Sheetz Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	1	1	0	0	2	0	0	0	0	1	0	0	0	0	0	5
6:15 AM	0	0	1	0	0	3	0	0	0	1	1	0	0	0	0	0	6
6:30 AM	0	2	0	0	0	3	1	0	0	1	0	0	0	0	0	0	7
6:45 AM	1	0	0	0	0	3	0	0	0	1	1	0	0	0	0	0	6
7:00 AM	1	1	1	0	0	3	0	0	0	0	0	0	0	0	0	0	6
7:15 AM	0	14	2	0	0	8	0	0	1	0	2	0	0	0	0	0	27
7:30 AM	1	9	0	0	0	12	0	0	0	0	3	0	0	0	0	0	25
7:45 AM	1	3	2	0	0	3	1	0	1	0	0	0	0	0	0	0	11
8:00 AM	1	3	1	0	0	4	0	0	0	0	0	0	0	0	0	0	9
8:15 AM	3	3	0	0	0	2	1	0	0	0	1	0	0	0	0	0	10
8:30 AM	0	5	1	0	0	3	1	0	0	0	2	0	0	0	0	0	12
8:45 AM	2	4	0	0	0	10	0	0	0	1	1	0	0	0	0	0	18
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	10	45	9	0	0	56	4	0	2	4	12	0	0	0	0	0	142
APPROACH %'s :	15.63%	70.31%	14.06%	0.00%	0.00%	93.33%	6.67%	0.00%	11.11%	22.22%	66.67%	0.00%					
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	6	15	2	0	0	19	2	0	0	1	4	0	0	0	0	0	49
PEAK HR FACTOR :	0.500	0.750	0.500	0.000	0.000	0.475	0.500	0.000	0.000	0.250	0.500	0.000	0.000	0.000	0.000	0.000	0.681
		0.958				0.525				0.625							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
3:45 PM	5	3	1	0	0	3	0	0	0	0	2	0	0	0	0	0	14
4:00 PM	1	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	5
4:15 PM	1	2	1	0	0	0	0	0	0	0	2	0	0	0	0	0	6
4:30 PM	3	4	0	0	0	2	0	0	0	0	1	0	0	0	0	0	10
4:45 PM	1	3	1	0	0	2	0	0	0	0	0	0	0	0	0	0	7
5:00 PM	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	1	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5
5:45 PM	1	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
6:00 PM	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
6:15 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	16	20	4	0	0	17	0	0	0	0	8	0	0	0	0	0	65
APPROACH %'s :	40.00%	50.00%	10.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	3	6	1	0	0	7	0	0	0	0	0	0	0	0	0	0	17
PEAK HR FACTOR :	0.750	0.500	0.250	0.000	0.000	0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.607
		0.500				0.583											

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Washington Patriots Dr/Sheetz Dwy
City: Charles Town
Control: 4-Way Stop

Project ID: 24-290004-003
Date: 9/10/2024

Data - Total

NS/EW Streets:	Augustine Ave				Augustine Ave				Washington Patriots Dr/Sheetz Dwy				Washington Patriots Dr/Sheetz Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	0.5	0.5	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	5	5	0	10	41	0	0	0	0	1	0	28	0	5	0	96
6:15 AM	3	8	3	0	6	35	2	0	0	0	1	0	19	1	4	0	82
6:30 AM	5	10	4	0	2	46	4	0	0	0	0	0	22	1	1	0	95
6:45 AM	17	17	1	0	6	51	7	0	1	0	2	0	16	0	1	0	119
7:00 AM	27	16	2	0	6	61	10	0	2	0	1	0	13	6	5	0	149
7:15 AM	70	25	2	0	12	54	45	0	9	2	21	0	23	12	2	0	277
7:30 AM	71	17	2	0	7	38	48	0	54	9	55	0	16	18	4	0	339
7:45 AM	5	28	2	0	6	44	5	0	9	5	19	0	19	1	6	0	149
8:00 AM	2	32	4	0	10	31	3	0	2	1	2	0	22	2	3	0	114
8:15 AM	9	25	4	0	3	52	4	0	1	2	3	0	17	0	7	0	127
8:30 AM	4	40	2	0	11	45	4	0	5	1	5	0	18	4	7	0	146
8:45 AM	1	39	1	0	8	48	2	0	1	0	7	0	15	2	9	0	133
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	215	262	32	0	87	546	134	0	84	20	117	0	228	47	54	0	1826
APPROACH %'s :	42.24%	51.47%	6.29%	0.00%	11.34%	71.19%	17.47%	0.00%	38.01%	9.05%	52.94%	0.00%	69.30%	14.29%	16.41%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	16	136	11	0	32	176	13	0	9	4	17	0	72	8	26	0	520
PEAK HR FACTOR :	0.444	0.850	0.688	0.000	0.727	0.846	0.813	0.000	0.450	0.500	0.607	0.000	0.818	0.500	0.722	0.000	0.890
	0.886				0.921				0.682				0.914				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	0.5	0.5	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	3	51	3	0	6	51	0	0	1	0	6	0	24	1	8	0	154
3:45 PM	8	50	2	0	6	44	5	0	3	0	5	0	18	3	11	0	155
4:00 PM	10	55	4	0	8	49	6	0	11	6	10	0	30	5	7	0	201
4:15 PM	12	45	4	0	4	41	6	0	8	1	9	0	25	1	6	0	162
4:30 PM	10	59	4	0	8	30	6	0	4	1	5	0	23	4	16	0	170
4:45 PM	22	49	4	0	6	39	17	0	7	4	12	0	32	1	11	0	204
5:00 PM	14	69	2	0	9	49	4	0	33	5	23	0	25	1	14	0	248
5:15 PM	15	55	3	0	4	41	8	0	7	4	12	0	17	2	6	0	174
5:30 PM	18	56	6	0	6	44	4	0	7	2	14	0	26	1	8	0	192
5:45 PM	13	48	2	0	9	31	4	0	5	2	8	0	20	4	15	0	161
6:00 PM	8	44	4	0	5	26	2	0	1	0	2	0	14	2	9	0	117
6:15 PM	6	64	0	0	2	25	10	0	5	1	2	0	20	3	8	0	146
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	139	645	38	0	73	470	72	0	92	26	108	0	274	28	119	0	2084
APPROACH %'s :	16.91%	78.47%	4.62%	0.00%	11.87%	76.42%	11.71%	0.00%	40.71%	11.50%	47.79%	0.00%	65.08%	6.65%	28.27%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	69	229	15	0	25	173	33	0	54	15	61	0	100	5	39	0	818
PEAK HR FACTOR :	0.784	0.830	0.625	0.000	0.694	0.883	0.485	0.000	0.409	0.750	0.663	0.000	0.781	0.625	0.696	0.000	0.825
	0.921				0.931				0.533				0.818				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Washington Patriots Dr/Sheetz Dwy
City: Charles Town
Control: 4-Way Stop

Project ID: 24-290004-003
Date: 9/10/2024

Data - Cars

NS/EW Streets:	Augustine Ave				Augustine Ave				Washington Patriots Dr/Sheetz Dwy				Washington Patriots Dr/Sheetz Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	0.5	0.5	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	4	5	0	10	40	0	0	0	0	1	0	27	0	5	0	93
6:15 AM	3	8	3	0	6	35	2	0	0	0	0	0	17	1	4	0	79
6:30 AM	5	9	3	0	2	45	4	0	0	0	0	0	19	1	0	0	88
6:45 AM	17	17	1	0	6	49	6	0	0	0	1	0	16	0	1	0	114
7:00 AM	27	15	2	0	6	61	9	0	1	0	0	0	11	6	5	0	143
7:15 AM	61	21	2	0	12	51	41	0	9	2	17	0	22	12	2	0	252
7:30 AM	64	15	0	0	7	36	47	0	50	8	47	0	14	18	4	0	310
7:45 AM	5	25	1	0	6	43	5	0	9	5	17	0	18	1	6	0	141
8:00 AM	2	29	4	0	9	30	3	0	2	1	2	0	19	2	3	0	106
8:15 AM	9	22	4	0	3	50	4	0	1	2	3	0	16	0	6	0	120
8:30 AM	4	36	2	0	11	38	1	0	5	1	4	0	18	4	6	0	130
8:45 AM	1	34	1	0	7	44	2	0	1	0	6	0	14	2	9	0	121
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	199	235	28	0	85	522	124	0	78	19	98	0	211	47	51	0	1697
APPROACH %'s :	43.07%	50.87%	6.06%	0.00%	11.63%	71.41%	16.96%	0.00%	40.00%	9.74%	50.26%	0.00%	68.28%	15.21%	16.50%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	16	121	11	0	30	162	10	0	9	4	15	0	67	8	24	0	477
PEAK HR FACTOR :	0.444	0.840	0.688	0.000	0.682	0.810	0.625	0.000	0.450	0.500	0.625	0.000	0.882	0.500	0.667	0.000	0.917
	0.881				0.886				0.700				0.884				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	0.5	0.5	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	3	49	3	0	6	49	0	0	1	0	6	0	24	1	8	0	150
3:45 PM	8	47	2	0	6	42	5	0	3	0	5	0	18	3	11	0	150
4:00 PM	10	55	4	0	8	47	6	0	11	6	10	0	29	5	7	0	198
4:15 PM	12	43	4	0	4	41	5	0	8	1	9	0	25	1	5	0	158
4:30 PM	10	57	2	0	8	29	6	0	4	1	5	0	22	4	15	0	163
4:45 PM	21	47	4	0	6	38	17	0	7	4	12	0	31	1	11	0	199
5:00 PM	13	69	1	0	9	48	4	0	32	5	23	0	24	1	14	0	243
5:15 PM	15	55	3	0	4	41	8	0	7	4	12	0	17	2	6	0	174
5:30 PM	18	55	6	0	6	41	4	0	7	2	14	0	26	1	8	0	188
5:45 PM	12	48	2	0	9	31	4	0	5	2	8	0	20	4	15	0	160
6:00 PM	8	42	4	0	5	26	2	0	1	0	2	0	14	2	9	0	115
6:15 PM	6	64	0	0	2	24	10	0	5	1	2	0	20	3	8	0	145
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	136	631	35	0	73	457	71	0	91	26	108	0	270	28	117	0	2043
APPROACH %'s :	16.96%	78.68%	4.36%	0.00%	12.15%	76.04%	11.81%	0.00%	40.44%	11.56%	48.00%	0.00%	65.06%	6.75%	28.19%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	67	226	14	0	25	168	33	0	53	15	61	0	98	5	39	0	804
PEAK HR FACTOR :	0.798	0.819	0.583	0.000	0.694	0.875	0.485	0.000	0.414	0.750	0.663	0.000	0.790	0.625	0.696	0.000	0.827
	0.925				0.926				0.538				0.826				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Washington Patriots Dr/Sheetz Dwy
City: Charles Town
Control: 4-Way Stop

Project ID: 24-290004-003
Date: 9/10/2024

Data - HT

NS/EW Streets:	Augustine Ave				Augustine Ave				Washington Patriots Dr/Sheetz Dwy				Washington Patriots Dr/Sheetz Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	0.5	0.5	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	3
6:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3
6:30 AM	0	1	1	0	0	1	0	0	0	0	0	0	3	0	1	0	7
6:45 AM	0	0	0	0	0	2	1	0	1	0	1	0	0	0	0	0	5
7:00 AM	0	1	0	0	0	0	1	0	1	0	1	0	2	0	0	0	6
7:15 AM	9	4	0	0	0	3	4	0	0	0	4	0	1	0	0	0	25
7:30 AM	7	2	2	0	0	2	1	0	4	1	8	0	2	0	0	0	29
7:45 AM	0	3	1	0	0	1	0	0	0	0	2	0	1	0	0	0	8
8:00 AM	0	3	0	0	1	1	0	0	0	0	0	0	3	0	0	0	8
8:15 AM	0	3	0	0	0	2	0	0	0	0	0	0	1	0	1	0	7
8:30 AM	0	4	0	0	0	7	3	0	0	0	1	0	0	0	1	0	16
8:45 AM	0	5	0	0	1	4	0	0	0	0	1	0	1	0	0	0	12
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	16	27	4	0	2	24	10	0	6	1	19	0	17	0	3	0	129
APPROACH %'s :	34.04%	57.45%	8.51%	0.00%	5.56%	66.67%	27.78%	0.00%	23.08%	3.85%	73.08%	0.00%	85.00%	0.00%	15.00%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	15	0	0	2	14	3	0	0	0	2	0	5	0	2	0	43
PEAK HR FACTOR :	0.000	0.750	0.000	0.000	0.500	0.500	0.250	0.000	0.000	0.000	0.500	0.000	0.417	0.000	0.500	0.000	0.672
	0.750				0.475				0.500				0.583				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	1	1	0	0	1	0.5	0.5	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
3:45 PM	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5
4:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	3
4:15 PM	0	2	0	0	0	0	1	0	0	0	0	0	0	0	1	0	4
4:30 PM	0	2	2	0	0	1	0	0	0	0	0	0	1	0	1	0	7
4:45 PM	1	2	0	0	0	1	0	0	0	0	0	0	1	0	0	0	5
5:00 PM	1	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0	5
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
5:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	14	3	0	0	13	1	0	1	0	0	0	4	0	2	0	41
APPROACH %'s :	15.00%	70.00%	15.00%	0.00%	0.00%	92.86%	7.14%	0.00%	100.00%	0.00%	0.00%	0.00%	66.67%	0.00%	33.33%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	2	3	1	0	0	5	0	0	1	0	0	0	2	0	0	0	14
PEAK HR FACTOR :	0.500	0.375	0.250	0.000	0.000	0.417	0.000	0.000	0.250	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.700
	0.500				0.417				0.250				0.500				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Prospect Hill Blvd
City: Charles Town
Control: 1-Way Stop(EB)

Project ID: 24-290004-004
Date: 9/10/2024

Data - Total

NS/EW Streets:	Augustine Ave				Augustine Ave				Prospect Hill Blvd				Prospect Hill Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	5	6	0	0	0	26	0	0	0	0	25	0	0	0	0	0	62
6:15 AM	4	8	0	0	0	14	1	0	3	0	28	0	0	0	0	0	58
6:30 AM	6	5	0	0	0	33	1	0	3	0	21	0	0	0	0	0	69
6:45 AM	6	13	0	0	0	32	1	0	3	0	30	0	0	0	0	0	85
7:00 AM	7	15	0	0	0	43	1	0	7	0	36	0	0	0	0	0	109
7:15 AM	10	27	0	0	0	74	7	0	12	0	48	0	0	0	0	0	178
7:30 AM	14	60	0	0	0	51	3	0	14	0	29	0	0	0	0	0	171
7:45 AM	9	35	0	0	0	23	3	0	12	0	32	0	0	0	0	0	114
8:00 AM	9	28	0	0	0	20	3	0	8	0	24	0	0	0	0	0	92
8:15 AM	12	21	0	0	0	28	7	0	12	0	31	0	0	0	0	0	111
8:30 AM	9	43	0	0	0	34	7	0	21	0	29	0	0	0	0	0	143
8:45 AM	10	38	0	0	0	39	10	0	21	0	17	0	0	0	0	0	135
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	101	299	0	0	0	417	44	0	116	0	350	0	0	0	0	0	1327
APPROACH %'s :	25.25%	74.75%	0.00%	0.00%	0.00%	90.46%	9.54%	0.00%	24.89%	0.00%	75.11%	0.00%					
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	40	130	0	0	0	121	27	0	62	0	101	0	0	0	0	0	481
PEAK HR FACTOR :	0.833	0.756	0.000	0.000	0.000	0.776	0.675	0.000	0.738	0.000	0.815	0.000	0.000	0.000	0.000	0.000	0.841
	0.817				0.755				0.815								

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	27	32	0	0	0	42	14	0	8	0	15	0	0	0	0	0	138
3:45 PM	32	33	0	0	0	37	14	0	12	0	19	0	0	0	0	0	147
4:00 PM	26	47	0	0	0	35	12	0	8	0	27	0	0	0	0	0	155
4:15 PM	24	33	0	0	0	36	10	0	9	0	16	0	0	0	0	0	128
4:30 PM	39	42	0	0	0	23	8	0	9	0	21	0	0	0	0	0	142
4:45 PM	35	32	0	0	0	39	11	0	14	0	23	0	0	0	0	0	154
5:00 PM	42	73	0	0	0	43	10	0	6	0	18	0	0	0	0	0	192
5:15 PM	30	39	0	0	0	34	16	0	4	0	22	0	0	0	0	0	145
5:30 PM	37	34	0	0	0	25	12	0	13	0	26	0	0	0	0	0	147
5:45 PM	39	28	0	0	0	26	5	0	8	0	21	0	0	0	0	0	127
6:00 PM	26	29	0	0	0	17	11	0	9	0	13	0	0	0	0	0	105
6:15 PM	35	41	0	0	0	23	12	0	8	0	15	0	0	0	0	0	134
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	392	463	0	0	0	380	135	0	108	0	236	0	0	0	0	0	1714
APPROACH %'s :	45.85%	54.15%	0.00%	0.00%	0.00%	73.79%	26.21%	0.00%	31.40%	0.00%	68.60%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	144	178	0	0	0	141	49	0	37	0	89	0	0	0	0	0	638
PEAK HR FACTOR :	0.857	0.610	0.000	0.000	0.000	0.820	0.766	0.000	0.661	0.000	0.856	0.000	0.000	0.000	0.000	0.000	0.831
	0.700				0.896				0.808								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Prospect Hill Blvd
City: Charles Town
Control: 1-Way Stop(EB)

Project ID: 24-290004-004
Date: 9/10/2024

Data - Cars

NS/EW Streets:	Augustine Ave				Augustine Ave				Prospect Hill Blvd				Prospect Hill Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	5	5	0	0	0	26	0	0	0	0	25	0	0	0	0	0	61
6:15 AM	4	8	0	0	0	14	1	0	3	0	28	0	0	0	0	0	58
6:30 AM	5	4	0	0	0	31	1	0	3	0	21	0	0	0	0	0	65
6:45 AM	6	12	0	0	0	31	1	0	3	0	29	0	0	0	0	0	82
7:00 AM	7	13	0	0	0	42	1	0	7	0	36	0	0	0	0	0	106
7:15 AM	7	26	0	0	0	66	6	0	11	0	48	0	0	0	0	0	164
7:30 AM	14	54	0	0	0	50	3	0	12	0	28	0	0	0	0	0	161
7:45 AM	7	34	0	0	0	22	3	0	12	0	32	0	0	0	0	0	110
8:00 AM	8	26	0	0	0	20	3	0	8	0	22	0	0	0	0	0	87
8:15 AM	11	18	0	0	0	27	6	0	12	0	30	0	0	0	0	0	104
8:30 AM	8	39	0	0	0	24	7	0	19	0	29	0	0	0	0	0	126
8:45 AM	9	34	0	0	0	34	9	0	20	0	17	0	0	0	0	0	123
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	91	273	0	0	0	387	41	0	110	0	345	0	0	0	0	0	1247
APPROACH %'s :	25.00%	75.00%	0.00%	0.00%	0.00%	90.42%	9.58%	0.00%	24.18%	0.00%	75.82%	0.00%					
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	36	117	0	0	0	105	25	0	59	0	98	0	0	0	0	0	440
PEAK HR FACTOR :	0.818	0.750	0.000	0.000	0.000	0.772	0.694	0.000	0.738	0.000	0.817	0.000	0.000	0.000	0.000	0.000	0.873
	0.814				0.756				0.818								

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	27	30	0	0	0	40	13	0	8	0	15	0	0	0	0	0	133
3:45 PM	32	30	0	0	0	35	13	0	11	0	19	0	0	0	0	0	140
4:00 PM	26	47	0	0	0	35	11	0	7	0	25	0	0	0	0	0	151
4:15 PM	23	31	0	0	0	35	10	0	9	0	15	0	0	0	0	0	123
4:30 PM	39	39	0	0	0	23	8	0	9	0	20	0	0	0	0	0	138
4:45 PM	34	31	0	0	0	39	11	0	14	0	23	0	0	0	0	0	152
5:00 PM	42	72	0	0	0	42	10	0	6	0	18	0	0	0	0	0	190
5:15 PM	30	39	0	0	0	34	16	0	4	0	22	0	0	0	0	0	145
5:30 PM	37	33	0	0	0	22	12	0	12	0	26	0	0	0	0	0	142
5:45 PM	39	28	0	0	0	26	5	0	8	0	21	0	0	0	0	0	127
6:00 PM	25	28	0	0	0	17	11	0	9	0	13	0	0	0	0	0	103
6:15 PM	35	41	0	0	0	22	12	0	8	0	15	0	0	0	0	0	133
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	389	449	0	0	0	370	132	0	105	0	232	0	0	0	0	0	1677
APPROACH %'s :	46.42%	53.58%	0.00%	0.00%	0.00%	73.71%	26.29%	0.00%	31.16%	0.00%	68.84%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	143	175	0	0	0	137	49	0	36	0	89	0	0	0	0	0	629
PEAK HR FACTOR :	0.851	0.608	0.000	0.000	0.000	0.815	0.766	0.000	0.643	0.000	0.856	0.000	0.000	0.000	0.000	0.000	0.828
	0.697				0.894				0.822								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Prospect Hill Blvd
City: Charles Town
Control: 1-Way Stop(EB)

Project ID: 24-290004-004
Date: 9/10/2024

Data - HT

NS/EW Streets:	Augustine Ave				Augustine Ave				Prospect Hill Blvd				Prospect Hill Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
6:45 AM	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	3
7:00 AM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
7:15 AM	3	1	0	0	0	8	1	0	1	0	0	0	0	0	0	0	14
7:30 AM	0	6	0	0	0	1	0	0	2	0	1	0	0	0	0	0	10
7:45 AM	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
8:00 AM	1	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	5
8:15 AM	1	3	0	0	0	1	1	0	0	0	1	0	0	0	0	0	7
8:30 AM	1	4	0	0	0	10	0	0	2	0	0	0	0	0	0	0	17
8:45 AM	1	4	0	0	0	5	1	0	1	0	0	0	0	0	0	0	12
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	10	26	0	0	0	30	3	0	6	0	5	0	0	0	0	0	80
APPROACH %'s :	27.78%	72.22%	0.00%	0.00%	0.00%	90.91%	9.09%	0.00%	54.55%	0.00%	45.45%	0.00%					
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	4	13	0	0	0	16	2	0	3	0	3	0	0	0	0	0	41
PEAK HR FACTOR :	1.000	0.813	0.000	0.000	0.000	0.400	0.500	0.000	0.375	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.603
	0.850				0.450				0.750								

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	2	0	0	0	2	1	0	0	0	0	0	0	0	0	0	5
3:45 PM	0	3	0	0	0	2	1	0	1	0	0	0	0	0	0	0	7
4:00 PM	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	4
4:15 PM	1	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0	5
4:30 PM	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
4:45 PM	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	0	3	0	0	1	0	0	0	0	0	0	0	5
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	14	0	0	0	10	3	0	3	0	4	0	0	0	0	0	37
APPROACH %'s :	17.65%	82.35%	0.00%	0.00%	0.00%	76.92%	23.08%	0.00%	42.86%	0.00%	57.14%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	1	3	0	0	0	4	0	0	1	0	0	0	0	0	0	0	9
PEAK HR FACTOR :	0.250	0.750	0.000	0.000	0.000	0.333	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.450
	0.500				0.333				0.250								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Old Cave Rd/Page-Jackson School Rd/CR 36
City: Charles Town
Control: 2-Way Stop(EB/WB)

Project ID: 24-290004-005
Date: 9/10/2024

Data - Total

NS/EW Streets:	Augustine Ave				Augustine Ave				Old Cave Rd/Page-Jackson School Rd/CR 36					Old Cave Rd/Page-Jackson School Rd/CR 36							
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND					WESTBOUND				SOUTHBOUND2			
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
6:00 AM	0	4	2	0	1	25	0	0	0	0	0	0	0	0	0	1	0	0	0	0	33
6:15 AM	2	8	0	0	0	14	0	0	0	0	0	0	0	0	2	0	0	0	0	0	26
6:30 AM	1	9	1	0	1	26	1	0	1	0	4	0	0	0	3	2	0	0	0	0	49
6:45 AM	1	13	0	0	1	24	1	0	0	0	2	0	0	0	1	1	0	0	0	0	44
7:00 AM	2	15	0	0	3	33	2	0	1	2	1	0	0	1	1	4	0	0	1	0	66
7:15 AM	4	29	1	0	0	81	3	0	1	1	2	0	0	0	0	1	0	0	0	0	123
7:30 AM	1	59	10	0	4	39	5	0	2	3	0	0	0	1	2	5	0	0	2	0	133
7:45 AM	2	39	5	0	1	19	5	0	3	0	1	0	0	2	3	4	0	0	0	0	84
8:00 AM	7	27	2	0	5	16	2	0	2	0	2	0	0	1	7	1	0	0	2	0	74
8:15 AM	3	29	1	0	0	32	4	0	1	0	0	0	1	0	4	3	0	1	3	0	82
8:30 AM	12	49	1	0	4	27	23	0	1	0	8	0	0	0	4	4	0	1	3	0	137
8:45 AM	18	39	2	0	3	21	13	0	18	9	25	0	1	0	9	4	0	0	2	0	164
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	53	320	25	0	23	357	59	0	30	15	45	0	2	5	36	30	0	2	13	0	1015
APPROACH %'s :	13.32%	80.40%	6.28%	0.00%	5.24%	81.32%	13.44%	0.00%	32.61%	16.30%	48.91%	0.00%	2.17%	7.04%	50.70%	42.25%	0.00%	13.33%	86.67%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																				TOTAL
PEAK HR VOL :	40	144	6	0	12	96	42	0	22	9	35	0	2	1	24	12	0	2	10	0	457
PEAK HR FACTOR :	0.556	0.735	0.750	0.000	0.600	0.750	0.457	0.000	0.306	0.250	0.350	0.000	0.500	0.250	0.667	0.750	0.000	0.500	0.833	0.000	0.697
	0.766				0.694				0.321					0.712							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND					WESTBOUND				SOUTHBOUND2			
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
3:30 PM	3	35	2	0	4	39	11	0	20	9	19	0	0	0	2	2	0	0	1	0	147
3:45 PM	2	40	2	0	3	42	0	0	5	1	9	0	0	3	2	2	0	0	0	0	111
4:00 PM	2	46	0	0	4	34	2	0	7	3	8	0	0	0	0	2	0	0	0	0	108
4:15 PM	1	35	0	0	3	39	0	0	1	2	5	0	0	0	0	2	0	0	0	0	88
4:30 PM	1	40	3	0	0	22	0	0	0	0	3	0	0	2	3	3	0	0	0	1	78
4:45 PM	1	45	1	0	5	52	2	0	5	2	4	0	0	0	1	3	0	0	0	0	121
5:00 PM	1	74	0	0	3	45	3	0	3	3	0	0	0	2	0	4	0	0	0	0	138
5:15 PM	1	35	1	0	3	42	1	0	2	0	1	0	0	0	0	1	1	0	0	0	88
5:30 PM	1	39	2	0	4	34	1	0	1	0	2	0	0	0	1	3	0	0	0	0	88
5:45 PM	1	30	0	0	3	25	0	0	0	0	3	0	0	0	0	3	0	0	0	0	65
6:00 PM	0	33	2	0	0	29	0	0	2	0	0	0	0	0	0	5	0	0	0	0	71
6:15 PM	0	42	1	0	1	33	0	0	0	0	1	0	0	1	0	6	0	0	0	0	85
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	14	494	14	0	33	436	20	0	46	20	55	0	0	8	9	36	1	0	1	1	1188
APPROACH %'s :	2.68%	94.64%	2.68%	0.00%	6.75%	89.16%	4.09%	0.00%	38.02%	16.53%	45.45%	0.00%	0.00%	14.81%	16.67%	66.67%	1.85%	0.00%	50.00%	50.00%	
PEAK HR :	04:45 PM - 05:45 PM																				TOTAL
PEAK HR VOL :	4	193	4	0	15	173	7	0	11	5	7	0	0	2	2	11	1	0	0	0	435
PEAK HR FACTOR :	1.000	0.652	0.500	0.000	0.750	0.832	0.583	0.000	0.550	0.417	0.438	0.000	0.000	0.250	0.500	0.688	0.250	0.000	0.000	0.000	0.788
	0.670				0.826				0.523					0.667							

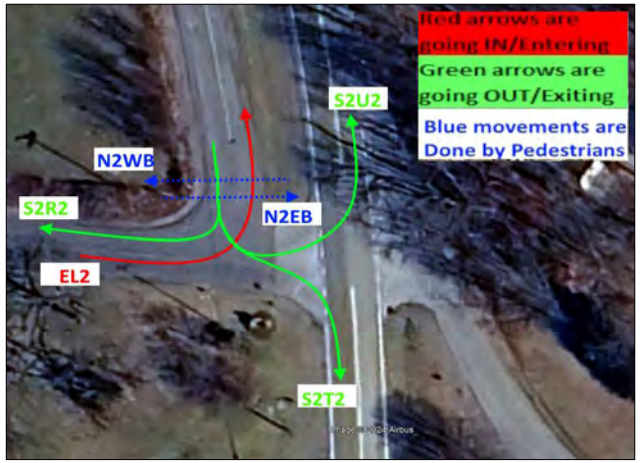
Explanation for extra leg movements

Movements exiting the extra leg

S2U2	Movements exiting from Extra Leg (Page-Jackson School Rd N2) entering into Augustine Ave heading SB.
S2T2	Movements exiting from Extra Leg (Page-Jackson School Rd N2) entering into Augustine Ave heading NB.
S2R2	Movements exiting from Extra Leg (Page-Jackson School Rd N2) entering into Page-Jackson School Rd heading EB.

Movements entering the extra leg

EL2	Movements coming from EB on Page-Jackson School Rdentering into the Extra Leg (Page-Jackson School Rd N2)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Old Cave Rd/Page-Jackson School Rd/CR 36
City: Charles Town
Control: 2-Way Stop(EB/WB)

Project ID: 24-290004-005
Date: 9/10/2024

Data - Cars

NS/EW Streets:	Augustine Ave				Augustine Ave				Old Cave Rd/Page-Jackson School Rd/CR 36					Old Cave Rd/Page-Jackson School Rd/CR 36							
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND					WESTBOUND				SOUTHBOUND2			
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
6:00 AM	0	3	2	0	1	25	0	0	0	0	0	0	0	0	0	1	0	0	0	0	32
6:15 AM	2	8	0	0	0	14	0	0	0	0	0	0	0	0	2	0	0	0	0	0	26
6:30 AM	1	8	1	0	1	25	1	0	1	0	3	0	0	0	2	2	0	0	0	0	45
6:45 AM	1	12	0	0	1	24	1	0	0	0	2	0	0	0	1	1	0	0	0	0	43
7:00 AM	1	14	0	0	3	32	2	0	1	2	1	0	0	1	1	4	0	0	1	0	63
7:15 AM	3	28	1	0	0	74	3	0	1	1	0	0	0	0	0	1	0	0	0	0	112
7:30 AM	0	52	10	0	4	38	5	0	2	2	0	0	0	1	2	5	0	0	2	0	123
7:45 AM	2	38	5	0	1	18	5	0	3	0	1	0	0	2	3	4	0	0	0	0	82
8:00 AM	7	25	1	0	5	16	2	0	2	0	2	0	0	1	7	1	0	0	2	0	71
8:15 AM	2	27	1	0	0	30	4	0	0	0	0	0	1	0	4	2	0	1	3	0	75
8:30 AM	9	47	1	0	3	25	16	0	0	0	1	0	0	0	4	4	0	0	2	0	112
8:45 AM	17	37	2	0	3	19	13	0	18	9	22	0	1	0	9	4	0	0	2	0	156
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	45	299	24	0	22	340	52	0	28	14	32	0	2	5	35	29	0	1	12	0	940
APPROACH %'s :	12.23%	81.25%	6.52%	0.00%	5.31%	82.13%	12.56%	0.00%	36.84%	18.42%	42.11%	0.00%	2.63%	7.25%	50.72%	42.03%	0.00%	7.69%	92.31%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																				TOTAL
PEAK HR VOL :	35	136	5	0	11	90	35	0	20	9	25	0	2	1	24	11	0	1	9	0	414
PEAK HR FACTOR :	0.515	0.723	0.625	0.000	0.550	0.750	0.547	0.000	0.278	0.250	0.284	0.000	0.500	0.250	0.667	0.688	0.000	0.250	0.750	0.000	0.663
	0.772				0.773				0.280					0.692							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND					WESTBOUND				SOUTHBOUND2			
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
3:30 PM	2	34	2	0	4	38	4	0	16	8	16	0	0	0	2	2	0	0	0	0	128
3:45 PM	0	39	2	0	3	42	0	0	4	1	7	0	0	3	2	2	0	0	0	0	105
4:00 PM	2	45	0	0	4	34	2	0	7	3	7	0	0	0	0	2	0	0	0	0	106
4:15 PM	1	33	0	0	2	38	0	0	1	2	5	0	0	0	0	2	0	0	0	0	84
4:30 PM	1	39	3	0	0	22	0	0	0	0	3	0	0	2	3	3	0	0	0	1	77
4:45 PM	1	44	1	0	5	52	2	0	5	2	4	0	0	0	1	3	0	0	0	0	120
5:00 PM	1	74	0	0	3	44	3	0	3	3	0	0	0	1	0	4	0	0	0	0	136
5:15 PM	1	35	1	0	3	42	1	0	2	0	1	0	0	0	0	0	1	0	0	0	87
5:30 PM	1	38	2	0	4	31	1	0	1	0	2	0	0	0	1	3	0	0	0	0	84
5:45 PM	1	30	0	0	3	25	0	0	0	0	3	0	0	0	0	3	0	0	0	0	65
6:00 PM	0	32	2	0	0	28	0	0	2	0	0	0	0	0	0	5	0	0	0	0	69
6:15 PM	0	42	1	0	1	32	0	0	0	0	1	0	0	1	0	6	0	0	0	0	84
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	11	485	14	0	32	428	13	0	41	19	49	0	0	7	9	35	1	0	0	1	1145
APPROACH %'s :	2.16%	95.10%	2.75%	0.00%	6.77%	90.49%	2.75%	0.00%	37.61%	17.43%	44.95%	0.00%	0.00%	13.46%	17.31%	67.31%	1.92%	0.00%	0.00%	100.00%	
PEAK HR :	04:45 PM - 05:45 PM																				TOTAL
PEAK HR VOL :	4	191	4	0	15	169	7	0	11	5	7	0	0	1	2	10	1	0	0	0	427
PEAK HR FACTOR :	1.000	0.645	0.500	0.000	0.750	0.813	0.583	0.000	0.550	0.417	0.438	0.000	0.000	0.250	0.500	0.625	0.250	0.000	0.000	0.000	0.785
	0.663				0.809				0.523					0.700							

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Old Cave Rd/Page-Jackson School Rd/CR 36
City: Charles Town
Control: 2-Way Stop(EB/WB)

Project ID: 24-290004-005
Date: 9/10/2024

Data - HT

NS/EW Streets:	Augustine Ave				Augustine Ave				Old Cave Rd/Page-Jackson School Rd/CR 36					Old Cave Rd/Page-Jackson School Rd/CR 36							
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND					WESTBOUND				SOUTHBOUND2			
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
6:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	4
6:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 AM	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
7:15 AM	1	1	0	0	0	7	0	0	0	0	2	0	0	0	0	0	0	0	0	0	11
7:30 AM	1	7	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	10
7:45 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:15 AM	1	2	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0	0	0	7
8:30 AM	3	2	0	0	1	2	7	0	1	0	7	0	0	0	0	0	0	1	1	0	25
8:45 AM	1	2	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	8
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	8	21	1	0	1	17	7	0	2	1	13	0	0	0	1	1	0	1	1	0	75
APPROACH %'s :	26.67%	70.00%	3.33%	0.00%	4.00%	68.00%	28.00%	0.00%	12.50%	6.25%	81.25%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	50.00%	50.00%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																				TOTAL
PEAK HR VOL :	5	8	1	0	1	6	7	0	2	0	10	0	0	0	0	1	0	1	1	0	43
PEAK HR FACTOR :	0.417	1.000	0.250	0.000	0.250	0.750	0.250	0.000	0.500	0.000	0.357	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.250	0.000	0.430
	0.700				0.350				0.375					0.250							

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND					WESTBOUND				SOUTHBOUND2			
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
3:30 PM	1	1	0	0	0	1	7	0	4	1	3	0	0	0	0	0	0	0	1	0	19
3:45 PM	2	1	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	6
4:00 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
4:15 PM	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
5:30 PM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	EL2	WL	WT	WR	WU	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	3	9	0	0	1	8	7	0	5	1	6	0	0	1	0	1	0	0	1	0	43
APPROACH %'s :	25.00%	75.00%	0.00%	0.00%	6.25%	50.00%	43.75%	0.00%	41.67%	8.33%	50.00%	0.00%	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																				TOTAL
PEAK HR VOL :	0	2	0	0	0	4	0	0	0	0	0	0	0	1	0	1	0	0	0	0	8
PEAK HR FACTOR :	0.000	0.500	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.500
	0.500				0.333									0.500							

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Craighill Dr
City: Charles Town
Control: 1-Way Stop(WB)

Project ID: 24-290004-006
Date: 9/10/2024

Data - Total

NS/EW Streets:	Augustine Ave				Augustine Ave				Craighill Dr				Craighill Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	6	0	0	0	16	0	0	0	0	0	0	1	0	0	0	23
6:15 AM	0	8	0	0	0	14	0	0	0	0	0	0	0	0	0	0	22
6:30 AM	0	10	0	0	0	26	0	0	0	0	0	0	1	0	3	0	40
6:45 AM	0	15	0	0	0	26	0	0	0	0	0	0	1	0	1	0	43
7:00 AM	1	16	2	0	0	42	0	0	0	0	0	0	1	0	0	0	62
7:15 AM	0	31	0	0	2	85	0	0	0	0	0	0	2	0	1	0	121
7:30 AM	0	58	2	0	0	45	0	0	0	0	0	0	1	0	1	0	107
7:45 AM	0	54	0	0	1	23	0	0	0	0	0	0	1	0	1	0	80
8:00 AM	0	25	0	0	0	23	0	0	0	0	0	0	1	0	0	0	49
8:15 AM	0	37	2	0	0	38	0	0	0	0	0	0	2	0	1	0	80
8:30 AM	0	48	2	0	2	61	0	0	0	0	0	0	0	0	1	0	114
8:45 AM	0	63	1	0	1	33	0	0	0	0	0	0	0	0	0	0	98
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	371	9	0	6	432	0	0	0	0	0	0	11	0	9	0	839
APPROACH %'s :	0.26%	97.38%	2.36%	0.00%	1.37%	98.63%	0.00%	0.00%					55.00%	0.00%	45.00%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	159	4	0	3	195	0	0	0	0	0	0	5	0	3	0	370
PEAK HR FACTOR :	0.250	0.685	0.500	0.000	0.375	0.574	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.750	0.000	0.764
		0.683				0.569								0.667			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	58	0	0	3	55	0	0	0	0	0	0	1	0	2	0	119
3:45 PM	0	49	1	0	0	47	0	0	0	0	0	0	0	0	1	0	98
4:00 PM	0	57	3	0	2	37	0	0	0	0	0	0	0	0	2	0	101
4:15 PM	0	37	0	0	3	40	0	0	0	0	0	0	1	0	1	0	82
4:30 PM	0	42	0	0	2	27	0	0	0	0	0	0	0	0	2	0	73
4:45 PM	0	50	0	0	2	56	0	0	0	0	0	0	0	0	3	0	111
5:00 PM	0	78	3	0	2	49	0	0	0	0	0	0	0	0	1	0	133
5:15 PM	0	43	2	0	0	40	0	0	0	0	0	0	1	0	1	0	87
5:30 PM	0	35	0	0	3	25	0	0	0	0	0	0	1	0	2	0	66
5:45 PM	0	33	0	0	3	26	0	0	0	0	0	0	1	0	2	0	65
6:00 PM	0	41	0	0	3	30	0	0	0	0	0	0	0	0	2	0	76
6:15 PM	0	43	3	0	2	31	0	0	0	0	0	0	2	0	0	0	81
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	566	12	0	25	463	0	0	0	0	0	0	7	0	19	0	1092
APPROACH %'s :	0.00%	97.92%	2.08%	0.00%	5.12%	94.88%	0.00%	0.00%					26.92%	0.00%	73.08%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	213	5	0	6	172	0	0	0	0	0	0	1	0	7	0	404
PEAK HR FACTOR :	0.000	0.683	0.417	0.000	0.750	0.768	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.583	0.000	0.759
		0.673				0.767								0.667			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Craighill Dr
City: Charles Town
Control: 1-Way Stop(WB)

Project ID: 24-290004-006
Date: 9/10/2024

Data - Cars

NS/EW Streets:	Augustine Ave				Augustine Ave				Craighill Dr				Craighill Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	5	0	0	0	16	0	0	0	0	0	0	1	0	0	0	22
6:15 AM	0	8	0	0	0	14	0	0	0	0	0	0	0	0	0	0	22
6:30 AM	0	9	0	0	0	25	0	0	0	0	0	0	1	0	3	0	38
6:45 AM	0	14	0	0	0	26	0	0	0	0	0	0	1	0	1	0	42
7:00 AM	1	15	2	0	0	41	0	0	0	0	0	0	1	0	0	0	60
7:15 AM	0	30	0	0	1	77	0	0	0	0	0	0	2	0	1	0	111
7:30 AM	0	53	2	0	0	45	0	0	0	0	0	0	1	0	1	0	102
7:45 AM	0	52	0	0	1	22	0	0	0	0	0	0	1	0	1	0	77
8:00 AM	0	24	0	0	0	23	0	0	0	0	0	0	1	0	0	0	48
8:15 AM	0	33	1	0	0	37	0	0	0	0	0	0	2	0	1	0	74
8:30 AM	0	46	1	0	2	49	0	0	0	0	0	0	0	0	1	0	99
8:45 AM	0	61	1	0	0	31	0	0	0	0	0	0	0	0	0	0	93
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	350	7	0	4	406	0	0	0	0	0	0	11	0	9	0	788
APPROACH %'s :	0.28%	97.77%	1.96%	0.00%	0.98%	99.02%	0.00%	0.00%					55.00%	0.00%	45.00%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	150	4	0	2	185	0	0	0	0	0	0	5	0	3	0	350
PEAK HR FACTOR :	0.250	0.708	0.500	0.000	0.500	0.601	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.750	0.000	0.788
		0.705				0.599								0.667			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	54	0	0	3	46	0	0	0	0	0	0	1	0	2	0	106
3:45 PM	0	46	1	0	0	47	0	0	0	0	0	0	0	0	1	0	95
4:00 PM	0	56	3	0	2	37	0	0	0	0	0	0	0	0	1	0	99
4:15 PM	0	35	0	0	3	38	0	0	0	0	0	0	1	0	1	0	78
4:30 PM	0	41	0	0	2	27	0	0	0	0	0	0	0	0	2	0	72
4:45 PM	0	49	0	0	2	56	0	0	0	0	0	0	0	0	3	0	110
5:00 PM	0	77	3	0	2	48	0	0	0	0	0	0	0	0	1	0	131
5:15 PM	0	42	2	0	0	37	0	0	0	0	0	0	1	0	1	0	83
5:30 PM	0	35	0	0	3	25	0	0	0	0	0	0	1	0	2	0	66
5:45 PM	0	33	0	0	3	26	0	0	0	0	0	0	1	0	2	0	65
6:00 PM	0	40	0	0	3	30	0	0	0	0	0	0	0	0	2	0	75
6:15 PM	0	41	3	0	2	29	0	0	0	0	0	0	2	0	0	0	77
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	549	12	0	25	446	0	0	0	0	0	0	7	0	18	0	1057
APPROACH %'s :	0.00%	97.86%	2.14%	0.00%	5.31%	94.69%	0.00%	0.00%					28.00%	0.00%	72.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	209	5	0	6	168	0	0	0	0	0	0	1	0	7	0	396
PEAK HR FACTOR :	0.000	0.679	0.417	0.000	0.750	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.583	0.000	0.756
		0.669				0.750								0.667			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Augustine Ave & Craighill Dr
City: Charles Town
Control: 1-Way Stop(WB)

Project ID: 24-290004-006
Date: 9/10/2024

Data - HT

NS/EW Streets:	Augustine Ave				Augustine Ave				Craighill Dr				Craighill Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	1	0	0	1	8	0	0	0	0	0	0	0	0	0	0	10
7:30 AM	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
7:45 AM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	6
8:30 AM	0	2	1	0	0	12	0	0	0	0	0	0	0	0	0	0	15
8:45 AM	0	2	0	0	1	2	0	0	0	0	0	0	0	0	0	0	5
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	21	2	0	2	26	0	0	0	0	0	0	0	0	0	0	51
APPROACH %'s :	0.00%	91.30%	8.70%	0.00%	7.14%	92.86%	0.00%	0.00%									
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	0	9	0	0	1	10	0	0	0	0	0	0	0	0	0	0	20
PEAK HR FACTOR :	0.000	0.450	0.000	0.000	0.250	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500
		0.450				0.306											

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:30 PM	0	4	0	0	0	9	0	0	0	0	0	0	0	0	0	0	13
3:45 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
4:15 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	17	0	0	0	17	0	0	0	0	0	0	0	0	1	0	35
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%					0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8
PEAK HR FACTOR :	0.000	1.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500
		1.000				0.333											

National Data & Surveying Services

Intersection Turning Movement Count

Location: Old Cave Rd & Berryville Pike
City: Charles Town
Control: 2-Way Stop(NB/SB)

Project ID: 23-290003-006
Date: 11/2/2023

Data - Total

NS/EW Streets:	Old Cave Rd				Old Cave Rd				Berryville Pike				Berryville Pike				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	6	1	5	0	0	0	0	0	0	46	3	0	0	140	1	0	202
6:15 AM	1	1	3	0	0	0	0	0	0	51	0	0	3	163	3	0	225
6:30 AM	2	0	7	0	2	0	0	0	0	60	0	0	1	154	4	0	230
6:45 AM	3	0	5	0	1	0	0	0	0	72	1	0	1	156	0	0	239
7:00 AM	5	4	1	0	3	0	0	0	0	88	1	0	2	215	4	1	324
7:15 AM	9	3	12	0	5	0	1	0	0	112	1	0	0	266	6	0	415
7:30 AM	9	4	9	0	1	0	2	0	0	198	3	0	2	278	2	0	508
7:45 AM	6	1	11	0	3	4	1	0	0	138	5	0	9	192	9	0	379
8:00 AM	2	0	6	0	2	0	0	0	1	99	2	0	10	155	5	0	282
8:15 AM	5	1	7	0	1	0	0	0	2	107	0	0	7	148	5	1	284
8:30 AM	3	1	10	0	1	0	0	0	0	115	3	0	4	121	7	0	265
8:45 AM	5	4	5	1	8	2	0	0	0	129	1	0	8	106	11	0	280
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	56	20	81	1	27	6	4	0	3	1215	20	0	47	2094	57	2	3633
APPROACH %'s :	35.44%	12.66%	51.27%	0.63%	72.97%	16.22%	10.81%	0.00%	0.24%	98.14%	1.62%	0.00%	2.14%	95.18%	2.59%	0.09%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	29	12	33	0	12	4	4	0	0	536	10	0	13	951	21	1	1626
PEAK HR FACTOR :	0.806	0.750	0.688	0.000	0.600	0.250	0.500	0.000	0.000	0.677	0.500	0.000	0.361	0.855	0.583	0.250	0.800
	0.771				0.625				0.679				0.874				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	0	2	1	0	0	4	0	0	0	188	4	0	11	137	8	0	355
3:15 PM	3	0	8	0	1	4	2	0	1	178	4	0	8	148	6	1	364
3:30 PM	1	1	11	0	6	0	0	0	0	176	8	0	9	177	4	0	393
3:45 PM	4	4	16	0	3	0	1	0	1	194	7	0	9	141	1	1	382
4:00 PM	2	0	3	0	6	1	2	0	1	225	5	0	14	153	3	0	415
4:15 PM	2	2	14	0	6	1	1	0	0	239	9	0	12	151	2	0	439
4:30 PM	0	0	8	0	2	0	0	0	0	226	4	0	11	185	3	0	439
4:45 PM	6	5	9	0	3	2	0	0	0	87	2	0	17	182	3	0	316
5:00 PM	3	0	8	0	3	2	0	0	5	322	6	0	12	152	3	0	516
5:15 PM	3	0	5	0	3	3	0	0	0	261	6	0	18	139	1	0	439
5:30 PM	0	1	8	0	8	0	0	0	1	198	4	0	11	138	0	2	371
5:45 PM	1	1	15	0	2	1	0	0	0	198	4	0	13	132	1	0	368
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	25	16	106	0	43	18	6	0	9	2492	63	0	145	1835	35	4	4797
APPROACH %'s :	17.01%	10.88%	72.11%	0.00%	64.18%	26.87%	8.96%	0.00%	0.35%	97.19%	2.46%	0.00%	7.18%	90.89%	1.73%	0.20%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	12	5	30	0	11	7	0	0	5	896	18	0	58	658	10	0	1710
PEAK HR FACTOR :	0.500	0.250	0.833	0.000	0.917	0.583	0.000	0.000	0.250	0.696	0.750	0.000	0.806	0.889	0.833	0.000	0.828
	0.588				0.750				0.690				0.899				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Old Cave Rd & Berryville Pike
City: Charles Town
Control: 2-Way Stop(NB/SB)

Project ID: 23-290003-006
Date: 11/2/2023

Data - Cars

NS/EW Streets:	Old Cave Rd				Old Cave Rd				Berryville Pike				Berryville Pike				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	6	1	5	0	0	0	0	0	0	45	3	0	0	137	1	0	198
6:15 AM	1	1	3	0	0	0	0	0	0	46	0	0	2	159	3	0	215
6:30 AM	2	0	7	0	2	0	0	0	0	56	0	0	1	145	4	0	217
6:45 AM	3	0	5	0	1	0	0	0	0	67	1	0	1	144	0	0	222
7:00 AM	4	4	1	0	3	0	0	0	0	80	1	0	2	204	4	1	304
7:15 AM	9	3	10	0	5	0	1	0	0	109	1	0	0	251	6	0	395
7:30 AM	9	4	9	0	1	0	2	0	0	166	3	0	1	260	2	0	457
7:45 AM	6	1	11	0	2	4	1	0	0	115	5	0	8	183	9	0	345
8:00 AM	2	0	6	0	2	0	0	0	0	80	2	0	7	137	4	0	240
8:15 AM	4	1	6	0	1	0	0	0	1	89	0	0	7	131	5	1	246
8:30 AM	3	1	10	0	1	0	0	0	0	101	3	0	4	105	7	0	235
8:45 AM	5	4	4	1	8	2	0	0	0	109	1	0	8	95	11	0	248
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	54	20	77	1	26	6	4	0	1	1063	20	0	41	1951	56	2	3322
APPROACH %'s :	35.53%	13.16%	50.66%	0.66%	72.22%	16.67%	11.11%	0.00%	0.09%	98.06%	1.85%	0.00%	2.00%	95.17%	2.73%	0.10%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	28	12	31	0	11	4	4	0	0	470	10	0	11	898	21	1	1501
PEAK HR FACTOR :	0.778	0.750	0.705	0.000	0.550	0.250	0.500	0.000	0.000	0.708	0.500	0.000	0.344	0.863	0.583	0.250	0.821
	0.807				0.679				0.710				0.885				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	0	2	1	0	0	4	0	0	0	175	4	0	10	125	8	0	329
3:15 PM	3	0	7	0	1	4	2	0	1	174	4	0	8	134	6	1	345
3:30 PM	1	1	10	0	6	0	0	0	0	169	8	0	9	162	4	0	370
3:45 PM	4	3	15	0	3	0	0	0	1	185	5	0	9	131	0	1	357
4:00 PM	2	0	2	0	6	1	2	0	1	210	5	0	14	144	3	0	390
4:15 PM	2	2	14	0	6	1	1	0	0	227	9	0	12	142	2	0	418
4:30 PM	0	0	8	0	2	0	0	0	0	216	4	0	11	172	3	0	416
4:45 PM	5	5	9	0	3	2	0	0	0	86	2	0	16	176	3	0	307
5:00 PM	3	0	8	0	3	2	0	0	4	309	5	0	12	143	3	0	492
5:15 PM	3	0	5	0	3	3	0	0	0	254	6	0	18	135	1	0	428
5:30 PM	0	1	7	0	8	0	0	0	1	196	4	0	11	136	0	2	366
5:45 PM	1	1	13	0	2	1	0	0	0	191	4	0	13	131	1	0	358
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	24	15	99	0	43	18	5	0	8	2392	60	0	143	1731	34	4	4576
APPROACH %'s :	17.39%	10.87%	71.74%	0.00%	65.15%	27.27%	7.58%	0.00%	0.33%	97.24%	2.44%	0.00%	7.48%	90.53%	1.78%	0.21%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	11	5	30	0	11	7	0	0	4	865	17	0	57	626	10	0	1643
PEAK HR FACTOR :	0.550	0.250	0.833	0.000	0.917	0.583	0.000	0.000	0.250	0.700	0.708	0.000	0.792	0.889	0.833	0.000	0.835
	0.605				0.750				0.697				0.888				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Old Cave Rd & Berryville Pike
City: Charles Town
Control: 2-Way Stop(NB/SB)

Project ID: 23-290003-006
Date: 11/2/2023

Data - HT

NS/EW Streets:	Old Cave Rd				Old Cave Rd				Berryville Pike				Berryville Pike				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	4
6:15 AM	0	0	0	0	0	0	0	0	0	5	0	0	1	4	0	0	10
6:30 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	9	0	0	13
6:45 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	12	0	0	17
7:00 AM	1	0	0	0	0	0	0	0	0	8	0	0	0	11	0	0	20
7:15 AM	0	0	2	0	0	0	0	0	0	3	0	0	0	15	0	0	20
7:30 AM	0	0	0	0	0	0	0	0	0	32	0	0	1	18	0	0	51
7:45 AM	0	0	0	0	1	0	0	0	0	23	0	0	1	9	0	0	34
8:00 AM	0	0	0	0	0	0	0	0	1	19	0	0	3	18	1	0	42
8:15 AM	1	0	1	0	0	0	0	0	1	18	0	0	0	17	0	0	38
8:30 AM	0	0	0	0	0	0	0	0	0	14	0	0	0	16	0	0	30
8:45 AM	0	0	1	0	0	0	0	0	0	20	0	0	0	11	0	0	32
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	4	0	1	0	0	0	2	152	0	0	6	143	1	0	311
APPROACH %'s :	33.33%	0.00%	66.67%	0.00%	100.00%	0.00%	0.00%	0.00%	1.30%	98.70%	0.00%	0.00%	4.00%	95.33%	0.67%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	0	2	0	1	0	0	0	0	66	0	0	2	53	0	0	125
PEAK HR FACTOR :	0.250	0.000	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.516	0.000	0.000	0.500	0.736	0.000	0.000	0.613
	0.375				0.250				0.516				0.724				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	2	0	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	0	0	0	0	0	0	0	0	0	13	0	0	1	12	0	0	26
3:15 PM	0	0	1	0	0	0	0	0	0	4	0	0	0	14	0	0	19
3:30 PM	0	0	1	0	0	0	0	0	0	7	0	0	0	15	0	0	23
3:45 PM	0	1	1	0	0	0	1	0	0	9	2	0	0	10	1	0	25
4:00 PM	0	0	1	0	0	0	0	0	0	15	0	0	0	9	0	0	25
4:15 PM	0	0	0	0	0	0	0	0	0	12	0	0	0	9	0	0	21
4:30 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	13	0	0	23
4:45 PM	1	0	0	0	0	0	0	0	0	1	0	0	1	6	0	0	9
5:00 PM	0	0	0	0	0	0	0	0	1	13	1	0	0	9	0	0	24
5:15 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	4	0	0	11
5:30 PM	0	0	1	0	0	0	0	0	0	2	0	0	0	2	0	0	5
5:45 PM	0	0	2	0	0	0	0	0	0	7	0	0	0	1	0	0	10
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	1	7	0	0	0	1	0	1	100	3	0	2	104	1	0	221
APPROACH %'s :	11.11%	11.11%	77.78%	0.00%	0.00%	0.00%	100.00%	0.00%	0.96%	96.15%	2.88%	0.00%	1.87%	97.20%	0.93%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	1	0	0	0	0	0	0	0	1	31	1	0	1	32	0	0	67
PEAK HR FACTOR :	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.596	0.250	0.000	0.250	0.615	0.000	0.000	0.698
	0.250				0.000				0.550				0.635				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Candlewood Dr & Berryville Pike
City: Charles Town
Control: 1-Way Stop(NB)

Project ID: 23-290003-007
Date: 11/2/2023

Data - Total

NS/EW Streets:	Candlewood Dr				Candlewood Dr				Berryville Pike				Berryville Pike				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	0	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	6	0	7	0	0	0	0	0	0	49	0	0	0	140	0	0	202
6:15 AM	7	0	11	0	0	0	0	0	0	51	1	0	1	157	0	1	229
6:30 AM	5	0	7	0	0	0	0	0	0	72	0	0	3	153	0	1	241
6:45 AM	6	0	4	0	0	0	0	0	0	73	0	0	6	159	0	0	248
7:00 AM	6	0	8	0	0	0	0	0	0	94	0	0	3	210	0	0	321
7:15 AM	13	0	8	0	0	0	0	0	0	123	1	0	2	266	0	0	413
7:30 AM	4	0	7	0	0	0	0	0	0	209	4	0	8	271	0	0	503
7:45 AM	6	0	9	0	0	0	0	0	0	147	4	0	7	204	0	0	377
8:00 AM	7	0	13	0	0	0	0	0	0	107	5	0	6	170	0	0	308
8:15 AM	4	0	8	0	0	0	0	0	0	112	5	0	1	152	0	0	282
8:30 AM	2	0	10	0	0	0	0	0	0	124	2	0	6	129	0	0	273
8:45 AM	10	0	11	0	0	0	0	0	0	129	4	0	5	112	0	0	271
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	76	0	103	0	0	0	0	0	0	1290	26	0	48	2123	0	2	3668
APPROACH %'s :	42.46%	0.00%	57.54%	0.00%					0.00%	98.02%	1.98%	0.00%	2.21%	97.70%	0.00%	0.09%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	29	0	32	0	0	0	0	0	0	573	9	0	20	951	0	0	1614
PEAK HR FACTOR :	0.558	0.000	0.889	0.000	0.000	0.000	0.000	0.000	0.000	0.685	0.563	0.000	0.625	0.877	0.000	0.000	0.802
	0.726				0.000				0.683				0.870				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	0	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	6	0	10	0	0	0	0	0	0	191	4	0	14	147	0	1	373
3:15 PM	8	0	11	0	0	0	0	0	0	181	4	0	10	165	0	1	380
3:30 PM	5	0	6	0	0	0	0	0	0	187	7	0	8	175	0	0	388
3:45 PM	0	0	9	0	0	0	0	0	0	200	7	0	9	158	0	1	384
4:00 PM	3	0	5	0	0	0	0	0	0	231	8	0	5	169	0	1	422
4:15 PM	5	0	10	1	0	0	0	0	0	245	7	0	10	156	0	0	434
4:30 PM	3	0	4	0	0	0	0	0	0	222	10	0	14	197	0	1	451
4:45 PM	4	0	8	0	0	0	0	0	0	103	4	0	16	198	0	0	333
5:00 PM	4	0	9	0	0	0	0	0	0	313	13	0	8	158	0	1	506
5:15 PM	6	0	5	0	0	0	0	0	0	267	10	0	17	157	0	0	462
5:30 PM	2	0	7	0	0	0	0	0	0	206	8	0	10	150	0	2	385
5:45 PM	2	0	7	0	0	0	0	0	0	203	13	0	16	138	0	1	380
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	48	0	91	1	0	0	0	0	0	2549	95	0	137	1968	0	9	4898
APPROACH %'s :	34.29%	0.00%	65.00%	0.71%					0.00%	96.41%	3.59%	0.00%	6.48%	93.09%	0.00%	0.43%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	17	0	26	0	0	0	0	0	0	905	37	0	55	710	0	2	1752
PEAK HR FACTOR :	0.708	0.000	0.722	0.000	0.000	0.000	0.000	0.000	0.000	0.723	0.712	0.000	0.809	0.896	0.000	0.500	0.866
	0.827				0.000				0.722				0.896				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Candlewood Dr & Berryville Pike
City: Charles Town
Control: 1-Way Stop(NB)

Project ID: 23-290003-007
Date: 11/2/2023

Data - Cars

NS/EW Streets:	Candlewood Dr				Candlewood Dr				Berryville Pike				Berryville Pike				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	0	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	6	0	7	0	0	0	0	0	0	48	0	0	0	138	0	0	199
6:15 AM	7	0	11	0	0	0	0	0	0	47	1	0	1	151	0	1	219
6:30 AM	5	0	7	0	0	0	0	0	0	67	0	0	3	145	0	1	228
6:45 AM	6	0	4	0	0	0	0	0	0	68	0	0	6	146	0	0	230
7:00 AM	6	0	7	0	0	0	0	0	0	87	0	0	1	200	0	0	301
7:15 AM	13	0	8	0	0	0	0	0	0	117	1	0	2	250	0	0	391
7:30 AM	4	0	7	0	0	0	0	0	0	181	3	0	6	253	0	0	454
7:45 AM	5	0	8	0	0	0	0	0	0	125	2	0	6	195	0	0	341
8:00 AM	7	0	12	0	0	0	0	0	0	88	2	0	4	146	0	0	259
8:15 AM	3	0	8	0	0	0	0	0	0	93	5	0	0	135	0	0	244
8:30 AM	2	0	10	0	0	0	0	0	0	111	1	0	6	116	0	0	246
8:45 AM	10	0	11	0	0	0	0	0	0	111	3	0	4	99	0	0	238
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	74	0	100	0	0	0	0	0	0	1143	18	0	39	1974	0	2	3350
APPROACH %'s :	42.53%	0.00%	57.47%	0.00%					0.00%	98.45%	1.55%	0.00%	1.94%	97.97%	0.00%	0.10%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	28	0	30	0	0	0	0	0	0	510	6	0	15	898	0	0	1487
PEAK HR FACTOR :	0.538	0.000	0.938	0.000	0.000	0.000	0.000	0.000	0.000	0.704	0.500	0.000	0.625	0.887	0.000	0.000	0.819
	0.690				0.000				0.701				0.881				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	0	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	5	0	9	0	0	0	0	0	0	178	4	0	13	135	0	1	345
3:15 PM	8	0	9	0	0	0	0	0	0	176	4	0	10	150	0	1	358
3:30 PM	4	0	5	0	0	0	0	0	0	179	7	0	8	162	0	0	365
3:45 PM	0	0	9	0	0	0	0	0	0	190	7	0	9	147	0	1	363
4:00 PM	1	0	5	0	0	0	0	0	0	217	8	0	5	162	0	1	399
4:15 PM	3	0	9	1	0	0	0	0	0	233	7	0	10	147	0	0	410
4:30 PM	2	0	4	0	0	0	0	0	0	211	9	0	14	185	0	1	426
4:45 PM	4	0	8	0	0	0	0	0	0	102	4	0	16	193	0	0	327
5:00 PM	3	0	8	0	0	0	0	0	0	300	13	0	8	149	0	1	482
5:15 PM	6	0	4	0	0	0	0	0	0	260	10	0	17	154	0	0	451
5:30 PM	2	0	7	0	0	0	0	0	0	203	8	0	10	148	0	2	380
5:45 PM	2	0	7	0	0	0	0	0	0	195	13	0	16	137	0	1	371
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	40	0	84	1	0	0	0	0	0	2444	94	0	136	1869	0	9	4677
APPROACH %'s :	32.00%	0.00%	67.20%	0.80%					0.00%	96.30%	3.70%	0.00%	6.75%	92.80%	0.00%	0.45%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	15	0	24	0	0	0	0	0	0	873	36	0	55	681	0	2	1686
PEAK HR FACTOR :	0.625	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.728	0.692	0.000	0.809	0.882	0.000	0.500	0.874
	0.813				0.000				0.726				0.883				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Candlewood Dr & Berryville Pike
City: Charles Town
Control: 1-Way Stop(NB)

Project ID: 23-290003-007
Date: 11/2/2023

Data - HT

NS/EW Streets:	Candlewood Dr				Candlewood Dr				Berryville Pike				Berryville Pike				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	0	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	6	0	0	10
6:30 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	8	0	0	13
6:45 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	13	0	0	18
7:00 AM	0	0	1	0	0	0	0	0	0	7	0	0	2	10	0	0	20
7:15 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	16	0	0	22
7:30 AM	0	0	0	0	0	0	0	0	0	28	1	0	2	18	0	0	49
7:45 AM	1	0	1	0	0	0	0	0	0	22	2	0	1	9	0	0	36
8:00 AM	0	0	1	0	0	0	0	0	0	19	3	0	2	24	0	0	49
8:15 AM	1	0	0	0	0	0	0	0	0	19	0	0	1	17	0	0	38
8:30 AM	0	0	0	0	0	0	0	0	0	13	1	0	0	13	0	0	27
8:45 AM	0	0	0	0	0	0	0	0	0	18	1	0	1	13	0	0	33
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	3	0	0	0	0	0	0	147	8	0	9	149	0	0	318
APPROACH %'s :	40.00%	0.00%	60.00%	0.00%					0.00%	94.84%	5.16%	0.00%	5.70%	94.30%	0.00%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	0	2	0	0	0	0	0	0	63	3	0	5	53	0	0	127
PEAK HR FACTOR :	0.250	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.563	0.375	0.000	0.625	0.736	0.000	0.000	0.648
	0.375								0.569				0.725				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	0	0	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	1	0	1	0	0	0	0	0	0	13	0	0	1	12	0	0	28
3:15 PM	0	0	2	0	0	0	0	0	0	5	0	0	0	15	0	0	22
3:30 PM	1	0	1	0	0	0	0	0	0	8	0	0	0	13	0	0	23
3:45 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	11	0	0	21
4:00 PM	2	0	0	0	0	0	0	0	0	14	0	0	0	7	0	0	23
4:15 PM	2	0	1	0	0	0	0	0	0	12	0	0	0	9	0	0	24
4:30 PM	1	0	0	0	0	0	0	0	0	11	1	0	0	12	0	0	25
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	6
5:00 PM	1	0	1	0	0	0	0	0	0	13	0	0	0	9	0	0	24
5:15 PM	0	0	1	0	0	0	0	0	0	7	0	0	0	3	0	0	11
5:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
5:45 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	1	0	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	8	0	7	0	0	0	0	0	0	105	1	0	1	99	0	0	221
APPROACH %'s :	53.33%	0.00%	46.67%	0.00%					0.00%	99.06%	0.94%	0.00%	1.00%	99.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	2	0	2	0	0	0	0	0	0	32	1	0	0	29	0	0	66
PEAK HR FACTOR :	0.500	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.615	0.250	0.000	0.000	0.604	0.000	0.000	0.660
	0.500								0.635				0.604				

APPENDIX C: LEVEL OF SERVICE & DELAY DEFINITIONS

TECHNICAL MEMORANDUM

Subject: Level of Service Definitions

Introduction

The purpose of this memorandum is to define the level of service (LOS) metric that commonly used as a measure of effectiveness (MOE) for traffic operations.

All capacity analyses are based on the procedures specified by the Transportation Research Board's (TRB) Highway Capacity Manual (HCM), which is currently on its sixth edition. Level of service ranges from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

Signalized Intersections

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **Level of Service A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.
- **Level of Service B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
- **Level of Service C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.
- **Level of Service D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.
- **Level of Service E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.
- **Level of Service F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

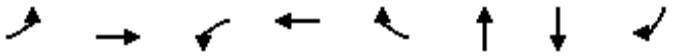
Unsignalized Intersections

At an unsignalized intersection, the major street through traffic and right-turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left-turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **Level of Service A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **Level of Service B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **Level of Service C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **Level of Service D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **Level of Service E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **Level of Service F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

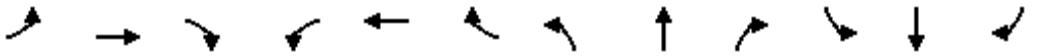
APPENDIX D: ANALYSIS WORKSHEETS OF 2024 EXISTING CONDITIONS



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	82	401	10	678	418	8	304	210
v/c Ratio	0.53	0.29	0.13	0.73	0.57	0.02	0.57	0.24
Control Delay	51.5	17.4	42.6	32.0	5.9	17.6	26.0	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	17.4	42.6	32.0	5.9	17.6	26.0	10.9
Queue Length 50th (ft)	43	66	5	169	0	3	124	53
Queue Length 95th (ft)	#99	126	21	226	60	12	224	101
Internal Link Dist (ft)		1137		3233		690	155	
Turn Bay Length (ft)	660		155		265			
Base Capacity (vph)	159	1373	75	1151	802	332	530	887
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.29	0.13	0.59	0.52	0.02	0.57	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	357	0	9	603	372	0	0	7	271	0	187
Future Volume (veh/h)	73	357	0	9	603	372	0	0	7	271	0	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1722	1870	418	1722	1781	1870	1870	418	1767	1870	1841
Adj Flow Rate, veh/h	82	401	0	10	678	418	0	0	8	304	0	210
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	8	12	2	100	12	8	2	2	100	9	2	4
Cap, veh/h	120	1211	0	7	1036	478	0	0	635	644	0	735
Arrive On Green	0.07	0.37	0.00	0.02	0.32	0.32	0.00	0.00	0.40	0.40	0.00	0.40
Sat Flow, veh/h	1697	3358	0	398	3272	1510	0	0	1585	1397	0	1560
Grp Volume(v), veh/h	82	401	0	10	678	418	0	0	8	304	0	210
Grp Sat Flow(s),veh/h/ln	1697	1636	0	398	1636	1510	0	0	1585	1397	0	1560
Q Serve(g_s), s	4.0	7.5	0.0	1.5	15.2	22.2	0.0	0.0	0.3	14.1	0.0	7.0
Cycle Q Clear(g_c), s	4.0	7.5	0.0	1.5	15.2	22.2	0.0	0.0	0.3	14.3	0.0	7.0
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	120	1211	0	7	1036	478	0	0	635	644	0	735
V/C Ratio(X)	0.69	0.33	0.00	1.45	0.65	0.87	0.00	0.00	0.01	0.47	0.00	0.29
Avail Cap(c_a), veh/h	160	1211	0	33	1157	534	0	0	635	644	0	735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.5	19.2	0.0	41.7	25.0	27.4	0.0	0.0	15.3	19.6	0.0	13.7
Incr Delay (d2), s/veh	7.3	0.2	0.0	318.2	1.1	13.9	0.0	0.0	0.0	0.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.5	0.0	0.7	5.3	8.8	0.0	0.0	0.1	4.1	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	19.4	0.0	359.9	26.1	41.3	0.0	0.0	15.4	20.2	0.0	13.9
LnGrp LOS	D	B	A	F	C	D	A	A	B	C	A	B
Approach Vol, veh/h		483			1106			8			514	
Approach Delay, s/veh		23.9			34.9			15.4			17.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	37.4		40.0	12.0	32.9		40.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	31.0		34.0	8.0	30.0		34.0				
Max Q Clear Time (g_c+I1), s	3.5	9.5		16.3	6.0	24.2		2.3				
Green Ext Time (p_c), s	0.0	2.2		1.8	0.0	2.7		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		28.1	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	4	110	0	0	0	128	251	66	1	348	15
Future Vol, veh/h	16	4	110	0	0	0	128	251	66	1	348	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	13	2	5	2	2	2	2	11	8	2	7	7
Mvmt Flow	19	5	129	0	0	0	151	295	78	1	409	18

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1056	1095	418	427	0	0	373	0	0
Stage 1	420	420	-	-	-	-	-	-	-
Stage 2	636	675	-	-	-	-	-	-	-
Critical Hdwy	6.53	6.52	6.25	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.53	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.53	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.617	4.018	3.345	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	238	214	629	1132	-	-	1185	-	-
Stage 1	640	589	-	-	-	-	-	-	-
Stage 2	507	453	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	197	0	629	1132	-	-	1185	-	-
Mov Cap-2 Maneuver	197	0	-	-	-	-	-	-	-
Stage 1	531	0	-	-	-	-	-	-	-
Stage 2	506	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	2.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1132	-	-	197	629	1185	-	-
HCM Lane V/C Ratio	0.133	-	-	0.119	0.206	0.001	-	-
HCM Control Delay (s)	8.7	0	-	25.7	12.2	8	0	-
HCM Lane LOS	A	A	-	D	B	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.4	0.8	0	-	-

Intersection	
Int Delay, s/veh	12.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	74	16	96	71	37	17	173	86	8	31	197	108
Future Vol, veh/h	74	16	96	71	37	17	173	86	8	31	197	108
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	215	-	-	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	7	6	16	8	2	2	9	12	3	2	3	6
Mvmt Flow	87	19	113	84	44	20	204	101	9	36	232	127

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	914	886	296	948	945	106	359	0	0	110	0	0
Stage 1	368	368	-	514	514	-	-	-	-	-	-	-
Stage 2	546	518	-	434	431	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.56	6.36	7.18	6.52	6.22	4.19	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.56	-	6.18	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.56	-	6.18	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.054	3.444	3.572	4.018	3.318	2.281	-	-	2.218	-	-
Pot Cap-1 Maneuver	249	279	711	235	262	948	1162	-	-	1480	-	-
Stage 1	642	614	-	532	535	-	-	-	-	-	-	-
Stage 2	513	527	-	589	583	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	175	224	711	157	211	948	1162	-	-	1480	-	-
Mov Cap-2 Maneuver	175	224	-	157	211	-	-	-	-	-	-	-
Stage 1	529	599	-	438	441	-	-	-	-	-	-	-
Stage 2	373	434	-	468	569	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.9	38.6	5.7	0.7
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1162	-	-	175	543	157	279	1480	-	-
HCM Lane V/C Ratio	0.175	-	-	0.497	0.243	0.532	0.228	0.025	-	-
HCM Control Delay (s)	8.8	-	-	44.4	13.7	51.4	21.7	7.5	-	-
HCM Lane LOS	A	-	-	E	B	F	C	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	2.4	0.9	2.6	0.9	0.1	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	45	145	40	137	191	14
Future Vol, veh/h	45	145	40	137	191	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	7	1	13	7	6	7
Mvmt Flow	53	171	47	161	225	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	488	233	241	0	-	0
Stage 1	233	-	-	-	-	-
Stage 2	255	-	-	-	-	-
Critical Hdwy	6.47	6.21	4.23	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.309	2.317	-	-	-
Pot Cap-1 Maneuver	530	809	1264	-	-	-
Stage 1	794	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	510	809	1264	-	-	-
Mov Cap-2 Maneuver	510	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	776	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1264	-	710	-	-
HCM Lane V/C Ratio	0.037	-	0.315	-	-
HCM Control Delay (s)	8	-	12.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	6	4	4	6	14	9	157	16	8	197	15
Future Vol, veh/h	7	6	4	4	6	14	9	157	16	8	197	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	17	50	2	2	2	33	7	2	2	6	2
Mvmt Flow	8	7	5	5	7	16	11	185	19	9	232	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	487	485	241	482	485	195	250	0	0	204	0	0
Stage 1	259	259	-	217	217	-	-	-	-	-	-	-
Stage 2	228	226	-	265	268	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.67	6.7	7.12	6.52	6.22	4.43	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.153	3.75	3.518	4.018	3.318	2.497	-	-	2.218	-	-
Pot Cap-1 Maneuver	491	461	693	495	482	846	1154	-	-	1368	-	-
Stage 1	746	667	-	785	723	-	-	-	-	-	-	-
Stage 2	775	690	-	740	687	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	469	452	693	479	473	846	1154	-	-	1368	-	-
Mov Cap-2 Maneuver	469	452	-	479	473	-	-	-	-	-	-	-
Stage 1	738	662	-	776	715	-	-	-	-	-	-	-
Stage 2	744	682	-	721	682	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	10.9	0.4	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1154	-	-	500	639	1368	-	-
HCM Lane V/C Ratio	0.009	-	-	0.04	0.044	0.007	-	-
HCM Control Delay (s)	8.1	0	-	12.5	10.9	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	3	174	4	3	215
Future Vol, veh/h	5	3	174	4	3	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	6	2	33	5
Mvmt Flow	6	4	205	5	4	253

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	469	208	0	0	210	0
Stage 1	208	-	-	-	-	-
Stage 2	261	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.43	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.497	-
Pot Cap-1 Maneuver	553	832	-	-	1196	-
Stage 1	827	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	551	832	-	-	1196	-
Mov Cap-2 Maneuver	551	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	780	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	631	1196	-
HCM Lane V/C Ratio	-	-	0.015	0.003	-
HCM Control Delay (s)	-	-	10.8	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	625	10	14	951	21	29	12	33	12	4	4
Future Vol, veh/h	0	625	10	14	951	21	29	12	33	12	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	12	2	15	6	2	3	2	6	8	2	2
Mvmt Flow	0	735	12	16	1119	25	34	14	39	14	5	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1144	0	0	747	0	0	1335	1917	374	1526	1898	560
Stage 1	-	-	-	-	-	-	741	741	-	1151	1151	-
Stage 2	-	-	-	-	-	-	594	1176	-	375	747	-
Critical Hdwy	4.14	-	-	4.4	-	-	7.56	6.54	7.02	7.66	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.22	-	-	2.35	-	-	3.53	4.02	3.36	3.58	4.02	3.32
Pot Cap-1 Maneuver	606	-	-	777	-	-	111	67	612	76	69	472
Stage 1	-	-	-	-	-	-	372	421	-	201	271	-
Stage 2	-	-	-	-	-	-	456	263	-	602	418	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	606	-	-	777	-	-	106	66	612	67	68	472
Mov Cap-2 Maneuver	-	-	-	-	-	-	286	215	-	183	218	-
Stage 1	-	-	-	-	-	-	372	421	-	201	265	-
Stage 2	-	-	-	-	-	-	434	257	-	545	418	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	18.7	23.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	350	606	-	-	777	-	-	216
HCM Lane V/C Ratio	0.249	-	-	-	0.021	-	-	0.109
HCM Control Delay (s)	18.7	0	-	-	9.7	-	-	23.7
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.4

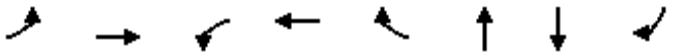
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	661	9	20	951	0	29	0	32	0	0	0
Future Vol, veh/h	0	661	9	20	951	0	29	0	32	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	11	33	25	6	2	3	2	6	2	2	2
Mvmt Flow	0	778	11	24	1119	0	34	0	38	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1119	0	0	789	0	0	1386	1945	389	1556	1956	560
Stage 1	-	-	-	-	-	-	778	778	-	1167	1167	-
Stage 2	-	-	-	-	-	-	608	1167	-	389	789	-
Critical Hdwy	4.14	-	-	4.6	-	-	7.56	6.54	7.02	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.45	-	-	3.53	4.02	3.36	3.52	4.02	3.32
Pot Cap-1 Maneuver	620	-	-	693	-	-	102	64	598	77	63	472
Stage 1	-	-	-	-	-	-	353	405	-	206	266	-
Stage 2	-	-	-	-	-	-	447	266	-	606	400	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	620	-	-	693	-	-	99	62	598	70	61	472
Mov Cap-2 Maneuver	-	-	-	-	-	-	275	212	-	70	61	-
Stage 1	-	-	-	-	-	-	353	405	-	206	257	-
Stage 2	-	-	-	-	-	-	432	257	-	568	400	-

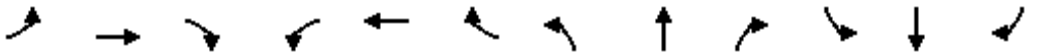
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	15.4	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	275	598	620	-	-	693	-	-	-
HCM Lane V/C Ratio	0.124	0.063	-	-	-	0.034	-	-	-
HCM Control Delay (s)	19.9	11.4	0	-	-	10.4	-	-	0
HCM Lane LOS	C	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.4	0.2	0	-	-	0.1	-	-	-



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	187	697	5	466	354	8	289	101
v/c Ratio	0.62	0.45	0.06	0.63	0.56	0.03	0.58	0.11
Control Delay	39.2	15.8	38.2	31.0	6.8	20.6	28.1	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	15.8	38.2	31.0	6.8	20.6	28.1	7.4
Queue Length 50th (ft)	83	106	2	104	0	2	110	18
Queue Length 95th (ft)	159	198	14	165	64	14	237	45
Internal Link Dist (ft)		1137		3233		690	155	
Turn Bay Length (ft)	660		155		265			
Base Capacity (vph)	455	1733	83	1076	760	316	501	1100
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.40	0.06	0.43	0.47	0.03	0.58	0.09

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	174	648	0	5	433	329	0	0	7	269	0	94
Future Volume (veh/h)	174	648	0	5	433	329	0	0	7	269	0	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1796	1870	418	1737	1870	418	1900	625	1870	1870	1856
Adj Flow Rate, veh/h	187	697	0	5	466	354	0	0	8	289	0	101
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	7	2	100	11	2	100	0	86	2	2	3
Cap, veh/h	232	1337	0	4	882	424	0	0	579	597	0	775
Arrive On Green	0.13	0.39	0.00	0.01	0.27	0.27	0.00	0.00	0.36	0.36	0.00	0.36
Sat Flow, veh/h	1739	3503	0	398	3300	1585	0	0	1610	1395	0	1572
Grp Volume(v), veh/h	187	697	0	5	466	354	0	0	8	289	0	101
Grp Sat Flow(s),veh/h/ln	1739	1706	0	398	1650	1585	0	0	1610	1395	0	1572
Q Serve(g_s), s	7.8	11.7	0.0	0.7	9.0	15.8	0.0	0.0	0.2	12.5	0.0	2.6
Cycle Q Clear(g_c), s	7.8	11.7	0.0	0.7	9.0	15.8	0.0	0.0	0.2	12.7	0.0	2.6
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	232	1337	0	4	882	424	0	0	579	597	0	775
V/C Ratio(X)	0.80	0.52	0.00	1.36	0.53	0.84	0.00	0.00	0.01	0.48	0.00	0.13
Avail Cap(c_a), veh/h	463	1726	0	37	1098	528	0	0	579	597	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.6	17.5	0.0	37.2	23.5	26.0	0.0	0.0	15.5	19.6	0.0	10.3
Incr Delay (d2), s/veh	6.4	0.3	0.0	348.2	0.5	9.3	0.0	0.0	0.0	0.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	3.9	0.0	0.4	3.1	6.2	0.0	0.0	0.1	3.6	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.0	17.8	0.0	385.4	24.0	35.3	0.0	0.0	15.5	20.2	0.0	10.4
LnGrp LOS	D	B	A	F	C	D	A	A	B	C	A	B
Approach Vol, veh/h		884			825			8			390	
Approach Delay, s/veh		22.1			31.0			15.5			17.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	35.4		33.0	16.0	26.1		33.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	38.0		27.0	20.0	25.0		27.0				
Max Q Clear Time (g_c+I1), s	2.7	13.7		14.7	9.8	17.8		2.2				
Green Ext Time (p_c), s	0.0	4.2		1.1	0.4	2.2		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			24.7									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	14	96	0	0	0	127	289	87	0	267	45
Future Vol, veh/h	19	14	96	0	0	0	127	289	87	0	267	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	4	3	2	2	2	2
Mvmt Flow	22	16	109	0	0	0	144	328	99	0	303	51

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	995	1044	329	354	0	0	427	0	0
Stage 1	329	329	-	-	-	-	-	-	-
Stage 2	666	715	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	271	229	712	1194	-	-	1132	-	-
Stage 1	729	646	-	-	-	-	-	-	-
Stage 2	511	434	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	228	0	712	1194	-	-	1132	-	-
Mov Cap-2 Maneuver	228	0	-	-	-	-	-	-	-
Stage 1	612	0	-	-	-	-	-	-	-
Stage 2	511	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	2.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	228	712	1132	-	-
HCM Lane V/C Ratio	0.121	-	-	0.164	0.153	-	-	-
HCM Control Delay (s)	8.4	0	-	23.9	11	0	-	-
HCM Lane LOS	A	A	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.6	0.5	0	-	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	51	14	52	97	8	47	61	234	13	27	163	35
Future Vol, veh/h	51	14	52	97	8	47	61	234	13	27	163	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	215	-	-	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	3	2	2	3	2	23	2	2	2
Mvmt Flow	60	16	61	114	9	55	72	275	15	32	192	41

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	736	711	213	742	724	283	233	0	0	290	0	0
Stage 1	277	277	-	427	427	-	-	-	-	-	-	-
Stage 2	459	434	-	315	297	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.13	6.52	6.22	4.13	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.13	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.13	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.527	4.018	3.318	2.227	-	-	2.218	-	-
Pot Cap-1 Maneuver	335	358	827	330	352	756	1329	-	-	1272	-	-
Stage 1	729	681	-	604	585	-	-	-	-	-	-	-
Stage 2	582	581	-	694	668	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	286	330	827	277	325	756	1329	-	-	1272	-	-
Mov Cap-2 Maneuver	286	330	-	277	325	-	-	-	-	-	-	-
Stage 1	690	664	-	571	553	-	-	-	-	-	-	-
Stage 2	502	550	-	611	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.7	21.2	1.6	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1329	-	-	286	627	277	634	1272	-	-
HCM Lane V/C Ratio	0.054	-	-	0.21	0.124	0.412	0.102	0.025	-	-
HCM Control Delay (s)	7.9	-	-	20.9	11.6	26.8	11.3	7.9	-	-
HCM Lane LOS	A	-	-	C	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.4	1.9	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	84	146	186	141	45
Future Vol, veh/h	33	84	146	186	141	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	39	99	172	219	166	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	756	193	219	0	-	0
Stage 1	193	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	376	849	1350	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	328	849	1350	-	-	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	570	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1350	-	586	-	-
HCM Lane V/C Ratio	0.127	-	0.235	-	-
HCM Control Delay (s)	8.1	-	13	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.9	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	5	8	5	4	11	4	210	5	11	173	6
Future Vol, veh/h	10	5	8	5	4	11	4	210	5	11	173	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	25	2	9	2	2	2	2	2	2
Mvmt Flow	12	6	9	6	5	13	5	247	6	13	204	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	503	497	208	501	497	250	211	0	0	253	0	0
Stage 1	234	234	-	260	260	-	-	-	-	-	-	-
Stage 2	269	263	-	241	237	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.35	6.52	6.29	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.725	4.018	3.381	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	479	475	832	445	475	772	1360	-	-	1312	-	-
Stage 1	769	711	-	697	693	-	-	-	-	-	-	-
Stage 2	737	691	-	714	709	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	462	468	832	431	468	772	1360	-	-	1312	-	-
Mov Cap-2 Maneuver	462	468	-	431	468	-	-	-	-	-	-	-
Stage 1	766	703	-	694	690	-	-	-	-	-	-	-
Stage 2	717	688	-	692	701	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	11.5	0.1	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1360	-	-	548	581	1312	-	-
HCM Lane V/C Ratio	0.003	-	-	0.049	0.04	0.01	-	-
HCM Control Delay (s)	7.7	0	-	11.9	11.5	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	7	226	5	6	189
Future Vol, veh/h	1	7	226	5	6	189
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	8	266	6	7	222

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	505	269	0	0	272	0
Stage 1	269	-	-	-	-	-
Stage 2	236	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	527	770	-	-	1291	-
Stage 1	776	-	-	-	-	-
Stage 2	803	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	524	770	-	-	1291	-
Mov Cap-2 Maneuver	524	-	-	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	798	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	727	1291	-
HCM Lane V/C Ratio	-	-	0.013	0.005	-
HCM Control Delay (s)	-	-	10	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	901	18	58	755	10	12	5	30	11	7	0
Future Vol, veh/h	5	901	18	58	755	10	12	5	30	11	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	20	3	6	2	5	2	8	2	2	2	2	2
Mvmt Flow	6	1060	21	68	888	12	14	6	35	13	8	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	900	0	0	1081	0	0	1667	2119	541	1569	2117	444
Stage 1	-	-	-	-	-	-	1083	1083	-	1024	1024	-
Stage 2	-	-	-	-	-	-	584	1036	-	545	1093	-
Critical Hdwy	4.5	-	-	4.14	-	-	7.66	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.4	-	-	2.22	-	-	3.58	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	648	-	-	641	-	-	59	50	485	75	50	561
Stage 1	-	-	-	-	-	-	221	292	-	252	311	-
Stage 2	-	-	-	-	-	-	450	307	-	490	288	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	648	-	-	641	-	-	52	44	485	62	44	561
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	190	-	204	167	-
Stage 1	-	-	-	-	-	-	219	289	-	250	278	-
Stage 2	-	-	-	-	-	-	390	274	-	441	285	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	19.3	26.6
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	307	648	-	-	641	-	-	188
HCM Lane V/C Ratio	0.18	0.009	-	-	0.106	-	-	0.113
HCM Control Delay (s)	19.3	10.6	-	-	11.3	-	-	26.6
HCM Lane LOS	C	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.6	0	-	-	0.4	-	-	0.4

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	905	37	57	806	0	17	0	26	0	0	0
Future Vol, veh/h	0	905	37	57	806	0	17	0	26	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	4	3	2	4	2	12	2	8	2	2	2
Mvmt Flow	0	1040	43	66	926	0	20	0	30	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	926	0	0	1083	0	0	1635	2098	520	1578	2141	463
Stage 1	-	-	-	-	-	-	1040	1040	-	1058	1058	-
Stage 2	-	-	-	-	-	-	595	1058	-	520	1083	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.74	6.54	7.06	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.62	4.02	3.38	3.52	4.02	3.32
Pot Cap-1 Maneuver	734	-	-	640	-	-	60	51	486	74	48	546
Stage 1	-	-	-	-	-	-	229	306	-	240	300	-
Stage 2	-	-	-	-	-	-	434	300	-	507	292	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	734	-	-	640	-	-	55	46	486	64	43	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	195	-	64	43	-
Stage 1	-	-	-	-	-	-	229	306	-	240	269	-
Stage 2	-	-	-	-	-	-	389	269	-	476	292	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	18	0
HCM LOS			C	A

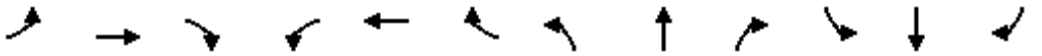
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	192	486	734	-	-	640	-	-	-
HCM Lane V/C Ratio	0.102	0.061	-	-	-	0.102	-	-	-
HCM Control Delay (s)	25.9	12.9	0	-	-	11.3	-	-	0
HCM Lane LOS	D	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.3	0.2	0	-	-	0.3	-	-	-

APPENDIX E: ANALYSIS WORKSHEETS OF 2031 FUTURE CONDITIONS WITHOUT DEVELOPMENT



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	96	491	10	858	449	8	185	186	254
v/c Ratio	0.56	0.26	0.18	0.56	0.48	0.11	0.75	0.75	0.63
Control Delay	63.0	13.4	61.0	26.0	4.0	53.6	66.4	66.8	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.0	13.4	61.0	26.0	4.0	53.6	66.4	66.8	31.3
Queue Length 50th (ft)	72	85	8	246	0	6	145	146	129
Queue Length 95th (ft)	124	163	26	361	66	22	221	222	167
Internal Link Dist (ft)		1137		3233		690		155	
Turn Bay Length (ft)	660		155		265				
Base Capacity (vph)	501	1921	60	1525	943	75	314	314	709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.26	0.17	0.56	0.48	0.11	0.59	0.59	0.36

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	452	0	9	789	413	0	0	7	341	0	234
Future Volume (veh/h)	88	452	0	9	789	413	0	0	7	341	0	234
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1722	1870	418	1722	1781	1870	1870	418	1767	1870	1841
Adj Flow Rate, veh/h	96	491	0	10	858	449	0	0	8	371	0	254
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	12	2	100	12	8	2	2	100	9	2	4
Cap, veh/h	122	1778	0	7	1598	737	0	0	145	583	0	382
Arrive On Green	0.07	0.54	0.00	0.02	0.49	0.49	0.00	0.00	0.09	0.17	0.00	0.17
Sat Flow, veh/h	1697	3358	0	398	3272	1510	0	0	1585	3365	0	1560
Grp Volume(v), veh/h	96	491	0	10	858	449	0	0	8	371	0	254
Grp Sat Flow(s),veh/h/ln	1697	1636	0	398	1636	1510	0	0	1585	1682	0	1560
Q Serve(g_s), s	6.7	9.7	0.0	2.0	21.8	26.0	0.0	0.0	0.6	12.3	0.0	17.6
Cycle Q Clear(g_c), s	6.7	9.7	0.0	2.0	21.8	26.0	0.0	0.0	0.6	12.3	0.0	17.6
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	122	1778	0	7	1598	737	0	0	145	583	0	382
V/C Ratio(X)	0.79	0.28	0.00	1.52	0.54	0.61	0.00	0.00	0.06	0.64	0.00	0.66
Avail Cap(c_a), veh/h	509	1778	0	27	1598	737	0	0	145	673	0	424
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.8	14.7	0.0	59.0	21.3	22.4	0.0	0.0	49.8	46.1	0.0	40.9
Incr Delay (d2), s/veh	10.8	0.4	0.0	349.2	1.3	3.7	0.0	0.0	0.7	1.6	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	3.3	0.0	0.8	7.9	9.1	0.0	0.0	0.3	5.1	0.0	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.6	15.1	0.0	408.2	22.6	26.1	0.0	0.0	50.5	47.7	0.0	44.3
LnGrp LOS	E	B	A	F	C	C	A	A	D	D	A	D
Approach Vol, veh/h		587			1317			8			625	
Approach Delay, s/veh		23.4			26.7			50.5			46.3	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	71.2		25.8	13.6	64.6		16.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	56.0		24.0	36.0	28.0		11.0				
Max Q Clear Time (g_c+I1), s	4.0	11.7		19.6	8.7	28.0		2.6				
Green Ext Time (p_c), s	0.0	3.0		1.2	0.3	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		30.8	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

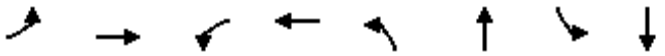
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	4	110	0	0	0	128	307	66	1	465	15
Future Vol, veh/h	16	4	110	0	0	0	128	307	66	1	465	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	5	2	2	2	2	11	8	2	7	7
Mvmt Flow	17	4	120	0	0	0	139	334	72	1	505	16

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1163	1199	513	521	0	0	406	0	0
Stage 1	515	515	-	-	-	-	-	-	-
Stage 2	648	684	-	-	-	-	-	-	-
Critical Hdwy	6.53	6.52	6.25	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.53	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.53	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.617	4.018	3.345	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	205	185	555	1045	-	-	1153	-	-
Stage 1	578	535	-	-	-	-	-	-	-
Stage 2	500	449	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	178	0	555	1045	-	-	1153	-	-
Mov Cap-2 Maneuver	178	0	-	-	-	-	-	-	-
Stage 1	501	0	-	-	-	-	-	-	-
Stage 2	500	0	-	-	-	-	-	-	-

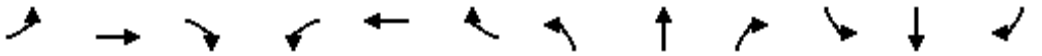
Approach	EB	NB	SB
HCM Control Delay, s	15.6	2.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1045	-	-	178	555	1153	-	-
HCM Lane V/C Ratio	0.133	-	-	0.122	0.215	0.001	-	-
HCM Control Delay (s)	9	-	-	28	13.3	8.1	-	-
HCM Lane LOS	A	-	-	D	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.4	0.8	0	-	-



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	80	121	77	58	188	163	34	458
v/c Ratio	0.43	0.48	0.42	0.27	0.42	0.18	0.05	0.53
Control Delay	45.1	17.5	44.8	31.2	11.7	14.0	8.1	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	17.5	44.8	31.2	11.7	14.0	8.1	19.5
Queue Length 50th (ft)	43	9	41	21	46	54	8	178
Queue Length 95th (ft)	88	60	85	57	78	95	19	274
Internal Link Dist (ft)		559		114		281		460
Turn Bay Length (ft)					215		225	
Base Capacity (vph)	187	252	185	213	443	903	735	858
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.48	0.42	0.27	0.42	0.18	0.05	0.53

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	16	96	71	37	17	173	142	8	31	314	108
Future Volume (veh/h)	74	16	96	71	37	17	173	142	8	31	314	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1811	1663	1781	1870	1870	1767	1722	1856	1870	1856	1811
Adj Flow Rate, veh/h	80	17	104	77	40	18	188	154	9	34	341	117
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	6	16	8	2	2	9	12	3	2	3	6
Cap, veh/h	189	24	149	182	131	59	438	777	45	682	593	203
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.08	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1711	220	1348	1697	1222	550	1682	1611	94	1781	1321	453
Grp Volume(v), veh/h	80	0	121	77	0	58	188	0	163	34	0	458
Grp Sat Flow(s),veh/h/ln	1711	0	1568	1697	0	1771	1682	0	1705	1781	0	1774
Q Serve(g_s), s	3.9	0.0	6.7	3.8	0.0	2.7	5.4	0.0	4.9	0.9	0.0	17.3
Cycle Q Clear(g_c), s	3.9	0.0	6.7	3.8	0.0	2.7	5.4	0.0	4.9	0.9	0.0	17.3
Prop In Lane	1.00		0.86	1.00		0.31	1.00		0.06	1.00		0.26
Lane Grp Cap(c), veh/h	189	0	173	182	0	190	438	0	822	682	0	796
V/C Ratio(X)	0.42	0.00	0.70	0.42	0.00	0.31	0.43	0.00	0.20	0.05	0.00	0.58
Avail Cap(c_a), veh/h	190	0	174	189	0	197	438	0	822	741	0	796
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.4	0.0	38.6	37.6	0.0	37.1	13.4	0.0	13.3	11.8	0.0	18.4
Incr Delay (d2), s/veh	1.5	0.0	11.6	1.6	0.0	0.9	0.7	0.0	0.5	0.0	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	3.1	1.6	0.0	1.2	1.8	0.0	1.8	0.3	0.0	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	50.2	39.1	0.0	38.0	14.1	0.0	13.9	11.8	0.0	21.4
LnGrp LOS	D	A	D	D	A	D	B	A	B	B	A	C
Approach Vol, veh/h		201			135			351			492	
Approach Delay, s/veh		45.7			38.6			14.0			20.8	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	49.4		15.9	12.0	46.4		15.7				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	40.0		10.0	7.0	40.0		10.0				
Max Q Clear Time (g_c+I1), s	2.9	6.9		8.7	7.4	19.3		5.8				
Green Ext Time (p_c), s	0.0	1.4		0.1	0.0	4.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			25.0									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	172	49	184	281	17
Future Vol, veh/h	54	172	49	184	281	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	1	13	7	6	7
Mvmt Flow	59	187	53	200	305	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	620	314	323	0	-	0
Stage 1	314	-	-	-	-	-
Stage 2	306	-	-	-	-	-
Critical Hdwy	6.47	6.21	4.23	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.309	2.317	-	-	-
Pot Cap-1 Maneuver	444	729	1177	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	424	729	1177	-	-	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	736	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	1.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1177	-	622	-	-
HCM Lane V/C Ratio	0.045	-	0.395	-	-
HCM Control Delay (s)	8.2	-	14.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.9	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	6	4	4	6	14	9	214	16	8	251	15
Future Vol, veh/h	7	6	4	4	6	14	9	214	16	8	251	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	17	50	2	2	2	33	7	2	2	6	2
Mvmt Flow	8	7	4	4	7	15	10	233	17	9	273	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	572	569	281	567	569	242	289	0	0	250	0	0
Stage 1	299	299	-	262	262	-	-	-	-	-	-	-
Stage 2	273	270	-	305	307	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.67	6.7	7.12	6.52	6.22	4.43	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.153	3.75	3.518	4.018	3.318	2.497	-	-	2.218	-	-
Pot Cap-1 Maneuver	431	412	656	434	432	797	1115	-	-	1316	-	-
Stage 1	710	640	-	743	691	-	-	-	-	-	-	-
Stage 2	733	659	-	705	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	412	405	656	420	424	797	1115	-	-	1316	-	-
Mov Cap-2 Maneuver	412	405	-	420	424	-	-	-	-	-	-	-
Stage 1	703	635	-	736	684	-	-	-	-	-	-	-
Stage 2	705	652	-	688	656	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	11.5	0.3	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1115	-	-	449	582	1316	-	-
HCM Lane V/C Ratio	0.009	-	-	0.041	0.045	0.007	-	-
HCM Control Delay (s)	8.3	0	-	13.4	11.5	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	3	231	4	3	269
Future Vol, veh/h	5	3	231	4	3	269
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	6	2	33	5
Mvmt Flow	5	3	251	4	3	292

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	551	253	0	0	255	0
Stage 1	253	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.43	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.497	-
Pot Cap-1 Maneuver	495	786	-	-	1149	-
Stage 1	789	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	494	786	-	-	1149	-
Mov Cap-2 Maneuver	494	-	-	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	574	1149	-
HCM Lane V/C Ratio	-	-	0.015	0.003	-
HCM Control Delay (s)	-	-	11.4	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	790	10	14	1178	21	29	12	33	12	4	4
Future Vol, veh/h	0	790	10	14	1178	21	29	12	33	12	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	12	2	15	6	2	3	2	6	8	2	2
Mvmt Flow	0	859	11	15	1280	23	32	13	36	13	4	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1303	0	0	870	0	0	1537	2198	435	1746	2180	640
Stage 1	-	-	-	-	-	-	865	865	-	1310	1310	-
Stage 2	-	-	-	-	-	-	672	1333	-	436	870	-
Critical Hdwy	4.14	-	-	4.4	-	-	7.56	6.54	7.02	7.66	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.22	-	-	2.35	-	-	3.53	4.02	3.36	3.58	4.02	3.32
Pot Cap-1 Maneuver	527	-	-	693	-	-	78	44	558	52	46	418
Stage 1	-	-	-	-	-	-	313	369	-	159	227	-
Stage 2	-	-	-	-	-	-	409	221	-	553	367	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	527	-	-	693	-	-	74	43	558	45	45	418
Mov Cap-2 Maneuver	-	-	-	-	-	-	241	179	-	145	181	-
Stage 1	-	-	-	-	-	-	313	369	-	159	222	-
Stage 2	-	-	-	-	-	-	388	216	-	499	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	21.3	28.5
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	300	527	-	-	693	-	-	175
HCM Lane V/C Ratio	0.268	-	-	-	0.022	-	-	0.124
HCM Control Delay (s)	21.3	0	-	-	10.3	-	-	28.5
HCM Lane LOS	C	A	-	-	B	-	-	D
HCM 95th %tile Q(veh)	1.1	0	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	811	24	56	1132	0	75	0	138	0	0	0
Future Vol, veh/h	0	811	24	56	1132	0	75	0	138	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	11	33	25	6	2	3	2	6	2	2	2
Mvmt Flow	0	882	26	61	1230	0	82	0	150	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1230	0	0	908	0	0	1619	2234	441	1793	2260	615
Stage 1	-	-	-	-	-	-	882	882	-	1352	1352	-
Stage 2	-	-	-	-	-	-	737	1352	-	441	908	-
Critical Hdwy	4.14	-	-	4.6	-	-	7.56	6.54	7.02	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.45	-	-	3.53	4.02	3.36	3.52	4.02	3.32
Pot Cap-1 Maneuver	562	-	-	617	-	-	~ 68	42	553	51	40	434
Stage 1	-	-	-	-	-	-	305	362	-	158	217	-
Stage 2	-	-	-	-	-	-	374	217	-	565	352	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	562	-	-	617	-	-	~ 63	38	553	34	36	434
Mov Cap-2 Maneuver	-	-	-	-	-	-	222	165	-	34	36	-
Stage 1	-	-	-	-	-	-	305	362	-	158	196	-
Stage 2	-	-	-	-	-	-	337	196	-	412	352	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	19.7	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	222	553	562	-	-	617	-	-	-
HCM Lane V/C Ratio	0.367	0.271	-	-	-	0.099	-	-	-
HCM Control Delay (s)	30.3	13.9	0	-	-	11.5	-	-	0
HCM Lane LOS	D	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	1.6	1.1	0	-	-	0.3	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	228	891	5	618	423	9	172	172	128
v/c Ratio	0.75	0.43	0.09	0.46	0.47	0.11	0.70	0.70	0.25
Control Delay	61.5	14.9	57.0	29.3	4.8	53.6	63.6	63.6	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.5	14.9	57.0	29.3	4.8	53.6	63.6	63.6	18.0
Queue Length 50th (ft)	169	170	4	181	0	7	134	134	53
Queue Length 95th (ft)	240	318	17	283	76	24	203	203	67
Internal Link Dist (ft)		1137		3233		690		155	
Turn Bay Length (ft)	660		155		265				
Base Capacity (vph)	515	2050	60	1334	899	81	336	336	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.43	0.08	0.46	0.47	0.11	0.51	0.51	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	212	829	0	5	575	393	1	0	7	320	0	119
Future Volume (veh/h)	212	829	0	5	575	393	1	0	7	320	0	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1796	1870	418	1737	1870	418	1900	625	1870	1870	1856
Adj Flow Rate, veh/h	228	891	0	5	618	423	1	0	8	344	0	128
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	7	2	100	11	2	100	0	86	2	2	3
Cap, veh/h	262	2053	0	4	1517	729	17	0	133	438	0	430
Arrive On Green	0.15	0.60	0.00	0.01	0.46	0.46	0.09	0.00	0.09	0.12	0.00	0.12
Sat Flow, veh/h	1739	3503	0	398	3300	1585	181	0	1449	3563	0	1572
Grp Volume(v), veh/h	228	891	0	5	618	423	9	0	0	344	0	128
Grp Sat Flow(s),veh/h/ln	1739	1706	0	398	1650	1585	1630	0	0	1781	0	1572
Q Serve(g_s), s	15.4	16.9	0.0	1.1	14.9	23.6	0.6	0.0	0.0	11.2	0.0	7.7
Cycle Q Clear(g_c), s	15.4	16.9	0.0	1.1	14.9	23.6	0.6	0.0	0.0	11.2	0.0	7.7
Prop In Lane	1.00		0.00	1.00		1.00	0.11		0.89	1.00		1.00
Lane Grp Cap(c), veh/h	262	2053	0	4	1517	729	149	0	0	438	0	430
V/C Ratio(X)	0.87	0.43	0.00	1.40	0.41	0.58	0.06	0.00	0.00	0.79	0.00	0.30
Avail Cap(c_a), veh/h	522	2053	0	27	1517	729	149	0	0	713	0	551
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.8	12.9	0.0	59.5	21.5	23.9	49.8	0.0	0.0	51.1	0.0	34.5
Incr Delay (d2), s/veh	8.7	0.7	0.0	368.1	0.8	3.4	0.8	0.0	0.0	3.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	5.8	0.0	0.5	5.5	8.8	0.3	0.0	0.0	5.0	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	13.6	0.0	427.6	22.4	27.2	50.6	0.0	0.0	54.2	0.0	34.9
LnGrp LOS	E	B	A	F	C	C	D	A	A	D	A	C
Approach Vol, veh/h		1119			1046			9			472	
Approach Delay, s/veh		22.7			26.3			50.6			49.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	78.2		19.8	23.1	61.2		16.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	56.0		24.0	36.0	28.0		11.0				
Max Q Clear Time (g_c+I1), s	3.1	18.9		13.2	17.4	25.6		2.6				
Green Ext Time (p_c), s	0.0	6.2		1.5	0.7	1.2		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		28.9	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

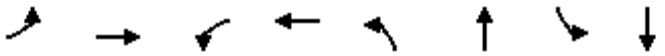
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	14	96	0	0	0	127	391	87	0	343	45
Future Vol, veh/h	19	14	96	0	0	0	127	391	87	0	343	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	4	3	2	2	2	2
Mvmt Flow	21	15	104	0	0	0	138	425	95	0	373	49

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1147	1194	398	422	0	0	-	-	0
Stage 1	398	398	-	-	-	-	-	-	-
Stage 2	749	796	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	220	187	652	1127	-	-	0	-	-
Stage 1	678	603	-	-	-	-	0	-	-
Stage 2	467	399	-	-	-	-	0	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	193	0	652	1127	-	-	-	-	-
Mov Cap-2 Maneuver	193	0	-	-	-	-	-	-	-
Stage 1	595	0	-	-	-	-	-	-	-
Stage 2	467	0	-	-	-	-	-	-	-

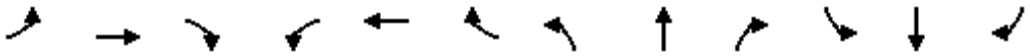
Approach	EB	NB	SB
HCM Control Delay, s	15.8	1.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1127	-	-	193	652	-	-
HCM Lane V/C Ratio	0.122	-	-	0.186	0.16	-	-
HCM Control Delay (s)	8.6	-	-	27.9	11.6	-	-
HCM Lane LOS	A	-	-	D	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.7	0.6	-	-



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	72	105	60	66	379	29	298
v/c Ratio	0.28	0.31	0.50	0.25	0.10	0.34	0.05	0.30
Control Delay	40.9	18.0	45.2	15.9	9.1	15.1	8.8	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	18.0	45.2	15.9	9.1	15.1	8.8	16.4
Queue Length 50th (ft)	29	8	57	5	15	108	7	106
Queue Length 95th (ft)	66	47	107	40	34	233	18	175
Internal Link Dist (ft)		559		114		281		460
Turn Bay Length (ft)					215		225	
Base Capacity (vph)	196	233	233	260	650	1101	634	1000
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.31	0.45	0.23	0.10	0.34	0.05	0.30

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	14	52	97	8	47	61	336	13	27	239	35
Future Volume (veh/h)	51	14	52	97	8	47	61	336	13	27	239	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1870	1870	1856	1870	1559	1870	1870	1870
Adj Flow Rate, veh/h	55	15	57	105	9	51	66	365	14	29	260	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	3	2	2	3	2	23	2	2	2
Cap, veh/h	190	36	138	193	27	151	579	874	34	510	743	109
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.06	0.49	0.49	0.04	0.47	0.47
Sat Flow, veh/h	1781	341	1296	1767	243	1379	1767	1789	69	1781	1595	233
Grp Volume(v), veh/h	55	0	72	105	0	60	66	0	379	29	0	298
Grp Sat Flow(s),veh/h/ln	1781	0	1637	1767	0	1622	1767	0	1858	1781	0	1828
Q Serve(g_s), s	2.6	0.0	3.7	5.1	0.0	3.1	1.6	0.0	11.8	0.7	0.0	9.4
Cycle Q Clear(g_c), s	2.6	0.0	3.7	5.1	0.0	3.1	1.6	0.0	11.8	0.7	0.0	9.4
Prop In Lane	1.00		0.79	1.00		0.85	1.00		0.04	1.00		0.13
Lane Grp Cap(c), veh/h	190	0	174	193	0	177	579	0	908	510	0	852
V/C Ratio(X)	0.29	0.00	0.41	0.54	0.00	0.34	0.11	0.00	0.42	0.06	0.00	0.35
Avail Cap(c_a), veh/h	198	0	182	236	0	216	606	0	908	577	0	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	37.6	38.0	0.0	37.1	10.9	0.0	14.8	11.7	0.0	15.3
Incr Delay (d2), s/veh	0.8	0.0	1.6	2.4	0.0	1.1	0.1	0.0	1.4	0.0	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.6	2.3	0.0	1.3	0.6	0.0	4.6	0.3	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.9	0.0	39.1	40.3	0.0	38.2	11.0	0.0	16.2	11.8	0.0	16.5
LnGrp LOS	D	A	D	D	A	D	B	A	B	B	A	B
Approach Vol, veh/h		127			165			445			327	
Approach Delay, s/veh		38.6			39.5			15.4			16.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	50.0		15.6	10.7	47.9		15.8				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	38.0		10.0	7.0	38.0		12.0				
Max Q Clear Time (g_c+I1), s	2.7	13.8		5.7	3.6	11.4		7.1				
Green Ext Time (p_c), s	0.0	3.5		0.1	0.0	2.7		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			22.1									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	39	102	174	260	199	55
Future Vol, veh/h	39	102	174	260	199	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	42	111	189	283	216	60

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	907	246	276	0	-	0
Stage 1	246	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	306	793	1287	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	261	793	1287	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	514	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	3.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1287	-	507	-	-
HCM Lane V/C Ratio	0.147	-	0.302	-	-
HCM Control Delay (s)	8.3	-	15.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.5	-	1.3	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	5	8	5	4	11	4	263	5	11	231	6
Future Vol, veh/h	10	5	8	5	4	11	4	263	5	11	231	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	25	2	9	2	2	2	2	2	2
Mvmt Flow	11	5	9	5	4	12	4	286	5	12	251	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	584	578	255	583	579	289	258	0	0	291	0	0
Stage 1	279	279	-	297	297	-	-	-	-	-	-	-
Stage 2	305	299	-	286	282	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.35	6.52	6.29	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.725	4.018	3.381	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	423	427	784	391	426	734	1307	-	-	1271	-	-
Stage 1	728	680	-	665	668	-	-	-	-	-	-	-
Stage 2	705	666	-	674	678	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	408	421	784	378	420	734	1307	-	-	1271	-	-
Mov Cap-2 Maneuver	408	421	-	378	420	-	-	-	-	-	-	-
Stage 1	725	673	-	662	665	-	-	-	-	-	-	-
Stage 2	686	663	-	654	671	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	12.1	0.1	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1307	-	-	494	530	1271	-	-
HCM Lane V/C Ratio	0.003	-	-	0.051	0.041	0.009	-	-
HCM Control Delay (s)	7.8	0	-	12.7	12.1	7.9	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	7	279	5	6	247
Future Vol, veh/h	1	7	279	5	6	247
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	8	303	5	7	268

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	588	306	0	0	308	0
Stage 1	306	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	471	734	-	-	1253	-
Stage 1	747	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	468	734	-	-	1253	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	761	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	685	1253	-
HCM Lane V/C Ratio	-	-	0.013	0.005	-
HCM Control Delay (s)	-	-	10.3	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1133	18	58	961	10	12	5	30	11	7	0
Future Vol, veh/h	5	1133	18	58	961	10	12	5	30	11	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	20	3	6	2	5	2	8	2	2	2	2	2
Mvmt Flow	5	1232	20	63	1045	11	13	5	33	12	8	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1056	0	0	1252	0	0	1905	2434	626	1800	2433	523
Stage 1	-	-	-	-	-	-	1252	1252	-	1171	1171	-
Stage 2	-	-	-	-	-	-	653	1182	-	629	1262	-
Critical Hdwy	4.5	-	-	4.14	-	-	7.66	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.4	-	-	2.22	-	-	3.58	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	558	-	-	552	-	-	39	31	427	50	31	499
Stage 1	-	-	-	-	-	-	173	242	-	205	265	-
Stage 2	-	-	-	-	-	-	408	262	-	437	239	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	558	-	-	552	-	-	34	27	427	41	27	499
Mov Cap-2 Maneuver	-	-	-	-	-	-	147	156	-	167	134	-
Stage 1	-	-	-	-	-	-	171	240	-	203	235	-
Stage 2	-	-	-	-	-	-	350	232	-	391	237	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	22.5	32.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	256	558	-	-	552	-	-	152
HCM Lane V/C Ratio	0.2	0.01	-	-	0.114	-	-	0.129
HCM Control Delay (s)	22.5	11.5	-	-	12.4	-	-	32.2
HCM Lane LOS	C	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.7	0	-	-	0.4	-	-	0.4

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1090	84	168	982	0	47	0	96	0	0	0
Future Vol, veh/h	0	1090	84	168	982	0	47	0	96	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	4	3	2	4	2	12	2	8	2	2	2
Mvmt Flow	0	1185	91	183	1067	0	51	0	104	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1067	0	0	1276	0	0	2085	2618	593	2026	2709	534
Stage 1	-	-	-	-	-	-	1185	1185	-	1433	1433	-
Stage 2	-	-	-	-	-	-	900	1433	-	593	1276	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.74	6.54	7.06	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.62	4.02	3.38	3.52	4.02	3.32
Pot Cap-1 Maneuver	649	-	-	540	-	-	~ 27	24	434	34	21	491
Stage 1	-	-	-	-	-	-	185	261	-	141	198	-
Stage 2	-	-	-	-	-	-	280	198	-	459	236	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	649	-	-	540	-	-	~ 20	16	434	19	14	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	123	110	-	19	14	-
Stage 1	-	-	-	-	-	-	185	261	-	141	131	-
Stage 2	-	-	-	-	-	-	185	131	-	349	236	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.2	28.3	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	123	434	649	-	-	540	-	-	-
HCM Lane V/C Ratio	0.415	0.24	-	-	-	0.338	-	-	-
HCM Control Delay (s)	53.6	15.9	0	-	-	15	-	-	0
HCM Lane LOS	F	C	A	-	-	C	-	-	A
HCM 95th %tile Q(veh)	1.8	0.9	0	-	-	1.5	-	-	-

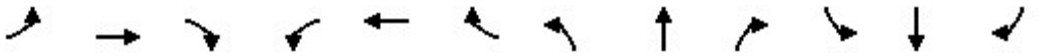
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX F: ANALYSIS WORKSHEETS OF 2031 FUTURE CONDITIONS WITH DEVELOPMENT



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	111	542	10	964	449	8	185	186	291
v/c Ratio	0.60	0.28	0.18	0.64	0.49	0.11	0.75	0.75	0.70
Control Delay	63.4	13.6	61.0	28.7	5.8	53.6	66.4	66.8	33.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.4	13.6	61.0	28.7	5.8	53.6	66.4	66.8	33.5
Queue Length 50th (ft)	83	96	8	295	20	6	145	146	150
Queue Length 95th (ft)	138	181	26	431	108	22	221	222	189
Internal Link Dist (ft)		1137		3233		690		155	
Turn Bay Length (ft)	660		155		265				
Base Capacity (vph)	501	1921	60	1498	910	75	314	314	709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.28	0.17	0.64	0.49	0.11	0.59	0.59	0.41

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	499	0	9	887	413	0	0	7	341	0	268
Future Volume (veh/h)	102	499	0	9	887	413	0	0	7	341	0	268
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1722	1870	418	1722	1781	1870	1870	418	1767	1870	1841
Adj Flow Rate, veh/h	111	542	0	10	964	449	0	0	8	371	0	291
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	12	2	100	12	8	2	2	100	9	2	4
Cap, veh/h	138	1726	0	7	1513	698	0	0	145	637	0	422
Arrive On Green	0.08	0.53	0.00	0.02	0.46	0.46	0.00	0.00	0.09	0.19	0.00	0.19
Sat Flow, veh/h	1697	3358	0	398	3272	1510	0	0	1585	3365	0	1560
Grp Volume(v), veh/h	111	542	0	10	964	449	0	0	8	371	0	291
Grp Sat Flow(s),veh/h/ln	1697	1636	0	398	1636	1510	0	0	1585	1682	0	1560
Q Serve(g_s), s	7.7	11.3	0.0	2.0	26.9	27.3	0.0	0.0	0.6	12.1	0.0	20.1
Cycle Q Clear(g_c), s	7.7	11.3	0.0	2.0	26.9	27.3	0.0	0.0	0.6	12.1	0.0	20.1
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	138	1726	0	7	1513	698	0	0	145	637	0	422
V/C Ratio(X)	0.80	0.31	0.00	1.52	0.64	0.64	0.00	0.00	0.06	0.58	0.00	0.69
Avail Cap(c_a), veh/h	509	1726	0	27	1513	698	0	0	145	673	0	439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.1	16.0	0.0	59.0	24.6	24.7	0.0	0.0	49.8	44.3	0.0	39.2
Incr Delay (d2), s/veh	10.2	0.5	0.0	349.2	2.1	4.5	0.0	0.0	0.7	1.2	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	3.9	0.0	0.8	9.9	9.8	0.0	0.0	0.3	4.9	0.0	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.3	16.5	0.0	408.2	26.6	29.2	0.0	0.0	50.5	45.5	0.0	43.5
LnGrp LOS	E	B	A	F	C	C	A	A	D	D	A	D
Approach Vol, veh/h		653			1423			8			662	
Approach Delay, s/veh		24.6			30.1			50.5			44.6	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	69.3		27.7	14.8	61.5		16.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	56.0		24.0	36.0	28.0		11.0				
Max Q Clear Time (g_c+I1), s	4.0	13.3		22.1	9.7	29.3		2.6				
Green Ext Time (p_c), s	0.0	3.4		0.6	0.3	0.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			32.4									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.

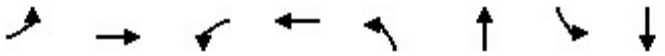
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	4	110	0	0	0	128	321	66	1	499	15
Future Vol, veh/h	16	4	110	0	0	0	128	321	66	1	499	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	5	2	2	2	2	11	8	2	7	7
Mvmt Flow	17	4	120	0	0	0	139	349	72	1	542	16

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1215	1251	550			558	0	0	421	0	0
Stage 1	552	552	-			-	-	-	-	-	-
Stage 2	663	699	-			-	-	-	-	-	-
Critical Hdwy	6.53	6.52	6.25			4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.53	5.52	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.53	5.52	-			-	-	-	-	-	-
Follow-up Hdwy	3.617	4.018	3.345			2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	190	172	529			1013	-	-	1138	-	-
Stage 1	555	515	-			-	-	-	-	-	-
Stage 2	492	442	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	164	0	529			1013	-	-	1138	-	-
Mov Cap-2 Maneuver	164	0	-			-	-	-	-	-	-
Stage 1	479	0	-			-	-	-	-	-	-
Stage 2	492	0	-			-	-	-	-	-	-

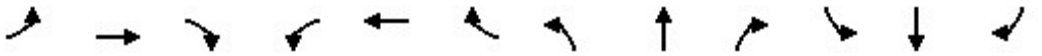
Approach	EB	NB	SB
HCM Control Delay, s	16.3	2.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1013	-	-	164	529	1138	-	-
HCM Lane V/C Ratio	0.137	-	-	0.133	0.226	0.001	-	-
HCM Control Delay (s)	9.1	-	-	30.3	13.8	8.2	-	-
HCM Lane LOS	A	-	-	D	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.4	0.9	0	-	-



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	80	121	77	58	188	179	34	495
v/c Ratio	0.43	0.48	0.42	0.27	0.45	0.20	0.05	0.58
Control Delay	45.1	17.5	44.8	31.2	12.3	14.2	8.1	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	17.5	44.8	31.2	12.3	14.2	8.1	20.6
Queue Length 50th (ft)	43	9	41	21	46	60	8	199
Queue Length 95th (ft)	88	60	85	57	78	104	19	304
Internal Link Dist (ft)		559		114		281		460
Turn Bay Length (ft)					215		225	
Base Capacity (vph)	187	252	185	213	416	903	727	860
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.48	0.42	0.27	0.45	0.20	0.05	0.58

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	16	96	71	37	17	173	156	8	31	348	108
Future Volume (veh/h)	74	16	96	71	37	17	173	156	8	31	348	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1811	1663	1781	1870	1870	1767	1722	1856	1870	1856	1811
Adj Flow Rate, veh/h	80	17	104	77	40	18	188	170	9	34	378	117
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	6	16	8	2	2	9	12	3	2	3	6
Cap, veh/h	189	24	149	182	131	59	413	782	41	667	610	189
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.08	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1711	220	1348	1697	1222	550	1682	1621	86	1781	1359	421
Grp Volume(v), veh/h	80	0	121	77	0	58	188	0	179	34	0	495
Grp Sat Flow(s),veh/h/ln	1711	0	1568	1697	0	1771	1682	0	1707	1781	0	1780
Q Serve(g_s), s	3.9	0.0	6.7	3.8	0.0	2.7	5.4	0.0	5.5	0.9	0.0	19.1
Cycle Q Clear(g_c), s	3.9	0.0	6.7	3.8	0.0	2.7	5.4	0.0	5.5	0.9	0.0	19.1
Prop In Lane	1.00		0.86	1.00		0.31	1.00		0.05	1.00		0.24
Lane Grp Cap(c), veh/h	189	0	173	182	0	190	413	0	823	667	0	799
V/C Ratio(X)	0.42	0.00	0.70	0.42	0.00	0.31	0.46	0.00	0.22	0.05	0.00	0.62
Avail Cap(c_a), veh/h	190	0	174	189	0	197	413	0	823	727	0	799
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.4	0.0	38.6	37.6	0.0	37.1	13.9	0.0	13.5	11.8	0.0	18.9
Incr Delay (d2), s/veh	1.5	0.0	11.6	1.6	0.0	0.9	0.8	0.0	0.6	0.0	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	3.1	1.6	0.0	1.2	1.8	0.0	2.0	0.3	0.0	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	50.2	39.1	0.0	38.0	14.7	0.0	14.1	11.8	0.0	22.5
LnGrp LOS	D	A	D	D	A	D	B	A	B	B	A	C
Approach Vol, veh/h		201			135			367			529	
Approach Delay, s/veh		45.7			38.6			14.4			21.8	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	49.4		15.9	12.0	46.4		15.7				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	40.0		10.0	7.0	40.0		10.0				
Max Q Clear Time (g_c+I1), s	2.9	7.5		8.7	7.4	21.1		5.8				
Green Ext Time (p_c), s	0.0	1.6		0.1	0.0	4.5		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			25.4									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	172	49	198	315	17
Future Vol, veh/h	54	172	49	198	315	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	1	13	7	6	7
Mvmt Flow	59	187	53	215	342	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	672	351	360	0	-	0
Stage 1	351	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Critical Hdwy	6.47	6.21	4.23	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.309	2.317	-	-	-
Pot Cap-1 Maneuver	413	695	1140	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	394	695	1140	-	-	-
Mov Cap-2 Maneuver	394	-	-	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.4	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1140	-	588	-	-
HCM Lane V/C Ratio	0.047	-	0.418	-	-
HCM Control Delay (s)	8.3	-	15.4	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	2.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	6	4	4	6	14	9	228	16	8	285	15
Future Vol, veh/h	7	6	4	4	6	14	9	228	16	8	285	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	17	50	2	2	2	33	7	2	2	6	2
Mvmt Flow	8	7	4	4	7	15	10	248	17	9	310	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	624	621	318	619	621	257	326	0	0	265	0	0
Stage 1	336	336	-	277	277	-	-	-	-	-	-	-
Stage 2	288	285	-	342	344	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.67	6.7	7.12	6.52	6.22	4.43	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.153	3.75	3.518	4.018	3.318	2.497	-	-	2.218	-	-
Pot Cap-1 Maneuver	398	384	624	401	403	782	1079	-	-	1299	-	-
Stage 1	678	616	-	729	681	-	-	-	-	-	-	-
Stage 2	720	649	-	673	637	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	380	377	624	387	395	782	1079	-	-	1299	-	-
Mov Cap-2 Maneuver	380	377	-	387	395	-	-	-	-	-	-	-
Stage 1	671	611	-	721	674	-	-	-	-	-	-	-
Stage 2	691	642	-	656	632	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	11.8	0.3	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1079	-	-	417	553	1299	-	-
HCM Lane V/C Ratio	0.009	-	-	0.044	0.047	0.007	-	-
HCM Control Delay (s)	8.4	0	-	14	11.8	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	3	284	4	3	293
Future Vol, veh/h	5	3	284	4	3	293
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	6	2	33	5
Mvmt Flow	5	3	309	4	3	318

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	635	311	0	0	313	0
Stage 1	311	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.43	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.497	-
Pot Cap-1 Maneuver	443	729	-	-	1091	-
Stage 1	743	-	-	-	-	-
Stage 2	733	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	442	729	-	-	1091	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	731	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	519	1091	-
HCM Lane V/C Ratio	-	-	0.017	0.003	-
HCM Control Delay (s)	-	-	12.1	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	837	10	14	1276	21	29	12	33	12	4	4
Future Vol, veh/h	0	837	10	14	1276	21	29	12	33	12	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	12	2	15	6	2	3	2	6	8	2	2
Mvmt Flow	0	910	11	15	1387	23	32	13	36	13	4	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1410	0	0	921	0	0	1642	2356	461	1879	2338	694
Stage 1	-	-	-	-	-	-	916	916	-	1417	1417	-
Stage 2	-	-	-	-	-	-	726	1440	-	462	921	-
Critical Hdwy	4.14	-	-	4.4	-	-	7.56	6.54	7.02	7.66	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.22	-	-	2.35	-	-	3.53	4.02	3.36	3.58	4.02	3.32
Pot Cap-1 Maneuver	480	-	-	661	-	-	65	35	537	41	36	385
Stage 1	-	-	-	-	-	-	291	349	-	136	201	-
Stage 2	-	-	-	-	-	-	380	196	-	534	347	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	480	-	-	661	-	-	62	34	537	35	35	385
Mov Cap-2 Maneuver	-	-	-	-	-	-	222	160	-	125	162	-
Stage 1	-	-	-	-	-	-	291	349	-	136	196	-
Stage 2	-	-	-	-	-	-	359	191	-	480	347	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	23.2	32.4
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	277	480	-	-	661	-	-	153
HCM Lane V/C Ratio	0.29	-	-	-	0.023	-	-	0.142
HCM Control Delay (s)	23.2	0	-	-	10.6	-	-	32.4
HCM Lane LOS	C	A	-	-	B	-	-	D
HCM 95th %tile Q(veh)	1.2	0	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	948	24	56	1209	0	75	0	138	0	0	0
Future Vol, veh/h	0	948	24	56	1209	0	75	0	138	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	11	33	25	6	2	3	2	6	2	2	2
Mvmt Flow	0	1030	26	61	1314	0	82	0	150	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1314	0	0	1056	0	0	1809	2466	515	1951	2492	657
Stage 1	-	-	-	-	-	-	1030	1030	-	1436	1436	-
Stage 2	-	-	-	-	-	-	779	1436	-	515	1056	-
Critical Hdwy	4.14	-	-	4.6	-	-	7.56	6.54	7.02	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.45	-	-	3.53	4.02	3.36	3.52	4.02	3.32
Pot Cap-1 Maneuver	522	-	-	534	-	-	~ 49	30	494	38	29	407
Stage 1	-	-	-	-	-	-	248	309	-	140	197	-
Stage 2	-	-	-	-	-	-	353	197	-	511	300	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	522	-	-	534	-	-	~ 45	27	494	24	26	407
Mov Cap-2 Maneuver	-	-	-	-	-	-	188	145	-	24	26	-
Stage 1	-	-	-	-	-	-	248	309	-	140	175	-
Stage 2	-	-	-	-	-	-	313	175	-	356	300	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	23.4	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	188	494	522	-	-	534	-	-	-
HCM Lane V/C Ratio	0.434	0.304	-	-	-	0.114	-	-	-
HCM Control Delay (s)	38.1	15.4	0	-	-	12.6	-	-	0
HCM Lane LOS	E	C	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	2	1.3	0	-	-	0.4	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	53	235	14	24	274
Future Vol, veh/h	34	53	235	14	24	274
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	58	255	15	26	298

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	613	263	0	0	270	0
Stage 1	263	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	456	776	-	-	1293	-
Stage 1	781	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	445	776	-	-	1293	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	781	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	445	776	1293	-
HCM Lane V/C Ratio	-	-	0.083	0.074	0.02	-
HCM Control Delay (s)	-	-	13.8	10	7.8	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.2	0.1	-

Intersection	
Int Delay, s/veh	16.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	792	1107	177	180	198
Future Vol, veh/h	90	792	1107	177	180	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	861	1203	192	196	215

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1395	0	-	0	1926	698
Stage 1	-	-	-	-	1299	-
Stage 2	-	-	-	-	627	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	486	-	-	-	~ 58	383
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	486	-	-	-	~ 46	383
Mov Cap-2 Maneuver	-	-	-	-	~ 160	-
Stage 1	-	-	-	-	~ 176	-
Stage 2	-	-	-	-	495	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	108.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	486	-	-	-	160	383
HCM Lane V/C Ratio	0.201	-	-	-	1.223	0.562
HCM Control Delay (s)	14.3	-	-	-	199.7	25.8
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.7	-	-	-	11.1	3.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	272	966	5	665	423	9	172	172	155
v/c Ratio	0.78	0.47	0.09	0.53	0.49	0.11	0.70	0.70	0.28
Control Delay	60.4	15.4	57.0	32.7	5.2	53.6	63.6	63.6	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	15.4	57.0	32.7	5.2	53.6	63.6	63.6	17.0
Queue Length 50th (ft)	201	190	4	207	0	7	134	134	61
Queue Length 95th (ft)	276	354	17	321	81	24	203	203	73
Internal Link Dist (ft)		1137		3233		690		155	
Turn Bay Length (ft)	660		155		265				
Base Capacity (vph)	515	2050	60	1252	869	81	336	336	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.47	0.08	0.53	0.49	0.11	0.51	0.51	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	898	0	5	618	393	1	0	7	320	0	144
Future Volume (veh/h)	253	898	0	5	618	393	1	0	7	320	0	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1796	1870	418	1737	1870	418	1900	625	1870	1870	1856
Adj Flow Rate, veh/h	272	966	0	5	665	423	1	0	8	344	0	155
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	7	2	100	11	2	100	0	86	2	2	3
Cap, veh/h	306	2050	0	4	1430	687	17	0	133	441	0	472
Arrive On Green	0.18	0.60	0.00	0.01	0.43	0.43	0.09	0.00	0.09	0.12	0.00	0.12
Sat Flow, veh/h	1739	3503	0	398	3300	1585	181	0	1449	3563	0	1572
Grp Volume(v), veh/h	272	966	0	5	665	423	9	0	0	344	0	155
Grp Sat Flow(s),veh/h/ln	1739	1706	0	398	1650	1585	1630	0	0	1781	0	1572
Q Serve(g_s), s	18.3	18.9	0.0	1.1	17.2	24.7	0.6	0.0	0.0	11.2	0.0	9.2
Cycle Q Clear(g_c), s	18.3	18.9	0.0	1.1	17.2	24.7	0.6	0.0	0.0	11.2	0.0	9.2
Prop In Lane	1.00		0.00	1.00		1.00	0.11		0.89	1.00		1.00
Lane Grp Cap(c), veh/h	306	2050	0	4	1430	687	149	0	0	441	0	472
V/C Ratio(X)	0.89	0.47	0.00	1.40	0.46	0.62	0.06	0.00	0.00	0.78	0.00	0.33
Avail Cap(c_a), veh/h	522	2050	0	27	1430	687	149	0	0	713	0	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.3	13.3	0.0	59.5	24.1	26.3	49.8	0.0	0.0	51.0	0.0	32.6
Incr Delay (d2), s/veh	9.7	0.8	0.0	368.1	1.1	4.1	0.8	0.0	0.0	3.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	6.5	0.0	0.5	6.4	9.4	0.3	0.0	0.0	5.0	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.0	14.1	0.0	427.6	25.2	30.4	50.6	0.0	0.0	54.1	0.0	33.0
LnGrp LOS	E	B	A	F	C	C	D	A	A	D	A	C
Approach Vol, veh/h		1238			1093			9			499	
Approach Delay, s/veh		23.8			29.0			50.6			47.5	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	78.1		19.8	26.1	58.0		16.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	56.0		24.0	36.0	28.0		11.0				
Max Q Clear Time (g_c+I1), s	3.1	20.9		13.2	20.3	26.7		2.6				
Green Ext Time (p_c), s	0.0	6.8		1.6	0.8	0.7		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		30.1	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

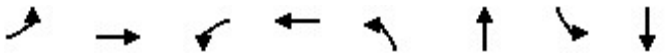
Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	14	96	0	0	0	127	432	87	0	368	45
Future Vol, veh/h	19	14	96	0	0	0	127	432	87	0	368	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	4	3	2	2	2	2
Mvmt Flow	21	15	104	0	0	0	138	470	95	0	400	49

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1219	1266	425	449	0	0	-	-	0
Stage 1	425	425	-	-	-	-	-	-	-
Stage 2	794	841	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	199	169	629	1101	-	-	0	-	-
Stage 1	659	586	-	-	-	-	0	-	-
Stage 2	445	380	-	-	-	-	0	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	174	0	629	1101	-	-	-	-	-
Mov Cap-2 Maneuver	174	0	-	-	-	-	-	-	-
Stage 1	577	0	-	-	-	-	-	-	-
Stage 2	445	0	-	-	-	-	-	-	-

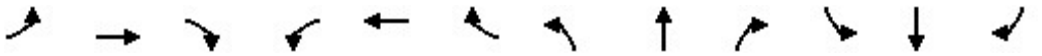
Approach	EB	NB	SB
HCM Control Delay, s	16.8	1.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1101	-	-	174	629	-	-
HCM Lane V/C Ratio	0.125	-	-	0.206	0.166	-	-
HCM Control Delay (s)	8.7	-	-	31	11.9	-	-
HCM Lane LOS	A	-	-	D	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.7	0.6	-	-



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	72	105	60	66	424	29	325
v/c Ratio	0.28	0.31	0.50	0.25	0.11	0.38	0.05	0.32
Control Delay	40.9	18.0	45.2	15.9	9.2	15.7	8.9	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	18.0	45.2	15.9	9.2	15.7	8.9	16.9
Queue Length 50th (ft)	29	8	57	5	15	124	7	119
Queue Length 95th (ft)	66	47	107	40	34	265	18	193
Internal Link Dist (ft)		559		114		281		460
Turn Bay Length (ft)					215		225	
Base Capacity (vph)	196	233	233	260	625	1102	594	1001
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.31	0.45	0.23	0.11	0.38	0.05	0.32

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	14	52	97	8	47	61	377	13	27	264	35
Future Volume (veh/h)	51	14	52	97	8	47	61	377	13	27	264	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1870	1870	1856	1870	1559	1870	1870	1870
Adj Flow Rate, veh/h	55	15	57	105	9	51	66	410	14	29	287	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	3	2	2	3	2	23	2	2	2
Cap, veh/h	190	36	138	193	27	151	558	878	30	477	754	100
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.06	0.49	0.49	0.04	0.47	0.47
Sat Flow, veh/h	1781	341	1296	1767	243	1379	1767	1798	61	1781	1618	214
Grp Volume(v), veh/h	55	0	72	105	0	60	66	0	424	29	0	325
Grp Sat Flow(s),veh/h/ln	1781	0	1637	1767	0	1622	1767	0	1859	1781	0	1832
Q Serve(g_s), s	2.6	0.0	3.7	5.1	0.0	3.1	1.6	0.0	13.6	0.7	0.0	10.4
Cycle Q Clear(g_c), s	2.6	0.0	3.7	5.1	0.0	3.1	1.6	0.0	13.6	0.7	0.0	10.4
Prop In Lane	1.00		0.79	1.00		0.85	1.00		0.03	1.00		0.12
Lane Grp Cap(c), veh/h	190	0	174	193	0	177	558	0	908	477	0	853
V/C Ratio(X)	0.29	0.00	0.41	0.54	0.00	0.34	0.12	0.00	0.47	0.06	0.00	0.38
Avail Cap(c_a), veh/h	198	0	182	236	0	216	584	0	908	544	0	853
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	37.6	38.0	0.0	37.1	11.0	0.0	15.2	11.9	0.0	15.6
Incr Delay (d2), s/veh	0.8	0.0	1.6	2.4	0.0	1.1	0.1	0.0	1.7	0.1	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.6	2.3	0.0	1.3	0.6	0.0	5.4	0.3	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.9	0.0	39.1	40.3	0.0	38.2	11.1	0.0	17.0	12.0	0.0	16.9
LnGrp LOS	D	A	D	D	A	D	B	A	B	B	A	B
Approach Vol, veh/h		127			165			490			354	
Approach Delay, s/veh		38.6			39.5			16.2			16.5	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	50.0		15.6	10.7	47.9		15.8				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	38.0		10.0	7.0	38.0		12.0				
Max Q Clear Time (g_c+I1), s	2.7	15.6		5.7	3.6	12.4		7.1				
Green Ext Time (p_c), s	0.0	3.9		0.1	0.0	3.0		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		22.2	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	39	102	174	301	224	55
Future Vol, veh/h	39	102	174	301	224	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	42	111	189	327	243	60

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	978	273	303	0	-	0
Stage 1	273	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	278	766	1258	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	236	766	1258	-	-	-
Mov Cap-2 Maneuver	236	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	490	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	3.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1258	-	472	-	-
HCM Lane V/C Ratio	0.15	-	0.325	-	-
HCM Control Delay (s)	8.4	-	16.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.5	-	1.4	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	5	8	5	4	11	4	304	5	11	256	6
Future Vol, veh/h	10	5	8	5	4	11	4	304	5	11	256	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	25	2	9	2	2	2	2	2	2
Mvmt Flow	11	5	9	5	4	12	4	330	5	12	278	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	655	649	282	654	650	333	285	0	0	335	0	0
Stage 1	306	306	-	341	341	-	-	-	-	-	-	-
Stage 2	349	343	-	313	309	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.35	6.52	6.29	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.725	4.018	3.381	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	379	389	757	350	388	693	1277	-	-	1224	-	-
Stage 1	704	662	-	629	639	-	-	-	-	-	-	-
Stage 2	667	637	-	651	660	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	365	383	757	338	382	693	1277	-	-	1224	-	-
Mov Cap-2 Maneuver	365	383	-	338	382	-	-	-	-	-	-	-
Stage 1	701	654	-	626	636	-	-	-	-	-	-	-
Stage 2	648	634	-	631	652	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.5	12.8	0.1	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1277	-	-	451	486	1224	-	-
HCM Lane V/C Ratio	0.003	-	-	0.055	0.045	0.01	-	-
HCM Control Delay (s)	7.8	0	-	13.5	12.8	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	7	317	5	6	310
Future Vol, veh/h	1	7	317	5	6	310
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	8	345	5	7	337

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	699	348	0	0	350	0
Stage 1	348	-	-	-	-	-
Stage 2	351	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	406	695	-	-	1209	-
Stage 1	715	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	403	695	-	-	1209	-
Mov Cap-2 Maneuver	403	-	-	-	-	-
Stage 1	715	-	-	-	-	-
Stage 2	708	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	637	1209	-
HCM Lane V/C Ratio	-	-	0.014	0.005	-
HCM Control Delay (s)	-	-	10.7	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1202	18	58	1004	10	12	5	30	11	7	0
Future Vol, veh/h	5	1202	18	58	1004	10	12	5	30	11	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	20	3	6	2	5	2	8	2	2	2	2	2
Mvmt Flow	5	1307	20	63	1091	11	13	5	33	12	8	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1102	0	0	1327	0	0	2003	2555	664	1883	2554	546
Stage 1	-	-	-	-	-	-	1327	1327	-	1217	1217	-
Stage 2	-	-	-	-	-	-	676	1228	-	666	1337	-
Critical Hdwy	4.5	-	-	4.14	-	-	7.66	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.4	-	-	2.22	-	-	3.58	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	534	-	-	516	-	-	33	26	403	43	26	482
Stage 1	-	-	-	-	-	-	156	223	-	192	252	-
Stage 2	-	-	-	-	-	-	395	249	-	415	220	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	534	-	-	516	-	-	28	23	403	35	23	482
Mov Cap-2 Maneuver	-	-	-	-	-	-	134	145	-	155	121	-
Stage 1	-	-	-	-	-	-	155	221	-	190	221	-
Stage 2	-	-	-	-	-	-	335	219	-	369	218	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	24.3	34.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	237	534	-	-	516	-	-	140
HCM Lane V/C Ratio	0.216	0.01	-	-	0.122	-	-	0.14
HCM Control Delay (s)	24.3	11.8	-	-	12.9	-	-	34.8
HCM Lane LOS	C	B	-	-	B	-	-	D
HCM 95th %tile Q(veh)	0.8	0	-	-	0.4	-	-	0.5

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1179	84	168	1115	0	47	0	96	0	0	0
Future Vol, veh/h	0	1179	84	168	1115	0	47	0	96	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	4	3	2	4	2	12	2	8	2	2	2
Mvmt Flow	0	1282	91	183	1212	0	51	0	104	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1212	0	0	1373	0	0	2254	2860	641	2219	2951	606
Stage 1	-	-	-	-	-	-	1282	1282	-	1578	1578	-
Stage 2	-	-	-	-	-	-	972	1578	-	641	1373	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.74	6.54	7.06	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.62	4.02	3.38	3.52	4.02	3.32
Pot Cap-1 Maneuver	571	-	-	496	-	-	~ 20	17	403	24	14	440
Stage 1	-	-	-	-	-	-	160	234	-	114	168	-
Stage 2	-	-	-	-	-	-	253	168	-	430	212	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	571	-	-	496	-	-	~ 14	11	403	13	9	440
Mov Cap-2 Maneuver	-	-	-	-	-	-	106	90	-	13	9	-
Stage 1	-	-	-	-	-	-	160	234	-	114	106	-
Stage 2	-	-	-	-	-	-	160	106	-	319	212	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.2	33.5	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	106	403	571	-	-	496	-	-	-
HCM Lane V/C Ratio	0.482	0.259	-	-	-	0.368	-	-	-
HCM Control Delay (s)	67.2	17	0	-	-	16.4	-	-	0
HCM Lane LOS	F	C	A	-	-	C	-	-	A
HCM 95th %tile Q(veh)	2.1	1	0	-	-	1.7	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	38	284	41	63	248
Future Vol, veh/h	25	38	284	41	63	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	41	309	45	68	270

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	738	332	0	0	354	0
Stage 1	332	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	385	710	-	-	1205	-
Stage 1	727	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	360	710	-	-	1205	-
Mov Cap-2 Maneuver	360	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	629	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	360	710	1205	-
HCM Lane V/C Ratio	-	-	0.075	0.058	0.057	-
HCM Control Delay (s)	-	-	15.8	10.4	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2	0.2	-

Intersection	
Int Delay, s/veh	7.1

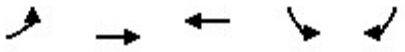
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	123	1120	947	215	143	125
Future Vol, veh/h	123	1120	947	215	143	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	134	1217	1029	234	155	136

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1263	0	-	0	2023	632
Stage 1	-	-	-	-	1146	-
Stage 2	-	-	-	-	877	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	546	-	-	-	~ 50	423
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	367	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	546	-	-	-	~ 38	423
Mov Cap-2 Maneuver	-	-	-	-	168	-
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	367	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	64.5
HCM LOS			F

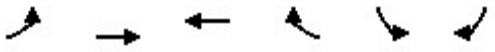
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	546	-	-	-	168	423
HCM Lane V/C Ratio	0.245	-	-	-	0.925	0.321
HCM Control Delay (s)	13.7	-	-	-	105.5	17.5
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	1	-	-	-	6.9	1.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	98	861	1395	196	215
v/c Ratio	0.53	0.33	0.66	0.68	0.49
Control Delay	48.3	4.9	15.1	47.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.3	4.9	15.1	47.2	8.7
Queue Length 50th (ft)	53	75	273	106	0
Queue Length 95th (ft)	103	117	391	170	57
Internal Link Dist (ft)		2796	1500	426	
Turn Bay Length (ft)	175				
Base Capacity (vph)	210	2607	2110	363	496
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.33	0.66	0.54	0.43

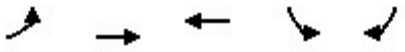
Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	792	1107	177	180	198
Future Volume (veh/h)	90	792	1107	177	180	198
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	861	1203	192	196	215
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	125	2627	1901	302	287	255
Arrive On Green	0.07	0.74	0.62	0.62	0.16	0.16
Sat Flow, veh/h	1781	3647	3165	488	1781	1585
Grp Volume(v), veh/h	98	861	693	702	196	215
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1783	1781	1585
Q Serve(g_s), s	4.9	7.5	22.0	22.3	9.3	11.9
Cycle Q Clear(g_c), s	4.9	7.5	22.0	22.3	9.3	11.9
Prop In Lane	1.00			0.27	1.00	1.00
Lane Grp Cap(c), veh/h	125	2627	1100	1103	287	255
V/C Ratio(X)	0.78	0.33	0.63	0.64	0.68	0.84
Avail Cap(c_a), veh/h	208	2627	1100	1103	366	326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.2	4.0	10.7	10.8	35.6	36.7
Incr Delay (d2), s/veh	10.1	0.3	2.7	2.8	3.6	14.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	1.5	7.1	7.3	4.3	10.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.3	4.4	13.5	13.6	39.2	51.3
LnGrp LOS	D	A	B	B	D	D
Approach Vol, veh/h		959	1395		411	
Approach Delay, s/veh		9.2	13.5		45.6	
Approach LOS		A	B		D	

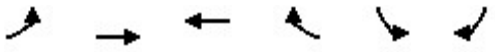
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		71.0		19.0	10.8	60.2
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		62.5		18.5	10.5	47.5
Max Q Clear Time (g_c+I1), s		9.5		13.9	6.9	24.3
Green Ext Time (p_c), s		6.0		0.6	0.1	9.2

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	134	1217	1263	155	136
v/c Ratio	0.57	0.46	0.64	0.60	0.39
Control Delay	45.2	5.2	15.9	45.4	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	5.2	15.9	45.4	9.5
Queue Length 50th (ft)	72	109	230	84	0
Queue Length 95th (ft)	123	182	383	138	46
Internal Link Dist (ft)		2796	1500	426	
Turn Bay Length (ft)	175				
Base Capacity (vph)	325	2670	1980	363	433
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.46	0.64	0.43	0.31

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	123	1120	947	215	143	125
Future Volume (veh/h)	123	1120	947	215	143	125
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	134	1217	1029	234	155	136
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	168	2795	1848	419	202	180
Arrive On Green	0.09	0.79	0.64	0.64	0.11	0.11
Sat Flow, veh/h	1781	3647	2971	652	1781	1585
Grp Volume(v), veh/h	134	1217	634	629	155	136
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1753	1781	1585
Q Serve(g_s), s	6.6	10.0	17.9	18.0	7.6	7.5
Cycle Q Clear(g_c), s	6.6	10.0	17.9	18.0	7.6	7.5
Prop In Lane	1.00			0.37	1.00	1.00
Lane Grp Cap(c), veh/h	168	2795	1141	1126	202	180
V/C Ratio(X)	0.80	0.44	0.56	0.56	0.77	0.76
Avail Cap(c_a), veh/h	327	2795	1141	1126	366	326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	3.1	9.0	9.0	38.7	38.7
Incr Delay (d2), s/veh	8.3	0.5	2.0	2.0	6.0	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	1.4	5.5	5.5	3.6	6.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.2	3.6	10.9	11.0	44.7	45.0
LnGrp LOS	D	A	B	B	D	D
Approach Vol, veh/h		1351	1263		291	
Approach Delay, s/veh		8.0	11.0		44.9	
Approach LOS		A	B		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		75.3		14.7	13.0	62.3
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		62.5		18.5	16.5	41.5
Max Q Clear Time (g_c+I1), s		12.0		9.6	8.6	20.0
Green Ext Time (p_c), s		10.0		0.6	0.2	7.8

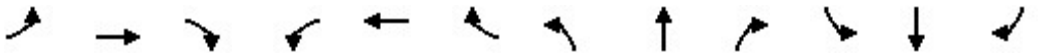
Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

APPENDIX G: ANALYSIS WORKSHEETS OF 2035 FUTURE CONDITIONS WITH DEVELOPMENT



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	114	615	10	1047	468	8	194	195	304
v/c Ratio	0.60	0.32	0.18	0.71	0.52	0.11	0.77	0.77	0.71
Control Delay	63.3	14.3	61.0	31.0	7.4	53.6	67.2	67.5	33.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	14.3	61.0	31.0	7.4	53.6	67.2	67.5	33.8
Queue Length 50th (ft)	85	113	8	337	36	6	152	152	156
Queue Length 95th (ft)	141	208	26	485	142	22	231	232	197
Internal Link Dist (ft)		1137		3233		690		155	
Turn Bay Length (ft)	660		155		265				
Base Capacity (vph)	501	1908	60	1478	894	75	314	314	716
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.32	0.17	0.71	0.52	0.11	0.62	0.62	0.42

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	566	0	9	963	431	0	0	7	358	0	280
Future Volume (veh/h)	105	566	0	9	963	431	0	0	7	358	0	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1722	1870	418	1722	1781	1870	1870	418	1767	1870	1841
Adj Flow Rate, veh/h	114	615	0	10	1047	468	0	0	8	389	0	304
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	12	2	100	12	8	2	2	100	9	2	4
Cap, veh/h	142	1709	0	7	1490	687	0	0	145	655	0	434
Arrive On Green	0.08	0.52	0.00	0.02	0.46	0.46	0.00	0.00	0.09	0.19	0.00	0.19
Sat Flow, veh/h	1697	3358	0	398	3272	1510	0	0	1585	3365	0	1560
Grp Volume(v), veh/h	114	615	0	10	1047	468	0	0	8	389	0	304
Grp Sat Flow(s),veh/h/ln	1697	1636	0	398	1636	1510	0	0	1585	1682	0	1560
Q Serve(g_s), s	7.9	13.3	0.0	2.0	30.8	29.4	0.0	0.0	0.6	12.6	0.0	21.0
Cycle Q Clear(g_c), s	7.9	13.3	0.0	2.0	30.8	29.4	0.0	0.0	0.6	12.6	0.0	21.0
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	142	1709	0	7	1490	687	0	0	145	655	0	434
V/C Ratio(X)	0.80	0.36	0.00	1.52	0.70	0.68	0.00	0.00	0.06	0.59	0.00	0.70
Avail Cap(c_a), veh/h	509	1709	0	27	1490	687	0	0	145	673	0	442
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.0	16.9	0.0	59.0	26.2	25.8	0.0	0.0	49.8	44.0	0.0	38.8
Incr Delay (d2), s/veh	10.1	0.6	0.0	349.2	2.8	5.4	0.0	0.0	0.7	1.4	0.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	4.7	0.0	0.8	11.5	10.6	0.0	0.0	0.3	5.2	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.1	17.5	0.0	408.2	29.0	31.2	0.0	0.0	50.5	45.4	0.0	43.6
LnGrp LOS	E	B	A	F	C	C	A	A	D	D	A	D
Approach Vol, veh/h		729			1525			8			693	
Approach Delay, s/veh		24.7			32.2			50.5			44.6	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	68.7		28.3	15.0	60.6		16.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	56.0		24.0	36.0	28.0		11.0				
Max Q Clear Time (g_c+I1), s	4.0	15.3		23.0	9.9	32.8		2.6				
Green Ext Time (p_c), s	0.0	3.9		0.4	0.3	0.0		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			33.3									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.

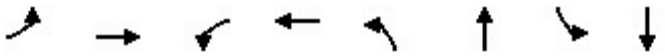
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	4	110	0	0	0	128	342	66	1	528	15
Future Vol, veh/h	16	4	110	0	0	0	128	342	66	1	528	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	13	2	5	2	2	2	2	11	8	2	7	7
Mvmt Flow	17	4	120	0	0	0	139	372	72	1	574	16

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1270	1306	582	590	0	0	444	0	0
Stage 1	584	584	-	-	-	-	-	-	-
Stage 2	686	722	-	-	-	-	-	-	-
Critical Hdwy	6.53	6.52	6.25	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.53	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.53	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.617	4.018	3.345	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	176	160	507	985	-	-	1116	-	-
Stage 1	536	498	-	-	-	-	-	-	-
Stage 2	480	431	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	151	0	507	985	-	-	1116	-	-
Mov Cap-2 Maneuver	151	0	-	-	-	-	-	-	-
Stage 1	460	0	-	-	-	-	-	-	-
Stage 2	480	0	-	-	-	-	-	-	-

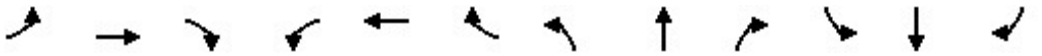
Approach	EB	NB	SB
HCM Control Delay, s	17.1	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	985	-	-	151	507	1116	-	-
HCM Lane V/C Ratio	0.141	-	-	0.144	0.236	0.001	-	-
HCM Control Delay (s)	9.3	-	-	32.8	14.3	8.2	-	-
HCM Lane LOS	A	-	-	D	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.5	0.9	0	-	-



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	80	121	77	58	188	201	34	527
v/c Ratio	0.43	0.48	0.42	0.27	0.48	0.22	0.05	0.61
Control Delay	45.1	17.5	44.8	31.2	13.0	14.5	8.1	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	17.5	44.8	31.2	13.0	14.5	8.1	21.6
Queue Length 50th (ft)	43	9	41	21	46	69	8	219
Queue Length 95th (ft)	88	60	85	57	78	116	19	333
Internal Link Dist (ft)		559		114		281		460
Turn Bay Length (ft)					215		225	
Base Capacity (vph)	187	252	185	213	391	903	715	861
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.48	0.42	0.27	0.48	0.22	0.05	0.61

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	16	96	71	37	17	173	177	8	31	377	108
Future Volume (veh/h)	74	16	96	71	37	17	173	177	8	31	377	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1811	1663	1781	1870	1870	1767	1722	1856	1870	1856	1811
Adj Flow Rate, veh/h	80	17	104	77	40	18	188	192	9	34	410	117
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	6	16	8	2	2	9	12	3	2	3	6
Cap, veh/h	189	24	149	182	131	59	391	787	37	647	623	178
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.08	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1711	220	1348	1697	1222	550	1682	1632	76	1781	1388	396
Grp Volume(v), veh/h	80	0	121	77	0	58	188	0	201	34	0	527
Grp Sat Flow(s),veh/h/ln	1711	0	1568	1697	0	1771	1682	0	1708	1781	0	1784
Q Serve(g_s), s	3.9	0.0	6.7	3.8	0.0	2.7	5.4	0.0	6.2	0.9	0.0	20.8
Cycle Q Clear(g_c), s	3.9	0.0	6.7	3.8	0.0	2.7	5.4	0.0	6.2	0.9	0.0	20.8
Prop In Lane	1.00		0.86	1.00		0.31	1.00		0.04	1.00		0.22
Lane Grp Cap(c), veh/h	189	0	173	182	0	190	391	0	824	647	0	801
V/C Ratio(X)	0.42	0.00	0.70	0.42	0.00	0.31	0.48	0.00	0.24	0.05	0.00	0.66
Avail Cap(c_a), veh/h	190	0	174	189	0	197	391	0	824	707	0	801
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.4	0.0	38.6	37.6	0.0	37.1	14.5	0.0	13.7	11.8	0.0	19.4
Incr Delay (d2), s/veh	1.5	0.0	11.6	1.6	0.0	0.9	0.9	0.0	0.7	0.0	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	3.1	1.6	0.0	1.2	1.8	0.0	2.2	0.3	0.0	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	50.2	39.1	0.0	38.0	15.4	0.0	14.4	11.9	0.0	23.6
LnGrp LOS	D	A	D	D	A	D	B	A	B	B	A	C
Approach Vol, veh/h		201			135			389			561	
Approach Delay, s/veh		45.7			38.6			14.9			22.9	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	49.4		15.9	12.0	46.4		15.7				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	40.0		10.0	7.0	40.0		10.0				
Max Q Clear Time (g_c+I1), s	2.9	8.2		8.7	7.4	22.8		5.8				
Green Ext Time (p_c), s	0.0	1.8		0.1	0.0	4.7		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			25.7									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	172	49	219	344	17
Future Vol, veh/h	54	172	49	219	344	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	1	13	7	6	7
Mvmt Flow	59	187	53	238	374	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	727	383	392	0	-	0
Stage 1	383	-	-	-	-	-
Stage 2	344	-	-	-	-	-
Critical Hdwy	6.47	6.21	4.23	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.309	2.317	-	-	-
Pot Cap-1 Maneuver	384	667	1109	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	366	667	1109	-	-	-
Mov Cap-2 Maneuver	366	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	707	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.5	1.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1109	-	557	-	-
HCM Lane V/C Ratio	0.048	-	0.441	-	-
HCM Control Delay (s)	8.4	-	16.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	2.2	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	6	4	4	6	14	9	249	16	8	314	15
Future Vol, veh/h	7	6	4	4	6	14	9	249	16	8	314	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	17	50	2	2	2	33	7	2	2	6	2
Mvmt Flow	8	7	4	4	7	15	10	271	17	9	341	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	678	675	349	673	675	280	357	0	0	288	0	0
Stage 1	367	367	-	300	300	-	-	-	-	-	-	-
Stage 2	311	308	-	373	375	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.67	6.7	7.12	6.52	6.22	4.43	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.67	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.153	3.75	3.518	4.018	3.318	2.497	-	-	2.218	-	-
Pot Cap-1 Maneuver	366	357	598	369	376	759	1049	-	-	1274	-	-
Stage 1	653	596	-	709	666	-	-	-	-	-	-	-
Stage 2	699	634	-	648	617	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	348	350	598	356	368	759	1049	-	-	1274	-	-
Mov Cap-2 Maneuver	348	350	-	356	368	-	-	-	-	-	-	-
Stage 1	646	591	-	701	659	-	-	-	-	-	-	-
Stage 2	671	627	-	630	611	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	12.3	0.3	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1049	-	-	387	522	1274	-	-
HCM Lane V/C Ratio	0.009	-	-	0.048	0.05	0.007	-	-
HCM Control Delay (s)	8.5	0	-	14.8	12.3	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	3	306	4	3	325
Future Vol, veh/h	5	3	306	4	3	325
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	6	2	33	5
Mvmt Flow	5	3	333	4	3	353

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	694	335	0	0	337	0
Stage 1	335	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.43	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.497	-
Pot Cap-1 Maneuver	409	707	-	-	1068	-
Stage 1	725	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	408	707	-	-	1068	-
Mov Cap-2 Maneuver	408	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	705	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	485	1068	-
HCM Lane V/C Ratio	-	-	0.018	0.003	-
HCM Control Delay (s)	-	-	12.6	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	921	10	14	1370	21	29	12	33	12	4	4
Future Vol, veh/h	0	921	10	14	1370	21	29	12	33	12	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	12	2	15	6	2	3	2	6	8	2	2
Mvmt Flow	0	1001	11	15	1489	23	32	13	36	13	4	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1512	0	0	1012	0	0	1784	2549	506	2026	2531	745
Stage 1	-	-	-	-	-	-	1007	1007	-	1519	1519	-
Stage 2	-	-	-	-	-	-	777	1542	-	507	1012	-
Critical Hdwy	4.14	-	-	4.4	-	-	7.56	6.54	7.02	7.66	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.66	5.54	-
Follow-up Hdwy	2.22	-	-	2.35	-	-	3.53	4.02	3.36	3.58	4.02	3.32
Pot Cap-1 Maneuver	438	-	-	608	-	-	51	26	501	31	27	357
Stage 1	-	-	-	-	-	-	256	317	-	117	180	-
Stage 2	-	-	-	-	-	-	354	175	-	501	315	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	438	-	-	608	-	-	48	25	501	26	26	357
Mov Cap-2 Maneuver	-	-	-	-	-	-	196	143	-	108	144	-
Stage 1	-	-	-	-	-	-	256	317	-	117	176	-
Stage 2	-	-	-	-	-	-	333	171	-	446	315	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	26.2	37.3
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	249	438	-	-	608	-	-	133
HCM Lane V/C Ratio	0.323	-	-	-	0.025	-	-	0.163
HCM Control Delay (s)	26.2	0	-	-	11.1	-	-	37.3
HCM Lane LOS	D	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	1.3	0	-	-	0.1	-	-	0.6

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1025	24	56	1330	0	75	0	138	0	0	0
Future Vol, veh/h	0	1025	24	56	1330	0	75	0	138	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	11	33	25	6	2	3	2	6	2	2	2
Mvmt Flow	0	1114	26	61	1446	0	82	0	150	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1446	0	0	1140	0	0	1959	2682	557	2125	2708	723
Stage 1	-	-	-	-	-	-	1114	1114	-	1568	1568	-
Stage 2	-	-	-	-	-	-	845	1568	-	557	1140	-
Critical Hdwy	4.14	-	-	4.6	-	-	7.56	6.54	7.02	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.45	-	-	3.53	4.02	3.36	3.52	4.02	3.32
Pot Cap-1 Maneuver	465	-	-	492	-	-	~ 38	22	464	28	21	369
Stage 1	-	-	-	-	-	-	220	282	-	116	170	-
Stage 2	-	-	-	-	-	-	322	170	-	482	274	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	465	-	-	492	-	-	~ 34	19	464	17	18	369
Mov Cap-2 Maneuver	-	-	-	-	-	-	166	124	-	17	18	-
Stage 1	-	-	-	-	-	-	220	282	-	116	149	-
Stage 2	-	-	-	-	-	-	282	149	-	326	274	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	26.8	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	166	464	465	-	-	492	-	-	-
HCM Lane V/C Ratio	0.491	0.323	-	-	-	0.124	-	-	-
HCM Control Delay (s)	46	16.4	0	-	-	13.3	-	-	0
HCM Lane LOS	E	C	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	2.4	1.4	0	-	-	0.4	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	54	256	14	27	303
Future Vol, veh/h	34	54	256	14	27	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	59	278	15	29	329

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	673	286	0	0	293	0
Stage 1	286	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	421	753	-	-	1269	-
Stage 1	763	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	409	753	-	-	1269	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	763	-	-	-	-	-
Stage 2	667	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	409	753	1269	-
HCM Lane V/C Ratio	-	-	0.09	0.078	0.023	-
HCM Control Delay (s)	-	-	14.7	10.2	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	0.1	-

Intersection	
Int Delay, s/veh	37.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	121	845	1174	231	204	225
Future Vol, veh/h	121	845	1174	231	204	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	132	918	1276	251	222	245

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1527	0	-	0	2125	764
Stage 1	-	-	-	-	1402	-
Stage 2	-	-	-	-	723	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	432	-	-	-	~ 43	346
Stage 1	-	-	-	-	~ 193	-
Stage 2	-	-	-	-	441	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	432	-	-	-	~ 30	346
Mov Cap-2 Maneuver	-	-	-	-	~ 122	-
Stage 1	-	-	-	-	~ 134	-
Stage 2	-	-	-	-	441	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	237.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	432	-	-	-	122	346
HCM Lane V/C Ratio	0.304	-	-	-	1.818	0.707
HCM Control Delay (s)	16.9	-	-	-	$ 459.2	37
HCM Lane LOS	C	-	-	-	F	E
HCM 95th %tile Q(veh)	1.3	-	-	-	17.3	5.1

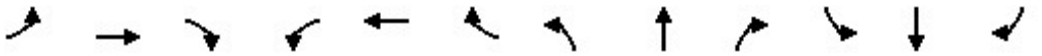
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	282	1000	5	709	439	9	181	181	161
v/c Ratio	0.79	0.49	0.09	0.58	0.51	0.11	0.72	0.72	0.29
Control Delay	60.3	16.0	57.0	34.6	5.4	53.6	64.2	64.2	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	16.0	57.0	34.6	5.4	53.6	64.2	64.2	16.5
Queue Length 50th (ft)	208	203	4	229	0	7	142	142	62
Queue Length 95th (ft)	284	373	17	#359	85	24	213	213	74
Internal Link Dist (ft)		1137		3233		690		155	
Turn Bay Length (ft)	660		155		265				
Base Capacity (vph)	515	2036	60	1220	868	81	336	336	705
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.49	0.08	0.58	0.51	0.11	0.54	0.54	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	930	0	5	659	408	1	0	7	337	0	150
Future Volume (veh/h)	262	930	0	5	659	408	1	0	7	337	0	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1796	1870	418	1737	1870	418	1900	625	1870	1870	1856
Adj Flow Rate, veh/h	282	1000	0	5	709	439	1	0	8	362	0	161
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	7	2	100	11	2	100	0	86	2	2	3
Cap, veh/h	316	2032	0	4	1394	670	17	0	133	459	0	489
Arrive On Green	0.18	0.60	0.00	0.01	0.42	0.42	0.09	0.00	0.09	0.13	0.00	0.13
Sat Flow, veh/h	1739	3503	0	398	3300	1585	181	0	1449	3563	0	1572
Grp Volume(v), veh/h	282	1000	0	5	709	439	9	0	0	362	0	161
Grp Sat Flow(s),veh/h/ln	1739	1706	0	398	1650	1585	1630	0	0	1781	0	1572
Q Serve(g_s), s	19.0	20.1	0.0	1.1	19.0	26.5	0.6	0.0	0.0	11.8	0.0	9.4
Cycle Q Clear(g_c), s	19.0	20.1	0.0	1.1	19.0	26.5	0.6	0.0	0.0	11.8	0.0	9.4
Prop In Lane	1.00		0.00	1.00		1.00	0.11		0.89	1.00		1.00
Lane Grp Cap(c), veh/h	316	2032	0	4	1394	670	149	0	0	459	0	489
V/C Ratio(X)	0.89	0.49	0.00	1.40	0.51	0.66	0.06	0.00	0.00	0.79	0.00	0.33
Avail Cap(c_a), veh/h	522	2032	0	27	1394	670	149	0	0	713	0	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.9	13.9	0.0	59.5	25.5	27.7	49.8	0.0	0.0	50.7	0.0	31.7
Incr Delay (d2), s/veh	10.7	0.9	0.0	368.1	1.3	5.0	0.8	0.0	0.0	3.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	6.9	0.0	0.5	7.2	10.2	0.3	0.0	0.0	5.3	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.6	14.7	0.0	427.6	26.8	32.6	50.6	0.0	0.0	53.9	0.0	32.1
LnGrp LOS	E	B	A	F	C	C	D	A	A	D	A	C
Approach Vol, veh/h		1282			1153			9			523	
Approach Delay, s/veh		24.4			30.8			50.6			47.2	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	77.5		20.5	26.8	56.7		16.0				
Change Period (Y+Rc), s	5.0	6.0		5.0	5.0	6.0		5.0				
Max Green Setting (Gmax), s	8.0	56.0		24.0	36.0	28.0		11.0				
Max Q Clear Time (g_c+I1), s	3.1	22.1		13.8	21.0	28.5		2.6				
Green Ext Time (p_c), s	0.0	7.1		1.6	0.8	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		31.0	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

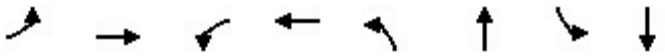
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	14	96	0	0	0	127	456	87	0	391	45
Future Vol, veh/h	19	14	96	0	0	0	127	456	87	0	391	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	25	-	0	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	4	3	2	2	2	2
Mvmt Flow	21	15	104	0	0	0	138	496	95	0	425	49

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1270	1317	450	474	0	0	-	-	0
Stage 1	450	450	-	-	-	-	-	-	-
Stage 2	820	867	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	186	157	609	1078	-	-	0	-	-
Stage 1	642	572	-	-	-	-	0	-	-
Stage 2	433	370	-	-	-	-	0	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	162	0	609	1078	-	-	-	-	-
Mov Cap-2 Maneuver	162	0	-	-	-	-	-	-	-
Stage 1	560	0	-	-	-	-	-	-	-
Stage 2	433	0	-	-	-	-	-	-	-

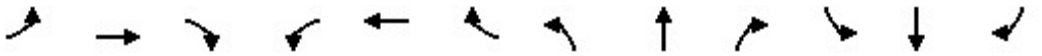
Approach	EB	NB	SB
HCM Control Delay, s	17.5	1.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1078	-	-	162	609	-	-
HCM Lane V/C Ratio	0.128	-	-	0.221	0.171	-	-
HCM Control Delay (s)	8.8	-	-	33.4	12.1	-	-
HCM Lane LOS	A	-	-	D	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.8	0.6	-	-



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	72	105	60	66	450	29	350
v/c Ratio	0.28	0.31	0.50	0.25	0.11	0.41	0.05	0.35
Control Delay	40.9	18.0	45.2	15.9	9.2	16.1	8.9	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	18.0	45.2	15.9	9.2	16.1	8.9	17.3
Queue Length 50th (ft)	29	8	57	5	15	135	7	131
Queue Length 95th (ft)	66	47	107	40	34	286	18	210
Internal Link Dist (ft)		559		114		281		460
Turn Bay Length (ft)					215		225	
Base Capacity (vph)	196	233	233	260	603	1103	570	1002
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.31	0.45	0.23	0.11	0.41	0.05	0.35

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	14	52	97	8	47	61	401	13	27	287	35
Future Volume (veh/h)	51	14	52	97	8	47	61	401	13	27	287	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1870	1870	1856	1870	1559	1870	1870	1870
Adj Flow Rate, veh/h	55	15	57	105	9	51	66	436	14	29	312	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	3	2	2	3	2	23	2	2	2
Cap, veh/h	190	36	138	193	27	151	539	880	28	457	762	93
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.06	0.49	0.49	0.04	0.47	0.47
Sat Flow, veh/h	1781	341	1296	1767	243	1379	1767	1802	58	1781	1635	199
Grp Volume(v), veh/h	55	0	72	105	0	60	66	0	450	29	0	350
Grp Sat Flow(s),veh/h/ln	1781	0	1637	1767	0	1622	1767	0	1860	1781	0	1835
Q Serve(g_s), s	2.6	0.0	3.7	5.1	0.0	3.1	1.6	0.0	14.7	0.7	0.0	11.3
Cycle Q Clear(g_c), s	2.6	0.0	3.7	5.1	0.0	3.1	1.6	0.0	14.7	0.7	0.0	11.3
Prop In Lane	1.00		0.79	1.00		0.85	1.00		0.03	1.00		0.11
Lane Grp Cap(c), veh/h	190	0	174	193	0	177	539	0	909	457	0	855
V/C Ratio(X)	0.29	0.00	0.41	0.54	0.00	0.34	0.12	0.00	0.50	0.06	0.00	0.41
Avail Cap(c_a), veh/h	198	0	182	236	0	216	565	0	909	524	0	855
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	0.0	37.6	38.0	0.0	37.1	11.1	0.0	15.5	12.1	0.0	15.9
Incr Delay (d2), s/veh	0.8	0.0	1.6	2.4	0.0	1.1	0.1	0.0	1.9	0.1	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.6	2.3	0.0	1.3	0.6	0.0	5.8	0.3	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.9	0.0	39.1	40.3	0.0	38.2	11.2	0.0	17.5	12.1	0.0	17.3
LnGrp LOS	D	A	D	D	A	D	B	A	B	B	A	B
Approach Vol, veh/h		127			165			516			379	
Approach Delay, s/veh		38.6			39.5			16.7			16.9	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	50.0		15.6	10.7	47.9		15.8				
Change Period (Y+Rc), s	5.0	6.0		6.0	5.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	38.0		10.0	7.0	38.0		12.0				
Max Q Clear Time (g_c+I1), s	2.7	16.7		5.7	3.6	13.3		7.1				
Green Ext Time (p_c), s	0.0	4.1		0.1	0.0	3.2		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			22.3									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	39	102	174	325	247	55
Future Vol, veh/h	39	102	174	325	247	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	225	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	42	111	189	353	268	60

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1029	298	328	0	-	0
Stage 1	298	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	259	741	1232	-	-	-
Stage 1	753	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	219	741	1232	-	-	-
Mov Cap-2 Maneuver	219	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.2	2.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1232	-	447	-	-
HCM Lane V/C Ratio	0.154	-	0.343	-	-
HCM Control Delay (s)	8.5	-	17.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.5	-	1.5	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	5	8	5	4	11	4	328	5	11	279	6
Future Vol, veh/h	10	5	8	5	4	11	4	328	5	11	279	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	25	2	9	2	2	2	2	2	2
Mvmt Flow	11	5	9	5	4	12	4	357	5	12	303	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	707	701	307	706	702	360	310	0	0	362	0	0
Stage 1	331	331	-	368	368	-	-	-	-	-	-	-
Stage 2	376	370	-	338	334	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.35	6.52	6.29	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.35	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.725	4.018	3.381	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	350	363	733	322	362	669	1250	-	-	1197	-	-
Stage 1	682	645	-	607	621	-	-	-	-	-	-	-
Stage 2	645	620	-	631	643	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	336	357	733	311	356	669	1250	-	-	1197	-	-
Mov Cap-2 Maneuver	336	357	-	311	356	-	-	-	-	-	-	-
Stage 1	679	637	-	605	619	-	-	-	-	-	-	-
Stage 2	627	618	-	611	635	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.1	13.3	0.1	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1250	-	-	421	457	1197	-	-
HCM Lane V/C Ratio	0.003	-	-	0.059	0.048	0.01	-	-
HCM Control Delay (s)	7.9	0	-	14.1	13.3	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	7	348	5	6	339
Future Vol, veh/h	1	7	348	5	6	339
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	8	378	5	7	368

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	763	381	0	0	383	0
Stage 1	381	-	-	-	-	-
Stage 2	382	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	372	666	-	-	1175	-
Stage 1	691	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	369	666	-	-	1175	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	605	1175	-
HCM Lane V/C Ratio	-	-	0.014	0.006	-
HCM Control Delay (s)	-	-	11	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1251	18	58	1060	10	12	5	30	11	7	0
Future Vol, veh/h	5	1251	18	58	1060	10	12	5	30	11	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	490	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	2	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	20	3	6	2	5	2	8	2	2	2	2	2
Mvmt Flow	5	1360	20	63	1152	11	13	5	33	12	8	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1163	0	0	1380	0	0	2086	2669	690	1971	2668	576
Stage 1	-	-	-	-	-	-	1380	1380	-	1278	1278	-
Stage 2	-	-	-	-	-	-	706	1289	-	693	1390	-
Critical Hdwy	4.5	-	-	4.14	-	-	7.66	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.66	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.4	-	-	2.22	-	-	3.58	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	504	-	-	493	-	-	28	22	388	37	22	460
Stage 1	-	-	-	-	-	-	144	210	-	176	235	-
Stage 2	-	-	-	-	-	-	379	232	-	400	208	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	504	-	-	493	-	-	24	19	388	29	19	460
Mov Cap-2 Maneuver	-	-	-	-	-	-	124	134	-	142	111	-
Stage 1	-	-	-	-	-	-	143	208	-	174	205	-
Stage 2	-	-	-	-	-	-	318	202	-	353	206	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	26	38.1
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	222	504	-	-	493	-	-	128
HCM Lane V/C Ratio	0.23	0.011	-	-	0.128	-	-	0.153
HCM Control Delay (s)	26	12.2	-	-	13.4	-	-	38.1
HCM Lane LOS	D	B	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.9	0	-	-	0.4	-	-	0.5

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1250	84	168	1182	0	47	0	96	0	0	0
Future Vol, veh/h	0	1250	84	168	1182	0	47	0	96	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	420	-	315	440	-	290	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	4	3	2	4	2	12	2	8	2	2	2
Mvmt Flow	0	1359	91	183	1285	0	51	0	104	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1285	0	0	1450	0	0	2368	3010	680	2331	3101	643
Stage 1	-	-	-	-	-	-	1359	1359	-	1651	1651	-
Stage 2	-	-	-	-	-	-	1009	1651	-	680	1450	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.74	6.54	7.06	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.62	4.02	3.38	3.52	4.02	3.32
Pot Cap-1 Maneuver	536	-	-	463	-	-	~ 16	13	380	20	11	416
Stage 1	-	-	-	-	-	-	143	215	-	103	155	-
Stage 2	-	-	-	-	-	-	239	155	-	407	194	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	536	-	-	463	-	-	~ 11	8	380	10	7	416
Mov Cap-2 Maneuver	-	-	-	-	-	-	95	80	-	10	7	-
Stage 1	-	-	-	-	-	-	143	215	-	103	94	-
Stage 2	-	-	-	-	-	-	145	94	-	295	194	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.2	38.5	0
HCM LOS			E	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	95	380	536	-	-	463	-	-	-
HCM Lane V/C Ratio	0.538	0.275	-	-	-	0.394	-	-	-
HCM Control Delay (s)	80.3	18	0	-	-	17.7	-	-	0
HCM Lane LOS	F	C	A	-	-	C	-	-	A
HCM 95th %tile Q(veh)	2.4	1.1	0	-	-	1.9	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	45	308	41	69	271
Future Vol, veh/h	25	45	308	41	69	271
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	49	335	45	75	295

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	803	358	0	0	380	0
Stage 1	358	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	353	686	-	-	1178	-
Stage 1	707	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	326	686	-	-	1178	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	597	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	326	686	1178	-
HCM Lane V/C Ratio	-	-	0.083	0.071	0.064	-
HCM Control Delay (s)	-	-	17	10.7	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.2	0.2	-

Intersection	
Int Delay, s/veh	55.4

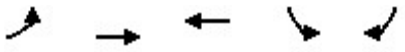
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	209	1083	892	337	251	236
Future Vol, veh/h	209	1083	892	337	251	236
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	175	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	227	1177	970	366	273	257

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1336	0	-	0	2196	668
Stage 1	-	-	-	-	1153	-
Stage 2	-	-	-	-	1043	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	512	-	-	-	~ 38	401
Stage 1	-	-	-	-	~ 263	-
Stage 2	-	-	-	-	300	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	512	-	-	-	~ 21	401
Mov Cap-2 Maneuver	-	-	-	-	~ 124	-
Stage 1	-	-	-	-	~ 146	-
Stage 2	-	-	-	-	300	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	$ 334.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	512	-	-	-	124	401
HCM Lane V/C Ratio	0.444	-	-	-	2.2	0.64
HCM Control Delay (s)	17.5	-	-	-	$ 622.9	28.6
HCM Lane LOS	C	-	-	-	F	D
HCM 95th %tile Q(veh)	2.3	-	-	-	23	4.3

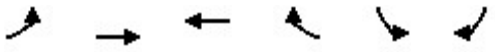
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	132	918	1527	222	245
v/c Ratio	0.66	0.36	0.78	0.73	0.53
Control Delay	54.7	5.3	19.3	49.0	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	5.3	19.3	49.0	9.7
Queue Length 50th (ft)	71	87	351	119	6
Queue Length 95th (ft)	#148	127	457	191	67
Internal Link Dist (ft)		2796	1500	426	
Turn Bay Length (ft)	175				
Base Capacity (vph)	213	2573	1961	363	509
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.36	0.78	0.61	0.48

Intersection Summary

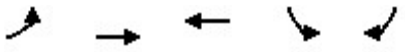
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	121	845	1174	231	204	225
Future Volume (veh/h)	121	845	1174	231	204	225
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	132	918	1276	251	222	245
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	164	2565	1720	335	318	283
Arrive On Green	0.09	0.72	0.58	0.58	0.18	0.18
Sat Flow, veh/h	1781	3647	3060	577	1781	1585
Grp Volume(v), veh/h	132	918	759	768	222	245
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1766	1781	1585
Q Serve(g_s), s	6.5	8.7	28.2	29.1	10.5	13.5
Cycle Q Clear(g_c), s	6.5	8.7	28.2	29.1	10.5	13.5
Prop In Lane	1.00			0.33	1.00	1.00
Lane Grp Cap(c), veh/h	164	2565	1030	1024	318	283
V/C Ratio(X)	0.81	0.36	0.74	0.75	0.70	0.87
Avail Cap(c_a), veh/h	208	2565	1030	1024	366	326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	4.7	13.9	14.1	34.7	35.9
Incr Delay (d2), s/veh	16.4	0.4	4.7	5.0	4.9	19.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	2.0	10.0	10.3	5.0	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.5	5.1	18.6	19.1	39.6	55.2
LnGrp LOS	E	A	B	B	D	E
Approach Vol, veh/h		1050	1527		467	
Approach Delay, s/veh		11.6	18.8		47.8	
Approach LOS		B	B		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		69.5		20.5	12.8	56.7
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		62.5		18.5	10.5	47.5
Max Q Clear Time (g_c+I1), s		10.7		15.5	8.5	31.1
Green Ext Time (p_c), s		6.6		0.5	0.1	8.7

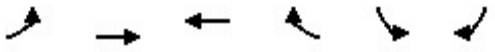
Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	227	1177	1336	273	257
v/c Ratio	0.77	0.47	0.78	0.82	0.51
Control Delay	53.8	6.6	22.3	55.0	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	6.6	22.3	55.0	8.0
Queue Length 50th (ft)	122	138	318	147	0
Queue Length 95th (ft)	#220	177	414	#262	62
Internal Link Dist (ft)		2796	1500	426	
Turn Bay Length (ft)	175				
Base Capacity (vph)	324	2514	1717	363	529
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.47	0.78	0.75	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	209	1083	892	337	251	236
Future Volume (veh/h)	209	1083	892	337	251	236
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	227	1177	970	366	273	257
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	264	2540	1307	489	330	294
Arrive On Green	0.15	0.71	0.52	0.52	0.19	0.19
Sat Flow, veh/h	1781	3647	2624	946	1781	1585
Grp Volume(v), veh/h	227	1177	678	658	273	257
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1700	1781	1585
Q Serve(g_s), s	11.2	12.7	26.9	27.4	13.3	14.2
Cycle Q Clear(g_c), s	11.2	12.7	26.9	27.4	13.3	14.2
Prop In Lane	1.00			0.56	1.00	1.00
Lane Grp Cap(c), veh/h	264	2540	918	878	330	294
V/C Ratio(X)	0.86	0.46	0.74	0.75	0.83	0.87
Avail Cap(c_a), veh/h	327	2540	918	878	366	326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	5.5	17.0	17.2	35.3	35.6
Incr Delay (d2), s/veh	17.2	0.6	5.3	5.8	13.4	20.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	2.9	10.3	10.1	6.9	13.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	54.6	6.1	22.3	23.0	48.6	56.5
LnGrp LOS	D	A	C	C	D	E
Approach Vol, veh/h		1404	1336		530	
Approach Delay, s/veh		13.9	22.7		52.5	
Approach LOS		B	C		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		68.8		21.2	17.8	51.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		62.5		18.5	16.5	41.5
Max Q Clear Time (g_c+I1), s		14.7		16.2	13.2	29.4
Green Ext Time (p_c), s		9.4		0.5	0.2	6.2

Intersection Summary	
HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

APPENDIX H: TURN LANE WARRANTS

Guide for Left-Turn Lanes on Two-Lane Highways

Two-Lane Highways

Based on AASHTO, *A Policy on Geometric Design of Highways and Streets, 2011*

Background:

Exhibit 9-75 is a guide to traffic volumes where left-turn facilities should be considered on two-lane highways. For the volumes shown, left and right turns from the minor street can be equal to, but not gresater than, the left turns from the major street.

Of note, Exhibit 9-75 is used in accordance with *WVDOH, MANUAL ON RULES AND REGULATIONS FOR CONSTRUCTING DRIVEWAYS ON STATE HIGHWAY RIGHTS-OF-WAY.*

Project Information:

Project:	Vinton Hayes
Project ID:	1178-036
Intersection(s) and Movement(s):	9 - Augustine Ave at Propossed Site Access 10 - Berryville Pike at Proposed Site Access
Scenario:	2031 and 2035 Future Conditions with Development
Analysis:	Gorove Slade

Assessment Summary:

Study Scenario	Opposing Volume (vph)	Advancing Volume (vph)	Left Turning Volume (vph)	Left Turning %	Operating Speed (mph)	Threshold Advancing Volume (vph)	Treatment
9 - Augustine Avenue - SBL - AM Peak TF 2031	249	298	24	8%	>50	284.7	Warranted
9 - Augustine Avenue - SBL - PM Peak TF 2031	325	311	63	20%	>50	200	Warranted
9 - Augustine Avenue - SBL - AM Peak TF 2035	1284	882	90	10%	>50	244.7	Warranted
9 - Augustine Avenue - SBL - PM Peak TF 2035	1162	1243	123	10%	>50	282.4	Warranted
10 - Berryville Pike - EBL - AM Peak TF 2031	270	330	27	8%	60	291	Warranted
10 - Berryville Pike - EBL - PM Peak TF 2031	349	340	69	20%	60	204.8	Warranted
10 - Berryville Pike - EBL - AM Peak TF 2035	1405	966	121	13%	60	265.875	Warranted
10 - Berryville Pike - EBL - PM Peak TF 2035	1229	1292	209	16%	60	235.075	Warranted

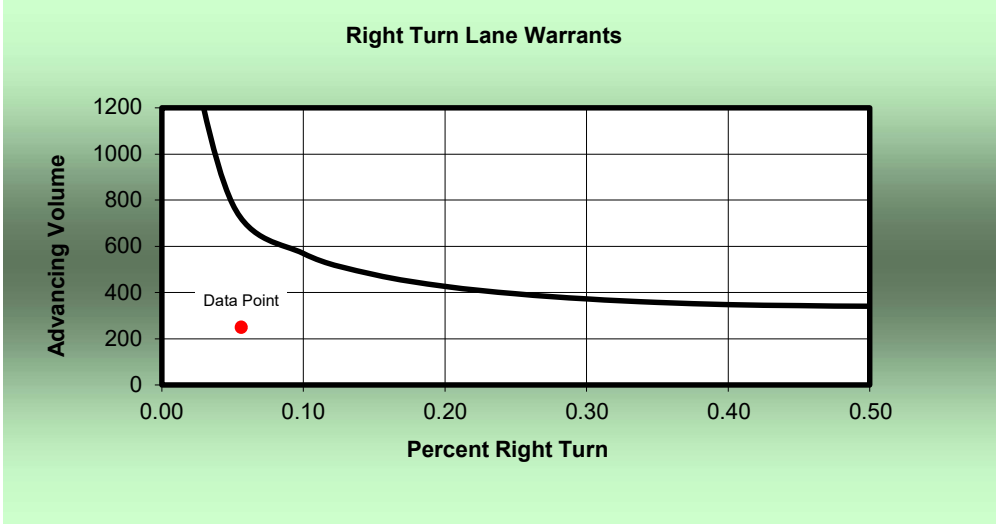
Metric					US Customary				
Opposing volume (veh/h)	Advancing volume (veh/h) 5% left turns	10% left turns	20% left turns	30% left turns	Opposing volume (veh/h)	Advancing volume (veh/h) 5% left turns	10% left turns	20% left turns	30% left turns
60-km/h operating speed					40-mph operating speed				
800	330	240	180	160	800	330	240	180	160
600	410	305	225	200	600	410	305	225	200
400	510	380	275	245	400	510	380	275	245
200	640	470	350	305	200	640	470	350	305
100	720	515	390	340	100	720	515	390	340
80-km/h operating speed					50-mph operating speed				
800	280	210	165	135	800	280	210	165	135
600	350	260	195	170	600	350	260	195	170
400	430	320	240	210	400	430	320	240	210
200	550	400	300	270	200	550	400	300	270
100	615	445	335	295	100	615	445	335	295
100-km/h operating speed					60-mph operating speed				
800	230	170	125	115	800	230	170	125	115
600	290	210	160	140	600	290	210	160	140
400	365	270	200	175	400	365	270	200	175
200	450	330	250	215	200	450	330	250	215
100	505	370	275	240	100	505	370	275	240

Exhibit 9-75. Guide for Left-Turn Lanes on Two-Lane Highways (6)

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	14	Speed Limit (mph)	55
Advancing Volume (vph)	249		



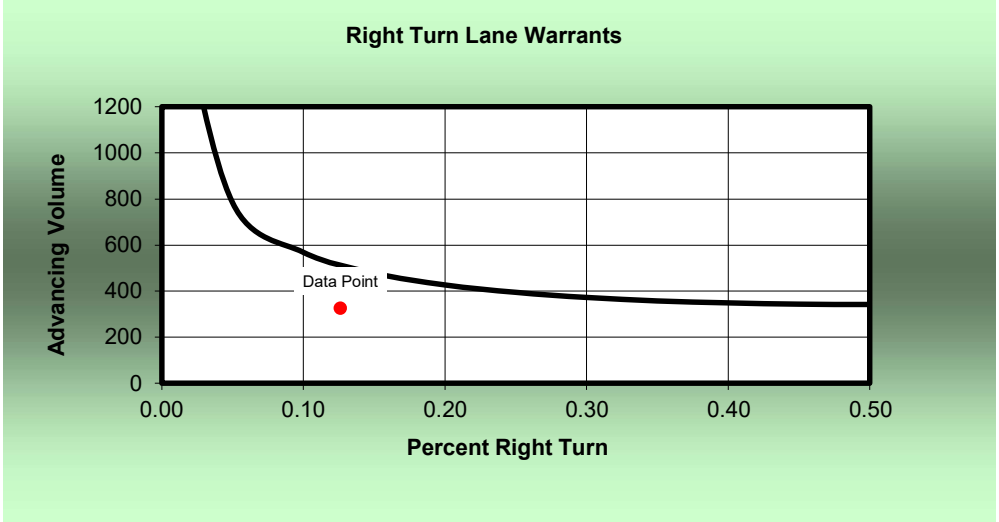
Right Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	41	Speed Limit (mph)	55
Advancing Volume (vph)	325		



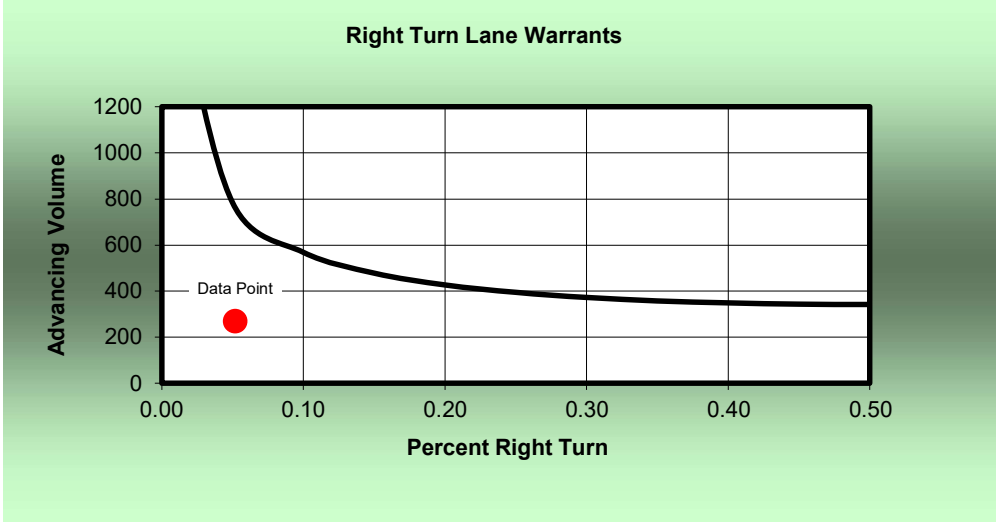
Right Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	14	Speed Limit (mph)	55
Advancing Volume (vph)	270		



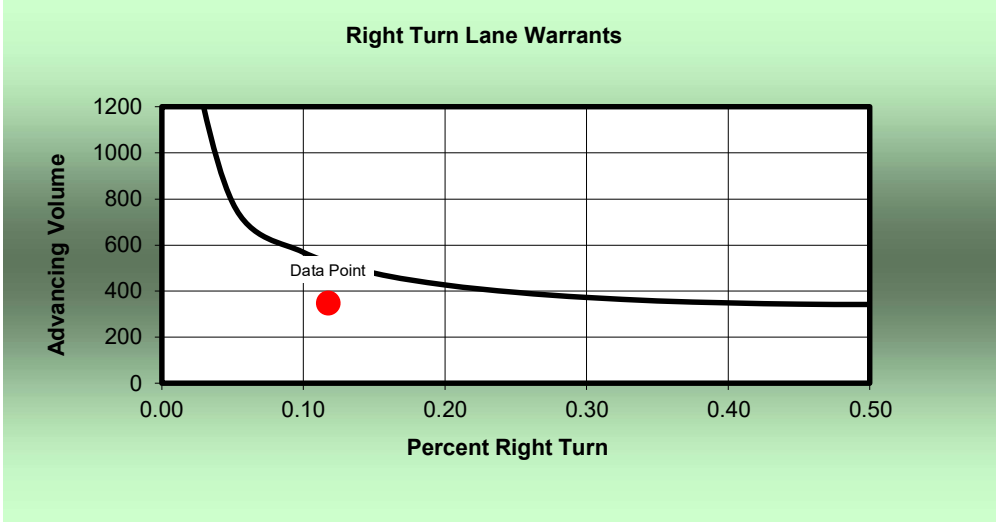
Right Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	41	Speed Limit (mph)	55
Advancing Volume (vph)	349		



Right Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	177	Speed Limit (mph)	60
Advancing Volume (vph)	1284		



Right Turn Lane WARRANTED

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	215	Speed Limit (mph)	60
Advancing Volume (vph)	1162		



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	231	Speed Limit (mph)	60
Advancing Volume (vph)	1405		



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	337	Speed Limit (mph)	60
Advancing Volume (vph)	1229		



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

APPENDIX I: INTERSECTION APPROACH PHOTOS

Intersection 1 Approach Photos



Intersection 1 SB Approach


Intersection 1 WB Approach



Intersection 1 NB Approach


Intersection 1 EB Approach

Intersection 2 Approach Photos



Intersection 2 NB Approach



Intersection 2 WB Approach



Intersection 2 SB Approach



Intersection 2 EB Approach

Intersection 3 Approach Photos



Intersection 3 NB Approach


Intersection 3 SB Approach



Intersection 3 WB Approach

Intersection 4 Approach Photos



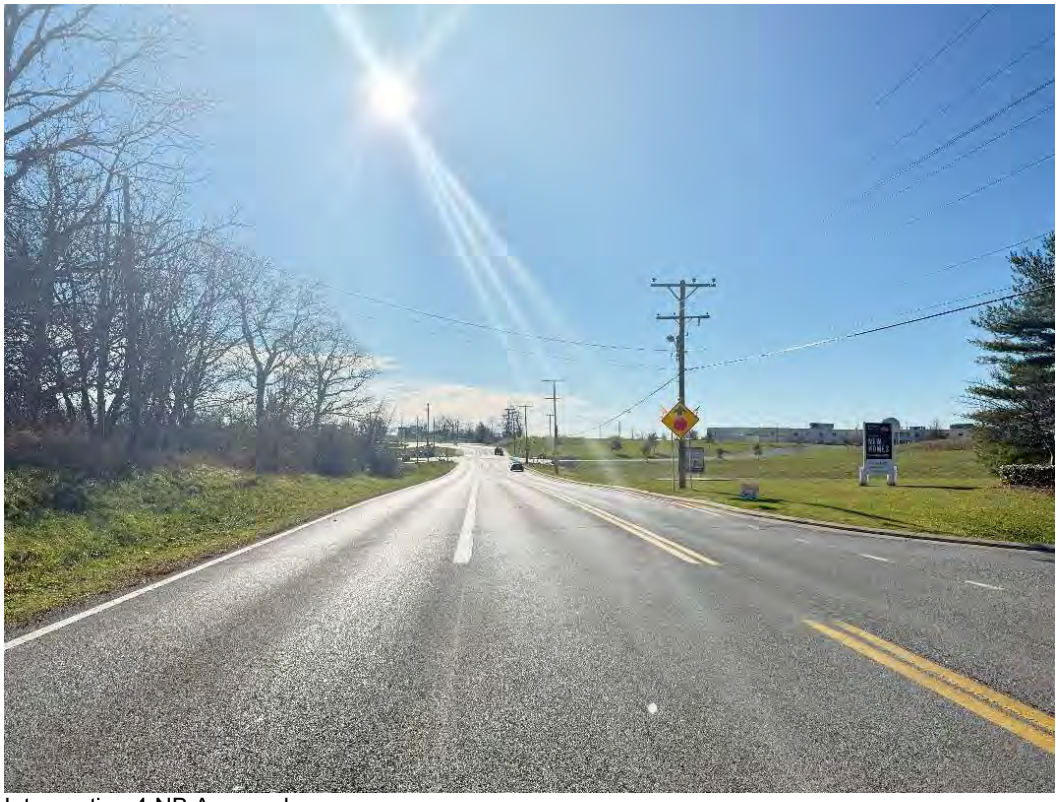
Intersection 4 EB Approach



Intersection 4 SB Approach



Intersection 4 WB Approach



Intersection 4 NB Approach

Intersection 5 Approach Photos



Intersection 5 NB Approach



Intersection 5 SB Approach



Intersection 5 EB Approach



Intersection 5 WB Approach

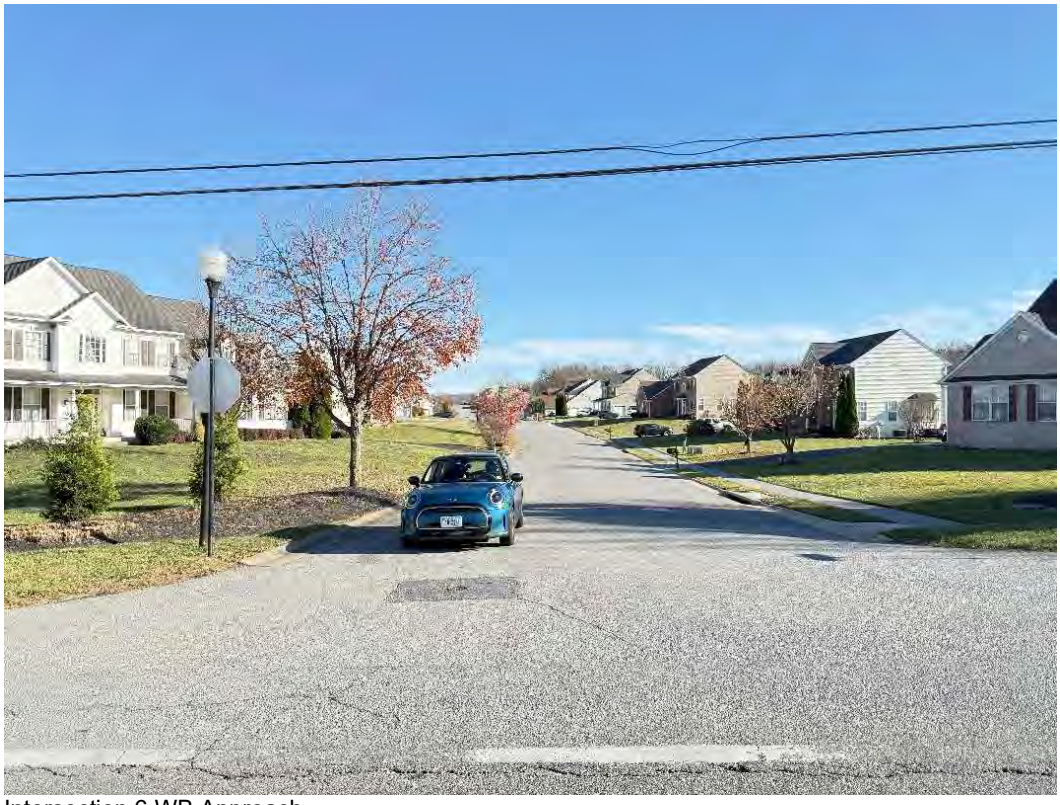
Intersection 6 Approach Photos



Intersection 6 SB Approach



Intersection 6 NB Approach



Intersection 6 WB Approach

Intersection 7 Approach Photos



Intersection 7 SB Approach



Intersection 7 WB Approach



Intersection 7 NB Approach



Intersection 7 EB Approach

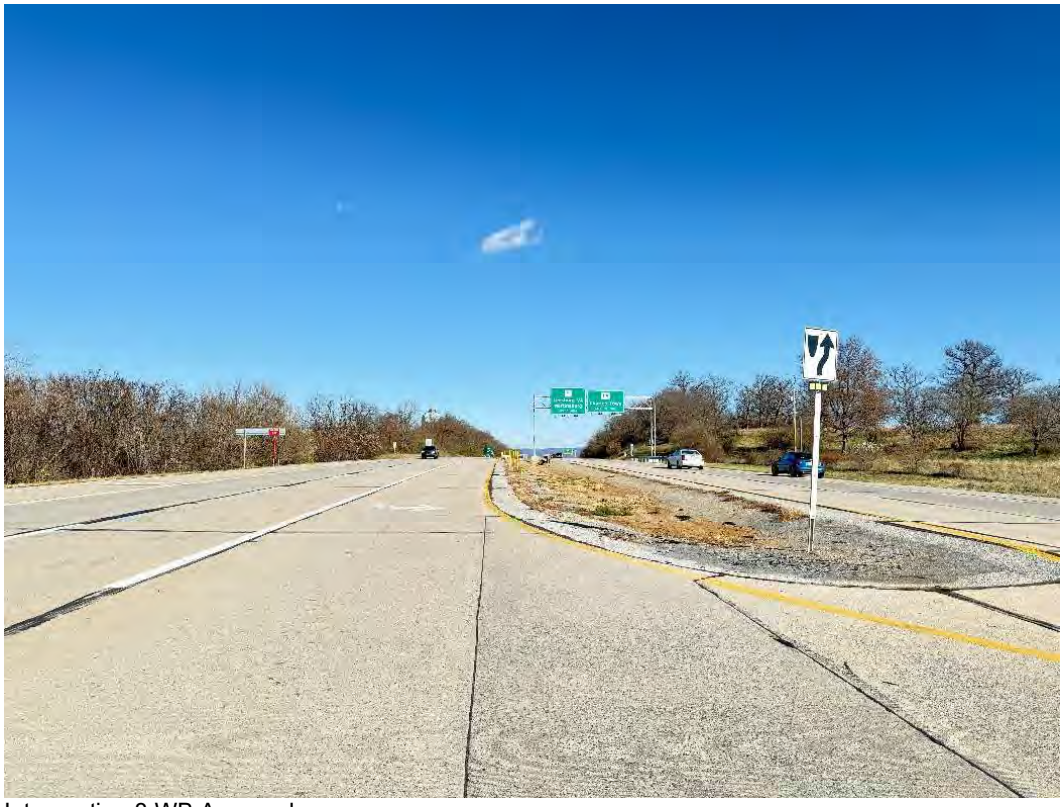
Intersection 8 Approach Photos



Intersection 8 NB Approach



Intersection 8 SB Approach



Intersection 8 WB Approach



Intersection 8 EB Approach

Planning Commission
101 East Washington Street
Charles Town, WV 25414

SCHEDULED

Meeting: 12/22/25
Department: Planning Commission
Category: Report
Initiator:

AGENDA ITEM (ID #)

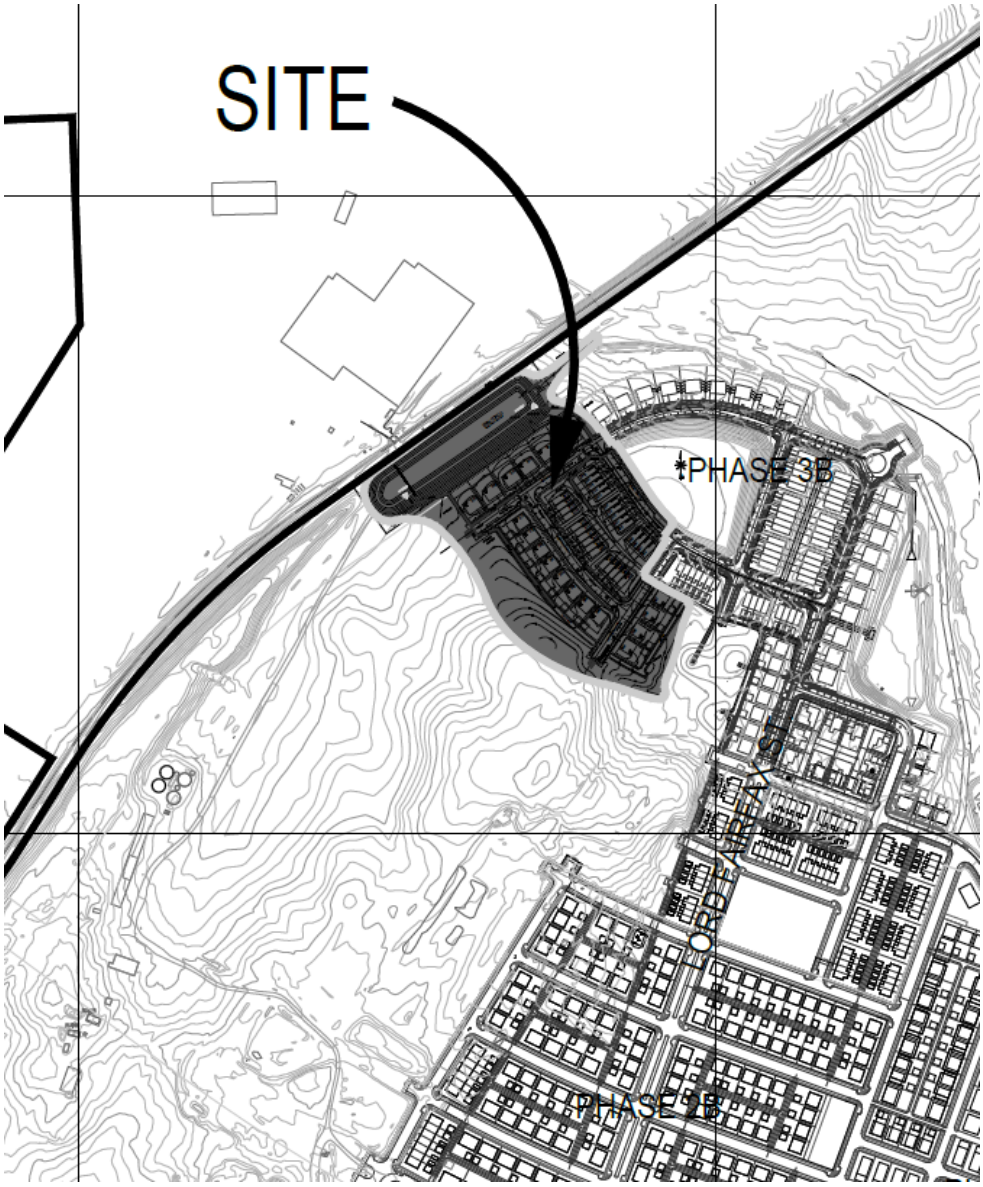
Public Hearing: *SLD2025-07* - Huntfield Phase 4 - Preliminary Plan

ATTACHMENTS:

- 1. Staff Report.pdf
- 2. Application.pdf
- 3. Plan Set.pdf
- 4. KH Review.pdf

Preliminary Plan – Huntfield Phase 4 (formerly 3D)
SLD2025-07

Date: For the December 22, 2025 Planning Commission meeting
Applicant: DR Acquisitions LLC
Property Owner: DR Acquisitions LLC
Report by: James Newman, City Planner, Zoning/Subdivision Administrator
Proposal: Major Land Development
Property Location: Phase 4: Intersection of Westmoreland Way and Abigail St. Formerly Phase 3D.
Current Zoning: Neighborhood Residential



PROJECT

OVERVIEW
The development of 22.6 acres for 47 residential lots; 18 single family homes and 29 townhomes.

COMPLETENESS REVIEW

This item was deemed complete by the Planning Commission on October 27, 2025.

ZONING REVIEW

The property is zoned Neighborhood Residential (NR). Per the Zoning Ordinance:

The purpose of the NR District is to provide for a mix of housing types and related services and Uses, including Commercial Uses and office services.

…

The intent is to create a cohesive pattern of primarily residential development that allows a mix of Uses, including neighborhood servicing Commercial and office Uses and/or Commercial and office Uses that complement the primarily residential character of the neighborhood.

DENSITY

Maximum density in NR Zoning is 10 units per acre. Net buildable land area is 16.16 acres. Applicant proposes 47 units, a density of 3 units per acre.

LOT DIMENSIONS

The proposed typical lot dimensions and setbacks adhere to the requirements of the zoning district/Conditions of Annexation.

SIDEWALKS

Sidewalks must be between 5-6 ft. in width; sidewalks of 5 ft. width are provided on both sides of all roads within the development.

UTILITIES

Provided; all utility lines to be buried underground.

LIGHTING

A photometric plan is provided. Street lighting will have an acorn-style cap as required, and the propose layout and intensity conform to the street lighting requirements. While the lighting does not use the required white metal halide materials, it uses LED, which operates much better compared to traditional metal halides: improved light direction, start up time, service life, and energy usage.

BUFFERS

None required.

PARKING

Each single-family detached home is required to have two off-street parking space, and each townhome is required to have 1.8 spots per dwelling, with spaces no further than 200 feet from their unit.

The six single-family detached homes on the north side of Westmoreland Way have a driveway; the driveways appear to be exactly 25 feet in depth as measured from the back of the sidewalk.

The driveway distance for some of the townhomes is less than 25 feet. At the sketch plan hearing the applicant stated that the actual design when building permits are issued will conform to the 25 foot minimum distance required by the COA, otherwise the units will have to cantilevered over the driveways to ensure the 25 ft. distance.

The townhome driveways will be connected by one continuous concrete apron rather than individual driveways separated by grassy areas.

STORMWATER

The City's 3rd party engineering firm, Kimley-Horn, has reviewed the plans and has no comments about storm water management system.

OPEN SPACE

Open space has been provided within 250 feet of the townhomes via the large field on Abigail St.

TOWNHOME DEVELOPMENT STANDARDS

These standards were reviewed in depth at the sketch plan phase; the proposal is in accordance with those requirements.

CONDITIONS OF ANNEXATION

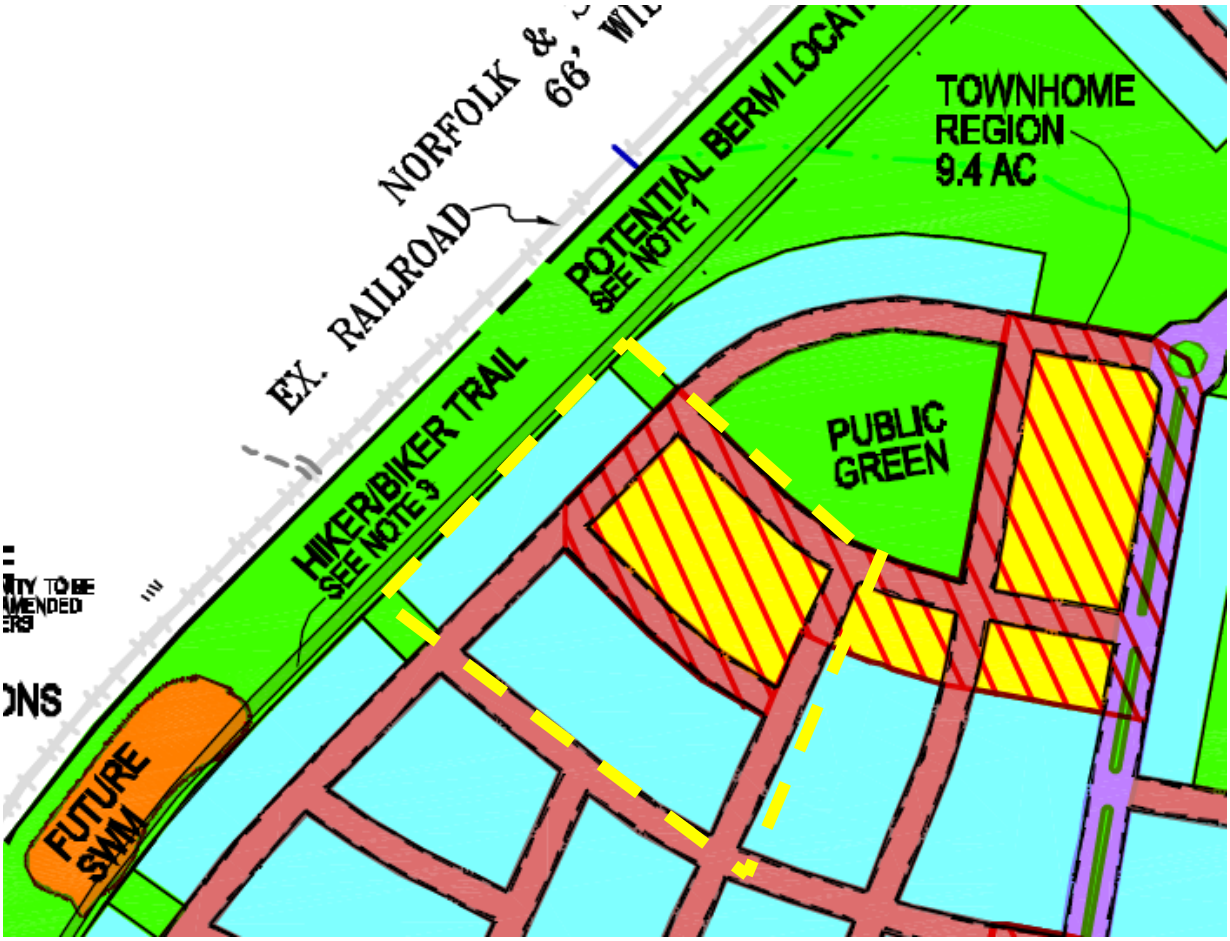
City Council approved revisions to the Conditions of Annexation in August 2024. The proposed design is in conformance with Conditions.

The phase is split between two 'Zones' of Huntfield. Zone 1 covers the single-family homes to the west of Edgebrook Dr. and south of Brandywine St., and requires that the units have alley-access/rear-loaded parking. This requirement is met.

Zone 2 permits front loaded garage for any unit type, without a recessed garage if the distance is at least 25 feet from the rear of the sidewalk to the front of the garage. For the single family homes which front on Westmoreland Way that distance is only 20 feet, so a recessed garage is required. For the townhomes that distance fluctuates; actual distance will be assessed at building permit review.

All other applicable requirements (minimum lot size, road frontage, setbacks) are met.

The hiker/biker trail shown in the Master Plan and which is adjacent to the stormwater pond is has been provided on this plan set. Phase 4 is outlined on the next page in dashed yellow lines:



The trail system will have a stone gravel base with woodchip covering; the City's standard details require that trails have an asphalt concrete top coat. Asphalt is durable and long lasting[1] but contributes to the urban heat island effect and retains heat, and the hard surface can cause injury if users fall on it. The woodchips will require more regular replacement due to crushing/flooding, but are a softer surface in case of accidents and do not retain heat to the extent of asphalt[2].

From the University of Minnesota[3]:

Wood Chips: "Hauling and spreading wood chips requires extensive labor, and wood chips need to be replaced every three years as they decay or are displaced. In most situations, wood chips should be a temporary tread material."

Asphalt: "Asphalt is a good choice where a hard surface is needed, such as for wheelchairs, touring bicycles, in-line skaters, or heavy hiking use. Asphalt is expensive compared to natural surfaces and crushed rock, and the site must be accessible to the equipment needed to apply and roll it. Tree roots may uplift and fracture asphalt laid on shallow soil over bedrock."

[1] https://www.il-asphalt.org/files/2214/4594/9423/NAPA-IS129.pdf
[2] https://www.proflowpavers.com/news/do-wooden-pavers-get-as-hot-as-concrete-the-surprising-truth-for-your-outdoor-comfort
[3] https://open.lib.umn.edu/woodlandstewardship/chapter/recreational-trail-design/

CONCLUSION

The applicant is seeking to develop Phase 4 (formerly 3B) in the Huntfield community with 47 residential lots, split between single-family detached and townhome units. The plan is generally in conformance with the preliminary plan requirements and requirements of the Zoning/SALDO Ordinances; the lighting material is more efficient than what the SALDO mandates, and the choice of trail material has pros/cons compared to the mandated asphalt, which has pros/cons of its own.

RECOMMENDATION

Approval

MAJOR SUBDIVISION AND LAND DEVELOPMENT APPLICATION

The submission of this form, along with the prescribed information and required fees, shall serve as the Applicant's Major S/LD Application as required by Ordinance Section 1332.03.

1. SUBMISSION DATE 08/04/25

2. APPLICATION TYPE
- ☐ Sketch Plan
- ☑ Preliminary Plan
- ☐ Final Plan

3. FEES

See next page. Fee is comprised of base fee, additional fees, and legal notice fees.

Sketch and Preliminary Plans each require Class I legal notices, first class mail, and public hearing signs. Final plans are reviewed administratively.

4. SUBMITTAL PACKAGE

Please submit a paper application and one paper plan set with at least dimensions of 24" x 36", as well as a plan set in PDF format.

Fee Schedule

1. BASE FEES

- **Sketch/Preliminary** Plan Review - $300 application fee.

- **Final Plan/ Record Plat** Review Fees: $200 application fee

2. APPLICATION FEES

(1) Single principal structure on a single site - $200 filing fee
(2) < 3 Residential Buildings - $200 filing fee
(3) 3 or more Residential Buildings - $500 filing fee plus $50 per building, minimum of $2000 escrow.
(4) Manufactured (Mobile) Home Park - $500 filing fee plus $50 per dwelling unit, minimum of $2000 escrow.
(5) Commercial and Industrial Buildings - $700 filing fee plus $2000 escrow.
(6) Subdivision only – $200 filing fee

Building Addition:
(1.) Less than 2,5000 sq.ft AND less than 50% increase in impervious area - $200
(2.) More than 2,5000 sq.ft OR more than 50% increase in impervious area - $300

3. LEGAL NOTICE FEES

(1). Newspaper public notice:
A. Class I/I-0 Legal Advertisement- - $25 flat fee
B. Class II/II-0 Legal Advertisement - $50 flat fee
C. Class III/III-0 Legal Advertisement - $75 flat fee

(2). Mailed notice:
A. First class mail - $25 flat fee
B. Certified mail - $75 flat fee

(3). Signage:
A. Public notice signage - $10 flat fee

4. ADDITIONAL FEES

These fees may differ between applications depending on the level of analysis required.

- Legal review fees for zoning and site plan reviews will be will be actual costs incurred based on the -legal review.

- Water and Sewer review fees for zoning and site plan reviews will actual costs incurred based on the review.

- Third-party review fees for zoning and site plan reviews will be actual costs incurred based on the review.

3. APPLICANT'S NAME* DR Acquisitions, LLC

Address: 10313 Arnett Dr, Ste 101, Hagerstown, MD 21740

Telephone Number (240) 420-6046 ext: 2032

Email Address mmonahan@drbgroup.com

4. PROPERTY OWNER'S NAME DR Acquisitions, LLC

Address: 7945 Wormans Mill Rd, Frederick, MD 21701

Telephone Number (240) 420-6046 ext: 2032

Email Address mmonahan@drbgroup.com

5. LEGAL DESCRIPTION OF THE SUBJECT PROPERTY (list all parcels that apply)

Property Address: Westmoreland Way

Tax Map # and Parcel: Tax Map #11, Parcel 1

Property Area in Square Feet or Acres: 280.43 Acres

*Applicants include: Property owner(s), Engineer(s), Surveyor(s), or Consultant(s)

6. FEE CALCULATION (Per Fee Schedule)

BASE: $300

APPLICATION: $500+$50/bldg = $500+($50*47)=$2,850

The City will send out invoices for 3rd party review.

LEGAL (**For sketch and preliminary only**)

MAILING TYPE: $25

LEGAL AD $25

SIGNAGE: $10

AMOUNT DUE: $ $3,210

7. DESCRIPTION OF PROJECT AND PROPOSED USE(S) OF THE PROPERTY:

The purpose of this project is for the construction of public roads, utilities, stormwater management facilities, utility access roads, and associated infrastructure for residential use.

8. DESCRIPTION OF THE EXISTING (OR FORMER) USE(S) OF THE PROPERTY AND CURRENT ZONING:

The project site is currently undeveloped, with similar residential developments surrounding the sight within the same property limits. The property is currently zoned neighborhood residential (NR).

9. ARE THERE ANY ANTICIPATED WAIVERS OR VARIANCES? IF YES, PROVIDE DETAILS:

None

10. PARCEL HISTORY (List all pending or previously approved applications on the subject parcels inventoried above, including previous site plan applications if this application is a site plan amendment)

Application No.	Project Name and Phase	Status	Approval Date
	Huntfield, Phase 3B	Approved	5/22/2006

11. HAS THE PROPERTY BEEN THE SUBJECT OF ANY COURT ACTION?

☑ No

☐ Yes (Please specify nature of all proceedings and current status)

_____

_____

_____

12. PLAN/PLAT SUBMISSION TO OTHER AGENCIES (Documentation of all required approvals must be attached to this Application or submitted prior to Preliminary S/LD Application approval)

Agency (Specify others as applicable)	Submittal Date	Permit ID/#	Date of Approval/Issuance
City of Charles Town Utility Board			
Jefferson County Addressing Office			
Jefferson County Board of Education			
WV Department of Environmental Protection			
WV Department of Transportation, Division of Highways			
WV State Historic Preservation Office			
WV Office of Environmental Health Services			
U.S. Army Corps of Engineers			
Other (specify each Agency)			

APPLICANT CERTIFICATION

I certify that, to the best of my knowledge, the submitted information and statements are true and correct. I also certify that I have received and read Section 1332.03 of the Charles Town S/LD Ordinance and relevant provisions of the Charles Town City Code.

Signature of Applicant



Date 8/4/2025

Signature of Property Owner (If different than Applicant)

_____ Date _____

Please submit an original completed Application and specified number of Site Plan copies to the following:

At City Hall:	Or	Via Mail:
Subdivision Administrator City of Charles Town 101 E. Washington Street Charles Town, WV 25414		Subdivision Administrator City of Charles Town PO BOX 14 Charles Town, WV 25414

FOR CITY USE ONLY

Application Number:_____ Date Application Received:_____

Fee: $_____ Paid:$_____ Check No._____

Receipt No._____

Subdivision Administrator Approval/Denial:_____ Date:_____

Planning Commission Approval/Denial:_____ Date:_____

Comments/Conditions:_____

_____

_____

_____

CONSTRUCTION PLANS AND PROFILES

SITE PLAN - SLD 2025-07

HUNTFIELD - PHASE 4

CHARLES TOWN CORPORATION
JEFFERSON COUNTY, WV

GENERAL NOTES

1. THIS SET OF DRAWINGS PERTAINS TO PHASE 4 OF HUNTFIELD, WHICH CONSISTS OF A TOTAL SITE AREA OF 24.34 ACRES. PHASE 4 CONTAINS, 18 SFD LOTS AND 29 SFA LOTS FOR A COMBINED TOTAL OF 47 RESIDENTIAL LOTS. REFERENCE WAS MADE TO THE SCHEMATIC PLAN "HUNTFIELD OVERALL COMPOSITE SCHEMATIC PLAN" (SCHM 2004-0002) APPROVED APRIL 12, 2005. NOTE THAT THE "HUNTFIELD COMPOSITE SCHEMATIC" IS COMPOSED OF SEVERAL SITE PLANS. THIS SET OF PLANS PERTAINS TO A SMALL SECTION OF THE SCHEMATIC. THESE PLANS SHALL BE IN CONFORMANCE WITH THE APPROVED SCHEMATIC PLAN & ALL ZONING REQUIREMENTS INCLUDING THOSE MODIFIED IN THE HUNTFIELD PROFFERS. ALL OPEN SPACE, RESIDENTIAL, AND COMMERCIAL REQUIREMENTS SHALL CORRESPOND TO THOSE SET FORTH IN THE SCHEMATIC.
2. THE PROPERTY DELINEATED HEREON IS A PORTION OF PARCEL 1, AS SHOWN ON CHARLES TOWN CORPORATION TAX ASSESSMENT MAP 11, DEED BOOK 949, PAGE 203, WHICH IS LOCATED AMONG THE LAND RECORDS OF JEFFERSON COUNTY
3. BOUNDARY INFORMATION, SHOWN HEREON, WAS OBTAINED FROM A PLAT SHOWING HUNTFIELD, LC PROPERTY AS RECORDED IN THE OFFICE OF THE CLERK OF THE COUNTY COMMISSION OF JEFFERSON COUNTY, WEST VIRGINIA, IN PLAT BOOK 19, PAGE 49.
4. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM APPALACHIA SURVEY OF WEST VIRGINIA, LLC. BASIS FOR SURVEY WAS NAD'27-NAVD'88 AND FIELD VERIFIED BY MRA, INC.
5. THE PROPERTY SHOWN HEREON WAS ACQUIRED BY DR ACQUISITIONS AS RECORDED IN THE OFFICE OF THE CLERK OF THE COMMISSION OF JEFFERSON COUNTY, WEST VIRGINIA IN DEED BOOK 1263, PAGE 99.
6. THE HOMEOWNER'S ASSOCIATION INC. WILL BE RESPONSIBLE FOR THE MAINTENANCE OF STORM WATER DETENTION/DRAINAGE FACILITIES AND EASEMENTS. IN ADDITION THEY SHALL BE RESPONSIBLE FOR MAINTENANCE OF SIDEWALKS & STREET LIGHTS. THE WEST VIRGINIA DEPARTMENT OF HIGHWAY IS NOT RESPONSIBLE FOR MAINTENANCE OF SIDEWALKS AND STREET LIGHTS.
7. ALL CONSTRUCTION SHALL CONFORM TO CURRENT CITY OF CHARLES TOWN, WVDOH AND SANITATION AUTHORITY STANDARDS AND SPECIFICATIONS.
8. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROVIDED IN ACCORDANCE WITH THE 1993 "WEST VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK FOR DEVELOPING AREAS".
9. THE APPROVAL OF THESE PLANS SHALL IN NO WAY RELIEVE THE DEVELOPER OR HIS AGENT OF ANY LEGAL RESPONSIBILITY WHICH MAY BE REQUIRED BY THE CODE OF WEST VIRGINIA OR ANY OTHER ORDINANCE ENACTED BY THE CITY OF CHARLES TOWN.
10. STANDARD GUARDRAILS AND HANDRAILS SHALL BE INSTALLED AT HAZARDOUS LOCATIONS AS DETERMINED DURING FINAL FIELD INSPECTION BY CITY OF CHARLES TOWN AND/OR WVDOH.
11. ALL UNDERGROUND UTILITIES WITHIN STREET RIGHT-OF-WAYS SHALL BE INSTALLED TO THE REQUIRED DISTANCE BEYOND THE RIGHT-OF-WAY LINE PRIOR TO THE INSTALLATION OF ANY SUBBASE MATERIAL, CURB AND GUTTER, OR SIDEWALK.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF UTILITY OVERBLASTING FOR FUTURE EXTENSIONS WITH ALL ADJACENT SECTIONS.
13. THESE PLANS MAKE NO REPRESENTATION AS TO SUBSURFACE CONDITIONS AND THE PRESENCE OF SUBSURFACE WATER OR THE NEED FOR SUBSURFACE DRAINAGE FACILITIES.
14. ANY WELLS OR SEPTIC FIELDS WITHIN THE LIMITS OF THE SITE WILL BE ABANDONED IN ACCORDANCE WITH STATE AND LOCAL HEALTH DEPARTMENT REQUIREMENTS AND REGULATIONS PRIOR TO RECORD PLAT APPROVAL.
15. THE SECTION DELINEATED HEREON CONTAINS NO KNOWN ARCHEOLOGICAL OR HISTORICAL LANDMARKS.
16. CONTRACTORS SHALL ARRANGE FOR THE LOCATION OF ALL UNDERGROUND FACILITIES PRIOR TO THE CONSTRUCTION INCLUDING TEST HOLES TO PHYSICALLY LOCATE UNDERGROUND UTILITIES AS NECESSARY.
17. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED AT ALL INTERSECTIONS AND BE IN COMPLIANCE WITH ALL APPLICABLE ZONING AND CODIFIED ORDINANCE FOR THE CITY OF CHARLES TOWN.
18. FINAL HOUSE AND ACCESSORY LOCATIONS ARE SUBJECT TO APPROVAL AT BUILDING PERMIT SUBMISSION.
19. PARKING FOR THIS SITE PLAN WILL BE IN COMPLIANCE WITH ALL REQUIRED REGULATIONS.
20. WETLAND INFORMATION OBTAINED FROM WETLAND DELINEATION REPORT PREPARED BY GREENHORNE AND O'MARA, INC. DATED JULY 14, 2000.
21. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE ESTABLISHMENT OR CONSTRUCTION OF ALL AREAS OR SITE IMPROVEMENTS SHOWN ON THE SITE PLAN, INCLUDING STREET SIGNS, TRAFFIC SIGNS, OPEN SPACE, RECREATIONAL FACILITIES, STORMWATER FACILITIES, SIDEWALKS, AND OTHER FACILITIES SHOWN ON THIS SITE PLAN.
22. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR MAINTAINING ALL IMPROVEMENTS AND AREAS UNTIL CONVEYANCE OF THE IMPROVEMENTS TO THE HOME OWNERS ASSOCIATION OR OTHER ENTITY. UPON RELEASE FROM THE ASSOCIATED PERFORMANCE RELATED BOND OR OTHER FORM OF SURETY BOND POSTED WITH THE CITY OR COUNTY, ALL OPEN SPACE PARCELS, ALLEYS, AND OTHER COMMON ELEMENTS SHALL BE CONVEYED TO HUNTFIELD COMMUNITY ASSOCIATION, INC AT WHICH TIME THE ASSOCIATION SHALL BE RESPONSIBLE FOR THE UPKEEP OF SUCH PARCELS. REFERENCE ARTICLE IV, SECTION 4.1, 4.2 AND 4.3 OF THE DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS FOR THE HUNTFIELD COMMUNITY ASSOCIATION, INC, WHICH WAS RECORDED FEBRUARY 14, 2003 IN DEED BOOK 970 AT PAGE 154.
23. THE OWNER MUST BOND ALL REQUIRED SITE IMPROVEMENTS PRIOR TO THEIR CONSTRUCTION.
24. ALL STREETS SHOWN WITHIN THIS PLAN WITH THE EXCEPTION OF LORD FAIRFAX STREET ARE DEFINED AS LOCAL ROADS PER THE CRITERIA LISTED IN SECTION 1333.02 OF THE SUBDIVISION / LAND DEVELOPMENT ORDINANCE.
25. ALL STREETS ARE TO BE DEDICATED TO THE CITY OF CHARLES TOWN. CONVEYANCE OF THE STREETS TO THE CITY WILL OCCUR UPON RELEASE FROM THE ASSOCIATED PERFORMANCE RELATED BOND OR OTHER FORM OF SURETY BOND POSTED WITH THE CITY OR COUNTY.
26. THE CONTRACTOR SHALL OBTAIN A COPY OF THE MOST RECENT CHARLES TOWN UTILITY BOARD WATER AND SEWER SPECIFICATIONS AND INSTALL AND TEST THE LINES ACCORDING TO THESE STANDARDS. APPLICABLE CITY OF CHARLES TOWN STANDARD DETAILS FOR FIRE HYDRANTS, THRUST BLOCKING, WATER METERS, DROP MANHOLES, SANITARY LATERALS, AND PIPE TRENCHING SHALL BE USED DURING THE INSTALLATION OF THESE LINES.



VICINITY MAP

SCALE : 1"= 1000'

OWNER / DEVELOPER

DR AQUISITIONS, LLC
7945 WORMANS MILL RD.
FREDERICK, MD, 21701

ENGINEER'S CERTIFICATION

I HEREBY CERTIFY THAT THESE SEALED PLANS REASONABLY MEET OR EXCEED MINIMUM ACCEPTABLE ENGINEERING STANDARDS AND THOSE STATE AND COUNTY CODE PROVISIONS APPLICABLE ON SAID DATE.

JON K. ERICKSON, PE
MORRIS & RITCHIE ASSOCIATES

SURVEYOR'S CERTIFICATION

THE SURVEYOR, IN SIGNING THIS PLAT/PLAN, ATTESTS TO THE BEST OF HIS OR HER KNOWLEDGE, THIS PLAN IS COMPLETE AND ACCURATE.

JON K. ERICKSON, PE
MORRIS & RITCHIE ASSOCIATES

CONTACT "MISS UTILITY" AT
1-800-245-4848
BEFORE ANY CONSTRUCTION PER CITY OF CHARLES TOWN WATER DEPARTMENT ORDINANCE

APPLICATION #	ASSOCIATED PROJECT	STATUS	APPROVAL DATE
	HUNTFIELD, PHASE I SCHEMATIC	APPROVED	2/11/2002
STPL 2002-0001	HUNTFIELD, PHASE I (SITE PLAN)	APPROVED	6/24/2002
SBRD 2002-0001	HUNTFIELD, PHASE I RECORD PLAT	APPROVED	7/29/2002
RPOC 2003-0001	HUNTFIELD, PHASE I (RECORD PLAT CORRECTION)	APPROVED	Recorded 9/9/03
	HUNTFIELD, REVISED PHASE 1&2A SCHEMATIC	APPROVED	10/22/2002
SPAM 2003-001	HUNTFIELD, PHASE 1 REVISED (SITE PLAN AMMENDMENT)	APPROVED	5/28/2003
SBDR 2003-0001/RPAM 2003-0001	HUNTFIELD, PHASE 1 REVISED (RECORD PLAT AMMENDMENT)	APPROVED	6/16/2003
SCHM 2003-0003	HUNTFIELD, COMPOSITE SCHEMATIC 1	APPROVED	5/28/2003
SPAM 2003-0002	HUNTFIELD, PHASE 1 BLOCK 1 REVISION (SITE PLAN AMMENDMENT)	APPROVED	10/27/2003
RPAM 2003-0002	HUNTFIELD, PHASE 1 BLOCK 1 REVISION (RECORD PLAT AMMENDMENT)	APPROVED	10/27/2003
STPL 2003-0001	HUNTFIELD, PHASE 2A (SITE PLAN)	APPROVED	5/28/2003
SBRD 2003-0002	HUNTFIELD, PHASE 2A RECORD PLAT	APPROVED	3/30/2004
SCHM 2003-0001	HUNTFIELD, PHASE 2B SCHEMATIC	APPROVED	2/24/2003
STPL 2003-0006	HUNTFIELD, PHASE 2B (SITE PLAN)	APPROVED	8/5/2004
SBRD 2004-0002	HUNTFIELD, PHASE 2B SECTION 1A RECORD PLAT	APPROVED	5/24/2004
SBRD 2004-0002	HUNTFIELD, PHASE 2B SECTION 1B RECORD PLAT	APPROVED	10/25/2004
STPL 2003-0009	HUNTFIELD, PHASE 3A (SITE PLAN)	APPROVED	5/24/2004
SBRD 2004-0003	HUNTFIELD, PHASE 3A SECTION 1 RECORD PLAT	APPROVED	5/24/2004
SBRD 2004-0003	HUNTFIELD, PHASE 3A SECTION 2 RECORD PLAT	APPROVED	6/28/2004
STPL 2004-0006	HUNTFIELD, PHASE 3B (SITE PLAN)	APPROVED	5/22/2006
STPL 2009-0005	HUNTFIELD, PHASE 3A BLOCK 29 REVISION	APPROVED	12/18/2009
STPL 2024-0005	HUNTFIELD, PHASE 3B REVISION	APPROVED	08/26/2024

NOTES: 1) HUNTFIELD COMPOSITE SCHEMATIC 1 (SCHM 2003-0003) REPLACED PREVIOUSLY APPROVED HUNTFIELD SCHEMATICS.
2) THE DATE LISTED FOR THE PHASE 2B SITE PLAN APPROVAL CORRESPONDS TO THE DATE THAT THE REVISED DEPARTMENT OF HIGHWAYS PERMIT WAS ISSUED WHICH COVERED THE OUTSTANDING LOTS IN HUNTFIELD 2B.

Sheet List Table	
Sheet Number	Sheet Title
1	COVER SHEET
2	GENERAL NOTES
3	PROFFERS
4	GRADING PLAN
5	GRADING PLAN
6	ADA RAMP GRADING PLAN
7	ADA RAMP DETAILS
8	SIGNAGE & PAVEMENT MARKING PLAN
9	ROAD PROFILES
10	ROAD PROFILES
11	CTUB DETAILS
12	CTUB DETAILS
13	CTUB DETAILS
14	E&S - PHASE I
15	E&S - PHASE I
16	E&S - PHASE II
17	E&S - PHASE II
18	E&S - NOTES AND DETAILS
19	E&S - NOTES AND DETAILS
20	STORM PROFILES
21	STORM COMPUTATIONS
22	SWM - PRE DEVELOPMENT
23	SWM - POST DEVELOPMENT
24	SWM - POND DESIGN
25	SWM - HYDROGRAPHS
26	SWM - HYDROGRAPHS
27	LANDSCAPE PLAN
28	LANDSCAPE PLAN
29	PHOTOMETRIC PLAN

STATEMENT OF ACCEPTANCE

THE DEVELOPER, IN SIGNING THIS PLAT, AGREES TO ABIDE BY ALL CONDITIONS, TERMS, AND SPECIFICATIONS PROVIDED HEREON.

DR AQUISITIONS, LLC
7945 WORMANS MILL ROAD
FREDERICK, MD, 21701

"This Preliminary Plan and Plat was approved by the City of Charles Town, on the _____ day of _____, 20_____, subject to any conditions specified hereon.

All expenses incurred with respect to improvements for all utility services, paving, grading, landscaping, curbs, gutters, sidewalks, road lighting, road signs, flood protection devices, drainage structures and all other improvements that may be required shall be the responsibility of the subdivider and not the City.

_____ _____
Secretary of the Planning Commission Date

MRA
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS
3445 BOX HILL CORPORATE CENTER DR
SUITE A
ABINGDON, MD 21009
410-515-9000
MRAGTA.COM

JON K. ERICKSON REGISTERED 16052 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE
	1ST SUBMISSION COMMENTS	12/03/2025
	2ND SUBMISSION COMMENTS	12/10/2025

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HUNTFIELD - PHASE 4
CONSTRUCTION DRAWINGS
CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY:
SCALE: 1"=1000'	DESIGN BY:
DATE: 07/01/25	REVIEW BY:
SHEET: 1 OF 29	

SHEET TITLE
COVER SHEET

SHEET NUMBER
1

LEGEND

- EX. R/W LINE
- EX. PROPERTY LINE
- EX. ADJ. PROPERTY LINE
- EX. 10' CONTOUR
- EX. 2' CONTOUR
- SOILS LINE
- EX. ZONING LINE
- EX. FENCE LINE
- EX. STREAM
- EX. EASEMENT
- EX. POND LINE
- EX. FLOODPLAIN
- EX. FLOODPLAIN BUFFER
- EX. CRITICAL AREA
- EX. FOREST BUFFER
- EX. WETLAND LINE
- EX. OVERHEAD LINE

- I.P.F. IRON PIPE FOUND
- I.P.S. IRON PIPE SET
- I.R.F. IRON REBAR FOUND
- I.R.S. IRON REBAR SET
- EX. SPOT ELEVATION
- PROP. R/W LINE
- PROP. PROPERTY LINE
- PROP. LOT LINE
- PROP. 1' CONTOUR
- PROP. 2' CONTOUR
- PROP. 10' CONTOUR
- PROP. TREE LINE
- PROP. FOREST CONSERVATION LINE
- PROP. BUILDING
- PROP. BLDG SETBACK LINE
- PROP. CURB
- PROP. ROAD CENTER LINE
- PROP. LIMITS OF DISTURBANCE
- PROP. SEPTIC RESERVE AREA
- PROP. EASEMENT LINE
- PROP. METAL FENCE
- PROP. WOOD FENCE
- PROP. SANITARY LINE
- PROP. STORM DRAIN
- PROP. WATER LINE
- PROP. SWALE CENTER LINE
- PROP. OVERHEAD LINE
- PROP. UNDERGROUND CONDUIT
- PROP. CABLE TV LINE
- PROP. ELECTRIC LINE
- PROP. GAS LINE
- REINFORCED SILT FENCE
- SILT FENCE
- SUPER SILT FENCE
- PROP. HYDRANT
- PROP. VALVE
- PROP. SIAMESE CONNECTION
- PROP. SIGN
- PROP. LIGHT POLE

APPROVED DEVIATIONS & WAIVERS

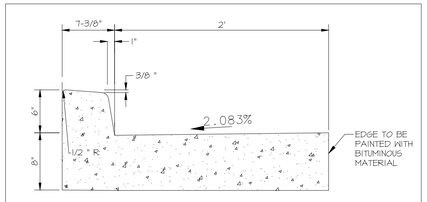
1. WAIVERS AND DEVIATIONS APPROVED PER DEVELOPMENT PLAN & PLAT APPROVED JUNE 16, 2021 RZNG-21-013 & LDPP-21-025.

DEVIATIONS

1. 5.5.2f – SETBACKS FOR PRINCIPAL BUILDINGS SHALL BE SHOWN IN TABLE 11– TABLE14 AND/OR TABLE 22 AND TABLE 23. DEVIATION TO ALLOW 7' 2" SIDE SETBACKS FOR THE SINGLE-FAMILY UNITS PROPOSED IN T3.

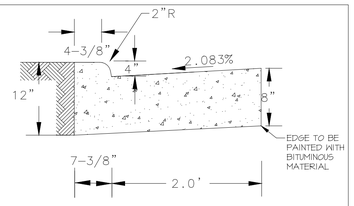
WAIVERS

1. 3.5.4. – BLOCKS ADJACENT TO UNDEVELOPED LAND, AREAS UNSUITABLE FOR DEVELOPMENT, OR PRE-EXISTING INCOMPLETE BLOCKS MAY BE EXEMPT FROM BLOCK FACE LENGTH AND BLOCK PERIMETER REQUIREMENTS BY ADMINISTRATIVE WAIVER IN ACCORDANCE WITH 1.5.3. WAIVER TO ALLOW FOR BLOCKS ADJACENT TO UNDEVELOPED OR UNSUITABLE LAND TO BE EXEMPT FROM BLOCK PERIMETER AND BLOCK FACE LENGTH REQUIREMENTS.



7-3/8" COMBINATION CONCRETE CURB AND GUTTER TYPE I

NOT TO SCALE



NOTES:
1. CONCRETE SHALL BE CLASS A3 IN PLACE, 3000 PSI
2. EXPANSION JOINT AND #3 BAR DOWELS @24" O.C. IF ADJACENT TO OTHER CONCRETE AREAS. (TYP. ALL CURBS)

DEPRESSED CURB & GUTTER

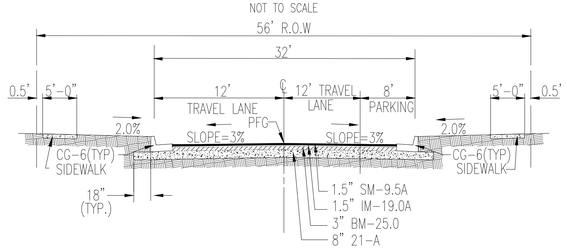
NOT TO SCALE

DEPRESSED CURB TO BE INSTALLED ALONG FRONTAGE OF ALL TOWNHOUSE UNITS

TYPICAL SECTION

EDGEBROOK DRIVE AND ABIGAIL STREET

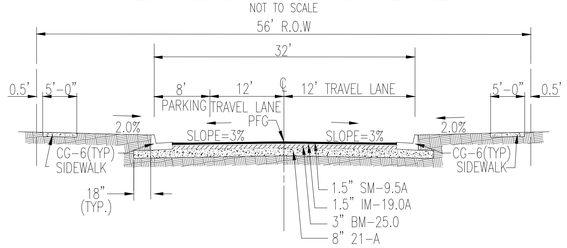
NOT TO SCALE



TYPICAL SECTION

WESTMORELAND WAY AND BRANDYWINE STREET

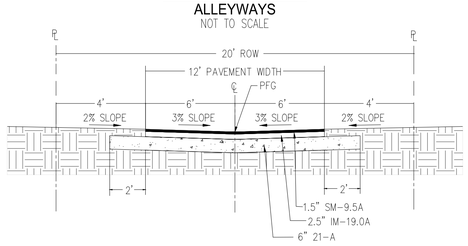
NOT TO SCALE



TYPICAL SECTION

ALLEYWAYS

NOT TO SCALE



ROADWAY NOTES:
1. A SMOOTHING GRADE SHALL BE MAINTAINED FROM THE CENTERLINE OF THE EXISTING ROAD TO THE PROPOSED CURB AND GUTTER, TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/OR THE PONDING OF ANY WATER ON THE ROADWAY.
2. SIDEWALKS AND TRAILS SHALL BE CONSTRUCTED ON A SUBGRADE COMPACTED TO 95% DENSITY AT OPTIMUM MOISTURE CONTENT.
3. SIDEWALKS SHALL BE CONSTRUCTED ON A FOUR (4") INCH THICK LAYER OF NVDOH BED COURSE MATERIAL CLASS I OR 3.
4. PAVEMENT SECTIONS SHOWN ARE "PRELIMINARY ONLY" AND SUBJECT TO REVISION BASED ON FINAL PAVEMENT DESIGN PER GIVEN ROAD CLASSIFICATION UTILIZING ACTUAL FIELD CBR VALUES.

TEST PIT NOTE:

= TEST PIT REQUIRED
(SEE GRADING SHEETS)

IN ORDER TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF A GIVEN UTILITY AND TO ASSIST THE CONTRACTOR AND/OR OWNER IN DETERMINING AREAS OF SPECIAL CONCERN, MRA, HAS INDICATED HEREON CERTAIN LOCATIONS WHERE TEST PITS SHOULD BE EXCAVATED PRIOR TO COMMENCING CONSTRUCTION. THESE INDICATIONS ARE NOT INTENDED TO BE ALL INCLUSIVE AND WILL NOT RELIEVE THE CONTRACTOR AND/OR OWNER OF THE RESPONSIBILITY OF DIGGING ADDITIONAL TEST PITS, AS MIGHT BE REQUIRED BY ACTUAL SITE CONDITIONS. ANY DISCREPANCIES FOUND BETWEEN ACTUAL AND ASSUMED CONDITIONS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF MRA BY CALLING 703-994-4047. FURTHERMORE, TEST PITS HAVE BEEN PLACED WHERE KNOWN UTILITIES EXIST. UPON CALLING WV 811, SHOULD THE CONTRACTOR IDENTIFY EXISTING UTILITIES NOT SHOWN ON OUR PLAN, MRA MUST BE CALLED IMMEDIATELY AT 703-994-4047.

CONCRETE NOTE:
THE CONTRACTOR SHALL VERIFY CONCRETE FORM PLACEMENT TO ASSURE COMPLIANCE WITH CURRENT LOCAL AND STATE ADA AS WELL AS BUILDING CODES. ADA INSPECTION SHALL BE REQUIRED PRIOR TO POURING CONCRETE. THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR MEETING ALL APPLICABLE HANDICAP SLOPE AND DISTANCE REQUIREMENTS AS WELL AS OTHER REQUIREMENTS AS STATED IN THE APPLICABLE CODES.

ANY DISCREPANCIES FOUND SHOULD BE BROUGHT TO THE SITE ENGINEER'S ATTENTION BEFORE ANY CONCRETE IS PLACED.

UTILITY NOTES:
1. ALL SANITARY SEWER AND WATERLINE MUST BE IN ACCORDANCE WITH CHARLES TOWN UTILITY BOARD SEWER SPECIFICATIONS AND WEST VIRGINIA AMERICAN WATER SPECIFICATIONS.
2. ALL SANITARY SEWER EASEMENTS SHALL BE DEDICATED TO THE CHARLES TOWN UTILITY BOARD.

GENERAL NOTES:

1. ALL LOTS HAVE VEHICULAR ACCESS FROM INTERIOR SUBDIVISION ROADS ONLY.
2. QUANTITY CONTROL OF STORM WATER RUNOFF SHALL BE PROVIDED BY THE STORM WATER MANAGEMENT POND SHOWN IN THE E&S PLANS AND POND DETAILS. THE QUALITY OF RUNOFF DURING CONSTRUCTION SHALL BE MANAGED BY PROPER SEDIMENT AND EROSION CONTROL MEASURES, AS WELL AS LONG, FLAT, WELL MAINTAINED DRAINAGE DITCHES.
3. TO KEEP EROSION AND SEDIMENTATION TO A MINIMUM, DISTURB AS LITTLE EARTH AS POSSIBLE DURING ALL PHASES OF CONSTRUCTION.
4. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN SEVEN (7) CALENDAR DAYS.
5. THE BENCH MARK IS A PK NAIL IN TOP OF CURB APPROXIMATE STAION 20+50 (19.5R) PROSPECT HILL BOULEVARD.
6. ALL UTILITY SERVICES TO DWELLINGS SHALL BE UNDERGROUND.
7. ROOF DRAINS SHALL DISCHARGE TO AREAS DESIGNED OR GRADED TO SAFELY CARRY WATER AWAY FROM DWELLINGS.
8. PAINT STRIPING ON CENTERLINE PER SCHOOL BOARD SPECIFICATIONS.
9. ALL BUILDINGS TO BE SERVED BY CENTRAL WATER AND SEWER. PRIVATE WELLS ARE PROHIBITED.
10. A MINIMUM HORIZONTAL DISTANCE OF 10' SHALL BE MAINTAINED BETWEEN SANITARY SEWER AND POTABLE WATER LINES EXCEPT WHEN CROSSING.
11. THRUST BLOCKS SHALL BE PROVIDED FOR ALL HORIZONTAL AND VERTICAL BENDS, TEES, WYES, CAPS, AND PLUGS PER THE CITY OF CHARLES TOWN WATER DEPARTMENT STANDARD DETAILS.
12. USE DETECTABLE TAPE OF 0.5 MIL THINK AND THREE INCHES WIDE AS SPECIFIED IN THE CITY OF CHARLES TOWN WATER DEPARTMENT SPECIFICATIONS.
13. THE CONTRACTOR SHALL GIVE 24-HOUR NOTICE TO THE CITY FOR AN INSPECTION REQUEST. THE CITY SHALL INSPECT AND APPROVE ALL PIPE WORK BEFORE IT IS BACKFILLED.

Zoning Information

District - NR (Neighborhood Residential)
Modified as set forth in the proffers for the Huntfield Development in "Letter of Clarification / Huntfield Proffer Statement Dated March 28, 2002" & the Amendment to the Huntfield Proffers dated May 3, 2004, Proffer Amendment #2 Dated 8/1/05 and Proffer Amendment #3 Dated 8/19/24

Proposed Uses
SFD - Single Family Detached Units
SFA - Single Family Attached Units (Townhouses)

Notes:
1) Per "Letter of Clarification/Huntfield Proffer Statement" dated March 28, 2002:
a) Minimum lot width shall be reduced to 50 feet at the street.
b) Minimum lot area shall be reduced to 5,000 square feet.
c) Front yard setback shall be 25 feet from the edge of pavement,
d) Encroachment within the front yard setback shall be no more than 30% or 8.34 feet.
(Note: The 30% value appears to be a typographical error in the proffers that should be 33%.)
e) Side yard setbacks shall be reduced to 5 feet minimum.
f) No setback from the property line for accessory structures shall be required.
g) Minimum paving width shall be 24 feet.

2) Per the City of Charles Town Zoning Ordinance, maximum area occupied by accessory structures to be less than 25% of the rear yard. Actual area occupied by accessory structure will be based on final selection of townhome product.

3) Per the City of Charles Town Zoning Ordinance, impervious site area not to exceed requirements shown in the table below. Actual impervious site area to be based on final selection of and SFD house types.

4) Max height not to exceed 3 stories or 45 ft per the Amended Huntfield Proffers dated 8/19/24. Actual height based on final selection of house type.

5) Per the Amended Huntfield Proffers dated May 3, 2004, front loading garages may be used for not more than 40% of the total number of garages proposed in the development.

SFD Units
** indicates items modified in proffers - see notes*

*Lot Size	Required	Provided
Min (sf)	5,000	> Minimum
***Lot Width**		
Min (ft)	50'	> Minimum
Impervious Site Coverage		
Max. Gross Site Area Covered (%)	70%	*See note 3*
***Max Height**		
Not to Exceed (stories/ft)	3/45	*See note 4*
***Front Setbacks**	25'	25'
***Side Setbacks**	5'	5'
Rear Setbacks	20'	20'
*Accessory Structures - See note 2		
No Setback Requirements - see note 1 (f),		
Corner Lots		
Shall have 2 fronts, 1 side, and 1 rear yard.		

SFA Units (Town homes)
** indicates items modified in proffers - see notes*

*Lot Size	Required	Provided
Min (sf)	1,600 SF	> Minimum
***Lot Width**		
Min (ft)	16'	20'
Impervious Site Coverage		
Max. Gross Site Area Covered (%)	80%	*See note 3*
***Max Height**		
Not to Exceed (stories/ft)	3/45	*See note 4*
***Front Setbacks**	25'	25'
***Side Setbacks (at the end of each row)**	10'	10'
Rear Setbacks	20'	20'
*Accessory Structures - See note 2		
No Setback Requirements - see note 1 (f).		

Total Parking (Phase 4)	Required	Provided
	89	151
*Min. Parking per SFD (2 Spaces / Unit) (18) Units	36	42
**Min. Parking per SFA (1.8 Spaces / Unit) (29) Units	53	58
On-Street Parking	-	51

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS
3445 BOX HILL CORPORATE CENTER DR
SUITE A
ABINGDON, MD 21009
410-515-9000
MRAGTA.COM

JON K. ERICKSON REGISTERED 16052 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: AS SHOWN	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:

SHEET: 2 OF 29

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
2

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

Original Proffers: Jan 7, 2002

Resolution for Amendment of Proffers 1 - May 17, 2004

Proffer Amendment 2 - August 1, 2005

Proffer Amendment 3 – August 19, 2024

1) EDUCATION- Huntfield, proffers to dedicate up to 17 acres of land to Jefferson County Board of Education. The land proposed to be donated to the Jefferson County Board of Education shall be identified via conceptual plan within one (1) year of the effective date of this document.

2) TRANSPORTATION- Huntfield, will maintain its commitment to participate with the West Virginia Division of Highways and other developments to pay for Huntfield's pro rata share of required road improvements directly attributable in part to Huntfield.

3) HISTORY- Huntfield proffers to provide any historic or archeologic reports and studies, as required by the State Historic Preservation Office, Division of Culture and History.

4) SOILS – "Huntfield proffers to identify and remediate any known environmental conditions in any manner, method or process that meets or exceeds West Virginia Department of Environmental Protection (WVDEP) de minimus soils standards and provide the report/documentation to the purchaser indicating proper soil remediation no later than at each home settlement.

5) OVERALL PLANNING

a) Huntfield proffers to actively participate with the City and adjacent landowners in the comprehensive planning, preservation, and development of the Old Route 340 corridor between Huntfield's boundaries and Evitt's Run.

b) Huntfield proffers to construct a 8' hiker/biker trail in a location in accordance with the Master Plan and within a timeframe in accordance with the mutual agreement of the city and Huntfield.

i) A contiguous sidewalk system from Huntfield to the Augustine Avenue Trail shall be constructed.

c) Huntfield proffers continued participation and coordination with the Eastern Panhandle Transportation Authority (EPTA) to provide bus service between Huntfield and downtown Charles Town, and any other major Charles Town developments. Huntfield shall further present development site plans which incorporate shuttle stops and other appropriate shuttle infrastructure in the Huntfield project.

d) Within 12 months of the full execution of this proffer amendment, Huntfield shall collect and distribute community information and future traffic volume projections and relevant data to the City, to incorporate into other/future traffic studies conducted by others.

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

i) Additionally, Huntfield shall cooperate with the City to provide all necessary construction easements or Right of Ways for current and future planned trails, walkways, and pedestrian crossings.

e) Lord Fairfax Street shall be developed as an alternative access point pursuant to the Huntfield Overall Composite Schematic plan with City of Charles Town Planning Commission approval date of April 12, 2005 (PREL-20107).

6) OTHER CONTRIBUTIONS- To offset its proportionate share of the costs of capital improvements and operating expenses brought about by the development of Huntfield, Huntfield proffers to pay the city the following per unit proffer fees:

a) The City shall collect $2,448 per single family, townhome or attached villa style dwelling unit, or any other style residence approved for permit, to be used for public facilities, infrastructure, and other improvements within the City. This monetary proffered fee shall be separate and exclusive of any County imposed Impact Fee. The City Fee shall be paid at Building Permit application for each dwelling unit.

b) Huntfield proffers to dedicate to the City up to 10 (ten) acres of improved (utilities and hard surface road frontage) but vacant land, for the use and benefit of the City for the purpose of constructing, operating, and maintaining municipal facilities.

7) CONDITIONS OF DEVELOPMENT OF PHASE I – The foregoing proffers are conditioned upon the following:

a) Current plans being processed in the County will be administered under the NR Zoning Ordinance, and accepted as currently designed, by the City with the following conditions:

i) Minimum lot width shall be reduced to 50 feet at the street.
ii) Minimum lot area shall be reduced to 5,000 square feet.
iii) Front yard setback shall be 25 feet from the edge of pavement.
iv) Encroachment within the front yard setback shall be no more than 30% or 8.34 feet.
v) Side yard setbacks shall be reduced to 5 feet minimum.
vi) No setback from the property line for accessory structures shall be required.
vii) Minimum paving width shall be 24 feet.

b) All plans submitted to the City for development within Huntfield beyond Phase I shall continue to be administered and processed under the NR Zoning Ordinance with the above-listed conditions until such time as the City has created and adopted the new zoning classification pursuant to its Resolution and Annexation Agreement.

8) CONDITIONS OF OVERALL DEVELOPMENT

The City and Huntfield agree to the following performance, design standards, and modifications to the Neighborhood Residential zoning regulations:

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

The foregoing proffers are further conditioned upon the following:

a) To allow the development of not more than 3,200 homes with the Property, according to "Neo Traditional and New Urbanist Planning Concepts." (*While Neo-Traditional Development often features primarily rear loaded homes, the intent of this agreement is to allow front loaded homes in designated areas so long as the development, as a whole, is in keeping with Neo-Traditional design including, but not limited to, walkability, connectivity, mixed-houses, quality architecture and design, urban design, increased density, and open space.*) Note, this is not an all-inclusive or exhaustive list of the characteristics of neo-traditional style but is used to illustrate the larger development style. All plans for the development of the Property now and in the future may be administered, at the option of Huntfield, under the Neighborhood Residential zoning classification with the following conditions:

b) The minimum 200,000 square feet of commercial, retail or office space proffered by Huntfield shall satisfy all requirements for land are devoted to office and/or commercial. This agreement does not preclude Huntfield from developing commercial/retail/office space beyond the 200,000 square feet requirements;

c) Huntfield will dedicate 15% of the total land area to open and recreational space. All active and passive recreational facilities provided in Huntfield shall be credited towards the 15% open space requirements specified herein. In addition, Huntfield will provide a minimum 50-foot buffer on either side of Bullskin Run measured from the edge of the stream bank and a landscaped 50-foot buffer along major highways (i.e. US Route 340, 340 Bypass, WV Route 9).

d) Maximum Building Heights shall be as follows:

i) Single Family Detached - 45' (forty-five feet), but not more than (3) three stories

ii) Townhouse - 45' (forty-five feet), but no more than 4 (four) stories Multi-Family - 55' (fifty-five feet), but not more than 4 (four) stories

iii) Office, Commercial, Civic and Mixed Use – 60' (sixty feet), but not more than (5) five stories

e) Minimum Lot Widths shall be as follows:

i) Single Family Detached - 50' (fifty-feet), however 45' (forty-five feet) for Active Adult Community (development)

ii) Townhouses – Mix of 16' (sixteen feet) to 24' (twenty-four feet);

f) Minimum Lot Sizes shall be as follows:

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

i) Single Family Detached – 5,000 (five thousand square feet), however 4,500 (forty-five hundred square feet) for Active Adult Community (development)

ii) Townhouses – 1,600 square feet;

g) Townhouse portions of development shall be permitted to have an area less than five acres;

h) Townhouse units shall be permitted at a maximum density of 16 units per net acre;

i) Multi-family units, as defined in the City's zoning ordinances, shall be permitted within Huntfield consistent with the City of Charles Town Zoning and Subdivision Ordinance requirements.

j) The minimum rear yard setback for units with attached rear-load garages shall be 10' (ten feet);

k) Alleys may be dead-end streets when intersection would cause a curb cut on a collector street;

l) Alleys may provide lot access and satisfy road frontage requirements when the lots served by those alleys front on open space;

m) Cul-de-sac streets shall be permitted in limited instances and require approval by the Planning Commission. When allowed, the cul-de-sac terminus shall include a landscaped circle.

n) The designated Village Center shall be permitted for Central Business District, General Commercial and Neighborhood Residential uses as defined in the present City of Charles Town Zoning Ordinance. The designed Neighborhood Centers shall be permitted for Office Residential, Neighborhood Residential and Neighborhood Commercial uses as defined in the present City of Charles Town Zoning Ordinance. Future changes in the existing Zoning Ordinances shall be made Applicable to this paragraph.

o) In order to allow townhouses to be constructed with both decks and two-car garages, accessory buildings may occupy up to 40% of the rear yard of any townhouse lot.

p) The development of gated communities (i.e. restricted access to specific neighborhoods) is not permitted, other than Active Adult Development.

q) To enable Huntfield to perform its obligations under the Annexation Agreement, the City shall work cooperatively with Huntfield to ensure that Huntfield may obtain the amount of sewage treatment plant capacity needed to serve the Property at each stage of its development until built out.

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

r) In addition to the proffered commitment to approach Pan Tran to provide bus services between Huntfield and downtown Charles Town, Huntfield shall cooperate with any efforts initiated by the City to provide transit services to Huntfield.

s) Huntfield will submit a "Master Schematic Plan", to City Planning Commission prior to applicable approvals for Phase 4 of the development that incorporate the "Neo Traditional and new Urbanist Concepts" and an exhibit illustrating the location, total land area and public accessibility of proposed recreational and open space. Subsequent site plans submitted to support this Master Schematic Plan will provide the detailed design and concepts as they relate to street and block networks; an interconnected pedestrian sidewalk and trail system; landscape screening, buffers and design consideration to mitigate the visual impacts of parking lots; street and parking lot landscaping using the West Virginia Division of Forestry's Recommended Trees for City and Communities publication as the species guide; and design and pedestrian attributes as related to the Village Center, major civic and public use buildings should be located in or adjacent to the village and neighborhood centers or adjacent to the civic green, square or park in the village center. Public space components and civic buildings should terminate vistas whenever possible. Public and civic use buildings may front on open spaces such as parks and greens.

t) Garage Configuration:

The areas shaded and/or hatched and noted in Exhibit A as Zone 1, Zone 2, and Zone 3 are subject to specific garage configuration conditions as follows:

i) **Zone 1**: The use of rear entry, alley access parking or rear-loading detached or attached garages for residential garage parking is required. The homes in Zone 1 must provide parking to the rear of the home as indicated in Exhibit A.

ii) **Zone 2**: Single family attached or detached residential units with front loading garages or parking (defined as access from street facing front of the home) are permitted without a recessed garage requirement so long as a minimum 25' length minimum driveway is provided extending from back of sidewalk to the front of the garage. Zone 2 includes all land shown/illustrated within Exhibit A.

iii) **Zone 3**: Single family attached or detached residential units with front loading garages or parking (defined as access from the street facing front of the home) are permitted without a recessed garage requirement so long as a minimum 25' length minimum driveway is provided extending from back of sidewalk to the front of the garage. Zone 3 includes all the land as noted (and not illustrated) within Exhibit A to include the remaining 481.25 deeded acres to the northwestern side of railroad tracks.

v. Community Pool and Associated Facilities:

iv) Huntfield proffers the design, permitting, and construction of a community swimming pool, pool club house with bathroom facilities and associated parking lot in similar layout

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

and conformance with the Huntfield Recreation Center preliminary plans (PP-20125).

(1) Community Pool shall be a minimum of 4,500+ /sf, inclusive of access steps, 3' shallow end and up to 8' deep end, and a 800+ /sf Children's pool.

(2) Single Story Pool clubhouse (min 2,100/sf) with men's and women's restroom, locker room, and changing room facilities.

(3) Parking area consistent with approved preliminary plans.

(4) Pool and associated land and facilities shall be dedicated to HOA upon completion (defined as issuance of Use & Occupancy Permit) and before use by any residents. HOA shall furnish, supply, operate, and manage facilities from acceptance of facility without financial assistance or contribution from Developer or City.

(5) The Pool, Clubhouse and all associated site work shall be complete, dedicated to the HOA, and able to be used by all residents within two (2) years of the effective date of this signed Proffer Amendment.

(6) All basketball courts, recreational equipment and green space shall be built out consistent with the Huntfield Recreation Center preliminary plans (PP-20125). The construction of the basketball courts and recreational equipment shall commence no later than the time the pool dedication occurs to the HOA and completed and ready for usage within one (1) year.

9) ZONING YIELD

a) Approved under the zoning shall be 3,200 residential units of single family detached, single family attached, multi-family, and 200,000 to 1,000,000 square feet commercial, retail, and office development. If desired, Huntfield may produce a market study identifying the potential to increase the total square footage of commercial, retail and office space beyond the required minimum of 200,000 square feet. In order to achieve the desired maximum commercial development of 1,000,000 square feet, the City acknowledges that Floor Area Ratios (FAR's) of greater than 1 or building heights of 75 feet may be considered by the City of Charles Town.

b) Phasing of development or building permits – No phasing of development or building permits will be imposed with the exception of Article 10.a as outlined herein. (Subject to availability of adequate infrastructure facilities).

10) SEQUENCE OF DEVELOPMENT

a) All lots in Zone 1 as defined herein, shall have homes/residences constructed and fully built out prior to any residential construction is permitted to commence in Zone 3 (as defined herein). All land within Zone 2 is specifically excluded from this restriction.

Huntfield List of Proffers

Proffer Amendment 3

Approval Date 8/19/24

Proffer Amendment 3 Adopted by Council the 19th day of August, 2024

Robert M. Trainor
Mayor

John Nissel
City Manager/Clerk

Dan Eberlein
DR Acquisitions, LLC, Manager

MRA

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

3445 BOX HILL CORPORATE CENTER DR
SUITE A
ABINGDON, MD 21009
410-515-9000

MRAGTA.COM

JON K. ERICKSON
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: AS SHOWN	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 3 OF 29	

SHEET TITLE

PROFFERS

SHEET NUMBER

3

SWM POND G
RETENTION POND III

GABION WALL
TW=518.00
BW=512.00

EMERGENCY SPILLWAY (5' WIDE)
INV.=521.00±

SWM RISER

MATCHLINE

WESTMORELAND WAY

ABIGAIL STREET

EDGEBROOK DRIVE

643 8,250 S.F. F.F.=536.67 BSMT.=527.67 G.F.E.=536.00
644 8,250 S.F. F.F.=537.34 BSMT.=528.34 G.F.E.=536.67
645 8,250 S.F. F.F.=538.13 BSMT.=529.13 G.F.E.=537.46
646 8,250 S.F. F.F.=538.43 BSMT.=529.43 G.F.E.=537.76
647 8,250 S.F. F.F.=537.98 BSMT.=528.98 G.F.E.=537.31
648 8,327 S.F. F.F.=536.23 BSMT.=527.23 G.F.E.=535.56

678 6,090 S.F. F.F.=541.60 BSMT.=532.60 G.F.E.=535.63
679 5,400 S.F. F.F.=541.80 BSMT.=532.80 G.F.E.=536.72
680 5,400 S.F. F.F.=543.70 BSMT.=534.70 G.F.E.=537.83
681 5,520 S.F. F.F.=543.80 BSMT.=534.80 G.F.E.=539.00
682 5,738 S.F. F.F.=544.30 BSMT.=535.30 G.F.E.=540.21

677 5,165 S.F. 2ND=548.05 F.F.=538.73 G.F.E.=538.06
676 2,100 S.F. 2ND=548.05 F.F.=538.73 G.F.E.=538.06
675 2,100 S.F. 2ND=548.05 F.F.=538.73 G.F.E.=538.06
674 3,150 S.F. 2ND=548.62 F.F.=539.30 G.F.E.=538.63
673 3,150 S.F. 2ND=548.73 F.F.=539.41 G.F.E.=538.74
672 2,100 S.F. 2ND=549.40 F.F.=540.08 G.F.E.=539.41
671 2,100 S.F. 2ND=549.40 F.F.=540.08 G.F.E.=539.41
670 2,100 S.F. 2ND=549.40 F.F.=540.08 G.F.E.=539.41
669 2,100 S.F. 2ND=550.07 F.F.=540.75 G.F.E.=540.08
668 3,444 S.F. 2ND=550.07 F.F.=540.75 G.F.E.=540.08

649 4,216 S.F. 2ND=543.32 F.F.=534.00 G.F.E.=533.33
650 2,100 S.F. 2ND=543.99 F.F.=534.67 G.F.E.=534.00
651 2,100 S.F. 2ND=544.66 F.F.=535.34 G.F.E.=534.67
652 2,100 S.F. 2ND=545.33 F.F.=536.01 G.F.E.=535.34
653 3,150 S.F. 2ND=546.00 F.F.=536.68 G.F.E.=536.01
654 3,150 S.F. 2ND=547.12 F.F.=537.90 G.F.E.=537.23
655 2,100 S.F. 2ND=547.89 F.F.=538.57 G.F.E.=537.90
656 2,100 S.F. 2ND=548.56 F.F.=539.24 G.F.E.=538.57
657 2,100 S.F. 2ND=549.23 F.F.=539.91 G.F.E.=539.24
658 3,497 S.F. 2ND=549.23 F.F.=539.91 G.F.E.=539.24
3,540 S.F. 2ND=549.52 F.F.=540.20

5 PARKING SPACES
8 PARKING SPACES
18 PARKING SPACES
12 PARKING SPACES

Scale 1" = 30'

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MRAGTA.COM

JON K. ERICKSON
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
12/10/2025

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REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 4 OF 29	

SHEET TITLE

GRADING PLAN

SHEET NUMBER

4

MATCHLINE

Scale 1" = 30'

ABIGAIL STREET

EDGEBROOK DRIVE

ALLEY 3A36

BRANDYWINE STREET

ALLEY 3B34

ACCESS ESMT

110 PARKING SPACES

680 — 3,400 S.F. — F.F.=543.70 BSMT.=534.70 — G.F.E.=537.83

681 — 5,520 S.F. — F.F.=543.80 BSMT.=534.80 — G.F.E.=539.00

682 — 5,138 S.F. — F.F.=544.30 BSMT.=535.30 — G.F.E.=540.23

683 — 5,137 S.F. — F.F.=546.70 BSMT.=537.70 — G.F.E.=541.50

684 — 5,138 S.F. — F.F.=546.70 BSMT.=537.70 — G.F.E.=542.77

685 — 6,154 S.F. — F.F.=546.70 BSMT.=537.70 — STOP SIGN — G.F.E.=543.31

673 — 3,150 S.F. 2ND=548.73 F.F.=539.41 G.F.E.=538.74

672 — 2,100 S.F. 2ND=549.40 F.F.=540.08 G.F.E.=539.41

671 — 2,100 S.F. 2ND=549.40 F.F.=540.08 G.F.E.=539.41

670 — 2,100 S.F. 2ND=549.40 F.F.=540.08 G.F.E.=539.41

669 — 2,101 S.F. 2ND=550.07 F.F.=540.75 G.F.E.=540.08

668 — 3,444 S.F. 2ND=550.07 F.F.=540.75 G.F.E.=540.08

667 — 3,448 S.F. 2ND=550.68 F.F.=541.36 G.F.E.=540.69

666 — 2,100 S.F. 2ND=551.35 F.F.=542.03 G.F.E.=541.36

665 — 2,100 S.F. 2ND=551.35 F.F.=542.03 G.F.E.=541.36

664 — 2,101 S.F. 2ND=552.02 F.F.=542.70 G.F.E.=542.03

663 — 4,139 S.F. 2ND=552.02 F.F.=542.70 G.F.E.=542.03

654 — 3,150 S.F. 2ND=547.12 F.F.=537.90 G.F.E.=537.23

655 — 2,100 S.F. 2ND=547.89 F.F.=538.57 G.F.E.=537.90

656 — 2,100 S.F. 2ND=548.56 F.F.=539.24 G.F.E.=538.57

657 — 2,100 S.F. 2ND=549.23 F.F.=539.91 G.F.E.=539.24

658 — 3,447 S.F. 2ND=549.23 F.F.=539.91 G.F.E.=539.24

659 — 3,540 S.F. 2ND=549.52 F.F.=540.20 G.F.E.=539.53

660 — 2,100 S.F. 2ND=549.52 F.F.=540.20 G.F.E.=539.53

661 — 2,100 S.F. 2ND=549.52 F.F.=540.20 G.F.E.=539.53

662 — 4,011 S.F. 2ND=549.52 F.F.=540.20 G.F.E.=539.53

857 — F.F.=543.90 BSMT.=534.90 — 5,531 S.F. — G.F.E.=534.90

856 — F.F.=545.70 BSMT.=536.70 — 6,283 S.F. — G.F.E.=536.35

855 — F.F.=546.70 BSMT.=537.70 — 6,388 S.F. — G.F.E.=537.82

854 — F.F.=547.70 BSMT.=538.70 — 6,843 S.F. — G.F.E.=538.44

REMOVE EX. BOV

REMOVE EX. BOV

2" BOV

25' OVERBLAST

STOP BAR

STREET SIGN

STREET SIGN

TEE 3-8"x8"x8" VALVE

8" PVC SAN

5' CONC. SW

4" LAT.

6" LAT.

1" DIA.

1/2" DIA.

LOC

PC = 37+50.42

PT = 40+38.13

MRA

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

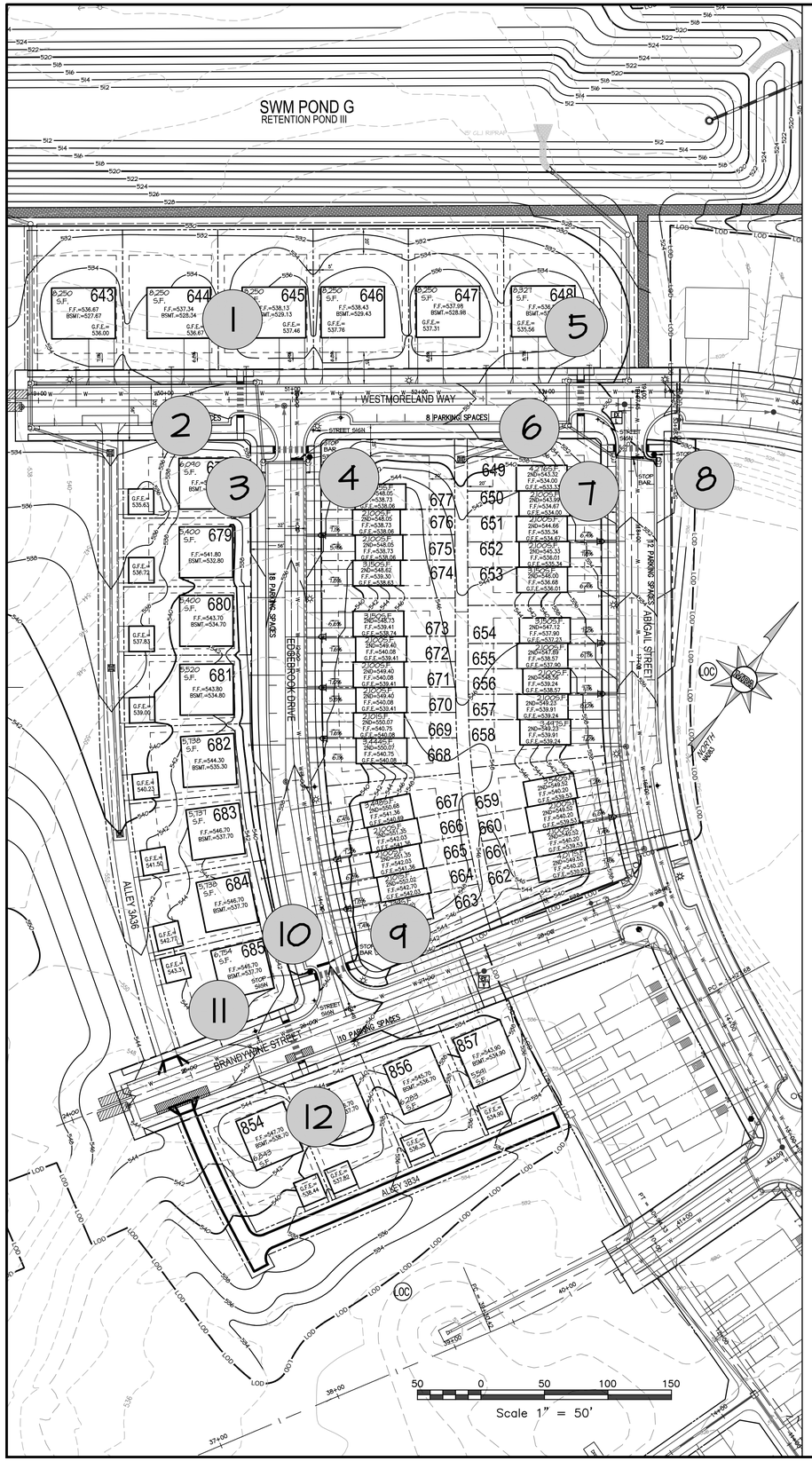
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 5 OF 29	

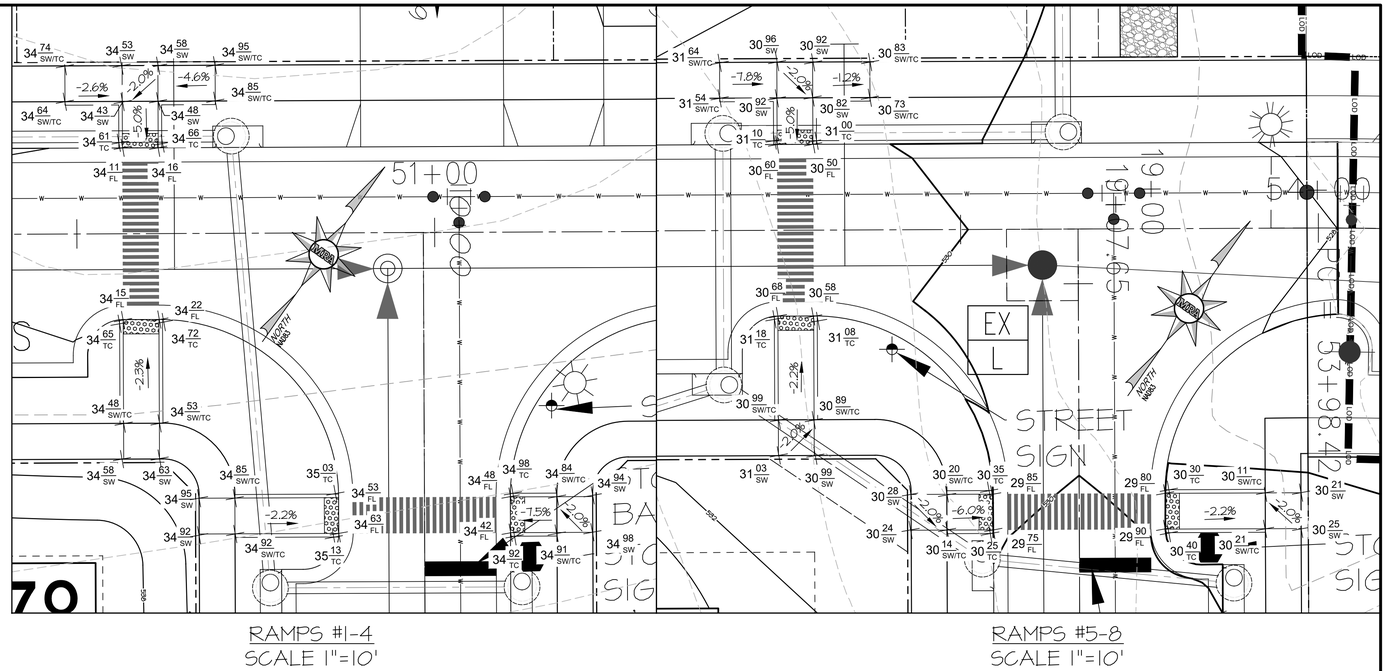
SHEET TITLE

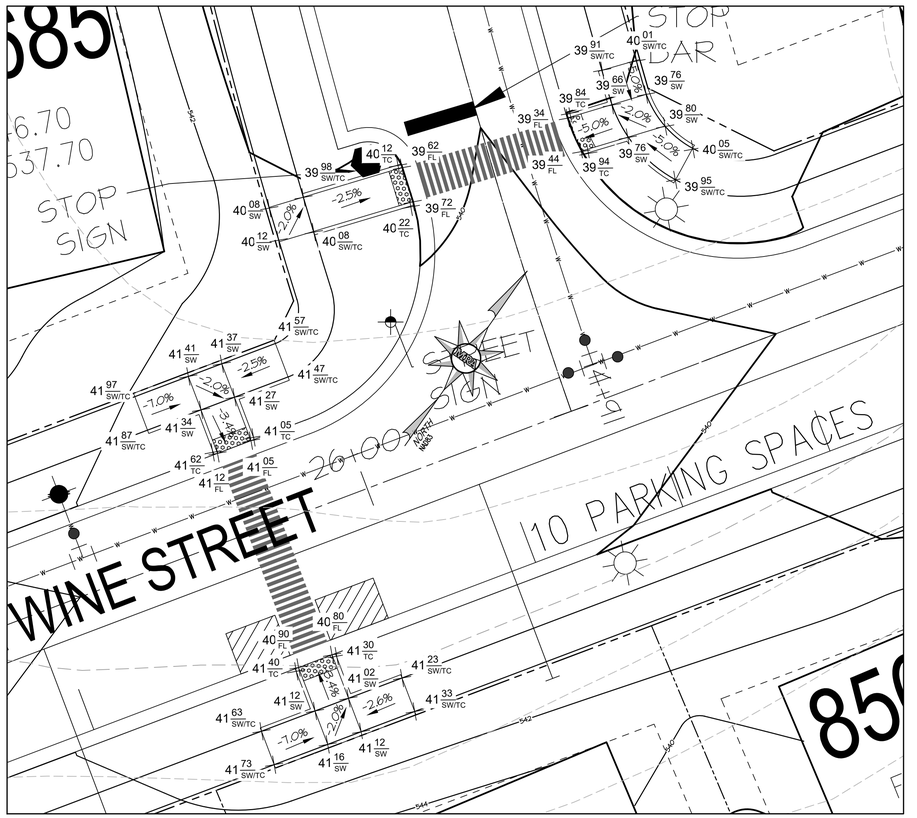
GRADING PLAN

SHEET NUMBER

5







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CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

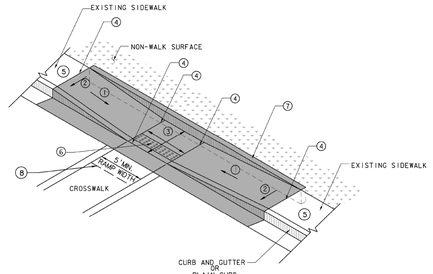
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 6 OF 29	

SHEET TITLE

ADA RAMP GRADING PLAN

SHEET NUMBER

6



TYPE III RAMP

NOTES

THE TYPE OF RAMP TO BE USED SHALL BE AS SPECIFIED ON THE PLANS. THESE STANDARDS CAN BE CONSIDERED GUIDELINES IN SELECTING RAMP TYPES, HOWEVER THEY CAN BE DEVIATED FROM WITH A SPECIAL DETAIL AS NOTED IN PLANS.

RAMP CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 609 OF THE CURRENT WVDOT, DOH STANDARD SPECIFICATIONS ROADS AND BRIDGES AND ANY SUBSEQUENT DOH SUPPLEMENTAL SPECIFICATIONS, AND THE PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PROWAG) DATED JULY 26, 2011. RAMP SURFACE SHALL INCLUDE A "DETECTABLE WARNING SURFACE" (SEE PVT7 SHT. 11 OF 13) AS SHOWN FOR EACH RAMP TYPE. A COARSE BROOM FINISH, TRANSVERSE TO FLARE SLOPES, OR EQUAL NON-SKID FINISH SHALL BE PROVIDED ON CONCRETE SURFACES.

NORMAL GUTTER FLOW LINE AND PROFILE SHALL BE MAINTAINED THROUGH THE RAMP AREA, UNLESS OTHERWISE SHOWN OR SPECIFIED. POSITIVE DRAINAGE MUST BE MAINTAINED SO THAT NO PONDING OCCURS WITHIN THE RAMP OR CLEAR SPACE AREA.

1/4" MINIMUM, 1/2" MAXIMUM PREFORMED EXPANSION JOINT FILLER, MEETING THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS, AS NOTED ABOVE, SHALL BE PLACED AT ALL LOCATIONS WHERE RAMP CONTACTS CURB, GUTTER, CONCRETE PAVEMENT, OR OTHER RIGID OBJECTS.

WHERE EXISTING SIDEWALK CONNECTS TO PROPOSED SIDEWALK OR RAMPS, EXPANSION JOINTS ALONG WITH DOWEL BARS WILL BE PLACED. DOWEL BARS WILL BE UTILIZED BETWEEN EXISTING AND PROPOSED TO REDUCE VERTICAL CHANGE. SEE SHEET 11 FOR ADDITIONAL INFORMATION.

SAWCUTS WILL BE UTILIZED DURING DEMOLITION OF EXISTING SIDEWALKS. SIMILAR METHODS MAY BE USED UPON APPROVAL BY FIELD ENGINEER.

RAMPS SHALL NOT BE PLACED IN LINE WITH DRAINAGE STRUCTURES. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF THE DRAINAGE STRUCTURE, EXCEPT WHERE EXISTING STRUCTURES ARE BEING UTILIZED FOR CONSTRUCTION OF NEW RAMPS.

ANY GRATE IN PEDESTRIAN AREAS SHALL HAVE OPENINGS NOT GREATER THAN 1/2" AND SHALL BE PLACED WITH LONG DIMENSION OF OPENING PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

IF THE 8.33% (12:1) SLOPE CANNOT BE OBTAINED DUE TO GRADE OF THE ADJACENT ROADWAY, THE SLOPED PORTION OF THE RAMP SHALL BE EXTENDED TO A MINIMUM LENGTH OF 15'-0".

EXISTING CROSS WALK AND STOP BAR MARKINGS TO BE ERADICATED AND RELOCATED AS DICTATED BY PROPOSED RAMP LOCATIONS. COST NOT INCIDENTAL TO COST OF PROPOSED RAMP.

CURB RAMP WIDTH SHALL MATCH SIDEWALK WIDTH PLUS CLEARANCE. TYPICAL SIDEWALK WIDTH IS 5' MINIMUM. RAMP WIDTHS LESS THAN 5' REQUIRE DIVISION/DISTRICT ENGINEER APPROVAL. WIDTHS LESS THAN 4' REQUIRE AN EXCEPTION JUSTIFICATION REPORT. SEE SHEET 11 FOR INFORMATION REGARDING RAMP THICKNESS.

GRADE BREAKS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.

CLEAR SPACE- BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE THE WIDTH OF THE CURB RAMP AND EXTENDING 4' MINIMUM INTO THE ABUTTING ROADWAY SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL TRAVEL LANE. SURFACE TO MATCH EXISTING. ANY CLEAR SPACE WORK TO BE COMPLETED WILL BE INCIDENTAL TO THE COST OF THE RAMP.

ALL CURB RAMPS SHALL BE CONSTRUCTED TO PROVIDE ACCESS TO EXISTING OPERABLE PARTS. AN EXAMPLE OF THIS WOULD BE PEDESTRIAN PUSH BUTTONS.

LEGEND

1. 8.33% (12:1) MAXIMUM RAMP SLOPE INCLUDING CONSTRUCTION TOLERANCE SLOPE OF RAMP SHALL CARRY THROUGH TO FACE OF CURB
2. CROSS SLOPE: 2.00% MAXIMUM INCLUDING CONSTRUCTION TOLERANCE
3. CURB RAMPS REQUIRE A (5'-0") MINIMUM TURNING SPACE WHERE PEDESTRIANS PERFORM TURNING MANEUVERS WITH A MAXIMUM CROSS SLOPE OF 2% AND LONGITUDINAL SLOPE MATCHING ROADWAY
4. GRADE BREAK REQUIRED TO BE FLUSH (0") AND PERPENDICULAR TO PEDESTRIAN PATH OF TRAVEL
5. IF SIDEWALK IS EXISTING AND NON-COMPLIANT SEE "TRANSITION TO EXISTING NON-COMPLIANT SIDEWALK" DETAIL SHEET 12
6. DETECTABLE WARNING SURFACE SEE "DETECTABLE WARNING SURFACE (DWS)" DETAIL SHEET 11
7. CURB WALL OR CHEEK WALL AS DICTATED BY FIELD CONDITIONS. SEE "EXISTING ADJACENT SURFACE TRANSITION" DETAIL SHEET 13
8. CLEAR SPACE - WIDTH OF CURB RAMP AND EXTENDING 4' MINIMUM
9. 3/4" CHAMFER EDGE

PAY LIMITS FOR CURB RAMPS (EXCLUDING DWS)

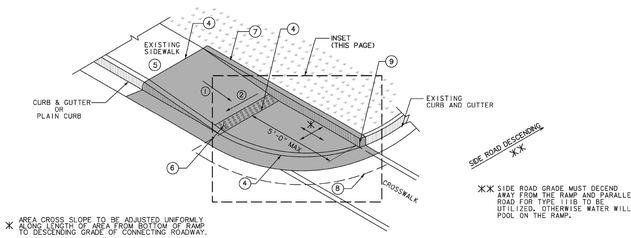
NOT TO SCALE

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DETAIL

PREPARED 1-4-1999
REVISION DATE
7/31/20
10/30/13
12/01/20

SIDEWALK RAMPS
(Sheet 5 of 13)
TYPE III RAMP

STANDARD SHEET PVT 7

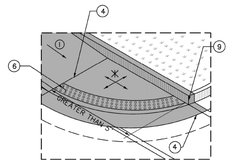


* AREA CROSS SLOPE TO BE ADJUSTED UNIFORMLY ALONG LENGTH OF AREA FROM BOTTOM OF RAMP TO DESCENDING GRADE OF CONNECTING ROADWAY.

** SIDE ROAD GRADE MUST DECEND AWAY FROM THE RAMP AND PARALLEL ROAD FOR TYPE IIIB TO BE UTILIZED, OTHERWISE WATER WILL POOL ON THE RAMP.

TYPE IIIB

(DESCENDING SIDE ROAD ONLY)



TYPE IIIB (INSET)

NOTES

THE TYPE OF RAMP TO BE USED SHALL BE AS SPECIFIED ON THE PLANS. THESE STANDARDS CAN BE CONSIDERED GUIDELINES IN SELECTING RAMP TYPES, HOWEVER THEY CAN BE DEVIATED FROM WITH A SPECIAL DETAIL AS NOTED IN PLANS.

RAMP CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 609 OF THE CURRENT WVDOT, DOH STANDARD SPECIFICATIONS ROADS AND BRIDGES AND ANY SUBSEQUENT DOH SUPPLEMENTAL SPECIFICATIONS, AND THE PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PROWAG) DATED JULY 26, 2011. RAMP SURFACE SHALL INCLUDE A "DETECTABLE WARNING SURFACE" (SEE PVT7 SHT. 11 OF 13) AS SHOWN FOR EACH RAMP TYPE. A COARSE BROOM FINISH, TRANSVERSE TO FLARE SLOPES, OR EQUAL NON-SKID FINISH SHALL BE PROVIDED ON CONCRETE SURFACES.

NORMAL GUTTER FLOW LINE AND PROFILE SHALL BE MAINTAINED THROUGH THE RAMP AREA, UNLESS OTHERWISE SHOWN OR SPECIFIED. POSITIVE DRAINAGE MUST BE MAINTAINED SO THAT NO PONDING OCCURS WITHIN THE RAMP OR CLEAR SPACE AREA.

1/4" MINIMUM, 1/2" MAXIMUM PREFORMED EXPANSION JOINT FILLER, MEETING THE REQUIREMENTS OF SECTION 609 OF THE SPECIFICATIONS, AS NOTED ABOVE, SHALL BE PLACED AT ALL LOCATIONS WHERE RAMP CONTACTS CURB, GUTTER, CONCRETE PAVEMENT, OR OTHER RIGID OBJECTS.

WHERE EXISTING SIDEWALK CONNECTS TO PROPOSED SIDEWALK OR RAMPS, EXPANSION JOINTS ALONG WITH DOWEL BARS WILL BE PLACED. DOWEL BARS WILL BE UTILIZED BETWEEN EXISTING AND PROPOSED TO REDUCE VERTICAL CHANGE. SEE SHEET 11 FOR ADDITIONAL INFORMATION.

SAWCUTS WILL BE UTILIZED DURING DEMOLITION OF EXISTING SIDEWALKS. SIMILAR METHODS MAY BE USED UPON APPROVAL BY FIELD ENGINEER.

RAMPS SHALL NOT BE PLACED IN LINE WITH DRAINAGE STRUCTURES. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF THE DRAINAGE STRUCTURE, EXCEPT WHERE EXISTING STRUCTURES ARE BEING UTILIZED FOR CONSTRUCTION OF NEW RAMPS.

ANY GRATE IN PEDESTRIAN AREAS SHALL HAVE OPENINGS NOT GREATER THAN 1/2" AND SHALL BE PLACED WITH LONG DIMENSION OF OPENING PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

IF THE 8.33% (12:1) SLOPE CANNOT BE OBTAINED DUE TO GRADE OF THE ADJACENT ROADWAY, THE SLOPED PORTION OF THE RAMP SHALL BE EXTENDED TO A MINIMUM LENGTH OF 15'-0".

EXISTING CROSS WALK AND STOP BAR MARKINGS TO BE ERADICATED AND RELOCATED AS DICTATED BY PROPOSED RAMP LOCATIONS. COST NOT INCIDENTAL TO COST OF PROPOSED RAMP.

CURB RAMP WIDTH SHALL MATCH SIDEWALK WIDTH PLUS CLEARANCE. TYPICAL SIDEWALK WIDTH IS 5' MINIMUM. RAMP WIDTHS LESS THAN 5' REQUIRE DIVISION/DISTRICT ENGINEER APPROVAL. WIDTHS LESS THAN 4' REQUIRE AN EXCEPTION JUSTIFICATION REPORT. SEE SHEET 11 FOR INFORMATION REGARDING RAMP THICKNESS.

GRADE BREAKS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.

CLEAR SPACE- BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE THE WIDTH OF THE CURB RAMP AND EXTENDING 4' MINIMUM INTO THE ABUTTING ROADWAY SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL TRAVEL LANE. SURFACE TO MATCH EXISTING. ANY CLEAR SPACE WORK TO BE COMPLETED WILL BE INCIDENTAL TO THE COST OF THE RAMP.

ALL CURB RAMPS SHALL BE CONSTRUCTED TO PROVIDE ACCESS TO EXISTING OPERABLE PARTS. AN EXAMPLE OF THIS WOULD BE PEDESTRIAN PUSH BUTTONS.

LEGEND

1. 8.33% (12:1) MAXIMUM RAMP SLOPE INCLUDING CONSTRUCTION TOLERANCE SLOPE OF RAMP SHALL CARRY THROUGH TO FACE OF CURB
2. CROSS SLOPE: 2.00% MAXIMUM INCLUDING CONSTRUCTION TOLERANCE
3. CURB RAMPS REQUIRE A (5'-0") MINIMUM TURNING SPACE WHERE PEDESTRIANS PERFORM TURNING MANEUVERS WITH A MAXIMUM CROSS SLOPE OF 2% AND LONGITUDINAL SLOPE MATCHING ROADWAY
4. GRADE BREAK REQUIRED TO BE FLUSH (0") AND PERPENDICULAR TO PEDESTRIAN PATH OF TRAVEL
5. IF SIDEWALK IS EXISTING AND NON-COMPLIANT SEE "TRANSITION TO EXISTING NON-COMPLIANT SIDEWALK" DETAIL SHEET 12
6. DETECTABLE WARNING SURFACE SEE "DETECTABLE WARNING SURFACE (DWS)" DETAIL SHEET 11
7. CURB WALL OR CHEEK WALL AS DICTATED BY FIELD CONDITIONS. SEE "EXISTING ADJACENT SURFACE TRANSITION" DETAIL SHEET 13
8. CLEAR SPACE - WIDTH OF CURB RAMP AND EXTENDING 4' MINIMUM
9. 3/4" CHAMFER EDGE

PAY LIMITS FOR CURB RAMPS (EXCLUDING DWS)

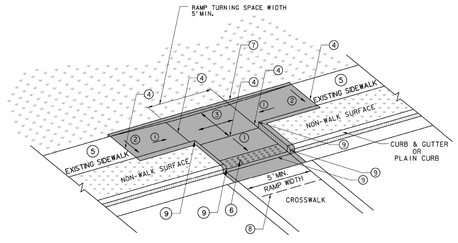
NOT TO SCALE

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DETAIL

PREPARED 1-4-1999
REVISION DATE
7/31/20
10/30/13
12/01/20

SIDEWALK RAMPS
(Sheet 8 of 13)
TYPE IIIB RAMP

STANDARD SHEET PVT 7



TYPE IV RAMP

NOTES

THE TYPE OF RAMP TO BE USED SHALL BE AS SPECIFIED ON THE PLANS. THESE STANDARDS CAN BE CONSIDERED GUIDELINES IN SELECTING RAMP TYPES, HOWEVER THEY CAN BE DEVIATED FROM WITH A SPECIAL DETAIL AS NOTED IN PLANS.

RAMP CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 609 OF THE CURRENT WVDOT, DOH STANDARD SPECIFICATIONS ROADS AND BRIDGES AND ANY SUBSEQUENT DOH SUPPLEMENTAL SPECIFICATIONS, AND THE PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PROWAG) DATED JULY 26, 2011. RAMP SURFACE SHALL INCLUDE A "DETECTABLE WARNING SURFACE" (SEE PVT7 SHT. 11 OF 13) AS SHOWN FOR EACH RAMP TYPE. A COARSE BROOM FINISH, TRANSVERSE TO FLARE SLOPES, OR EQUAL NON-SKID FINISH SHALL BE PROVIDED ON CONCRETE SURFACES.

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WHERE EXISTING SIDEWALK CONNECTS TO PROPOSED SIDEWALK OR RAMPS, EXPANSION JOINTS ALONG WITH DOWEL BARS WILL BE PLACED. DOWEL BARS WILL BE UTILIZED BETWEEN EXISTING AND PROPOSED TO REDUCE VERTICAL CHANGE. SEE SHEET 11 FOR ADDITIONAL INFORMATION.

SAWCUTS WILL BE UTILIZED DURING DEMOLITION OF EXISTING SIDEWALKS. SIMILAR METHODS MAY BE USED UPON APPROVAL BY FIELD ENGINEER.

RAMPS SHALL NOT BE PLACED IN LINE WITH DRAINAGE STRUCTURES. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF THE DRAINAGE STRUCTURE, EXCEPT WHERE EXISTING STRUCTURES ARE BEING UTILIZED FOR CONSTRUCTION OF NEW RAMPS.

ANY GRATE IN PEDESTRIAN AREAS SHALL HAVE OPENINGS NOT GREATER THAN 1/2" AND SHALL BE PLACED WITH LONG DIMENSION OF OPENING PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

IF THE 8.33% (12:1) SLOPE CANNOT BE OBTAINED DUE TO GRADE OF THE ADJACENT ROADWAY, THE SLOPED PORTION OF THE RAMP SHALL BE EXTENDED TO A MINIMUM LENGTH OF 15'-0".

EXISTING CROSS WALK AND STOP BAR MARKINGS TO BE ERADICATED AND RELOCATED AS DICTATED BY PROPOSED RAMP LOCATIONS. COST NOT INCIDENTAL TO COST OF PROPOSED RAMP.

CURB RAMP WIDTH SHALL MATCH SIDEWALK WIDTH PLUS CLEARANCE. TYPICAL SIDEWALK WIDTH IS 5' MINIMUM. RAMP WIDTHS LESS THAN 5' REQUIRE DIVISION/DISTRICT ENGINEER APPROVAL. WIDTHS LESS THAN 4' REQUIRE AN EXCEPTION JUSTIFICATION REPORT. SEE SHEET 11 FOR INFORMATION REGARDING RAMP THICKNESS.

GRADE BREAKS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.

CLEAR SPACE- BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE THE WIDTH OF THE CURB RAMP AND EXTENDING 4' MINIMUM INTO THE ABUTTING ROADWAY SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL TRAVEL LANE. SURFACE TO MATCH EXISTING. ANY CLEAR SPACE WORK TO BE COMPLETED WILL BE INCIDENTAL TO THE COST OF THE RAMP.

ALL CURB RAMPS SHALL BE CONSTRUCTED TO PROVIDE ACCESS TO EXISTING OPERABLE PARTS. AN EXAMPLE OF THIS WOULD BE PEDESTRIAN PUSH BUTTONS.

LEGEND

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2. CROSS SLOPE: 2.00% MAXIMUM INCLUDING CONSTRUCTION TOLERANCE
3. CURB RAMPS REQUIRE A (5'-0") MINIMUM TURNING SPACE WHERE PEDESTRIANS PERFORM TURNING MANEUVERS WITH A MAXIMUM CROSS SLOPE OF 2% AND LONGITUDINAL SLOPE MATCHING ROADWAY
4. GRADE BREAK REQUIRED TO BE FLUSH (0") AND PERPENDICULAR TO PEDESTRIAN PATH OF TRAVEL
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8. CLEAR SPACE - WIDTH OF CURB RAMP AND EXTENDING 4' MINIMUM
9. 3/4" CHAMFER EDGE

PAY LIMITS FOR CURB RAMPS (EXCLUDING DWS)

NOT TO SCALE

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DETAIL

PREPARED 1-4-1999
REVISION DATE
7/31/20
10/30/13
12/01/20

SIDEWALK RAMPS
(Sheet 9 of 13)
TYPE IV RAMP

STANDARD SHEET PVT 7

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

3445 BOX HILL CORPORATE CENTER DR
SUITE A
ABINGDON, MD 21009
410-515-9000

MRAGTA.COM

JOHN K. ERICKSON, REGISTERED, 16052, STATE OF WEST VIRGINIA, PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 7 OF 29	

SHEET TITLE

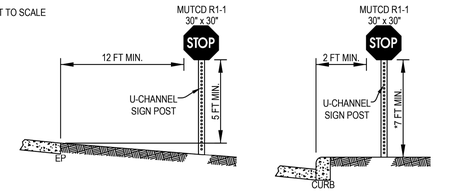
ADA RAMP DETAILS

SHEET NUMBER

7

STOP SIGN DETAIL:

NOT TO SCALE



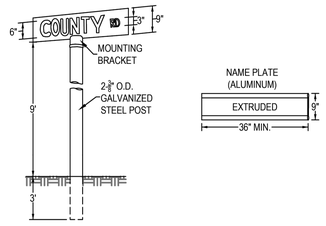
*WHERE PARKING OR PEDESTRIAN MOVEMENTS ARE LIKELY TO OCCUR

NOTES:

1. FOR MORE EXTENSIVE STANDARDS REFER TO THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS 2009 EDITION AND THE STANDARDS OF THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION.
2. U-CHANNEL POST SHALL BE PER WVDOH STANDARD DETAIL SHEET TE1-7A.

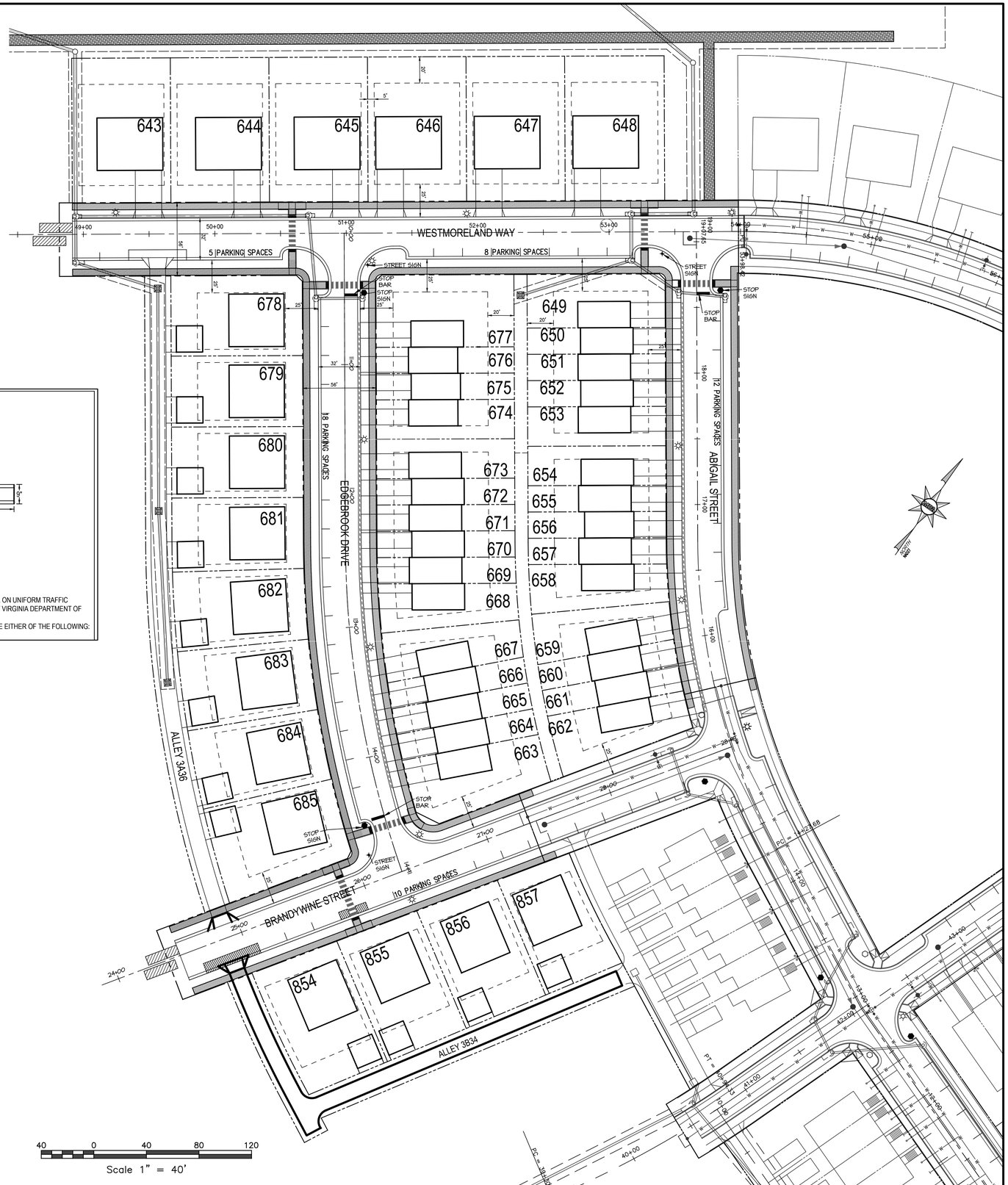
STREET SIGN DETAIL:

NOT TO SCALE



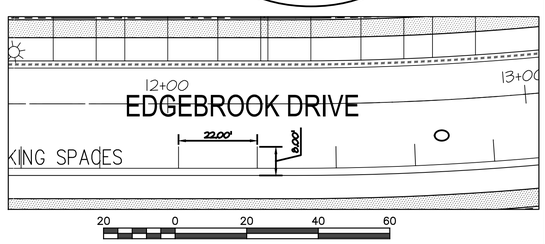
NOTES:

1. STREET SIGNS SHALL BE OF A DESIGN APPROVED BY CENTRAL DISPATCH.
2. FOR MORE EXTENSIVE STANDARDS REFER TO THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS AND THE STANDARDS OF THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION.
3. ROUND POSTS ARE NOT ALLOWED WITHIN WVDOH RIGHT-OF-WAY. SIGN POSTS MAY BE EITHER OF THE FOLLOWING: U-CHANNEL POSTS, 4"x4" WOODEN POSTS OR SQUARE TUBE POSTS.



Scale 1" = 40'

PARKING TICK DETAIL



20 0 20 40 60

Scale 1" = 20'

NOTES

1. A MARKED CROSSWALK SHALL CONSIST AS A MINIMUM OF 6" SOLID WHITE LINES SPACED AT 6' APART.
2. PARKING TICK SPECIFICATIONS BASED ON 2003 EDITION OF MUTCD STANDARDS FOR PARKING SPACE MARKINGS.

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

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JON K. ERICKSON
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STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

12/10/2025

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REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 8 OF 29	

SHEET TITLE

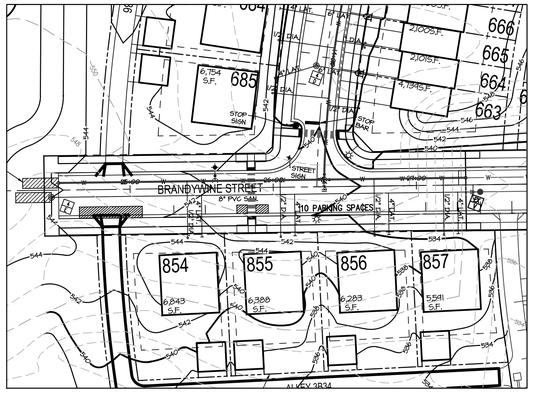
SIGNAGE & PAVEMENT MARKING PLAN

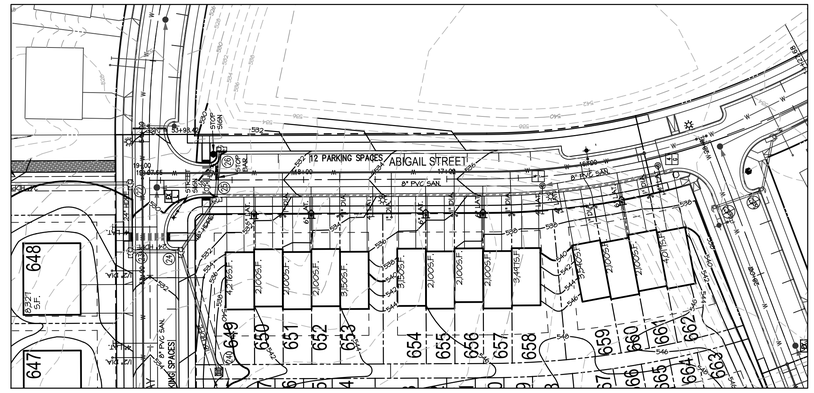
SHEET NUMBER

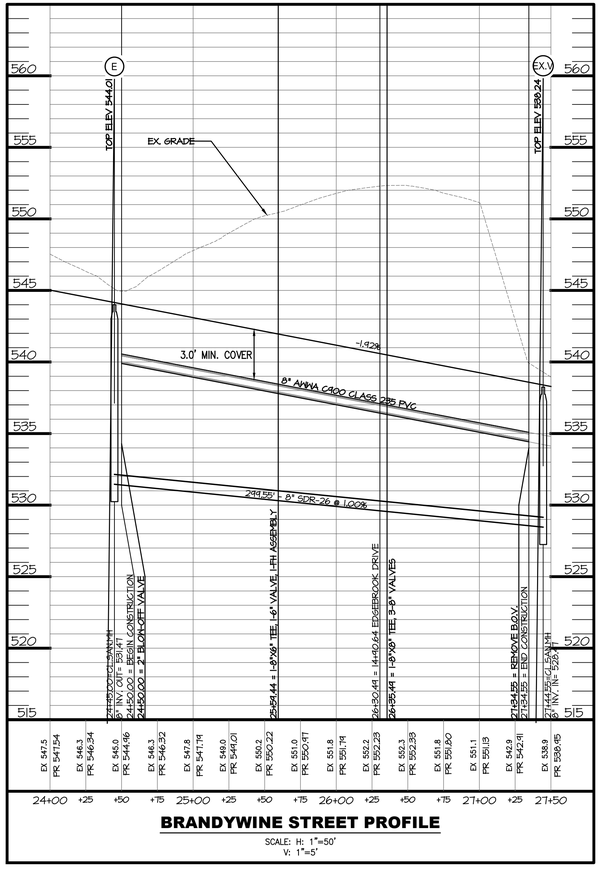
8

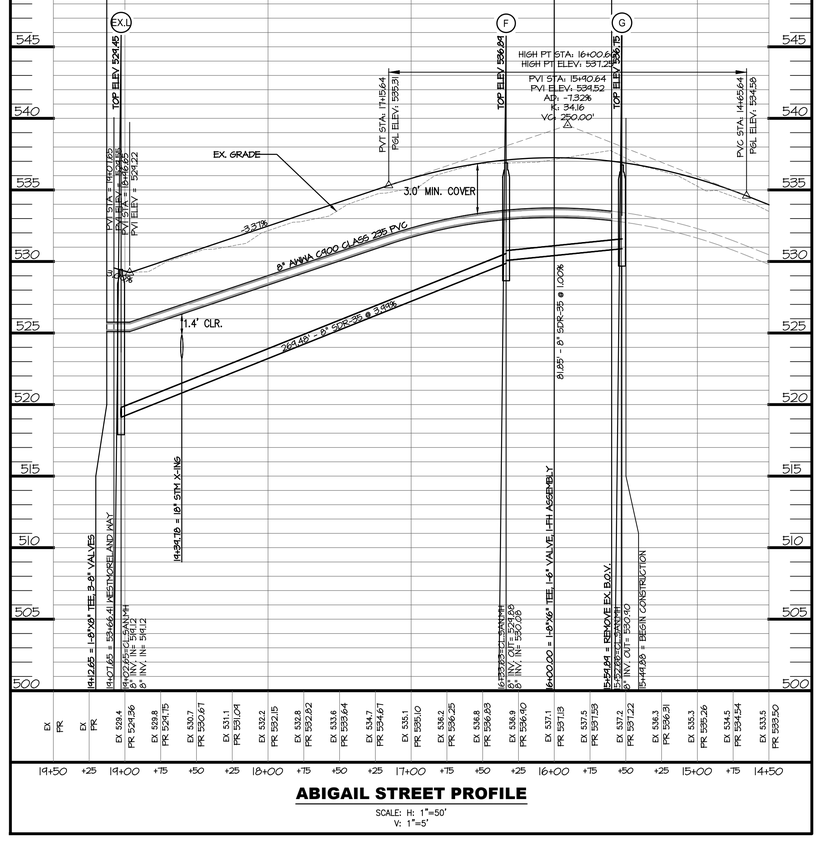
SEWER LATERAL TABLE

Section	Lot	Station	DS MH /	US MH	Slope (%)	Overall Length (FT.)	Invert @ Main	Invert of Lateral @ Main	Riser Height	End Riser Station	Inv. @ End of Riser	Vertical Bend Station	Inv @ Bottom Vert. Bend	Stack Height	Inv @ Top Vert.Bend	Inv @ End of Lateral	Finished Grade @ End Lat.	Basement Elevation (FT.)
4	648	0+27.60	EX.L /	A	2.08%	31.0	520.01	520.76	N/A			0+26.0	521.30	N/A		521.40	532.50	526.45
4	647	1+08.80	EX.L /	A	2.08%	31.0	520.41	521.16	N/A			0+26.0	521.70	2.00	523.70	523.81	534.00	528.29
4	646	1+83.79	EX.L /	A	2.08%	31.0	520.79	521.54	N/A			0+26.0	522.08	2.00	524.08	524.18	535.00	528.72
4	645	0+29.79	A /	B	2.08%	31.0	521.56	522.31	N/A			0+26.0	522.85	1.00	523.85	523.95	535.00	528.72
4	644	0+88.70	A /	B	2.08%	31.0	521.85	522.60	N/A			0+26.0	523.14	N/A		523.25	535.00	527.64
4	643	1+63.70	A /	B	2.08%	31.0	522.23	522.98	N/A			0+26.0	523.52	N/A		523.62	535.00	526.90
4	668	2+61.99	A /	C	2.08%	31.0	527.96	528.71	N/A			0+26.0	529.25	5.00	534.25	534.35	538.00	539.36
4	670	2+21.99	A /	C	2.08%	31.0	526.96	527.71	N/A			0+26.0	528.25	5.00	533.25	533.35	537.50	538.69
4	672	1+81.99	A /	C	2.08%	31.0	525.96	526.71	N/A			0+26.0	527.25	6.00	533.25	533.35	536.90	538.02
4	674	1+45.98	A /	C	2.08%	31.0	525.06	525.81	N/A			0+26.0	526.35	6.00	532.35	532.45	536.23	537.79
4	675	1+01.99	A /	C	2.08%	31.0	523.96	524.71	N/A			0+26.0	525.25	7.00	532.25	532.35	535.91	537.12
4	677	0+57.98	A /	C	2.08%	31.0	522.86	523.61	N/A			0+26.0	524.15	8.00	532.15	532.25	535.41	537.12
4	678	0+62.98	A /	C	2.08%	29.0	522.98	523.73	N/A			0+24.0	524.23	N/A		524.34	535.00	528.14
4	679	1+06.99	A /	C	2.08%	29.0	524.08	524.83	N/A			0+24.0	525.33	N/A		525.44	536.25	530.40
4	680	1+50.99	A /	C	2.08%	29.0	525.18	525.93	N/A			0+24.0	526.43	N/A		526.54	537.00	531.49
4	681	2+11.99	A /	C	2.08%	29.0	526.71	527.46	N/A			0+24.0	527.96	N/A		528.06	537.50	532.50
4	682	2+66.99	A /	C	2.08%	29.0	528.08	528.83	N/A			0+24.0	529.33	N/A		529.44	538.00	533.65
4	663	1+06.99	@MH	D	2.08%	31.0	530.73	531.48	N/A			0+26.0	532.02	4.00	536.02	536.13	539.72	541.44
4	665	0+67.00	C /	D	2.08%	31.0	530.35	531.10	N/A			0+26.0	531.64	3.00	534.64	534.74	539.00	540.10
4	667	0+22.51	C /	D	2.08%	31.0	529.46	530.21	N/A			0+26.0	530.75	4.00	534.75	534.85	538.50	540.10
4	683	0+15.00	C /	D	2.08%	29.0	529.31	530.06	N/A			0+24.0	530.56	N/A		530.66	538.50	535.02
4	684	0+72.00	C /	D	2.08%	29.0	530.45	531.20	N/A			0+24.0	531.70	N/A		531.80	539.50	536.45
4	685	1+06.99	@MH	D	2.08%	30.4	530.73	531.48	N/A			0+25.4	532.01	N/A		532.12	540.00	536.89
4	649	0+67.80	EX.L /	F	2.08%	21.0	522.58	523.33	N/A			0+16.0	523.66	4.00	527.66	527.76	531.00	532.55
4	651	1+07.80	EX.L /	F	2.08%	21.0	524.17	524.92	N/A			0+16.0	525.25	4.00	529.25	529.36	532.00	533.89
4	653	1+50.80	EX.L /	F	2.08%	21.0	525.89	526.64	N/A			0+16.0	526.97	3.00	529.97	530.07	533.00	535.23
4	654	1+87.80	EX.L /	F	2.08%	21.0	527.36	528.11	N/A			0+16.0	528.45	3.00	531.45	531.55	535.00	536.20
4	657	2+27.80	EX.L /	F	2.08%	21.0	528.96	529.71	N/A			0+16.0	530.04	2.00	532.04	532.15	536.00	537.54
4	658	2+69.46	@MH	F	2.08%	21.0	530.21	530.96	N/A			0+16.0	531.29	4.00	535.29	535.39	537.00	539.88
4	659	0+10.47	F /	G	2.08%	21.0	530.93	531.68	N/A			0+16.0	532.01	2.00	534.01	534.11	538.00	538.84
4	661	0+57.78	F /	G	2.08%	21.0	531.40	532.15	N/A			0+16.0	532.48	1.00	533.48	533.59	538.00	538.84
4	662	0+81.85	@MH	G	2.08%	21.0	531.22	531.97	N/A			0+16.0	532.31	2.00	534.31	534.41	538.00	538.84
4	857	0+15.72	EX.V /	E	2.08%	29.0	529.38	530.13	N/A			0+24.0	530.63	N/A		530.73	535.00	532.77
4	856	0+64.14	EX.V /	E	2.08%	29.0	529.86	530.61	N/A			0+24.0	531.11	N/A		531.21	535.00	534.03
4	855	1+29.71	EX.V /	E	2.08%	29.0	530.52	531.27	N/A			0+24.0	531.77	N/A		531.87	535.00	535.28
4	854	1+94.75	EX.V /	E	2.08%	29.0	531.17	531.92	N/A			0+24.0	532.42	N/A		532.52	535.00	536.60









50 0 50 100 150

Scale 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

3445 BOX HILL CORPORATE CENTER DR
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ABINGDON, MD 21009
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MRAGTA.COM

JON K. ERICKSEN, JR. REGISTERED 18052 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO, 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=50'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 9 OF 29	

SHEET TITLE

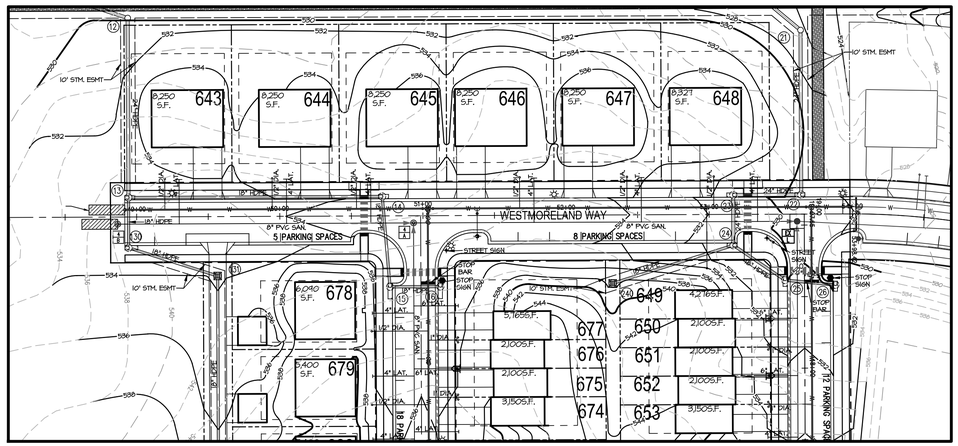
ROAD PROFILES

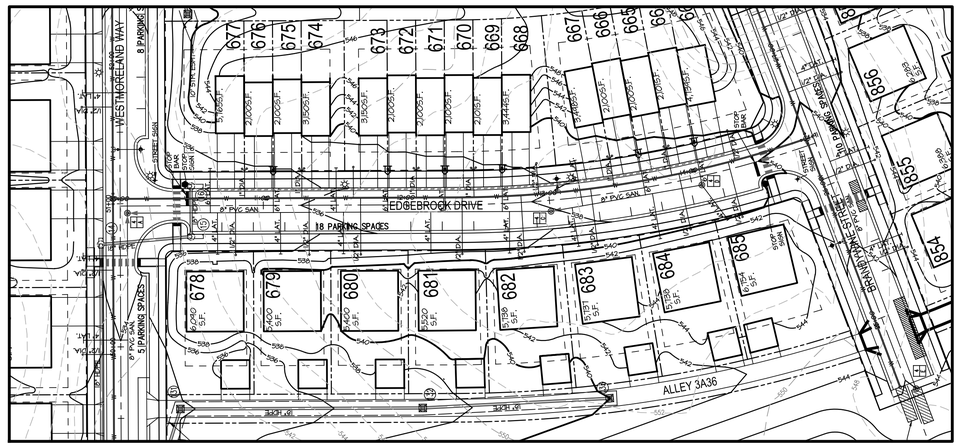
SHEET NUMBER

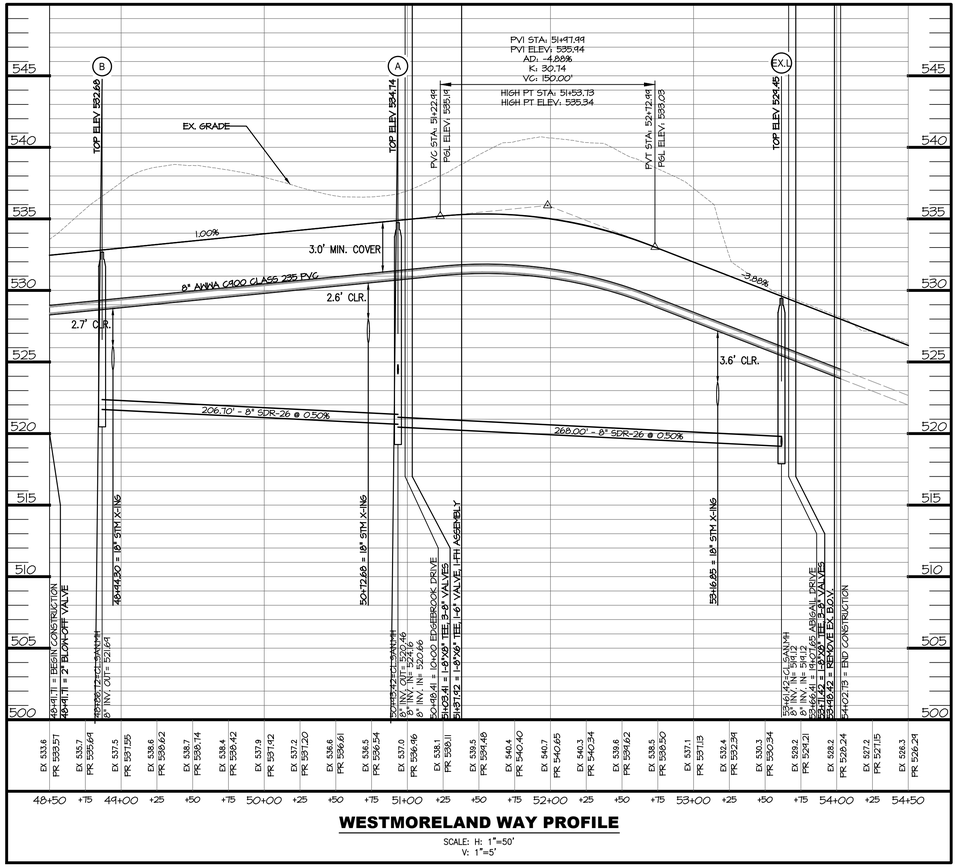
9

50 0 50 100 150

Scale 1" = 50'

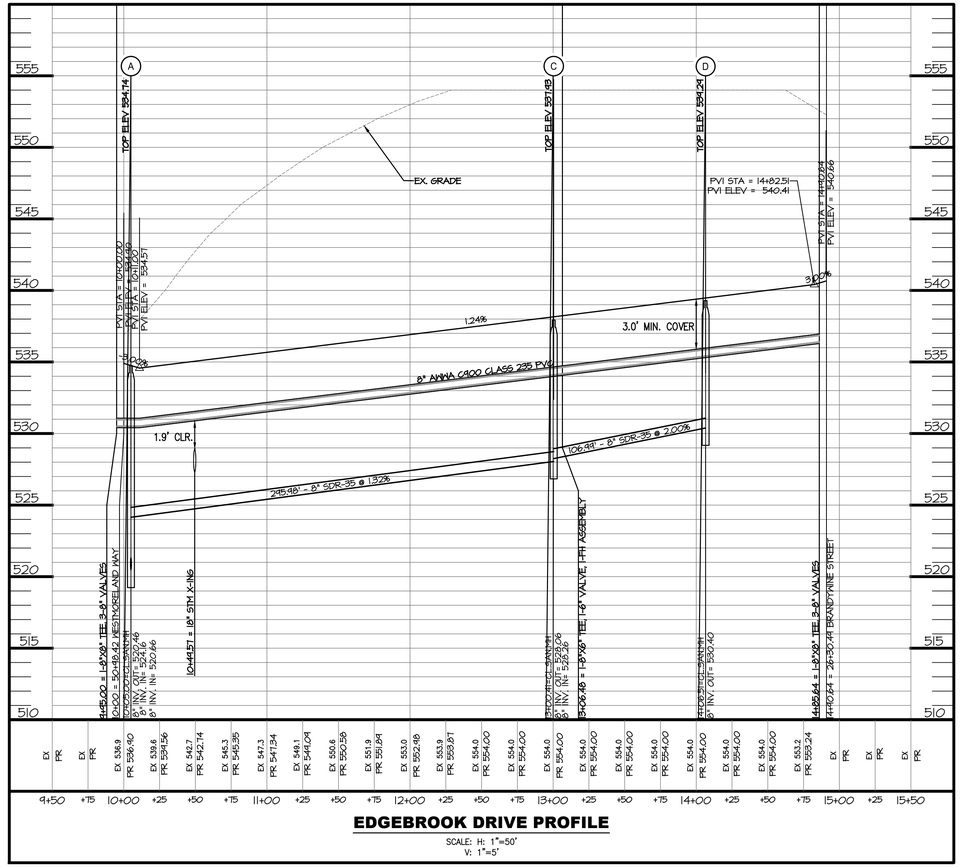






WESTMORELAND WAY PROFILE

SCALE: H: 1"=50'
V: 1"=5'



EDGEBROOK DRIVE PROFILE

SCALE: H: 1"=50'
V: 1"=5'

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

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JON K. ERICKSMOEN
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

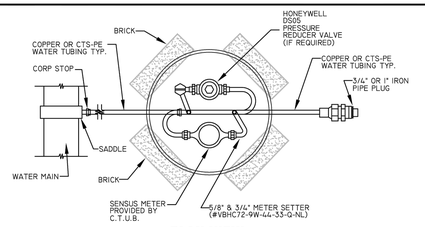
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=50'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 10 OF 29	

SHEET TITLE

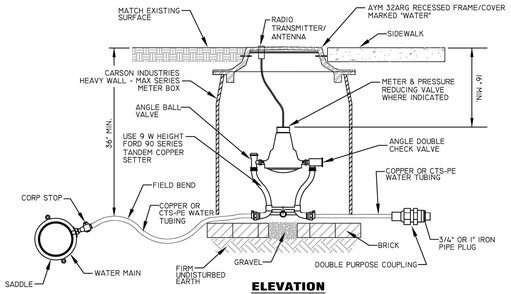
ROAD PROFILES

SHEET NUMBER

10



PLAN VIEW

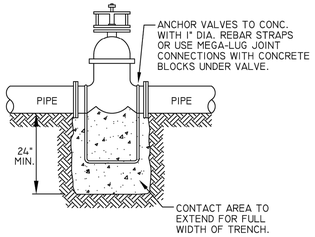


ELEVATION

NOTES:

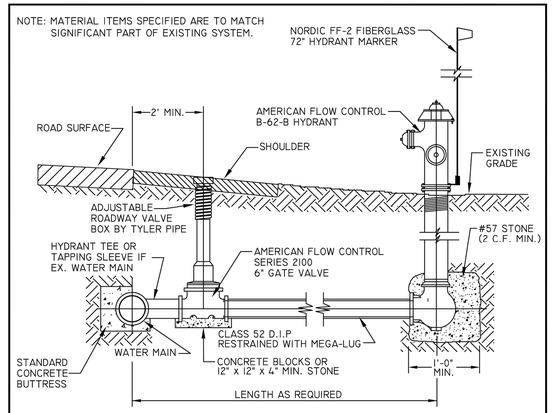
1. ALL BOLTS TO BE STAINLESS STEEL
2. CONNECT NEW METER SETTER TO EXISTING SERVICE LINES FOR LOCATIONS REQUIRING ONLY METER REPLACEMENT
3. PRESSURE REDUCING VALVE REQUIRED IF STATIC SYSTEM PRESSURES EXCEED 100 PSI
4. ALL METERS TO BE SENSUS RADIO READ PLACED AT PROPERTY LINE.

Charles Town Utility Board 832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313	**METERED CONNECTION DETAIL**	Standard Detail No. **W-1** NOT TO SCALE APRIL 2015

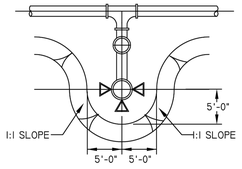


Charles Town Utility Board 832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313	**WATER VALVES DETAIL**	Standard Detail No. **W-3** NOT TO SCALE APRIL 2015

NOTE: MATERIAL ITEMS SPECIFIED ARE TO MATCH SIGNIFICANT PART OF EXISTING SYSTEM.

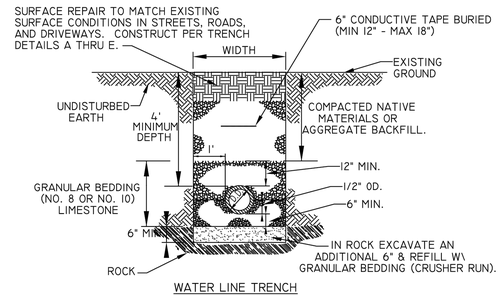


NOTES:
1. FOR ROAD INSTALLATIONS OR OTHER INTERFERENCES VALVE LOCATION MAY VARY.
2. VALVE BOX TO BE SET PLUMB AND CENTERED ON VALVE.



BANK CUTTING DETAIL

Charles Town Utility Board 832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313	**FIRE HYDRANT WITH TAPPING SLEEVE AND VALVE DETAIL**	Standard Detail No. **W-5** NOT TO SCALE APRIL 2015



WATER LINE TRENCH

NOTES:

1. W = MAXIMUM PERMISSIBLE TRENCH WIDTH, BASED UPON, W = O.D. + 24", UNLESS APPROVED BY THE ENGINEER.
2. TRENCHES TO BE SHEETED AND BRACED AS REQUIRED.
3. PROVIDE BEARING FOR FULL LENGTH OF BARREL, DIG HOLES FOR THE BELL.
4. BACKFILL TO BE COMPACTED IN 6" LAYERS TO 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE (+2%) IN ROADS AND STREETS. COMPACT TO MATCH EXISTING GROUND IN OTHER AREAS.
5. MAINTAIN MINIMUM OF 4' OF COVER TO THE TOP OF PIPE.
6. A CASING PIPE SHALL BE REQUIRED IN ROAD CROSSINGS WHERE SHOWN ON PLANS
7. ALL WATER LINES REQUIRE PERMIT FROM APPLICABLE REGULATORY ENTITIES. PERMIT REQUIREMENTS SUPERCEDE WHAT IS SHOWN ON THIS DETAIL.

Charles Town Utility Board 832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313	**WATER LINE TRENCH DETAIL**	Standard Detail No. **W-9** NOT TO SCALE APRIL 2015

22.5 & 45 DEGREE CONTACT AREA (SF)

PIPE SIZE	PRESSURE CLASS 100	150	200	250	300
2	1	1	1	1	1
4	1	1	2	2	2
6	2	2	3	4	5
8	3	4	5	7	8
10	4	6	8	10	12
12	5	9	12	15	18
14	8	12	16	20	24



22.5° & 45° BENDS

90 DEGREE BEND CONTACT AREA (SF)

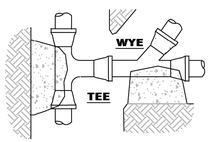
PIPE SIZE	PRESSURE CLASS 100	150	200	250	300
2	1	1	1	1	1
4	2	2	3	3	4
6	3	4	5	7	8
8	5	7	10	12	15
10	7	11	15	19	22
12	9	16	21	27	32
14	12	22	29	36	44



90° BEND

TEE CONTACT AREA (SF)

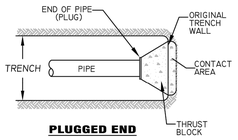
PIPE SIZE	PRESSURE CLASS 100	150	200	250	300
2	1	1	1	1	1
4	1	2	2	2	3
6	2	3	4	5	6
8	4	5	7	9	10
10	5	8	11	13	16
12	7	12	15	19	23
14	10	16	21	26	31



SAME CONTACT AREA AS TEE

PLUGGED END CONTACT AREA (SF)

PIPE SIZE	PRESSURE CLASS 100	150	200	250	300
2	1	1	1	1	1
4	1	2	2	2	3
6	2	3	4	5	6
8	4	5	7	9	10
10	5	8	11	13	16
12	7	12	15	19	23
14	10	16	21	26	31

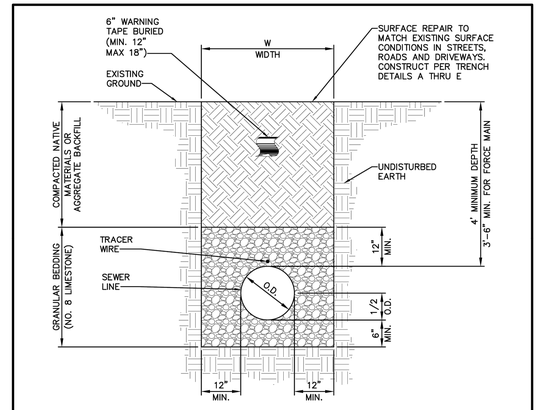


PLUGGED END

THRUST BLOCK GENERAL NOTES

1. ALL CONCRETE SHALL BE 3000 P.S.I. (AE)
2. THRUST BLOCKS SHALL BE IMBEDDED IN UNDISTURBED SOIL.
3. SOIL BEARING CAPACITY IS ASSUMED AT 3000 LB. SQ. FT. FOR WEAKER SOILS THRUST BLOCK AREAS SHALL BE INCREASED AS REQUIRED.
4. WRAP PIPE WITH POLYETHYELENE TO PREVENT CONTACT BETWEEN PIPE AND THE CONCRETE.

Charles Town Utility Board 832 S. George Street, P.O. Box 359, Charles Town, WV 25414 Phone: (304) 725-2316 • Fax: (304) 725-4313	**PIPE BUTTRESS DETAILS**	Standard Detail No. **W-13** NOT TO SCALE APRIL 2015



NOTES:

1. W = MAXIMUM PERMISSIBLE TRENCH WIDTH, BASED UPON, W = O.D. + 24", UNLESS APPROVED BY THE ENGINEER.
2. CONTRACTOR IS FULLY RESPONSIBLE FOR ALL MEANS, METHODS AND SAFETY FOR TRENCH EXCAVATIONS.
3. PROVIDE BEARING FOR FULL LENGTH OF BARREL, DIG HOLES FOR THE BELL.
4. BACKFILL ON SIDES TO 1/2 O.D. OF PIPE TO HOLD PIPE IN PLACE PRIOR TO PLACING ADDITIONAL BEDDING.
5. BACKFILL TO BE COMPACTED IN 6" LAYERS TO 95% OF MAXIMUM DENSITY (MODIFIED PROCTOR) AT OPTIMUM MOISTURE (+2%) IN ROADS AND STREETS. COMPACT TO MATCH EXISTING OR PROPOSED GRADE IN OTHER AREAS.
6. A CASING PIPE SHALL BE REQUIRED IN ROAD CROSSINGS WHERE SHOWN ON PLANS.

Charles Town Utility Board 661 S. George Street, Suite 101, Charles Town, WV 25414 Phone: (304) 725-2316 Fax: (304) 725-4313	**SEWER LINE TRENCH DETAIL**	Standard Detail No. **S-1** NOT TO SCALE JULY 2025

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

3445 BOX HILL CORPORATE CENTER DR
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ABINGDON, MD 21009
410-515-9000

MRAGTA.COM

JON K. ERICKSON — REGISTERED — 18052 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: AS SHOWN	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 11 OF 29	

SHEET TITLE

CTUB DETAILS

SHEET NUMBER

11

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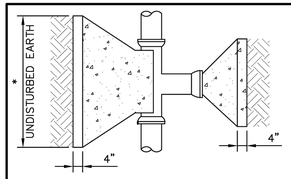
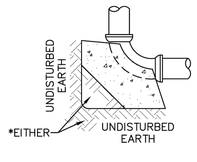
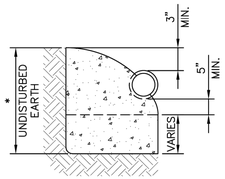


PLAN–TEES, WYES AND PLUGS



PLAN–BENDS



ELEVATION–TEES, WYES AND PLUGS

NOTES:
1. ALL CONCRETE SHALL BE MINIMUM 3,000 P.S.I.
2. THRUST BLOCKS SHALL BE IMBEDDED IN UNDISTURBED SOIL.
3. SOIL BEARING CAPACITY IS ASSUMED AT 3000 LB. SQ. FT. FOR WEAKER SOILS THRUST BLOCK AREAS SHALL BE INCREASED AS REQUIRED.
4. WRAP PIPE WITH POLYETHYLENE TO PREVENT CONTACT BETWEEN PIPE AND CONCRETE.
5. WITH APPROVAL OF ENGINEER, MEGA–LUG JOINT RESTRAINTS MAY BE SUBSTITUTED FOR THRUST BLOCKS PER MANUFACTURER'S RECOMMENDATION (TO BE FURNISHED BY CONTRACTOR). FOR DUCTILE IRON, USE UNIFLANGE 1400 OR EBBA 1100 AND FOR C900 PVC, USE UNIFLANGE 1500 OR EBBA 2000PV.
6. THRUST BLOCKING GENERALLY ONLY APPLIES TO PIPE FITTINGS 4" IN DIAMETER OR LESS.

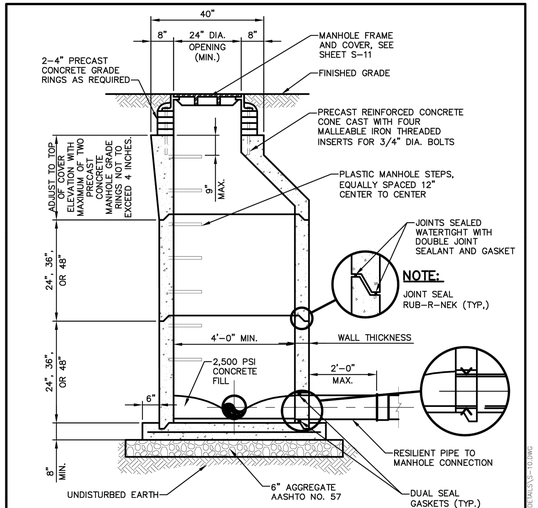
PIPE SIZE (IN.)	AREA (SQ IN.)	TOTAL FORCE (LBS.)	AREA OF BLOCK IN SQ. FT.				
			TEES & PLUGS	90° BENDS	45° BENDS	22 1/2° BENDS	11 1/4° BENDS
4	12.57	2,827	1.0	1.0	1.0	1.0	1.0
6	28.27	6,361	1.6	2.3	1.2	1.0	1.0
8	50.26	11,308	2.8	4.0	2.2	1.1	1.0
10	75.54	17,672	4.4	6.3	3.4	1.7	1.0
12	113.16	25,461	6.4	9.0	4.9	3.0	1.3
14	153.94	34,637	8.7	12.3	6.6	3.4	1.7
16	201.06	45,239	11.3	16.0	8.7	4.4	2.2
18	254.47	57,256	14.3	20.3	11.0	5.6	2.8
20	314.16	70,686	17.7	25.0	13.5	6.9	3.5
24	452.39	101,788	25.4	36.0	19.5	9.9	5.0

Charles Town Utility Board
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414
PHONE: (304) 725–2316 FAX: (304) 725–4313

PIPE BUTTRESS DETAIL

STANDARD DETAIL NO. **S-7**
NOT TO SCALE
JULY 2025

FILENAME: P:\CTUB\STANDARD DETAILS_CHARLES TOWN STANDARD DETAILS\S-7.DWG



NOTE:
SEE SHEET S–10A FOR MANHOLE NOTES

Charles Town Utility Board
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414
PHONE: (304) 725–2316 FAX: (304) 725–4313

PRECAST MANHOLE WITH ECCENTRIC TOP DETAIL

STANDARD DETAIL NO. **S-10**
NOT TO SCALE
JULY 2025

FILENAME: P:\CTUB\STANDARD DETAILS_CHARLES TOWN STANDARD DETAILS\S-10.DWG

GENERAL NOTES:
1. CONCRETE MANHOLES AND BASES SHALL CONFORM TO ASTM C–478.
2. REINFORCING STEEL SHALL CONFORM TO ASTM A–185.
3. FOR MANHOLES IN FLOODPLAINS AND/OR WHERE GROUNDWATER IS PRESENT, THE EXTERIOR SURFACE OF THE MANHOLE SHALL BE COATED WITH (2) TWO COATS OF A BITUMASTIC COATING SYSTEM, 8 MILS DFT PER COAT OF CARBOLINE 300M OR EQUAL.
4. FOR FORCE MAIN DISCHARGES AND TWO (2) DOWNSTREAM MANHOLES, THE ENTIRE INTERIOR SURFACE OF THE MANHOLE SHALL BE COATED WITH A MINIMUM 50 MIL DFT AROMATIC POLYUREA COATING SYSTEM, OBIC 1000 OR EQUAL.
5. ALL MANHOLE CONCRETE SHALL CONTAIN A 1% BY WEIGHT OF CEMENT CONCRETE WATERPROOFING ADMIXTURE, XYPEX C–1000 OR EQUAL.
6. MANHOLES FOR SEWER PIPE 24"–36" SHALL HAVE A 5'–0" MIN. INSIDE DIAMETER, AND POTENTIALLY SHALL BE USED IF ANGLE OF DEFLECTION DOES NOT PERMIT USE WITH A 4' MANHOLE.
7. FLOW CHANNELS SHALL PRECISELY ALIGN WITH THE ORIENTATION OF THE INCOMING/OUTGOING DISCHARGE SEWERS, FLOW CHANNEL RADIUS SHALL NOT EXCEED 90'. ALL LEDGES SHALL BE POSITIVELY SLOPED FROM MANHOLE WALL TO THE FLOW CHANNELS.

MANHOLE STEPS NOTES:
1. DISTANCE FROM RIM OF MANHOLE TO TOP OF STEP SHALL NOT EXCEED 30".
2. DISTANCE FROM BOTTOM STEP TO FLOOR OF MANHOLE SHALL NOT BE GREATER THAN 2 FEET.
3. DO NOT LOCATE STEPS OVER CHANNELS.

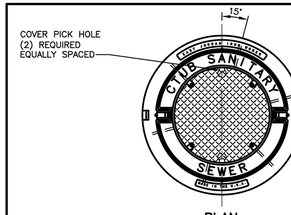
DROP CONNECTION NOTE:
AN INSIDE DROP CONNECTION SHALL BE INSTALLED WHEN THE PIPE INVERTS INTO THE MANHOLE ARE 2'–0" OR MORE ABOVE INVERT OUT OF THE MANHOLE. THE ENTIRE OUTER SURFACE AND CONCRETE ENCASEMENT AROUND THE MANHOLE AND THE CONNECTIONS SHALL BE COATED WITH TWO COATS OF BITUMASTIC.

Charles Town Utility Board
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414
PHONE: (304) 725–2316 FAX: (304) 725–4313

PRECAST MANHOLE NOTES

STANDARD DETAIL NO. **S-10A**
NOT TO SCALE
JULY 2025

FILENAME: P:\CTUB\STANDARD DETAILS_CHARLES TOWN STANDARD DETAILS\S-10A.DWG



PLAN

COVER NOTES:
1. LETTERING ON COVERS SHALL DENOTE CTUB SANITARY SEWER AS APPLICABLE.
2. BOTTOM RIBS MAY BE DELETED FROM MANHOLE COVER CASTINGS.
3. SHOP DRAWINGS SHALL BE SUBMITTED IF DETAILS/DIMENSIONS VARY.
4. FRAME BOLT NOTE: DRILL FOUR 1" DIA. HOLES ON A 33" DIA. BOLT CIRCLE.
5. COVER BOLT NOTE: WATERTIGHT ONLY (2) REQUIRED MIN. (4) REQUIRED MAX. EQUALLY SPACED.

NOTES:
1. MANHOLE COVERS SHALL NOT HAVE VENT HOLES, UNLESS AIR RELEASE VALVE IS PRESENT.
2. DIMENSIONS ABOVE ARE FOR EAST JORDAN IRONWORKS PRODUCTS.
3. APPROVED SUPPLIERS:
   EAST JORDAN IRON WORKS
   HIGHWAY: FRAME – PROD. NO. 1045Z UNDIPPED
   COVER – PROD. NO. 1040AGS UNDIPPED, SELF SEALING
   WATERTIGHT: FRAME AND COVER – PROD. NO. 1045ZPT/1010APT, UNDIPPED

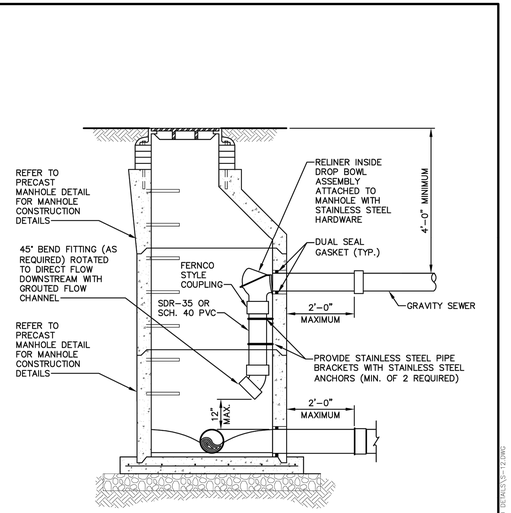
   NEENAH
   HIGHWAY: FRAME AND COVER R–1642, UNDIPPED, SELF SEALING
   WATERTIGHT: FRAME AND COVER R–1916, UNDIPPED
4. FRAME AND COVER TO COMPLY WITH ASTM A48, CLASS 30 TENSILE STRENGTH.
5. USE THREADED STAINLESS STEEL STANDARD HEXAGON HEAD BOLTS TO ANCHOR FRAME AND COVER TO MANHOLE.
6. PROVIDE WATERPROOF MORTAR EXTENDED OVER FRAME.
7. PROVIDE FOUR MALLEABLE IRON THREADED INSERTS FOR 3/4" DIA. BOLTS ON 33" DIA. BOLT CIRCLE INSTALLED IN PRECAST CONC. MANHOLE CONE SECTIONS BY MANHOLE MANUFACTURER.

Charles Town Utility Board
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414
PHONE: (304) 725–2316 FAX: (304) 725–4313

MANHOLE FRAME AND COVER DETAIL

STANDARD DETAIL NO. **S-11**
NOT TO SCALE
JULY 2025

FILENAME: P:\CTUB\STANDARD DETAILS_CHARLES TOWN STANDARD DETAILS\S-11.DWG



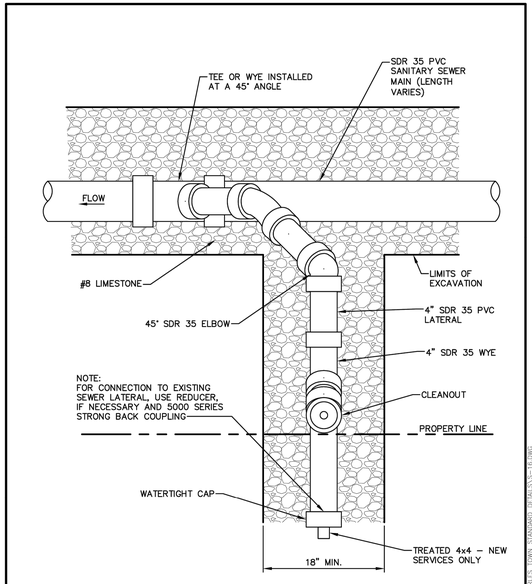
NOTE:
1. OUTSIDE DROP MANHOLES ARE PROHIBITED.

Charles Town Utility Board
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414
PHONE: (304) 725–2316 FAX: (304) 725–4313

INSIDE DROP MANHOLE DETAIL

STANDARD DETAIL NO. **S-12**
NOT TO SCALE
JULY 2025

FILENAME: P:\CTUB\STANDARD DETAILS_CHARLES TOWN STANDARD DETAILS\S-12.DWG



PLAN

Charles Town Utility Board
661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414
PHONE: (304) 725–2316 FAX: (304) 725–4313

NEW SINGLE LATERAL CONNECTION DETAIL (PLAN)

STANDARD DETAIL NO. **S-16**
NOT TO SCALE
JULY 2025

FILENAME: P:\CTUB\STANDARD DETAILS_CHARLES TOWN STANDARD DETAILS\S-16.DWG

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ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS
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410-515-9000
MRAGTA.COM

JON K. ERICKSON — REGISTERED — 18052 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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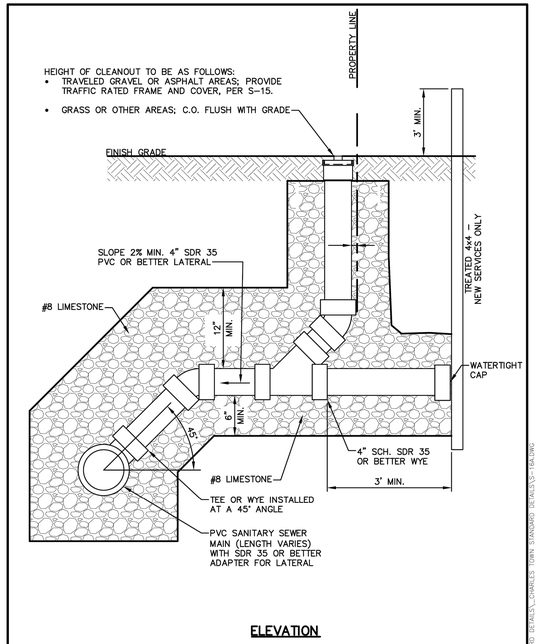
HUNTFIELD - PHASE 4
CONSTRUCTION DRAWINGS
CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: AS SHOWN	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 12 OF 29	

SHEET TITLE
CTUB DETAILS

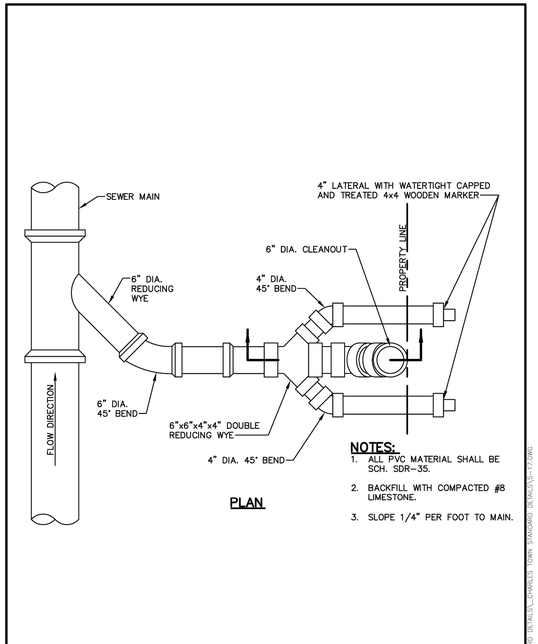
SHEET NUMBER
12



ELEVATION

Charles Town Utility Board 661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414 PHONE: (304) 725-2316 FAX: (304) 725-4313	**NEW SINGLE LATERAL CONNECTION DETAIL (ELEVATION)**	STANDARD DETAIL NO. **S-16A** NOT TO SCALE JULY 2025

FILENAME: C:\CUDA\STANDARD DETAILS\CHARLES TOWN STANDARD DETAILS\S-16A.DWG

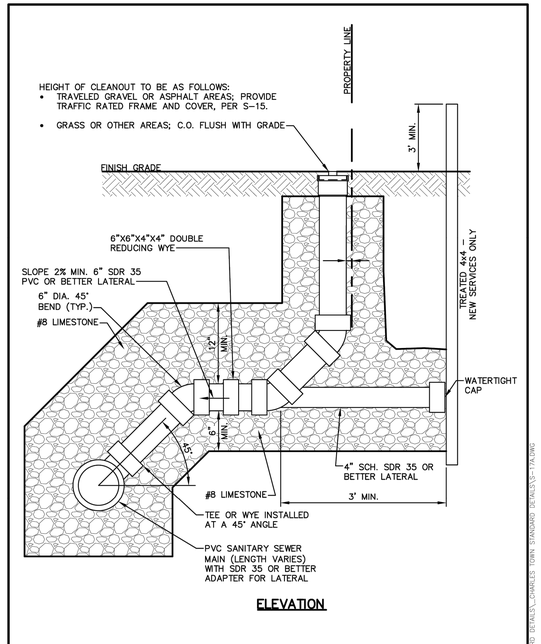


PLAN

NOTES:
1. ALL PVC MATERIAL SHALL BE SCH. SDR-35.
2. BACKFILL WITH COMPACTED #8 LIMESTONE.
3. SLOPE 1/4" PER FOOT TO MAIN.

Charles Town Utility Board 661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414 PHONE: (304) 725-2316 FAX: (304) 725-4313	**NEW DOUBLE LATERAL CONNECTION DETAIL (PLAN)**	STANDARD DETAIL NO. **S-17** NOT TO SCALE JULY 2025

FILENAME: C:\CUDA\STANDARD DETAILS\CHARLES TOWN STANDARD DETAILS\S-17.DWG



ELEVATION

Charles Town Utility Board 661 S. GEORGE STREET, SUITE 101, CHARLES TOWN, WV 25414 PHONE: (304) 725-2316 FAX: (304) 725-4313	**NEW DOUBLE LATERAL CONNECTION DETAIL (ELEVATION)**	STANDARD DETAIL NO. **S-17A** NOT TO SCALE JULY 2025

FILENAME: C:\CUDA\STANDARD DETAILS\CHARLES TOWN STANDARD DETAILS\S-17A.DWG

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: AS SHOWN	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:

SHEET: 13 OF 29

SHEET TITLE

CTUB DETAILS

SHEET NUMBER

13

SEDIMENT BASIN

SWM RISER (MODIFIED FOR E&S)

DA=10.4 AC
TO SEDIMENT BASIN

NOTE: SEDIMENT BASIN SIZED TO HANDLE
FUTURE PHASES AS NECESSARY

MATCHLINE

Scale 1" = 30'

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY:
SCALE: 1"=30'	DESIGN BY:
DATE: 07/01/25	REVIEW BY:
SHEET: 14 OF 29	

SHEET TITLE

E&S - PHASE I

SHEET NUMBER

14

MATCHLINE

DA=2.60 AC
TO SEDIMENT
TRAP #1

DRY STORAGE
(50' x 68' x 2')

WET STORAGE
(40' x 60' x 2.5')

ST
#1

LOC

DD

LOD

30 0 30 60 90
Scale 1" = 30'

NORTH

PC = 13+12.58
PT = 14+00.00
PT = 40+34.13
PC = 39+50.42

37+00 38+00 39+00 40+00 41+00 42+00 43+00 44+00

MRA

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY:
SCALE: 1"=30'	DESIGN BY:
DATE: 07/01/25	REVIEW BY:

SHEET: 15 OF 29

SHEET TITLE

E&S - PHASE I

SHEET NUMBER

15

SWM POND G
RETENTION POND III

GABION WALL
TW=518.00
BW=512.00

15' CL.I RIPRAP

EMERGENCY SPILLWAY (5' WIDE)
INV.=521.00'

SWM RISER

STM. ESMT

10' STM. ESMT

643 8,250 S.F.
644 8,250 S.F.
645 8,250 S.F.
646 8,250 S.F.
647 8,250 S.F.
648 8,329 S.F.
649 5,165 S.F.
650 2,100 S.F.
651 2,100 S.F.
652 2,100 S.F.
653 3,505 S.F.
654 2,100 S.F.
655 2,100 S.F.
656 2,100 S.F.
657 2,100 S.F.
658 3,449 S.F.
668 3,540 S.F.
669 3,444 S.F.
670 2,015 S.F.
671 2,100 S.F.
672 2,100 S.F.
673 3,150 S.F.
674 3,150 S.F.
675 2,100 S.F.
676 2,100 S.F.
677 2,100 S.F.
678 6,090 S.F.
679 5,400 S.F.
680 5,400 S.F.
681 5,520 S.F.
682 5,138 S.F.

DA=0.23 AC.
C=0.68

DA=0.09 AC.
C=0.64

DA=0.23 AC.
C=0.65

DA=0.05 AC.
C=0.64

DA=0.32 AC.
C=0.69

DA=0.22 AC.
C=0.67

DA=0.53 AC.
C=0.67

DA=0.31 AC.
C=0.62

DA=0.61 AC.
C=0.52

DA=0.68 AC.
C=0.60

DA=0.69 AC.
C=0.63

DA=0.60 AC.
C=0.58

DA=0.42 AC.
C=0.56

WESTMORELAND WAY

ABIGAIL STREET

ELDERBERRY DRIVE

MATCHLINE

Scale 1" = 30'

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DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS
CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 16 OF 29	

SHEET TITLE
E&S - PHASE II

SHEET NUMBER
16

MATCHLINE

DA=0.42 AC.
C=0.56

DA=0.52 AC.
C=0.58

DA=0.29 AC.
C=0.52

BRANDYWINE STREET

ABIGAIL STREET

LEDGEBROOK DRIVE

ALLEY 3B34

ACCESS ESMT

STOP SIGN

Scale 1" = 30'

NORTH

MRA

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

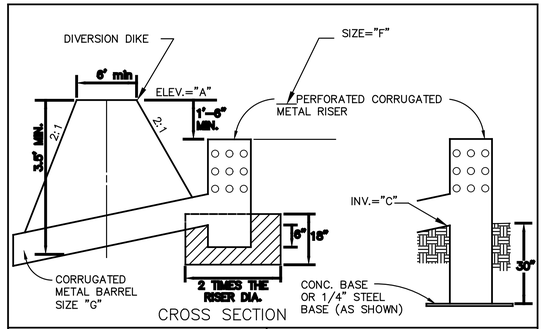
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 17 OF 29	

SHEET TITLE

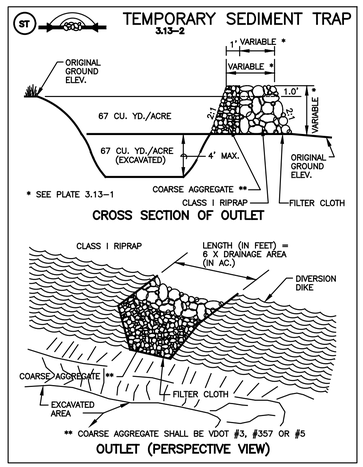
E&S - PHASE II

SHEET NUMBER

17

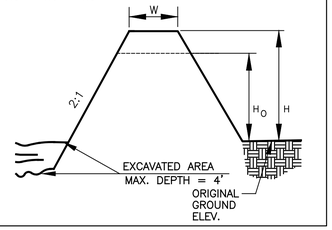


TEMPORARY SEDIMENT TRAP
STRUCTURE DETAIL



MINIMUM TOP WIDTH (W) REQUIRED FOR SEDIMENT TRAP EMBANKMENTS ACCORDING TO HEIGHT OF EMBANKMENT (FEET)

H	H_O	W
1.5	0.5	2.0
2.0	1.0	2.0
2.5	1.5	2.5
3.0	2.0	2.5
3.5	2.5	3.0
4.0	3.0	3.0
4.5	3.5	4.0
5.0	4.0	4.5



SEDIMENT TRAP DETAIL ELEVATIONS

TRAP #	DA	DRY STORAGE DIMENSIONS	DRY STORAGE REQUIRED	DRY STORAGE PROVIDED	WET STORAGE DIMENSIONS	WET STORAGE REQUIRED	WET STORAGE PROVIDED	"A"ELEV.	"B"ELEV.	"C"ELEV.	"D"ELEV.	"E"ELEV.	"G" SIZE	"F" SIZE
3	2.60 AC.	50' X 68' X 2.0'	5282 CF	6800 CF	40' X 60' X 2.5'	5282 CF	6000 CF	534.50	533.00	531.00	528.50	530.00	15"	21"

EROSION & SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS FOR THE CONSTRUCTION OF A PUBLIC ROADS, UTILITIES, STORMWATER MANAGEMENT FACILITIES, UTILITY ACCESS ROADS, AND ASSOCIATED INFRASTRUCTURE. THE SITE IS LOCATED TO THE NORTHWEST OF THE EXISTING HUNTFIELD SUBDIVISION. APPROXIMATELY 24.34 ACRES WILL BE DISTURBED DURING CONSTRUCTION OF THIS SITE AND ITS ASSOCIATED INFRASTRUCTURE.

SURROUNDING PROPERTY & EXISTING SITE CONDITIONS

PLANS FOR SIMILAR DEVELOPMENTS DELINEATED AS HUNTFIELD PHASE I, PHASE 2A, PHASE 2B, PHASE 3A AND 3B HAVE BEEN APPROVED. THE DEVELOPMENTS ARE LOCATED TO THE NORTHEAST, SOUTH, AND SOUTHEAST OF THE PROPOSED SITE. A FUTURE HUNTFIELD DEVELOPMENT, WHICH HAS BEEN TAKEN INTO CONSIDERATION DURING THE DESIGN OF HUNTFIELD PHASE 4 IS PROPOSED TO BE LOCATED TO THE SOUTH AND EAST OF THIS PROJECT. THIS FUTURE DEVELOPMENT SITE AND THE REMAINDER OF THE SURROUNDING LAND IS UNDEVELOPED, AND IS USED PREDOMINANTLY FOR CROP PLANTING. IN GENERAL, THE LAND IS RELATIVELY FLAT AND DRAINS TO THE NORTHEAST INTO A FLOOD PLAIN. ALL SOILS ON THE SUBJECT SITE ARE "B" SOILS (SEE SOIL TYPES LISTED BELOW).

GENERAL E&S REQUIREMENTS

TOPSOIL SHALL BE STRIPPED FROM GRADED AREAS AND STOCKPILED OFF SITE FOR LATER USE. ALL STOCKPILES MUST BE STABILIZED BY TEMPORARY VEGETATION WITHIN 7 CALENDAR DAYS. ALL DISTURBED AREAS SHALL BE STABILIZED WITH FAST GERMINATING TEMPORARY VEGETATION WITHIN SEVEN DAYS AFTER GRADING. ALL VEGETATIVE STABILIZATION SHALL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL AND RE-SEEDED AS NEEDED. ALL E&S MEASURES AND CONTROL DEVICES DESCRIBED HEREON SHALL CONFORM TO SECTIONS 3 THROUGH 5 OF THE "WEST VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK FOR DEVELOPING AREAS". THE JEFFERSON COUNTY INSPECTOR HAS THE AUTHORITY TO ADD OR DELETE EROSION AND SEDIMENT CONTROLS AS NEEDED IN THE FIELD AND AS SITE CONDITIONS WARRANT.

STRUCTURAL PRACTICES

1) INSTALL THE TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
2) INSTALL INLET PROTECTION FOR THE EXISTING STORM SEWER INLETS AS SHOWN ON THE "E&S 1" SHEET
3) PROVIDE TEMPORARY SEEDING AND MULCHING TO ALL EARTHEN PERIMETER CONTROLS IMMEDIATELY AFTER GRADING.
4) CONSTRUCT THE SEDIMENT BASIN AND TRAP
5) CLEAR REMAINING SITE IN AREAS NECESSARY TO STAGE CONSTUCTION.
6) START RE-VEGETATION AS AREAS ARE BROUGHT TO GRADE OR STAND IDLE FOR MORE THAN (14) DAYS
7) UPON INSTALLATION OF PROPOSED STORM SEWER PIPE, INSTALL INLET AND OUTLET PROTECTION.
8) STABILIZE THE REMAINDER OF THE DISTURBED AREA WITH PERMANENT SEEDING.
9) WHEN SITE WORK IS COMPLETED, REMOVE ALL STRUCTURAL PRACTICES AND APPLY PERMANENT SEEDING TO ALL DISTURBED AREAS.

MAINTENANCE

ALL MEASURES ARE TO BE INSPECTED DAILY BY THE SITE SUPERINTENDENT. ANY DAMAGED CONTROLS SHALL BE REPAIRED AND/OR REPLACED BY THE CLOSE OF THE DAY. NO CONTROLS ARE TO BE REMOVED WITHOUT THE APPROVAL OF THE SITE INSPECTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE OR PENALTIES CAUSED BY HIS FAILURE TO COMPLY WITH THE EROSION AND SEDIMENT CONTROL PROGRAM OR THE DIRECTION OF THE SITE INSPECTOR. THE DESIGN ENGINEER SHALL BE NOTIFIED OF ANY CHANGES TO THIS PROGRAM.

1. THE CHECK DAMS WILL BE CHECKED REGULARLY FOR SEDIMENT AND CLEANED WHEN NECESSARY.

2. THE GRAVEL OUTLETS WILL BE CHECKED REGULARLY FOR SEDIMENT BUILDUP, WHICH WILL PREVENT DRAINAGE. IF THE GRAVEL IS CLOGGED BY SEDIMENT, IT SHALL BE REMOVED AND CLEANED OR REPLACED.

3. THE SILT FENCE BARRIER WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER.

4. THE SEEDED AREA WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREA SHOULD BE FERTILIZED AND RESEEDED AS NEEDED.

STRUCTURAL PRACTICES

1. TEMPORARY CONSTRUCTION ENTRANCE – 3.02
A GRAVEL PAD LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS ON A CONSTRUCTION SITE TO REDUCE THE MUD TRANSPORTED ONTO PUBLIC ROADS AND OTHER PAVED AREAS.

2. CULVERT INLET PROTECTION – 3.08
A SEDIMENT FILTER LOCATED AT THE INLET TO STORM SEWER CULVERTS WHICH PREVENTS SEDIMENT FROM ENTERING, ACCUMULATING IN AND BEING TRANSFERRED BY THE CULVERT. IT ALSO PROVIDES EROSION CONTROL AT CULVERTS DURING THE PHASE OF A PROJECT WHERE ELEVATIONS AND DRAINAGE PATTERNS ARE CHANGING, CAUSING ORIGINAL CONTROL MEASURES TO BE INEFFECTIVE.

3. OUTLET PROTECTION – 3.18
THE INSTALLATION OF PAVED AND/OR RIP-RAP CHANNEL SECTIONS AND/OR STILLING BASINS BELOW STORM DRAIN OUTLETS TO REDUCE EROSION FROM SCOURING AT OUTLETS AND TO REDUCE FLOW VELOCITIES BEFORE STORMWATER ENTERS RECEIVING CHANNELS BELOW THESE OUTLETS.

VEGETATIVE PRACTICES

1. PERMANENT SEEDING – 3.32
ESTABLISHMENT OF PERENNIAL VEGETATIVE COVER BY PLANTING SEED ON ROUGH GRADING AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A YEAR OR MORE OR WHERE PERMANENT, LONG LIVED VEGETATIVE COVER IS NEEDED ON FINE GRADING AREAS.

2. TEMPORARY SEEDING – 3.31
ALL DENUDED AREAS, WHICH WILL BE LEFT DORMANT FOR EXTENDED PERIODS OF TIME, SHALL BE SEEDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING. SELECTION OF THE SEED MIXTURE WILL DEPEND ON THE TIME OF YEAR IT IS APPLIED.

3. EROSION CONTROL BLANKET – 3.36 OR MULCH – 3.35
EROSION CONTROL BLANKETS WILL BE INSTALLED OVER FILL SLOPES, WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDED TO PROTECT THE SLOPES FROM RILL AND GULLY EROSION AND TO ALLOW SEED TO GERMINATE PROPERLY. MULCH (STRAW OR FIBER) WILL BE USED ON RELATIVELY FLAT AREAS AND WILL BE APPLIED AS A SECOND STEP IN THE SEEDING OPERATION.

EROSION AND SEDIMENT CONTROL LEGEND

3.07	STORM DRAIN INLET PROTECTION	IP	
3.09	TEMPORARY DIVERSION DIKE	DD	DD
3.09-1	TEMPORARY DIVERSION	DV	DV
3.13	TEMPORARY SEDIMENT TRAP	ST	
3.14	TEMPORARY SEDIMENT BASIN	SB	
3.19	RIPRAP	RR	
3.02	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE	
3.05	SUPER SILT FENCE	SSF	
3.38	TREE PROTECTION	TP	
3.20	ROCK CHECK DAMS	CD	
3.08	CULVERT INLET PROTECTION	CIP	
3.24	TEMPORARY VEHICULAR STREAM CROSSING	SC	
3.05	SILT FENCE	SF	
3.18	OUTLET PROTECTION	OP	
	EXISTING TREE LINE		
	LIMITS OF CLEARING	LOC	
3.18	TEMPORARY SEEDING	TS	TS
3.18	PERMANENT SEEDING	PS	PS

SOILS LEGEND

SYMBOL	NAME	HYDROLOGICAL GROUP
DgB	DUFFIELD SILT LOAM, 2-6% SLOPES	B
DgC	DUFFIELD SILT LOAM, 6-12% SLOPES	B
FbB	FRANKSTOWN SHALY SILT LOAM, 2-6% SLOPES	B
FbC	FRANKSTOWN SHALY SILT LOAM, 6-12% SLOPES	B
Ho	HUNTINGTON SILT LOAM, LOCAL ALLUVIUM	B

SOIL INFORMATION WAS TAKEN FROM A HISTORICAL REPLICA OF "SOIL SURVEY OF JEFFERSON COUNTY WEST VIRGINIA" ISSUED FEBRUARY 1973 PROVIDED BY THE USDA.

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JON K. ERICKSON
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4
CONSTRUCTION DRAWINGS
CITY OF CHARLES TOWN, WEST VIRGINIA

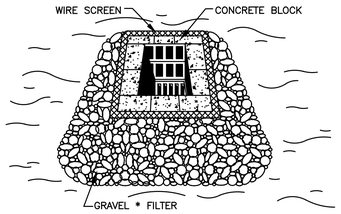
JOB NO.: 23182	DRAWN BY:
SCALE: 1"=30'	DESIGN BY:
DATE: 07/01/25	REVIEW BY:
SHEET: 18 OF 29	

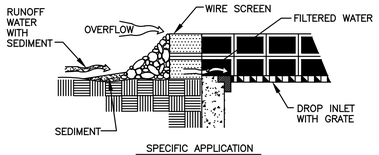
SHEET TITLE
E&S - NOTES AND DETAILS

SHEET NUMBER
18

STORM DRAIN INLET PROTECTION 3.07-3 (IP)

BLOCK AND GRAVEL DROP INLET SEDIMENT FILTER



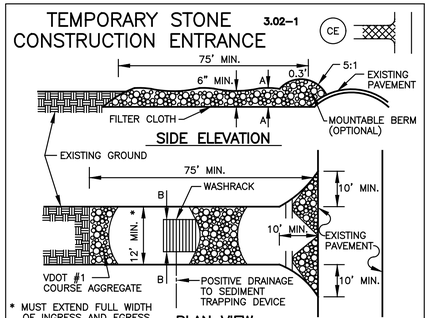


SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

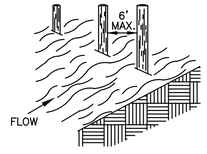
* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE

TEMPORARY STONE CONSTRUCTION ENTRANCE 3.02-1 (CE)

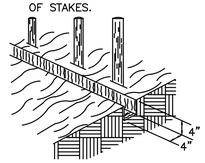


SILT FENCE (WITHOUT WIRE SUPPORT) 3.05-2 (SF)

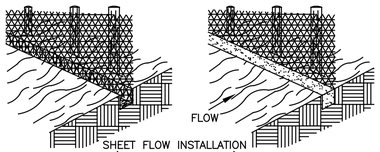
1. SET THE STAKES.



2. EXCAVATE A 4" X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.

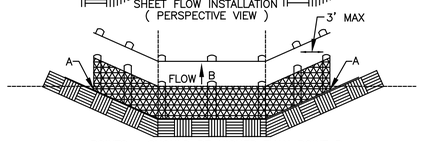


3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.



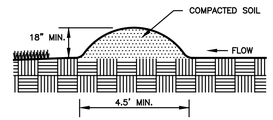
SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)

4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



POINTS A SHOULD BE HIGHER THAN POINT B.
DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

TEMPORARY DIVERSION DIKE 3.09-1 (DD)



SEDIMENT BASIN #1

BASIN VOLUME DESIGN

WET STORAGE

DRAINAGE AREA = 58 Ac.

1. MINIMUM REQUIRED VOLUME = 67 cu. yds. x TOTAL DRAINAGE AREA (ACRES). **
   67 cu. yds. x 58 Acres = 3,886 cu. yds.
2. AVAILABLE BASIN VOLUME = 4,989 cu. yds AT ELEVATION 509.50 (FROM STORAGE – ELEVATION CURVE)
3. EXCAVATE 4,989 cu. yds. TO OBTAIN REQUIRED VOLUME*.
   * ELEVATION CORRESPONDING TO REQUIRED VOLUME = INVERT OF THE DEWATERING ORIFICE.
4. AVAILABLE VOLUME BEFORE CLEANOUT REQUIRED.
   33 cu. yds. x 58 Acres = 914 cu. yds.
5. ELEVATION CORRESPONDING TO CLEANOUT LEVEL = 507.50
   (FROM STORAGE – ELEVATION CURVE)
6. DISTANCE FROM INVERT OF THE DEWATERING ORIFICE TO CLEANOUT LEVEL = 2.0 Ft.
   (MIN. = 1.0 Ft.)

DRY STORAGE

7. MINIMUM REQUIRED VOLUME = 67 cu. yds. x TOTAL DRAINAGE AREA (ACRES).
   67 cu. yds. x 58 Acres = 3,886 cu. yds.
8. TOTAL AVAILABLE BASIN VOLUME AT CREST OF RISER = 12,157 cu. yds AT ELEVATION 514.90 (FROM STORAGE – ELEVATION CURVE)
9. DIAMETER OF DEWATERING ORIFICE = 10 IN.
   ORIFICE SIZING:
   TOTAL DRY STORAGE S = 134,703 cf
   Q = S / 21600 sec = 6.23 cfs
   h = AVERAGE DRIVING HEAD = 1.5 ft
   A = AREA OF ORIFICE = 0.81 sf
   MIN d (in) = 9.67 in
10. DIAMETER OF OF FLEXIBLE TUBING = 12 IN. (DIAMETER OF DEWATERING ORIFICE PLUS 2 INCHES).

BASIN SHAPE

11. LENGTH OF FLOW / EFFECTIVE WIDTH (L/W) = 6.2 — IF > 2, BAFFLES ARE NOT REQUIRED X
    IF < 2, BAFFLES ARE REQUIRED _____

RUNOFF

12. Q_2 = 183 (58 X 0.55 X 5.75)
13. Q_{25} = 264 (58 X 0.55 X 8.27)

PRINCIPAL SPILLWAY DESIGN

14. WITH EMERGENCY SPILLWAY, REQUIRED SPILLWAY CAPACITY Q_p = Q_2 = 183 CFS
    WITHOUT EMERGENCY SPILLWAY, REQUIRED SPILLWAY CAPACITY Q_p = Q_{25} = 264 CFS
15. WITH EMERGENCY SPILLWAY:
    ASSUMED AVAILABLE HEAD (h) = 2.0 ft. (USING Q_2)
    h = CREST OF EMERGENCY SPILLWAY ELEVATION – CREST OF RISER ELEVATION

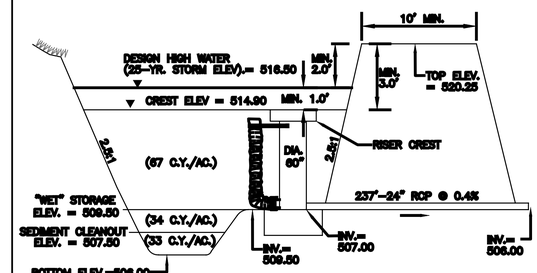
    WITHOUT EMERGENCY SPILLWAY:
    ASSUMED AVAILABLE HEAD (h) = 1.0 ft. (USING Q_{25})
    h = DESIGN HIGH WATER ELEVATION – CREST OF RISER ELEVATION
16. RISER DIAMETER (Dr) = 60 IN. ACTUAL HEAD (h) = 1.65 Ft.
    (FROM PLATE 3.14-8)
    NOTE: AVOID ORIFICE FLOW CONDITIONS.
17. BARREL LENGTH (l) = 237 Ft.
    HEAD (H) ON BARREL THROUGH EMBANKMENT = 9 Ft.
    (FROM PLATE 3.14-7)
18. BARREL DIAMETER = 24 IN.
    (FROM PLATE 3.14-B [CONCRETE PIPE] OR PLATE 3.14-A [CORRUGATED PIPE])

FINAL DESIGN ELEVATIONS

19. TOP OF DAM = 520.25
    DESIGN HIGH WATER = 518.07
    EMERGENCY SPILLWAY CREST = 517.25
    PRINCIPLE SPILLWAY CREST = 514.90
    DEWATERING ORIFICE INVERT = 509.50
    CLEANOUT ELEVATION = 507.50

** NOTE: THE SEDIMENT BASIN HAS BEEN SIZED TO HANDLE FUTURE PHASES OF HUNTFIELD THAT WILL BE DRAINING TO THIS FACILITY. SEDIMENT BASIN TO BE CONVERTED TO FINAL SWM CONFIGURATION UPON STABILIZATION OF THE FINAL PHASE IN THIS AREA.

TEMPORARY SEDIMENT BASIN #1 3.14-2



DESIGN ELEVATIONS WITHOUT EMERGENCY SPILLWAY
(RISER PASSES 25-YR. EVENT)

NOTE: SWM STRUCTURE TO BE TEMPORARILY MODIFIED TO ACT AS SEDIMENT BASIN OUTFALL STRUCTURE. A 10" ORIFICE AT INVERT ELEVATION OF 509.50 TO BE INSTALLED IN THE RISER WITH THE REQUIRED FLEXIBLE TUBING. THE HOLE IS TO BE PARGED UPON CONVERSION OF THE FACILITY TO FINAL SWM CONFIGURATION. ADDITIONALLY, THE 1-FOOT WEIR IN THE STRUCTURE REQUIRED FOR THE SWM FACILITY IS TO BE TEMPORARILY COVERED OR OTHERWISE DISABLED.

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JOHN K. ERICKSON, REGISTERED, 16052, STATE OF WEST VIRGINIA, PROFESSIONAL ENGINEER
12/10/2025

WV PROFESSIONAL CERTIFICATION:

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DATE	REVISION	REV NO.

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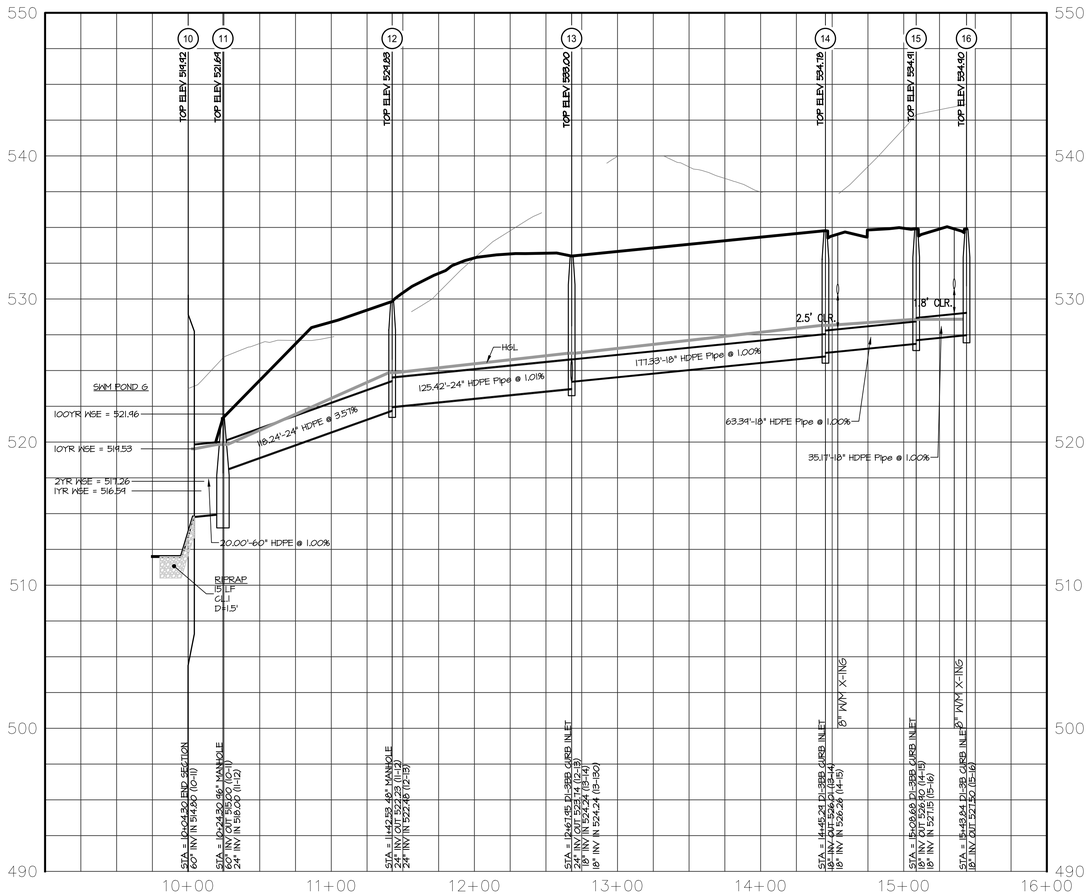
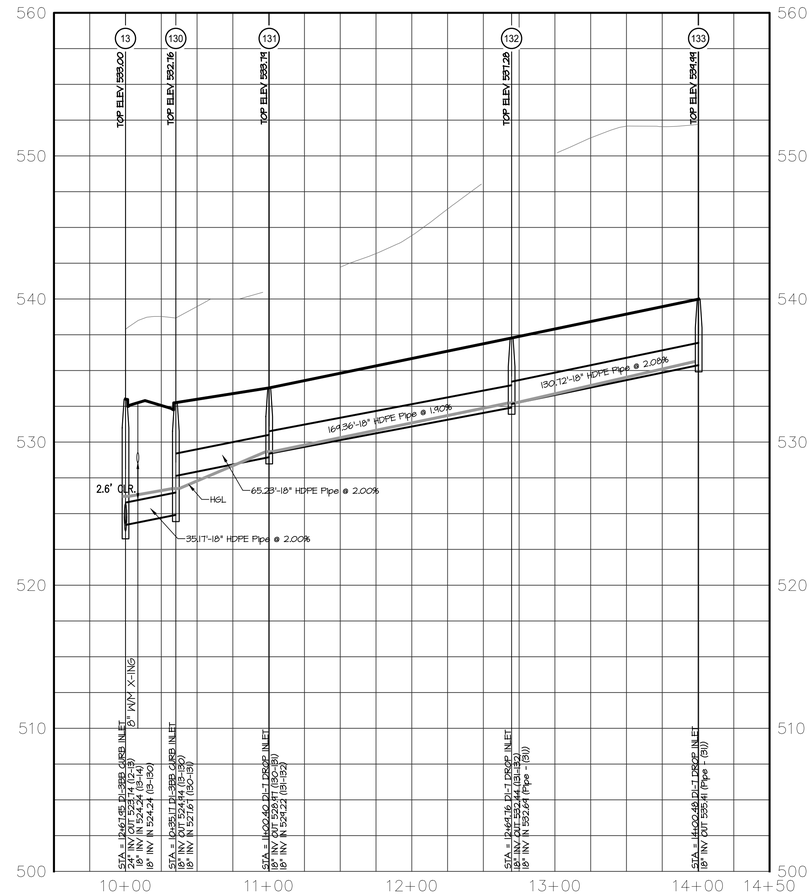
HUNTFIELD - PHASE 4
CONSTRUCTION DRAWINGS
CITY OF CHARLES TOWN, WEST VIRGINIA

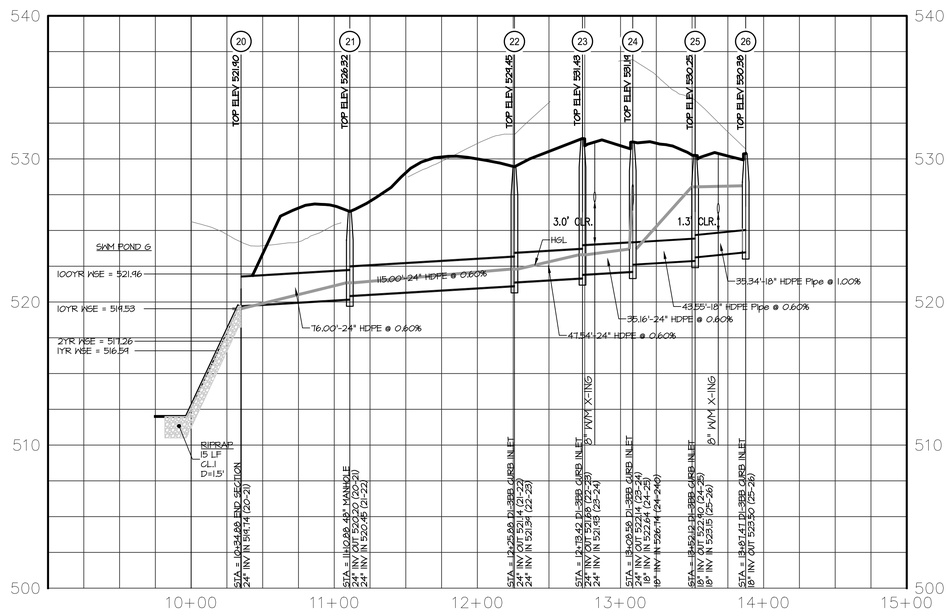
JOB NO.: 23182	DRAWN BY:
SCALE: 1"=30'	DESIGN BY:
DATE: 07/01/25	REVIEW BY:
SHEET: 19 OF 29	

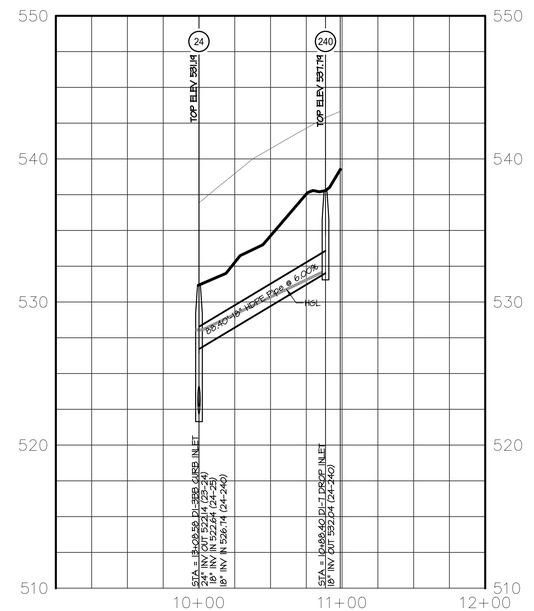
SHEET TITLE
E&S - NOTES AND DETAILS

SHEET NUMBER
19









50 0 50 100 150

Scale 1" = 50'

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REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=50'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:

SHEET: 20 OF 29

SHEET TITLE

STORM PROFILES

SHEET NUMBER

20

STORM SEWER DESIGN COMPUTATIONS

Project: Huntfield Phase 4

From Point	To Point	Drainage Area	C Factor	C x A Increment	C x A Cumm.	Inlet Time Min.	Rain Fall In/Hr	Runoff Q C.F.S.	Invert Elevation Upper End	Invert Elevation Lower End	Length FT.	Slope %	Dia. IN.	Capacity Q C.F.S.	VEL. F.P.S.	Flow Time MIN.
*																
16	15	0.68	0.60	0.41	0.41	5.00	6.88	2.81	527.50	527.15	35.17	1.00%	18	10.53	5.04	0.12
15	14	0.69	0.63	0.43	0.84	5.00	6.88	5.80	526.90	526.26	63.39	1.00%	18	10.53	6.10	0.17
14	13	0.09	0.64	0.06	0.90	5.00	6.88	6.19	526.01	524.24	177.33	1.00%	18	10.53	6.20	0.48
13	12	0.23	0.68	0.16	2.16	5.00	6.88	14.88	523.74	522.47	125.42	1.01%	24	22.80	7.73	0.27
12	11	0.00	0.00	0.00	2.16	5.00	6.88	14.88	522.22	518.00	118.24	3.57%	24	42.86	12.40	0.16
11	10	0.00	0.00	0.00	2.16	5.00	6.88	14.88	515.02	514.82	20.00	1.00%	60	261.14	7.20	0.05
*																
133	132	0.52	0.58	0.30	0.30	5.00	6.88	2.08	532.93	530.21	130.72	2.08%	18	15.19	6.01	0.36
132	131	0.42	0.56	0.24	0.54	5.00	6.88	3.69	529.96	526.75	169.36	1.90%	18	14.52	6.87	0.41
131	130	0.60	0.58	0.35	0.88	5.00	6.88	6.09	526.50	525.19	65.23	2.00%	18	14.90	8.00	0.14
130	13	0.32	0.69	0.22	1.11	5.00	6.88	7.61	524.94	524.24	35.17	2.00%	18	14.90	8.47	0.07
*																
240	24	0.61	0.52	0.32	0.32	5.00	6.88	2.18	532.04	526.74	88.40	6.00%	18	25.80	8.91	0.17
*																
26	25	0.31	0.62	0.19	0.19	5.00	6.88	1.32	523.50	523.15	35.34	1.00%	18	10.53	4.07	0.14
25	24	0.53	0.67	0.36	0.55	5.00	6.88	3.77	522.90	522.64	43.55	0.60%	18	8.16	4.52	0.16
24	23	0.22	0.67	0.15	1.01	5.00	6.88	6.96	522.14	521.93	35.16	0.60%	24	17.57	5.27	0.11
23	22	0.23	0.65	0.15	1.16	5.00	6.88	7.99	521.68	521.39	47.54	0.60%	24	17.57	5.46	0.15
22	21	0.05	0.64	0.03	1.19	5.00	6.88	8.21	521.14	520.45	115.00	0.60%	24	17.57	5.50	0.35
21	20	0.00	0.00	0.00	1.19	5.00	6.88	8.21	520.20	519.74	76.00	0.60%	24	17.57	5.50	0.23

STORM SEWER INLET COMPUTATIONS

INLET NUMBER	TYPE	LENGTH	TOTAL DEPTH (FT)	DRAINAGE AREA	C	C x A	W	INTENSITY	Q INCR	Q CARRY OVER	Q TOTAL	S GUTTER	Sx CROSS SLOPE	T SPREAD	W	W/T	Sw	SwSx	Eo	a	S'w	Se	Lt	P EFFECTIVE LENGTH	L/Lt	d	E	h	Q INT	d/H	Qb CARRY OVER	T SPREAD AT SAG
130	DI-3B	8.0	7.8	0.32	0.69	0.22	0.22	4.00	0.88		0.88	0.0200	0.0208	4.45	2.00	0.45	0.085	4.09	0.92	3.54	0.15	0.16	6.65		1.20		1.00		0.88		0.00	
16	DI-3B	10.0	7.4	0.68	0.60	0.41	0.41	4.00	1.63		1.63	0.0200	0.0208	6.54	2.00	0.31	0.085	4.09	0.78	3.54	0.15	0.14	9.38		1.07		1.00		1.63		0.00	
15	DI-3BB	10.0	8.0	0.69	0.63	0.43	0.43	4.00	1.74		1.74	0.0200	0.0208	6.76	2.00	0.30	0.085	4.09	0.77	3.54	0.15	0.13	9.72		1.03		1.00		1.74		0.00	
14	DI-3BB	6.0	8.7	0.09	0.64	0.06	0.06	4.00	0.23		0.23	0.0200	0.0208	3.56	2.00	0.56	0.085	4.09	0.97	3.54	0.15	0.16	3.68		1.63		1.00		0.23		0.00	
13	DI-3BB	6.0	9.3	0.23	0.68	0.16	0.16	4.00	0.63		0.63	0.0200	0.0208	3.10	2.00	0.65	0.085	4.09	0.99	3.54	0.15	0.17	5.55		1.08		1.00		0.63		0.00	
*																																
26	DI-3B	6.0	6.9	0.31	0.62	0.19	0.19	4.00	0.77		0.77	0.0200	0.0208	3.94	2.00	0.51	0.085	4.09	0.95	3.54	0.15	0.16	6.17		0.97		1.00		0.77		0.00	
25	DI-3B	8.0	7.4	0.53	0.67	0.36	0.36	4.00	1.42		1.42	0.0200	0.0208	6.07	2.00	0.33	0.085	4.09	0.81	3.54	0.15	0.14	8.66		0.92		0.99		1.41		0.01	
24	DI-3BB	6.0	9.1	0.22	0.67	0.15	0.15	4.00	0.59		0.59	0.0200	0.0208	2.81	2.00	0.71	0.085	4.09	0.99	3.54	0.15	0.17	5.40		1.11		1.00		0.59		0.00	
23	DI-3BB	6.0	9.8	0.23	0.65	0.15	0.15	4.00	0.60		0.60	0.0200	0.0208	2.88	2.00	0.69	0.085	4.09	0.99	3.54	0.15	0.17	5.43		1.10		1.00		0.60		0.00	
22	DI-3BB	6.0	8.3	0.05	0.64	0.03	0.03	4.00	0.13		0.13	0.0200	0.0208	2.86	2.00	0.70	0.085	4.09	0.99	3.54	0.15	0.17	2.84		2.11		1.00		0.13		0.00	
*																																
131	DI-7			0.60	0.58	0.35	0.35	4.00	1.39	0.00	1.39													6.5		0.17							
132	DI-7			0.42	0.56	0.24	0.24	4.00	0.94	0.00	0.94													6.5		0.13							
133	DI-7			0.52	0.58	0.30	0.30	4.00	1.21	0.00	1.21													6.5		0.16							
240	DI-7			0.61	0.52	0.32	0.32	4.00	1.27	0.00	1.27													6.5		0.16							

HYDRAULIC GRADE LINE COMPUTATIONS

Project: Huntfield Phase 4

INLET STATION (1)	UPSTREAM INLET	Outlet Water Surface Elev. (2)	Do in (3)	Qo cfs (4)	Lo ft (5)	Sfo % (6)	Hf ft (7)	JUNCTION LOSS Vo (8)	Ho (9)	Qi (10)	Vi (11)	QiVi (12)	2 Vi /2g (13)	Hi (14)	Angle (15)	Hd (15)	Ht (16)	1.3 Ht (17)	0.5 Ht (18)	FINAL H (19)	Inlet Water Surface Elev. (20)	RIM ELEV. (21)
10																			Starting Elevation		519.53	
11		519.53	60	14.88	20.00	0.00	0.00	0.8	0.00					0.12		0.24	0.37	0.48	0.24	0.24	519.84	521.69
	12		24							14.88	4.74	70.45	0.35		90							
12		519.84	24	14.88	118.24	0.43	0.51	4.7	0.09					0.12		0.24	0.45	0.59	0.29	0.80	524.87	529.83
	13		24							14.88	4.74	70.45	0.35		90							
13		524.87	24	14.88	125.42	0.43	0.54	4.7	0.09					0.10		0.20	0.39	0.51	0.25	0.79	526.23	533.00
	14		18							6.19	3.51	21.71	0.19	0.07	90	0.13						
	130		18							7.61	4.30	32.74	0.29	0.10	90	0.20						
14		526.23	18	6.19	177.33	0.35	0.61	3.5	0.05					0.06		0.12	0.22	0.29	0.15	0.76	528.22	534.76
	15		18							5.80	3.28	19.02	0.17		90							
15		528.22	18	5.80	63.39	0.30	0.19	3.3	0.04					0.01		0.03	0.08	0.11	0.05	0.25	528.59	534.91
	16		18							2.81	1.59	4.46	0.04		90							
130		526.39	18	7.61	35.17	0.52	0.18	4.3	0.07					0.06		0.13	0.27	0.35	0.17	0.36	529.33	532.76
	131		18							6.09	3.44	20.97	0.18		90							
131		529.33	18	6.09	65.23	0.33	0.22	3.4	0.05					0.02		0.05	0.12	0.15	0.08	0.29	532.73	533.79
	132		18							3.69	2.09	7.72	0.07		90							
132		532.73	18	3.69	169.36	0.12	0.21	2.1	0.02					0.01		0.01	0.04	0.05	0.03	0.23	535.64	537.28
	133		18							2.08	1.17	2.44	0.02		90							
20																			Starting Elevation		519.53	
21		521.34	24	8.21	76.00	0.13	0.10	2.6	0.03					0.04		0.07	0.14	0.18	0.09	0.19	522.24	526.32
	22		24							8.21	2.61	21.46	0.11		90							
22		522.24	24	8.21	115.00	0.13	0.15	2.6	0.03					0.04		0.07	0.13	0.17	0.09	0.24	523.23	529.45
	23		24							7.99	2.54	20.32	0.10		90							
23		523.23	24	7.99	47.54	0.12	0.06	2.5	0.03					0.03		0.05	0.11	0.14	0.07	0.13	523.66	531.43
	24		24							6.96	2.22	15.43	0.08		90							
24		523.66	24	6.96	35.16	0.09	0.03	2.2	0.02					0.02		0.05	0.09	0.12	0.06	0.09	528.03	531.19
	240		18							2.18	1.23	2.70	0.02	0.01	90	0.02						
	25		18							3.77	2.13	8.02	0.07	0.02	90	0.05						
25		528.03	18	3.77	43.55	0.13	0.06	2.1	0.02					0.00		0.01	0.03	0.03	0.02	0.07	528.11	530.25
	26		18							1.32	0.75	0.99	0.01		90							
240		528.03	18	2.18	88.40	0.04	0.04	1.235	0.01					0.00		0.00	0.01	0.01	0.00	0.04	532.08	537.79
	0									2.18	0.00	0.00	0.00		90							

MRA
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JOHN K. ERICKSON
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER
12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO, 20684, EXPIRATION DATE: 12/31/2026.

DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

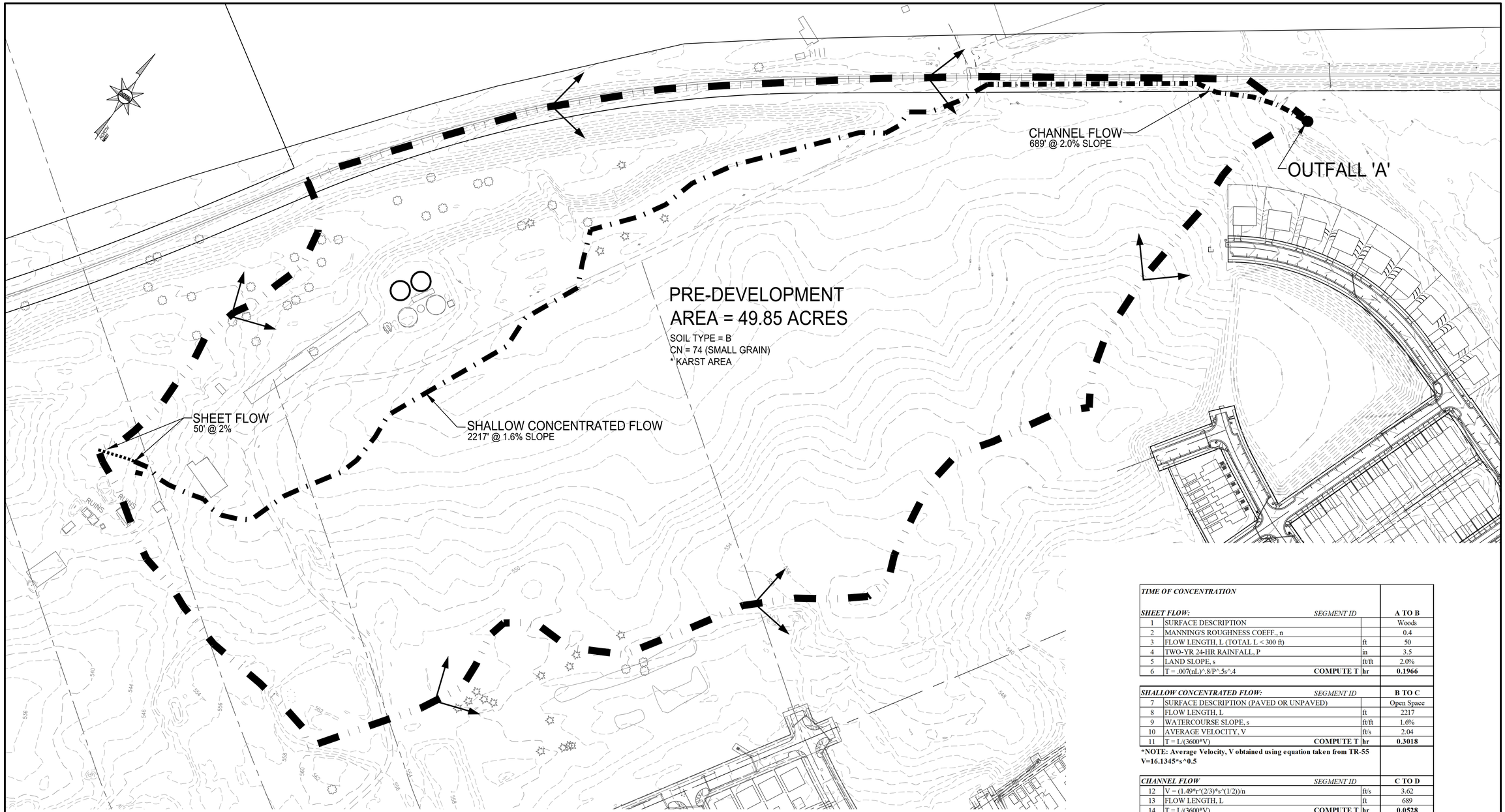
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: N/A	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 20 OF 29	

SHEET TITLE

STORM PROFILES

SHEET NUMBER

20



TIME OF CONCENTRATION			
SHEET FLOW:	*SEGMENT ID*		**A TO B**
1	SURFACE DESCRIPTION		Woods
2	MANNING'S ROUGHNESS COEFF., n		0.4
3	FLOW LENGTH, L (TOTAL L < 300 ft)	ft	50
4	TWO-YR 24-HR RAINFALL, P	in	3.5
5	LAND SLOPE, s	ft/ft	2.0%
6	T = .007(nL)^.8/P^.5s^.4 **COMPUTE T**	**hr**	**0.1966**
SHALLOW CONCENTRATED FLOW:	*SEGMENT ID*		**B TO C**
7	SURFACE DESCRIPTION (PAVED OR UNPAVED)		Open Space
8	FLOW LENGTH, L	ft	2217
9	WATERCOURSE SLOPE, s	ft/ft	1.6%
10	AVERAGE VELOCITY, V	ft/s	2.04
11	T = L/(3600*V) **COMPUTE T**	**hr**	**0.3018**
***NOTE: Average Velocity, V obtained using equation taken from TR-55 V=16.1345*s^0.5**			
CHANNEL FLOW	*SEGMENT ID*		**C TO D**
12	V = (1.49*r^(2/3)*s^(1/2))/n	ft/s	3.62
13	FLOW LENGTH, L	ft	689
14	T = L/(3600*V) **COMPUTE T**	**hr**	**0.0528**

15	***WATERSHED OR SUBAREA, T*** ***TOTAL T***	***hr***	***0.5512***
		min.	***33.1***
	USE Tc	***min.***	33

100 0 100 200 300

Scale 1" = 100'

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IAN E. ERICKSON — REGISTERED — 16052 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

12/10/2025

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REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=100'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:

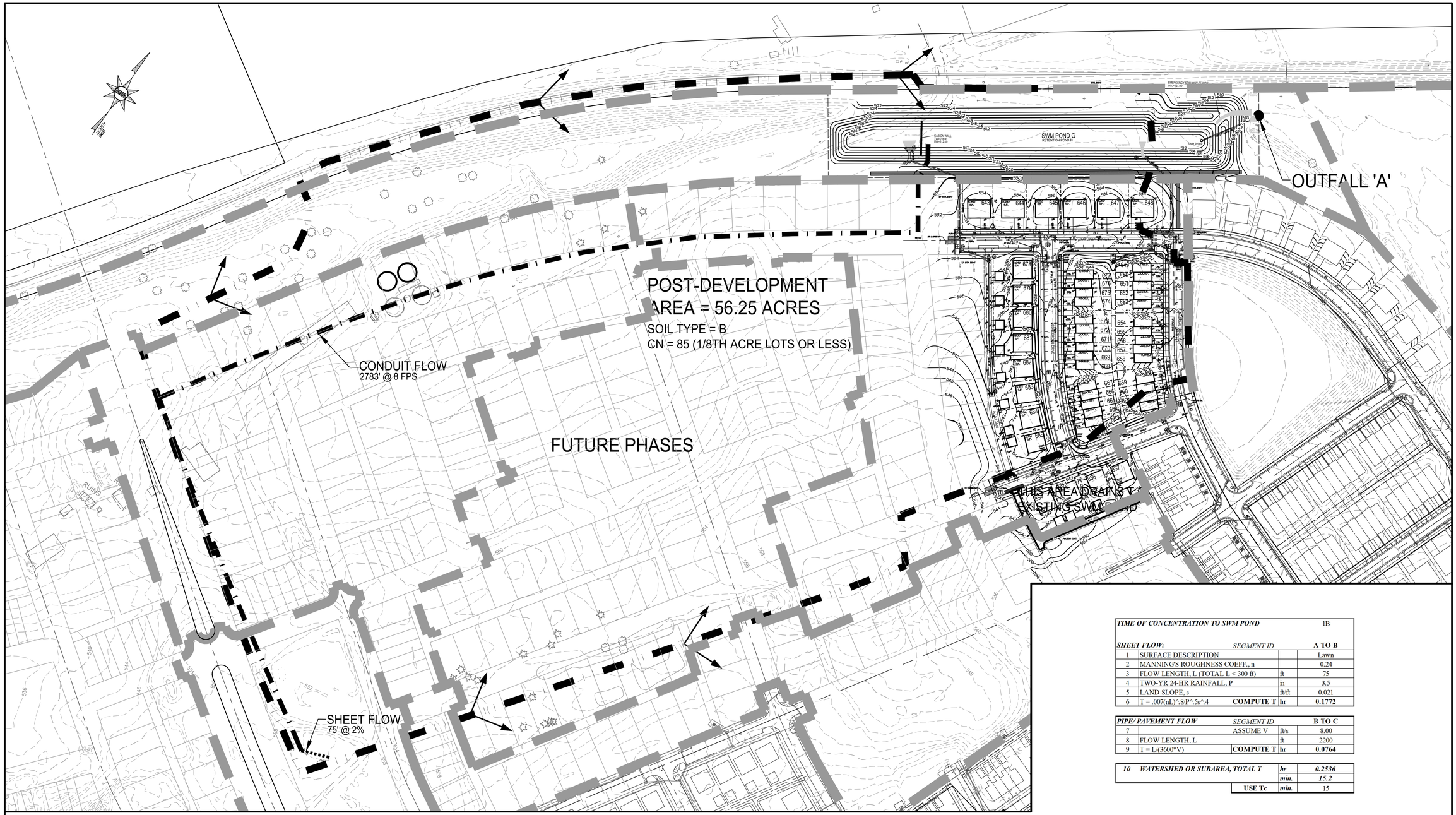
SHEET: 22 OF 29

SHEET TITLE

SWM - PRE DEVELOPMENT

SHEET NUMBER

22



TIME OF CONCENTRATION TO SWM POND			1B
SHEET FLOW:	*SEGMENT ID*		**A TO B**
1	SURFACE DESCRIPTION		Lawn
2	MANNING'S ROUGHNESS COEFF., n		0.24
3	FLOW LENGTH, L (TOTAL L < 300 ft)	ft	75
4	TWO-YR 24-HR RAINFALL, P	in	3.5
5	LAND SLOPE, s	ft/ft	0.021
6	T = .007(nL)^.8/P^.5s^.4 **COMPUTE T**	**hr**	**0.1772**

PIPE/ PAVEMENT FLOW	*SEGMENT ID*		**B TO C**
7	ASSUME V	ft/s	8.00
8	FLOW LENGTH, L	ft	2200
9	T = L/(3600*V) **COMPUTE T**	**hr**	**0.0764**

10	*WATERSHED OR SUBAREA, TOTAL T*		
		hr	*0.2536*
		min.	*15.2*
	USE Tc	*min.*	15

50 0 50 100 150

Scale 1" = 50'

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12/10/2025

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REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY:
SCALE: 1"=100'	DESIGN BY:
DATE: 07/01/25	REVIEW BY:

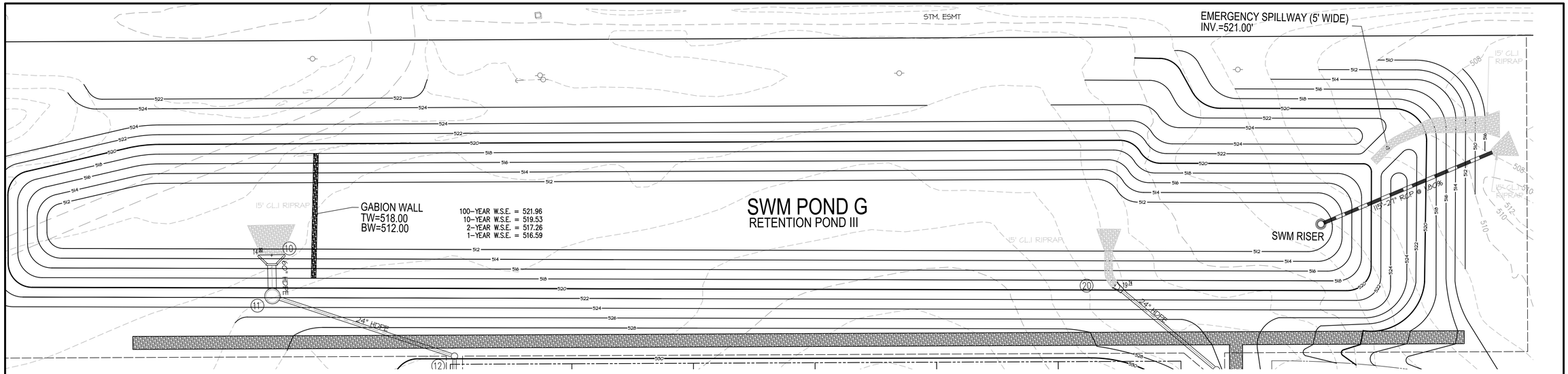
SHEET: 23 OF 29

SHEET TITLE

SWM - POST DEVELOPMENT

SHEET NUMBER

23



SWM Pond G - Riser Anti Flotation Computation

Buoyant Force: Contained volume of riser from the top of Riser Structure.

F_b = (Volume of Riser + Volume of Collar) x 62.4 lb/ft³

Riser Dimensions (inside): 2.00 ft. **Diameter** x 9.50 ft. **Height**

Riser Volume: 83.24 ft³

F_b = (83.24 ft³) x 62.4 lb/ft³

F_B = 5194.2 lb.

Downward Force: Riser Weight

F_W = [(Volume of walls, base+base fill)-(Barrel, weir and orifice openings)] x 150 lb/ft³

Wall Thickness:	0.67	ft.
Base Thickness:	0.67	ft.
Base Fill:	1.00	ft.
Wall Volume:	46.57	ft³
Base Volume:	2.11	ft³
Base Fill Volume:	22.40	ft³
Barrel Opening Volume:	2.66	ft³
Weir Opening(s) Volume:	4.02	ft³
Low Flow Orifice Volume:	0.13	ft³

Top of Riser
Top of Weir Opening
Weir Crest
Low Flow
Barrel
Base Fill
Base of Riser / Slab

F_W = [(46.57+2.11+22.4-2.66-4.02-0.13)+50] x 150 lb/ft3

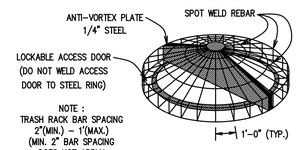
F_W = 9640.3 lb.

Check for Flotation:

Downward Force / Buoyant Force = 9640 / 5194

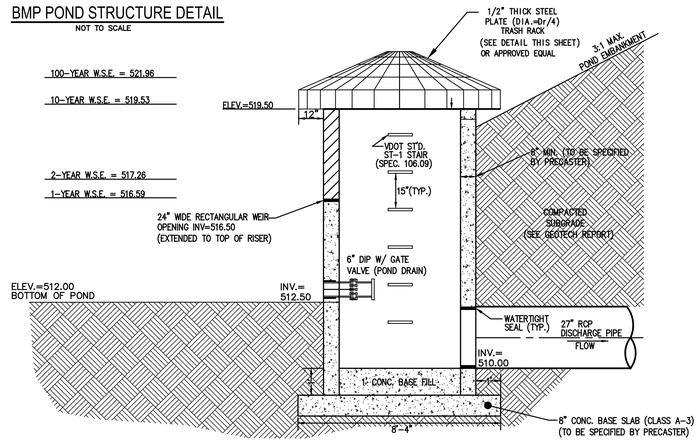
= 1.86 ≥ 1.25 Riser will not float.

TRASH RACK DETAIL



BMP POND STRUCTURE DETAIL

NOT TO SCALE



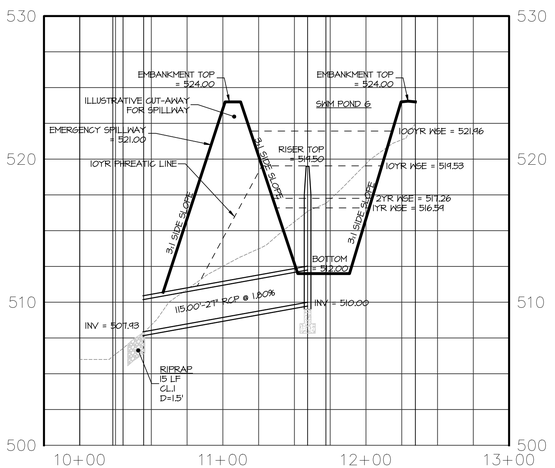
DETAIL NOTES

1. THE PURPOSE OF THESE PLANS IS TO PROVIDE THE BASIC DIMENSIONS REQUIRED TO CONTROL THE CONSTRUCTION OF THE PRINCIPAL & SPILLWAY. THE FOLLOWING DIMENSIONS AND/OR ELEVATIONS ARE FIXED:

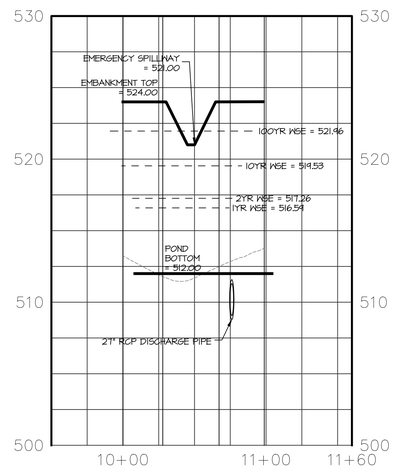
24" RECT. WEIR INV. = 516.50*
TOP OF RISER ELEV. = 519.50

*NOTE – 24" RECTANGULAR OPENING TO BE EXTENDED TO THE TOP OF THE RISER

2. ALL OTHER WALL, SPILLWAY AND FOOTING DIMENSIONS AND/OR THICKNESS, AS WELL AS, REINFORCEMENT, BUOYANCY CALCULATIONS AND THE METHOD OF JOINING THE VARIOUS STRUCTURAL ELEMENTS ARE SUBJECT TO DESIGN BY A PROFESSIONAL STRUCTURAL ENGINEER.
3. CONSTRUCTION AND CONTRACTION JOINTS ARE TO BE PROVIDED AS REQUIRED BY THE LATEST EDITION OF THE ACI CODE
4. SUBGRADE PREPARATION AND BEDDING REQUIREMENTS FOR ALL STRUCTURAL ELEMENTS ARE SUBJECT TO DESIGN BY A PROFESSIONAL GEOTECHNICAL ENGINEER.
5. PRECAST CONCRETE IS TO ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. CAST IN PLACE CONCRETE IS TO BE VDOT CLASS A3.
6. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A–615 (REINFORCING BARS).
7. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4".
8. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN STRICT CONFORMANCE TO THE LATEST VDOT STANDARDS AND SPECIFICATIONS.
9. SHOP DRAWINGS ARE TO BE SUBMITTED TO AND APPROVED BY THE ENGINEER PRIOR TO FABRICATION.
10. FOOTING DEPTHS SHOWN ARE MINIMUMS. ALL FOOTINGS ARE TO EXTEND DOWN TO SUITABLE BEARING MATERIAL AS DIRECTED BY THE GEOTECHNICAL ENGINEER.



POND OUTFALL PROFILE



POND EMBANKMENT PROFILE

STORMWATER MANAGEMENT NARRATIVE

STORMWATER MANAGEMENT FOR THE SUBJECT SITE HAS BEEN DESIGNED IN ACCORDANCE WITH THE CITY OF CHARLES TOWN SUBDIVISION AND LAND DEVELOPMENT ORDINANCE. THE SITE DRAINS TO THE NORTHEAST INTO A TRIBUTARY OF EVITTS RUN. THE ENTIRETY OF THE SITE DISCHARGES AT A SINGLE LOCATION IDENTIFIED AS OUTFALL 'A' ON THE PROVIDED DRAINAGE MAPS. THE SITE CONSISTS OF TYPE B SOILS AND THE GEOLOGY IS PREDOMINANTLY KARST. DUE TO THE PRESENSE OF KARST, THE SITE HAS BEEN DESIGNED IN ACCORDANCE WITH THE CHESAPEAKE STORMWATER NETWORK TECHNICAL BULLETIN NO. 1 "STORMWATER DESIGN GUIDELINES FOR KARST TERRAIN IN THE CHESAPEAKE BAY WATERSHED." ADDITIONALLY, THE PROVIDED SWM FACILITY HAS BEEN DESIGNED TO ACCOMMODATE THE FUTURE PHASES OF THE HUNTFIELD PROJECT LOCATED WITHIN THE DEPICTED DRAINAGE SHED FOR BOTH WATER QUANTITY AND QUALITY.

SWM QUANTITY NARRATIVE

THE SITE HAS BEEN DESIGNED TO DETAIN POST–DEVELOPMENT STORMWATER RUNOFF WITHIN THE PROPOSED SWM POND AND RELEASE IT AT PRE–DEVELOPMENT RATES FOR THE 1–YEAR (2.5–INCH), 2–YEAR (3.1–INCH), 10–YEAR (4.95–INCH) AND 100–YEAR (7–INCH) DESIGN STORMS (SEE PROVIDED SWM ROUTINGS). ADDITIONALLY, A KARST ADJUSTMENT FACTOR HAS BEEN APPLIED TO THE COMPUTED PRE–DEVELOPMENT RATES TO ACCOUNT FOR THE PRESENCE OF KARST TERRAIN. A FACTOR OF 0.33 HAS BEEN USED FOR THE 1–YEAR AND 2–YEAR STORM EVENTS, 0.43 FOR THE 10–YEAR STORM EVENT AND 0.50 FOR THE 100–YEAR STORM EVENT. THE POND HAS BEEN DESIGNED TO SAFELY PASS THE 100–YEAR STORM EVENT WHILE PROVIDING A MINIMUM OF 1–FOOT OF FREEBOARD TO THE TOP OF THE EMBANKMENT.

BMP QUALITY NARRATIVE

WATER QUALITY FOR THE SUBJECT SITE HAS BEEN ACHIEVED IN ACCORDANCE WITH THE PERFORMANCE–BASED CRITERIA OUTLINED IN THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK (1999), SPECIFICALLY SITUATION 2 WHERE THE EXISTING PERCENT IMPERVIOUS COVER IS LESS THAN OR EQUAL TO THE AVERAGE LAND COVER CONDITION AND THE PROPOSED IMPROVEMENTS WILL CREATE A TOTAL IMPERVIOUS COVER WHICH IS GREATER THAN THE AVERAGE LAND COVER. WATER QUALITY TREATMENT WILL BE ACHIEVED THROUGH THE INSTALLATION OF A RETENTION POND III (4 x WQV) WITH A TARGET PHOSPHOROUS REMOVAL EFFICIENCY OF 50%. THE DESIGN FACILITY IS CAPABLE OF TREATING SITES WITH AN IMPERVIOUS COVER RANGE OF 38–66%. THE PROPOSED SITE AND FUTURE PHASES ARE APPROXIMATELY 65% IMPERVIOUS. USING A TOTAL DRAINAGE AREA OF 56.25 ACRES AND AN IMPERVIOUS LAND COVER OF 65%, THE TREATMENT VOLUME (FIRST 0.5–INCH OF RUNOFF) IS COMPUTED TO BE 66,361 CU.FT. AND IS PROVIDED AT POND ELEVATION 514.69 (SEE STAGE STORAGE TABLE). DUE TO THE KARST TERRAIN, AN IMPERMEABLE LINER WILL BE REQUIRED (SEE GEOTECH REPORT).

GENERAL SPECIFICATIONS FOR S.W.M. DAM AND FACILITY

1. AREAS UNDER THE EMBANKMENT AND ANY STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL, ROOTS OR OTHER OBJECTIONAL MATERIAL.
2. THE SUITABILITY AND ACCEPTABILITY OF ALL FILL MATERIAL WILL BE DETERMINED BY REGULAR PERIODIC SOIL ANALYSIS AND COMPACTION TESTS, WHICH SHALL BE MADE BY A QUALIFIED GEOTECHNICAL ENG.
3. TESTS FOR SOIL ANALYSIS, MOISTURE CONTENT, AND COMPACTION ARE TO BE CONDUCTED IN ACCORDANCE WITH THE LATEST APPLICABLE ASTM STANDARDS AND SPECIFICATIONS.
4. THE EMBANKMENT MAY BE CONSTRUCTED AS A HOMOGENOUS EMBANKMENT DAM USING ACCEPTABLE MATERIAL CLASSIFIED ML, CL, SC, OR GC SOILS PER ASTM D–2487. IN ADDITION TO THESE MATERIALS, SOILS CLASSIFIED CH AND MH MAY BE USED AS COMPACTED EMBANKMENT FILL BELOW THE UPPER 5 FEET OF THE SLOPES. SOILS CLASSIFIED AS SM OR GM PER ASTM D–2487 OR SUITABLE FILL MAY BE USED FOR EMBANKMENT IN THE DOWNSTREAM HALF OF THE EMBANKMENT.
5. COMPACTION SHALL BE NOT LESS THAN 95% OF THE MAX. DRY DENSITY FOR THE GIVEN EMBANKMENT MATERIAL AS DETERMINED BY USE OF THE STANDARD PROCTOR METHOD PER ASTM T–99 OR ASTM D–698.
6. THE FILL SHALL BE CONSTRUCTED IN 8–INCH LOOSE LIFTS AND SHALL BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL SO THAT SMOOTH HORIZONTAL PLANES ARE NOT BUILT INTO THE FILL STRUCTURE. SMOOTH HORIZONTAL PLANES CAN BE AVOIDED BY SCARIFYING OR USE OF SHEEPS–FOOT ROLLERS.
7. THE EMBANKMENT SHALL BE CONSTRUCTED TO A MINIMUM ELEVATION 5% HIGHER THAN THE DESIGNED HEIGHT TO ALLOW FOR SETTLEMENT WHEN MECHANICAL COMPACTORS ARE USED FOR CONSTRUCTION.
8. IF SUFFICIENT ACCEPTABLE MATERIAL IS NOT AVAILABLE ON THE SITE TO PROPERLY COMPLETE THE FILL, THE CONTRACTOR IS RESPONSIBLE FOR ACQUIRING ACCEPTABLE BORROW MATERIAL.
9. REQUIRED POND LINER CONSISTS OF 6 INCHES OF TOPSOIL PLACED OVER 18 INCHES OF COMPACTED CLAY OR SOIL–BENTONITE MIX (SEE GEOTECH REPORT FOR SPECIFICATIONS).
10. A COMPLETED "CONSTRUCTION INSPECTION AND AS–BUILT SURVEY CHECKLIST", CERTIFIED BY A PROFESSIONAL ENGINEER OR SURVEYOR (3B), VERIFYING THAT THE STORM WATER MANAGEMENT FACILITIES AND ASSOCIATED CONVEYANCE SYSTEMS HAVE BEEN BUILT IN ACCORDANCE WITH THE APPROVED PLAN AND DESIGN SPECIFICATIONS.
11. THE DEVELOPER/OWNER SHALL PROVIDE FOR PERIODIC INSPECTION OF THE FACILITIES DURING CONSTRUCTION. DETAILED INSPECTION CHECKLISTS SHALL BE USED THAT INCLUDE SIGNOFFS BY A LICENSED LAND SURVEYOR OR A P.E. AT CRITICAL STAGES OF CONSTRUCTION.

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DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: AS SHOWN	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 24 OF 29	

SHEET TITLE

SWM - POND DESIGN

SHEET NUMBER

24

RAINFALL INTENSITY & PRECIPITATION

Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-------
2	51.9857	9.0000	0.7012	-------
3	0.0000	0.0000	0.0000	-------
5	50.1179	9.0000	0.6960	-------
10	50.1499	9.0000	0.6930	-------
25	51.5521	9.0000	0.6894	-------
50	52.9366	9.0000	0.6871	-------
100	54.3231	9.0000	0.6848	-------

File name: Frederick County MD.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	8.17	6.60	5.60	4.90	4.39	3.98	3.66	3.39	3.17	2.98	2.81	2.67
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	7.98	6.46	5.49	4.81	4.31	3.91	3.60	3.34	3.12	2.93	2.77	2.63
10	8.05	6.52	5.54	4.86	4.36	3.96	3.64	3.38	3.16	2.97	2.81	2.67
25	8.36	6.77	5.76	5.06	4.53	4.12	3.79	3.52	3.29	3.10	2.93	2.78
50	8.64	7.00	5.96	5.24	4.69	4.27	3.93	3.65	3.42	3.21	3.04	2.89
100	8.91	7.23	6.16	5.41	4.85	4.42	4.07	3.78	3.54	3.33	3.15	2.99

Tc = time in minutes. Values may exceed 60.

C:\Users\jvochvlie-nas\MRA\Projects\Jefferson Village\Engineering\Site Plan\Compel Stormwater-BZ\Frederick County MD.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.50	3.10	0.00	0.00	4.95	0.00	0.00	7.00
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PRE-DEVELOPMENT AREA 1-YEAR STORM

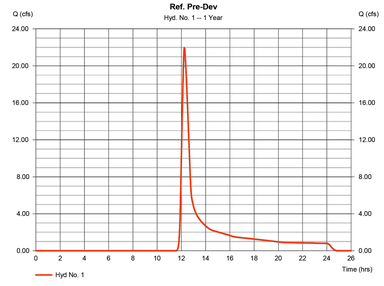
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 1

Ref. Pre-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 21.96 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 111,440 cuft
Drainage area	= 49.850 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.00 min
Total precip.	= 2.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



PRE-DEVELOPMENT AREA 2-YEAR STORM

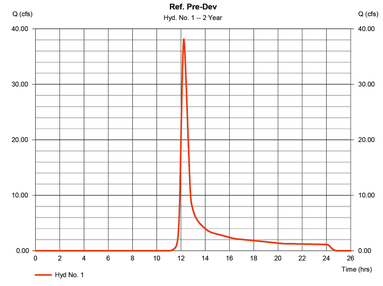
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 1

Ref. Pre-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 38.16 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 178,140 cuft
Drainage area	= 49.850 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.00 min
Total precip.	= 3.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



PRE-DEVELOPMENT AREA 10-YEAR STORM

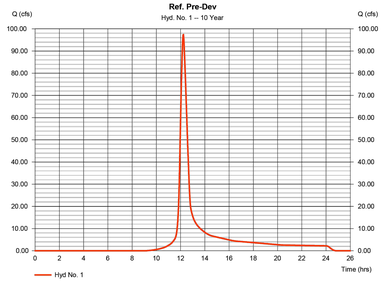
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 1

Ref. Pre-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 97.43 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 425,878 cuft
Drainage area	= 49.850 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.00 min
Total precip.	= 4.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



PRE-DEVELOPMENT AREA 100-YEAR STORM

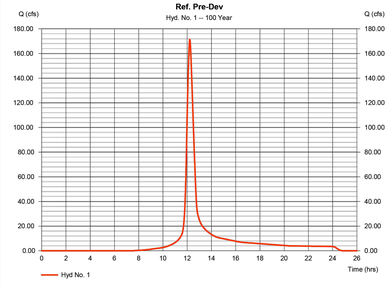
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 1

Ref. Pre-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 171.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.20 hrs
Time interval	= 2 min	Hyd. volume	= 740,577 cuft
Drainage area	= 49.850 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.00 min
Total precip.	= 7.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



POST-DEVELOPMENT AREA 1-YEAR STORM

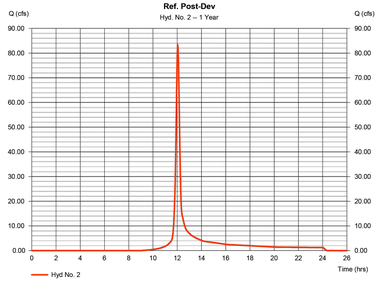
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 2

Ref. Post-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 83.39 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 234,611 cuft
Drainage area	= 56.250 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 2.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



POST-DEVELOPMENT AREA 2-YEAR STORM

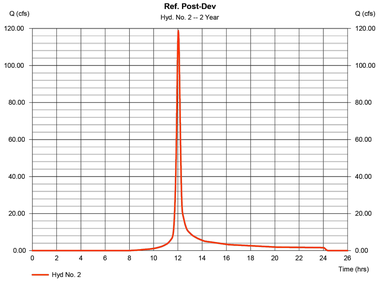
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 2

Ref. Post-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 118.80 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 332,984 cuft
Drainage area	= 56.250 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



POST-DEVELOPMENT AREA 10-YEAR STORM

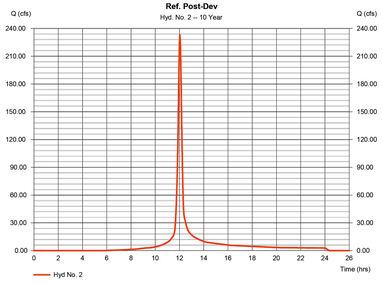
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 2

Ref. Post-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 233.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 661,327 cuft
Drainage area	= 56.250 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



POST-DEVELOPMENT AREA 100-YEAR STORM

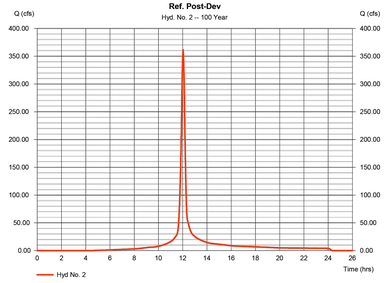
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 2

Ref. Post-Dev

Hydrograph type	= SCS Runoff	Peak discharge	= 361.65 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 1,045,696 cuft
Drainage area	= 56.250 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



On-site Target Release Flows for Stormwater Design in Karst Area					SWM Pond	
Storm Event	Pre-Dev Peak Discharge (cfs)	100% Karst Reduction Factor	Target Discharge (cfs)	Post-Dev Peak Discharge (cfs)	WSEL (ft)	Storage Volume (cu-ft)
1 YR	21.96	0.33	7.25	2.051	516.59	160,691
2 YR	38.16	0.33	12.59	6.476	517.26	199,126
10 YR	97.43	0.43	41.89	38.02	519.53	344,774
100 YR	171.34	0.50	85.67	78.53	521.96	530,968

NOTE: DUE TO THE KARST TERRAIN, POST-DEVELOPMENT PEAK DISCHARGES ARE FURTHER REDUCED BY KARST FACTORS (0.33, 0.33, 0.43, 0.50) FROM THE COMPUTED PRE-DEVELOPMENT PEAK DISCHARGE RATES.

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS
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410-515-9000
MRAGTA.COM

JON K. ERICKSON — REGISTERED — 16052 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO, 20684, EXPIRATION DATE: 12/31/2026.

DATE	REVISION	REV NO.

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: N/A	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:

SHEET: 24 OF 29

SHEET TITLE

SWM - POND DESIGN

SHEET NUMBER

24

POND SUMMARY (1-YEAR STORM)

Hydrograph Report

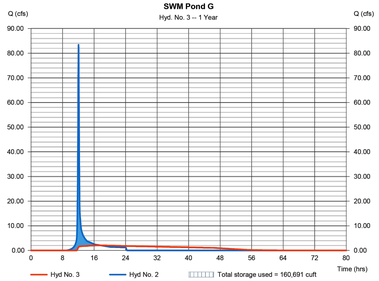
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 3

SWM Pond G

Hydrograph type	= Reservoir	Peak discharge	= 2.051 cfs
Storm frequency	= 1 yrs	Time to peak	= 17.70 hrs
Time interval	= 2 min	Hyd. volume	= 226,540 cuft
Inflow hyd. No.	= 2 - Ref. Post-Dev	Max. Elevation	= 516.59 ft
Reservoir name	= Pond G	Max. Storage	= 160,691 cuft

Storage Indication method used.



POND SUMMARY (2-YEAR STORM)

Hydrograph Report

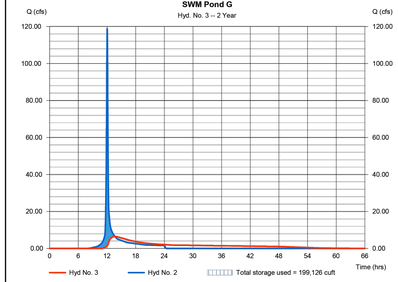
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 3

SWM Pond G

Hydrograph type	= Reservoir	Peak discharge	= 6.476 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.67 hrs
Time interval	= 2 min	Hyd. volume	= 324,842 cuft
Inflow hyd. No.	= 2 - Ref. Post-Dev	Max. Elevation	= 517.26 ft
Reservoir name	= Pond G	Max. Storage	= 199,126 cuft

Storage Indication method used.



POND SUMMARY (10-YEAR STORM)

Hydrograph Report

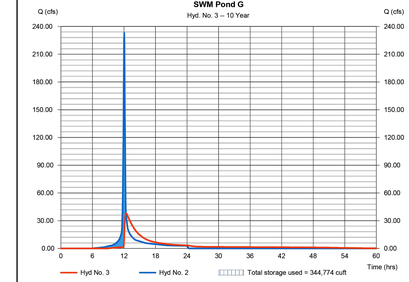
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 3

SWM Pond G

Hydrograph type	= Reservoir	Peak discharge	= 38.02 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.37 hrs
Time interval	= 2 min	Hyd. volume	= 653,120 cuft
Inflow hyd. No.	= 2 - Ref. Post-Dev	Max. Elevation	= 519.53 ft
Reservoir name	= Pond G	Max. Storage	= 344,774 cuft

Storage Indication method used.



POND SUMMARY (100-YEAR STORM)

Hydrograph Report

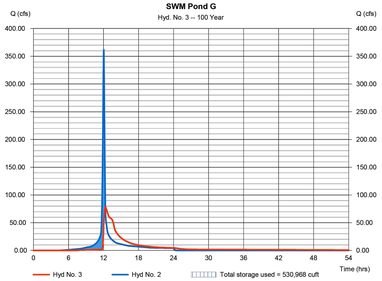
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Hyd. No. 3

SWM Pond G

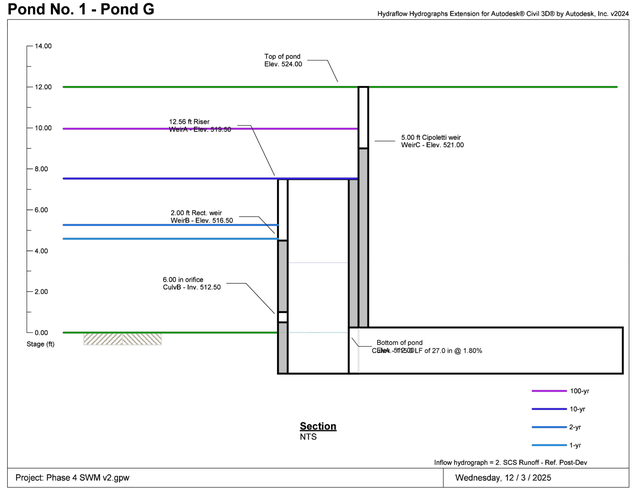
Hydrograph type	= Reservoir	Peak discharge	= 78.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.30 hrs
Time interval	= 2 min	Hyd. volume	= 1,037,453 cuft
Inflow hyd. No.	= 2 - Ref. Post-Dev	Max. Elevation	= 521.96 ft
Reservoir name	= Pond G	Max. Storage	= 530,968 cuft

Storage Indication method used.



Pond No. 1 - Pond G

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024



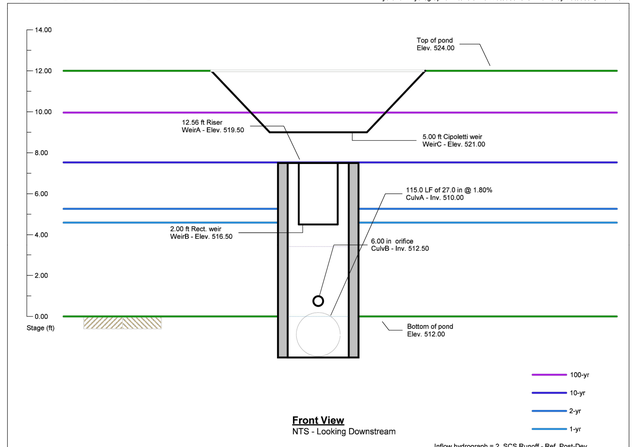
Section
NTS

Inflow hydrograph = 2. SCS Runoff - Ref. Post-Dev

Project: Phase 4 SWM v2.gpw | Wednesday, 12 / 3 / 2025

Pond No. 1 - Pond G

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024



Front View
NTS - Looking Downstream

Inflow hydrograph = 2. SCS Runoff - Ref. Post-Dev

Project: Phase 4 SWM v2.gpw | Wednesday, 12 / 3 / 2025

STAGE-STORAGE & DISCHARGE

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Pond No. 1 - Pond G

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 512.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	512.00	1,651	0	0
2.00	514.00	41,408	34,215	34,215
4.00	516.00	51,740	92,947	127,162
6.00	518.00	62,353	113,917	241,079
8.00	520.00	73,248	135,441	376,520
10.00	522.00	84,424	157,524	534,044
12.00	524.00	95,881	180,166	714,210

Culvert / Orifice Structures

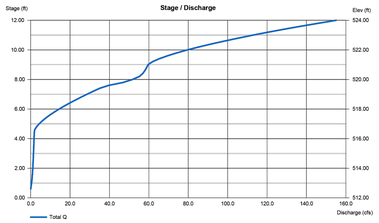
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 27.00	6.00	0.00	0.00
Span (in)	= 27.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 510.00	512.50	0.00	0.00
Length (ft)	= 115.00	0.00	0.00	0.00
Slope (%)	= 1.80	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	2.00	5.00	0.00
Crest El. (ft)	= 519.50	516.50	521.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	Cipltl	---
Multi-Stage	= Yes	Yes	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).



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024 — Wednesday, 12 / 3 / 2025

Pond No. 1 - Pond G

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 512.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	512.00	1,651	0	0
2.00	514.00	41,408	34,215	34,215
4.00	516.00	51,740	92,947	127,162
6.00	518.00	62,353	113,917	241,079
8.00	520.00	73,248	135,441	376,520
10.00	522.00	84,424	157,524	534,044
12.00	524.00	95,881	180,166	714,210

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 27.00	6.00	0.00	0.00
Span (in)	= 27.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 510.00	512.50	0.00	0.00
Length (ft)	= 115.00	0.00	0.00	0.00
Slope (%)	= 1.80	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	2.00	5.00	0.00
Crest El. (ft)	= 519.50	516.50	521.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	Cipltl	---
Multi-Stage	= Yes	Yes	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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	512.00	0.00	0.00	---	---	0.00	0.00	0.00	---	---	---	0.000
0.20	3,421	512.20	18.00 ic	0.00	---	---	0.00	0.00	0.00	---	---	---	0.000
0.40	6,843	512.40	18.00 ic	0.00	---	---	0.00	0.00	0.00	---	---	---	0.000
0.60	10,264	512.60	18.00 ic	0.03 ic	---	---	0.00	0.00	0.00	---	---	---	0.031
0.80	13,686	512.80	18.00 ic	0.13 ic	---	---	0.00	0.00	0.00	---	---	---	0.131
1.00	17,107	513.00	18.00 ic	0.47 ic	---	---	0.00	0.00	0.00	---	---	---	0.473
1.20	20,529	513.20	18.00 ic	0.63 ic	---	---	0.00	0.00	0.00	---	---	---	0.634
1.40	23,950	513.40	18.00 ic	0.76 ic	---	---	0.00	0.00	0.00	---	---	---	0.762
1.60	27,372	513.60	18.00 ic	0.87 ic	---	---	0.00	0.00	0.00	---	---	---	0.872
1.80	30,793	513.80	18.00 ic	0.97 ic	---	---	0.00	0.00	0.00	---	---	---	0.969
2.00	34,215	514.00	18.00 ic	1.06 ic	---	---	0.00	0.00	0.00	---	---	---	1.057
2.20	48,554	514.20	18.00 ic	1.14 ic	---	---	0.00	0.00	0.00	---	---	---	1.142
2.40	52,904	514.40	18.00 ic	1.21 ic	---	---	0.00	0.00	0.00	---	---	---	1.214
2.60	62,099	514.60	18.00 ic	1.29 ic	---	---	0.00	0.00	0.00	---	---	---	1.286
2.80	71,394	514.80	18.00 ic	1.35 ic	---	---	0.00	0.00	0.00	---	---	---	1.353
3.00	80,688	515.00	18.00 ic	1.42 ic	---	---	0.00	0.00	0.00	---	---	---	1.418
3.20	89,983	515.20	18.00 ic	1.48 ic	---	---	0.00	0.00	0.00	---	---	---	1.480
3.40	99,278	515.40	18.00 ic	1.54 ic	---	---	0.00	0.00	0.00	---	---	---	1.539
3.60	108,573	515.60	18.00 ic	1.60 ic	---	---	0.00	0.00	0.00	---	---	---	1.596
3.80	117,867	515.80	18.00 ic	1.65 ic	---	---	0.00	0.00	0.00	---	---	---	1.651
4.00	127,162	516.00	18.00 ic	1.70 ic	---	---	0.00	0.00	0.00	---	---	---	1.704
4.20	138,554	516.20	18.00 ic	1.76 ic	---	---	0.00	0.00	0.00	---	---	---	1.756
4.40	149,945	516.40	18.00 ic	1.81 ic	---	---	0.00	0.00	0.00	---	---	---	1.806
4.60	161,337	516.60	18.00 ic	1.85 ic	---	---	0.00	0.21	0.00	---	---	---	2.065
4.80	172,729	516.80	18.00 ic	1.90 ic	---	---	0.00	1.09	0.00	---	---	---	2.997
5.00	184,120	517.00	18.00 ic	1.95 ic	---	---	0.00	2.36	0.00	---	---	---	4.304
5.20	195,512	517.20	18.00 ic	1.99 ic	---	---	0.00	3.90	0.00	---	---	---	5.895
5.40	206,904	517.40	18.00 ic	2.04 ic	---	---	0.00	5.68	0.00	---	---	---	7.721
5.60	218,295	517.60	18.00 ic	2.08 ic	---	---	0.00	7.68	0.00	---	---	---	9.766
5.80	229,687	517.80	18.00 ic	2.12 ic	---	---	0.00	9.87	0.00	---	---	---	12.00
6.00	241,079	518.00	18.00 ic	2.17 ic	---	---	0.00	12.24	0.00	---	---	---	14.40
6.20	254,623	518.20	18.00 ic	2.21 ic	---	---	0.00	14.76	0.00	---	---	---	16.97
6.40	268,167	518.40	19.70 ic	2.25 ic	---	---	0.00	17.44	0.00	---	---	---	19.69
6.60	281,711	518.60	22.55 ic	2.29 ic	---	---	0.00	20.27	0.00	---	---	---	22.55
6.80	295,255	518.80	25.53 ic	2.30 ic	---	---	0.00	23.23	0.00	---	---	---	25.53
7.00	308,799	519.00	28.57 ic	2.25 ic	---	---	0.00	26.33	0.00	---	---	---	28.57

Continues on next page...

Pond G

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
7.20	322,343	519.20	31.73 ic	2.18 ic	---	---	0.00	29.55	0.00	---	---	---	31.73
7.40	335,888	519.40	34.99 ic	2.10 ic	---	---	0.00	32.89	0.00	---	---	---	34.99
7.60	349,432	519.60	39.61 ic	1.94 ic	---	---	1.32	36.35	0.00	---	---	---	39.61
7.80	362,976	519.80	46.97 ic	1.54 ic	---	---	6.88	38.56 s	0.00	---	---	---	46.97
8.00	376,520	520.00	51.69 ic	1.19 ic	---	---	14.79	35.71 s	0.00	---	---	---	51.69
8.20	392,272	520.20	55.13 ic	0.84 ic	---	---	24.50	29.79 s	0.00	---	---	---	55.13
8.40	408,025	520.40	56.85 ic	0.64 ic	---	---	30.29 s	25.92 s	0.00	---	---	---	56.85
8.60	423,777	520.60	57.95 ic	0.53 ic	---	---	33.66 s	23.76 s	0.00	---	---	---	57.95
8.80	439,530	520.80	58.85 ic	0.43 ic	---	---	36.23 s	22.17 s	0.00	---	---	---	58.84
9.00	455,282	521.00	59.64 ic	0.39 ic	---	---	38.31 s	20.50 s	0.00	---	---	---	59.63
9.20	471,034	521.20	60.36 ic	0.34 ic	---	---	40.09 s	19.93 s	1.49	---	---	---	61.85
9.40	486,787	521.40	61.05 ic	0.30 ic	---	---	41.61 s	19.12 s	4.21	---	---	---	65.25
9.60	502,539	521.60	61.70 ic	0.27 ic	---	---	42.98 s	18.45 s	7.74	---	---	---	69.44
9.80	518,292	521.80	62.34 ic	0.25 ic	---	---	44.20 s	17.88 s	11.92	---	---	---	74.24
10.00	534,044	522.00	62.96 ic	0.23 ic	---	---	45.29 s	17.39 s	16.65	---	---	---	79.57
10.20	552,061	522.20	63.56 ic	0.21 ic	---	---	46.32 s	16.99 s	21.89	---	---	---	85.41
10.40	570,077	522.40	64.16 ic	0.19 ic	---	---	47.30 s	16.64 s	27.38	---	---	---	91.71
10.60	588,093	522.60	64.74 ic	0.18 ic	---	---	48.24 s	16.34 s	33.06	---	---	---	98.51
10.80	606,110	522.80	65.32 ic	0.17 ic	---	---	49.04 s	16.06 s	40.21	---	---	---	105.48
11.00	624,127	523.00	65.89 ic	0.16 ic	---	---	49.86 s	15.84 s	47.10	---	---	---	112.96
11.20	642,143	523.20	66.45 ic	0.15 ic	---	---	50.60 s	15.62 s	54.33	---	---	---	120.70
11.40	660,160	523.40	67.01 ic	0.14 ic	---	---	51.32 s	15.44 s	61.91	---	---	---	128.81
11.60	678,177	523.60	67.56 ic	0.13 ic	---	---	52.02 s	15.25 s	69.91	---	---	---	137.24
11.80	696,193	523.80	68.10 ic	0.13 ic	---	---	52.75 s	15.16 s	78.01	---	---	---	146.05
12.00	714,210	524.00	68.64 ic	0.12 ic	---	---	53.46 s	15.03 s	86.52	---	---	---	155.06

...End

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

3445 BOX HILL CORPORATE CENTER DR
SUITE A
ABINGDON, MD 21009
410-515-9000

MRAGTA.COM

JON E. ERICKSON — REGISTERED — 16052 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO, 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

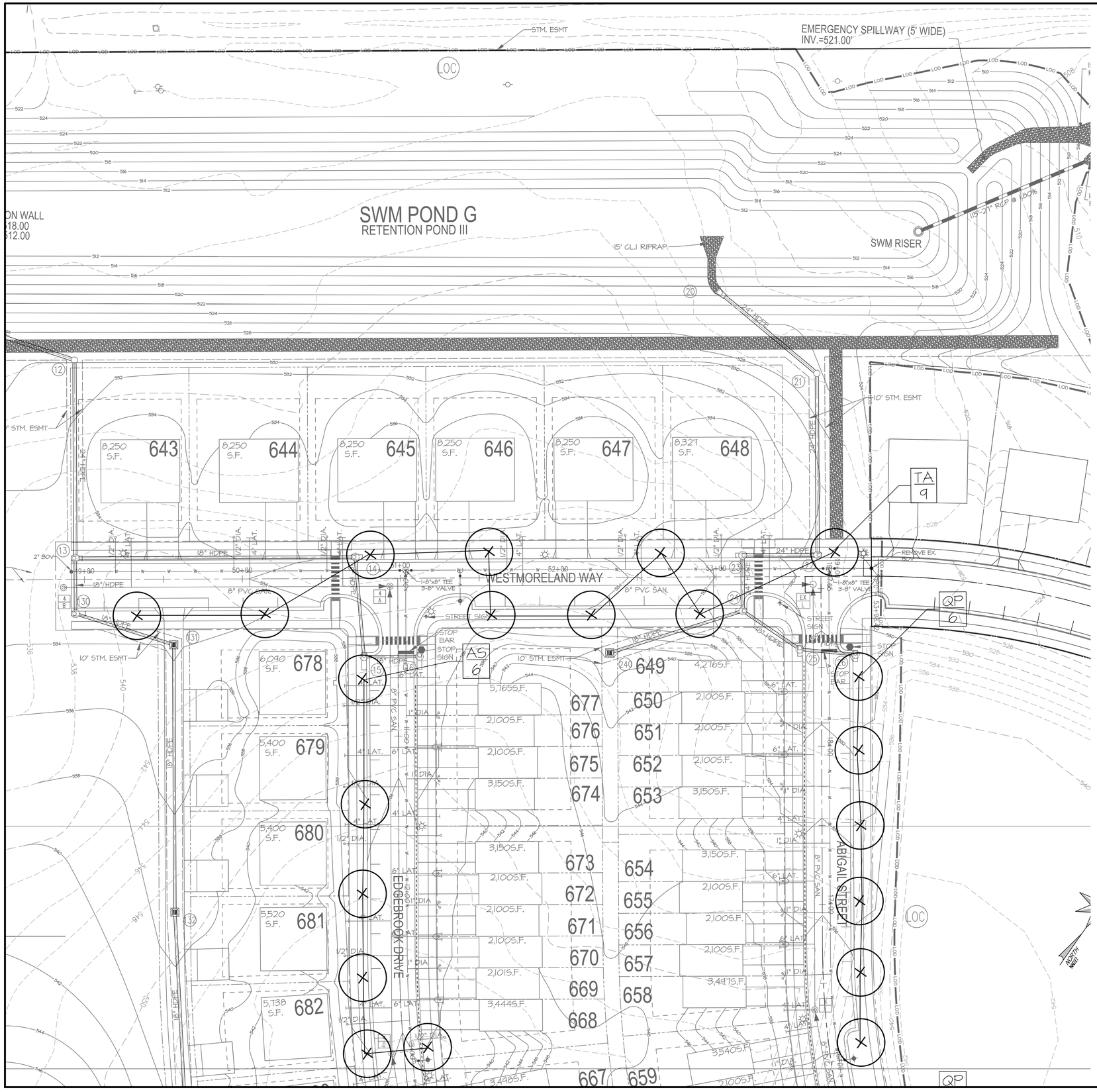
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: N/A	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 25 OF 29	

SHEET TITLE

SWM - HYDROGRAPHS

SHEET NUMBER

25



STREET TREE AND LANDSCAPE PLANTING LIST

Acer rubrum 'October Glory' – October Glory' Red Maple	(AR)	(QUANTITY = 8)
Amelanchier spp. – Serviceberry	(AS)	(QUANTITY = 9)
Plantanus x acerfolia 'Bloodgood' – Bloodgood London Plane	(PA)	(QUANTITY = N/A)
Quercus phellos – Willow Oak	(QP)	(QUANTITY = 7)
Tilia americana – American Linden	(TA)	(QUANTITY = 9)

SHRUBS
- Clethra alnifloia – Summersweet hummingbird (CA)
- Forthergilla gardeni – Fothergilla (FG)
- Ilex glabra – 'Shamrock' Inkberry (IGS)
- Rhus aromatica – Gro–Low Sumac (ROG)

LANDSCAPE CALCULATIONS

Non–Impervious Areas

Area from property lines to edge of sidewalk:	0.07
Area from edge of sidewalk to edge of roads:	0.48
	0.55 Acres

Area for Landscaping Computations	0.55 Acres
	23,958 Sq.Ft.

Landscape Requirements:

Trees – 1 per 2000 Sq.Ft	=	12 Trees
Shrubs – 3 per 2000 Sq.Ft.	=	36 Shrubs

Landscape Provided:

	33 Trees
See note 6 in General Notes.	36 Shrubs

GENERAL NOTES FOR LANDSCAPING
1. LANDSCAPING FOR ALL ROADS STUBBED OUT FOR FUTURE EXPANSION TO BE PROVIDED WITH FUTURE PLANS.
2. AT THE TIME OF PLANTING, ALL TREES MUST BE A MINIMUM OF 8' IN HEIGHT AND 2.5" IN CALIBER.
3. TREES TO BE PLANTED IN A UNIFORM MANNER SUCH THAT EACH STREET CONTAINS TREES OF A SINGLE SPECIES SELECTED FROM THE TABLE PROVIDE ABOVE.
4. THIS LANDSCAPE PLAN IS DESIGNED TO BE A PRELIMINARY PLAN FOR LANDSCAPE ARCHITECTS TO IMPROVE UPON.
5. ALL OPEN SPACE AREAS SHOWN ARE TO BE COVERED WITH GRASS. HOWEVER, THIS LANDSCAPE PLAN IS A PRELIMINARY PLAN (SEE NOTE 4). OTHER GROUND COVERING MAY BE SUBSTITUTED UPON FINAL DESIGN OF THE LANDSCAPE PLAN BY THE LANDSCAPE ARCHITECT. HOWEVER, THE GROUND COVERING MUST BE APPROVED BY THE CITY OF CHARLES TOWN PRIOR TO PLANTING.
6. SHRUBS TO BE PROVIDED IN INTERIOR LOT SPACE PER AGREEMENT WITH THE CITY OF CHARLES TOWN

30 0 30 60 90
Scale 1" = 30'

MRA
MORRIS & RITCHIE ASSOCIATES, INC.
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JON E. ERICKSON REGISTERED 16052 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
12/10/2025

WV PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO, 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4
CONSTRUCTION DRAWINGS
CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 27 OF 29	

SHEET TITLE
LANDSCAPE PLAN

SHEET NUMBER
27

MATCHLINE

Scale 1" = 30'

EDGEBROOK DRIVE

ABIGAIL STREET

ALLEY 3A36

BRANDYWINE STREET

ALLEY 3B34

ACCESS ESMT.

25' OVERBLAST

STOP SIGN

REMOVE EX. BOV

680 5,400 S.F.
681 5,520 S.F.
682 5,138 S.F.
683 5,131 S.F.
684 5,138 S.F.
685 6,154 S.F.
673 3,150 S.F.
672 2,100 S.F.
671 2,100 S.F.
670 2,100 S.F.
669 2,101 S.F.
668 3,444 S.F.
654 3,150 S.F.
655 2,100 S.F.
656 2,100 S.F.
657 2,100 S.F.
658 3,497 S.F.
667 3,498 S.F.
666 2,100 S.F.
665 2,100 S.F.
664 2,101 S.F.
663 4,139 S.F.
659 3,540 S.F.
660 2,100 S.F.
661 2,100 S.F.
662 4,011 S.F.
854 6,843 S.F.
855 6,388 S.F.
856 6,283 S.F.
857 5,591 S.F.

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

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JON K. ERICKSON
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO, 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

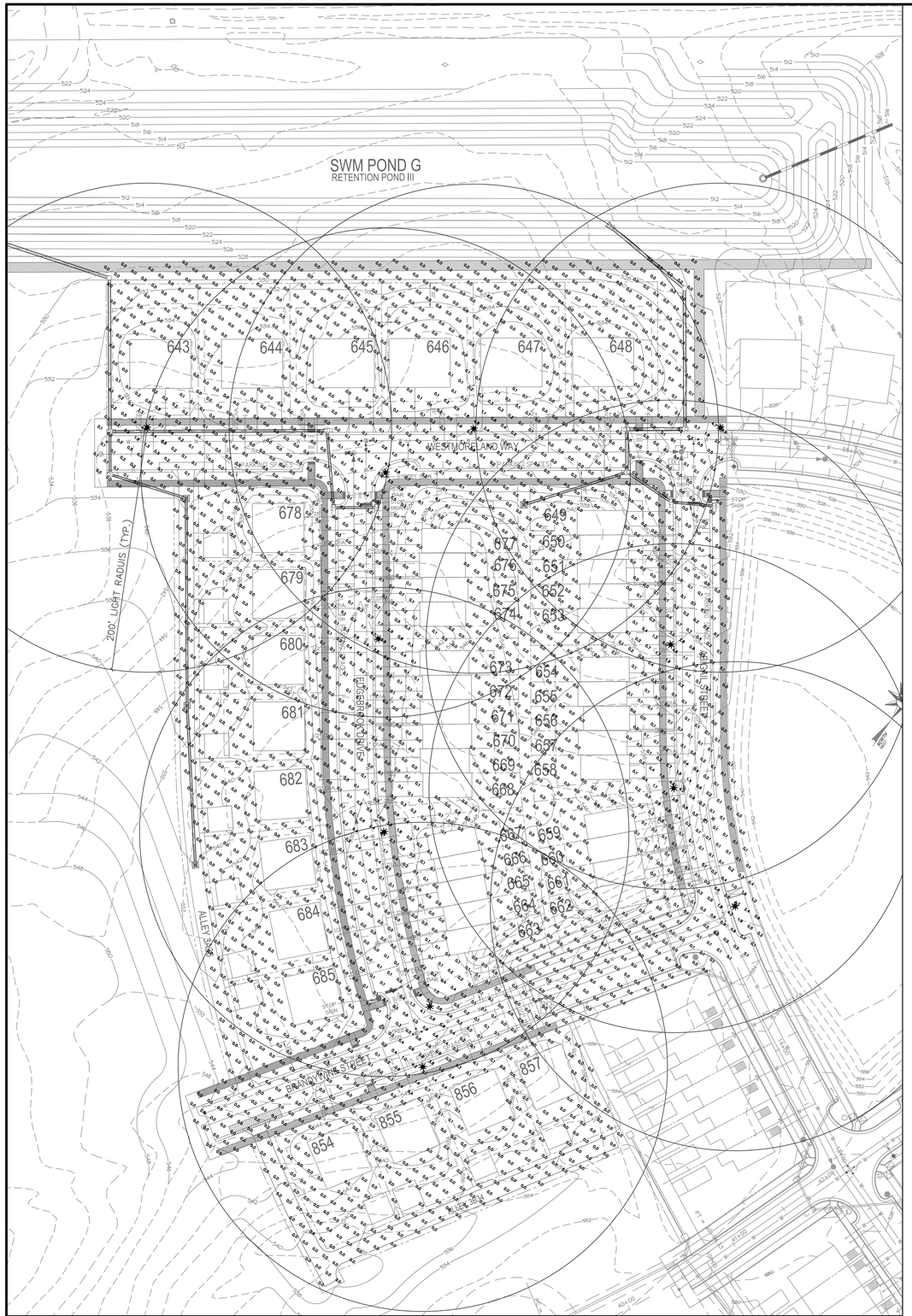
JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=30'	DESIGN BY: JWJ
DATE: 07/01/25	REVIEW BY:
SHEET: 28 OF 29	

SHEET TITLE

LANDSCAPE PLAN

SHEET NUMBER

28



50 0 50 100 150

Scale 1" = 50'

Project		Catalog #	Type
Prepared by		Notes	Date



Streetworks

ULA Utility LED Acorn

Decorative Post Top Luminaire

Product Features

Product Certifications

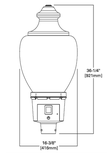
Interactive Menu

- Ordering Information page 2
- Product Specifications page 2
- Energy and Performance Data page 3

Quick Facts

- Traditional acorn decorative form factor
- Up to 156 lumens per watt
- Replaces up to 100W equivalent HID
- Tool-less entry for easy installation and maintenance
- Two levels of 10kV surge protection available

Dimensional Details



Connected Systems

- WaveLinx

Streetworks ULA UTILITY LED ACORN

Ordering Information

SAMPLE ORDER NUMBER: ULA-A-S-D-U-ASYM-VM-9-7030-4N7-10MSP-W-BK

Product Family *	Light Engine	Driver	Voltage	Distribution	Globe
ULA=ULU LED Acorn **BAA-ULA**=Utility LED Acorn Buy American Act Compliant * **TAA-ULA**=Utility LED Acorn Trade Agreements Act Compliant *	**A1** **A2** **A3** **A4** **A5** **A6** **A7** **A8** **A9**	**D**=Dimming **SLTB**=SiNU	**U**=Universal(120-277V)	**SYM**=Symmetric **ASYM**=Asymmetric	**VM**=Virtual Comfort	Milky Globe, 9" Neck **VM-S**=Virtual Comfort	Milky Globe, 9" Neck

Options (Add as Suffix)	Color	Accessories (Order Separately) *
7030=7K CRI / 3000K * **7021**=7K CRI / 2700K * **A**=ANSI Photocontrol Receptacle (Internal Mount) * **NA**=NEMA Photocontrol Receptacle (Internal Mount) * **FADC**=Field Adjustable Dimming Controller * **10K**=10kV LE 1440 Surge Protective Device **SPD**=Separate 10kV Surge Protective Device **MPC-NEMA**=NEMA Photocontrol - Multi-Tap **PBC**=Photocontrol Shorting Cap * **SC**=Sensor Side Shield 180 Degree Cutoff * **RDD**=Round Decal **Mounting**=Arm **ARM-ULA**=Internal 3F/BM/U1 * **Xxxxxx**=DOT Configuration - Contact Quotes Team **Xxxxxx**=Utility Configuration - Contact Quotes Team	**AP**=Grey **BK**=Black **BZ**=Bronze **DB**=Dark Bronze **GN**=Green	**GALWAN**=NEMA Photocontrol - Multi-Tap **GALWANSP**=Photocontrol Shorting Cap **GAT22**=15kV/10kA UL 1449 Surge Module Replacement **ULA-HS**=Internal Hood Side Shield 180 Degree Cutoff *

NOTES

1. Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper "WPO1002EN for additional support information.
2. Can be ordered EXTRA for vertical CCTs and CRIs when performing layouts. These files are published at the Utility LED Acorn luminaire product page on the website.
3. Total height of photocontrols nodes cannot exceed 4.5".
4. Not available with 480V operation.
5. Not available with 4A light engine.
6. For use with third party control systems when NEMA is required.
7. Luminaires are assembled and tested to ANSI standards and are built to be compliant with the Buy American Act of 1933 (BAA) or Trade Agreements Act of 1979 (TAA), respectively. Please refer to CSGGLOTRADEPOLICY02 of terms.
8. Accessories sold separately will be ordered ship-kit unit. Contact factory for more information. Compliance to stated standards may be impacted by accessory and other domestic preference requirements. Consult factory for further information.
9. Cannot be used with MPC-NEMA or NEMA Photocontrol Receptacle options.
10. Cannot be used with MPC other motion response control options or ELCY-DALI.
11. Controls system is not available with photosensitive receptacles (PR, PR1) or other controls systems (1A10, SYNA).

Specifications Features

Construction
- Heavy-duty cast aluminum housing and removable door. A single quarter turn fastener on the removable door provides tool-less access to wiring compartment.

Optics
- CLOSE 9" Visual Comfort textured acrylic globe is standard. Available in asymmetric or symmetric distributions. Offered standard in 4000K CCT and minimum 70 CRI.

Electrical
- 120-277VAC 50/60Hz operation.
- 10kV/10kA common- and differential mode surge protection available. Thermal management transfers heat rapidly away from the LED source for optimal efficiency and light output. Ambient operating temperature from -40°C to 40°C. Standard
- Three-position tunnel type compression terminal block.
- Luminaire available with the field adjustable dimming controller (FADC) to manually adjust wattage and reduce the total lumen output and light levels. Comes pre-set to the highest position at the lumen output selected

Controls
- 0-10V dimming driver standard. Photocontrol and After Hours Dim accessories available. Refer to controls options chart.
- Luminaire available with the field adjustable dimming controller (FADC) to manually adjust wattage and reduce the total lumen output and light levels. Comes pre-set to the highest position at the lumen output selected.

Mounting
- Pivot top-mount fits 3" O.D. tenon. Secured by square head 3/8" stainless steel mounting bolts.

Energy Data
Electronic LED Driver
- >0.9 Power Factor
- <20% Total Harmonic Distortion
- 120-277V 50/60Hz
- -30°C Minimum Temperature
- 40°C Ambient Temperature Rating

Certification
- Heights 12 ft and greater
- Options to meet Buy American and other domestic preference requirements.

Shipping Data & EPA
- Approximate Net Wt. 16 lbs. (7.3 kgs.)
- Effective Projected Area: (Sq. Ft.) 1.72

Warranty
- Five-year limited warranty. Consult website for details. www.cooperlighting.com/legal

Streetworks ULA UTILITY LED ACORN

Energy and Performance Data

Power and Lumens

Light Engine		A3	A4	A5	A6	A7	A8	A9
Nominal Power (Watts)		21	29	38	44	55	66	71
Wattage Label		20	30	40	45	60	65	70
Current (a) @ 120V		178 mA	244 mA	309 mA	370 mA	482 mA	471 mA	618 mA
Current (a) @ 277V		90 mA	126 mA	159 mA	192 mA	235 mA	240 mA	271 mA
Optics								
SYM	4000K	3,295	4,570	4,998	5,301	7,032	8,423	9,549
	BUG Rating	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3
	3000K	3,193	3,931	4,828	5,746	6,793	8,156	9,234
	BUG Rating	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3
	2700K	3,034	3,735	4,586	5,461	6,453	7,739	8,762
	BUG Rating	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3

Light Engine		A3	A4	A5	A6	A7	A8	A9
Nominal Power (Watts)		21	30	37	46	56	67	71
Wattage Label		20	30	40	50	60	70	70
Current (a) @ 120V		182 mA	250 mA	314 mA	390 mA	476 mA	480 mA	618 mA
Current (a) @ 277V		81 mA	118 mA	144 mA	173 mA	212 mA	214 mA	271 mA
Optics								
ASYM	4000K	3,122	3,898	4,697	5,488	6,367	7,989	8,097
	BUG Rating	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G4	B1-U0-G4
	3000K	3,018	3,734	4,527	5,301	6,140	7,717	8,749
	BUG Rating	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G4	B1-U0-G4
	2700K	2,885	3,548	4,301	5,036	5,833	7,331	8,311
	BUG Rating	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B1-U0-G3	B2-U0-G3

Lumen Maintenance

Light Engine	Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
ULA-A8-D-x-ASYM	40°C	>75%	71,000
ULA-A8-D-x-ASYM	40°C	>85%	139,000

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
10°C	1.02
15°C	1.01
25°C	1.00
40°C	0.99
50°C	0.98

FADC Settings

FADC Position	Lumen Multiplier
1	25%
2	46%
3	55%
4	62%
5	72%
6	77%
7	82%
8	85%
9	90%
10	100%

Note: *=3% typical value

Luxi Flux Area

Huntfield Phase 4

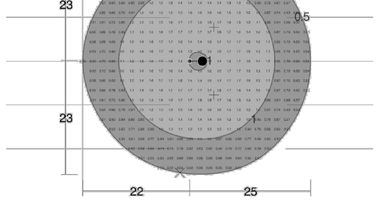
2025-Nov-02
Page 1/1

ULA-A9-D-U-SYM-VMx-BK.IES

COOPER LIGHTING SOLUTIONS - STREETWORKS
(FORMERLY EATON)
ULA-A9-D-U-SYM-VMx-BK
UTILITY LIGHT ACORN TYPE V SYMMETRIC
Single (Arm)

Luminaire Watts	73	W
Ballast/Driver Factor	1.00	
Light Loss Factor	1.00	
Total Proration Factor	1.00	
Luminaire Lumens	8514	lms

12 ft



Min: 0.50 fc
Max/Avg: 1.7

Avg: 1.0 fc
Avg/Min: 2.1

Max: 1.8 fc
Max/Min: 3.6

Version 1.3.0

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HUNTFIELD PHASE 4 PHOTOMETRIC SCHEDULE

AVERAGE FOOT–CANDLES	0.14
MAXIMUM FOOT–CANDLES	5.1
MINIMUM FOOT–CANDLES	0.0
MINIMUM TO MAXIMUM FC RATIO	0.00
MAXIMUM TO MINIMUM FC RATIO	5.15 / 0.00
AVERAGE TO MINIMUM FC RATIO	0.14 / 0.00

Section 1333.14, Lighting Standards

(A) *Public Street Lighting.* Street lights are required for all new Public Streets in accordance with the following standards:

1. Lights shall be provided along all City Streets and shall conform to Article 926, Underground Utilities, of the Charles Town Codified Ordinance.
2. Lights shall be provided at all entrances, intersections, and Cul-de-sacs.
3. Lights shall be spaced no more than two hundred (200) feet apart in residential areas, and no more than three hundred (300) feet apart in non-residential areas.
4. Lights shall use a white metal halide lighting system.
5. Lights shall conform to the power provider's requirements pertaining to watts, lumens, downlight reflectors and residential shields.
6. Lights shall be mounted on flat black poles with acorn style tops, unless otherwise specified by the Planning Commission.
7. Lights proposed within Land Developments and Subdivisions shall be provided without any installation or equipment costs incurred by the City of Charles Town.

MRA

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

3445 BOX HILL CORPORATE CENTER DR
SUITE A
ABINGDON, MD 21009
410-515-9000

MRAGTA.COM

JAY K. ERICKSON
REGISTERED
16052
STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

12/10/2025

WV PROFESSIONAL CERTIFICATION:

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WEST VIRGINIA, LICENSE NO. 20684, EXPIRATION DATE: 12/31/2026.

REV NO.	REVISION	DATE

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HUNTFIELD - PHASE 4

CONSTRUCTION DRAWINGS

CITY OF CHARLES TOWN, WEST VIRGINIA

JOB NO.: 23182	DRAWN BY: JWJ
SCALE: 1"=50'	DESIGN BY: BZ
DATE: 07/01/25	REVIEW BY:
SHEET: 29 OF 29	

SHEET TITLE

PHOTOMETRIC PLAN

SHEET NUMBER

29

Kimley»Horn

Memorandum

To: Jon Erickson, PE
Morris Ritchie & Associates, Inc.
3445 Buck Hill Corporate Center, Suite A
Abingdon, MD 21009

From: Mark Phillips, P.E.
Diego Carreira

Through: James Newman
City of Charles Town
101 E Washington Street
Charles Town, WV 25414

Date: December 12, 2025

Subject: Huntfield – Phase 4 Preliminary Plan Review – 2nd Submission

This memorandum summarizes our review of the Preliminary Plan for the Huntfield Phase 4 Project (dated December 10, 2025, prepared by Morris Ritchie and Associates) for the proposed development of 47 residential lots. The site is currently zoned Neighborhood Residential per the City of Charles Town Zoning Ordinance dated June 18, 2012 (Rev. February 18, 2025).

Kimley-Horn's review of this application is limited to the plan and application provided. Based upon our review, we have no further comments on the materials provided. Thank you for the opportunity to review this Sketch Plan. Please feel free to contact us at 703-870-3631 should you have any questions.

KIMLEY-HORN & ASSOCIATES, INC.

Mark Phillips, P.E.
Project Manager, Associate

Planning Commission
101 East Washington Street
Charles Town, WV 25414

SCHEDULED

Meeting: 12/22/25
Department: Planning Commission
Category: Report
Initiator:

AGENDA ITEM (ID #)

Public Hearing: *WV2025-01* - 231 N. Samuel St. - Landscaping waiver

ATTACHMENTS:

- 1. Staff Report.pdf
- 2. Application.pdf
- 3. Plan Set.pdf

Waiver Request
WV2025-01

Date: For the October 27, 2025 Planning Commission meeting
Applicant: US Developers LLC.
Property Owner: Adel Youssef
Report by: James Newman, City Planner, Zoning/Subdivision Administrator
Location: 231 N. Samuel St.



PROJECT OVERVIEW

A waiver from street tree landscaping requirements for a mixed-use development.

The applicant has withdrawn the stormwater waiver request; this waiver is merely for landscaping. The applicant has a new engineer who is working on a rain-garden concept for water control and retention; whether such a system can accommodate all the water on-site is yet to be analyzed. Details will be available at the Preliminary Plan public hearing.

ZONING REVIEW

The property is zoned Old Town Mixed-Use Commercial (OT-MUC). All adjacent properties zoned the same.

COMPREHENSIVE PLAN

The 2040 Comprehensive Plan identifies these parcels as Old Town *Mixed Use Commercial* in both the 10 yr. and 25 yr. future land use maps. The District's purpose is:

*To recognize the diversity of existing Downtown uses and to provide for **a wide range of residential and commercial office, restaurant, hospitality, and retail services** within in the Downtown. This land use designation intends to **strengthen** Charles Town's **urban core**, contribute to its historic character, **minimize impacts on adjacent land uses, and be well connected to existing and future land use**s located within the Urban Growth Boundary. Downtown Charles Town is **characterized by typical main street components** found in the Old Town Mixed Use Commercial land use.*

The proposed use of the property is in conformance with the Comprehensive Plan, which calls for:

A. Vertical mixed use, which the applicant proposes to build.
B. Commercial uses of a convenient nature within residential areas, which is met with a mixed-use project.
C. Reduction in traffic congestion by providing residential uses within walking distance of commercial uses.

SITE



View from N. Samuel St.



View from N. Samuel St. entrance



View from alley



View of rear yard from alley

REQUESTED WAIVER:

-Section 1333.16 Landscaping Standards:

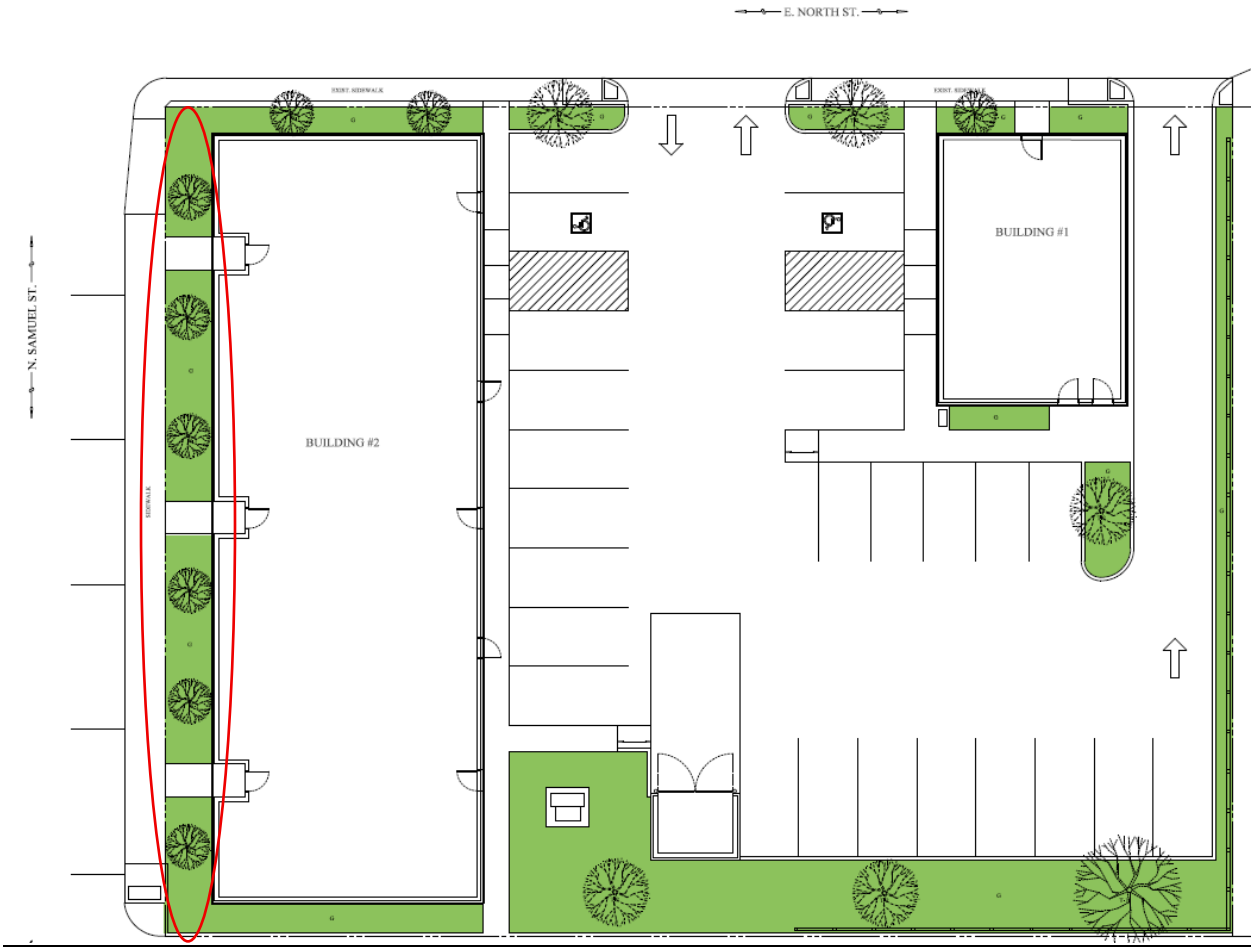
A.2.a. "A minimum of one (1) tree shall be required along every 50 feet of street frontage." The applicant proposes shrubs rather than trees along road frontage due to utility concerns.

Proposed Plant Type:



Source: https://www.saundersbrothers.com/plant/Buxus-microphylla-var-japonica-Green-Beauty

Proposed Location outlined in red circle below:



WAIVER

Adjustments that may be made to the requirements of this Ordinance to unusual site conditions in order to achieve a better design. Waivers may not be used to circumvent the process requirements of this Ordinance. The Planning Commission shall have the authority to grant a waiver to allow a modification, change, or an alternative solution to a requirement of this Ordinance. Please note that economic hardship along is not sufficient reason to grant an exception from the requirements.

REVIEW CRITERIA

Waivers from the minimum standards in this Ordinance may be granted by the Planning Commission only when the Planning Commission finds that granting a waiver will be consistent with all of the following criteria and the exception is the minimum necessary to afford relief:

a. *That the design of the project will provide public benefit such as a reduction in City maintenance cost, greater open space, parkland consistent with the City parks plan, or benefits of a similar nature;*

   The property is underutilized, with the existing pharmacy building occupying approximately 10% of the site and the parking lot covering 32% of the site of a 0.47 acre (20,480 sq. ft.) parcel. The use of the property for apartments and office/retail space along with a new smaller structure for the pharmacy will provide an efficient use of limited space in the urban downtown core of the City.

   The proposed waiver will allow that vision to come to fruition, providing for more life and activity in what is a quasi-industrial area of town. This property is not a greenfield site, but is instead a brownfield location whose owner is looking to make better use of the site by providing housing and commercial space; this provides a financial benefit to the owner while providing the public benefit of additional services and living space for City residents.

b. *The waiver, if granted, will not adversely affect the public health, safety or welfare, or the rights of adjacent property owners or residents;*

   The provision of shrubs rather than full trees will not adversely impact the public health, safety, or welfare, nor adversely affect adjacent property owners.

c. *That the waiver, if granted, will be in keeping with the intent and purpose of this Ordinance; and;*

   The Charles Town Subdivision and Land Development Ordinance is intended to guide future growth and development by regulating the Subdivision and physical Development of land within the jurisdiction of the City of Charles Town for the improvement of the health, safety, comfort, morals, and general public welfare of Charles Town citizens.

   The provision of shrubs rather than trees allows for landscaping along the road while keeping the buried utility lines free of root damage. The proposed shrubbery type (Green Velvet Boxwood – *buxus microphylla*) has a average root depth of 12-18 inches or less, compared to the proposed tree type of American Sycamore, which has an aggressive and deep rooting system; while the other tree type, Flowering Dogwood, has a shallow root depth it is not suitable to the area due to conflict caused by the small distance between the building and sidewalk and the broad expanse occupied by the flowering tree.

d. *That the waiver, if granted, will result in a project of better quality and/or character.*

The property is not at its highest and best use under its current arrangement. The proposed project will bring in some housing and commercial units bringing more life to that area of downtown. Using shrubs rather than full grown trees makes sense for a project with a low setback from roadways and located on a utility easement. The negative impact would be loss of shade from lack of trees on that frontage.

CONCLUSION

The applicant is seeking the following waiver:

1. Use of Street Trees. Applicant proposes smaller shrubs along N. Samuel Street.

The required street tree landscaping along N. Samuel will be located along an electric line easement so the roots must not go too deep.

RECOMMENDATION

Approval.

Waiver Application No._____

RECEIVED
JUL 09 2025
BY: VS

WAIVER APPLICATION

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

FEE: $260

1. SIGNATURES
   This application must be signed by all owners of the real estate which is the subject of the application. The owners may designate one or more professional agents to represent them in the application process using the spaces provided on this form.

2. PERMITS
   Approval of a waiver by the Planning Commission does not relieve the applicant from other requirements including, but not limited to, signs(s), building, zoning and use permits or site plans.

3. PUBLIC HEARING
   A waiver requires a public hearing before the Planning Commission.

Definition of a Waiver

Adjustments that may be made to the requirements of the Subdivision and Land Development Ordinance to unusual site conditions in order to achieve a better design. Waivers may not be used to circumvent the process requirements of the Ordinance.

Criteria

To grant a Waiver as permitted in the Subdivision Ordinance, the Planning Commission makes findings as specified in Section 1331.12(B)(2):

1. That the design of the project will provide public benefit such as a reduction in City maintenance cost, greater open space, parkland consistent with the City parks plan, or benefits of a similar nature;
2. The waiver, if granted, will not adversely affect the public health, safety or welfare, or the rights of adjacent property owners or residents;
3. That the waiver, if granted, will be in keeping with the intent and purpose of this Ordinance; and
4. That the waiver, if granted, will result in a project of better quality and/or character.

Exhibits may be required by the Subdivision Administrator or Planning Commission such as a lot location survey or site plan showing existing and proposed Structures, easements, watercourses, curb cuts and description of the uses of adjacent property that are necessary to describe existing or proposed conditions.

1. DATE 07/02/2025

2. APPLICANT'S NAME* US Devolopers LLC

Address: 231 N Samuel St, Charles Town, WV 25414

Telephone Number (571) 289-5857

Email Address Ay110576@gmail.com

3. PROPERTY OWNER'S NAME Adel Youssef

Address: 6805 Hartwood Ln, Centreville, VA 20121

Telephone Number (571)289-5857

Email Address Ay110576@gmail.com

4. LEGAL DESCRIPTION OF THE SUBJECT PROPERTY (list all parcels that apply)

Property Address: 231 N Samuel St, Charles Town, WV 25414

Tax Map # and Parcel: Parcel ID 19-03-0002-0076-0000 County 19 - Jefferson District 3 - Charles Town Corp Map 0002

Property Area in Square Feet or Acres: 0.48 Acres

5. DESCRIPTION OF THE EXISTING (OR FORMER) USE(S) OF THE PROPERTY AND CURRENT ZONING:

Property Class C - Commercial Land Use 373 - Retail-Single Occupancy

Use Type 83-Multi-Use - Sales, 84-Multi-Use - Storage

6. DESCRIPTION OF PROJECT AND PROPOSED USE(S) OF THE PROPERTY:

Six residential units and four retail spaces.

*Applicants include: Property owner(s), Engineer(s), Surveyor(s), or Consultant(s)

7. DESCRIPTION OF THE WAIVER REQUEST:

Relief from Stormwater requirements

8. LIST THE APPLICABLE SECTION(S) OF THE SUBDIVISION ORDINANCE FROM WHICH THE WAIVER IS REQUESTED:

9. JUSTIFICATION FOR THE REQUEST:

A) Explain how the design of the project will provide public benefit such as a reduction in City maintenance costs, greater open space, parkland consistent with the City Parks Plan or benefits of a similar nature;

B) Explain how the waiver, if granted, will not adversely affect the public health, safety, welfare or the rights of adjacent property owners or residents;

C) Explain how the waiver, if granted, will be in keeping with the intent and purpose of this Ordinance; and;

D) Explain how the waiver, if granted, will result in a project of better quality and/or character.

10. PARCEL HISTORY (List all pending or previously approved applications on the subject parcels inventoried above, including previous site plan applications if this application is a site plan amendment)

Application No.	Project Name and Phase	Status	Approval Date

11. HAS THE PROPERTY BEEN THE SUBJECT OF ANY COURT ACTION?

☑ No

☐ Yes (Please specify nature of all proceedings and current status)

APPLICANT CERTIFICATION

I certify that, to the best of my knowledge, the submitted information and statements are true and correct. I also certify that I have received and read Section 1331.12 of the Charles Town S/LD Ordinance and relevant provisions of the Charles Town City Code.

Signature of Applicant

_____ Date 07/09/2025

Signature of Property Owner (If different than Applicant)

_____ Date _____

Please submit an original completed Application and specified number of Site Plan copies to the following:

Subdivision Administrator
City of Charles Town
101 E. Washington Street
Charles Town, WV 25414

Subdivision Administrator
City of Charles Town
PO BOX 14
Charles Town, WV 25414

FOR CITY USE ONLY

Application Number:_____ Date Application Received:_____

Fee: $_____ Paid:$_____ Check No._____

Receipt No._____

Subdivision Administrator Approval:_____ Date:_____

Planning Commission Approval:_____ Date:_____

Comments/Conditions:_____

_____

_____

_____

_____

_____

PRELIMINARY LAND DEVELOPMENT PLANS

PRELIMINARY PLAT NUMBER: SALD 2025-03

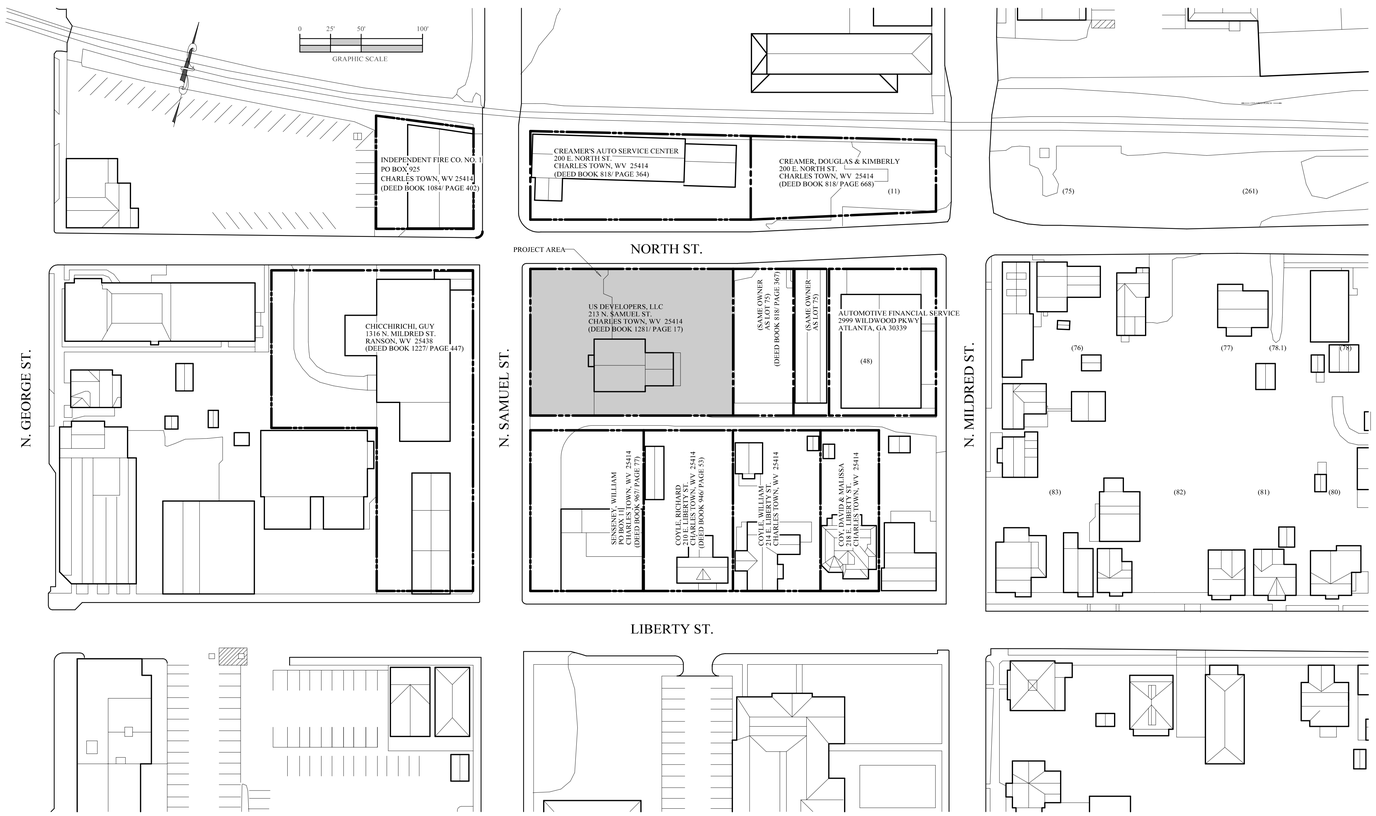
U.S. DEVELOPERS, LLC

231 N. SAMUEL STREET

CHARLES TOWN, WV 25414

VANNOSTRAND ARCHITECTS
29 E. MAIN STREET, STE 4
P.O. BOX 572
BUCKHANNON, WV
304-473-0555 26201

VISCINITY MAP & ADJACENT PARCEL INFORMATION



CITY OF CHARLES TOWN - SIGNATURE BLOCK

THESE PRELIMINARY PLANS WERE APPROVED BY THE CITY OF CHARLES TOWN, ON THE _____ DAY OF _____, 2025, SUBJECT TO ANY CONDITIONS SPECIFIED HEREON.

ALL EXPENSED INCURRED WITH RESPECT TO THE IMPROVEMENTS FOR ALL UTILITY SERVICES, PAVING, GRADING, LANDSCAPING, CURBS, GUTTERS, SIDEWALKS, ROAD LIGHTING, ROAD SIGNS, FLOOD PROTECTION DEVICES, DRAINAGE STRUCTURES AND ALL OTHER IMPROVEMENTS THAT MAY BE REQUIRED SHALL BE THE RESPONSIBILITY OF THE DEVELOPER AND NOT THE CITY.

SIGNED AND DATED BY THE SECRETARY OF THE PLANNING COMMISSION

PLANNING COMMISSION SECRETARY _____

ARCHITECT - SIGNATURE BLOCK

THE ARCHITECT, IN SIGNING THESE PRELIMINARY PLANS, ATTESTS TO THE BEST OF HIS KNOWLEDGE, ARE COMPLETE AND ACCURATE.

ARCHITECT _____ DATE 9/11/2025

OWNER - SIGNATURE BLOCK

THE DEVELOPER, IN SIGNING THESE PRELIMINARY PLANS, AGREES TO ABIDE BY ALL CONDITIONS, TERMS AND SPECIFICATIONS PROVIDED HEREON; AND TO COMPLETE ALL THE IMPROVEMENTS REQUIRED BY THESE PRELIMINARY PLANS.

DEVELOPER _____ DATE 9/11/2025

FLOOD PLAIN REQUIREMENTS

SUBJECT PROPERTY IS NOT LOCATED IN A DESIGNATED FLOOD AREA.

ENVIRONMENTAL PROTECTION REQUIREMENTS

NO WEST VIRGINA DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) PERMITS ARE REQUIRED FOR THE SUBJECT PROPERTY.

WV DIVISION OF HIGHWAYS REQUIREMENTS

NO WEST VIRGINA DIVISION OF HIGHWAYS (DOH) ENTRANCE PERMITS ARE REQUIRED FOR THE SUBJECT PROPERTY.

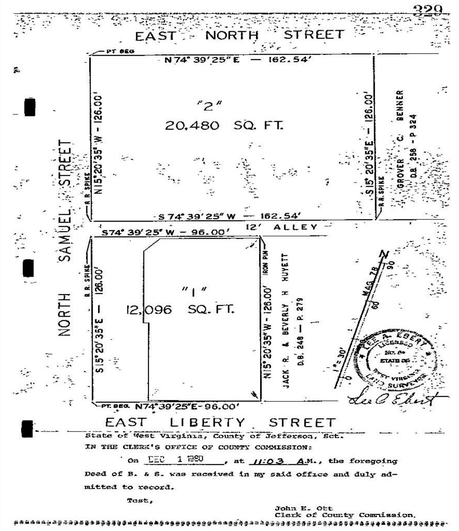
CHARLES TOWN PLANNING COMMISSION - WAIVERS/VARIANCES

REQUEST	ACTION
STORMWATER MANAGEMENT PLAN WAIVER	...

LIST OF DRAWINGS

CIVIL	C.00	COVER SHEET & VICINITY MAP
	C.01	EXISTING SITE PLAN
	C.02	SITE PLAN
	C.03	SITE UTILITY PLAN
	C.04	SITE GRADING PLAN
	C.05	LANDSCAPING PLAN

EXISTING PARCEL SURVEY



YOUSSEF PROPERTIES

213 NORTH SAMUEL STREET

CHARLES TOWN, WV 25414

rev	date	description

STATE OF WEST VIRGINIA — JAMES BRYSON VANNOSTRAND — NO. 3858 — REGISTERED ARCHITECT

job:	24070586
drawn:	DCS
checked:	BVN
date:	9/11/2025
scale:	AS SHOWN

SHEET

C.00

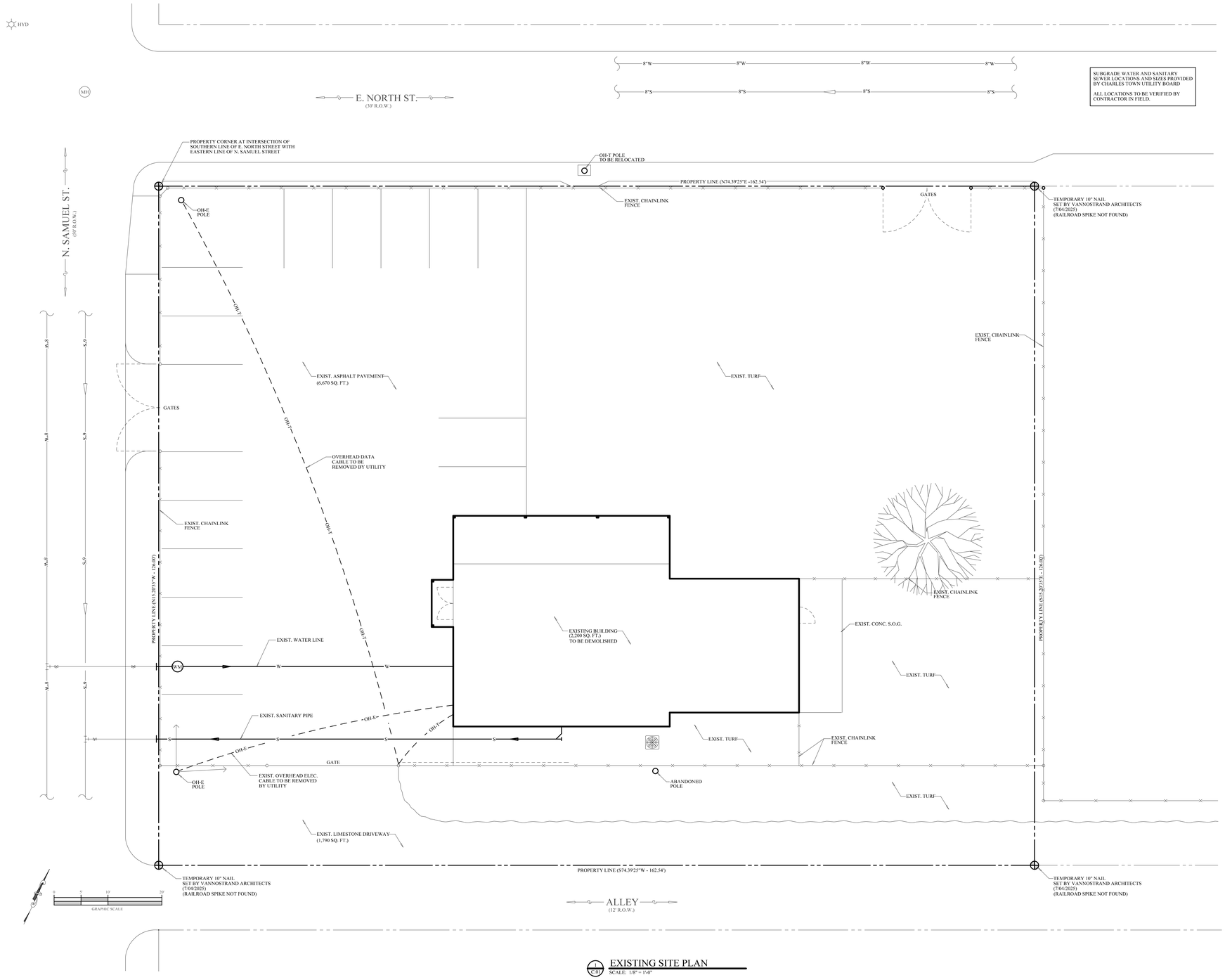
1 OF 6

EXISTING SITE NOTES

1. ALL STRUCTURES WITHIN PROPERTY LINE TO BE REMOVED, INLCUDING PAVEMENT, BUILDING, FENCING AND LANDSCAPING.
2. EXISTING CONCRETE SIDEWALKS AND CURBS OUTSIDE OF THE PROPERTY LINE ARE TO BE REMOVED, WHERE NOTED ON THE PLANS.
3. EXISTING PHARMACY BUILDING TO REMAIN IN OPERATION UNTIL BUILDING #1 IS CONSTRUCTED AND FUNCTIONAL.
4. ...
5. ...
6. ...
7. ...

SITE UTILITY ABBREVIATION LEGEND

W	WATER PIPING
WM	WATER METER
S	SANITARY PIPING
SS	STORMWATER PIPING
DS	DOWNSPOUT
UT	UNDERGROUND VOICE/DATA CONDUIT & CABLE
UE	UNDERGROUND ELECTRICAL CONDUIT & CABLE
OH-T	OVERHEAD VOICE/DATE CABLE
OH-E	OVERHEAD ELECTRICAL CABLE
XMFR	ELECTRICAL TRANSFORMER - PAD MOUNTED



1 C.01 EXISTING SITE PLAN
SCALE: 1/8" = 1'-0"

VANNOSTRAND ARCHITECTS
29 E. MAIN STREET, STE 4
P.O. BOX 572
BUCKHANNON, WV
304-473-0555 26201

YOUSSEF PROPERTIES
213 NORTH SAMUEL STREET
CHARLES TOWN, WV 25414

rev	date	description

STATE OF WEST VIRGINIA
JAMES BRYSON VANNOSTRAND
NO. 3938
REGISTERED ARCHITECT

job:	24070586
drawn:	DCS
checked:	BVN
date:	9/11/2025
scale:	AS SHOWN

SHEET
C.01
2 OF 6

SITE PLAN NOTES

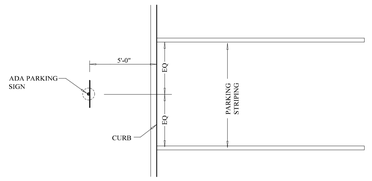
1. RAMP SLOPES SHALL NOT BE STEEPER THAN 1:12 UNLESS OTHERWISE SHOWN OR SPECIFIED.
2. SIDEWALKS THAT TERMINATE AT A VEHICULAR WAY SHALL HAVE A DETECTABLE WARNING SURFACE, 2'-0" WIDE, 6" FROM RAMP EDGES.
3. NORMAL GUTTER FLOW LINE AND PROFILE SHALL BE MAINTAINED THROUGH THE RAMP AREAS, UNLESS NOTED OTHERWISE.
4. ALL PARKING STALL AND LOADING ZONE MARKINGS TO BE 3" WIDE STROKE TRAFFIC PAINT.
5. ALL LAWN AREAS TO BE GRADED SMOOTH, SEEDED, AND MULTCHED WITH STRAW.
6. ALL NEW CONC. SIDEWALKS TO BE 4,000 PSI, BROOM FINISH, 4" THICK W/ 6x6 WWF, OVER 4" STONE. INSTALL CRACK CONTROL JOINTS 6'-0" O.C. (MAX.) AND CONSTRUCTION JOINTS 24'-0" O.C. (MAX.), U.N.O.
7. ALL NEW PAVING TO BE 1 1/2" ASPHALT WEARING COURSE, 2 1/2" BASE COURSE, 2" CRUSHER RUN STONE, 6" #3 LIMESTONE OVER COMPACTED SUBGRADE.
8. CONCRETE DUMPSTER PAD TO BE 4,000 PSI, BROOM FINISH, 6" THICK W/ #4 REBAR, 24" O.C. EA. WAY.
9. REMOVE ALL EXISTING SOIL, CONCRETE, ASPHALT AND OTHER ITEMS AS REQUIRED TO INSTALL NEW SIDEWALKS, VEHICLE PARKING AREAS, STRUCTURES, AND REGRADED LAWNS. LEGALLY DISPOSE OF ALL REMOVED MATERIAL OFF-SITE.
10. STOP SIGN. SEE DRAWING 5/C.02.
11. ...

ZONING

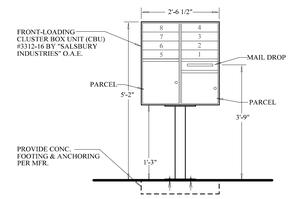
ITEM	DESCRIPTION	VALUE	MINIMUM	REMARKS
ZONE:	OLD TOWN - MIXED USE COMMERCIAL			
SINGLE PARCEL:	162.54' x 126.00'	20,480 SQ.FT.		
BUILDING 1:	FRONT YARD	4'	0'	...
	SIDE YARD	15'	0'	...
BUILDING 2:	FRONT YARD	7'	0'	...
	SIDE YARD	5'	0'	...
MAX. LOT COVERAGE				90.0% OF LOT
PROPOSED LOT COVERAGE				83.6% OF LOT
LOT COVERAGE	BUILDING 1 + 2	6,035 SQ. FT.	...	29.5% OF LOT
IMPERVIOUS SURFACE	WALKS,PARKING & DRIVE LANES	11,079 SQ. FT.	...	54.1% OF LOT
LANDSCAPE:	TURF	3,366 SQ.FT.	...	16.4% OF LOT
FENCE/SCREEN	ALONG ALLEY AT RESIDENTIAL LOTS	...	...	PROVIDED
DUMPSTER	FULL ENCLOSURE	...	...	PROVIDED
MAIL CLUSTER	SHARED FOR BOTH BUILDINGS	...	...	PROVIDED
...	...	...	...	...

PARKING

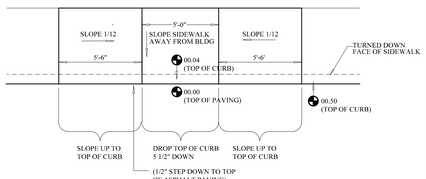
ITEM	DESCRIPTION	VALUE	PARKING FACTOR	PARKING STALLS
ZONE:	OLD TOWN MIXED-USE COMMERCIAL			
SINGLE PARCEL:	162.54' x 126.00'	20,480 SQ.FT.		
BUILDING 1:	1st FLOOR - PHARMACY	937 SQ. FT.	4.9/1,000 SQ.FT.	5
	2nd FLOOR - (2) APARTMENTS	1,200 SQ. FT.	1.2/DWELLING	3
BUILDING 2:	1st FLOOR x (3) GENERAL OFFICE	4,680 SQ.FT.	2.84/1,000 SQ.FT.	14
	2nd FLOOR - (4) APARTMENTS	4,680 SQ.FT.	1.2/DWELLING	5
TOTAL	...	...	...	27 REQUIRED / 26 PROVIDED
	ON-STREET PARKING	4	1/10th OF TOTAL	3
...	...	...	...	29 TOTAL PROVIDED
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...



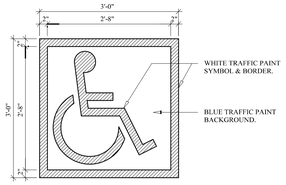
1 / C.02 PARKING STALL
SCALE: NTS



2 / C.02 MAIL PEDISTAL UNIT ELEVATION
N.T.S.

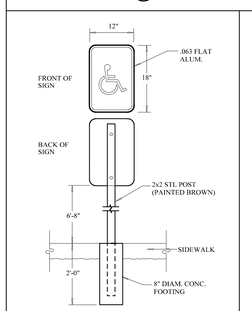


3 / C.02 CURB RAMP PLAN
SCALE: NTS

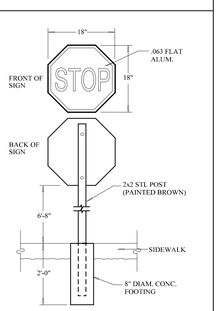


NOTE:
1) ALL STROKES TO BE 2" WIDE.
2) PROVIDE TWO-(2) COATS OF TRAFFIC PAINT.
3) LOCATE SYMBOL AT CENTER OF STALL WHERE SHOWN ON SITE PLAN.

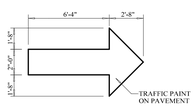
4 / C.02 PAVEMENT SIGN
N.T.S.



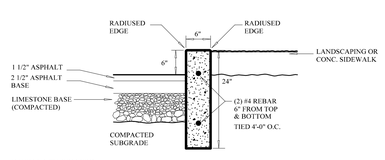
5 / C.02 ADA PARKING SIGN
N.T.S.



6 / C.02 STOP SIGN
N.T.S.

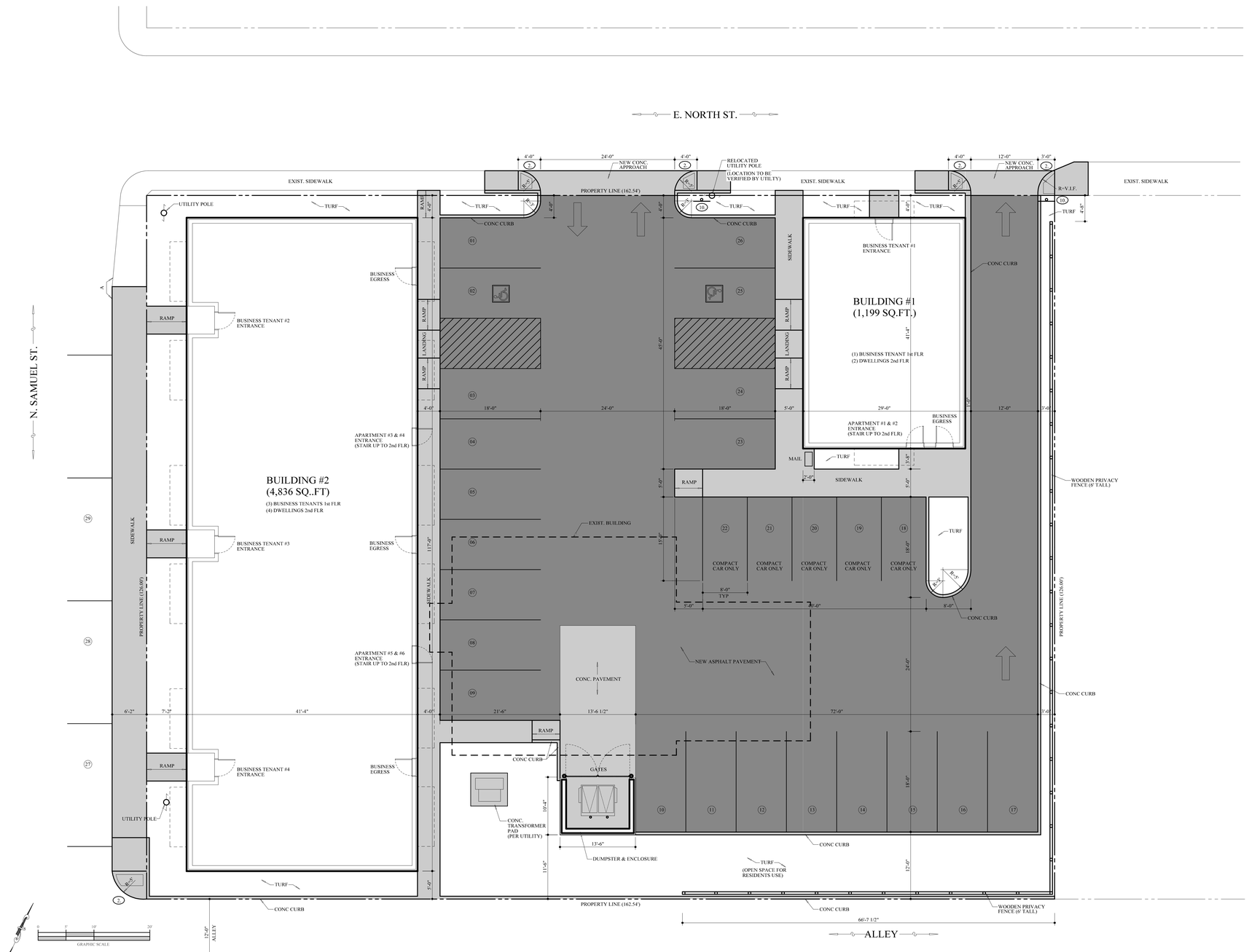


7 / C.02 TRAFFIC FLOW ARROW
SCALE: NTS



INSTALL 1/2" EXPANSION JOINTS EVERY 20'-0" (SEE PLAN FOR LOCATIONS)

8 / C.02 CURB SECTION
N.T.S.



9 / C.02 SITE PLAN
SCALE: 1/8" = 1'-0"

VANNOSTRAND ARCHITECTS
29 E. MAIN STREET, STE 4
P.O. BOX 572
BUCKHANNON, WV
304-473-0555 26201

YOUSSEF PROPERTIES

213 NORTH SAMUEL STREET
CHARLES TOWN, WV 25414

rev	date	description

STATE OF WEST VIRGINIA — JAMES BRYSON VANNOSTRAND — NO. 3986 — REGISTERED ARCHITECT

job:	24070586
drawn:	DCS
checked:	BVN
date:	9/11/2025
scale:	AS SHOWN

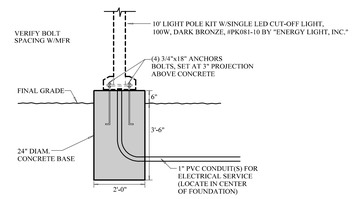
SHEET
C.02
3 OF 6

SITE UTILITY NOTES

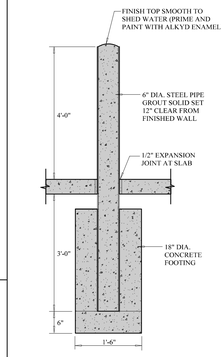
1. NEW DATA SERVICE CABLES TO BE INSTALLED 2'-0" (MIN.) UNDERGROUND FROM UTILITY POLE TO DEMARC AT BUILDING. CONDUIT TO BE SCHED. 40 PVC WITH SOLVENT FITTINGS - SEE "E" DWGS.
2. NEW UNDERGROUND ELECTRICAL CONDUIT TO BE INSTALLED 2'-4" (MIN) BELOW FINAL GRADE. CONDUIT TO BE SCHED. 40 PVC WITH SOLVENT FITTINGS - SCHED. 80 PVC WHERE ABOVE GRADE. VERIFY CONDUIT SIZE WITH UTILITY. SEE "E" DWGS.
3. NEW UNDERGROUND SANITARY PIPING TO BE SDR 35 PVC, INSTALLED 2'-0" (MIN.) BELOW FINAL GRADE. COORDINATE UTILITY CROSSINGS AND MAINTAIN 12" MIN. CLEARANCE. SEE "P" DWGS.
4. NEW UNDERGROUND WATER PIPING TO BE HDPE, INSTALLED 3'-0" (MIN.) BELOW FINAL GRADE, AND BEDDED WITH 6" LIMESTONE SAND. INSTALL WARNING TAPE AND TRACER WIRE. UTILITY TO INSTALL METERS. SEE "P" DWGS.
5. NEW CONC. LIGHTING FIXTURE FOUNDATION AND 1" PVC CONDUITS. INSTALL CONDUITS 1'-6" (MIN) BELOW FINAL GRADE. SEE "E" DWGS.
6. STORMWATER PIPE TO DISCHARGE AT FACE OF CURB.
7. OPEN ENDED STORMWATER PIPE INLET AT FACE OF CURB.
8. EXTEND SITE LIGHTING CONDUIT TO 1st FLOOR BUSINESS TENANT ELECTRICAL PANEL. SEE "E" DRAWINGS.
9. STORMWATER FLOW FOR PARKING LOT IS 364 GPM, BASED ON A TRIBUTARY AREA OF 12,748 SQUARE FEET, AND A 100-YEAR 1-HOUR RAINFALL OF 2.75 INCHES. (3) 4" STORMWATER PIPES AT ALLEY CURB (AT 1/4"/FT SLOPE) PROVIDE CAPACITY FOR 489 GPM.

SITE UTILITY ABBREVIATION LEGEND

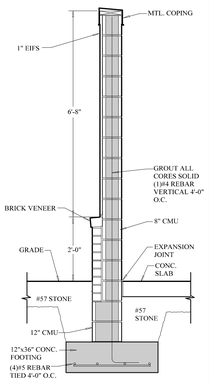
W	WATER PIPING
WM	WATER METER
HYD	FIRE HYDRANT
S	SANITARY PIPING
SS	STORMWATER PIPING
DS	DOWNSPOUT
UT	UNDERGROUND VOICE/DATA CONDUIT & CABLE
UE	UNDERGROUND ELECTRICAL CONDUIT & CABLE
OH-T	OVERHEAD VOICE/DATE CABLE
OH-E	OVERHEAD ELECTRICAL CABLE
XMFR	ELECTRICAL TRANSFORMER - PAD MOUNTED



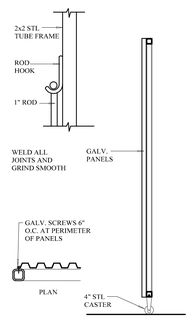
C.03 LIGHT STANDARD FOUNDATION
SCALE: NTS



2 C.03 BOLLARD DETAIL
N.T.S.



3 C.03 ENCLOSURE WALL
N.T.S.



4 C.03 GATE DETAIL
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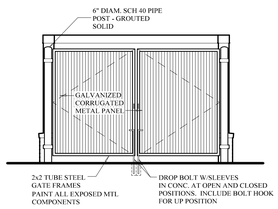
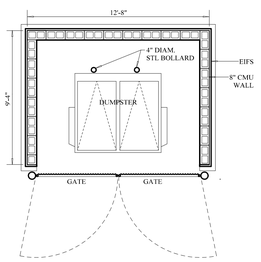
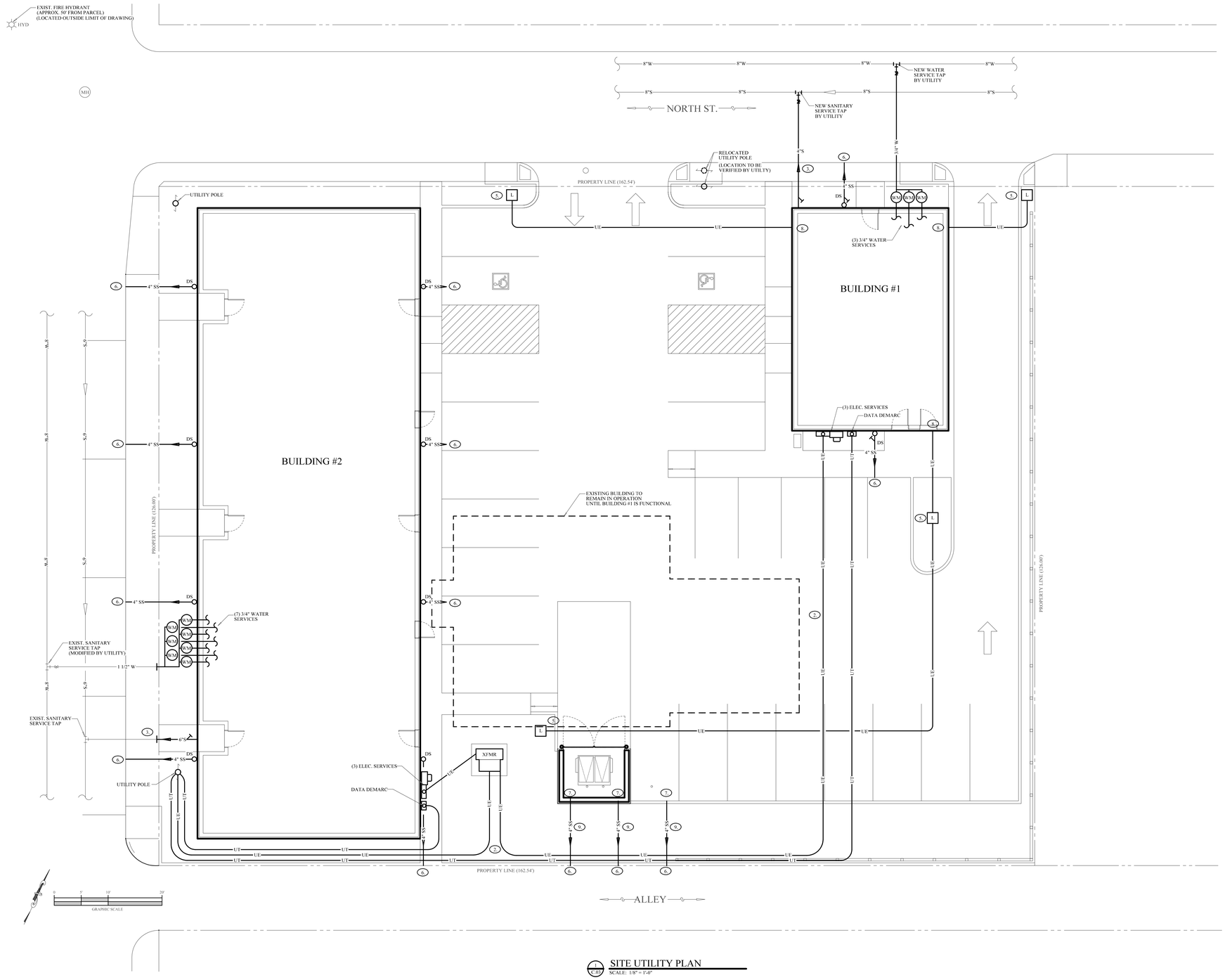




5 C.03 DUMPSTER ENCLOSURE
SCALE: 1" = 10'-0"



SITE UTILITY PLAN
SCALE: 1/8" = 1'-0"

VANNOSTRAND ARCHITECTS
29 E. MAIN STREET, STE 4
P.O. BOX 572
BUCKHANNON, WV
304-473-0555 26201

YOUSSEF PROPERTIES
213 NORTH SAMUEL STREET
CHARLES TOWN, WV 25414

rev	date	description

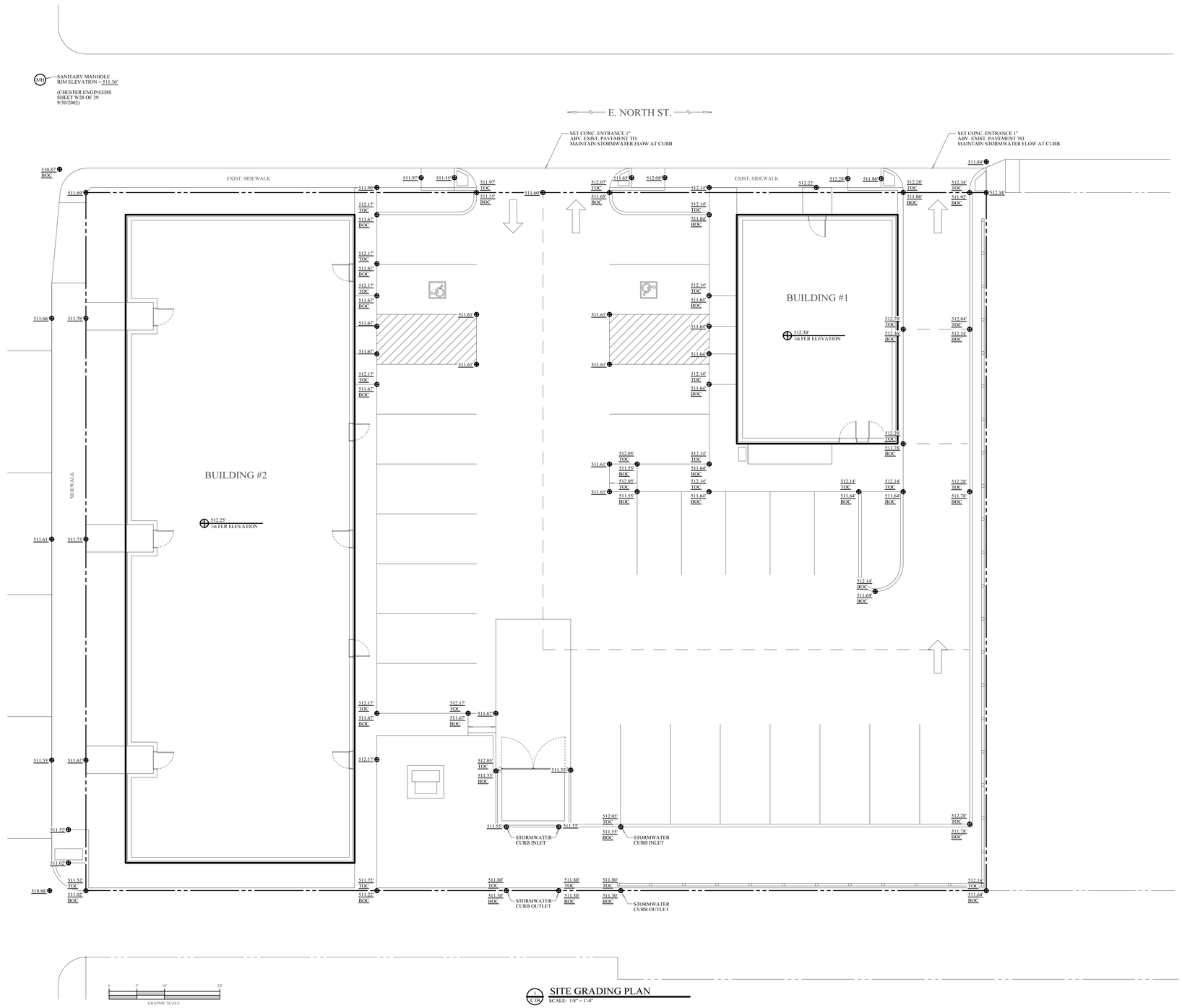
STATE OF WEST VIRGINIA — JAMES BRYSON VANNOSTRAND — NO. 3098 — REGISTERED ARCHITECT

job:	24070586
drawn:	DCS
checked:	BVN
date:	9/11/2025
scale:	AS SHOWN

SHEET
C.03
4 OF 6

GRADING PLAN NOTES

1. AREA OF SITE DISTURBANCE IS APPROXIMATELY 0.47 ACRE.
   ALL LAWN AREAS TO BE GRADED SMOOTH. VERIFY FINAL GRADES WITH ARCHITECT IN FIELD.
2. A TEMPORARY SILT FENCE SHALL BE INSTALLED AT THE PERIMETER OF THE DISTURBED AREA TO PREVENT ANY SEDIMENT FROM LEAVING THE SITE. ALL SILT FENCE MUST BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
3. ANY EXCESS SOIL AND INORGANIC RUBBLE SHALL BE HAULED TO AN APPROVED LOCATION OFF SITE.
   ---
4. ALL TIE-IN POINTS OF THE NEW WORK WITH EXISTING GRADES SHALL BE VERIFIED WITH THE ARCHITECT IN THE FIELD. ELEVATIONS SHOWN ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR.
5. AN ABSTRACT ELEVATION OF 100'-0" IS TO BE UTILIZED FOR EACH BUILDING 1st FLOOR FINISHED FLOOR ELEVATION AT THE MAIN ENTRANCE. SEE ARCHITECTURAL DRAWINGS.
6. "TOC" DENOTES TOP OF CURB ELEVATION. "BOC" DENOTES BOTTOM OF EXPOSED FACE OF CURB ELEVATION.
   ---
7. ---
   ---
8. ---



1 C.04 SITE GRADING PLAN
SCALE: 1/8" = 1'-0"

VANNOSTRAND ARCHITECTS
29 E. MAIN STREET, STE 4
P.O. BOX 572
BUCKHANNON, WV
304-473-0555 26201

YOUSSEF PROPERTIES
213 NORTH SAMUEL STREET
CHARLES TOWN, WV 25414

rev	date	description

STATE OF WEST VIRGINIA
JAMES BRYSON VANNOSTRAND
NO. 3898
REGISTERED ARCHITECT

job:	24070586
drawn:	DCS
checked:	BVN
date:	9/11/2025
scale:	AS SHOWN

SHEET
C.04
5 OF 6

LANDSCAPE NOTES

1. ALL GRASS, WEEDS, ROOTS, STICKS, STONES, AND OTHER DEBRIS TO BE REMOVED FROM THE SURFACE OF TOPSOIL PRIOR TO PLACING GRASS SEED.
2. ALL LANDSCAPED AREAS OF THE SITE ARE TO BE FERTILIZED, SEEDED, AND MULCHED WITH STRAW. CONTRACTOR SHALL WATER SEEDED AREAS AT THE COMPLETION OF THE SOWING AND WEEKLY THEREAFTER UNTIL A HEALTHY TURF IS ESTABLISHED FOR ONE YEAR BEYOND SUBSTANTIAL COMPLETION OF THE PROJECT.
3. PRIOR TO ACCEPTANCE, THE SEEDED AREA SHALL HAVE A MINIMUM OF 100 GRASS PLANTS PER SQUARE FOOT OVER THE ENTIRE AREA. BARE SPOTS SHALL BE NO LARGER THAN 6 SQUARE INCHES AND TOTAL BARE SPOTS SHALL NOT EXCEED 2% OF TOTAL SEEDED AREA.
4. LOCATIONS OF TREES AND SHRUBS ARE APPROXIMATE - EXACT PLACEMENT OF ALL TREES AND SHRUBS ARE TO BE VERIFIED WITH THE ARCHITECT IN THE FIELD.
5. INSTALL MUCH AROUND ALL TREES AND SHRUBS IN A CIRCLE, 3X THE WIDTH OF THE ROOT BALL.
6. ...
7. ...
8. ...

LANDSCAPE LEGEND

KEY	DESCRIPTION	NOTES
T-1	TREE	AMERICAN SYCAMORE (PLATANUS OCCIDENTALIS), 3" CALIPER
T-2	TREE	FLOWERING DOGWOOD (CORNUS FLORIDA), 1.5" CALIPER
...	...	...
...	...	...
S-1	SHRUB	GILBRALTAR AZALEA (RHODODENDRON GILBRALTAR), ORANGE, 5 GAL
...	...	...
G	GRASS	35% TALL FESCUE, 20% ANNUAL RYEGRASS, 20% PERENNIAL RYEGRASS, 20% CREEPER, 5% KNTKY BLUEGRASS
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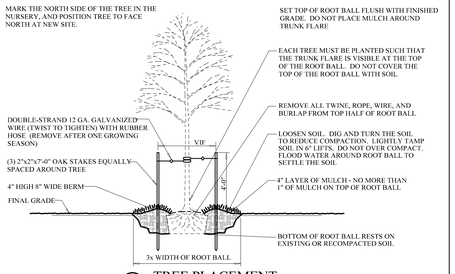
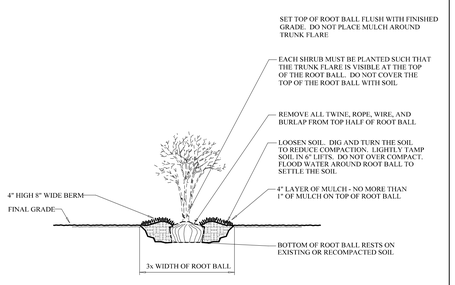


C.04 TREE PLACEMENT
SCALE: NTS



C.04 SHRUB PLACEMENT
SCALE: NTS



C.05 LANDSCAPING PLAN
SCALE: 1/8" = 1'-0"

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YOUSSEF PROPERTIES
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CHARLES TOWN, WV 25414

rev	date	description

STATE OF WEST VIRGINIA
JAMES BRYSON VANNOSTRAND
NO. 398
REGISTERED ARCHITECT

job:	24070586
drawn:	DCS
checked:	BVN
date:	9/11/2025
scale:	AS SHOWN

SHEET
C.05
6 OF 6

Planning Commission
101 East Washington Street
Charles Town, WV 25414

Meeting: 12/22/25
Department: Planning Commission
Category: Report
Initiator:

SCHEDULED

AGENDA ITEM (ID #)

Commission Review: 2026 Draft Calendar

ATTACHMENTS:

- 2026-Planning-Commission DRAFT.pdf

CITY OF CHARLES TOWN

Department of Community Development
Division of Planning & Zoning

101 East Washington Street, P.O. Box 14, Charles Town, WV 25414
Phone: (304) 724-3248 ♦ Fax: (304) 725-1014 ♦ Web: www.charlestownwv.us

2026 MEETING SCHEDULE OF THE CITY OF CHARLES TOWN PLANNING COMMISSION

Meetings are held in the Council Chambers at City Hall, at101 East Washington Street, at 7pm, on the 4th Monday of every month unless otherwise specified.

Scheduled Meetings	Submission Deadline
Monday, January 27, 2026	Friday, December 2, 2025
Monday, February 23, 2026	Friday, January 2, 2026
Monday, March 23, 2026	Monday, February 2, 2026
Monday, April 27, 2026	Monday, March 2, 2026
Tuesday, May 26, 2026	Wednesday, April 1, 2026
Monday, June 22, 2026	Friday, May 1, 2026
Monday, July 27, 2026	Monday, June 1, 2026
Monday, August 24, 2026	Wednesday, July 1, 2026
Monday, September 28, 2026	Monday, August 3, 2026
Monday, October 26, 2026	Tuesday, September 1, 2026
Monday, November 30, 2026	Thursday, October 1, 2026
Monday, December 28, 2026	Monday, November 2, 2026
Monday, January 25, 2027	Tuesday, December 1, 2026

Bold dates - These are the PC's minimum quarterly meeting dates. If additional business is required to be conducted, the other dates are available.

Italicized date - Indicates this meeting is not on the regularly scheduled meeting date.

Legal ads are published in the *Spirit of Jefferson*

DRAFT