AGENDA
CITY OF SHERIDAN
MAY 20, 2024
REGULAR COUNCIL MEETING START 7:00 P.M.

1. Call to Order

2. Pledge of Allegiance

3. Invocation to be given by Chris Schuett - Sheridan Bible Church

4. Roll Call of Members

5. Consideration of Agenda

6. Community Update

   A. Older Americans Month Proclamation - Carmen Rideout, Executive Director of The HUB

   B. Move with the Mayor/Spring Mental Health Challenge Proclamation - Jennifer Rizer/ National Forum for Heart Disease & Stroke Prevention

7. Staff Update

   A. Audit Update - City Treasurer Darla Hawkins

8. Comments from the Public

9. Public Hearings

   A. Public Hearing for PL-24-10, Resolution 15-24, Vacate 6,102.3 sq ft Adjacent to Palmer's Addition - Public Works Director Hanns Mercer

      i. Consideration of PL-24-10, Resolution 15-24, Vacate 6,102.3 sq ft Adjacent to Palmer's Addition

   B. Public Hearing for PL-24-11, Resolution 16-24, Final Plat of the HIE Subdivision - Public Works Director Hanns Mercer

      i. Consideration of PL-24-11, Resolution 16-24, Final Plat of the HIE Subdivision

C. Public Hearing for PL-24-12, Ordinance 2283, 4th and Val Vista Rezone - Public Works Director Hanns Mercer

i. Consideration of First Reading of PL-24-12, Ordinance 2283, 4th and Val Vista Rezone

D. Public Hearing for New Bar & Grill Liquor License #7 Application for Frackelton's - City Clerk Cecilia Good

i. Consideration of New Bar & Grill Liquor License Application #7 for Frackelton's - City Clerk Cecilia Good

10. Consent Agenda

0. Reappointment of DJ Dearcorn to the Sheridan Recreation District for a 3-year term expiring on June 30, 2027.

A. Award to Burns & McDonnell for the 30% Design of the Sheridan Wastewater Treatment Plant Upgrades Project in the Amount of $298,079

B. Minutes of Regular Council Meeting from May 6, 2024

C. Claims

OLD BUSINESS

11. Consideration of Second Reading of PL-24-6, Ordinance 2278, Story House Property Company Rezone 44.86 Acres from B-2 to PUD - Public Works Director Hanns Mercer

NEW BUSINESS

12. Resolution 18-24, Support for a SEEDA Grant to the Wyoming Business Council Business Ready Community Program

13. Council Comments and Requests for Future Agenda Items

14. Adjournment

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Executive

MEMORANDUM

RE: Older Americans Month Proclamation - Carmen Rideout, Executive Director of The HUB

From: Jennifer Rizer, Executive Assistant

To: City Council

CC:

Date: 05/20/2024

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Executive

MEMORANDUM

RE: Move with the Mayor/Spring Mental Health Challenge Proclamation - Jennifer Rizer/ National Forum for Heart Disease & Stroke Prevention

From: Jennifer Rizer, Executive Assistant

To: City Council

CC: City Administrator Stuart McRae

Date: 05/20/2024

CITY OF SHERIDAN, WYOMING

55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Public Works

MEMORANDUM

RE: Public Hearing for PL-24-10, Resolution 15-24, Vacate 6,102.3 sq ft Adjacent to Palmer's Addition - Public Works Director Hanns Mercer

From: Hanns Mercer, Public Works Director

To: City Council

CC:

Date: 05/01/2024

Recommendation:

Staff recommends approval of PL-24-10, Resolution 15-24. The applicant, Holy Name Church, is requesting to vacate 6,102.3 square feet of the east-west alley, located adjacent to 121 S Connor St. Block 2, Palmer's Addition, City of Sheridan, WY.

Background:

The applicant, Holy Name Church, is requesting to vacate 6,102.3 square feet of the east-west alley, located adjacent to 121 S Connor St. Block 2, Palmer's Addition, City of Sheridan, WY.

Nearest neighbor letters were sent. Affected utilities have been sent letters 30 days prior to the meeting.

Discussion:

Per Appendix B, Section 205 of the Sheridan Municipal Code:

A. Any plat may be vacated by the owners or proprietors thereof at any time before the sale of any lots, or before the subdivider has made substantial improvements in the subdivision, by submitting a copy of the plat to the Planning Commission, along with a written request for the vacation. In cases where lots have been sold, the written request shall be by all the owners of lots within the portion of the plat proposed to be vacated. The City Council shall approve or disapprove the vacation. The recording of an instrument vacating the plat shall operate to destroy the force and effect of the recording of the original plat and to divest all public rights in the streets, alleys, commons and public grounds laid out or described in such a plat.

B. Public rights-of-way or public easements which were dedicated under the provisions of these regulations, or laid out under any prior law of the State of Wyoming regulating plats, may be altered or vacated by resolution of the City Council, or in the case of an administrative replat, by action of the Public Works Director following a public hearing for which public notice has been given in a newspaper of general circulation at least seven days prior to the hearing.

C. Prior to consideration of any request to vacate or alter any platted public right-of-way or easement, the owner(s) of the land encumbered thereby must provide proof that all grantees having interest in the right-of-way/easement, including public and private utilities, have been notified twice in writing via certified mail of the owner's request to vacate or alter the easement. The first notification must occur at least thirty calendar days prior to any action by the City Council or Public Works Director. Alteration or vacation of the public right-of-way/easements may be

considered as part of the subdivision application.

D. Any part of a plat may be vacated provided such vacating does not abridge or destroy any of the rights and privileges of other proprietors in said plat; and provided, further, that nothing contained in this section shall authorize the closing or obstruction of any public highways. The request for vacation shall be made by all the owners of lots within that portion of the plat sought to be vacated.

E. When any streets and alleys are vacated, the area vacated shall be conveyed to all lots or parcels adjacent to the street or alley being vacated in equal proportions or as prescribed by the petitioners. When public grounds are vacated, the area vacated shall be disposed of in accordance with Wyoming Statutes.

Public and private utility companies were notified by certified mail 30 days prior to this meeting, and 38 adjacent property owners were notified, an ad was placed 7 days prior to the meeting and a sign posted on the property.

Attachments

Aerial
Resolution 15-24
ROW Vacation Petition
Utility Responses

Holy Name alley vacation



PUD

DISCLAIMER:
The City of Sheridan GIS Division produced this map for informational purposes only. The City of Sheridan provides this map on an "as is" basis without warranties of any kind, either expressed or implied, and shall not be liable for any direct, indirect, incidental, special or consequential damages arising out of the use of such map. The user acknowledges and agrees that the use of such data is at the sole risk of the user. General questions about this map including errors, omissions, and/or updates should be directed to the City of Sheridan GIS Division.

CITY OF Sheridan WYOMING

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Miles 0 0.7 1.4

Date: 4/24/2024 1:59 PM User: sgoodman

CITY OF SHERIDAN
RESOLUTION 15-24

A RESOLUTION vacating a 6,102.3 square foot east-west alley within the City Limits of Sheridan, Wyoming, located adjacent to 121 S Connor St. Block 6, Palmer's Addition to the City of Sheridan, WY.

WHEREAS, the property owners have petitioned the City Governing Body requesting that the alley be vacated; and

WHEREAS, this request for an alley vacation meets the requirements of Sheridan City Code Appendix B, §205.

Be it resolved by the City of Sheridan Governing Body :

That the alley located adjacent to 121 S Connor St. Block 6, Palmer's Addition to the City of Sheridan, WY. is hereby vacated

PASSED, APPROVED, AND ADOPTED this_____of _____ 2024.

_____

Richard Bridger, Mayor

ATTEST:

_____

Cecilia Good, City Clerk

State of Wyoming
SS
County of Sheridan

Subscribed and sworn to (or affirmed) before me this _____day of

_____, 2024 by _____.

_____
Notary Public
My commission expires _____.

PETITION FOR RIGHT-OF-WAY VACATION

TO THE CITY COUNCIL OF THE CITY OF SHERIDAN, WYOMING:

Pursuant to the provisions of Sheridan City Code Appendix B§ 205, and applicable state statutes, the undersigned landowner(s) respectfully petition and show the City Council as follows:

1. This is a petition for the vacation of right-of-way within the city limits of Sheridan, Wyoming, having a legal description as follows:

   Refer to attached Exhibit A prepared by FDL Consulting

2. Holy Name Church are the owners of abutting property who have signed this petition for vacation.

3. A survey of the area sought to be vacated is attached hereto and made a part hereof.

4. The petitioners certify that they represent a majority of the property owners, owning a majority of the property abutting the right-of-way to be vacated.

5. Petitioners hereby request that said lands be vacated for the following reason(s):

   Holy Name Church requests that said lands be vacated in order to construct a security fence around the perimeter of Holy Name Catholic School to provide a measure of safety for students and staff at the school.

Therefore, Petitioners pray said right-or-way be vacated pursuant to and in accordance with the applicable Wyoming Statutes and City Ordinances after proper notice and public hearing.

Dated this 22nd day of March, 2024

Signed by the Petitioners (attach more sheets as necessary:

Rev. [illegible]

STATE OF WYOMING)
) ss
COUNTY OF SHERIDAN)

The above and foregoing was subscribed, sworn to, and acknowledged before me this 22nd day of MARCH, 2024.

[illegible]
Notary Public

My Commission Expires: AUGUST 27, 2027

DOREEN CHOONG
Notary Public - State of Wyoming
Commission ID 165939
My Commission Expires 08/27/2027

Pierson, Nathan A

Thu, Apr 4, 4:20 PM (15 hours ago)

to me

Charter/Spectrum has no issues with the alley vacation of Block 6, Palmer's Addition, between lots 1-15 and 16-30.
Thank you.

Nathan Pierson | Construction Coordinator |
307-752-8900 | 140 E Loucks St |
Sheridan, WY 82801

Dan Coughlin

Wed, Apr 3, 12:20 PM (2 days ago)

to me

Sue,

SAWSJPB has no utilities in the alley and no easements. SAWSJPB has no objection to the vacation.

Dan Coughlin

Administrator
307-675-2931

Johney Mikkelson

11:34 AM (2 hours ago)

to me

Hi Sue,
I checked with our engineering department and have found that we don't have any facilities in this area.
Regards,

Johney Mikkelson
Project Assistant
Visionary Broadband

Lawler, Christopher

3:14 PM (18 minutes ago)

to Lynn, me

Sue,

MDU does currently have both Gas and Electric facilities in the alley vacation requested above and will need for continued use into the future to serve other customers. Being that the alley will still be an accessible and maintained easement for MDU into the future. MDU has no objection to the vacation.

Regards,

Chris Lawler
District Operations Manager III
Montana-Dakota Utilities Co.
2324 Dry Ranch Rd
Sheridan, WY 82801
(307)674-3545 Office
(307)751-4608 Cell

Apologies I see that it does reserve access and utilities. Therefore I have no exceptions.

Mr. Shelby Allen
OSP Engineering, Lumen
Gillette Wyoming
Ph: 307-682-7241
Cell: 307-299-8468

CITY OF SHERIDAN, WYOMING

55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Public Works

MEMORANDUM

RE: Public Hearing for PL-24-11, Resolution 16-24, Final Plat of the HIE Subdivision - Public Works Director Hanns Mercer

From: Hanns Mercer, Public Works Director

To: City Council

CC:

Date: 05/01/2024

Recommendation:

Staff received a positive recommendation from the Planning Commission regarding PL-24-11, Resolution 16-24, final plat of the HIE Subdivision. The owner, Prime Real Estate Holdings, LLC, is requesting to subdivide 5.335 acres from 1 lot into 2 lots. Zoned M1 Industrial District. Located at 1860 Commercial Ave. (PIN 56843545800125).

Background:

The applicant, Prime Real Estate Holdings, LLC, is requesting to subdivide 5.34 acres from 1 lot into 2 lots. Zoned M-1, Industrial District, and Entryway. Located at 1860 Coffeen Ave. (PIN 56843545800125). The property is listed as Lot 1 of the Sheridan Commercial Park Subdivision.

Surrounding properties are zoned M-1 and Entryway. The applicant is proposing to subdivide 5.34 acres from 1 lot into 2 lots. The applicant is proposing the following lot sizes:

- Lot 1 - 3.45 acres
- Lot 2 - 1.89 acres

Access to both properties will come via Commercial Avenue.

Discussion:

Prior to approving the final plat, the City Council will need to make the following findings per Sheridan City Code Appendix B §202, staff offers the following comments on the required findings:

The City shall not approve any proposed subdivision of land which, by itself, or as a part of a larger tract, is contiguous to or completely surrounded by the boundaries of the City, unless the application is accompanied by a properly-acknowledged petition for annexation to the City.

This property falls completely within the city limits, so this condition does not apply.

The City shall not approve any proposed subdivision of land which is within one mile of the corporate limits of Sheridan but not, at the time of submittal, eligible for annexation, unless the application is accompanied by a properly-acknowledged agreement not to contest future annexation proceedings.

Again, not applicable in this case, the property is within the city limits.

Every plat shall conform to the Zoning Ordinance currently adopted at the time of final plat approval.

The proposed subdivision conforms to the Zoning Ordinance.

All new subdivision developments within the Airport Influence Area within the city limits of the City of Sheridan shall grant an Avigation Easement to the Sheridan County Airport.

This proposed subdivision is outside the Airport influence area.

No subdivision shall be approved within the corporate limits of the City of Sheridan, or one mile thereof, unless City Public Works staff concludes that an adequate long-term water supply exists to support the proposed use and density of the subdivision in accordance with City adopted policy. City elected officials acting as Council representatives on other boards or committees that review development shall likewise consider long-range water supply in making any determination.

Staff sent out 10 nearest neighbor notifications to property owners within 300 feet as part of this application. In addition, notifications were advertised in the press and a sign posted on the property. Staff has not received any inquiries.

Attachments

Aerial

Final Plat

HIE Subdivision



DISCLAIMER:
The City of Sheridan GIS Division produced this map for informational purposes only. The City of Sheridan provides this map on an "as is" basis without warranties of any kind, either expressed or implied, and shall not be liable for any direct, indirect, incidental, special or consequential damages arising out of the use of such map. The user acknowledges and agrees that the use of such data is at the sole risk of the user. General questions about this map including errors, omissions, and/or updates should be directed to the City of Sheridan GIS Division.

CITY OF Sheridan WYOMING

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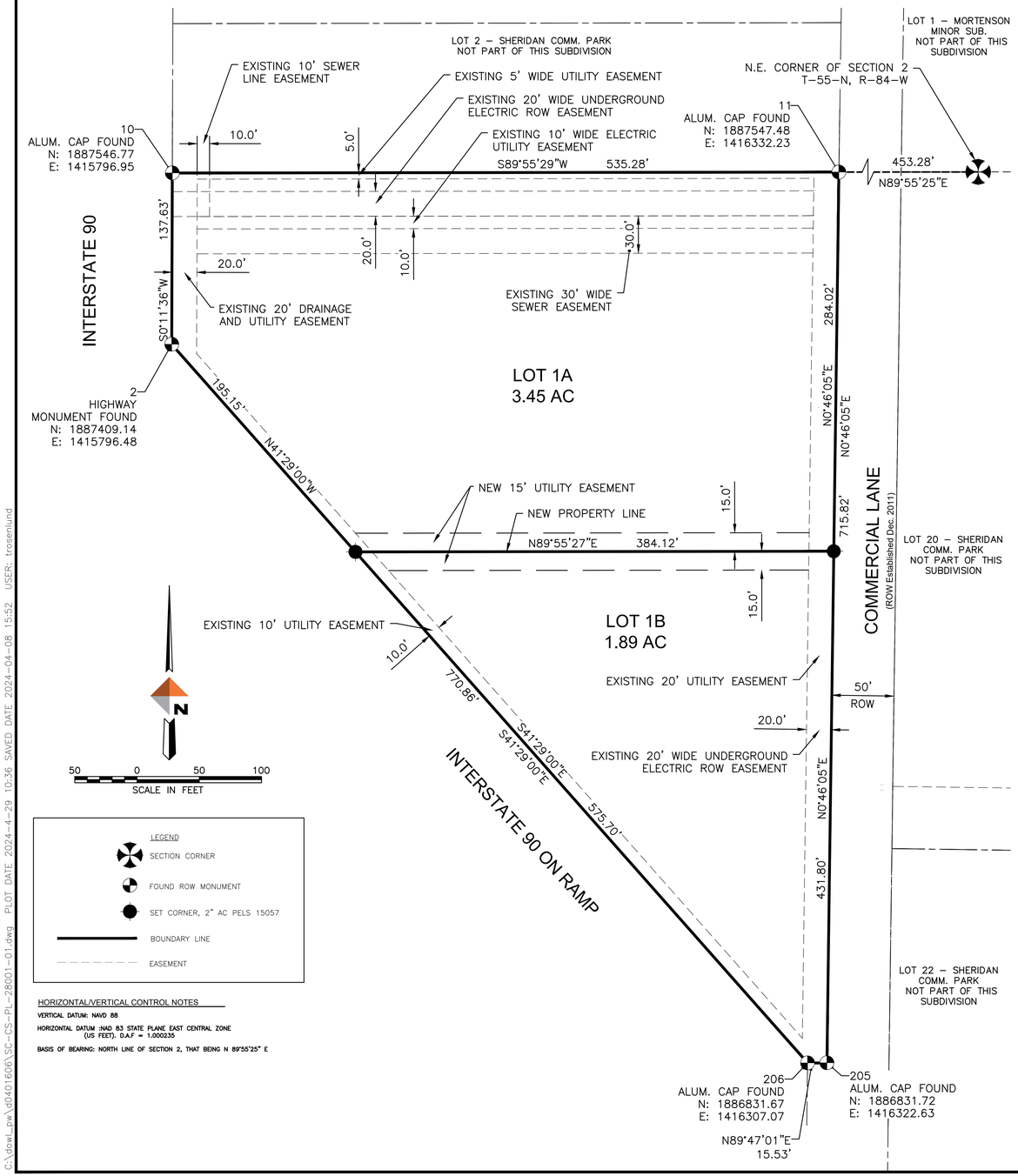
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FINAL PLAT OF THE HIE SUBDIVISION
A REPLAT OF LOT 1 OF
SHERIDAN COMMERCIAL PARK SUBDIVISION

SHERIDAN COUNTY, WYOMING

A PART OF THE NE 1/4, NE 1/4 OF SECTION 2, TOWNSHIP 55 NORTH, RANGE 84 WEST, 6TH PRINCIPLE MERIDIAN, COUNTY OF SHERIDAN, SHERIDAN COUNTY, STATE OF WYOMING

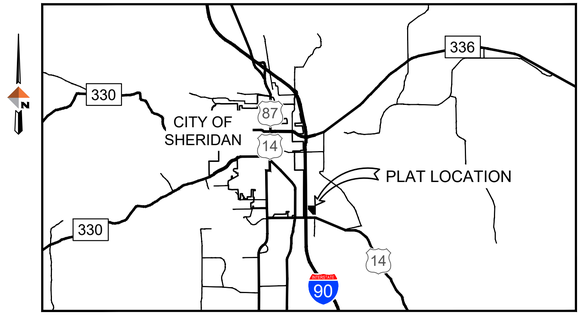


HORIZONTAL/VERTICAL CONTROL NOTES

VERTICAL DATUM: NAVD 88

HORIZONTAL DATUM :NAD 83 STATE PLANE EAST CENTRAL ZONE (US FEET). D.A.F. = 1.000235

BASIS OF BEARING: NORTH LINE OF SECTION 2, THAT BEING N 89°55'25" E



VICINITY MAP

CERTIFICATE OF OWNERS

KNOW ALL MEN BY THESE PRESENTS THAT THE UNDERSIGNED, _____, BEING THE OWNER OF INTEREST IN THE LAND SHOWN ON THIS PLAT, DOES HEREBY CERTIFY:

THAT THE FOREGOING PLAT DESIGNATED AS THE HIE SUBDIVISION, BEING A REPLAT OF LOT 1 OF SHERIDAN COMMERCIAL PARK IN THE CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING.

THAT THIS SUBDIVISION, AS IT IS DESCRIBED AND AS IT APPEARS ON THE PLAT, IS MADE WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRES OF THE UNDERSIGNED OWNER AND PROPRIETOR; AND THAT THIS IS A CORRECT PLAT IN THE AREA, AND THAT THE UNDERSIGNED OWNER OF THE LAND SHOWN AND DESCRIBED ON THIS PLAT DOES HEREBY DEDICATE TO THE CITY OF SHERIDAN AND ITS LICENSEES FOR PUBLIC USE FOR THE INDICATED PURPOSES, ALL STREETS, ALLEYS, EASEMENTS AND OTHER PUBLIC LANDS WITHIN THE BOUNDARY LINES OF THE PLAT, AS INDICATED, AND NOT ALREADY OTHERWISE DEDICATED FOR PUBLIC USE.

UTILITY EASEMENTS, AS DESIGNATED ON THIS PLAT, ARE HEREBY DEDICATED TO THE CITY OF SHERIDAN AND ITS LICENSEES FOR PUBLIC USE FOR THE PURPOSE OF INSTALLING, REPAIRING, REINSTALLING, REPLACING AND MAINTAINING SEWERS, WATER LINES, GAS LINES, ELECTRIC LINES, TELEPHONE LINES, CABLE TV LINES AND OTHER FORMS AND TYPES OF PUBLIC UTILITIES NOW OR HEREAFTER GENERALLY UTILIZED BY THE PUBLIC.

ALL RIGHTS UNDER AND BY VIRTUE OF THE HOMESTEAD EXEMPTION LAWS OF THE STATE OF WYOMING ARE HEREBY WAIVED AND RELEASED.

EXECUTED THIS_____DAY OF_____, 2024, BY:

PRIME REAL ESTATE HOLDINGS, LLC(OWNER)

BY_____

STATE OF _____
CITY OF _____

ON THIS _____DAY OF _____, 2024, BEFORE ME PERSONALLY APPEARED

_____TO ME PERSONALLY KNOWN WHO, BEING

DULY SWORN, DID SAY THAT (S)HE IS THE _____OF _____ AND THAT (S)HE DOES HEREBY ACKNOWLEDGE SAID INSTRUMENT TO BE THE FREE ACT AND DEAD OF SAID

NOTARY PUBLIC_____

MY COMMISSION EXPIRES: _____

DECLARATION VACATING PREVIOUS PLATTING

THIS PLAT IS A REPLAT OF LOT 1 SHERIDAN COMMERCIAL PARK SUBDIVISION IN THE CITY OF SHERIDAN, WYOMING, AS RECORDED IN DRAWER "S" OF PLATS, MAP 140, OF THE RECORDS OF SHERIDAN COUNTY CLERK. ALL PLATS OR PORTIONS THEREOF ENCOMPASSED BY BOUNDARY OF THIS PLAT ARE HEREBY VACATED.

LEGAL DESCRIPTION

LOT 1 SHERIDAN COMMERCIAL PARK SUBDIVISION, LOCATED IN THE NE1/4NE1/4 OF SECTION 2, TOWNSHIP 55N, RANGE 84W, 6TH P.M.; MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST OF SAID SECTION 2,

THENCE S 89°55'25" W, 453.28 FEET, TO THE NORTHEAST CORNER OF SUBJECT PARCEL AND THE TRUE POINT OF BEGINNING;

THENCE S 89°55'29" W, 535.28 FEET, TO THE EASTERLY RIGHT–OF–WAY OF INTERSTATE 90;

THENCE, ALONG SAID RIGHT–OF–WAY, S 0°11'36" W, 137.63 FEET;

THENCE S 41°29'00" E, 770.85 FEET;

THENCE, LEAVING SAID RIGHT–OF–WAY, N 89°47'01" E, 15.53 FEET;

THENCE N 0°46'05" E, 715.82 FEET, TO THE POINT OF BEGINNING.

CONTAINING 5.335 ACRES, MORE OR LESS, AND SUBJECT TO ANY PRIOR RECORDED EASEMENTS, DEEDS, OR ENCUMBRANCES.

SURVEYOR CERTIFICATE

I, TAD R. ROSENLUND, OF SHERIDAN, WY, HEREBY CERTIFY THAT THIS PLAT WAS MADE FROM NOTES TAKEN DURING AN ACTUAL SURVEY PERFORMED DURING THE MONTH OF SEPTEMBER, 2023, BY ME, FOR WHOSE WORK I STAND PERSONALLY RESPONSIBLE AND THAT THE SURVEY IS ACCURATELY REPRESENTED ON THIS PLAT AND IS SET OUT ON THE GROUND AS SHOWN HEREON.

_____
TAD R. ROSENLUND DATE
Wyoming L.S. No. 15057

Professional Engineer & Land Surveyor
TAD R. ROSENLUND
15057
Date
WYOMING

APPROVAL OF MORTGAGEE

MORTGAGEE: COWBOY STATE BANK

BY: _____ TITLE: _____

STATE OF WYOMING)
):SS
COUNTY OF SHERIDAN)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS _____ DAY OF _____, 2024.

WITNESS MY HAND AND OFFICIAL SEAL. MY COMMISSION EXPIRES: _____.

_____
NOTARY PUBLIC

DIRECTOR OF PUBLIC WORKS CERTIFICATE OF APPROVAL

THIS PLAT HAS BEEN PREPARED IN ACCORDANCE WITH THE REQUIREMENTS AND PROCEDURES OUTLINED IN THE SUBDIVISION REGULATIONS OF THE CITY OF SHERIDAN, WYOMING AND CERTIFIED THIS_____DAY OF_____, 2024 BY THE DIRECTOR OF PUBLIC WORKS OF SHERIDAN, WYOMING.

_____
DIRECTOR OF PUBLIC WORKS

CERTIFICATE OF THE CITY OF SHERIDAN PLANNING COMMISSION

REVIEWED BY THE CITY OF SHERIDAN PLANNING COMMISSION THIS_____DAY OF _____, 2024.

_____
ATTEST: VICE CHAIRMAN

_____
CHAIRMAN

CITY OF SHERIDAN CERTIFICATE OF APPROVAL

APPROVED BY THE CITY COUNCIL OF THE CITY OF SHERIDAN, WYOMING, THIS_____DAY OF_____, 2024.

_____
ATTEST: CLERK

_____
MAYOR

CERTIFICATE OF RECORDER

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE CLERK AND RECORDER AT_____O'CLOCK_____M., AND IS DULY

RECORDED IN BOOK NUMBER_____, PAGE NUMBER_____.

_____
COUNTY CLERK

REV	DATE	DESCRIPTION	BY
		REVISIONS	

DOWL
WWW.DOWL.COM
1833 S. Sheridan Ave
Sheridan, Wyoming 82801
307-672-9006

SHERIDAN COMMERCIAL PARK
SUBDIVISION REPLAT

PORTION OF THE NE1/4 NE1/4 OF SECTION 2
T55N, R84W, 6TH P.M.
SHERIDAN COUNTY, WYOMING

PROJECT 28.28001.01
DATE 04/29/24

© DOWL 2024

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OF 1

C:\dowl_pw\d0401606\SC-CS-PL-28001-01.dwg PLOT DATE 2024-4-29 10:36 SAVED DATE 2024-04-08 15:52 USER: trosenlund

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Public Works

MEMORANDUM

RE: Public Hearing for PL-24-12, Ordinance 2283, 4th and Val Vista Rezone - Public Works Director Hanns Mercer
From: Hanns Mercer, Public Works Director
To: City Council
CC:
Date: 04/29/2024

Recommendation:

Staff received a positive recommendation from the Planning Commission regarding PL-24-12, West half of lots 13, 14, 15, 16, 17, and 18, Block 26 Sheridan Land Company's Addition, Ordinance 2283. The applicants, Kon Ho In and Sun Ok In, are requesting to rezone 10,500 sq ft from R-3 Residence District to B-2 Business District. Located at 55 and 51 W. 4th St. (PIN 56842247400600).

Background:

The properties to the north, east and west are commercial properties zoned R-3. The properties to the south are zoned B-2. The subject property has 2 separate dwellings.

Discussion:

Neither state statute nor City Code contains required findings that must be made in changing a property's zoning designation. State statute does provide some requirements for zoning regulations in general, which the Planning Commission and City Council should be aware of:

WS §15-1-601(d) *All regulations shall be made;*
In accordance with a comprehensive plan and designed to:

A. Lessen congestion in the streets;
B. Secure safety from fire, panic and other dangers;
C. Promote health and general welfare;
D. Provide adequate light and air;
E. Prevent the overcrowding of land;
F. Avoid undue concentration of population; and
G. Facilitate adequate provisions for transportation, water, sewage, schools, parks and other public requirements.
ii. With reasonable consideration, among other things, of the character of the district and its peculiar suitability for particular uses;
iii. With a view to conserving the value of buildings and encouraging the most appropriate use of land throughout the city or town; and
iv. With consideration given to the historic integrity of certain neighborhoods or districts and a view to preserving, rehabilitating and maintaining historic properties and encouraging compatible uses within the neighborhoods or districts, but no regulation made to carry out the purposes of this paragraph is valid to the extent it constitutes an unconstitutional taking without compensation.

The Preamble of the City's Zoning Ordinance (Appendix A) states that the purpose of the zoning ordinance is to, *"promoting the health, safety, morals and general welfare of the inhabitants of the City of Sheridan by lessening congestion in the streets; securing safety from fire, panic and other dangers providing adequate light and air; preventing the overcrowding of land; avoiding the undue concentration of population, facilitating the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements." The future land use map designates this area as downtown mixed use, so the proposed rezone is in accordance with the future land use map.*

As part of the request to rezone this property, staff sent notices to the 31 property owners within 300 feet, placed a legal notice in the newspaper, and posted a sign on the property. At the time of writing this staff report, staff had not received any inquires.

Attachments

Zoning Exhibit

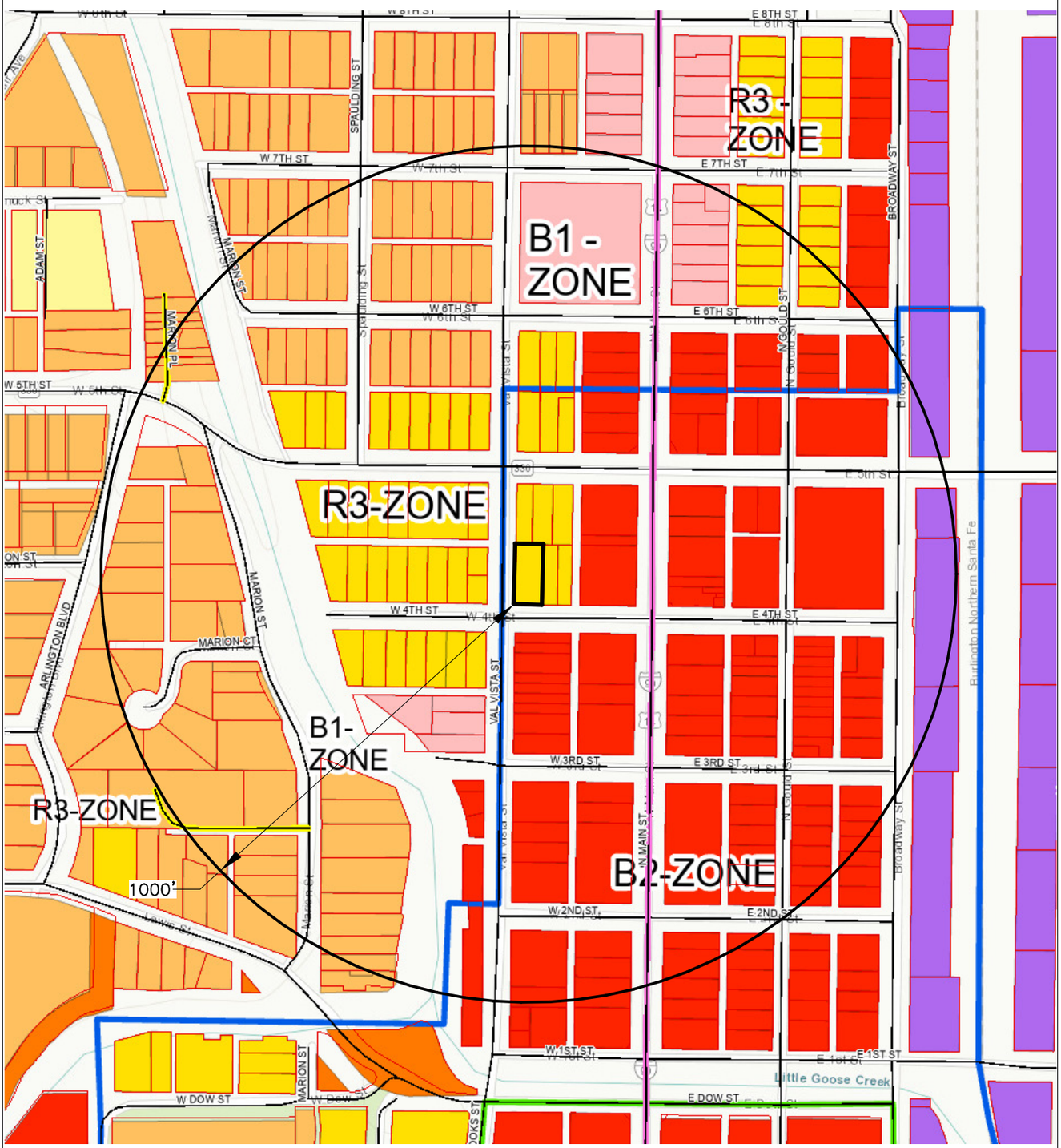
Rezone Exhibit

Petition

Rezone Concerns

CITY ZONING

FOR 1000 FEET SURROUNDING A TRACT OF LAND DESCRIBED IN DEED BOOK 567, PAGE 638 IN THE RECORDS OF THE SHERIDAN COUNTY CLERK, LOCATED IN SHERIDAN LAND COMPANY'S ADDITION TO THE CITY OF SHERIDAN, IN THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER (SE¼SE¼) OF SECTION 22 AND THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER (NE¼NE¼) OF SECTION 27, TOWNSHIP 56 NORTH, RANGE 84 WEST, 6TH P.M., CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING.



N

NO TRUE SCALE

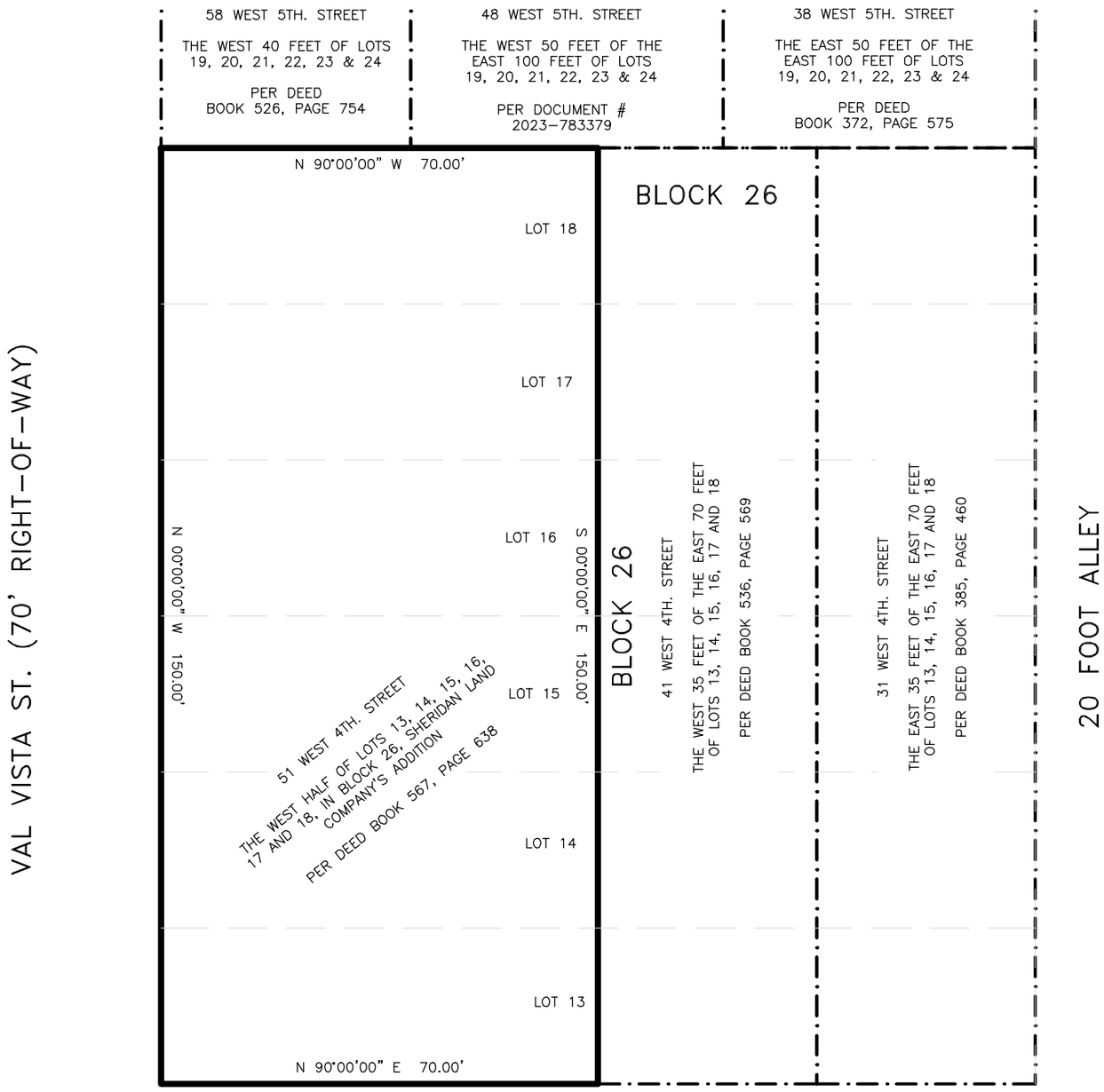
Cannon Consulting LLC
Making every shot count

PREPARED BY:	CANNON CONSULTING, LLC PO BOX 6106 SHERIDAN, WY 82801
FOR:	IN, KON HO & SUN OK 121 RED FOX RD SHERIDAN, WY 82801
Prepared by Cannon Consulting LLC (307) 752-0109	DATE: 3/22/24

REZONE EXHIBIT

LEGAL DESCRIPTION

A TRACT OF LAND, LOCATED IN THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER (SE¼SE¼) OF SECTION 22 AND THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER (NE¼NE¼) OF SECTION 27, TOWNSHIP 56 NORTH, RANGE 84 WEST, 6TH P.M., CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING, BEING THE WEST HALF OF LOTS 13, 14, 15, 16, 17 AND 18, IN BLOCK 26, SHERIDAN LAND COMPANY'S ADDITION TO THE TOWN, NOW CITY OF SHERIDAN, WYOMING. SUBJECT TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SAID BLOCK 26, SAID POINT BEING THE TRUE POINT OF BEGINNING OF SUBJECT TRACT; THENCE NORTH, 150.00 FEET ALONG THE WEST LINE OF SAID BLOCK TO THE NORTHWEST CORNER OF SAID LOT 18; THENCE EAST, 70.00 FEET ALONG THE NORTH LINE OF SAID LOT 18 TO THE MIDPOINT OF SAID NORTH LINE; THENCE SOUTH, 150.00 FEET ALONG THE EAST LINE OF THE WEST HALF OF SAID LOTS 13, 14, 15,16,17 AND 18 TO THE SOUTH LINE OF SAID LOT 13; THENCE WEST, 70.00 FEET ALONG SAID SOUTH LINE TO THE POINT OF BEGINNING.
CONTAINING AN AREA OF ±10500 SQ. FT. (±0.24 ACRES)



WEST 4TH ST. (70' RIGHT-OF-WAY)

SURVEYOR'S CERTIFICATE:
I, CLAYTON P. ROSENLUND DO HEREBY CERTIFY THAT THIS PLAT WAS MADE FROM AN ACTUAL FIELD SURVEY PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT IT CORRECTLY SHOWS THE LOCATION TO THE BEST OF MY KNOWLEDGE.

Professional Land Surveyor
CLAYTON ROSENLUND
14250
Date: 03/25/2024
WYOMING

Cannon Consulting LLC
Making every shot count

LEGEND

- ◆ FOUND MONUMENT AS NOTED
- ○ CALCULATED CORNER
- POB POINT OF BEGINNING
- SUBJECT TRACT BOUNDARY
- ADJOINING LOT LINES
- ORIGINAL LOT LINES
- SECTION LINE

N

SCALE: 1"=25'

BASIS OF BEARINGS & DISTANCES ARE: PER SHERIDAN LAND COMPANY'S PLAT (BEARINGS & DISTANCES ARE OF RECORD)

PREPARED BY:
CANNON CONSULTING, LLC
PO BOX 6106
SHERIDAN, WY 82801

FOR:
IN, KON HO & SUN OK
121 RED FOX RD
SHERIDAN, WY 82801

Prepared by Cannon Consulting LLC (307) 752-0109

DATE: 3/22/24

PETITION FOR REZONING

TO THE CITY COUNCIL OF THE CITY OF SHERIDAN, WYOMING:

Pursuant to the provisions of W.S. 15-1-601, 15-1-602, 15-1-603 et. seq., and other applicable statutes, and Appendix A, Sec. 16 of the Sheridan City Code, the undersigned landowner(s) respectfully petition and show the City Council as follows:

1. This is a petition for the rezoning of parcels of land within the city limits of Sheridan, Wyoming, having a legal description as follows:
   A TRACT OF LAND LOCATED IN THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER (SE1/4SE1/4) OF SECTION 22 AND THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER (NE1/4NE1/4) OF SECTION 27, TOWNSHIP 56 NORTH, RANGE 84 WEST, 6TH P.M., CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING. BEING THE WEST HALF OF LOTS 13, 14, 15, 16, 17, AND 18, IN BLOCK 26, SHERIDAN LAND COMPANY'S ADDITION TO THE TOEN, NOW CITY OF SHERIDAN, WYOMING.

2. Kon Ho In are the owners or authorized agents of said described land proposed to be rezoned.

3. A map of the area sought to be rezoned is attached hereto and made a part hereof.

4. Petitioners hereby request that said lands be zoned B-2.

Therefore, Petitioners pray said parcel(s) be rezoned B-2, pursuant to and in accordance with the applicable Wyoming Statutes and City Ordinances after proper notice and public hearing.

Dated this 28 day of March, 20☐. 2024

Signed by the Petitioners:

Subscribed and Sworn before me this 28TH day of MARCH, 2024

DREW HOMOLA
Notary Public

DREW HOMOLA
NOTARY PUBLIC
STATE OF WYOMING
COMMISSION ID: 163008
MY COMMISSION EXPIRES: 08/25/2029

My commission expires: 08/25/2029

Sue Goodman <sgoodman@sheridanwy.gov>

Fwd: PL-24-12,ORD 2283 rezone -concerns

1 message

Thomas Morneau <tmorneau@sheridanwy.gov> Tue, May 14, 2024 at 1:22 PM
To: Hanns Mercer <hmercer@sheridanwy.gov>, Sue Goodman <sgoodman@sheridanwy.gov>

FYI

Just received this email about proposed rezone.

Regards,

Thomas L. Morneau, P.E.
(307)-675-4228
City Engineer

---------- Forwarded message ---------
From: **John Vanblitter** <vanblitter@gmail.com>
Date: Tue, May 14, 2024 at 1:17 PM
Subject: PL-24-12,ORD 2283 rezone -concerns
To: tmorneau@sheridanwy.gov <tmorneau@sheridanwy.gov>

May 14,2024
John vanBlitter 41 W 4 st, Sheridan WY 82801
vanblitter@gmail.com

My property is next to subject property for proposed zoning changes.
- new owner has not stated what kind of retail/office or commercial business use. (current owner is star liquor store owner)
A gas station,liquor store would be inappropriate use due to close proximity to existing residential homes
Existing gas station on main and 4th. store,restaurant has had negative impacts with rubbish,
inadequate parking,loitering, and increasing problems with crime.

Future development should address minium parking standard,such as, one or more spaces per residential unit, 3 or more for employees (retail,office)

Property needs to be up to current codes in regards to utilities. ,currently, the three residential properties are all on the same line running to main sewer line on Val Vista. On going problem last ten years with blockage and collapse line on subject rezone property. Owner did not want to upgrade or let anyone near his property to fix or upgrade.
Public works has tried to clear lines on multiple times. my plumber had to snake 200ft to main line twice a year. Engineer tells me city has no responsibility for owner property lines.line is not on my property and have on numerous times tried to solved.

In Conclusion, My retirement home should have proper sewer/sanitation regardless of neighbor blockage. paying city services for water,sewer and garbage?
No Problem with rezone given the close proximity to main street and expanding downtown and believe multi use residential to be an ideal use for the community and not impact existing neighbors.

sincerely,
John vanBlitter
vanblitter@gmail.com

CITY OF SHERIDAN, WYOMING

55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Clerk

MEMORANDUM

RE: Public Hearing for New Bar & Grill Liquor License #7 Application for Frackelton's - City Clerk Cecilia Good

From: Cecilia Good, City Clerk

To: City Council

CC:

Date:

Discussion:

See attached application.

Attachments

Application

(7/23)

NEW OR TRANSFER LIQUOR LICENSE OR PERMIT APPLICATION

FOR LIQUOR DIVISION USE ONLY		
Customer #:		
Trf from:		
Reviewer:	Initials	Date
Agent:		/ /
Mgr:		/ /

To be completed by City / Town / County Clerk

Local License #: 7

License Fees

Annual Fee: $_____

Prorated Fee: $_____

Transfer Fee: $_____

Publishing Fee: $_____

Publishing Fee Direct Billed to Applicant: ☐

Date filed with clerk: 4 / 30 / 24

Advertising Dates: (2 Consecutive Weeks Prior to Hearing)

5/6/24 & 5/13/24

Public Hearing Date: 5 / 20 / 24

License Term: 5 / 21 / 24 (Month / Day / Year) Through 12 / 31 / 24 (Month / Day / Year)

LICENSING AUTHORITY: Begin publishing promptly. As W.S. 12-4-104(d) specifies: **NO LICENSING AUTHORITY SHALL APPROVE OR DENY THE APPLICATION UNTIL THE LIQUOR DIVISION HAS CERTIFIED THE APPLICATION IS COMPLETE.**

Applicant (Business Name): Phoenix Restaurant Group, LLC

Doing Business As (DBA) / Trade Name: Frackelton's

Building to be licensed / Building Address: 55 N. Main Street
(Address Number, and Suite or Unit Number, and Street or Road Name)
Sheridan (City) WY (State) 82801 (Zip) Sheridan (County)

Local Mailing Address: 55. N. Main Street
(Address Number or PO Box, and Suite or Unit Number, and Street or Road Name)
Sheridan (City) WY (State) 82801 (Zip) Sheridan (County)

Local Business Telephone Number: (307)675-6055 Fax Number: _____

Business E-Mail Address: _____

Business Primary Contact: Ryan (First Name) Winner (Last Name)

FILING FOR

☒ NEW LICENSE

☐ TRANSFER OF LOCATION

☐ TRANSFER OF OWNERSHIP
☐ ASSIGNMENT LETTER MUST BE ATTACHED

FORMERLY HELD BY: _____

FILING IN (CHOOSE ONLY ONE)

☒ CITY / TOWN OF: Sheridan

☐ COUNTY OF: _____

FILING AS (CHOOSE ONLY ONE)

☐ INDIVIDUAL
☐ PARTNERSHIP
☐ LP ☐ LLP ☐ LLLP
☒ LLC ☐ LC
☐ CORPORATION (INC)
☐ POLITICAL SUDIVISION
☐ ORGANIZATION
☐ OTHER _____

TYPE OF LICENSE OR PERMIT (CHOOSE ONLY ONE)

☐ **RETAIL LIQUOR LICENSE**

PRIMARY BUSINESS TYPE (CHOOSE ONLY ONE)
☐ ON-PREMISE BAR
☐ OFF-PREMISE PACKAGE STORE
☐ ON & OFF PREMISE BAR & PACKAGE STORE

☐ RESTAURANT LIQUOR LICENSE
☒ BAR AND GRILL LIQUOR LICENSE
☐ RESORT LIQUOR LICENSE

LIMITED RETAIL LIQUOR LICENSE (CLUB)
☐ VETERANS CLUB
☐ FRATERNAL CLUB
☐ GOLF CLUB
☐ SOCIAL CLUB

☐ MICROBREWERY PERMIT
☐ WINERY PERMIT
☐ MANUFACTURER SATELLITE PERMIT
☐ WINERY SATELLITE PERMIT
☐ COUNTY MALT BEVERAGE PERMIT
☐ SPECIAL MALT BEVERAGE PERMIT

SPECIAL STATUTORY DESIGNATIONS (CHOOSE ONLY ONE)

☐ COMMERCIAL AIRPORT (W.S. 12-4-201(d)(iv))
☐ GOLF CLUB (W.S. 12-5-201(f))
☐ GUEST RANCH (W.S. 12-5-201(f))
☐ RESORT (W.S. 12-4-401(iv) / 12-5-201(f))
☐ GOLF CLUB-POLIT. SUBDIVISION (W.S. 12-4-301(e) / 12-5-201(f))
☐ Other: _____

OPERATIONAL STATUS (To Assist the Liquor Division with scheduling inspections (W.S. 12-1-101(a)(xxi) / 12-2-301(c) / 12-4-103(a)(iv)))

☒ FULL TIME
☐ SEASONAL
☐ NON-OPERATIONAL / PARKED

MONTHS OF OPERATION from _____ to _____ ☒ All Year (Jan-Dec)

DAYS OF WEEK OF OPERATION from MON to SAT ☐ Every Day (Mon-Sun)

HOURS OF OPERATION from 3 to 9 ☐ 24 Hours a Day

(7/23)

ALL APPLICANTS MUST COMPLETE QUESTIONS 1- 3

1. BUILDING OWNERSHIP: W.S. 12-4-103(a)(iii)
Does the Applicant own or lease the licensed building?

(a) The Applicant **OWNS** the licensed building. ☐ YES (own)
(b) The Applicant **LEASES** the licensed building. ☒ YES (lease)

If the building is leased, please submit a copy of the lease and indicate:

(i) Lease term expiration date; located on page 1 paragraph 3 2.

Note: The lease term **MUST** continue at least through the term of the liquor license or permit

(ii) **Sales** provision for alcoholic or malt beverages: located, on page 3 paragraph 9.

Note: The lease **MUST** contain a provision for **SALE OF ALCOHOLIC or MALT BEVERAGES.**

---

2. LIQUOR BUSINESS CONTROL: W.S. 12-4-601(b)

(a) To operate the liquor business, has the business or license/permit been assigned, leased, transferred or contracted with any other person (entity) to operate and assert total or partial control of the license or permit or the licensed building? ☐ YES ☒ NO

(b) If the answer was **YES** to 2(a) above, explain fully and submit any documents in connection there within.

---

3. INTEREST IN LICENSE OR PERMIT: W.S. 12-5-401, 12-5-402, 12-5-403 -

Does any alcohol manufacturer, brewer, rectifier, wholesaler, or through a subsidiary affiliate, officer, director or member of any such firm:

(a) Hold any interest in the license/permit applied for? ☐ YES ☒ NO

(b) Furnish by way of loan or any other money or financial assistance for purposes hereof in the business? ☐ YES ☒ NO

(c) Furnish, give, rent or loan any equipment, fixtures, interior decorations or signs other than standard brewery or manufacturer's signs? ☐ YES ☒ NO

(d) If the answer was **YES** to any of the above, explain fully and submit any documents in connection there within.

---

4. RETAIL LIQUOR LICENSE-COUNTY LOCATIONS ONLY: W.S. 12-4-201(f)(ii)

Is the licensed building within five (5) miles of an incorporated town or city? ☐ YES ☐ NO

---

5. RETAIL LIQUOR LICENSE-COMMERCIAL SERVICE AIRPORTS ONLY: W.S. 12-4-201(m)

(a) Will food and beverage services be contracted or subcontracted? ☐ YES ☐ NO

1. If **YES**, is a copy of the food and beverage contract or lease attached? ☐ YES ☐ NO

---

6. BAR AND GRILL LICENSE OR RESTAURANT LIQUOR LICENSE ONLY: 12-4-413(a) / W.S. 12-4-407(a)

Is a copy of the valid food service permit or the approved permit application attached? ☐ YES ☒ NO

---

7. RESORT LIQUOR LICENSE: W.S. 12-4-401 through W.S. 12-4-403(b)

Submitted to State

Does the resort complex:

(a) Have an actual valuation of at least one million dollars, or have committed or expended at least one million dollars ($1,000,000.00) on the complex, excluding the value of the land? W.S. 12-4-401(b)(i) ☐ YES ☐ NO

(b) Include a restaurant and a convention facility; a convention facility that will seat at least one hundred (100) persons? W.S. 12-4-401(b)(ii) ☐ YES ☐ NO

(c) Include motel, hotel or privately owned condominium, town house or home accommodations approved for short term occupancy with at least one hundred (100) sleeping rooms? W.S. 12-4-401(b)(iii) ☐ YES ☐ NO

(d) If no on question (c), have a ski resort facility open to the general public in which has been committed or expended not less than 10 million dollars ($10,000,000.00)? W.S. 12-4-401(b)(iv) ☐ YES ☐ NO

(e) Will food and beverage services be contracted or subcontracted? W.S. 12-4-403(b) ☐ YES ☐ NO

1. If **YES** to (e), is a copy of the food and beverage contract or lease attached? ☐ YES ☐ NO

---

8. MICROBREWERY PERMIT ONLY: WHOLESALE DISTRIBUTION: W.S. 12-2-201(a)

(a) Will the microbrewery self-distribute its products or distribute through a licensed wholesaler? ☐ YES ☐ NO

If **YES**, a wholesale malt beverage license from the Liquor Division will be required.

9. LIMITED RETAIL (CLUB) LIQUOR LICENSE:

FRATERNAL CLUBS W.S. 12-1-101(a)(iii)(B)

(a) Has the fraternal organization been actively operating in at least thirty-six (36) states? ☐ YES ☐ NO

(b) Has the fraternal organization been actively in existence for at least twenty (20) years? ☐ YES ☐ NO

10. LIMITED RETAIL (CLUB) LIQUOR LICENSE:

VETERANS CLUBS W.S. 12-1-101(a)(iii)(A):

(a) Does the Veteran's organization hold a charter by the Congress of the United States? ☐ YES ☐ NO

(b) Is the membership of the Veteran's organization comprised only of Veterans and its duly organized auxiliary? ☐ YES ☐ NO

11. LIMITED RETAIL (CLUB) LIQUOR LICENSE:

GOLF CLUBS W.S. 12-1-101(a)(iii)(D) / W.S. 12-4-301(e):

(a) Does the golf club have more than fifty (50) bona fide members? ☐ YES ☐ NO

(b) Does the Applicant, maintain, or operate a bona fide golf course together with a clubhouse? ☐ YES ☐ NO

(c) Is the Applicant a Political Subdivision of the state that owns, maintains, or operates this golf course? ☐ YES ☐ NO

1. Will food and beverage services be contracted or subcontracted? W.S. 12-4-301(e) ☐ YES ☐ NO
2. If **YES**, is a copy of the food and beverage contract or lease attached? ☐ YES ☐ NO

12. LIMITED RETAIL (CLUB) LIQUOR LICENSE:

SOCIAL CLUBS W.S. 12-1-101(a)(iii)(E) / W.S. 12-4-301(b):

(a) Does the club have more than one hundred (100) bona fide members who are residents of the county in which the club is located? ☐ YES ☐ NO

(b) Is the club incorporated and operating solely as a nonprofit organization under the laws of this state? ☐ YES ☐ NO

(c) Is the club qualified as a tax-exempt organization under the Internal Revenue Service? ☐ YES ☐ NO

(d) Has the club been in continuous operation for a period of not less than one (1) year? ☐ YES ☐ NO

(e) Has the club received twenty-five dollars ($25.00) from each bona fide member as recorded by the secretary of the club and are club members at the time of this application in good standing by having paid at least one (1) full year in dues? ☐ YES ☐ NO

(f) Does the club hold quarterly meetings and have an actively engaged membership carrying out the objectives of the club? ☐ YES ☐ NO

(g) Is a true copy of the club bylaws attached to this application? ☐ YES ☐ NO

(h) Has at least fifty one percent (51%) of the membership signed a petition indicating a desire to secure a Limited Retail Liquor License? (Petition(s) Attached) ☐ YES ☐ NO

13. Applicant is Filing As Individual, Partnership, Political Subdivision, Organization or Other: W.S. 12-4-102(a)(ii) & (iii)

Each individual, partner or officer (as applicable) must complete all of the information below.
(If more information is required, list on a separate piece of paper and attach to this application.)

True and Correct Name	Date of Birth	Residence Address No. & Street City, State & Zip ***DO NOT LIST PO BOXES***	Residence Phone Number	Have you been a DOMICILED resident for at least 1 year and not claimed residence in any other state in the last year?	Have you been convicted within the previous 10 years of: a Felony Violation Relating to Alcoholic Liquor or Malt Beverages?	Have you been convicted within the previous 10 years of: any Violation Relating to Alcoholic Liquor or Malt Beverages?
				YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐
				YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐
				YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐
				YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐
				YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐

CITY OF SHERIDAN, WYOMING

55 Grinnell Plaza
Sheridan Wyoming 82801
(307) 675-4211
cgood@sheridanwy.gov

BAR & GRILL/RESTAURANT
LIQUOR LICENSE OPERATION PLAN

Name as it appears on license:	Phoenix Restaurant Group, LLC
Common Name (doing business as):	Frackelton's
Street Address:	55 N Main St., Sheridan, Wy 82801
Phone #:	307-675-6055

Hours of Operation

Our planned hours of operation are:

Monday:	3-9
Tuesday:	3-9
Wednesday:	3-9
Thursday:	3-9
Friday:	3-9
Saturday:	3-9
Sunday:	Closed

Last call will be 15 **minutes before closing and last service will be** 10 **minutes before closing.**

Use of License

Please describe the characteristics of your operations, including any entertainment that will contribute to the 60% food sales/entertainment requirement if applying for a Bar & Grill license:

We will be mainly a restaurant serving food but would like to complement those sales by possibly having small 1 person live music.

CITY OF SHERIDAN, WYOMING

55 Grinnell Plaza
Sheridan Wyoming 82801
(307) 675-4211
cgood@sheridanwy.gov

- **Provide your dispensing building design referencing alcohol service and storage locations, including outside consumption areas***

Nature of Business:	Regular Events:	Special Events:	Other:
• Bar	• Happy Hour	Charity Events	
• Restaurant	• Live Entertainment		

Security/ Crowd Control/ Capacity Limits

The official occupancy limit for our business is:

149

In order to comply with our occupancy limits we shall:

Use our reservation system to keep track of Customers and staff in the business and go on a wait if necessary.

We shall maintain peace and order in and around our business by (but not limited to):

- Requiring TIPS Training
- Reporting altercations or potential altercations to the Sheridan Police Department
- Follow all guidelines established by Chapter Four of Sheridan Municipal Code

Rules of the establishment shall be enforced by:

Our management team will be taking training courses on how to properly execute our rules and regulations regarding alcohol service and proper steps to take in the event of an issue arising.

Alcohol Management

CITY OF SHERIDAN, WYOMING

55 Grinnell Plaza
Sheridan Wyoming 82801
(307) 675-4211
cgood@sheridanwy.gov

To comply with Sheridan Municipal Code regarding alcoholic and malt beverages, including the use of eighteen (18) to twenty (20) year old servers in restaurants if applicable, our establishment will:

Enforce a strict policy adhering to all local, State and federal regulations. Require continuing education on responsible alcohol serving. We will also be utilizing the dispensing area appropriately.

I acknowledge that the Sheridan Police Department is an agent of the licensing authority and shall have the ability to inspect the licensed premises. Violations of City Code are subject to Section 4-13, resulting in action from Administrative Fees up to license revocation.

Signature of License Holder

4-26-24

Date

Ryan Wunner

Printed Name

*Outside consumption areas located on public right-of-way require a Sidewalk Use Agreement obtainable from the City Clerk's Office. Any substantial improvements on public right-of-way require a lease agreement.

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Executive

MEMORANDUM

RE: Reappointment of DJ Dearcorn to the Sheridan Recreation District for a 3-year term expiring on June 30, 2027.

From: Richard Bridger, Mayor

To: City Council

CC: Stuart J. McRae, City Administrator

Date: 05/20/2024

Recommendation:

I would like to recommend the reappointment of DJ Dearcorn to the Sheridan Recreation District for a 3-year term expiring on June 30, 2027.

CITY OF SHERIDAN, WYOMING

55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Public Works

MEMORANDUM

RE: Award to Burns & McDonnell for the 30% Design of the Sheridan Wastewater Treatment Plant Upgrades Project in the Amount of $298,079

From: Thomas Morneau, City Engineer

To: City Council

CC:

Date: 12/28/2023

Recommendation:

Staff recommends that the Mayor and City Council award the 30% design of the Sheridan Wastewater Treatment Plant Upgrades in the amount of $298,079.

Staff requests that for the Wastewater Treatment Plant Upgrades Project, the Mayor and City Council authorize the Public Works Director, Hanns Mercer, to act on behalf of the Council and Mayor on all matters related to this project.

Background:

The Sheridan Wastewater Treatment Plant is in need of several upgrades and improvements to address immediate health and safety concerns, continuation of community wastewater treatment services, and environmental protection needs. These projects have been prioritized, and the goal is to replace, improve, and modify crucial unit processes reaching obsolescence and presenting significant risks. The risks are not only to the health and safety of operations staff and the community, but also of the capability of the facility to ensure uninterrupted processing of the City's wastewater to achieve and/or maintain an adequate minimal level of service. The recommended priority improvements listed below are the most pressing and highest risk assets among those identified at the treatment facility.

Discussion:

The recently updated Wastewater System Master Plan and Plant Assessment identified that the recommended priority improvements listed are the most pressing and highest risk assets among those identified at the treatment facility. The site's electrical transformer has exceeded its useful life and is in need of replacement. The heating and ventilation system is not adequate and does not meet NFPA 820 requirements in various locations throughout the facility. The original raw sewage submersible pumps installed in 1981 have reached the point of obsolescence and to repair and maintain present unsafe conditions for operational staff. The belt filter press #2 is over 30 years old and is at the end of its useful life, requiring replacement with a new press that will provide operational redundancy and flexibility. The rotary drum influent screen within the headworks facility is 26 years old, and the lack of redundancy within the facility poses risk to downstream equipment for any period with the automatic screen not operational. The proposed solution includes constructing an additional flow channel to accommodate a second influent screen.

Funding:

This project is funded by Sewer Enterprise funds and a CWSRF loan.

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Clerk

MEMORANDUM

RE: **Minutes of Regular Council Meeting from May 6, 2024**
From: Cecilia Good, City Clerk
To: City Council
CC:
Date:

Discussion:
See attached draft minutes.

Attachments

Minutes

CITY OF SHERIDAN, WYOMING

MINUTES OF REGULAR COUNCIL MEETING

COUNCIL CHAMBERS **7:00 P.M.** **April 15, 2024**

1. Mayor Bridger called the meeting to order at 7:00 P.M.

2. Mayor Bridger led the Pledge of Allegiance to the Flag.

3. The invocation was led by Beverly Leichtnam.

4. The meeting was called to order with a quorum as follows:

Mayor Rich Bridger	Absent
Kristen Jennings	Present
Steven Brantz	Present
Andrew Patceg	Present
Greg Luhman	Present
Terry Weitzel	Present
Aaron Linden	Present

5. Councilmember Brantz moved, seconded by Councilmember Linden to approve the agenda.

Mayor Rich Bridger	Absent
Kristen Jennings	Aye
Steven Brantz	Aye
Andrew Patceg	Aye
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

6. Community Update

A. Michael Thomas, Social Studies Teacher at Sheridan High School, provided a We The People update from Nationals.

B. Kayla Stevens, Mental Health Provider at VA Health Care System and Board Member of Sheridan County National Alliance on Mental Illness (NAMI), presented the National Mental Health Awareness Month Proclamation.

C. Police Chief Travis Koltiska presented the National Police Week 2024 Proclamation.

D. City Clerk/Strategy Director Cecilia Good presented the Professional Municipal Clerks Week Proclamation.

E. Permit Technician Ashley Garcia presented the Building Safety Month Proclamation.

7. Staff Update

A. City Administrator Stuart McRae presented a Budget Timeline update.

8. Comments from the Public

A. There were no comments from the public.

Mayor Bridger joined the meeting at 7:27 P.M.

9. Consent Agenda

A. Bid Award to Simon Contractors for the City of Sheridan 2024 Pavement Maintenance Project in the Amount of $1,632,334.

B. Final Acceptance of Public Infrastructure for Cloud Peak Storage

C. Acceptance of Quitclaim Deed for 12th St Realignment

D. Minutes of Special Council Meeting April 25, 2024

E. Minutes of Special Council Meeting April 17, 2024

F. Minutes of Regular Council Meeting April 15, 2024

G. Claims

Wex Bank	Fuel - 3/14/2024 - 3/21/2024	$529.13
Advocacy & Resource Ctr	FY24 support	$7,500.00
Child Development Center Region 2	FY24 support	$2,625.00
Compass - Center for Families	FY24 support	$5,000.00
Downtown Sheridan Assoc	FY24 support	$15,000.00
Emergency Services Consulting International Inc.	SFR Master Plan	$5,040.00
Fremont Motor Sheridan Inc	Wastewater #WW201 - 2024 Ford F15	$42,430.00
Habitat for Humanity	FY24 support	$6,250.00
Montana Dakota Utilities Co	partial MDU bills	$1,957.00
NAMI Wyoming	FY24 Support	$1,250.00
Second Chance Sheridan Cat Rescue	FY24 support	$15,000.00
Senior Citizens Council	FY24 support	$20,000.00
Sheridan Artists Guild Et al	FY24 support	$3,000.00
Sheridan Arts Council	FY24 support	$375.00
Sheridan Community Land Trust	FY24 support	$7,500.00
Sheridan County Chamber of Commerce	FY24 support	$12,500.00
Sheridan County Conservation District	FY24 support	$3,750.00
Sheridan County Historical Society and Museum	FY24 support	$5,000.00
Steve's Truck Service Inc	RC363 Rebuild - engine, radiator & DPF	$39,337.90
Uprising	FY24 support	$2,125.00
AT&T Mobility	FD MDC for Engine 1 and Engine 2 for	$93.14
CenturyLink Communications LLC	April phone charges	$1,193.41
Floyd's Truck Center WY	Streets - #ST5-01 - FT-30-2 T Tilt Bed Tr	$32,696.84
Local Govt Liability Pool	insurance claim	$7,510.97
Montana Dakota Utilities Co	partial MDU bills April	$21,842.70
Range	telephone and internet service April	$2,800.79
Elan Financial Services	training	$98.99
Elan Financial Services	Job Posting for City Planner and City Tr	$1,947.45
Elan Financial Services	background search, postage, training	$1,178.99
Elan Financial Services	dry cleaning	$13.46
Elan Financial Services	Conference Registration & Luncheon	$135.00
Elan Financial Services	office supplies, hardware, keys, batteri	$1,487.03
Elan Financial Services	Travel expenses for 2024 educode con	$7,433.29

Elan Financial Services	tools	$187.50
Elan Financial Services	Working Meetings & Lunches	$394.98
Elan Financial Services	Sympathy Cards/Congrats Card, Certifi	$1,367.29
Elan Financial Services	March 2024Truck Ramps and Faucet fo	$103.77
Elan Financial Services	fuel, stickers, boots	$999.55
Elan Financial Services	uniforms, training, travel	$1,068.19
Elan Financial Services	hotel refund	($41.73)
Elan Financial Services	merch return	($9.00)
Elan Financial Services	return of merch	($29.88)
Elan Financial Services	registration	$25.00
Elan Financial Services	merch return	($33.18)
Elan Financial Services	travel, certification	$268.44
Elan Financial Services	training, uniform, registration, tool	$1,583.41
Elan Financial Services	uniforms, equipment, certification	$1,248.05
Elan Financial Services	merch return	($49.99)
Elan Financial Services	training, software	$209.49
Elan Financial Services	desk, supplies	$4,380.97
Elan Financial Services	merch return	($80.54)
Elan Financial Services	travel reimbursment	($841.85)
Elan Financial Services	March 2024Community Clean Up Give	$1,511.33
Elan Financial Services	certification	$200.00
Elan Financial Services	Qdoba (Training/Webinar lunch) Vol II	$322.18
Elan Financial Services	Drill Press Guard	$268.60
Elan Financial Services	software subscriptions, training, unifor	$1,574.94
Elan Financial Services	software	$2,287.96
Elan Financial Services	gas, internet, supplies	$326.07
Elan Financial Services	fuel	$61.82
Elan Financial Services	Monitors, TV, surge protection, study	$768.10
Elan Financial Services	Spot lights for UM job site	$201.48
AT&T Mobility	March phone bills	$1,631.65
CenturyLink Communications LLC	phone bills WTP and Cemetery	$2,845.00
Delta Wye Inc	Traffic Signal Cabinet-Labor to repair	$17,837.00
Montana Dakota Utilities Co	partial MDU bills March	$21,701.32
307 Auto Glass LLC	WC701 - R&R windshield	$200.00
307 Auto Glass LLC	WC7002 - windshield repair	$84.99
307 Auto Glass LLC	RC432 - windshield installation	$150.00
A Clear View Inc	Interior and exterior window cleaning	$1,750.00
A Plus Plumbers & Appliance Repair LLC	Plumbing work	$115.00
Ace Hardware-Newkirk	Shop supplies for parks grounds maint	$76.73
Ace Hardware-Newkirk	Paint Supplies	$13.39
Ace Hardware-Newkirk	Magnet swivel hooks (shields/guards)	$70.04
Ace Hardware-Newkirk	Expanded sheet metal (for shields/gua	$40.31
Ace Hardware-Newkirk	Misc. parts for plant project	$62.26
Ace Hardware-Newkirk	Hex Key Tool Set-Decorative Lights	$23.03
Ace Hardware-Newkirk	Palm Sander-Barricade Repairs	$59.99
Ace Hardware-Newkirk	Leaf blower repair for Parks	$220.95
Advance Fence	Lyon's Dog Park entrance	$973.77
A-Line Roofing and Exteriors	Repair to Garage Roof from Sanitation	$500.00
AlphaGraphics of Wyoming	CH - vinyl lettering & install - Mail Roo	$111.41
Altitude Recycling Equipment LLC	Splitter Manifold with O-Ring Kit for Ba	$665.00

Amazon Capital Services	No Smoking Signs	$19.94
Amazon Capital Services #A33MIR27FEZN42	ITEM: Liebert PST5 UPS - 850VA/500W	$89.49
Amazon Capital Services #A33MIR27FEZN42	25 ft power strip	$38.99
Amazon Capital Services #A33MIR27FEZN42	labels, organizer, markers, letter tray, s	$181.52
Amazon Capital Services #A33MIR27FEZN42	hanging folders, dry erase board, mark	$105.47
Amazon Capital Services #A33MIR27FEZN42	toner cartridge	$73.00
Amazon Capital Services #A33MIR27FEZN42	inner tubes for tires	$33.96
Amazon Capital Services #A33MIR27FEZN42	water filter	$154.00
Amazon Capital Services #A33MIR27FEZN42	Exit Signs and Microphone	$190.28
Amazon Capital Services #A33MIR27FEZN42	elliptical pedal machine, electric tread	$822.18
Amazon Capital Services #A33MIR27FEZN42	ITEM: Brother Genuine High Yield Ton	$189.04
Amazon Capital Services #A33MIR27FEZN42	Toner	$79.79
Amazon Capital Services #A33MIR27FEZN42	Cameras	$273.84
Amazon Capital Services #A33MIR27FEZN42	New swing for Kendrick Park	$32.98
Amazon Capital Services #A33MIR27FEZN42	gloves, seeds, mice bait	$513.75
Amazon Capital Services #A33MIR27FEZN42	Cleaning supplies and First Aid	$52.43
Amazon Capital Services #A33MIR27FEZN42	120 V light bulbs	$70.10
Amazon Capital Services #A33MIR27FEZN42	markers, whiteboard, t-shirt, battery c	$274.51
Amazon Capital Services #A33MIR27FEZN42	scanner	$157.69
Amazon Capital Services #A33MIR27FEZN42	Safety Mirror, copy paper	$93.98
Amazon Capital Services #A33MIR27FEZN42	iphone charger and case	$66.69
Amazon Capital Services #A33MIR27FEZN42	door hangers, pens, grip holder	$92.96
Amazon Capital Services #A33MIR27FEZN42	battery charger, batteries	$84.15
Amazon Capital Services #A33MIR27FEZN42	ITEM: Streamlight 44910 Waypoint 40	$250.24
Amazon Capital Services #A33MIR27FEZN42	circuit breakers	$169.97
Amazon Capital Services #A33MIR27FEZN42	splice terminals	$186.99
American Maid	Monthly Cleaning Service for Landfill O	$300.00
American Maid	Monthly Cleaning Service for Scale Hou	$150.00
American Maid	Monthly Cleaning Service for Recycling	$300.00
American Welding & Gas Inc	Carbon Dioxide for Welding	$287.08
American Welding & Gas Inc	Acetylene gas for plant project	$67.35
Angel Armor LLC	Duty bulletproof vest	$1,396.91
AT&T Mobility	MDC Aircards	$480.48
Automationdirectcom	Air Scour Blower Project	$2,406.00
Automationdirectcom	Control Upgrade for RWW Pump Statio	$2,596.50
Automationdirectcom	Control Upgrade for RWW Pump Statio	$2,596.50
Automationdirectcom	Alum Tanks	$1,741.00
Automationdirectcom	Upgrade Alum/Poly: Chemical pump co	$2,005.50
Big Horn Sanitation	SCG portable toilet - March	$87.53
Big Horn Sanitation	Sanitation fee for Malcolm Wallop Park	$126.50
Big Horn Tire Inc	WC7002 - 11R22.5 Galaxy DR271-G 16	$2,253.12
Bighorn Design Studio LLC	jacket, shirt	$141.00
Bighorn Design Studio LLC	vest, cardigan, shirt, jacket	$161.00
Bighorn Design Studio LLC	Streets - uniforms/clothing	$60.00
Black Mtn Engraving	Office supplies - name plates	$55.70
Bloedorn Lumber	Rebar building supplies 4/2/2024	$146.08
Bluemel Plumbing & Heating	Sewer camera for City Hall	$483.75
Brian's Boot & Shoe Company	Uniforms/clothing - boots	$170.95
Brian's Boot & Shoe Company	Uniforms/clothing - boots	$200.00
Brian's Boot & Shoe Company	Boots for George (Butch) Kennah	$193.45

Buffalo Computer Consulting LLC	PowerEdge T150 Server	$1,325.00
C & K Equipment Sales Inc	Tiller rental	$200.00
Carquest Auto Parts	KGC shop supplies	$78.17
Carquest Auto Parts	Fluids for Bld Division inspector vehicle	$6.24
Carquest Auto Parts	2 Antifreeze Dex 50/50 for Tower 1 4-2	$39.88
Carquest Auto Parts	2-LED Bulbs for Engine 2 Pump Panel L	$38.48
Carquest Auto Parts	Anti-freeze and grease for KGC	$29.89
Carquest Auto Parts	oil filter	$6.29
Carquest Auto Parts	brake pads, painted rotor	$143.62
Carquest Auto Parts	lube, air filters	$93.77
Carquest Auto Parts	fuel filter, lube	$60.53
Carquest Auto Parts	oil filter, air filter	$20.91
Carquest Auto Parts	mirror	$21.66
Carquest Auto Parts	xtraclear	$13.39
Carquest Auto Parts	lithium jump starter	$133.99
Carquest Auto Parts	blower motor	$60.49
Carquest Auto Parts	lube, fuel filter	$29.14
Carquest Auto Parts	fuel filter	$16.97
Carquest Auto Parts	fuel spin-on	$46.19
Carquest Auto Parts	air filter, air/water seperator, air eleme	$159.92
Carquest Auto Parts	fuel, air filters	$205.93
Carquest Auto Parts	oil filter, air filter	$12.94
Carquest Auto Parts	lube, air filters	$155.72
Carquest Auto Parts	oil filter, air filter	$11.29
Carquest Auto Parts	hose assemblies	$289.50
Carquest Auto Parts	serp belt poly rib	$26.45
Carquest Auto Parts	fuel filter, air filters	$65.42
Carquest Auto Parts	hose asembly	$166.87
Carquest Auto Parts	air filter	$86.44
Carquest Auto Parts	fuel element	$36.74
CDG Engineers Inc	W. 5th St. Bridge - Prof Svcs 3/1/24 - 3	$8,145.00
CDG Engineers Inc	S. Downtown - Prof. Svcs. 3/1/24 - 3/3	$12,907.25
Cedars Health LLC	Occupational Testing	$470.00
CMI-Teco	WC718 - filler cap	$138.79
CMI-Teco	WC713 - level sensors	$318.92
Collection Professionals Inc	CPI # 1885 - 3/1/2024-3/31/2024	$379.17
Comtronix	Annual Fire Alarm Monitoring for SFR 5	$540.00
Crescent Electric Supply Co	Fuses	$4.88
Croell Inc	Concrete - City Hall frost free hydrant	$1,700.00
Darla Hawkins or Brett Caiola	Reimb Petty Cash Sept 2023-March 20	$307.54
D-H Technologies LLC	Service Call to SFR-Problem with 307-6	$120.00
Dog and Cat Shelter Inc	FY24 Support	$25,000.00
Employ LLC	temporary labor for recycling	$5,502.64
Energy Laboratories Inc	WY5600052- TOC sample analysis invo	$271.00
Energy Laboratories Inc	WY5600052: TTHM-HAA5s sample ana	$1,433.00
Fastenal Company	Streets supplies	$1.93
Fastenal Company	Weight labels for Shelving	$84.60
Fastenal Company	Misc. hardware: Plant project (Pipe rep	$77.30
Foot of the Bighorns	Utility Tech Shoes	$110.00
Galls LLC	Blackinton Large Sergeant Chevron	$59.95

Gary SPade	Tow	$422.40
Grainger Inc	ST342 - fire hose adapter	$145.22
Grainger Inc	ST303 - rocker switch	$7.32
Grainger Inc	Shop - Jack Stand	$366.83
Grainger Inc	Shop toilet flush valve diaphragm asse	$59.08
Grainger Inc	screwdriver set, eye bolt shank	$59.24
Grainger Inc	inspection label, caution sign	$89.99
Grainger Inc	Shop supplies - safety sign	$67.10
Grainger Inc	Shop supplies - liquid storage containe	$97.08
Granicus	Video Streaming Services (Swagit) FY24	$1,295.00
Greensky Commercial Cleaning	CSC March Janitorial Services	$1,240.00
Hach Company	Reagent set, Chlorine free	$779.50
Harken Supply Inc	Freon Evacuation Recovery Tool and R	$124.74
Hawkins Inc	Stackable Poly Totes	$150.00
Hawkins Inc	Azone 15, Sodium Bisulfite, Filter Aid	$6,773.31
Hawkins Inc	Sodium Hexametaphosphate Crush	$5,754.00
Home Depot Credit Services	Casters; Safety Masks; Spray Handle	$108.21
Home Depot Credit Services	Safety Walk Tape for Recycling Center	$98.82
Home Depot Credit Services	Nylon Rope-Banner Install	$138.00
Home Depot Credit Services	Totes	$37.76
Home Depot Credit Services	Paint sprayer for Parks	$188.48
Home Depot Credit Services	Lumber for Parks	$13.58
Home Depot Credit Services	Paint supplies for Parks	$112.35
Home Depot Credit Services	Bench grinder and pressure washer for	$522.72
Home Depot Credit Services	Firewood	$34.85
Home Depot Credit Services	Paint; Supplies for Office Repairs	$104.60
Home Depot Credit Services	Screws	$36.65
Home Depot Credit Services	Parks grounds maintenance supplies	$37.96
Home Depot Credit Services	Tools for parks grounds maintenance	$106.07
Home Depot Credit Services	Lumber and supplies for SCG	$577.10
Home Depot Credit Services	Screws/Electrical Supplies	$37.98
Hot Iron Inc	Terra Turner Pay App #3 - 3/21/24 - 4/	$372,872.77
Humdinger Equipment LTD	Idler Pulley, Plow Bolt, Hoses and Gask	$1,824.65
iCrave Industries	Installation of K9 crate to vehicle	$5,665.44
iCrave Industries	PD123 - R&R main & auxiliary batteries	$595.65
iCrave Industries	PD104 - R&R APIM module & program	$1,226.87
InfoSend Inc	postage deposit to Infosend	$2,119.50
InfoSend Inc	bill printing & mailing - March	$6,107.49
InfoSend Inc	email/monthly fee - Mar	$139.30
Interstate Engineering Inc	GIS & Planning Svcs thru 3/23/2024	$11,280.00
Interstate Engineering Inc	GIS & Planning Svcs - Prof. Svcs thru 4/	$3,830.00
Joe Johnson Equipment LLC	ST342 - wire, 75 lbs.	$1,750.00
John Deere Financial #1111308145	PK467 - brake kit & hardware	$42.82
John Deere Financial #1111308145	PK467 - brake & hub kits, steering rack	$1,426.12
John Deere Financial #1111308145	Streets - supplies	$88.97
John Deere Financial #1111308145	(4) Pair of Pants	$197.95
John Deere Financial #1111308145	Snap Hook-Banner Install	$5.69
John Deere Financial #1111308145	LOF for JD mower (SW801)	$31.26
John Deere Financial #1111308145	(5) Pair of Pants for George (Butch) Ke	$239.95
John Deere Financial #1111308145	Clamping lever for Community Forestr	$9.99

John Deere Financial #1111308145	Work gloves	$15.98
John Deere Financial #1111308145	Improved lighting in lab area	$191.96
John Markwardt	Moved old furniture to landfill	$400.00
Joshua A Meyers	Safe Rides	$480.00
Kilpatrick Creations Inc	Embroidery: Troy Gilbert	$27.75
Kilpatrick Creations Inc	Clothing for firemen CE, LG, SR, PJ, ZM,	$1,281.00
Kilpatrick Creations Inc	Initial embroidery set up fee "ENGINE"	$45.00
Kilpatrick Creations Inc	(275) Shirts for Community Clean Up D	$2,462.75
Kilpatrick Creations Inc	Sgt Krinkee Memoriam	$176.00
Kois Brothers Equipment Co	WC713 - V2/rapid rail/python universa	$1,311.82
Lawson Products Inc	Shop - Misc Supplies	$181.74
Lawson Products Inc	Shop supplies - absorbent mat roll hold	$255.02
Lease Servicing Center Inc	TV370B and 836C payments	$5,811.21
LJS Concrete & Excavating LLC	Abatement - house demo	$10,000.00
Lube Refiners LLC	PD137 - LOF service	$81.06
Lube Refiners LLC	PD220 - LOF service	$81.06
Lube Refiners LLC	PD101 - LOF service	$81.06
Lube Refiners LLC	PD110 - LOF service	$71.16
Luke A Goddard	Medical Doctor Coverage for SFR for M	$500.00
M&K Rentals	Stump grinder for parks grounds maint	$162.50
Mark Lee Fritz	CSC - L&M for office/bathroom remod	$9,553.00
Midas Tire and Auto	TS21 Front End Alignment	$107.99
Midland Implement Co Inc	Golf - #GC8-01 - Walk-Behind Seeder/T	$8,679.00
Morrison-Maierle Inc	Wetland Dr. Pathway - Prof. Svcs thru	$6,886.50
Motorola Solutions Inc	Cable	$68.26
Mountain View Building Inc	Landfill T678 misc - exc/bacfill liner rep	$511.25
Moxey Schreiber Veterinary Hospital	K-9 Vet Bill	$330.07
Moxey Schreiber Veterinary Hospital	K-9 Vet Bill	$43.46
Moxey Schreiber Veterinary Hospital	K-9 Vet Bill	$34.60
Moxey Schreiber Veterinary Hospital	return of collar and medication	($46.07)
Mullinax Concrete Service & Irrigation	Streets - Washed Sand	$1,994.48
Mullinax Concrete Service & Irrigation	Aggregate for Washington Park	$89.54
Mullinax Concrete Service & Irrigation	Top soil for KGC	$709.53
Mullinax Concrete Service & Irrigation	Aggregate for Thorne Rider Dog Park	$91.35
Mullinax Concrete Service & Irrigation	Streets - sand hot plant	$419.81
Mullinax Concrete Service & Irrigation	Streets - Durapatch Pea Gravel	$216.63
Mullinax Concrete Service & Irrigation	Streets - Grade w/ road base	$350.98
Nancy Jane Trangmoe	Embroidery for George (Buch) Kennah	$60.00
Nancy Jane Trangmoe	Uniform Embroidery	$60.00
Napa Auto Parts	Batteries for TS574	$477.92
Napa Auto Parts	Batteries for TS575	$701.96
Napa Auto Parts	3 way puller for KGC	$10.75
Napa Auto Parts	Shop supplies - Electronic & Parts clean	$54.26
Napa Auto Parts	Spark plug for cemetery	$25.32
Napa Auto Parts	Battery tester	$9.35
Napa Auto Parts	Air filter and anti freeze for KGC	$122.31
Napa Auto Parts	Battery 2-73	$193.49
Napa Auto Parts	items returned	($390.18)
Napa Auto Parts	led, lamp, grommet	$18.96
Napa Auto Parts	heater resistor	$44.98

Napa Auto Parts	fuel and water filter	$40.49
Napa Auto Parts	exactfitblade	$26.48
Napa Auto Parts	grommet	$2.69
Napa Auto Parts	starter	$264.24
Napa Auto Parts	battery box	$49.48
Napa Auto Parts	power steering grill	$472.31
Napa Auto Parts	steering gear	$483.79
Napa Auto Parts	steering fitman arm	$105.07
Napa Auto Parts	oil seal	$51.23
Napa Auto Parts	door hinge pin kit	$78.98
Napa Auto Parts	grommet	$5.92
Napa Auto Parts	blower wheel	$53.98
Napa Auto Parts	brakes	$182.99
Napa Auto Parts	jun blok	$11.69
Napa Auto Parts	switch	$26.99
Napa Auto Parts	hi-amp flush mount	$43.19
Napa Auto Parts	10 bags of floor dry for fire station 4-2	$119.90
Napa Auto Parts	return	($18.00)
Norco Inc	Shop supplies - First Aid	$49.08
Norco Inc	Cases of Glass Cleaner	$237.12
Norco Inc	Medium Puncture Proof Gloves	$256.00
Norco Inc	Disposable Gloves and 6 Cases of Trash	$473.10
Norco Inc	Large Black Leather Gloves	$11.08
Norco Inc	Streets - hard hat	$26.67
Norco Inc	(3) Cases of Paper Towels	$254.79
Norco Inc	Propane for Recycling Forklift 04/10/2	$246.18
Norco Inc	Disinfectant Deodorant	$67.92
Norco Inc	Streets - Misc Supplies	$20.22
Norco Inc	Paper cleaning supplies for City Hall	$217.83
Norco Inc	Streets - safety signs	$61.00
O'Dell Construction Inc	Recycle Center Add - Pay App #10 Reta	$24,582.70
O'Dell Construction Inc	Recycle Center Add - Const. Pay App #9	$12,628.35
Office Shop Inc	Monthly Copy Charges	$99.04
Office Shop Inc	3rd floor copy costs	$224.32
Office Shop Inc	Admin Copier	$470.00
Office Shop Inc	UM copier charges	$33.43
Office Shop Inc	1st floor copier costs March	$187.25
Office Shop Inc	1st floor copier costs overage	$743.02
Office Shop Inc	basement printer rate for January thru	$223.28
Office Shop Inc	City Hall copier usage 3/25/24 - 4/24/2	$297.66
Office Shop Inc	Toner for Municipal Court printer	$138.13
Office Shop Inc	Streets copy costs	$129.19
Office Shop Leasing	Copier Leases	$131.93
Office Shop Leasing	Copier Leases	$60.00
Office Shop Leasing	UM copier lease	$54.48
One-Time Customer Refund Vendor	Deposit Refund - 603 Aspen Trl	$29.65
One-Time Customer Refund Vendor	Deposit Refund - 2020 Quail Ct	$102.80
One-Time Customer Refund Vendor	Deposit Refund - 1257 Val Vista St.	$81.41
One-Time Customer Refund Vendor	Deposit Refund - 739 E Timberline Dr.	$52.67
One-Time Customer Refund Vendor	Deposit Refund - 206 1/2 N Main St.	$78.06

One-Time Customer Refund Vendor	Deposit Refund - 829 S Sheridan Ave	$45.50
One-Time Customer Refund Vendor	Deposit Refund - 1425 Ridgeway Ave	$125.00
One-Time Customer Refund Vendor	RFC 2024 - 814 N Custer St #103	$20.51
One-Time Customer Refund Vendor	Refund refrigeration decommission fee	$29.20
One-Time Customer Refund Vendor	Refund - 3270 Wrench Dr # IRRG	$3,411.38
One-Time Employee Reimbursement Vendor	Reimb running shoes for KCondos 4-7-	$121.30
One-Time Employee Reimbursement Vendor	Meals Per Diem (379.50) and Uber/Lyf	$529.11
One-Time Employee Reimbursement Vendor	Meals Per Diem (379.50) and Uber/Lyf	$530.50
One-Time Employee Reimbursement Vendor	Reimbursement for airfare, lodging, an	$1,928.44
One-Time Employee Reimbursement Vendor	Reimburse meals per diem for MGallo	$147.50
One-Time Employee Reimbursement Vendor	Steel Toe Shoes - Reimbursement for C	$74.19
One-Time Employee Reimbursement Vendor	Work Boots	$54.04
One-Time Employee Reimbursement Vendor	WARS conference travel reimbusemen	$163.50
One-Time Employee Reimbursement Vendor	WARS conference travel reimbusemen	$163.50
One-Time Employee Reimbursement Vendor	WARS conference travel reimbusemen	$163.50
One-Time Employee Reimbursement Vendor	Travel Expense Reimbursement, WY Ac	$458.95
O'Reilly Auto Enterprises LLC	PD Durango - headlight bulb	$30.39
O'Reilly Auto Enterprises LLC	9 bags of floor dry for fuel spill at 1229	$161.91
O'Reilly Auto Enterprises LLC	PD101 - headlight bulb	$25.77
Pace Analytical Services LLC	Monthly Oil & Grease Effluent Tests W	$121.80
Pace Analytical Services LLC	WY5600052-Bac-T sample analysis invo	$493.20
Peterbilt of Wyoming	WC320 - relay valve	$81.76
Polydyne Inc	Clarifloc 450 LB Drum x4	$3,150.00
Positive Concepts Inc	Thermal ticket paper	$260.64
Powder River Power of Sheridan Inc	CamLock Gaskets for Sodium Hypo hos	$9.90
Powder River Power of Sheridan Inc	Shop supplies - air coupler & hose, nitr	$95.82
Powder River Power of Sheridan Inc	Roller Bearing, Oil Seal	$622.10
Powder River Power of Sheridan Inc	WC78 - hyd hose, assy & fittings	$108.08
Powder River Power of Sheridan Inc	WC78 - brass fitting	$6.64
Powder River Power of Sheridan Inc	Shop supplies - cable tie	$10.82
Pro Shopkeeper Computer Software Company	Point of sale software for KGC	$4,906.20
Rocky Mountain Sign Design & Print	Outdoor Freon Sign	$226.00
Security State Bank	Terra Turner Pay App #3 Retainage - 3/	$19,624.88
Servall Uniform & Linen Supply	City hall rugs April 18 2024	$164.64
Servall Uniform & Linen Supply	UM rug cleaning	$104.19
Servall Uniform & Linen Supply	Clean Rugs for SFR 4-11-2024	$35.32
Servall Uniform & Linen Supply	Uniform and rug cleaning	$213.27
Servall Uniform & Linen Supply	rug cleaning	$147.08
Servall Uniform & Linen Supply	Rug Cleaning	$195.64
Servall Uniform & Linen Supply	Bi-Weekly Rug Cleaning - Landfill 04/18	$260.28
Servall Uniform & Linen Supply	Uniform and rug cleaning	$207.92
Servall Uniform & Linen Supply	Clean rugs for SFR 4-25-2024	$35.32
Severson Supply Co Inc	Streets hot plant - belting & belting te	$1,220.82
Severson Supply Co Inc	Streets hot plant belt & joint kit	$703.41
Sheridan Artists Guild Et al	Administration for SPAC	$1,200.00
Sheridan Commercial Co	Wall plates and facial tissue for City Ha	$18.79
Sheridan Commercial Co	Paint-Barricade Repairs	$249.91
Sheridan Commercial Co	WWTP Sheridan Commercial Blanket S	$856.22
Sheridan Commercial Co	Streets supplies - Gas cylinder	$13.14
Sheridan Commercial Co	Ear Muffs for Butch Kennah	$22.29

Sheridan Commercial Co	Streets supplies - fasteners and anchor	$15.56
Sheridan Commercial Co	Streets supplies - fasteners & anchors,	$10.22
Sheridan Commercial Co	Shop supplies - Tubing	$3.16
Sheridan Commercial Co	UPS shipping, packing tape, channel pli	$165.23
Sheridan Commercial Co	Fasteners and anchors	$3.30
Sheridan Commercial Co	channel pliers	$75.52
Sheridan Commercial Co	Red Marking Paint	$71.01
Sheridan Commercial Co	Paint for Office	$50.47
Sheridan Commercial Co	Brushes for Painting Sign Office	$9.49
Sheridan Commercial Co	Paint for Barricade Repairs	$336.59
Sheridan Commercial Co	Streets supplies - hot plant	$15.72
Sheridan Commercial Co	Tire Chain Repair Pliers	$110.00
Sheridan Commercial Co	Streets supplies - GDN hose and penetr	$68.35
Sheridan Commercial Co	Outlet Cover Plate and No Smoking Sig	$5.33
Sheridan Commercial Co	wire shipping tags for city hall	$2.47
Sheridan Commercial Co	light bulbs for city hall	$99.90
Sheridan Commercial Co	Foam sealant for city hall	$8.98
Sheridan Commercial Co	Paint for Office	$50.47
Sheridan Commercial Co	Lab Samples UPS Shipping Outgoing	$174.03
Sheridan Commercial Co	Lab Samples UPS Shipping Outgoing	$28.98
Sheridan Commercial Co	Office Supplies	$97.13
Sheridan Commercial Co	Electrical covers and vent cover	$35.50
Sheridan Commercial Co	Streets - 100PK Zip Ties	$9.85
Sheridan Commercial Co	Streets - Fire Ext. Sign	$40.23
Sheridan Commercial Co	Streets Hand Tool - Rand Orbit Sander	$24.00
Sheridan County Chamber of Commerce	marketing campaign for Main St constr	$600.00
Sheridan Econ-O-Wash Laundry	WWTP Econ-o-wash Laundry Services	$44.00
Sheridan Econ-O-Wash Laundry	WWTP Econ-o-wash Laundry Services	$54.00
Sheridan Econ-O-Wash Laundry	WWTP Econ-o-wash Laundry Services	$44.00
Sheridan Econ-O-Wash Laundry	Laundry Services - Shop	$34.00
Sheridan Econ-O-Wash Laundry	Laundry Services - Shop	$60.00
Sheridan Econ-O-Wash Laundry	Laundry Services - Shop	$38.00
Sheridan Floor to Ceiling	Carpet Tiles Replaced in 3rd Floor Conf	$125.00
Sheridan Motor Inc	UM273 - oil switch	$81.22
Sheridan Motor Inc	Shop - vehicle label	$4.97
Sheridan Newspapers Inc	LPO 41262 - Story House PUD Rezone	$21.60
Sheridan Newspapers Inc	LPO 41259 - BOA 733 W Loucks Ad	$43.20
Sheridan Newspapers Inc	LPO 41266 - PC Notice Res 11-24 The V	$35.60
Sheridan Newspapers Inc	LPO 41261 - Notice of Surplus Auction	$32.40
Sheridan Newspapers Inc	LPO 41267 - CC Notice of The Villages A	$48.95
Sheridan Newspapers Inc	Minutes of Special Council Meeting 2.2	$59.40
Sheridan Newspapers Inc	Notice of Passage of Ord 2279 , Techni	$18.90
Sheridan Newspapers Inc	Notice of Fire Civil Service Comm open	$81.00
Sheridan Newspapers Inc	Minutes of City Council Meeting 3/18/	$942.30
Sheridan Newspapers Inc	LPO 41257 - Access Gates Imp. Proj. Ad	$178.20
Sheridan Newspapers Inc	LPO 41252 - NE Transmission FONSI Ad	$170.10
Sheridan Newspapers Inc	LPO 41253 - NE Transmission P.M. Ad	$275.40
Sherwin Williams Company	Paint for playground equipment	$156.38
Sign Solutions USA LLC	Replacement Signs	$1,614.79
Six Robblee's Inc	Shop - Tire Spreader	$2,238.96

Six Robblee's Inc	Shop supplies - cement/frame fittingsS	$67.68
Six Robblee's Inc	UM382 - hood latch assy	$122.12
Smith Psychological Services LLC	Therapy Services	$1,200.00
Source Office & Technology	Desk for Assistant Clerk	$2,651.85
Spark Innovations LLC	Streets Electrical Work - Fuel Tank	$244.00
Stantec Consulting Services Inc (SCSI)	Main St. - Const. Obs. 2/24/24 - 3/22/2	$4,671.75
Stryker Sales Corporation	Stryker Lucas 3, v3.1 with accessories Q	$1,411.01
Stryker Sales Corporation	Stryker Lucas 3, v3.1 with accessories Q	$33,799.51
Stryker Sales Corporation	Stryker Lucas 3, v3.1 with accessories Q	$2,147.11
Tire Rama	RC02 - tires installed (4)	$864.12
Top Office Products Inc	Streets office supplies - copy paper	$25.20
Top Office Products Inc	Conference chairs for 2nd floor + chair	$4,399.00
Top Office Products Inc	12 BSN-26741 Steno Books for SFR	$44.28
Top Office Products Inc	Copy count charge for February 2024 f	$243.02
Top Office Products Inc	SFR Copy Count for April 2024 for stati	$198.49
Tri State Truck & Equipment Inc	RC432 - windshield	$195.32
Tyler Technologies Inc	utility billing implementation	$652.00
Vertical Door Solutions Inc	Overhead door repair at Parks Mainten	$465.00
VRM Inc	Labor to Replace Rollers on Landfill Rol	$655.00
VRM Inc	Labor to Perform 2,000 Hour Service o	$2,134.00
VRM Inc	250 Hour Service on TANA 4-73 and La	$5,861.25
VRM Inc	Leak and Manifold Issue on Baler #2	$860.00
Wagner Ranch Services LLC	Streets - 5/8in Chips	$1,247.40
Wagner Ranch Services LLC	Scoria for KGC parking lot	$442.00
Water & Environmental Technologies Inc	Hume Draw Prof. Svcs. 2/1/24 - 3/31/2	$8,809.00
Water Products & Solutions	Shop - Water 5 gallons	$17.50
Waterous Company	Waterous Company-Discharge and Ball	$563.70
Weed Warriors	Contractual mowing	$2,690.00
Western Emulsions Inc	Streets - Dura Patch Oil	$1,609.30
Winsupply of Sheridan Wy Co	Tank Drain project: PVC supplies	$36.38
Winsupply of Sheridan Wy Co	Tank Drain project: PVC supplies, flush	$58.97
Winsupply of Sheridan Wy Co	Tank Drain project: PVC supplies, union	$37.42
Winsupply of Sheridan Wy Co	Irrigation supplies for parks grounds m	$65.21
Winsupply of Sheridan Wy Co	Butterfly valves (tank drain project)	$410.45
Winsupply of Sheridan Wy Co	PVC piping and bushings (tank drain pr	$203.65
Winsupply of Sheridan Wy Co	Backflow Test Supplies	$18.50
Winsupply of Sheridan Wy Co	Tank Drain project: PVC supplies, union	$395.50
Winsupply of Sheridan Wy Co	Tank Drain project: PVC supplies, union	$139.30
WY Law Enforcement Academy	Training	$472.00
WY Office of Attorney General	Crime Victims Surcharges 04/2024	$143.00
Wyoming Assoc Rural Water Systems	2024 annual WARWS conference regist	$1,335.00
Wyoming Fire Chiefs' Association	WFCA Annual membership renewal for	$220.00
Wyoming Machinery Company	LF4003 - anti-freeze, 1 QT	$14.38
Wyoming Machinery Company	LF486, LF4003 & LF476 - filters, belt, t-	$172.10
Wyoming Machinery Company	LF486, LF4003 & LF476 - filters, belt, t-	$61.69
Wyoming Machinery Company	LF486, LF4003 & LF476 - filters, belt, t-	$285.34
Wyoming Machinery Company	LF486, LF4003 & LF476 - filters, belt, t-	$1,079.54
Wyoming Machinery Company	LF486, LF4003 & LF476 - filters, belt, t-	$182.72
Wyoming Machinery Company	LF486, LF4003 & LF476 - filters, belt, t-	$105.22
Wyoming Machinery Company	return of thermostat and accumulator	($223.16)

Wyoming Machinery Company	return of filter	($280.66)
Wyoming Office of State Lands & Investments	DW123 payment #6	$154,332.74
Wyoming Rents	Roller Rental - Streets	$150.00
Yonkee & Toner LLP	City Attorney fees March	$16,357.50
Zowada Recycling & Steel LLC	Metal to Repair Landfill Roll Off Dumps	$58.04
Zowada Recycling & Steel LLC	Grip Strut for Cleaning Boots	$70.00
Zowada Recycling & Steel LLC	2nd Grip Strut for Cleaning Boots	$70.00

Councilmember Jennings moved, seconded by Councilmember Linden , to approve the consent agenda.

Mayor Rich Bridger	Aye
Kristen Jennings	Aye
Steven Brantz	Aye
Andrew Patceg	Aye
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

OLD BUSINESS

10. Consideration of the Third and Final Reading of Ordinance 2281 Changing the Time for Regular City Council Meetings.

Councilmember Weitzel moved, seconded by Councilmember Jennings, to approve on Third and Final Reading of Ordinance 2281 Changing the Time for Regular City Council Meetings.

Mayor Rich Bridger	Aye
Kristen Jennings	Aye
Steven Brantz	Aye
Andrew Patceg	Aye
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

NEW BUSINESS

11. Consideration of Purchase and Installation of an All-Inclusive Playground at Blacktooth Park from Star Playgrounds for the amount of $1,036,384. City Engineer Thomas Morneau updated the Council.

Beverly Leichtnam spoke in favor of the park.

Councilmember Weitzel moved, seconded by Councilmember Linden, to approve Purchase and Installation of an All-Inclusive Playground at Blacktooth Park. Councilmember Patceg moved, seconded by Councilmember Jennings, to amend the motion to limit the funding for the park to $500,000.

Mayor Rich Bridger	Nay
Kristen Jennings	Aye
Steven Brantz	Nay
Andrew Patceg	Aye
Greg Luhman	Nay
Terry Weitzel	Nay
Aaron Linden	Nay

Council voted on the main motion.

Mayor Rich Bridger	Aye
Kristen Jennings	Aye
Steven Brantz	Aye
Andrew Patceg	Nay
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

12. Consideration of Resolution 13-24 Supporting a Vision Zero Policy and Development of a Complete Streets Improvement Plan. Public Works Director Hanns Mercer updated the Council.

Councilmember Brantz moved, seconded by Councilmember Weitzel, to approve Resolution 13-24 Supporting a Vision Zero Policy and Development of a Complete Streets Improvement Plan.

Mayor Rich Bridger	Aye
Kristen Jennings	Nay
Steven Brantz	Aye
Andrew Patceg	Nay
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

13. Consideration of Resolution 17-24 Authorizing the Submission of a Safe Streets and Roads for All (SS4A) Grant. Public Works Director Hanns Mercer updated the Council.

Councilmember Weitzel moved, seconded by Councilmember Brantz, to approve Resolution 13-24 Supporting a Vision Zero Policy and Development of a Complete Streets Improvement Plan.

Mayor Rich Bridger	Aye

Kristen Jennings	Nay
Steven Brantz	Aye
Andrew Patceg	Nay
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

14. Consideration of Contract with IAFF Local #276. Human Resources Director Heather Doke updated the Council.

Councilmember Linden moved, seconded by Councilmember Brantz, to approve Contract with IAFF Local #276.

Mayor Rich Bridger	Aye
Kristen Jennings	Aye
Steven Brantz	Aye
Andrew Patceg	Aye
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

15. Council Comments and Requests for Future Agenda Items

A. Mayor and Council discussed boards and commissions.

B. Councilmember Patceg requested that the RAISE Grant be reviewed for strings attached and also requested information on the West Corridor project.

C. City Administrator McRae informed Council that the pool will be evaluated this Thursday at 2 pm. Additionally, he provided an update on the status of the audit, and that it should be completed by May 17th.

16. Councilmember Linden moved, seconded by Councilmember Jennings, to adjourn into Executive Session per Stature 6-4-405: (ii) To consider the appointment, employment, right to practice or dismissal of a public officer, professional person or employee.

Mayor Rich Bridger	Aye
Kristen Jennings	Aye
Steven Brantz	Aye
Andrew Patceg	Aye
Greg Luhman	Aye
Terry Weitzel	Aye
Aaron Linden	Aye

Council returned from Executive Session at 8:33 P.M.

17. Mayor Bridger adjourned the meeting at 8:33 P.M.

APPROVED:

_____

Richard Bridger, Mayor

ATTEST:

_____

Cecilia Good, City Clerk

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Clerk

MEMORANDUM

RE:	**Claims**
From:	Cecilia Good, City Clerk
To:	City Council
CC:	City Administrator Stuart McRae
Date:	05/20/2024

Background:
See the attached claims list.

Attachments

Claims May 20th, 2024

Vendor	Description	Invoice Net
A & M Service & Supply Inc	Scale House Printer Toner	$141.00
A-Plus Services LLC	Tow Charges	$300.00
Ace Hardware-Newkirk	Rope to repair ladder - Rope SISAL 3/8"x400' Tan 5	$17.70
Ace Hardware-Newkirk	sledge hammers	$80.85
Ace Hardware-Newkirk	Misc. small tools	$143.52
AlphaGraphics of Wyoming	Printed court forms	$1,029.00
AlphaGraphics of Wyoming	Business cards - Trai & Earl	$78.00
AlphaGraphics of Wyoming	Business Cards	$147.00
AM Signal LLC	RRFB (Rectangular Rapid Flashing Beacons) Updates	$34,243.15
Amazon Capital Services #A33MIR27FEZN42	poster frame	$147.89
Amazon Capital Services #A33MIR27FEZN42	monitor mount, kitchen island cart, monitor	$799.82
Amazon Capital Services #A33MIR27FEZN42	pc mount, batteries, mouse, cable management	$115.48
Amazon Capital Services #A33MIR27FEZN42	chair mat, wastebasket, clipboard, pad	$144.02
Amazon Capital Services #A33MIR27FEZN42	paper, dog treats	$105.35
Amazon Capital Services #A33MIR27FEZN42	envelopes, certificate holders, certificates	$105.34
Amazon Capital Services #A33MIR27FEZN42	batteries, sticky notes, pens, beverage stirrers	$63.11
Amazon Capital Services #A33MIR27FEZN42	Knipex flexible hose cutter	$103.47
Amazon Capital Services #A33MIR27FEZN42	wireless mouse	$66.02
Amazon Capital Services #A33MIR27FEZN42	batteries, mouse	$40.32
Amazon Capital Services #A33MIR27FEZN42	sharpies	$37.87
Amazon Capital Services #A33MIR27FEZN42	return of microphone	($22.09)
Amazon Capital Services #A33MIR27FEZN42	batteries	$28.21
Amazon Capital Services #A33MIR27FEZN42	pens, labels, sticky notes	$115.32
Ameri -Tech Equipment Company	RC332 - tailgate holding valve	$219.61
American Engineering Testing Inc	Geotech Report - 1050 N Sheridan Ave	$5,000.00
American Maid	city hall cleaning for April 2024	$2,000.00
American Maid	UM office cleaning	$450.00
American Maid	Deep cleaning of City Hall	$3,600.00
American Welding & Gas Inc	Shop - welding supplies	$12.48
Ardurra Group Inc.	On-Call GIS Services 4/1/24 - 4/30/24	$8,605.00
Ayres Associates Inc	DDD Zoning Prof. Svcs. thru 4/20/2024	$11,974.89
B&B Leasing Company	Sharp Copier Model No BP50C26, Serial No. 25059278	$157.43
Babe's Flowers Inc	Flowers	$75.00
Big Horn Logistics LLC	Quarterly SCADA Programming, New Interface	$904.00
Big Horn Sanitation	South Park sanitation fee	$432.00
Bighorn Design Studio LLC	Shop - Uniforms/clothing	$1,372.50
Bloedorn Lumber	Streets supplies 2X4	$21.30
Brian's Boot & Shoe Company	Safety Boots-Justin Stevens	$157.45
Buggy Bath Unlimited LLC	April 2024 SWR Truck Wash and Monthly Landfill Pas	$293.39
Burns & Mc Donnell	Landfill - Cell 10 & Remediation - P.S. March 24	$52,679.41
Burns & Mc Donnell	Cell 10 Title V - Prof. Svcs. 3/1/24 - 3/31/24	$25,508.09
Carquest Auto Parts	Mud Flaps for Dump Truck 3-81	$30.00
Carquest Auto Parts	Grease for Solid Waste Trucks	$38.58
Carquest Auto Parts	Grease for Solid Waste Trucks	$64.30
Cedars Health LLC	Occupational Testing	$1,145.00
Certified Laboratories	Shop - Gear Oil	$568.02
CHS Inc.	Hot Plant Oil - Streets	$11,890.29
CMI-Teco	WC701 - sensors & pressure switches	$320.30
CMI-Teco	WC7002 - m/c plugs & led signal stats	$60.20
CMI-Teco	RC301 - 2024 Mack MD742 Roll-Off Truck	$140,207.00
Coca-Cola Bottling Company High Country	Pallet of Water for Landfill 05/14/24	$642.60
Communication Technologies	Radio Install for New Recycling Roll Off Truck RC3	$708.20
County Trash LLC	Dumpster pickup-biweekly	$115.00
Crescent Electric Supply Co	return	($119.37)

Crescent Electric Supply Co	Sump pump electrical lines	$107.55
Crescent Electric Supply Co	Sump pump electrical lines	$536.10
Crescent Electric Supply Co	Sump pump electrical lines	$77.32
Crescent Electric Supply Co	Sump pump electrical lines	$11.51
Cummins Rocky Mountain	Shop software - Insite Pro	$770.00
Current Electric LLC	Troubeshot Washington Park water sales	$105.00
Dana Kepner Company	12" brass saddles	$1,028.40
Direct Electric	Added double outlets on 3rd floor city hall	$552.32
DOWL LLC	N. Clarifier Design - Prof. Svcs. 3/24/24 - 4/20/2	$9,540.00
DOWL LLC	Terra Turner - Prof. Svcs. 3/24/2024 - 4/20/2024	$36,955.00
Downtown Sheridan Assoc	SPAC membership in DSA	$200.00
Empathia Inc	EAP services 5/1/24-7/31/24	$1,039.50
Employers Council	Pre Employment Background Checks	$1,268.75
Engineering Associates	Spec Update - Prof. Svcs. 1/19/24 - 4/19/24	$13,110.24
Enviro-Clean Equipment Inc	ST343 - fuel tank cap	$44.92
Front Range Fire Apparatus LTD	Screen Strainer 2.50" (AKRON) for Tower 1	$45.45
Galls LLC	uniforms	$1,636.38
Government Finance Officers Association	Renew #300170049-Brett L Caiola	$190.00
Greenfold Services LLC	Janitorial Services	$1,960.00
Hach Company	Hach Service Partnership Agreement	$18,728.00
Harris Computer Systems	employee self service - Spec: July 2024	$612.34
Hawkins Inc	Sodium Hypo, Soda Ash and Sodium Hex	$14,096.02
Heartland Kubota LLC	Repair for unit # 4-89	$2,685.43
Heartland Tree Care LLC	Contractor tree pruning at Kendrick Park	$3,520.00
Home Depot Credit Services	Marion House - blinds, alarm, fire ext & bulbs	$786.24
Home Depot Credit Services	Rebar for parks grounds maintenance	$16.35
Home Depot Credit Services	Brass fitting and valve for irrigation repairs	$80.98
Home Depot Credit Services	Portable Power	$199.00
Home Depot Credit Services	Parks grounds maintenance irrigation repair suppli	$409.21
Home Depot Credit Services	Compost and potting mix for annuals	$197.64
Home Depot Credit Services	Lumber for Parks Grounds Maintenance	$18.90
InfoSend Inc	Utility Bill Insert - Spring Mailer	$1,111.58
Interstate Engineering Inc	Kendrick Pool - Prof. Svcs. 3/17/24 - 4/6/24	$26,715.70
Interstate Power Systems	TS366 Boom Repair (Bucket Truck)	$14,982.67
J J Keller & Associates Inc	Streets - Safety Management Suite Subscription	$3,229.00
JC Contracting Inc	E. 5th St. Corridor misc. - sewer line repair	$18,471.16
John Deere Financial #1111308145	Extension cord	$99.99
John Deere Financial #1111308145	Muck boots: Alex Patterson	$209.95
Kenny L Rolfe Matco Tools	Shop supplies - Disc cover & screws	$156.09
Kenny L Rolfe Matco Tools	Shop tools - Stud installer	$57.70
Kerns Law Office LLC	attorney consult	$438.75
Kilpatrick Creations Inc	1/4 zip shirts KF	$119.85
Kilpatrick Creations Inc	Uniform supplies for Parks Grounds Maintenance and	$1,353.80
Kilpatrick Creations Inc	Uniform supplies for Parks Grounds Maintenance and	$908.25
Kois Brothers Equipment Co	WC316 - keeper assys & HL-shoe, ejectors	$1,549.23
Kois Brothers Equipment Co	SN302 - pump boxes, hyd motor & spinner	$1,832.87
Lawson Products Inc	Shop supplies - pin & socket	$174.40
Lease Servicing Center Inc	payment #10 for TV370B and 836C	$5,811.21
Legacy Irrigation and Supply LLC	Streets - Pipe for Kendrick Park	$1,952.00
Leininger Law LLC	Prosecuting attorney fees	$5,661.25
LN Curtis & Sons	LNCurtis-Gauge BOW Liquid Filled Panel Mount AF	$83.00
Long Building Technologies Inc	Check UV-2 - Troubleshoot the termocouple on UV2.	$732.06
Lube Refiners LLC	PD126 - LOF service	$81.06
Lube Refiners LLC	PD201 - LOF service	$63.06
Martini's Automotive Detailing LLC	Auto Detailing UA269 - Utility Tech	$254.35

MC2 Engineering & Construction	N. Heights Ph III - CA 1/28/24 - 4/30/24	$8,075.00
MC2 Engineering & Construction	Beltway Ph I Grant Efforts - 2/1/24 - 4/30/24	$3,208.75
MC2 Engineering & Construction	Blacktooth Park Ph 4 - CA 1/28/24 - 4/26/24	$4,670.00
Memorial Hospital of Sheridan County	SMH-Pharmacy Supplies for April 2024	$15.86
Merchant McIntyre & Associates LLC	Infrastructure Grant Services - May 2024	$8,000.00
Midwest Laboratories Inc	2nd Compost Testing 03/28/24	$418.00
Montana Dakota Utilities Co	partial MDU bills	$17,685.52
Mullinax Concrete Service & Irrigation	Aggregate for cemetery	$1,240.69
Mullinax Concrete Service & Irrigation	Streets - Sand	$3,636.63
Napa Auto Parts	Battery for PK801	$60.80
Napa Auto Parts	Shop supplies - grease fitting	$11.07
Napa Auto Parts	Truck cleaning supplies	$14.97
Napa Auto Parts	item return	($31.00)
National Testing Network Inc	Testing Charges	$195.00
NFPA	Annual NFPA Membership Renewal for DC Brutlag ID N	$175.00
Norco Inc	(2) 2XL Pullover Sweatshirts	$49.96
Norco Inc	Janitorial supplies for parks grounds maintenance	$171.77
Norco Inc	paper towels, lens cleaners, ear plugs	$121.76
Norco Inc	Shop supplies - First Aid	$30.52
Norco Inc	Shop misc supplies	$241.68
Norco Inc	Janitorial supplies for Parks grounds maintenance	$296.84
Norco Inc	Eye wash flush, anti fog wipes, safety glasses	$51.65
Norco Inc	(5) 2XL Short Sleeve Safety Shirts and Lens Wipes	$83.44
Office Shop Inc	Copier charges	$373.36
Office Shop Inc	Contract rate for building dept printer	$17.20
Office Shop Inc	UM copier charges	$33.43
Office Shop Inc	Canon/IRAC5535i-III	$18.62
Office Shop Inc	City Hall copier usage 4/15/24 - 5/14/24 #3546-01	$144.09
Office Shop Inc	New chair for City Planner	$610.70
One-Call of Wyoming	(592) One-Call Tickets for April 24 CDC	$444.00
One-Time Customer Refund Vendor	Refund - 1749 Sagebrush Dr	$59.35
One-Time Customer Refund Vendor	Refund - 230 E Burrows St, 1657 Holloway Ave, 609	$129.80
One-Time Customer Refund Vendor	Refunds - 1421 Dana Ave , 507 N Sheridan Ave	$55.67
One-Time Customer Refund Vendor	Deposit Refund - 314 Pheasant Pl	$64.83
One-Time Customer Refund Vendor	Refund - 601 N Sheridan Ave	$5.00
One-Time Customer Refund Vendor	Refund - 209 Wyoming Ave	$63.58
One-Time Customer Refund Vendor	Refund - 1355 Granite Ln	$35.31
One-Time Customer Refund Vendor	Refund - 222 W Loucks St.	$59.35
One-Time Customer Refund Vendor	Refund - 1138 Cross Creek Ct	$5.00
One-Time Customer Refund Vendor	Refund - 117 E 7th St.	$45.58
One-Time Customer Refund Vendor	Refund - 829 S Main St.	$5.00
One-Time Customer Refund Vendor	Refund -1987 Edwards Dr # C	$65.84
One-Time Customer Refund Vendor	Refund - 2153 Skyview West Dr	$3.08
One-Time Customer Refund Vendor	Deposit Refund - 440 W 5th St.	$59.68
One-Time Employee Reimbursement Vendor	Municipal Court Conference Reimbursement: mileage	$646.50
One-Time Employee Reimbursement Vendor	Military grade ballistic rated safety glasses for	$152.70
One-Time Employee Reimbursement Vendor	WPSG-Structural Fire Gloves (PPE) for Jason Etchec	$144.80
One-Time Employee Reimbursement Vendor	Clothing Reimbursement	$211.96
One-Time Employee Reimbursement Vendor	Uniform Boots	$105.96
One-Time Employee Reimbursement Vendor	CID Clothing	$361.18
One-Time Employee Reimbursement Vendor	J. Attebury: WARWS reimbursement (April 16-19)	$176.50
One-Time Employee Reimbursement Vendor	Clothing for MGalloway 5-10-2024	$103.88
One-Time Employee Reimbursement Vendor	CID Clothing	$318.43
One-Time Employee Reimbursement Vendor	Justin Stevens CDL Learners Permit	$47.25
One-Time Employee Reimbursement Vendor	T.Manolis: WARWS reimbursement (April 16-19)	$176.50

One-Time Employee Reimbursement Vendor	M. Burtis: WARWS reimbursement (April 16-19)	$176.50
One-Time Employee Reimbursement Vendor	D. Davis: WARWS reimbursement (April 16-19)	$176.50
One-Time Miscellaneous Accounts Payable Vendor	2023 California Unclaimed Property	$79.33
Peak Consulting	Consultant help with Firefighter Testing	$6,000.00
Peak Pest Solutions LLC	Monthly service	$125.00
Peak Pest Solutions LLC	Monthly service	$78.75
Peak Pest Solutions LLC	Monthly Pest service	$131.25
Porter Muirhead Cornia & Howard	audit progress bill	$20,000.00
Porter Muirhead Cornia & Howard	FY23 Audit	$50,000.00
Powder River Power of Sheridan Inc	Shop supplies - Fitting o-ring, brass fitting	$36.52
Powder River Power of Sheridan Inc	WC316 - hyd hose, assy & fittings	$103.48
Powder River Power of Sheridan Inc	Hose fittings and hydraulic lines for KGC	$207.54
Powder River Power of Sheridan Inc	Sockets	$16.45
Powder River Power of Sheridan Inc	RC332 - hyd hose, assy & fittings	$102.79
Powder River Power of Sheridan Inc	LF324 - air hose, nipple & ball valve	$167.32
PreCise MRM LLC	Dump truck GPS	$160.00
Quill LLC	Toner for Printer	$147.98
R.I REP CORP	2inch meters	$1,743.30
R.I REP CORP	2inch meters	$877.21
Randall Engineering Surveys	Survey/Mapping for 1050 N. Sheridan Ave	$2,170.00
Range	Crimestoppers	$33.79
Regency Midwest Ventures Limited Partnership	WARS spring conference hotel rooms	$303.00
Regency Midwest Ventures Limited Partnership	WARS spring conference hotel rooms	$303.00
Regency Midwest Ventures Limited Partnership	WARS spring conference hotel rooms	$303.00
Rhonda M Gould	Seamstress	$30.00
Royer Quality Castings Inc	Locking Well Cap	$52.41
Servall Uniform & Linen Supply	SWR Bi Weekly Rug Cleaning 05/02/24	$147.08
Servall Uniform & Linen Supply	Landfill Bi Weekly Rug Cleaning 05/02/24	$260.28
Servall Uniform & Linen Supply	Rug Cleaning	$195.64
Servall Uniform & Linen Supply	Uniform and rug cleaning	$215.49
Servall Uniform & Linen Supply	UM rug cleaning	$104.19
Servall Uniform & Linen Supply	Clean Rugs for SFR 5-9-2024	$35.32
Sheridan Commercial Co	dry erase markers and equipment paint for building	$21.35
Sheridan Commercial Co	Eng - desk organizer	$14.19
Sheridan Commercial Co	Shop supplies - clamp & tubing	$19.88
Sheridan Commercial Co	Fasteners and anchors for CPAT boxes in station 5-	$7.38
Sheridan Commercial Co	Weed and Pest supplies	$88.15
Sheridan Commercial Co	Streets hot plant supplies - hinges	$22.43
Sheridan Commercial Co	Fasteners, anchors, and picture hanging strips for	$17.68
Sheridan Commercial Co	WP47 - 6' of 1/2x3/4x100 clr tubing	$12.31
Sheridan Commercial Co	WP47 - 3/8-18 npt tap	$15.28
Sheridan Commercial Co	Copy paper	$269.00
Sheridan Commercial Co	Hand Wash	$63.45
Sheridan Commercial Co	Toilet cleaner, air spray	$19.98
Sheridan Commercial Co	CO Detectors for Public-Education Program 5-12-202	$99.88
Sheridan Commercial Co	Departmental supplies for Weed and Pest	$317.49
Sheridan Commercial Co	Batteries	$22.47
Sheridan Commercial Co	Office Supplies	$97.48
Sheridan Commercial Co	Streets supplies - fasteners & anchors	$3.28
Sheridan Commercial Co	Streets - floor mats and binder	$711.61
Sheridan Commercial Co	Streets - sealant	$11.98
Sheridan Commercial Co	Mason drill bit	$18.87
Sheridan Commercial Co	Kitchen trash bags	$20.94
Sheridan County Chamber of Commerce	Ignite conference	$340.00
Sheridan County Chamber of Commerce	Monthly Chamber Luncheon - R. Bridger, S. McRae, A	$175.00

Sheridan County Public Works	PL Ad - Gage R Wandler Sub	$7.00
Sheridan Floor to Ceiling	Repair to Council Chambers window blind	$254.00
Sheridan Media	Community Clean Up Ad 04/02/24	$63.00
Sheridan Media	Spring Free Day Ads 04/23/24 & 04/30/24	$196.00
Sheridan Memorial Clinics	Occupational Testing	$42.00
Sheridan Newspapers Inc	Minutes of Regular City Council Meeting 4/1/24	$747.90
Sheridan Newspapers Inc	Notice of passage of Ord 2275	$21.60
Sheridan Newspapers Inc	Notice of passage of Ord 2277	$18.90
Sheridan Newspapers Inc	Minutes of City Council Meeting 4/15/24	$874.80
Sheridan Newspapers Inc	LPO 41271 - Notice for PC for The Villages	$29.70
Sheridan Newspapers Inc	LPO 41272 - PH for CC for Towns Minor	$21.60
Sheridan Newspapers Inc	LPO 41269 - SWTP Flooring Ad for Bids	$291.60
Sheridan Newspapers Inc	LPO 41265 - 2024 R&O Ad for Bids	$283.50
Sheridan Newspapers Inc	LPO 41273 - 41 Day Ad for Cell 10 Ph I	$145.80
Sheridan Transportation Taxi	Safe Ride	$1,953.00
Simplot Partners	Fertilizer for Weed and Pest	$3,221.60
Simplot Partners	Fertilizer for KGC	$664.80
Smith Psychological Services LLC	Therapy Services	$750.00
Stantec Consulting Services Inc (SCSI)	Main St. - Const. Obs. 3/23/24 - 4/19/24	$17,338.50
Stephen Howard Tucker	Recruitment Video	$3,159.38
Stryker Sales Corporation	cable external power extension	$644.80
Talx Corporation	Equifax workforce solutions	$1,803.00
Tank Management Services	Fuel Monthly Report	$727.00
Target Solutions Learning LLC	Guardian Tracking	$1,280.95
Team Laboratory Chemical LLC	Streets - Tack Coat	$235.76
Team Laboratory Chemical LLC	Streets - Fine Road Patch	$1,131.97
The Rogers Law Firm LLC	Public defender for D. Camp	$332.50
The United States Composting Council	Bronze Soilbuilder Membership Renewal	$525.00
Thomas J Klepperich	Judge Klepperich April hours	$3,225.00
Thompson Master Masons, Inc	Masonry infill for vent piping in fire station 5-7	$250.00
Tire Rama	Replacement tires for mower	$97.90
Tire Rama	PK411 - new tires installed (2)	$97.90
Tire Rama	GC - mower tire repair	$36.95
Tire Rama	ST493 - swapped rear tires	$310.00
Tire Rama	WC37 - R&R Rimco steel wheels (8)	$1,299.60
Tires for Reclamation Inc	Tire Recycling 05/02/24	$1,513.00
Toro NSN	May fee for KGC software	$175.00
Transaction Warehouse Inc	profile/quickpay/automatic payments - APR 2024	$3,853.80
Tree Mechanics	Cottonwood deep root fert	$136.00
Tri State Oil Reclaimers, Inc	Shop - Haul used oil & antifreeze	$75.00
Trihydro Corporation	2023 R&O - CA thru 3/30/2024	$2,139.75
Trihydro Corporation	Environmental Monitoring and Reporting - March 30,	$15,621.26
Trihydro Corporation	Security Gates - prelim. design thru 3/30/2024	$11,538.00
TruGreen	Fertilizer	$125.00
TWS Trucking Services LLC	Hauled Tires for Recycling 05/02/24	$800.00
Tyler Technologies Inc	utility billing implementation	$1,304.00
Tyler Technologies Inc	resident access migration	$1,400.00
Visionary Communications	Buisness wireless internet	$220.68
VRM Inc	Fire System Deployment on TANA LF473	$5,650.00
VRM Inc	Repaired Roll Off Truck Bin 1	$970.00
Wastebuilt Environmental Solutions Inc	(60) Rear Load Dumpster Lids	$1,553.11
Water Products & Solutions	CSC - Water dispenser rental	$10.00
Weed Warriors	Contractual mowing for Parks grounds maintenance	$2,240.00
Western Water Consultants Inc	12th St. Realignment - Prof. Svcs. 2/1/24 - 3/31/2	$2,000.00
Winsupply of Sheridan Wy Co	Irrigation repair supplies for parks grounds maint	$251.72

Winsupply of Sheridan Wy Co	Irrigation supplies for parks grounds maintenance	$296.15
Winsupply of Sheridan Wy Co	Irrigation supplies for parks grounds maintenance	$503.36
Winsupply of Sheridan Wy Co	Irrigation supplies for parks grounds maintenance	$49.68
Winsupply of Sheridan Wy Co	Irrigation supplies for parks grounds maintenance	$146.92
Winsupply of Sheridan Wy Co	Irrigation supplies for KGC	$44.28
Winsupply of Sheridan Wy Co	Streets - Misc supplies	$1,925.91
Winsupply of Sheridan Wy Co	Streets - 1/8 Bend PVC	$36.57
Winsupply of Sheridan Wy Co	Meter pit repair721 Big Goose	$55.47
WLM Excavation	Asphalt prep for columbarium parking	$8,940.00
WY Department of Transportation	E. 5th St. Corridor - WYDOT thru 1/2/2024	$1,616.24
WY Department of Transportation	E. 5th St. Corridor - WYDOT thru 12/1/2023	$1,746.23
WY Department of Transportation	E. 5th St. Corridor - WYDOT thru 11/1/2023	$413.06
WY Department of Transportation	E. 5th St. Corridor - WYDOT thru 5/1/24	$14,208.31
WY Dept of Enviromental Quality	Cell 10 Title V - Permit App Fee	$500.00
WY Office of Attorney General	Crime Victims surcharges 04.2024	$35.00
Wyoming Electric Inc	Replaced Belts on Exhaust Fan at Recycling Center	$206.00
Wyoming First Aid & Safety Supply LLC	Restock of firstaid kit supplies for City Hall	$156.90
Wyoming Machinery Company	STL435 - cover-roof	$705.47
Wyoming Regional EMS LLC	FY24 Ambulance Service	$12,420.00
Wyoming State Treasurer	Payment #2 Fire A Promissory Loan	$86,275.00
Wyoming Water Association	Wyoming Water Association 2024 Membership Dues Mu	$600.00
Yonkee & Toner LLP	city attorney April fees	$22,093.43
Zowada Plumbing & Heating Inc	heater repair	$114.00
		$890,529.10

Vendor	Description	Invoice Net
AT&T Mobility	AT&T bills April	$1,681.93
CenturyLink Communications LLC	phone bills	$3,033.40
Farmers Co-op Oil Co	Fuel for Landfill 04/05/24	$2,416.22
Farmers Co-op Oil Co	Fuel for Landfill 04/12/24	$1,757.28
Farmers Co-op Oil Co	Fuel for Landfill	$2,455.91
Farmers Co-op Oil Co	Streets - oil for forklift	$19.11
Farmers Co-op Oil Co	4/23/2024 fuel delivery to csc	$1,514.10
Farmers Co-op Oil Co	Shop - bulk 15w40 (135 gal)	$2,182.95
Farmers Co-op Oil Co	Fuel for Landfill 04/26/24	$2,944.24
Farmers Co-op Oil Co	4/5/24 fuel delivery to Kendrick golf course	$1,657.21
Farmers Co-op Oil Co	4/19/2024 fuel delivery to Kendrick golf course	$60.76
Farmers Co-op Oil Co	4/8/2024 fuel delivery to SWTP	$1,132.31
Farmers Co-op Oil Co	4/26/2024 fuel delivery to Kendrick golf course	$622.11
Farmers Co-op Oil Co	4/15/24 fuel delivery to csc	$1,572.90
		$23,050.43

Vendor	Description	Invoice Net
CenturyLink Communications LLC	phone bill water distribution	$167.78
Early Entry Pro Cutting LLC	Shop - drain/grate & parts/supplies for shop floor	$4,653.88
Lube Refiners LLC	PD119 - LOF service	$81.06
Montana Dakota Utilities Co	partial MDU bills April	$21,019.95
Tree Mechanics		$1,191.00
		$27,113.67

Vendor	Description	Invoice Net
Wex Bank	Fuel - 3/24/2024 - 4/23/2024	$25,270.49

CITY OF SHERIDAN, WYOMING

55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Public Works

MEMORANDUM

RE: Consideration of Second Reading of PL-24-6, Ordinance 2278, Story House Property Company Rezone 44.86 Acres from B-2 to PUD - Public Works Director Hanns Mercer

From: Hanns Mercer, Public Works Director

To: City Council

CC:

Date: 12/27/2023

Recommendation:

PL-24-6, Ordinance 2278. The applicant, Story House Property Company, LLC, is requesting to rezone 44.86 acres from B-2 Business District to a Planned Unit Development, PUD. Located at 2323 E. 5th St. (PIN 56842410000333).

Background:

The Planning Commission reviewed PL-23-51, Ordinance 2278 on January 8, 2024 and provided a positive recommendation to the City Council. At this time, the Developer's Agreement and several other items were missing from what was submitted by the applicant for review. The City Council held a public hearing on January 15, 2024 and approved the first reading of the Ordinance. On second reading, Hanns Mercer, Public Works Director, recommended tabling the consideration of the second reading in order to bring the subdivision back through the Planning Commission due to substantial changes in the traffic plan. On 3/11/2024, the Planning Commission heard the updates regarding Story House and have provided the following requests for the City Council to consider:

1. City Utilities, Streets and Fire Department provide assurance that a 100’ turn radius located on the east portion of Phase I is sufficient for City vehicles and emergency response vehicles.

2. 36’ roads must be increased to 39’.

Applicant did not widen the road from 36' to 39'.

3. Establish language in the Developers Agreement that would allow the City to request a Sewer capacity analysis as lots are sold to ensure adequate space exists within the sewer plant cells. Should their sewer analysis show that there was not sufficient capacity, the Developer is prohibit from further sales until the cells have been installed.

Applicant has revised the sanitary sewer infrastructure. The Project will consist of a gravity sanitary sewer system within the Phase 1 area conveying all flows to an on-site lift station that will be owned and maintained by the City of Sheridan. The lift station will pump sanitary sewer through a force main to convey flows to the highest topographical point near East Ridge Road at which point the sanitary sewer system will convert to a gravity system down to the City’s sewer system connection at Valley View Drive. The City of Sheridan will own and operate the entirety of the sanitary sewer system.

The amended proposed density of the Project is 359 residential units and 3 commercial units which has been

changed from the original 407 residential units and 3 commercial units that was originally proposed

4. Sidewalks be included on the center lots in Block 7. The right of way in Block 7 can be reduced to 50’.

Applicant included sidewalks on both sides of the road in Block 7 and kept the right of way at 60'

5. All other variances requested be approved with no additional amendments.

Attachments

Aerial
Preliminary Plat
Variance Requests
Road Width Variance Request
Updated Drainage Report
Geotech Report
Traffic Report
Updated Water & Sewer Report
Ordinance 2278
Development Agreement

Story House Village PUD



DISCLAIMER:
The City of Sheridan GIS Division produced this map for informational purposes only. The City of Sheridan provides this map on an "as is" basis without warranties of any kind, either expressed or implied, and shall not be liable for any direct, indirect, incidental, special or consequential damages arising out of the use of such map. The user acknowledges and agrees that the use of such data is at the sole risk of the user. General questions about this map including errors, omissions, and/or updates should be directed to the City of Sheridan GIS Division.

CITY OF Sheridan WYOMING

Legend

Roads
- County Road
- Forest Service Road
- Private Road
- PUBLIC ROAD
- City of Sheridan Road
- Sheridan College Road
- Sheridan County Airport
- State of Wyoming Road
- VA Road
- Parcels

Zoning City
- MA - Medical Arts District
- R1 - Residence District
- R2 - Residence District
- R3 - Residence District
- R4 - Residence District

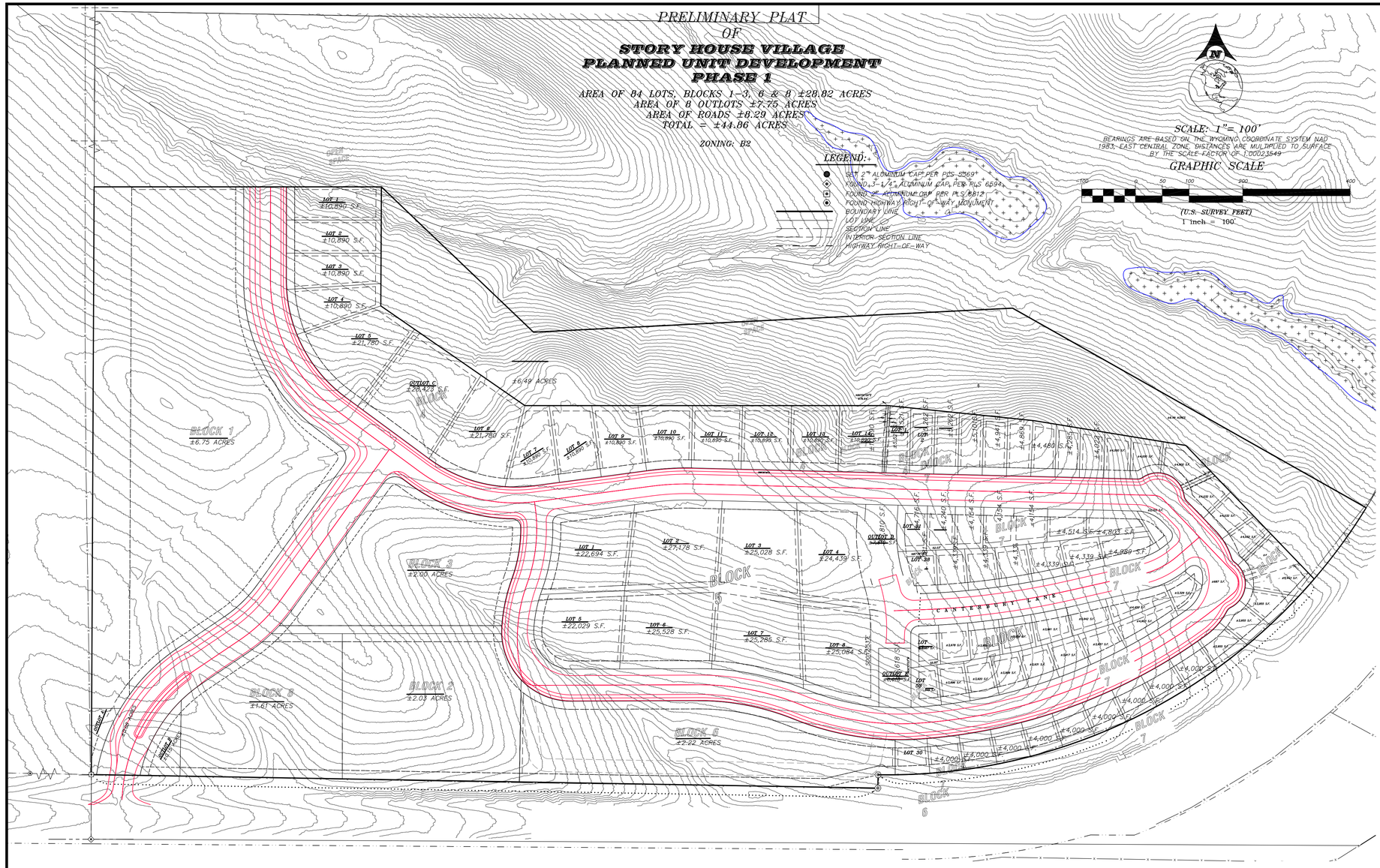
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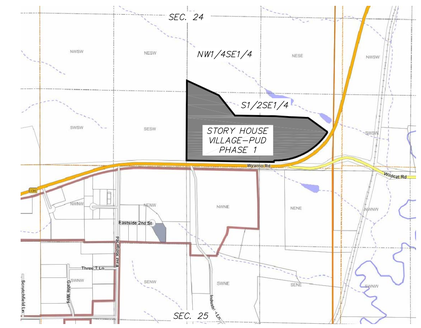
PRELIMINARY PLAT
OF
STORY HOUSE VILLAGE
PLANNED UNIT DEVELOPMENT
PHASE 1

AREA OF 84 LOTS, BLOCKS 1-3, 6 & 8 ±28.82 ACRES
AREA OF 8 OUTLOTS ±7.75 ACRES
AREA OF ROADS ±8.29 ACRES
TOTAL = ±44.86 ACRES

ZONING: B2



LOCATION MAP



NO TRUE SCALE

CERTIFICATE OF DEDICATION

KNOWN ALL MEN BY THESE PRESENTS THAT THE UNDERSIGNED STORY HOUSE PROPERTY COMPANY LLC BEING THE OWNER(S), PROPRIETORS OR PARTIES OF INTEREST IN THE LAND SHOWN ON THIS PLAT, DO HEREBY STATE:

THAT THE FOREGOING PLAT DESIGNATED AS **STORY HOUSE VILLAGE PLANNED UNIT DEVELOPMENT PHASE 1** IS A SUBDIVISION OF THE NW1/4SE1/4 and the S1/2SE1/4, SECTION 24, TOWNSHIP 56 NORTH, RANGE 84 WEST 6TH PRINCIPAL MERIDIAN, CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Commencing at the quarter corner of said Section 24 (monumented with a 3¼" Aluminum Cap per PLS 6594); thence N00°16'03"E, 120.65 feet along the west line of said S½SE¼ to a 2" Aluminum Cap per PLS 6812 being the POINT OF BEGINNING this tract;
thence N00°16'03"E, 1320.34 feet along said west line to a 2" Aluminum Cap per PLS 5369;
thence S67°06'27"E, 579.60 feet to a 2" Aluminum Cap per PLS 5369;
thence S44°49'33"E, 398.03 feet to a 2" Aluminum Cap per PLS 5369;
thence S87°48'06"E, 773.47 feet to a 2" Aluminum Cap per PLS 5369;
thence S79°47'33"E, 454.02 feet to a 2" Aluminum Cap per PLS 5369;
thence S58°22'51"E, 391.82 feet to a 2" Aluminum Cap per PLS 5369, lying on the north right of way line of Wyarno Road (AKA State Highway No. 336);
thence along said north right of way line, through a curve to the right, having a central angle of 59°23'00", a radius of 1045.92 feet, an arc length of 1084.03 feet, a chord bearing of S61°18'38"W and a chord distance of 1036.15 feet to a standard WYDOT right of way monument at the end of said curve to the right;
thence along said north right of way line S01°14'12"W, 24.84 feet to a standard WYDOT right of way monument;
thence N89°00'45"W, 1464.83 feet along said north right of way line to the POINT OF BEGINNING.

SAID SUBDIVISION CONTAINS **±44.86 ACRES** OF LAND, MORE OR LESS.

STORY HOUSE VILLAGE PLANNED UNIT DEVELOPMENT PHASE 1, AS IT IS DESCRIBED AND AS IT APPEARS ON THIS PLAT, IS MADE WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRES OF THE UNDERSIGNED OWNER(S) AND PROPRIETORS; AND THAT THIS IS A CORRECT PLAT OF THE AREA AS IT IS DIVIDED INTO LOTS, OUTLOTS, STREETS AND EASEMENTS.

THE UNDERSIGNED OWNER(S) OF THE LAND SHOWN AND DESCRIBED ON THIS PLAT DO HEREBY DEDICATE TO THE CITY OF SHERIDAN AND ITS LICENSEES FOR PUBLIC USE FOR THE INDICATED PURPOSES, ALL STREETS, EASEMENTS AND OTHER PUBLIC LANDS, AS INDICATED, AND NOT ALREADY OTHERWISE DEDICATED FOR PUBLIC USE.

UTILITY EASEMENTS, AS DESIGNATED ON THE PLAT, ARE HEREBY GRANTED TO THE CITY OF SHERIDAN AND IT'S LICENSEES FOR PUBLIC USE FOR THE PURPOSE OF INSTALLING, REPAIRING, REINSTALLING, REPLACING AND MAINTAINING SANITARY SEWERS, STORM SEWERS, WATER LINES, GAS LINES, ELECTRIC LINES, TELEPHONE LINES, CABLE TV LINE, AND OTHER FORMS AND TYPES OF PUBLIC UTILITIES NOW OR HEREAFTER GENERALLY UTILIZED BY THE PUBLIC.

OUTLOTS ARE DRAINAGE EASEMENTS, OTHER EASEMENTS (AS SHOWN & DEFINED), AND OPEN SPACES WHICH ARE OWNED & MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.

SURVEYOR'S CERTIFICATE

STATE OF WYOMING :ss
COUNTY OF SHERIDAN:

I, THONE STEWART, DO HEREBY STATE THAT I AM A REGISTERED LAND SURVEYOR, LICENSED UNDER THE LAWS OF THE STATE OF WYOMING, THAT THIS PLAT IS A TRUE, CORRECT AND COMPLETE PLAT OF **STORY HOUSE VILLAGE PLANNED UNIT DEVELOPMENT PHASE 1**, AS LAID OUT, PLATTED, DEDICATED AND SHOWN HEREON, THAT THIS PLAT WAS MADE FROM AN ACCURATE SURVEY OF SAID PROPERTY CONDUCTED BY ME OR UNDER MY DIRECT SUPERVISION AND CORRECTLY SHOWS THE LOCATION AND DIMENSIONS OF ALL LOTS, EASEMENTS AND STREETS OF SAID SUBDIVISION IN COMPLIANCE WITH THE CITY OF SHERIDAN REGULATIONS GOVERNING THE SUBDIVISION OF LAND.

Professional Land Surveyor
THONE STEWART
Date:
WYOMING

PRELIMINARY DRAFT

"PLAT IS VALID ONLY IF PRINT HAS ORIGINAL SIGNATURE OF SURVEYOR SIGNED AND DATED"

DECLARATION EXTINGUISHING PREVIOUS EASEMENTS

1) ALL EARLIER EASEMENTS OR PORTIONS THEREOF ENCOMPASSED BY THE BOUNDARY OF THIS PLAT ARE HEREBY EXTINGUISHED UNLESS NOTED OTHERWISE.

2) EXISTING UTILITIES PLACED IN PREVIOUS RECORDED EASEMENTS WITHIN THE BOUNDARY OF THIS PLAT HAVE SENIOR RIGHTS AND ARE NOW PROTECTED BY EASEMENTS OR ROADS AS SHOWN ON THIS PLAT.

CITY OF SHERIDAN CERTIFICATES OF APPROVAL

REVIEWED BY THE CITY OF SHERIDAN PLANNING COMMISSION THIS _____ DAY OF _____ , _____ .

_____ _____
ATTEST: VICE-CHAIRMAN CHAIRMAN

_____ _____ _____
DIRECTOR OF PUBLIC WORKS

APPROVED BY THE CITY COUNCIL OF THE CITY OF SHERIDAN, WYOMING, THIS___DAY OF_____, ____.

_____ _____
ATTEST: CITY CLERK MAYOR

NOTES

1. All areas requiring placement of compacted fill must be constructed in accordance with the construction drawings and Section 01750 – Special Provisions of the Story House Village PUD Phase 1.
2. A geotechnical evaluation and foundation design must be performed by a Wyoming Licensed Professional Engineer for permanent structures constructed on Lots containing compacted fill. This includes the following:
   a. Block 3
   b. Block 4: Lots 1, 2, 3, 4, 5, 6, 13, 14, and Outlot C
   c. Block 5: Lots 1, 5, and 6
   d. Block 6
   e. Block 7: Lots 1, 2, 3, 10, 11, 12, 13, 14, 15, 16, 20, 29, and 30
   f. Block 8
   g. Outlot B

(See Sheets 2 and 3 for Lot and Block locations).

CERTIFICATE OF RECORDER

STATE OF WYOMING :ss
COUNTY OF SHERIDAN

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE CLERK AND RECORDER AT_____ O'CLOCK ___.M.,

THIS _____, DAY OF _____ , 20 _____, AND IS RECORDED IN PLAT BOOK _____, PAGE _____

_____ STAMP RECEIVING NUMBER _____
COUNTY CLERK

IN TESTIMONY WHEREOF:

ALL RIGHTS UNDER AND BY VIRTUE OF THE HOMESTEAD EXEMPTION LAWS OF THE STATE OF WYOMING ARE HEREBY WAIVED AND RELEASED.

THE UNDERSIGNED HAVE CAUSED THESE PRESENTS TO BE SIGNED THIS _____ DAY OF _____

FP STORY HOUSE PROPERTY COMPANY, LLC

BY: _____
, MEMBER

STATE OF WYOMING
COUNTY OF SHERIDAN :ss

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BY xxxxxxxxxxxx BEFORE ME THIS DAY OF _____ , _____ .

WITNESS MY HAND AND OFFICIAL SEAL. MY COMMISSION EXPIRES _____

_____
NOTARY PUBLIC

SIGNED BY AFFIDAVIT

BY: SECURITY STATE BANK ("LIEN HOLDER"), SEE AFFIDAVIT FILED AT THE SHERIDAN COUNTY COURTHOUSE.
DOCUMENT NUMBER: _____

PRELIMINARY PLAT
OF
STORY HOUSE VILLAGE
PLANNED UNIT DEVELOPMENT
PHASE 1

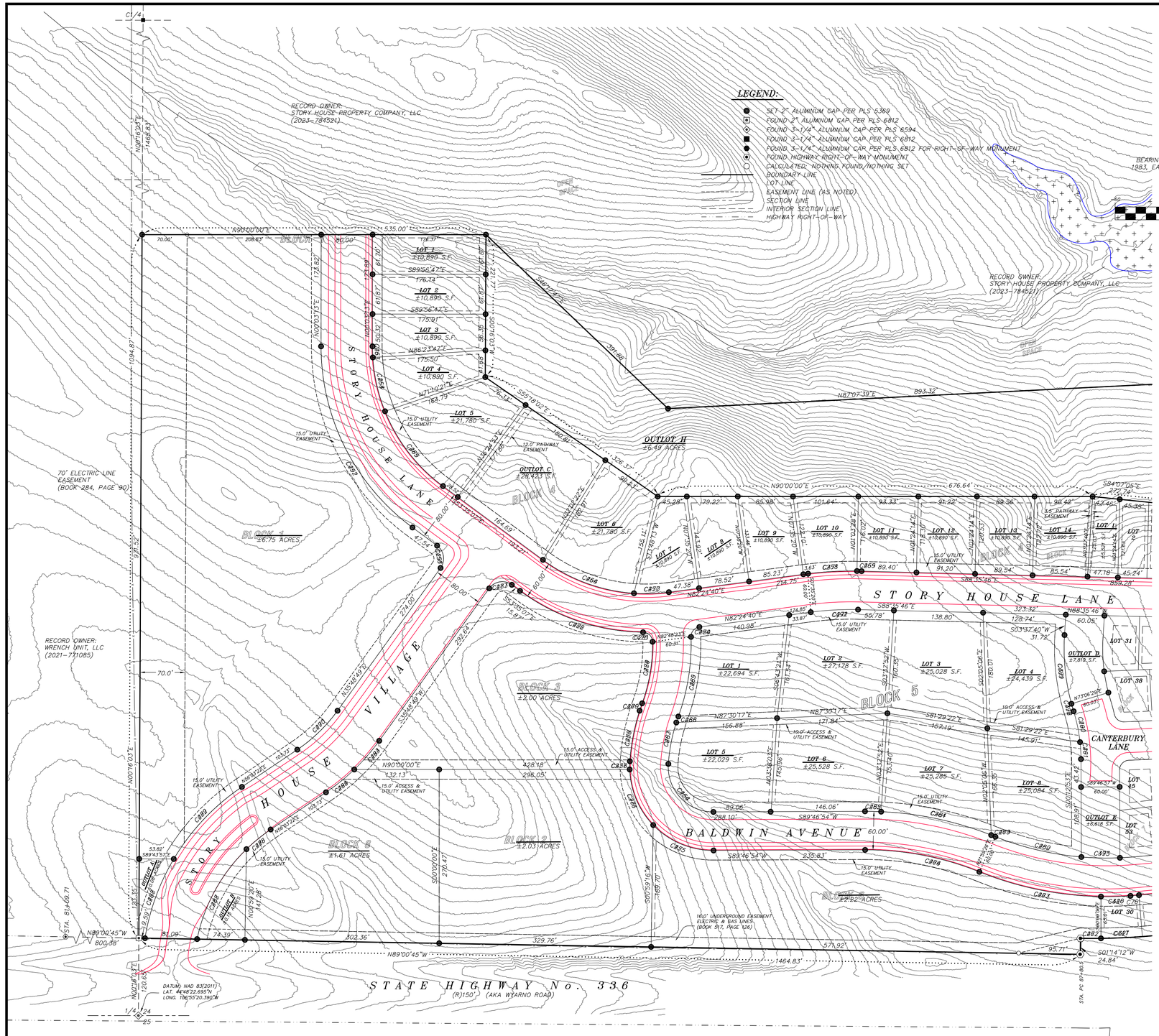
SITUATED IN THE S/2SE1/4 OF SECTION 24, TOWNSHIP 56 NORTH, RANGE 84 WEST, 6TH PRINCIPAL MERIDIAN, SHERIDAN COUNTY, WYOMING

DEVELOPER: STORY HOUSE PROPERTY COMPANY, LLC
40 EAST WORKS STREET, SUITE 18
SHERIDAN WY, 82801

PRESTFELDT SURVEYING
2340 WETLANDS DR., SUITE 100
PO BOX 3082
SHERIDAN, WY 82801
307-672-7415

CLIENT: WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801

JN: 2023-058
DN: 2023-058-PUD-2-20
PF: T2023-058
REVIEWED BY: JSP
FEBRUARY 23, 2024



CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD LENGTH
C454	94°08'19"	70.00'	115.01'	S43°08'56"E	102.50'
C455	46°08'30"	130.00'	104.69'	S67°08'51"E	101.89'
C456	5°39'33"	130.00'	12.84'	S01°05'26"W	12.84'
C457	53°38'20"	350.00'	327.66'	S26°45'57"E	315.83'
C458	89°23'56"	25.00'	39.01'	N08°53'09"W	35.17'
C459	13°56'56"	330.00'	80.34'	S10°53'41"W	80.14'
C460	2°06'21"	330.00'	12.13'	S18°55'20"W	12.13'
C461	42°20'16"	130.00'	96.06'	S22°54'28"E	93.89'
C462	1°44'42"	1045.92'	31.86'	S89°52'13"E	31.85'
C463	3°39'25"	270.00'	17.23'	S01°46'30"E	17.23'
C464	32°26'57"	270.00'	152.91'	S69°48'36"E	150.88'
C465	0°20'46"	530.00'	3.20'	S88°46'09"E	3.20'
C466	22°12'32"	470.00'	182.18'	N79°06'50"W	181.04'
C467	20°59'06"	530.00'	194.12'	S78°30'07"E	193.03'
C468	18°19'08"	270.00'	86.33'	S12°45'47"E	85.96'
C469	31°39'47"	270.00'	149.21'	S37°45'14"E	147.32'
C470	11°33'16"	270.00'	54.45'	N88°11'18"E	54.36'
C471	8°38'49"	530.00'	79.99'	N86°44'04"E	79.91'
C472	25°20'46"	352.00'	155.72'	S43°22'59"W	154.45'
C473	20°14'33"	248.00'	87.62'	N45°56'05"E	87.16'
C474	20°44'18"	270.00'	97.73'	N09°36'21"E	97.19'
C475	88°27'13"	15.00'	23.16'	N44°59'24"W	20.93'
C476	35°37'54"	330.00'	205.22'	S71°24'04"E	201.93'
C477	90°36'04"	25.00'	39.53'	S81°06'51"W	35.54'
C478	10°13'50"	272.00'	48.57'	S50°56'27"W	48.50'
C479	0°28'37"	530.00'	4.41'	N68°14'52"W	4.41'
C480	17°08'08"	469.98'	140.56'	S76°34'37"E	140.03'
C481	19°00'43"	530.00'	175.87'	N77°59'33"W	175.06'
C482	2°43'11"	530.00'	25.16'	N88°51'30"W	25.16'
C483	13°56'56"	270.00'	65.73'	S10°53'41"W	65.57'
C484	84°20'49"	15.00'	22.08'	S40°14'15"W	20.14'
C485	21°54'40"	330.00'	126.20'	N09°01'10"E	125.43'
C486	2°06'21"	270.00'	9.92'	S18°55'20"W	9.92'
C487	21°28'22"	352.00'	131.92'	S19°58'25"W	131.15'
C488	34°08'12"	272.00'	162.06'	S28°45'26"W	159.67'
C489	20°53'28"	329.56'	120.17'	S06°49'04"E	119.50'
C490	17°02'45"	254.21'	75.63'	N08°44'25"W	75.35'
C491	17°02'45"	254.21'	75.63'	N08°44'25"W	75.35'
C492	8°59'34"	470.00'	73.77'	S86°54'27"W	73.69'
C493	20°14'33"	328.00'	115.88'	N45°56'05"E	115.28'
C494	20°14'33"	328.00'	115.88'	N45°56'05"E	115.28'
C495	7°19'18"	470.00'	60.06'	S88°48'16"E	60.02'
C496	2°06'35"	329.56'	12.14'	S16°12'30"E	12.13'

PRELIMINARY PLAT
OF

STORY HOUSE VILLAGE PLANNED UNIT DEVELOPMENT PHASE 1

SITUATED IN THE S/2SE1/4 OF SECTION 24, TOWNSHIP 56 NORTH, RANGE 84 WEST, 6TH PRINCIPAL MERIDIAN, SHERIDAN COUNTY, WYOMING

DEVELOPER: STORY HOUSE PROPERTY COMPANY, LLC
40 EAST WORKS STREET, SUITE 18
SHERIDAN WY, 82801

PRESTFELDT SURVEYING
2340 WETLANDS DR., SUITE 100
PO BOX 3082
SHERIDAN, WY 82801
307-672-7415

CLIENT: WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801

JN: 2023-058
DN: 2023-058-PUD-2-20
PF: T2023-058
REVIEWED BY: JSP
FEBRUARY 23, 2024

RECORD OWNER
STORY HOUSE PROPERTY COMPANY, LLC
(2023-784521)

STORY HOUSE LANE

CANTERBURY LANE

BALDWIN AVENUE

STATE HIGHWAY No 336 (ALSO KNOWN AS WYARNO ROAD)

OUTLOT H ±6.49 ACRES

OUTLOT D ±7,810 S.F.

OUTLOT E ±6,618 S.F.

OUTLOT F ±2,103 S.F.

OUTLOT G ±687 S.F.

LOT 1 ±5,521 S.F.
LOT 2 ±5,262 S.F.
LOT 3 ±5,262 S.F.
LOT 4 ±5,101 S.F.
LOT 5 ±4,941 S.F.
LOT 6 ±4,869 S.F.
LOT 7 ±4,480 S.F.
LOT 8 ±4,285 S.F.
LOT 9 ±4,082 S.F.
LOT 10 ±4,000 S.F.
LOT 11 ±4,000 S.F.
LOT 12 ±4,900 S.F.
LOT 13 ±4,032 S.F.
LOT 14 ±4,032 S.F.
LOT 15 ±4,032 S.F.
LOT 16 ±4,032 S.F.
LOT 17 ±5,443 S.F.
LOT 18 ±3,955 S.F.
LOT 19 ±3,955 S.F.
LOT 20 ±3,955 S.F.
LOT 21 ±4,000 S.F.
LOT 22 ±4,000 S.F.
LOT 23 ±4,000 S.F.
LOT 24 ±4,000 S.F.
LOT 25 ±4,000 S.F.
LOT 26 ±4,000 S.F.
LOT 27 ±4,000 S.F.
LOT 28 ±4,000 S.F.
LOT 29 ±4,000 S.F.
LOT 30 ±4,000 S.F.
LOT 31 ±4,716 S.F.
LOT 32 ±4,240 S.F.
LOT 33 ±4,154 S.F.
LOT 34 ±4,154 S.F.
LOT 35 ±4,154 S.F.
LOT 36 ±4,514 S.F.
LOT 37 ±4,803 S.F.
LOT 38 ±5,081 S.F.
LOT 39 ±4,339 S.F.
LOT 40 ±4,339 S.F.
LOT 41 ±4,339 S.F.
LOT 42 ±4,339 S.F.
LOT 43 ±4,339 S.F.
LOT 44 ±4,989 S.F.
LOT 45 ±3,987 S.F.
LOT 46 ±3,978 S.F.
LOT 47 ±3,959 S.F.
LOT 48 ±3,954 S.F.
LOT 49 ±3,961 S.F.
LOT 50 ±3,942 S.F.
LOT 51 ±4,452 S.F.
LOT 52 ±3,949 S.F.
LOT 53 ±3,896 S.F.
LOT 54 ±3,920 S.F.
LOT 55 ±3,909 S.F.
LOT 56 ±3,931 S.F.
LOT 57 ±3,917 S.F.
LOT 58 ±3,937 S.F.
LOT 59 ±4,903 S.F.
LOT 60 ±3,329 S.F.
LOT 61 ±4,452 S.F.

BLOCK 6
BLOCK 7

15.0' UTILITY EASEMENT
5.0' PATHWAY EASEMENT
6.0' PATHWAY EASEMENT
10' SANITARY SEWER EASEMENT
16.0' UNDERGROUND ELECTRIC & GAS LINE EASEMENT (BOOK 517, PAGE 126)

STA. PT 103+19.2

Δ=17°29'12"
R=1045.92'
L=319.21'
CB=N22°46'45"E
CL=317.98'

Δ=59°23'00"
R=1045.92'
L=1084.03'
CB=S61°18'38"W
CL=1036.15'

STA. PC 87+80.5

CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD LENGTH
C375	11°19'58"	180.00'	35.60'	N71°34'56"E	35.54'
C376	1°23'16"	1530.00'	37.06'	N87°27'10"E	37.05'
C377	88°21'58"	15.00'	23.13'	S44°57'52"W	20.91'
C378	29°41'04"	15.00'	7.92'	N70°06'35"E	7.73'
C379	17°19'27"	50.00'	15.12'	N16°17'42"W	15.06'
C380	36°16'09"	15.00'	9.50'	S25°46'28"E	9.34'
C381	17°50'54"	130.00'	40.49'	N26°16'27"W	40.33'
C382	35°59'59"	15.00'	9.42'	S35°21'02"E	9.27'
C383	24°49'06"	50.00'	21.66'	N51°09'45"E	21.49'
C384	35°59'59"	15.00'	9.42'	S45°34'19"W	9.27'
C385	15°20'19"	130.00'	34.80'	N46°24'15"E	34.70'
C386	44°44'59"	70.00'	54.67'	N66°13'27"W	53.29'
C387	120°26'38"	15.00'	31.53'	N70°38'17"W	26.04'
C388	14°21'13"	180.15'	45.13'	N58°44'14"E	45.01'
C389	11°52'28"	970.00'	20.73'	N54°41'09"E	20.73'
C390	44°01'31"	70.04'	53.81'	N32°03'19"E	52.50'
C391	3°53'36"	900.30'	56.99'	N85°09'37"E	56.98'
C392	40°38'14"	50.00'	35.46'	S75°29'45"W	34.72'
C393	59°13'45"	50.00'	51.69'	N54°34'17"W	49.42'
C394	8°46'58"	130.00'	19.93'	N39°35'21"W	19.91'
C395	9°32'09"	50.00'	8.32'	N48°34'57"W	8.31'
C396	27°37'16"	50.00'	23.67'	N30°15'14"W	23.45'
C397	25°48'49"	50.00'	22.53'	N03°47'11"W	22.34'
C398	29°37'56"	50.00'	25.86'	N23°56'12"E	25.57'
C399	11°09'47"	130.00'	25.33'	N33°09'13"E	25.29'
C400	2°02'11"	1530.00'	54.38'	N85°44'26"E	54.38'
C401	2°09'23"	1530.00'	57.58'	N83°38'39"E	57.58'
C402	2°17'10"	1530.00'	61.05'	N81°25'23"E	61.05'
C403	2°31'44"	1530.00'	67.53'	N79°00'55"E	67.53'
C404	0°30'09"	1530.00'	13.42'	N77°29'59"E	13.42'
C405	3°11'25"	970.00'	54.01'	N81°47'54"E	54.00'
C406	3°15'06"	970.00'	55.05'	N78°34'39"E	55.04'
C407	3°20'57"	970.00'	56.70'	N75°16'37"E	56.69'
C408	3°32'42"	970.00'	60.02'	N71°49'48"E	60.01'
C409	3°45'19"	970.00'	63.57'	N68°10'47"E	63.56'
C410	4°15'55"	970.00'	72.21'	N64°10'10"E	72.19'
C411	6°44'20"	970.00'	114.09'	N58°40'03"E	114.02'
C412	1°04'57"	1030.00'	19.46'	N54°36'53"E	19.46'
C413	3°19'32"	1030.00'	59.78'	N83°38'02"E	59.78'
C414	3°18'36"	1030.00'	59.50'	N80°18'58"E	59.49'

CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	CHORD BEARING	CHORD LENGTH
C415	3°18'12"	1030.00'	59.38'	N77°00'34"E	59.38'
C416	3°18'21"	1030.00'	59.43'	N73°42'18"E	59.42'
C417	3°19'02"	1030.00'	59.63'	N70°23'36"E	59.62'
C418	3°20'17"	1030.00'	60.01'	N67°03'57"E	60.00'
C419	3°22'07"	1030.00'	60.56'	N63°42'45"E	60.55'
C420	3°24'35"	1030.00'	61.30'	N60°19'24"E	61.29'
C421	3°27'45"	1030.00'	62.24'	N56°53'14"E	62.24'
C422	3°28'53"	1045.92'	63.55'	N83°58'54"E	63.54'
C423	3°27'57"	1045.92'	63.27'	N80°30'29"E	63.26'
C424	3°27'33"	1045.92'	63.15'	N77°02'44"E	63.14'
C425	3°27'42"	1045.92'	63.19'	N73°35'06"E	63.18'
C426	3°28'23"	1045.92'	63.40'	N70°07'04"E	63.39'
C427	3°29'37"	1045.92'	63.77'	N66°38'04"E	63.76'
C428	3°31'26"	1045.92'	64.33'	N63°07'33"E	64.32'
C429	3°33'52"	1045.92'	65.07'	N59°34'54"E	65.06'
C430	3°37'00"	1045.92'	66.02'	N55°59'28"E	66.01'
C431	3°40'55"	1045.92'	67.21'	N52°20'30"E	67.20'
C432	4°05'08"	1045.92'	74.58'	N48°27'29"E	74.56'
C433	5°47'25"	1045.92'	105.70'	N43°31'12"E	105.66'
C434	5°47'25"	1045.92'	105.70'	N43°31'12"E	105.66'
C435	2°12'36"	1470.00'	56.70'	N85°32'16"E	56.70'
C436	2°18'08"	1470.00'	59.06'	N83°16'54"E	59.06'
C437	2°24'13"	1470.00'	61.67'	N80°55'43"E	61.66'
C438	2°33'07"	1472.67'	65.59'	N78°26'59"E	65.58'
C439	7°25'21"	120.00'	15.55'	N60°16'00"E	15.53'
C440	92°59'21"	15.00'	24.34'	N02°38'33"E	21.76'
C441	13°16'15"	120.00'	27.79'	N70°36'47"E	27.73'
C442	7°10'35"	269.56'	33.76'	S11°10'41"E	33.74'
C443	1°16'45"	1470.00'	32.82'	N87°16'56"E	32.82'
C444	11°13'04"	269.56'	52.78'	S01°58'52"E	52.69'
C445	0°44'07"	1030.00'	13.22'	N85°39'51"E	13.22'
C446	4°58'26"	530.00'	46.01'	N88°31'07"E	45.99'
C447	3°32'06"	1045.92'	64.53'	N87°29'23"E	64.52'
C448	4°17'29"	314.32'	23.54'	N15°07'02"W	23.54'
C449	79°06'29"	14.89'	20.56'	S52°31'26"E	18.97'
C450	7°22'56"	120.59'	15.54'	N52°50'08"E	15.53'
C451	20°26'24"	70.00'	24.97'	N00°11'37"W	24.84'
C452	2°24'49"	179.98'	7.58'	N50°20'37"E	7.58'
C453	2°29'49"	269.56'	11.75'	S16°00'53"E	11.75'

SCALE: 1"= 40'

BEARINGS ARE BASED ON THE WYOMING COORDINATE SYSTEM NAD 1983, EAST CENTRAL ZONE. DISTANCES ARE MULTIPLIED TO SURFACE BY THE SCALE FACTOR OF 1.0002354

GRAPHIC SCALE

-40 0 20 40 80 160

(U.S. SURVEY FEET)
1 inch = 40'

LEGEND:

- SET 2" ALUMINUM CAP PER PLS 5369
- FOUND 2" ALUMINUM CAP PER PLS 6812
- FOUND 3-1/4" ALUMINUM CAP PER PLS 6594
- FOUND 3-1/4" ALUMINUM CAP PER PLS 6812
- FOUND 3-1/4" ALUMINUM CAP PER PLS 6812 FOR RIGHT-OF-WAY MONUMENT
- FOUND HIGHWAY RIGHT-OF-WAY MONUMENT
- CALCULATED: NOTHING FOUND/NOTHING SET
- BOUNDARY LINE
- LOT LINE
- EASEMENT LINE (AS NOTED)
- SECTION LINE
- INTERIOR SECTION LINE
- RIGHT-OF-WAY

PRELIMINARY PLAT
OF
STORY HOUSE VILLAGE, PLANNED UNIT DEVELOPMENT PHASE 1

SITUATED IN THE S/2SE1/4 OF SECTION 24, TOWNSHIP 56 NORTH, RANGE 84 WEST, 6TH PRINCIPAL MERIDIAN, SHERIDAN COUNTY, WYOMING

DEVELOPER: STORY HOUSE PROPERTY COMPANY, LLC
40 EAST WORKS STREET, SUITE 18
SHERIDAN WY, 82801

PS RESTFELDT SURVEYING
2340 WETLANDS DR., SUITE 100
PO BOX 3082
SHERIDAN, WY 82801
307-672-7415

CLIENT: WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801

JN: 2023-058
DN: 2023-058-PUD-2-20
PF: T2023-058
REVIEWED BY: JSP
FEBRUARY 23, 2024

WWC ENGINEERING

1849 TERRA AVE, SHERIDAN, WY 82801 | 307.672.0761

March 1, 2024

City of Sheridan
Planning Department
55 Grinnell Street
Sheridan, WY 82801

Re: Variance Request – Depth to Front Ratio

Planning Department:

On behalf of the applicant, Story House Property Company, LLC, WWC Engineering is formally requesting a variance for the Story House Village Phase 1 planned unit development (PUD), specifically related to the depth to front ratio for Block 4 – Lots 1-3; Block 7 - Lots 1-4; and Block 7 – Lots 16-18. In accordance with the existing regulations outlined in Appendix B Section 505(C)(1) of the City of Sheridan Municipal Code, the permitted depth to front ratio is limited to 2.5 to 1. However, due to characteristics of the property and the proposed development plan, we are seeking approval for Block 4 – Lots 1-3; Block 7 - Lots 1-4; and Block 7 – Lots 16-18 to have a depth to front ratio greater than 2.5 to 1 as detailed below.

	Lot Depth (ft)	Lot Frontage (ft)	Depth to Front Ratio
Block 4 - Lot 1	176.37’	61.70’	2.86 to 1
Block 4 - Lot 2	176.14’	61.87’	2.85 to 1
Block 4 - Lot 3	175.91’	67.55’	2.60 to 1
Block 7 - Lot 1	125.03’	47.18’	2.65 to 1
Block 7 - Lot 2	121.63’	45.24’	2.69 to 1
Block 7 - Lot 3	118.08’	45.24’	2.61 to 1
Block 7 - Lot 4	114.54’	45.24’	2.53 to 1
Block 7 - Lot 16	100.99’	23.67	4.27 to 1
Block 7 - Lot 17	100.99’	22.53	4.48 to 1
Block 7 - Lot 18	100.63’	25.86	3.89 to 1

Thank you for your time and consideration. We look forward to working collaboratively with the City of Sheridan to achieve a successful outcome for all parties involved.

Sincerely,

Sarah Rohrer

Sarah Rohrer, P.E.
Project Manager

WWC ENGINEERING

1849 TERRA AVE, SHERIDAN, WY 82801 | 307.672.0761

March 1, 2024

City of Sheridan
Planning Department
55 Grinnell Street
Sheridan, WY 82801

Re: Variance Request – Lot Frontage

Planning Department:

On behalf of the applicant, Story House Property Company, LLC, WWC Engineering is formally requesting a variance for the Story House Village Phase 1 planned unit development (PUD), specifically related to the frontage for Block 7 – Lots 16-17. In accordance with the existing regulations outlined in Appendix B Section 505(C)(5) of the City of Sheridan Municipal Code, every lot shall consist of frontage of at least twenty-five feet on a public street. However, due to characteristics of the property and the proposed development plan, we are seeking approval for Block 7 – Lots 16-17 to have a frontage less than 25' as detailed below.

	Lot Frontage (ft)
Block 7 - Lot 16	23.67
Block 7 - Lot 17	22.53

Thank you for your time and consideration. We look forward to working collaboratively with the City of Sheridan to achieve a successful outcome for all parties involved.

Sincerely,

Sarah Rohrer

Sarah Rohrer, P.E.
Project Manager

WWC ENGINEERING

1849 TERRA AVE, SHERIDAN, WY 82801 | 307.672.0761

March 1, 2024

City of Sheridan
55 Grinnell Street
Sheridan, WY 82801

Re: Variance Request – Radius

Engineering Department:

On behalf of the applicant, Story House Property Company, LLC, WWC Engineering is formally requesting a variance for the Story House Village Phase 1 planned unit development (PUD), specifically related to the centerline curve radius for the roads along Baldwin Ave. The variance being sought is for a 100’ radius, as opposed to the required 150’ radius outlined in Appendix B Section 505(D) of the City of Sheridan Municipal Code.

This request is grounded in the fact that Baldwin Ave is designated for residential use only, and all commercial traffic in Block 1, 2, 3, and 8 will be accessed from Story House Village Road. The proposed 100' radius aligns with the specifications outlined in Appendix B for a 36' road within a 60' right of way. Additionally, we have taken proactive measures to address concerns related to parking and road width. Specifically, 50' bulb outs have been incorporated to facilitate parking for corner lots and to widen the road in the areas adjacent to the radius.

These adjustments aim to enhance safety and convenience within the development, catering to the specific needs of a residential area. The 36’ streets, coupled with on-street parking, are designed not only to accommodate residents but also to naturally reduce traffic speed. As a further measure, the proposed speed limit within the development is set at 25 mph, contributing to a safer and more controlled traffic environment.

In summary, the requested variance for a 100' radius along Baldwin Ave aligns with the nature of the area designated for residential use. The proposed modifications, including bulb outs, are intended to mitigate any potential concerns while ensuring the overall functionality and safety of Story House Village Phase 1.

Thank you for your time and consideration. We look forward to working collaboratively with the City of Sheridan to achieve a successful outcome for all parties involved.

Sincerely,

Sarah Rohrer

Sarah Rohrer, P.E.
Project Manager

WWC ENGINEERING

1849 TERRA AVE, SHERIDAN, WY 82801 | 307.672.0761

March 1, 2024

City of Sheridan
55 Grinnell Street
Sheridan, WY 82801

Re: Variance Request – Roadway Widths

Engineering Department:

On behalf of the applicant, Story House Property Company, LLC, WWC Engineering is formally requesting a variance for the Story House Village Phase 1 planned unit development (PUD), specifically related to the roadway widths along Story House Lane and Baldwin Ave. The variance being sought is for a thirty-six foot (36') roadway width along the entirety of Baldwin Ave and for portions of Story House Lane east of Story House Village.

- Section 503.2.1 of the City of Sheridan Public Infrastructure Design Standards outlines the required roadway widths for single family local roads as 36' roadways with an ADT of less than 2000.

- Section 503.2.1 of the City of Sheridan Public Infrastructure Design Standards outlines the required roadway widths for commercial, industrial, multi-family roads as 39' roadways with an ADT of less than 2500.

- Appendix B Section 504(D) of the City of Sheridan Municipal Code outlines the required roadway widths for local streets, high- and low-density residential areas as 36' roadways with an ADT of less than 250.

- Appendix B Section 504(D) of the City of Sheridan Municipal Code outlines the required roadway widths for local streets, commercial, and industrial areas as 39' roadways with an ADT of less than 500.

The estimated ADT for the development blocks along the requested 36' roadways are detailed in Table 1 below:

Table 1. Estimated ADT

	Total ADT	Story House Lane ADT	Baldwin Ave ADT
Block 4	85	85	--
Block 5	432	216	216
Block 6	346	--	346
Block 7	542	271	271
Total	1405	572	833

This roadway width variance request is grounded in the fact that east Story House Lane and Baldwin Ave are designated for residential use only, and all commercial traffic in Block 1, 2, 3, and 8 will be accessed from Story House Village Road. Additionally, the applicant has implemented supplementary parking measures to accommodate smaller roadway widths. The proposed allowable parking for Phase 1 is described in Table 2 below and depicted on the attached Figures 1 and 2.

Table 2. Allowable Parking

Story House Village (SHV)	No On-Street Parking
Story House Lane	
• West of SHV	No On-Street Parking
• East of SHV – Block 4	No On-Street Parking
• East of SHV – Block 7	2 Sided On-Street Parking
Baldwin Avenue	
• East – Block 7	2 Sided On-Street Parking
• Central – Blocks 5/6	1 Side On-Street Parking
• West – Blocks 2/3	No On-Street Parking
Canterbury Lane	2 Sided On-Street Parking

To further reduce parking concerns, Table 3 below details the estimated parking availability for Block 7, as this is the only area with parking allowed on both sides of the proposed 36' roads. The table below presents the conservative estimates of parking availability, with the understanding that the actual parking capacity could be augmented by the inclusion of driveways, thereby further alleviating on-road parking congestion and enhancing the overall accessibility of the neighborhood.

Table 3. Estimated Parking Availability

	Lots	On-Street Parking	Parking to Lot Ratio
Block 7 - Total	60	173	2.9 to 1
• Story House Lane & Baldwin Ave	45	123	2.7 to 1
• Canterbury Lane	15	50	3.3 to 1

An alternate side parking strategy along Story House Lane and Baldwin Avenue within Block 7 will be utilized to allow snowplows to have sufficient roadway width to be efficient with snow removal. This strategy will be implemented using street signs designating parking days. Table 4 below demonstrates the ability to do alternate side parking.

Table 4. Alternate Side Parking

Story House Lane & Baldwin Ave	45 Lots – 123 On-Street Parking Spots
• Outside Curve of Road	67
• Inside Curve of Road	56

In summary, the requested variance for 36’ roadway width along the entirety of Baldwin Ave and for portions of Story House Lane east of Story House Village aligns with the intended use by accommodating restricted on-street parking in most areas. Where parking is permitted on both sides, an alternate side parking strategy will be employed during snow removal, ensuring efficient maintenance of roadways while optimizing available parking space.

Thank you for your time and consideration. We look forward to working collaboratively with the City of Sheridan to achieve a successful outcome for all parties involved.

Sincerely,

Sarah Rohrer

Sarah Rohrer, P.E.
Project Manager

K:\Sheridan\Story House Management\2023137 Story House Village\05CAD\Sheets\WORK\23137_VILG_PRKNG.dwg PARKING 2/19/2024 9:03:58 AM

NO PARKING

PARKING SPOTS	
INTENDED BLOCK	*NUMBER*
BLOCK 6	35
BLOCK 7 (60 LOTS)	173
TOTAL	208

NO PARKING THIS SIDE OF STREET

NO PARKING THIS SIDE OF STREET

NO PARKING THIS SIDE OF STREET

STORY HOUSE LANE

STORY HOUSE VILLAGE

BALDWIN AVENUE

MOCKINGBIRD DRIVE

CANTERBURY LANE

WY HWY 336

WILDCAT ROAD

N

0 75' 150'

SCALE: 1" = 150'
11" x 17" PAPER SIZE

DRAFT

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE PUD - PHASE 1

PARKING CONCEPT FIGURE

SHERIDAN COUNTY, WYOMING

DESIGNED BY: *SER*
DRAWN BY: *CIM*
CHECKED BY: *CDR*
DATE: *02/14/2024*

FIGURE
1

K:\Sheridan\Story House Management\2023137 Story House Village\05CAD\Sheets\WORK\23137_VILG_PRKNG_LOT.dwg PARKING 2/19/2024 9:06:23 AM

NO PARKING

PARKING SPOTS

TYPE	NUMBER
BLOCK 6 - STREET	35
BLOCK 7 (60 LOTS)	233
BLOCK 7 - STREET	*113*
BLOCK 7 - DRIVEWAY	*120*
TOTAL	268

FUTURE DRIVEWAY (TYP)
(2 PARKING SPOTS
ADDED PER DRIVEWAY)

NO PARKING
THIS SIDE
OF STREET

NO PARKING
THIS SIDE
OF STREET

NO PARKING
THIS SIDE
OF STREET

STORY HOUSE LANE

STORY HOUSE VILLAGE

BALDWIN AVENUE

MOCKINGBIRD DRIVE

CANTERBURY LANE

WY HWY 336

WILDCAT ROAD

N

0 75' 150'

SCALE: 1" = 150'
11" x 17" PAPER SIZE

DRAFT

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE PUD - PHASE 1

PARKING CONCEPT FIGURE ON LOT

SHERIDAN COUNTY, WYOMING

DESIGNED BY: *SER*
DRAWN BY: *CIM*
CHECKED BY: *CDR*
DATE: *02/14/2024*

FIGURE
2

WWC ENGINEERING

1849 TERRA AVE, SHERIDAN, WY 82801 | 307.672.0761

March 1, 2024

City of Sheridan
Utilities Department
55 Grinnell Street
Sheridan, WY 82801

Re: Variance Request – 20' Sewer Easement

City of Sheridan Utilities Department:

On behalf of the applicant, Story House Property Company, LLC, WWC Engineering is formally requesting a variance for the Story House Village Phase 1 planned unit development (PUD), specifically related to the sewer easements abutting Block 5, Lots 1 – 8 and Block 7, Lots 16 and 17. In accordance with the existing regulations outlined in Section 401 of the City of Sheridan Public Infrastructure Design Standards, subsection 9-g, the minimum width of an easement or right-of-way for City use in which a sewer will be installed is twenty (20) feet. If the final depth as measured from finished grade to the top of the sewer main exceeds 6.0 feet, the following table shall be used to determine the minimum width of right-of-way or easement required:

Depth of sewer main measured from finished grade to top of pipe (feet).	Minimum distance (feet) from center of proposed sewer main to edge of building or established R-O-W.
6.0 and less	10.0 (20.0 feet total width)
6.0 to 10.0	15.0 (30.0 feet total width)
Greater than 10.0 feet	At least 20.0 feet (40.0 ft total), and function of soil type.

The design depth of sewer main measured from finished grade to top of pipe varies from 8.0' to 10.8' for the sewer easement abutting Block 5, Lots 1 – 8 and varies from 6.1' to 10.5' for the sewer easement abutting Block 7, Lots 16 & 17. We believe that the sewer infrastructure can be effectively operated and maintained within a 20' easement without imposing additional easement widths on the lots. We are requesting approval for the sewer easements adjacent to Block 5 – Lots 1 - 8 and Block 7, Lots 16 and 17 to have the minimum width of 20'.

Thank you for your time and consideration. We look forward to working collaboratively with the City of Sheridan to achieve a successful outcome for all parties involved.

Sincerely,

Sarah Rohrer

Sarah Rohrer, P.E.
Project Manager

WWC ENGINEERING

1849 TERRA AVE, SHERIDAN, WY 82801 | 307.672.0761

May 13, 2024

City of Sheridan
55 Grinnell Street
Sheridan, WY 82801

Re: Variance Request – Roadway Widths

Engineering Department:

On behalf of the applicant, Story House Property Company, LLC, WWC Engineering is formally requesting a variance for the Story House Village Phase 1 planned unit development (PUD), specifically related to the roadway widths along Story House Lane and Baldwin Ave.

Story House Lane – Between Block 4 and Block 5 – Proposed single family and multi-family

The variance being sought is for a thirty-six-foot (36') roadway width with a proposed parking plan of no parking on either side of the street. The PUD design report designates one (1) off-street parking space per dwelling unit for Block 4 and two (2) off-street parking spaces per dwelling unit for Block 5.

- Section 503.2.1 of the City of Sheridan Public Infrastructure Design Standards outlines the required roadway widths for commercial, industrial, multi-family roads as 39' roadways with an ADT of less than 2,500.

- Appendix B Section 504(D) of the City of Sheridan Municipal Code outlines the required roadway widths for local streets, high- and low-density residential areas as 36' roadways with an ADT of less than 250.

Baldwin Ave – Between Block 5 and Block 6 - Proposed single family and multi-family

The variance being sought is for a thirty-six-foot (36') roadway width with a proposed parking plan of one-sided parking adjacent to Block 6. The PUD design report designates two (2) off-street parking spaces per dwelling unit for Block 5.

- Section 503.2.1 of the City of Sheridan Public Infrastructure Design Standards outlines the required roadway widths for commercial, industrial, multi-family roads as 39' roadways with an ADT of less than 2,500.

- Appendix B Section 504(D) of the City of Sheridan Municipal Code outlines the required roadway widths for local streets, high- and low-density residential areas as 36' roadways with an ADT of less than 250.

Story House Lane & Baldwin Ave – Block 7 – Proposed single family

The variance being sought is for a thirty-six-foot (36') roadway width with a proposed parking plan of alternate side parking during snow removal.

- Section 503.2.1 of the City of Sheridan Public Infrastructure Design Standards outlines the required roadway widths for single family local roads as 36' roadways with an ADT of less than 2,000. – Story House Village PUD meets this design requirement.

- Appendix B Section 504(D) of the City of Sheridan Municipal Code outlines the required roadway widths for local streets, high- and low-density residential areas as 36' roadways with an ADT of less than 250.

A comparison of roadway cross sections of Story House Village PUD's proposed 36' roadway widths with the proposed parking plan compared to the 39' alternative with parking on both sides is shown in Figure 1.

Average Daily Traffic (ADT)

East Story House Lane has an estimated ADT of 572 vehicles per day and Baldwin Ave has an estimated ADT of 833 vehicles per day for Blocks 4-7. The estimated ADTs for each block are shown in Table 1.

Table 1. Estimated ADT

	Total ADT	Story House Lane ADT	Baldwin Ave ADT
Block 4	85	85	--
Block 5	432	216	216
Block 6	346	--	346
Block 7	542	271	271
Total	**1405**	**572**	**833**

Due to the inconsistency between the ADT requirements between the City of Sheridan Public Infrastructure Design Standards and the City of Sheridan Municipal Codes, industry standard roadway guidelines published by the American Associate of State Highway and Transportation Officials (AASHTO) were used for design standards.

- Section 4.3 (Geometric Design of Highways and Streets) recommends lane widths of 9 to 12 ft based on an ADT of 2,000 vehicles per day or less.

- Section 2.5 (Geometric Design of Low-Volume Roads) – recommends design volumes based on an ADT of 2,000 vehicles per day or less.

- Section 4.2.1.2 (Geometric Design of Low-Volume Roads) – recommends the total roadway widths in very high-density developments as 32' for one-sided parking and 34-38' for two-sided parking. These widths incorporate consideration of access for fire trucks and other emergency vehicles.

Story House Village PUD Proposed Parking Plan

The applicant has implemented supplementary parking measures to accommodate the proposed roadway widths. The proposed allowable parking for Phase 1 is described in Table 2 below and depicted on the attached Figure 1.

Table 2. Allowable Parking

Story House PUD Proposed Parking Plan	
Story House Village (SHV)	No On-Street Parking
Story House Lane	
• West of SHV	No On-Street Parking
• East of SHV – Blocks 4/5	No On-Street Parking
• East of SHV – Block 7	2 Sided On-Street Parking with Alternate Side Parking During Snow Removal
Baldwin Avenue	
• East – Block 7	2 Sided On-Street Parking with Alternate Side Parking During Snow Removal
• Central – Blocks 5/6	1 Side On-Street Parking
• West – Blocks 2/3	No On-Street Parking
Canterbury Lane	2 Sided On-Street Parking with Alternate Side Parking During Snow Removal

To further reduce parking concerns, Table 3 below details the estimated parking availability for Block 7, as this is the only area with parking allowed on both sides of the proposed 36' roads. An alternate side parking strategy within Block 7 will be utilized to allow snowplows to have sufficient roadway width to be efficient with snow removal. This strategy will be implemented using street signs.

Table 3. Estimated Parking Availability

	Lots	On-Street Parking	Parking to Lot Ratio	Total Parking	Total Parking to Lot Ratio
Block 7 - Total	60	113	3.8 to 1	233	3.8 to 1
• Story House Lane & Baldwin Ave	45	77	1.7 to 1	167	3.7 to 1
• Canterbury Lane	15	36	2.4 to 1	66	4.4 to 1

Emergency Vehicles

As described in the International Fire Code (IFC), the following roadway widths dictate the available parking to safely allow emergency vehicles to still pass through:

- 20-26’ Road – No Parking Both Sides
- 26-32 Road – No Parking on One Side
- >32’ Road – Parking on Both Sides

Based on these IFC requirements, any roadway greater than 32’ allows for parking on both sides with enough space for emergency vehicles to navigate. The proposed 36’ roadways allow for parking on both sides and emergency vehicles to pass through safely.

In summary, the requested variance for 36’ roadway width along the entirety of Baldwin Ave and for portions of Story House Lane east of Story House Village aligns with the intended use by accommodating restricted on-street parking in most areas. Where parking is permitted on both sides, an alternate side parking strategy will be employed during snow removal, ensuring efficient maintenance of roadways while optimizing available parking space. This roadway width variance request is grounded in the fact that east Story House Lane and Baldwin Ave are designated for residential use only, and all commercial traffic in Block 1, 2, 3, and 8 will be accessed from Story House Village Boulevard. Additionally, the applicant has implemented supplementary parking measures to accommodate smaller roadway widths.

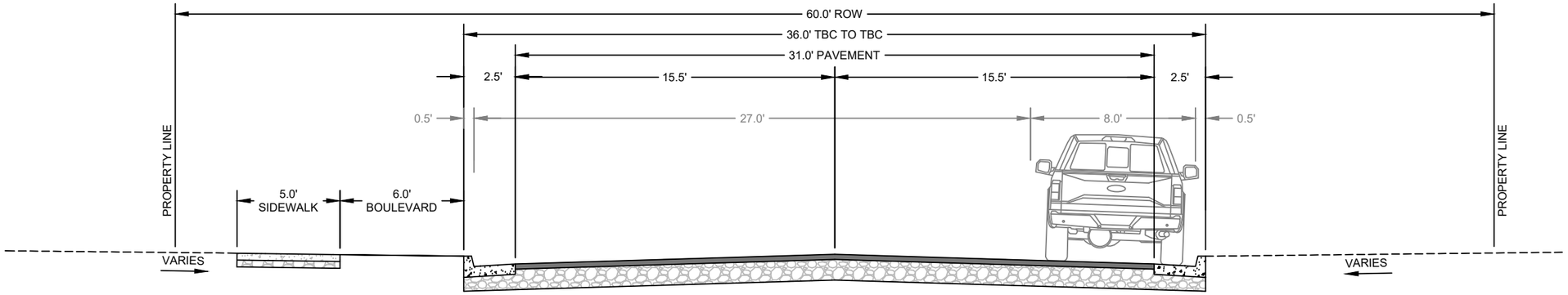
Thank you for your time and consideration. We look forward to working collaboratively with the City of Sheridan to achieve a successful outcome for all parties involved.

Sincerely,

Sarah Rohrer

Sarah Rohrer, P.E.
Project Manager

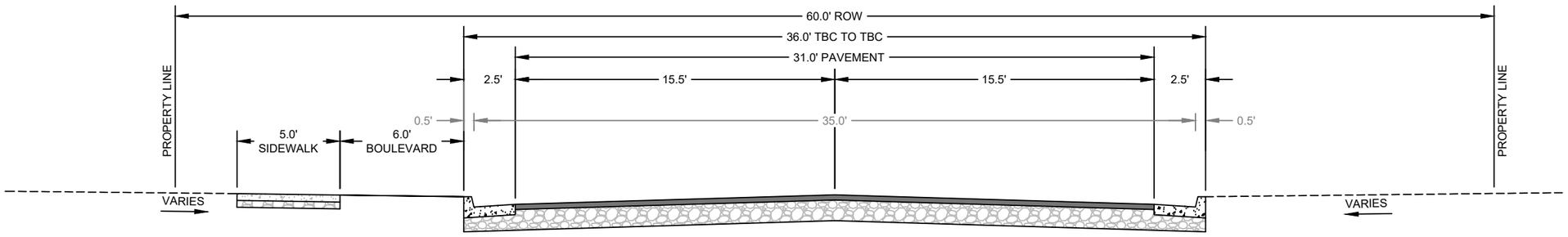
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PROPOSED 36' ROAD SECTION - 1 SIDED PARKING

NOT TO SCALE

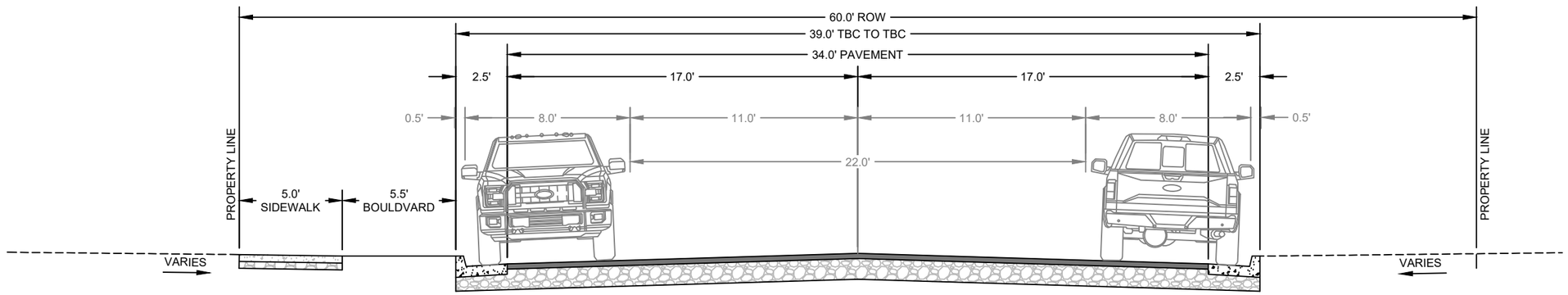
- STORY HOUSE LANE - BETWEEN BLOCK 4 AND BLOCK 5



PROPOSED 36' ROAD SECTION - NO PARKING

NOT TO SCALE

- BALDWIN AVE - BETWEEN BLOCK 5 AND BLOCK 6



39' ROAD SECTION - BOTH SIDED PARKING

NOT TO SCALE

CONCEPT

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE

36' VS 39' ROAD CROSS SECTIONS

SHERIDAN COUNTY, WYOMING

DESIGNED BY: SER
DRAWN BY: CIG
CHECKED BY: JPC
DATE: 6/9/2023

SHEET 1

K:\Sheridan\Story House Management\2023137 Story House Village\05CAD\Sheets\WORK\23137_VILG_PRKNG_LOT.dwg PARKING 5/13/2024 3:33:28 PM

FUTURE DRIVEWAY (2 PARKING SPOTS ADDED PER DRIVEWAY)

NO PARKING

PARKING SPOTS

TYPE	NUMBER
BLOCK 6 - STREET	35
BLOCK 7 (60 LOTS)	233
BLOCK 7 - STREET	*113*
BLOCK 7 - DRIVEWAY	*120*
TOTAL	268

BLOCK 1

BLOCK 4

BLOCK 3

BLOCK 5

BLOCK 8

BLOCK 2

BLOCK 6

BLOCK 7

STORY HOUSE LANE

STORY HOUSE VILLAGE

BALDWIN AVENUE

MOCKINGBIRD DRIVE

CANTERBURY LANE

WY HWY 336

WILDCAT ROAD

NO PARKING THIS SIDE OF STREET

ALTERNATE SIDE PARKING DURING SNOW REMOVAL (ENTIRETY OF BLOCK 7)

N

0 75' 150'

SCALE: 1" = 150'
11" x 17" PAPER SIZE

DRAFT

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
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STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE PUD - PHASE 1

PARKING CONCEPT FIGURE ON LOT

SHERIDAN COUNTY, WYOMING

DESIGNED BY: SER
DRAWN BY: CIM
CHECKED BY: CDR
DATE: 02/14/2024

FIGURE
2

STORY HOUSE VILLAGE PUD
PHASE 1

DRAINAGE REPORT

PREPARED FOR:

CITY OF SHERIDAN

ON BEHALF OF:

STORY HOUSE PROPERTY COMPANY, LLC

WWC ENGINEERING

April 2024

STORY HOUSE VILLAGE PUD – PHASE 1
DRAINAGE REPORT

Prepared for:	City of Sheridan 55 Grinnell Plaza Sheridan, WY 82801
On Behalf of:	Story House Property Company, LLC 40 E Works Street #1B Sheridan, WY 82801
Prepared by:	WWC Engineering 1849 Terra Avenue Sheridan, WY 82801 (307) 672-0761
Principal Authors:	Kenneth Markley, E.I.
Reviewed by:	Sarah Rohrer, P.E. Jeffrey Barron, P.E.

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Post-development 1
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Pre-Development Drainage Area 4
Post-Development System 4
Post-Development Runoff Control 10
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Appendix B Stormwater Hydraulics
Appendix C Soil Data
Appendix D FEMA Information

Project Description

The purpose of this final drainage report is to provide runoff control recommendations resulting from the hydrologic effects of the proposed Story House Village – Phase 1 (Project). Phase 1 of the development includes commercial and residential development. Future development may occur on the property at which time hydrologic effects will be assessed and reported as required. Hydrology and hydraulic calculations provided hereafter will detail the comparison of pre-development and post-development runoff from the proposed Project and provide recommendations on best management practices for any increased runoff post-development in accordance with the 2016 City of Sheridan Storm Drainage Manual (City, 2016); hereafter referred to as the Manual. Stormwater hydrology design calculations are included in Appendix A and stormwater hydraulic design calculations are included in Appendix B.

Location

The Project is located on State Highway 336, also known as Wyarno Road, in Sheridan, Wyoming. The property is bound by Highway 336 to the south and private property to the north, west, and east. The Project encompasses approximately 44.86 acres within the southern half of the southeast quarter of Section 24, T56N, R84W. Figure 1 provides the general location of the Project.

Site Conditions

Pre-development

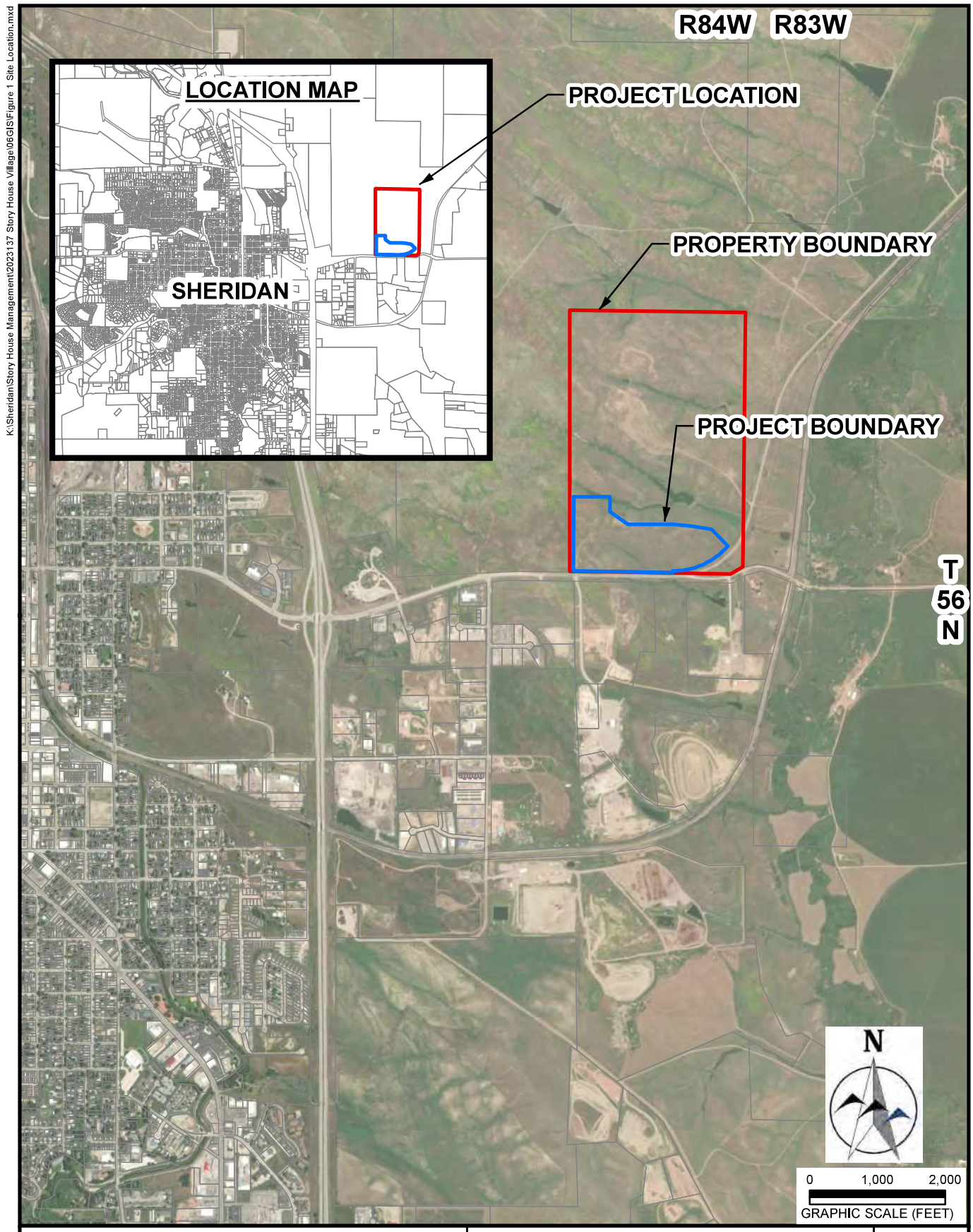
Pre-development conditions of the area include an existing two-track road that enters the Project and unimproved grazing land with a minor gully bisecting portions of the project running northwest to southeast. Stormwater runoff from the adjacent property to the west drains onto the Project area. The general topography east of the Project slopes to the east flowing into Prairie Dog Creek. Stormwater runoff on the Project currently drains north and east.

Soils

The soils found near the surface are generally composed of lean clay or clayey sand alluvial soils with claystone bedrock underneath based on a geotechnical investigation of the Project area prepared by American Engineering Testing (AET). The ground cover in the area is native herbaceous land with grass and shrubs with some exposed areas of soil. The geotechnical report is available upon request and the NRCS soil survey for the Project area is included in Appendix C. There are no apparent previous drainage reports for this area. The Project area is classified as Zone X, an area of minimal flood hazard, and is not within the 100-year flood elevation of the published FIS report. FEMA flood information is included in Appendix D.

Post-development

The Project is a combined commercial and residential planned unit development (PUD) with proposed commercial and residential development. Roads, curbs, gutters, and sidewalks will be constructed as part of the Project. The layout of the proposed Project is depicted in Figure 2. The PUD drainage will utilize curb and gutter flow and sheet flow to route runoff to existing



PRELIMINARY DRAINAGE PLAN

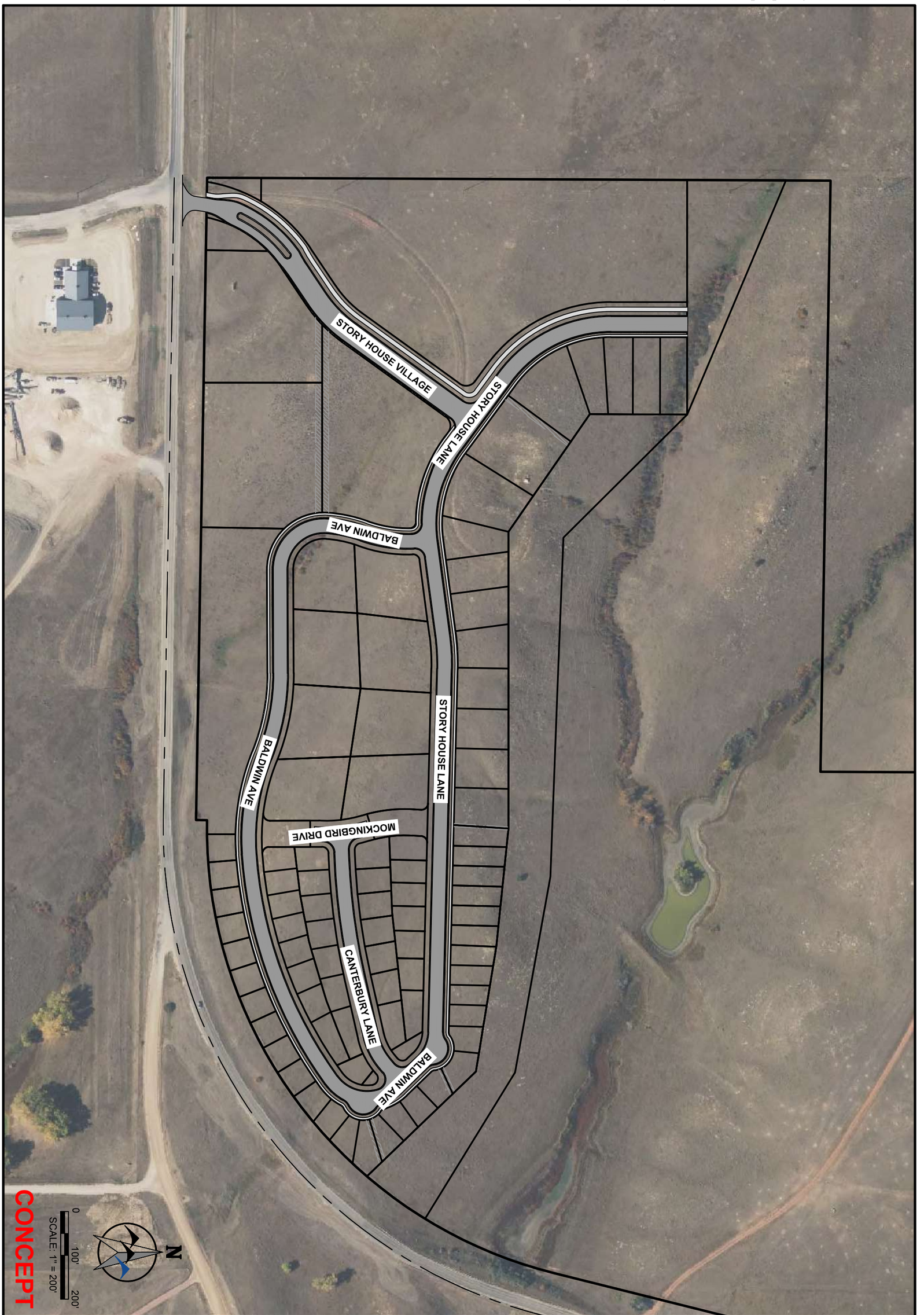
GENERAL LOCATION

STORY HOUSE VILLAGE - PHASE 1

DESIGNED BY: SER
DRAWN BY: RAV
CHECKED BY: SER
DATE: 10/02/2023

WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801
307-672-0761

FIGURE 1



CONCEPT

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE - PHASE 1

SITE LAYOUT

SHERIDAN COUNTY, WY

FIGURE 2

DESIGNED BY: SER
DRAWN BY: CIM
CHECKED BY: JGB
DATE: 10/20/2023

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

ponds to the north and an existing road drainage ditch and culverts to the south. The drainage area to the west will drain to the Project and ultimately to the road drainage ditch to the south.

Hydrologic Analysis and Results

The Manual was used for the hydrologic and hydraulic analysis of the Project. The land use was conservatively estimated as general commercial and or central business. WYDOT classifies Wyarno Road as a collector street. The 10-year and 100-year design storms were used for this analysis. The storm recurrence interval of the 10-year and 100-year storms with 24-hour rainfall amounts of 2.35 and 3.46 inches were used. The NRCS Method was selected to analyze runoff events based on the size of drainage areas exceeding five acres; WinTR-55 computer modeling was utilized in the analyzation. The NRCS procedure in HEC-22 was used to estimate preliminary detention volume needs. Detention calculations are detailed in Appendix B.

Pre-Development Drainage Area

A hydrologic analysis for the pre-development drainage areas was performed and the following drainage basins were delineated: East, Center, West, Off-Site West, and North. The drainage basins used for the analysis are shown in Figure 3. Currently, runoff from these basins is routed to five existing outfalls as described in Table 1.

Appendix A shows the weighted curve numbers used for the pre-development basins. The curve numbers were used to predict stormwater runoff peak flows. NRCS soils data was used to determine the hydrologic groups in determination of the curve number. NRCS data is included in Appendix C.

Table 1. Pre-Development Drainage Basins

Outfall	Pre-Development Basins
A	Off-Site West West
B	Central
C	East
Reservoir	North
D	Overflow from road ditch and reservoir outlet

Post-Development System

Post-developed proposed conditions include paved roads, curbs and gutters, sidewalks, and buildings with drainage planned to follow gutter flow to the existing pond areas to the north and to the existing road drainage ditch and culverts to the south. New post development drainage basins were delineated based on the planned grading of the PUD and are depicted in Figure 4. The boundaries of these areas were determined based on flow paths that will continue to be routed onto the Project and the proposed development from the PUD itself. Each post-development basin flows towards an existing outfall as summarized in Table 2. The design calculations for post-development drainage basins are provided in Appendix A.

K:\Sheridan\Story House Management\2023137 Story House Village\06GIS\23137_Story_House.aprx 4/25/2024 11:20 AM

LEGEND

- PARCEL
- PROJECT BOUNDARY
- DRAINAGE BASIN
- FLOW DIRECTION
- EXISTING CONTOURS
- SITE ROAD
- Outfalls
- CULVERTS

3880 3870 3880 3860 3900 3880 3860 3930 3920 3840 3850 3940 3910 3920 3930 3930 3910 3900 3860 3850 3920 3880 3870 3860 3910 3860 3850

NORTH

OFF-SITE WEST

WEST

CENTRAL

EAST

Reservoir

D

C

A

B

WYARNO ROAD (WY HWY 336)

WILDCAT ROAD

INDUSTRIAL LANE

N

0 125 250 500

GRAPHIC SCALE: FEET

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801
(307) 672-0761
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STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE - PHASE 1

PRE-DEVELOPMENT DRAINAGE PLAN

SHERIDAN COUNTY, WYOMING

DESIGNED BY: SER
DRAWN BY: CIG
CHECKED BY: SER
DATE: 10/19/2023

FIGURE
3

K:\Sheridan\Story House Management\20231137 Story House Village\06GIS\23137_Story_House.aprx 4/25/2024 11:20 AM

LEGEND

- PARCEL
- PROJECT BOUNDARY
- DRAINAGE BASIN
- FLOW DIRECTION
- POND C GRADING BOUNDARY
- MAJOR CONTOURS
- MINOR CONTOURS
- EXISTING CONTOURS
- SITE ROADS
- OUTFALL
- 1 OUTLET
- CULVERTS
- ROW

N1A N1B N1C N1D N2 W1A W1B W2A W2B C1A C1B C2A C2B C2C C2D C4A C4B S1 S2 C1A, C1B, C2A 1 2 3 4 A B C D Reservoir Pond C

WYARNO ROAD (WY HWY 336)

WILDCAT ROAD

INDUSTRIAL LANE

N

0 125 250 500

GRAPHIC SCALE: FEET

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE - PHASE 1

POST-DEVELOPMENT DRAINAGE PLAN

SHERIDAN COUNTY, WYOMING

DESIGNED BY: KM
DRAWN BY: KM
CHECKED BY: SER
DATE: 04/06/2024

FIGURE 4

Appendix A shows the weighted curve numbers, estimated peak flows and runoff volumes for each storm event and given frequency, and the time of concentration for the post-development basins. The curve numbers calculated were used to determine peak discharge flow rates at the basin outlets. NRCS soils data was used to determine the hydrologic groups and determine curve numbers. NRCS data is included in Appendix C.

Table 2. Post-Development Drainage Basins

Outfall	Post-Development Basins
A	Off-Site West W1 A & B W2 A & B
B	C1 A & B C2 A & D S-1
C	C4 A & B S-2
Reservoir[1]	N1 A, B, C, & D N2 C2 B & C
D	Overflow from road ditch and reservoir outlet

[1]Reservoir also receives runoff from offsite areas to the north and northwest of the site.

Swales between lot lines are graded to route stormwater away from the buildable areas and to minimize flow across lot lines. Hydraulic calculations for the swales are included in Appendix B. Figure 5 portrays cross sections for typical grading slopes for lots. Prior to runoff reaching the designated outfalls, the planned finished grade topography of the roads and curb and gutter create areas that require outlets for the flows to reach the intended outfalls. Table 3 summarizes the outlet locations by post-development basins contributing to the flow arriving at these locations, and Figure 4 shows locations of the outlets. Each outlet location will have a double gutter to allow runoff to cross the crown of the streets, access a curb, and then flow through drainage swales to the prescribed outfall. Calculations for the curb cuts are included in Appendix B.

Table 3. Post-Development Street Outlets

Street Outlet Location	Contributing Basins
1	C1A, C1B
2	C2B, C2C
3	C1A, C1B, C2A, C2D
4	C4A, C4B

The pre-development and post-development conditions of the Project area were compared to determine potential stormwater impacts due to the proposed development. Table 4 depicts post-development drainage flows and demonstrates a decreased flow rate for the culvert at

\\wwc.local\work\Sheridan\Story House Management\2023137 Story House Village\05CAD\References\Blocks\TYP_LOT_SECTIONS.dwg 11X17 PP 2/16/2024 2:24:59 PM

BLOCK 7 TYPICAL SWALE PROFILE

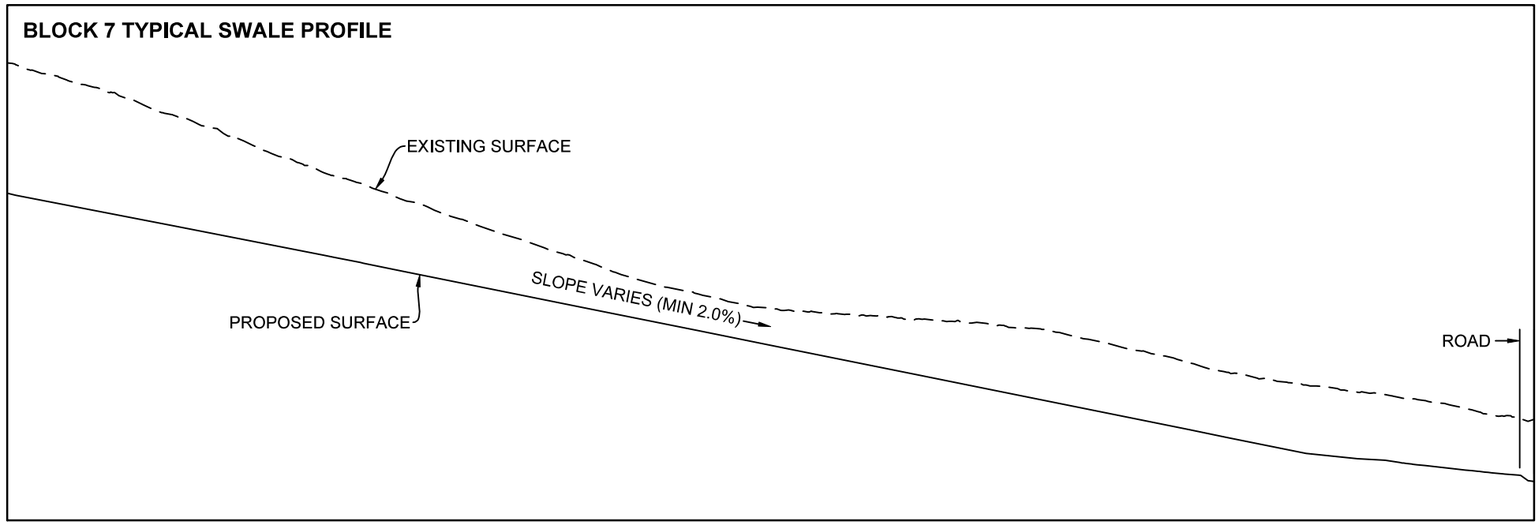
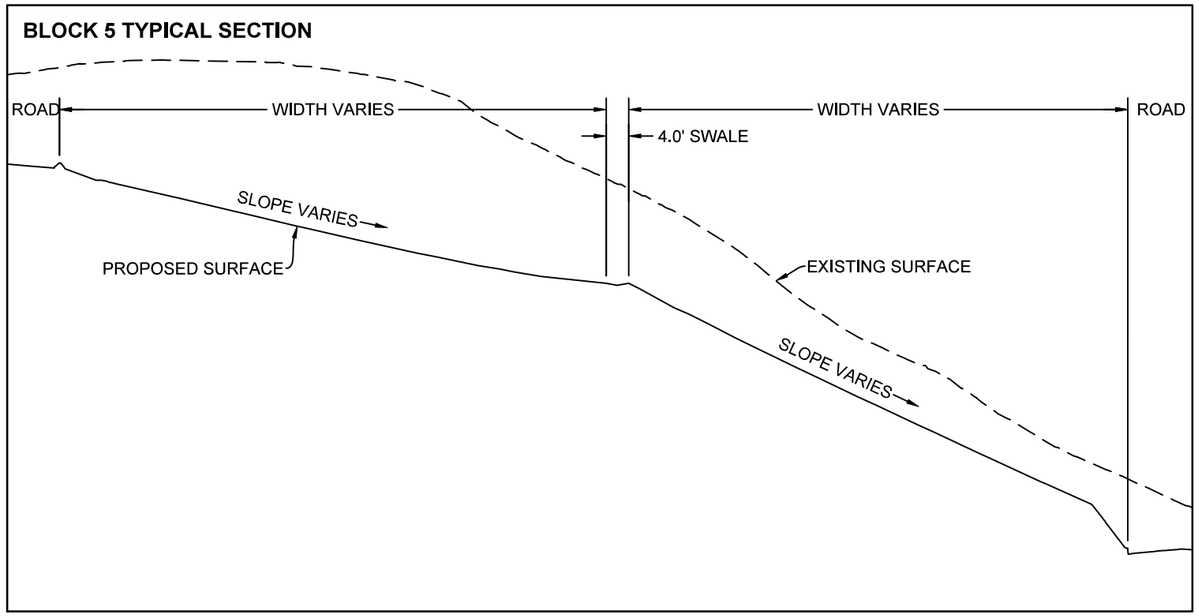
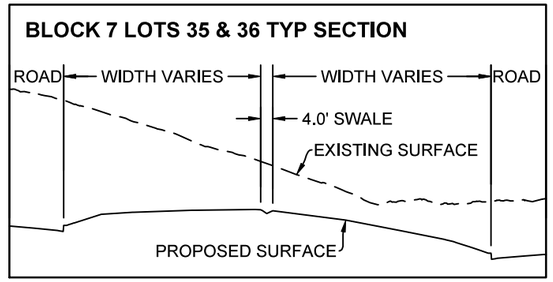


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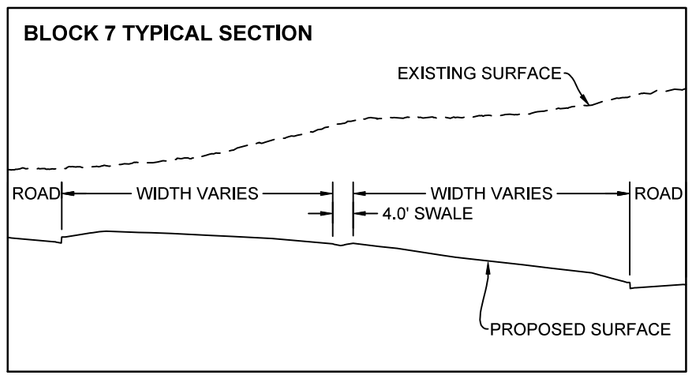
BLOCK 5 TYPICAL SECTION



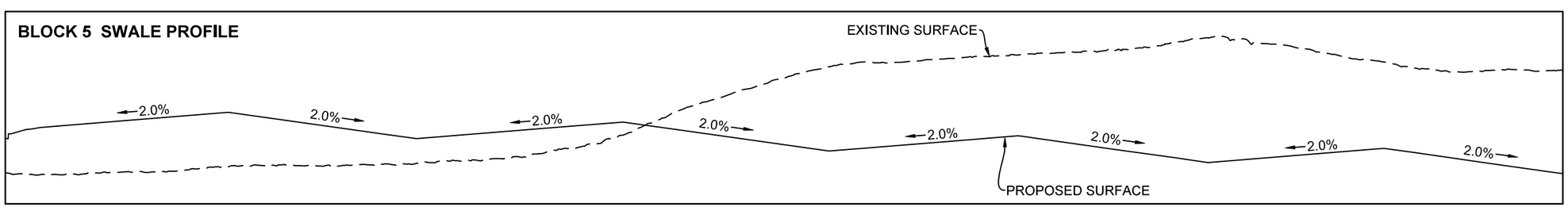
BLOCK 7 LOTS 35 & 36 TYP SECTION



BLOCK 7 TYPICAL SECTION



BLOCK 5 SWALE PROFILE



NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
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STORY HOUSE MANAGEMENT
STORY HOUSE VILLAGE

TYPICAL LOT GRADING SECTION

SHERIDAN COUNTY, WYOMING

DESIGNED BY: KMM
DRAWN BY: CJG
CHECKED BY: SER
DATE: 2/16/2024

FIGURE
1

Table 4. Runoff Summary

Outfall	Recurrence Interval	Timeframe	Runoff Volume (acre*ft)	Total Q (cfs)	Difference (cfs)	Attenuated Flows[1] (cfs)	Percent Difference	Q_{bypass} (cfs)	ΣQ_{bypass} (cfs)
A	10-Year	Pre-developed	1.4	20.9	-4.1	12.2	-21.3%	8.7	8.7
		Post-developed	1.2	16.8		9.6		7.2	7.2
	100-Year	Pre-developed	2.6	39.8	-8.0	21.1	-25.1%	18.7	18.7
		Post-developed	2.1	31.8		15.8		16	16
B	10-Year	Pre-developed	1.6	23.6	7.9	15.6	0.0%	8	16.7
		Post-developed	1.6	31.5		15.6		15.9	23.1
	100-Year	Pre-developed	2.9	42.4	6.4	19.3	-0.5%	23.1	41.8
		Post-developed	2.7	48.8		19.2		29.6	45.6
C	10-Year	Pre-developed	0.5	8.1	7.5	5.9	79.7%	2.2	18.9
		Post-developed	1.1	15.6		10.6		5	28.1
	100-Year	Pre-developed	1.0	14.8	9.9	10.1	46.5%	4.7	46.5
		Post-developed	1.7	24.7		14.8		9.9	55.5
Reservoir[2]	10-Year	Pre-developed	27.5	237.2	15.9	237.2	-87.2%	0	0
		Post-developed		253.1		30.3			
	100-Year	Pre-developed	46.8	408.9	20.1	408.9	-92.0%	0	0
		Post-developed		429.0		32.9			
D[3]	10-Year	Pre-developed	27.5	31.1	6.6	NA	1.5%	0	0
		Post-developed	27.9	37.7					
	100-Year	Pre-developed	46.8	67.6	3.7		1.1%	0	0
		Post-developed	47.3	71.3					

[1]Attenuated flows are the flows passing through the culverts. See Table 7 for details on culverts.

[2]Reservoir also receives runoff from offsite areas to the north and northwest of the site. See secondary access road culvert calculations in Appendix B.

[3]Culvert D is not activated in pre- or post-developed conditions. Percent differences are for the runoff volumes in this row.

outfall A, and flows increased for the runoff at outfalls B, C, and the reservoir. Tables 7 and 8 on the following page depict the pipe flows along with culvert data for culverts adjacent to the WYDOT ROW. A secondary access road is planned to the northeast of the site. A proposed culvert will be placed just downstream of the existing reservoir. Detailed calculations for Tables 4 through 8 are included in Appendix B.

With the increase of flows at outfalls B and D, a ponding assessment was performed to analyze the ponding depth that occurs with pre-developed and post-developed runoff conditions. Table 5 shows the ponding depth at culvert outfall B shows no change resulting from the additional runoff from development improvements. Culvert D ponding depth increases but does not reach the culvert invert at outfall D. Figures and calculations for the ponding are included in Appendix B.

Table 5. Outfall B Ponding Summary

Outfall	Recurrence Interval	Timeframe	Ponding Depth (in)	Difference (in)
B	10-Year	Pre-developed	24	0
		Post-developed	24	
	100-Year	Pre-developed	35	0
		Post-developed	35	
D[1]	10-Year	Pre-developed	63	39
		Post-developed	102	
	100-Year	Pre-developed	90	43
		Post-developed	133	

[1]Culvert D is not activated in pre- or post-developed conditions.

With the increase of flows at outfall C, a detention pond is planned to attenuate the additional flows due to post-developed runoff conditions. The detention pond would be located on the developer's property southeast of Wyarno Road as shown in Figure 4. Table 6 summarizes the detention pond, Pond C, and detailed calculations for detention and outflow orifice are shown in Appendix B.

Table 6. Pond C Summary

Control Volume	Top Area (sq ft)	Storage Volume (acre-ft)	100-yr Inflow (cfs)	100-yr Outflow (cfs)	Historic 100-yr Outflow (cfs)
Pond C	6400	0.54	24.7	10	14.8
WQV	3600	0.20	3.7		

Post-Development Runoff Control

During construction, excelsior logs, silt fence or other best management practices (BMPs) will be implemented to prevent runoff to adjacent streets or properties. These erosion control measures will remain in place throughout construction to minimize erosion and sedimentation. Should the lots be further developed beyond the description in the report, the hydrologic effects should be reevaluated for post-development flows.

Table 7. Culvert Flows Summary

Culvert	Diameter (in)	Flow Area (sqft)	Length (ft)	Slope (ft/ft)	Storm Recurrence Interval (yr)	Historic Pipe Flow (cfs)	Post-Developed Pipe Flow (cfs)	Flowmaster Velocity (fps)
A	24	3.14	70.1	0.0114	10	12.2	9.6	4.55
					100	21.1	15.8	5.03
B	24	3.14	94.5	0.00489	10	15.6	15.6	4.97
					100	19.3	19.2	6.11
C	18	1.77	66.2	0.0445	10	5.9	10.6	7.4
					100	10.1	14.8	8.38
SW[1]	18	1.77	53.0	0.0143	10	3.9	8.2	4.64
					100	8.7	14.4	8.15
Secondary Access	24	3.14	217	0.0138	10	NA	30.3	9.64
					100		32.9	10.47

[1]Culvert under the Story House Village approach

Table 8. Culvert Bypass Volumes Summary

Storm	Timeframe	Total inflow (acre*ft)	Culvert A (acre*ft)	Culvert B (acre*ft)	Culvert C (acre*ft)	Total outflow (acre*ft)	Total Bypass Volumes (acre*ft)
10-Year	Pre-development	3.6	1.4	1.6	0.5	3.5	0.1
10-Year	Post-development	4.3	1.2	1.6	1.1	3.9	0.4
100-Year	Pre-development	6.6	2.6	2.9	1.0	6.5	0.1
100-Year	Post-development	7.1	2.1	2.7	1.7	6.5	0.6

Post-construction BMPs will be properly installed and maintained until vegetation is reestablished. All structures will be constructed at proper elevation to facilitate positive drainage away from the structures and allow stormwater to drain to the roadways.

CONCLUSIONS AND RECOMMENDATIONS

This drainage report for the Story House Village PUD Phase 1 development indicates that with a combination of the proposed grading; drainage routing and control measures of swales, double gutters, and curb cuts; and the addition of the detention Pond C, drainage from the proposed development can be contained by gutter flow and surface sheet flows. The comparison between pre-development and post-development conditions shows a comprehensive understanding of the hydrological effect of the Project, with careful consideration given to managing increased runoff. Overall, the report concludes that the implementation of these controls will adequately address stormwater management needs, support the sustainable development of the PUD while safeguarding the surrounding environment.

REFERENCES

City of Sheridan Public Works Dept. (2016) "Storm Drainage Design Criteria". City of Sheridan, 55 Grinnell Plaza, Sheridan, WY. Available on the Internet as of October 2023: https://www.sheridanwy.gov.

US Department of Transportation, FHWA. (2013) "Urban Drainage Design Manual". Hydraulic Engineering Circular No. 22, Third Edition. Publication No. FHWA-NHI-10-009, Rev. August 2013. Available on the Internet as of October 2023: https://www.fhwa.dot.gov/engineering/hydraulics/library_listing.cfm

APPENDIX A

Stormwater Hydrology

Table A. Pre-Development Curve Numbers for the SCS Method

Curve Number (SCS Peak Flow Method)						
Basin	**Total Area (acres)**	**Surface**	**Subarea (acres)**	**Hydrologic Group**	**Curve Number**	
Off-Site West	8.32	Pasture	5.12	B	71	77
			0.64	C	81	
			2.56	D	89	
West	8.45	Pasture	0.13	C	81	89
			7.93	D	89	
		Dirt	0.20	D	89	
		Paved with open ditches	0.20	D	93	
North	11.7	Pasture	5.98	D	89	80
			5.68	B	71	
		Dirt	0.02	D	89	
			0.02	B	82	
Central	16.69	Pasture	14.63	D	89	87
			1.66	B	71	
		Dirt	0.13	D	89	
			0.02	B	93	
		Paved with open ditches	0.25	D	93	
East	5.8	Pasture	2.57	C	81	86
			3.10	D	89	
		Paved with open ditches	0.03	C	92	
			0.10	D	93	

Table B. Post-Development Curve Numbers for the SCS Method

Curve Number (SCS Peak Flow Method)						
Basin	**Total Area (acres)**	**Surface**	**Subarea (acres)**	**Hydrologic Group**	**Curve Number**	
Off-Site West	8.32	Pasture	5.12	B	71	77
			0.64	C	81	
			2.56	D	89	
C1A	0.40	Paved parking lots, roofs, driveways	0.40	D	98	98
C1B	0.17	Paved parking lots, roofs, driveways	0.17	D	98	98
C2A	4.4	Paved parking lots, roofs, driveways	3.30	D	98	96
		Poor Condition Lawns	1.10		89	
C2B	1.93	Paved parking lots, roofs, driveways	0.40	B	98	89
			0.60	D	98	
		Poor Condition Lawns	0.85	B	79	
			0.08	D	89	
C2C	0.2	Paved parking lots, roofs, driveways	0.10	B	98	98
			0.10	D	98	
C2D	5.48	Paved parking lots, roofs, driveways	1.37	B	98	95
			2.74	D	98	
		Poor Condition Lawns	0.46	B	79	
			0.91	D	89	
C4A	5.11	Paved parking lots, roofs, driveways	2.56	B	98	94
			1.28	D	98	
		Poor Condition Lawns	0.85	B	79	
			0.43	D	89	
C4B	1.29	Paved parking lots, roofs, driveways	0.77	B	98	96
			0.39	D	98	
		Poor Condition Lawns	0.13	B	79	
N1A	4.35	Paved parking lots, roofs, driveways	2.00	D	98	93
		Poor Condition Lawns	2.35		89	
N1B	0.48	Paved parking lots, roofs, driveways	0.48	D	98	98
N1C	0.32	Paved parking lots, roofs, driveways	0.32	D	98	98
N1D	2.19	Paved parking lots, roofs, driveways	0.01	B	98	93
			0.90	D	98	
		Poor Condition Lawns	0.03	B	79	
			1.25	D	89	
N-2	2.8	Paved parking lots, roofs, driveways	1.25	B	98	87
		Poor Condition Lawns	1.55		79	
W1A	2.13	Paved parking lots, roofs, driveways	1.28	D	98	94
		Poor Condition Lawns	0.85		89	
W1B	1.05	Paved parking lots, roofs, driveways	0.53	D	98	94
		Poor Condition Lawns	0.53		89	
W2A	0.29	Paved parking lots, roofs, driveways	0.29	D	98	98
W2B	1.43	Poor Condition Lawns	1.43	D	89	89
S1	3.20	Paved parking lots, roofs, driveways	1.60	D	98	94
		Poor Condition Lawns	1.60	D	89	
S2	1.16	Paved parking lots, roofs, driveways	0.50	D	98	91
		Poor Condition Lawns	0.19	B	79	
			0.47	D	89	

Table C. Pre-Development Time of Concentration Calculations

Time of Concentration (SCS Peak Flow Method)						
Basin	**Flow Type**	**Flow Length (ft)**	**Slope (ft/ft)**	**Velocity (ft/s)**	**tc (min)**	**tc (min)**
Off-Site West	Sheet Flow	100	0.0852	- -	7.7	**11.2**
	Shallow Concentrated Flow	717	0.0460	1.21	3.5	
West	Sheet Flow	100	0.0513	- -	9.5	**14.8**
	Shallow Concentrated Flow	983	0.0364	1.22	5.3	
North	Sheet Flow	100	0.0988	- -	7.3	**8.9**
	Shallow Concentrated Flow	483	0.1042	1.09	1.6	
Central	Sheet Flow	100	0.0338	- -	11.2	**16.8**
	Shallow Concentrated Flow	1247	0.0534	1.34	5.6	
East	Sheet Flow	100	0.0222	- -	13.3	**14.9**
	Shallow Concentrated Flow	500	0.0961	0.67	1.7	

Table D. Post-Development Time of Concentration Calculations

Time of Concentration (SCS Peak Flow Method)						
Basin	**Flow Type**	**Flow Length (ft)**	**Slope (ft/ft)**	**Velocity (ft/s)**	**tc (min)**	**tc (min)**
Off-Site West	Sheet Flow	100	0.0852	- -	7.7	**11.2**
	Shallow Concentrated Flow	717	0.0460	1.21	3.5	
W1A	Sheet Flow	100	0.0292	- -	1.4	**6.0**
	Shallow Concentrated Flow	315	0.0163	1.99	2.0	
W1B	Sheet Flow	100	0.0437	- -	1.3	**6.0**
	Shallow Concentrated Flow	414	0.0218	2.42	2.3	
W2A	Sheet Flow	19	0.0200	- -	0.5	**6.0**
	Shallow Concentrated Flow	417	0.0218	3.00	2.9	
W2B	Sheet Flow	100	0.0726	- -	8.2	**12.7**
	Shallow Concentrated Flow	288	0.0679	- -	1.1	
		150	0.0022	0.71	3.3	
N1A	Sheet Flow	100	0.0568	- -	1.1	**6.4**
	Shallow Concentrated Flow	749	0.0134	2.20	5.3	
N1B	Sheet Flow	19	0.0200	- -	0.5	**6.0**
	Shallow Concentrated Flow	419	0.0200	2.53	2.4	
N1C	Sheet Flow	19	0.0200	- -	0.5	**6.0**
	Shallow Concentrated Flow	419	0.0200	2.53	2.4	
N1D	Sheet Flow	100	0.0872	- -	7.7	**7.9**
	Shallow Concentrated Flow	80	0.1035	0.38	0.2	
N2	Sheet Flow	100	0.0537	- -	1.1	**6.0**
	Shallow Concentrated Flow	150	0.0438	- -	0.7	
		180	0.0367	2.54	1.0	
C1A	Sheet Flow	19	0.0200	--	0.5	**6.0**
	Shallow Concentrated Flow	93	0.0215	1.83	0.5	
C1B	Sheet Flow	19	0.0200	- -	0.5	**6.0**
	Shallow Concentrated Flow	93	0.0215	1.83	0.5	
C2A	Sheet Flow	100	0.0366	- -	10.9	**13.9**
	Shallow Concentrated Flow	350	0.0583	- -	1.5	
		402	0.0500	1.02	1.5	

Table D. Post-Development Time of Concentration Calculations (Cont.)

Time of Concentration (SCS Peak Flow Method)						
Basin	**Flow Type**	**Flow Length (ft)**	**Slope (ft/ft)**	**Velocity (ft/s)**	**tc (min)**	**tc (min)**
C2B	Sheet Flow	100	0.0160	- -	1.9	**6.0**
	Shallow Concentrated Flow	372	0.0300	2.18	1.7	
C2C	Sheet Flow	19	0.0200	- -	0.5	**6.0**
	Shallow Concentrated Flow	272	0.0232	2.53	1.4	
C2D	Sheet Flow	100	0.0500	- -	9.6	**11.6**
	Shallow Concentrated Flow	230	0.0924	- -	0.8	
		231	0.0231	0.80	1.3	
C4A	Sheet Flow	100	0.0327	- -	11.3	**15.2**
	Shallow Concentrated Flow	600	0.0489	- -	2.8	
		185	0.0231	0.97	1.0	
C4B	Sheet Flow	19	0.0200	- -	0.5	**6.0**
	Shallow Concentrated Flow	750	0.0500	- -	2.8	
		360	0.0200	3.52	2.1	
S1	Sheet Flow	100	0.0350	- -	8.6	**10.1**
	Shallow Concentrated Flow	290	0.0632	0.74	1.5	
S2	Sheet Flow	100	0.0474	- -	9.8	**11.0**
	Shallow Concentrated Flow	197	0.0266	3.02	1.3	

Table E. Runoff Summary

Pre-Development Flow Rates			
Basin	**Total Area (acres)**	**10-Year Event (cfs)**	**100-Year Event (cfs)**
Off-Site West	8.32	6.95	15.68
West	7.51	13.95	24.12
North	11.7	12.75	26.64
Central	16.7	23.55	42.40
East	5.8	8.08	14.83
Total	50.94	64.20	121.01
Post Development Flow Rates			
Basin	**Total Area (acres)**	**10-Year Event (cfs)**	**100-Year Event (cfs)**
W1A	2.13	5.94	9.08
W1B	1.05	2.71	4.28
W2A	0.29	0.85	1.26
W2B	1.43	2.47	4.28
N1A	4.35	11.99	18.33
N1B	0.48	1.41	2.11
N1C	0.32	0.94	1.40
N1D	2.19	5.78	8.85
N2	2.8	5.72	9.89
C1A	0.4	1.19	1.77
C1B	0.17	0.51	0.76
C2A	4.4	10.15	15.53
C2B	1.93	5.00	7.89
C2C	0.2	0.58	0.87
C2D	5.48	12.76	19.84
C4A	5.11	10.59	16.74
C4B	1.29	3.60	5.51
S1	3.2	8.00	12.23
Total*	45.54	87.2	142.73

*Total includes acreage and runoff from Off-Project West basin

10YR

BASIN	A	CN	P (in)	S	I_a	R_v (in)	R_v (Acre*ft)
N1A	4.35	93	2.35	0.75	0.15	1.64	0.59
N1B	0.48	98	2.35	0.20	0.04	2.12	0.08
N1C	0.32	98	2.35	0.20	0.04	2.12	0.06
N1D	2.19	93	2.35	0.75	0.15	1.64	0.30
N2	1.4	87	2.35	1.49	0.30	1.19	0.14
W1A	2.13	94	2.35	0.64	0.13	1.73	0.31
W1B	1.05	94	2.35	0.64	0.13	1.73	0.15
W2A	0.29	98	2.35	0.20	0.04	2.12	0.05
W2B	1.43	89	2.35	1.24	0.25	1.32	0.16
C1A	0.4	98	2.35	0.20	0.04	2.12	0.07
C1B	0.17	98	2.35	0.20	0.04	2.12	0.03
C2A	4.4	96	2.35	0.42	0.08	1.91	0.70
C2B	1.93	82	2.35	2.20	0.44	0.89	0.14
C2C	0.2	98	2.35	0.20	0.04	2.12	0.04
C2D	5.48	95	2.35	0.53	0.11	1.82	0.83
C4A	5.11	94	2.35	0.64	0.13	1.73	0.74
C4B	1.29	96	2.35	0.42	0.08	1.91	0.21
S1	3.2	94	2.35	0.64	0.13	1.73	0.46
S2	1.16	91	2.35	0.99	0.20	1.47	0.14
OS-WEST	8.32	77	2.35	2.99	0.60	0.65	0.45
WEST	8.45	89	2.35	1.24	0.25	1.32	0.93
NORTH	11.7	80	2.35	2.50	0.50	0.79	0.77
CENT	16.692	87	2.35	1.49	0.30	1.19	1.65
EAST	5.8	86	2.35	1.63	0.33	1.12	0.54

$$I_a = 0.2S$$

$$S = \frac{1000}{CN} - 10$$

$$R_v = \frac{(P - I_a)^2}{P - I_a + S}$$

LEGEND
Reservoir-bound
A, B, or C-bound
Pre-Development

100YR

BASIN	A	CN	P (in)	S	I_a	R_v (in)	R_v (Acre*ft)
N1A	4.35	93	3.46	0.75	0.15	2.70	0.98
N1B	0.48	98	3.46	0.20	0.04	3.23	0.13
N1C	0.32	98	3.46	0.20	0.04	3.23	0.09
N1D	2.19	93	3.46	0.75	0.15	2.70	0.49
N2	1.4	87	3.46	1.49	0.30	2.15	0.25
W1A	2.13	94	3.46	0.64	0.13	2.80	0.50
W1B	1.05	94	3.46	0.64	0.13	2.80	0.24
W2A	0.29	98	3.46	0.20	0.04	3.23	0.08
W2B	1.43	89	3.46	1.24	0.25	2.32	0.28
C1A	0.4	98	3.46	0.20	0.04	3.23	0.11
C1B	0.17	98	3.46	0.20	0.04	3.23	0.05
C2A	4.4	96	3.46	0.42	0.08	3.01	1.10
C2B	1.93	82	3.46	2.20	0.44	1.75	0.28
C2C	0.2	98	3.46	0.20	0.04	3.23	0.05
C2D	5.48	95	3.46	0.53	0.11	2.90	1.32
C4A	5.11	94	3.46	0.64	0.13	2.80	1.19
C4B	1.29	96	3.46	0.42	0.08	3.01	0.32
S1	3.2	94	3.46	0.64	0.13	2.80	0.75
S2	1.16	91	3.46	0.99	0.20	2.50	0.24
OS-WEST	8.32	77	3.46	2.99	0.60	1.40	0.97
WEST	8.45	89	3.46	1.24	0.25	2.32	1.63
NORTH	11.7	80	3.46	2.50	0.50	1.60	1.56
CENT	16.692	87	3.46	1.49	0.30	2.15	2.99
EAST	5.8	86	3.46	1.63	0.33	2.06	1.00

Runoff Volumes Summary

Storm	Timeframe	Total inflow (acre*ft)	Culvert A (acre*ft)	Culvert B (acre*ft)	Culvert C (acre*ft)	Total outflow (acre*ft)	Total Bypass Volumes (acre*ft)
10-Year	Pre-development	3.6	1.4	1.6	0.5	3.5	0.1
10-Year	Post-development	4.3	1.2	1.6	1.1	3.9	0.4
100-Year	Pre-development	6.6	2.6	2.9	1.0	6.5	0.1
100-Year	Post-development	7.1	2.1	2.7	1.7	6.5	0.6

PRE-DEVELOPMENT BASIN HYDROLOGY

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Pre-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\Story House Pre-Development.w55

Date: 10/19/2023
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
East		Outlet	5.8	86	.249
Central		Outlet	16.69	87	.28
West		Outlet	8.45	89	.247
Off-Site_W		Outlet	8.32	77	.187
North		Outlet	11.7	80	.148

Total area: 50.96 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley
Story House
Pre-Development
Sheridan County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley Story House
Pre-Development
Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
East	8.08	14.83
Central	23.55	42.40
West	13.95	24.12
Off-Site_W	6.95	15.68
North	12.75	26.64
REACHES		
OUTLET	64.20	121.01

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kmarkley Story House
Pre-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
East	8.08	12.04	14.83	12.04
Central	23.55	12.07	42.40	12.06
West	13.95	12.05	24.12	12.03
Off-Site_W	6.95	12.03	15.68	12.01
North	12.75	11.99	26.64	11.98
REACHES				
OUTLET	64.20		121.01	

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kmarkley Story House
Pre-Development

Sheridan County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
East	5.80	0.249	86	Outlet	
Central	16.69	0.280	87	Outlet	
West	8.45	0.247	89	Outlet	
Off-Site_W	8.32	0.187	77	Outlet	
North	11.70	0.148	80	Outlet	

Total Area: 50.96 (ac)

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Story House
Pre-Development
Sheridan County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
East							
SHEET	100	0.0222	0.150				0.221
SHALLOW	500	0.0961	0.050				0.028
						Time of Concentration	.249
Central							
SHEET	100	0.0338	0.150				0.187
SHALLOW	1247	0.0534	0.050				0.093
						Time of Concentration	.28
West							
SHEET	100	0.0513	0.150				0.158
SHALLOW	983	0.0364	0.050				0.089
						Time of Concentration	.247
Off-Site_W							
SHEET	100	0.0852	0.150				0.129
SHALLOW	717	0.0460	0.050				0.058
						Time of Concentration	.187
North							
SHEET	100	0.0988	0.150				0.122
SHALLOW	483	0.1042	0.050				0.026
						Time of Concentration	.148

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Story House
Pre-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
East	Paved; open ditches (w/right-of-way)		C	.03	92
	Paved; open ditches (w/right-of-way)		D	.1	93
	Herbaceous	(fair)	C	2.57	81
	Herbaceous	(fair)	D	3.1	89
	Total Area / Weighted Curve Number			5.8	86
Central	Paved; open ditches (w/right-of-way)		D	.25	93
	Dirt (w/ right-of-way)		B	.02	82
	Dirt (w/ right-of-way)		D	.13	89
	Herbaceous	(fair)	B	1.66	71
	Herbaceous	(fair)	D	14.63	89
	Total Area / Weighted Curve Number			16.69	87
West	Paved; open ditches (w/right-of-way)		D	.2	93
	Dirt (w/ right-of-way)		D	.2	89
	Herbaceous	(fair)	C	.125	81
	Herbaceous	(fair)	D	7.925	89
	Total Area / Weighted Curve Number			8.45	89
Off-Site_W	Herbaceous	(fair)	B	5.12	71
	Herbaceous	(fair)	C	.64	81
	Herbaceous	(fair)	D	2.56	89
	Total Area / Weighted Curve Number			8.32	77
North	Dirt (w/ right-of-way)		B	.02	82
	Dirt (w/ right-of-way)		D	.02	89
	Herbaceous	(fair)	B	5.68	71
	Herbaceous	(fair)	D	5.98	89
	Total Area / Weighted Curve Number			11.7	80

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POST-DEVELOPMENT BASIN HYDROLOGY

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Post-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\Story House Post-Development.w55

Date: 2/16/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
C-S		Outlet	23.34	95	0.253
N-W		Outlet	15.04	92	0.211
OS-WEST		Outlet	8.32	77	0.187

Total area: 46.70 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
C-S	50.37	78.31
N-W	30.23	49.42
OS-WEST	6.95	15.68
REACHES		
OUTLET	87.20	142.73

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Story House
Post-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
C-S	50.37	12.03	78.31	12.03
N-W	30.23	12.02	49.42	12.01
OS-WEST	6.95	12.03	15.68	12.01
REACHES				
OUTLET	87.20		142.73	

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
C-S	23.34	0.253	95	Outlet	
N-W	15.04	0.211	92	Outlet	
OS-WEST	8.32	0.187	77	Outlet	

Total Area: 46.70 (ac)

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
C-S							
User-provided							0.253
					Time of Concentration		0.253
N-W							
User-provided							0.211
					Time of Concentration		0.211
OS-WEST							
User-provided							0.187
					Time of Concentration		0.187

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
C-S	CN directly entered by user	-	23.34	95
	Total Area / Weighted Curve Number		23.34	95
N-W	CN directly entered by user	-	15.04	92
	Total Area / Weighted Curve Number		15.04	92
OS-WEST	CN directly entered by user	-	8.32	77
	Total Area / Weighted Curve Number		8.32	77

POST-DEVELOPMENT SUBBASIN HYDROLOGY

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Post-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\Story House Post-Development N-W.w55

Date: 2/16/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
N-1A		Outlet	4.35	93	0.107
N-1B		Outlet	0.48	98	0.1
N-1C		Outlet	0.32	98	0.1
N-1D		Outlet	2.19	93	0.132
N-2		Outlet	2.8	87	0.100
W-1A		Outlet	2.13	94	0.100
W-1B		Outlet	1.05	94	0.100
W-2A		Outlet	0.29	98	0.1
W-2B		Outlet	1.43	89	.211

Total area: 15.04 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

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Story House
Post-Development
Sheridan County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II

Dimensionless Unit Hydrograph: <standard>

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Story House
Post-Development
Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
N-1A	10.65	17.12
N-1B	1.41	2.11
N-1C	0.94	1.40
N-1D	5.14	8.25
N-2	5.13	9.22
W-1A	5.51	8.70
W-1B	2.71	4.28
W-2A	0.85	1.26
W-2B	2.47	4.28
REACHES		
OUTLET	34.23	55.71

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Story House
Post-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
N-1A	10.65	11.93	17.12	11.93
N-1B	1.41	11.93	2.11	11.92
N-1C	0.94	11.93	1.40	11.92
N-1D	5.14	11.95	8.25	11.95
N-2	5.13		9.22	

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           11.94     11.93

W-1A            5.51      8.70
           11.93     11.93

W-1B            2.71      4.28
           11.93     11.93

W-2A            0.85      1.26
           11.93     11.92

W-2B            2.47      4.28
           12.02     12.01


REACHES

OUTLET         34.23     55.71

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                                Post-Development
                             Sheridan County, Wyoming

                              Sub-Area Summary Table

 Sub-Area    Drainage      Time of      Curve    Receiving      Sub-Area
Identifier     Area     Concentration  Number     Reach       Description
                (ac)         (hr)
-------------------------------------------------------------------------------
N-1A              4.35      0.107         93     Outlet
N-1B               .48      0.100         98     Outlet
N-1C               .32      0.100         98     Outlet
N-1D              2.19      0.132         93     Outlet
N-2               2.80      0.100         87     Outlet
W-1A              2.13      0.100         94     Outlet
W-1B              1.05      0.100         94     Outlet
W-2A               .29      0.100         98     Outlet
W-2B              1.43      0.211         89     Outlet

Total Area:   15.04 (ac)
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kmarkley                          Story House
                                Post-Development
                             Sheridan County, Wyoming

                    Sub-Area Time of Concentration Details

 Sub-Area      Flow            Mannings's    End      Wetted                 Travel
Identifier/   Length    Slope       n        Area     Perimeter   Velocity    Time
                (ft)    (ft/ft)             (sq ft)     (ft)      (ft/sec)    (hr)
-------------------------------------------------------------------------------
N-1A
  SHEET          100   0.0568     0.011                                       0.019
  SHALLOW        749   0.0134     0.025                                       0.088

                                                 Time of Concentration      0.107
                                                                          ========

N-1B
  SHEET           19   0.0200     0.011                                       0.008
  SHALLOW        419   0.0200     0.025                                       0.040
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				Time of Concentration	0.1

N-1C					
SHEET	19	0.0200	0.011		0.008
SHALLOW	419	0.0200	0.025		0.040
				Time of Concentration	0.1
N-1D					
SHEET	100	0.0872	0.150		0.128
SHALLOW	80	0.1035	0.050		0.004
				Time of Concentration	0.132
N-2					
SHEET	100	0.0537	0.011		0.019
SHALLOW	150	0.0438	0.050		0.012
SHALLOW	180	0.0367	0.050		0.016
				Time of Concentration	0.100
W-1A					
SHEET	100	0.0292	0.011		0.024
SHALLOW	315	0.0163	0.025		0.034
				Time of Concentration	0.100
W-1B					
SHEET	100	0.0437	0.011		0.021
SHALLOW	414	0.0218	0.025		0.038
				Time of Concentration	0.100
W-2A					
SHEET	19	0.0200	0.011		0.008
SHALLOW	417	0.0218	0.050		0.049
				Time of Concentration	0.1
W-2B					
SHEET	100	0.0726	0.150		0.137
SHALLOW	288	0.0679	0.050		0.019
SHALLOW	150	0.0022	0.050		0.055
				Time of Concentration	.211

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil	Sub-Area Area	Curve Number

			Group	(ac)	
N-1A	CN directly entered by user		-	4.35	93
	Total Area / Weighted Curve Number			4.35	93
N-1B	Paved parking lots, roofs, driveways		D	.48	98
	Total Area / Weighted Curve Number			.48	98
N-1C	Paved parking lots, roofs, driveways		D	.32	98
	Total Area / Weighted Curve Number			.32	98
N-1D	CN directly entered by user		-	2.19	93
	Total Area / Weighted Curve Number			2.19	93
N-2	CN directly entered by user		-	2.8	87
	Total Area / Weighted Curve Number			2.8	87
W-1A	CN directly entered by user		-	2.13	94
	Total Area / Weighted Curve Number			2.13	94
W-1B	Open space; grass cover < 50%	(poor)	D	.525	89
	Paved parking lots, roofs, driveways		D	.525	98
	Total Area / Weighted Curve Number			1.05	94
W-2A	Paved parking lots, roofs, driveways		D	.29	98
	Total Area / Weighted Curve Number			.29	98
W-2B	Open space; grass cover < 50%	(poor)	D	1.43	89
	Total Area / Weighted Curve Number			1.43	89

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Post-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\est CN's Post-Development C-S.w55

Date: 2/16/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
C-1A		Outlet	0.4	98	0.1
C-1B		Outlet	0.17	98	0.1
C-2A		Outlet	4.4	89	0.231
C-2B		Outlet	1.93	89	0.100
C-2C		Outlet	0.2	98	0.1
C-2D		Outlet	5.48	89	0.194
C-4A		Outlet	5.11	94	.253
C-4B		Outlet	1.29	96	0.1
S1		Outlet	3.2	94	0.169
S2		Outlet	1.16	91	0.184

Total area: 23.34 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

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Story House
Post-Development
Sheridan County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data

Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

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kmarkley Story House
Post-Development
Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
C-1A	1.19	1.77
C-1B	0.51	0.76
C-2A	7.44	12.83
C-2B	3.94	6.82
C-2C	0.58	0.87
C-2D	9.71	16.76
C-4A	10.59	16.74
C-4B	3.60	5.51
S1	7.41	11.70
S2	2.30	3.82
REACHES		
OUTLET	45.10	74.07

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kmarkley Story House
Post-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
C-1A	1.19	11.93	1.77	11.92
C-1B	0.51	11.93	0.76	11.92
C-2A	7.44	12.03	12.83	12.03
C-2B	3.94		6.82	

	11.93	11.93	
C-2C	0.58	0.87	
	11.93	11.92	
C-2D	9.71	16.76	
	12.01	12.01	
C-4A	10.59	16.74	
	12.04	12.04	
C-4B	3.60	5.51	
	11.93	11.92	
S1	7.41	11.70	
	11.97	11.98	
S2	2.30	3.82	
	11.99	11.99	
REACHES			
OUTLET	45.10	74.07	

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
C-1A	.40	0.100	98	Outlet	
C-1B	.17	0.100	98	Outlet	
C-2A	4.40	0.231	89	Outlet	
C-2B	1.93	0.100	89	Outlet	
C-2C	.20	0.100	98	Outlet	
C-2D	5.48	0.194	89	Outlet	
C-4A	5.11	0.253	94	Outlet	
C-4B	1.29	0.100	96	Outlet	
S1	3.20	0.169	94	Outlet	
S2	1.16	0.184	91	Outlet	

Total Area: 23.34 (ac)

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
C-1A							
SHEET	19	0.0200	0.011				0.008
SHALLOW	93	0.0215	0.025				0.009

				Time of Concentration	0.1
C-1B					
SHEET	19	0.0200	0.011		0.008
SHALLOW	93	0.0215	0.025		0.009
				Time of Concentration	0.1
C-2A					
SHEET	100	0.0366	0.150		0.181
SHALLOW	350	0.0583	0.050		0.025
SHALLOW	402	0.0500	0.025		0.025
				Time of Concentration	0.231
C-2B					
SHEET	100	0.0160	0.011		0.031
SHALLOW	372	0.0300	0.025		0.029
				Time of Concentration	0.100
C-2C					
SHEET	19	0.0200	0.011		0.008
SHALLOW	272	0.0232	0.025		0.024
				Time of Concentration	0.1
C-2D					
SHEET	100	0.0500	0.150		0.160
SHALLOW	230	0.0924	0.050		0.013
SHALLOW	231	0.0231	0.025		0.021
				Time of Concentration	0.194
C-4A					
SHEET	100	0.0327	0.150		0.189
SHALLOW	600	0.0489	0.050		0.047
SHALLOW	185	0.0231	0.025		0.017
				Time of Concentration	.253
C-4B					
SHEET	19	0.0200	0.011		0.008
SHALLOW	750	0.0500	0.025		0.046
SHALLOW	360	0.0200	0.025		0.035
				Time of Concentration	0.1
S1					
SHEET	100	0.0645	0.150		0.144
SHALLOW	290	0.0403	0.050		0.025
				Time of Concentration	0.169
S2					
SHEET	100	0.0474	0.150		0.163
SHALLOW	197	0.0266	0.050		0.021

Time of Concentration 0.184

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
C-1A	Paved parking lots, roofs, driveways		D	.4	98
	Total Area / Weighted Curve Number			.4	98
C-1B	Paved parking lots, roofs, driveways		D	.17	98
	Total Area / Weighted Curve Number			.17	98
C-2A	CN directly entered by user		-	4.4	89
	Total Area / Weighted Curve Number			4.4	89
C-2B	CN directly entered by user		-	1.93	89
	Total Area / Weighted Curve Number			1.93	89
C-2C	Paved parking lots, roofs, driveways		B	.1	98
	Paved parking lots, roofs, driveways		D	.1	98
	Total Area / Weighted Curve Number			.2	98
C-2D	CN directly entered by user		-	5.48	89
	Total Area / Weighted Curve Number			5.48	89
C-4A	Open space; grass cover < 50%	(poor)	B	.852	79
	Open space; grass cover < 50%	(poor)	D	.426	89
	Paved parking lots, roofs, driveways		B	2.555	98
	Paved parking lots, roofs, driveways		D	1.277	98
	Total Area / Weighted Curve Number			5.11	94
C-4B	Open space; grass cover < 50%	(poor)	B	.129	79
	Paved parking lots, roofs, driveways		B	.774	98
	Paved parking lots, roofs, driveways		D	.387	98
	Total Area / Weighted Curve Number			1.29	96
S1	CN directly entered by user		-	3.2	94
	Total Area / Weighted Curve Number			3.2	94

			=====	==
S2	CN directly entered by user	-	1.16	91
	Total Area / Weighted Curve Number		1.16	91
			====	==

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OUTFALL HYDROLOGY

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Post-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\Story House Post-Development A OUTLET.w55

Date: 2/16/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
W-1A		Outlet	2.13	94	0.100
W-1B		Outlet	1.05	94	0.100
W-2A		Outlet	0.29	98	0.1
W-2B		Outlet	1.43	89	.211
OS-WEST		Outlet	8.32	77	0.187

Total area: 13.22 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley
Story House
Post-Development
Sheridan County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley

Story House
Post-Development
Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
W-1A	5.51	8.70
W-1B	2.71	4.28
W-2A	0.85	1.26
W-2B	2.47	4.28
OS-WEST	6.95	15.68
REACHES		
OUTLET	16.81	31.76

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kmarkley

Story House
Post-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
W-1A	5.51	11.93	8.70	11.93
W-1B	2.71	11.93	4.28	11.93
W-2A	0.85	11.93	1.26	11.92
W-2B	2.47	12.02	4.28	12.01
OS-WEST	6.95	12.03	15.68	12.01
REACHES				
OUTLET	16.81		31.76	

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Story House
Post-Development

Sheridan County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
W-1A	2.13	0.100	94	Outlet	
W-1B	1.05	0.100	94	Outlet	
W-2A	.29	0.100	98	Outlet	
W-2B	1.43	0.211	89	Outlet	
OS-WEST	8.32	0.187	77	Outlet	

Total Area: 13.22 (ac)

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
W-1A							
SHEET	100	0.0292	0.011				0.024
SHALLOW	315	0.0163	0.025				0.034
					Time of Concentration		0.100
W-1B							
SHEET	100	0.0437	0.011				0.021
SHALLOW	414	0.0218	0.025				0.038
					Time of Concentration		0.100
W-2A							
SHEET	19	0.0200	0.011				0.008
SHALLOW	417	0.0218	0.050				0.049
					Time of Concentration		0.1
W-2B							
SHEET	100	0.0726	0.150				0.137
SHALLOW	288	0.0679	0.050				0.019
SHALLOW	150	0.0022	0.050				0.055
					Time of Concentration		.211
OS-WEST							
User-provided							0.187
					Time of Concentration		0.187

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
W-1A	CN directly entered by user		-	2.13	94
	Total Area / Weighted Curve Number			2.13	94
W-1B	Open space; grass cover < 50%	(poor)	D	.525	89
	Paved parking lots, roofs, driveways		D	.525	98
	Total Area / Weighted Curve Number			1.05	94
W-2A	Paved parking lots, roofs, driveways		D	.29	98
	Total Area / Weighted Curve Number			.29	98
W-2B	Open space; grass cover < 50%	(poor)	D	1.43	89
	Total Area / Weighted Curve Number			1.43	89
OS-WEST	CN directly entered by user		-	8.32	77
	Total Area / Weighted Curve Number			8.32	77

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Post-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\Story House Post-Development B OUTLET.w55

Date: 2/16/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
C-1A		Outlet	0.4	98	0.1
C-1B		Outlet	0.17	98	0.1
C-2A		Outlet	4.4	96	.231
C-2D		Outlet	5.48	95	.194
S1		Outlet	3.2	94	0.169

Total area: 13.65 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley
Story House
Post-Development
Sheridan County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley

Story House
Post-Development
Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
C-1A	1.19	1.77
C-1B	0.51	0.76
C-2A	10.15	15.53
C-2D	12.76	19.84
S1	7.41	11.70
REACHES		
OUTLET	31.50	48.78

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kmarkley

Story House
Post-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
C-1A	1.19	11.93	1.77	11.92
C-1B	0.51	11.93	0.76	11.92
C-2A	10.15	12.02	15.53	12.02
C-2D	12.76	12.00	19.84	11.99
S1	7.41	11.97	11.70	11.98
REACHES				
OUTLET	31.50		48.78	

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Story House
Post-Development

Sheridan County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
C-1A	.40	0.100	98	Outlet	
C-1B	.17	0.100	98	Outlet	
C-2A	4.40	0.231	96	Outlet	
C-2D	5.48	0.194	95	Outlet	
S1	3.20	0.169	94	Outlet	

Total Area: 13.65 (ac)

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
C-1A							
SHEET	19	0.0200	0.011				0.008
SHALLOW	93	0.0215	0.025				0.009
					Time of Concentration		0.1
C-1B							
SHEET	19	0.0200	0.011				0.008
SHALLOW	93	0.0215	0.025				0.009
					Time of Concentration		0.1
C-2A							
SHEET	100	0.0366	0.150				0.181
SHALLOW	350	0.0583	0.050				0.025
SHALLOW	402	0.0500	0.025				0.025
					Time of Concentration		.231
C-2D							
SHEET	100	0.0500	0.150				0.160
SHALLOW	230	0.0924	0.050				0.013
SHALLOW	231	0.0231	0.025				0.021
					Time of Concentration		.194
S1							
SHEET	100	0.0645	0.150				0.144
SHALLOW	290	0.0403	0.050				0.025
					Time of Concentration		0.169

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
C-1A	Paved parking lots, roofs, driveways		D	.4	98
	Total Area / Weighted Curve Number			.4	98
				==	==
C-1B	Paved parking lots, roofs, driveways		D	.17	98
	Total Area / Weighted Curve Number			.17	98
				===	==
C-2A	Open space; grass cover < 50%	(poor)	D	1.1	89
	Paved; curbs and storm sewers		D	3.3	98
	Total Area / Weighted Curve Number			4.4	96
				===	==
C-2D	Open space; grass cover < 50%	(poor)	B	.457	79
	Open space; grass cover < 50%	(poor)	D	.913	89
	Paved parking lots, roofs, driveways		B	1.37	98
	Paved parking lots, roofs, driveways		D	2.74	98
	Total Area / Weighted Curve Number			5.48	95
				====	==
S1	CN directly entered by user		-	3.2	94
	Total Area / Weighted Curve Number			3.2	94
				===	==

WinTR-55 Current Data Description

--- Identification Data ---

User: kmarkley
Project: Story House
SubTitle: Post-Development
State: Wyoming
County: Sheridan
Filename: K:\Sheridan\Story House Management\2023137 Story House Village\07Calc\Drainage Calcs\Story House Post-Development C OUTLET.w55

Date: 2/16/2024
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
C-4A		Outlet	5.11	94	.253
C-4B		Outlet	1.29	96	0.1
S2		Outlet	1.16	91	0.184

Total area: 7.56 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley Story House
Post-Development
Sheridan County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.61	2.05	2.35	2.78	3.12	3.46	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

kmarkley Story House
Post-Development

Sheridan County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)	100-Yr (cfs)
SUBAREAS		
C-4A	10.59	16.74
C-4B	3.60	5.51
S2	2.30	3.82
REACHES		
OUTLET	15.62	24.72

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Story House
Post-Development
Sheridan County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS				
C-4A	10.59	12.04	16.74	12.04
C-4B	3.60	11.93	5.51	11.92
S2	2.30	11.99	3.82	11.99
REACHES				
OUTLET	15.62		24.72	

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Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
C-4A	5.11	0.253	94	Outlet	
C-4B	1.29	0.100	96	Outlet	
S2	1.16	0.184	91	Outlet	

Total Area: 7.56 (ac)

kmarkley

Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
C-4A							
SHEET	100	0.0327	0.150				0.189
SHALLOW	600	0.0489	0.050				0.047
SHALLOW	185	0.0231	0.025				0.017
						Time of Concentration	.253
C-4B							
SHEET	19	0.0200	0.011				0.008
SHALLOW	750	0.0500	0.025				0.046
SHALLOW	360	0.0200	0.025				0.035
						Time of Concentration	0.1
S2							
SHEET	100	0.0474	0.150				0.163
SHALLOW	197	0.0266	0.050				0.021
						Time of Concentration	0.184

kmarkley

Story House
Post-Development
Sheridan County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
C-4A	Open space; grass cover < 50%	(poor)	B	.852	79
	Open space; grass cover < 50%	(poor)	D	.426	89
	Paved parking lots, roofs, driveways		B	2.555	98
	Paved parking lots, roofs, driveways		D	1.277	98
	Total Area / Weighted Curve Number			5.11	94
C-4B	Open space; grass cover < 50%	(poor)	B	.129	79
	Paved parking lots, roofs, driveways		B	.774	98
	Paved parking lots, roofs, driveways		D	.387	98
	Total Area / Weighted Curve Number			1.29	96

S2	CN directly entered by user	-	1.16	91
	Total Area / Weighted Curve Number		1.16	91
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APPENDIX B

Stormwater Hydraulics

GUTTER AND SWALE HYDRAULICS

10 yr Storm

O:\References\..\2016 City of Sheridan Storm Drainage Manual.pdf

https://www.fhwa.dot.gov/engineering/hydraulics/pubs/10009/10009.pdf

			Gutter Flow (CFS)	Cross slope (ft/ft)	Long. Slope (ft/ft)	Manning's coef.	0.56	Width (ft)	Depth (in)	
BASIN	Basin Flow (CFS)	Road Name	Q	Sx	Sl	n	Ku	T	D	
N1A	11.99	SHV-S W1B	2.71	**0.02**	**0.006**	**0.016**	**0.56**	11.6	2.8	[Round[T=((D4*G4)/(H4*E4^1.67*F4^0.5))^0.375; D=I4*E4*12],1]
N1B	1.41	SHV-S W2A	0.85					7.6	1.9	
N1C	0.94	SHV-N C1A	1.19					8.6	2.1	
N1D	5.78	SHV-N C1B	0.51					6.2	1.5	
N2	5.72	Story House Ln N1B	1.41					9.1	2.2	
W1A	5.94	Story House Ln N1C	0.94					7.8	1.9	
W1B	2.71	Story House Ln C2B	5					14.6	3.6	
W2A	0.85	Story House Ln C2C	0.58					6.5	1.6	
W2B	2.47	Story House Ln C4B	3.6					12.9	3.1	
C1A	1.19	Baldwin Ave C4B	3.6					12.9	3.1	
C1B	0.51	Baldwin Ave C4A	10.59					19.4	4.7	
C2A	10.15	Baldwin Ave C2D	12.76					20.8	5.0	
C2B	5	Baldwin Ave C1A C1B C2A	11.85					20.2	4.9	
C2C	0.58	Canterbury Ln C4A	10.59					19.4	4.7	
C2D	12.76									
C4A	10.59									
C4B	3.6									
S1	8									
S2	2.74									

$$Q = (K_u/n)\, S_x^{1.67}\, S_L^{0.5}\, T^{2.67} \qquad (4\text{-}2)$$

or in terms of T

$$T = [(Qn) / (K_u\, S_x^{1.67}\, S_L^{0.5})]^{0.375} \qquad (4\text{-}2)$$

where:

- K_u = 0.376 (0.56 in English units)
- n = Manning's coefficient (Table 4-3)
- Q = Flow rate, m^3/s (ft^3/s)
- T = Width of flow (spread), m (ft)
- S_x = Cross slope, m/m (ft/ft)
- S_L = Longitudinal slope, m/m (ft/ft)

Equation 4-2 neglects the resistance of the curb face since this resistance is negligible.

Spread on the pavement and flow depth at the curb are often used as criteria for spacing pavement drainage inlets. Design Chart 1 in Appendix A is a nomograph for solving Equation 4-2. The chart can be used for either criterion with the relationship:

$$d = T\, S_x \qquad (4\text{-}3)$$

where:

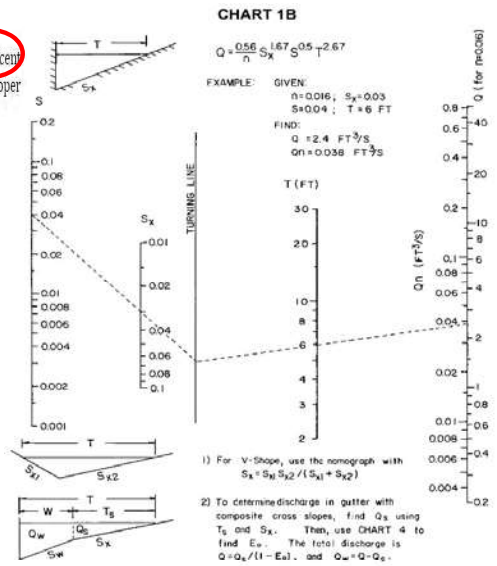
- d = Depth of flow, m (ft)

6.2.2 Minimum Gutter Slope

Gutters shall be constructed at slopes no flatter than 0.4 percent for retrofit conditions and 0.6 percent for new construction. Gutter sections must be tested by applying a flow of water to verify proper drainage.

Table 4-3. Manning's n for Street and Pavement Gutters.

Type of Gutter or Pavement	Manning's n
Concrete gutter, troweled finish	0.012
Asphalt Pavement:	
Smooth texture	0.013
Rough texture	0.016
Concrete gutter-asphalt pavement:	
Smooth	0.013
Rough	0.015
Concrete pavement:	
Float finish	0.014
Broom finish	0.016
For gutters with small slope, where sediment may accumulate, increase above values of "n" by	0.002
Reference: USDOT, FHWA, HDS-3[36]	



Flow in Triangular Gutter Sections - English Units

6.2 GUTTER FLOW

The primary purpose of streets is to carry traffic and the use of streets for storm runoff must therefore be restricted. However, streets are also an integral part of the urban drainage system and may be used for transporting a limited amount of storm runoff. The City allows the use of streets for drainage within the limitations specified in Tables 6.1 and 6.2. Street classifications are specified on the Functional Classification Map developed by the City of Sheridan.

Table 6.1 – Allowable Use Of Streets For Minor Storm Runoff

Street Classification	Maximum Street Encroachment
Local	No curb overtopping. Flow may spread to crown of street.[1]
Collectors	No curb overtopping. Flow spread must leave at least one, ten-foot lane free of water, five feet either side of the street crown.[1]
Arterials	No curb overtopping. Flow spread must leave at least two ten-foot lanes free of water, ten feet each side of the street crown or median.[1]
Arterials (6 or more lanes)	No curb overtopping. Flow spread must leave at least four ten-foot lanes free of water, twenty feet each side of the street crown or median.[1]

[1]Where no curbing exists, encroachment shall not extend beyond property lines, except at drainage easements

Table 6.2 – Allowable Use Of Streets For Major Storm Runoff

Street Classification	Maximum Depth
Local and Collectors	The depth of water at the gutter flowline shall not exceed 18 inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.
Arterials	To allow for emergency vehicles, the depth of flow at the street crown shall be no more than six inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.

6.2.1 Hydraulics

Gutter flow encroachment and hydraulics shall be evaluated using the methods presented in Section 4.3 of the HEC-22 Manual:

http://www.fhwa.dot.gov/engineering/hydraulics/pubs/10009/10009.pdf

100 yr Storm

O:\References\..\2016 City of Sheridan Storm Drainage Manual.pdf

https://www.fhwa.dot.gov/engineering/hydraulics/pubs/10009/10009.pdf

			Gutter Flow (CFS)	Cross slope (ft/ft)	Long. Slope (ft/ft)	Manning's coef.	0.56	Width (ft)	Depth (in)
BASIN	Basin Flow (CFS)	Road Name	Q	Sx	Sl	n	Ku	T	D
N1A	18.33	SHV-S W1B	4.28	**0.02**	**0.006**	**0.016**	**0.56**	13.8	3.3
N1B	2.11	SHV-S W2A	1.26					8.7	2.1
N1C	1.4	SHV-N C1A	1.77					9.9	2.4
N1D	8.85	SHV-N C1B	0.76					7.2	1.7
N2	9.89	Story House Ln N1B	2.11					10.5	2.5
W1A	9.08	Story House Ln N1C	1.4					9.0	2.2
W1B	4.28	Story House Ln C2B	7.89					17.3	4.2
W2A	1.26	Story House Ln C2C	0.87					7.6	1.8
W2B	4.28	Story House Ln C4B	5.51					15.1	3.6
C1A	1.77	Baldwin Ave C4B	5.51					15.1	3.6
C1B	0.76	Baldwin Ave C4A	16.74					22.9	5.5
C2A	15.53	Baldwin Ave C2D	19.84					24.4	5.9
C2B	7.89	Baldwin Ave C1A C1B C2A	18.06					23.6	5.7
C2C	0.87	Canterbury Ln C4A	16.74					22.9	5.5
C2D	19.84								
C4A	16.74								
C4B	5.51								
S1	12.23								
S2	4.25								

[Round[T=((D4*G4)/(H4*E4^1.67*F4^0.5))^0.375; D=I4*E4*12],1]

$$Q = (K_u/n)\, S_x^{1.67}\, S_L^{0.5}\, T^{2.67} \qquad (4\text{-}2)$$

or in terms of T

$$T = [(Qn) / (K_u\, S_x^{1.67}\, S_L^{0.5})]^{0.375} \qquad (4\text{-}2)$$

where:

- K_u = 0.375 (0.56 in English units)
- n = Manning's coefficient (Table 4-3)
- Q = Flow rate, m^3/s (ft^3/s)
- T = Width of flow (spread), m (ft)
- S_x = Cross slope, m/m (ft/ft)
- S_L = Longitudinal slope, m/m (ft/ft)

Equation 4-2 neglects the resistance of the curb face since this resistance is negligible.

Spread on the pavement and flow depth at the curb are often used as criteria for spacing pavement drainage inlets. Design Chart 1 in Appendix A is a nomograph for solving Equation 4-2. The chart can be used for either criterion with the relationship:

$$d = T\, S_x \qquad (4\text{-}3)$$

where:

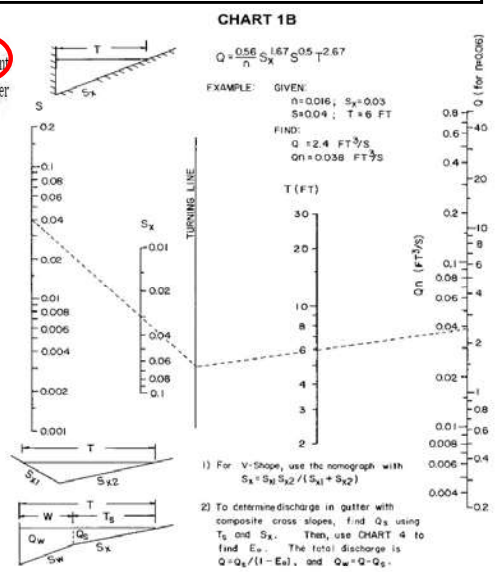
- d = Depth of flow, m (ft)

6.2.2 Minimum Gutter Slope

Gutters shall be constructed at slopes no flatter than 0.4 percent for retrofit conditions and 0.6 percent for new construction. Gutter sections must be tested by applying a flow of water to verify proper drainage.

Table 4-3. Manning's n for Street and Pavement Gutters.

Type of Gutter or Pavement	Manning's n
Concrete gutter, troweled finish	0.012
Asphalt Pavement:	
Smooth texture	0.013
Rough texture	0.016
Concrete gutter-asphalt pavement:	
Smooth	0.013
Rough	0.015
Concrete pavement:	
Float finish	0.014
Broom finish	0.016
For gutters with small slope, where sediment may accumulate, increase above values of "n" by	0.002
Reference: USDOT, FHWA, HDS-3[36]	



6.2 GUTTER FLOW

The primary purpose of streets is to carry traffic and the use of streets for storm runoff must therefore be restricted. However, streets are also an integral part of the urban drainage system and may be used for transporting a limited amount of storm runoff. The City allows the use of streets for drainage within the limitations specified in Tables 6.1 and 6.2. Street classifications are specified on the Functional Classification Map developed by the City of Sheridan.

Table 6.1 – Allowable Use Of Streets For Minor Storm Runoff

Street Classification	Maximum Street Encroachment
Local	No curb overtopping. Flow may spread to crown of street.[1]
Collectors	No curb overtopping. Flow spread must leave at least one, ten-foot lane free of water, five feet either side of the street crown.[1]
Arterials	No curb overtopping. Flow spread must leave at least two ten-foot lanes free of water, ten feet each side of the street crown or median.[1]
Arterials (6 or more lanes)	No curb overtopping. Flow spread must leave at least four ten-foot lanes free of water, twenty feet each side of the street crown or median.[1]

[1]Where no curbing exists, encroachment shall not extend beyond property lines, except at drainage easements

Table 6.2 – Allowable Use Of Streets For Major Storm Runoff

Street Classification	Maximum Depth
Local and Collectors	The depth of water at the gutter flowline shall not exceed 18 inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.
Arterials	To allow for emergency vehicles, the depth of flow at the street crown shall be no more than six inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.

6.2.1 Hydraulics

Gutter flow encroachment and hydraulics shall be evaluated using the methods presented in Section 4.3 of the HEC-22 Manual:

http://www.fhwa.dot.gov/engineering/hydraulics/pubs/10009/10009.pdf

Triangular Channel (SWALE calcs.fm8)

Label	Solve For	Friction Method	Roughness Coefficient	Channel Slope (ft/ft)	Normal Depth (in)
Block 5 back Triangular Channel - 1	Normal Depth	Manning Formula	0.035	0.020	3.2
Block 7 back Triangular Channel - 1	Normal Depth	Manning Formula	0.035	0.020	3.8
Block 5 side Triangular Channel - 1	Normal Depth	Manning Formula	0.035	0.020	4.1
Block 7 side Triangular Channel - 1	Normal Depth	Manning Formula	0.035	0.020	1.6

Left Side Slope (H:V)	Right Side Slope (H:V)	Discharge (cfs)	Flow Area (ft²)	Wetted Perimeter (ft)	Hydraulic Radius (in)
20.000	20.000	2.17	1.4	10.6	1.6
15.500	15.500	2.75	1.6	9.9	1.9
20.000	20.000	4.33	2.3	13.7	2.1
20.000	20.000	0.38	0.4	5.5	0.8

Top Width (ft)	Critical Depth (in)	Critical Slope (ft/ft)	Velocity (ft/s)	Velocity Head (ft)	Specific Energy (ft)
10.56	2.8	0.036	1.56	0.04	0.30
9.85	3.4	0.034	1.76	0.05	0.37
13.69	3.7	0.033	1.85	0.05	0.40
5.49	1.4	0.046	1.01	0.02	0.15

Froude Number	Flow Type	Notes	Messages
0.755	Subcritical		
0.778	Subcritical		
0.788	Subcritical		
0.680	Subcritical		

CURB CUT HYDRAULICS

Worksheet for OUTLET 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.020 ft/ft
Bottom Width	0.66 ft
Discharge	1.70 cfs

Results	
Normal Depth	5.3 in
Flow Area	0.3 ft²
Wetted Perimeter	1.6 ft
Hydraulic Radius	2.3 in
Top Width	0.66 ft
Critical Depth	7.1 in
Critical Slope	0.010 ft/ft
Velocity	5.78 ft/s
Velocity Head	0.52 ft
Specific Energy	0.96 ft
Froude Number	1.526
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.3 in
Critical Depth	7.1 in
Channel Slope	0.020 ft/ft
Critical Slope	0.010 ft/ft

Worksheet for OUTLET 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.020 ft/ft
Bottom Width	1.25 ft
Discharge	4.53 cfs

Results	
Normal Depth	5.9 in
Flow Area	0.6 ft²
Wetted Perimeter	2.2 ft
Hydraulic Radius	3.3 in
Top Width	1.25 ft
Critical Depth	8.9 in
Critical Slope	0.007 ft/ft
Velocity	7.40 ft/s
Velocity Head	0.85 ft
Specific Energy	1.34 ft
Froude Number	1.864
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.9 in
Critical Depth	8.9 in
Channel Slope	0.020 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for OUTLET 3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.020 ft/ft
Bottom Width	5.00 ft
Discharge	24.21 cfs

Results	
Normal Depth	6.0 in
Flow Area	2.5 ft²
Wetted Perimeter	6.0 ft
Hydraulic Radius	5.0 in
Top Width	5.00 ft
Critical Depth	10.8 in
Critical Slope	0.003 ft/ft
Velocity	9.74 ft/s
Velocity Head	1.47 ft
Specific Energy	1.97 ft
Froude Number	2.435
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.0 in
Critical Depth	10.8 in
Channel Slope	0.020 ft/ft
Critical Slope	0.003 ft/ft

Worksheet for OUTLET 4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.020 ft/ft
Bottom Width	4.50 ft
Discharge	20.96 cfs

Results	
Normal Depth	5.9 in
Flow Area	2.2 ft²
Wetted Perimeter	5.5 ft
Hydraulic Radius	4.8 in
Top Width	4.50 ft
Critical Depth	10.5 in
Critical Slope	0.003 ft/ft
Velocity	9.54 ft/s
Velocity Head	1.41 ft
Specific Energy	1.90 ft
Froude Number	2.405
Flow Type	Supercritical

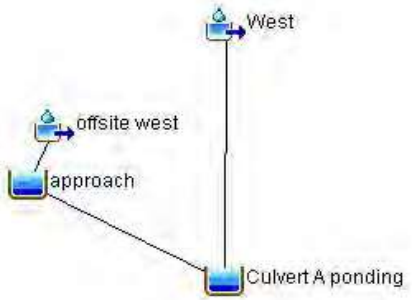
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.9 in
Critical Depth	10.5 in
Channel Slope	0.020 ft/ft
Critical Slope	0.003 ft/ft

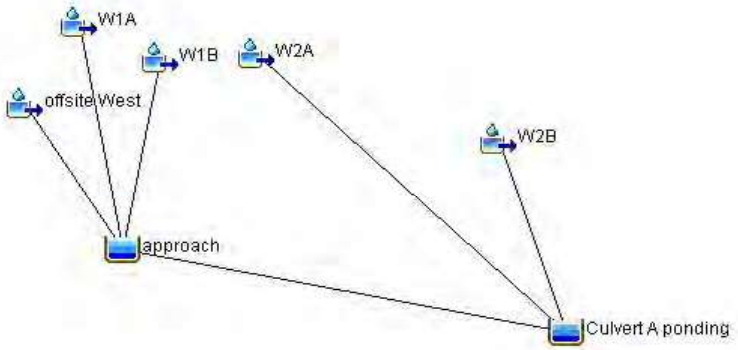
OUTFALL PONDING AND CULVERT CALCULATIONS

OUTFALL A HEC-HMS CALCS					
STORM	**HYDROLOGIC ELEMENT**	**Drainage Area (mi^2)**	**Q_{PEAK} (CFS)**	**TIME OF PEAK**	**VOLUME (AF)**
PRE-10-YR	offsite west	0.013	5.3	22Mar2023, 12:00	0.4
	West	0.013	11.4	22Mar2023, 12:00	0.9
	approach	0.013	3.9	22Mar2023, 12:15	0.4
	Culvert A ponding	0.0262031	12.2	22Mar2023, 12:15	1.4
PRE-100-YR	offsite west	0.013	5.3	22Mar2023, 12:00	0.4
	West	0.0132031	11.4	22Mar2023, 12:00	0.9
	approach	0.013	3.9	22Mar2023, 12:15	0.4
	Culvert A ponding	0.0262031	12.2	22Mar2023, 12:15	1.4
POST 10-YR	offsite West	0.013	5.3	22Mar2023, 12:00	0.4
	W1A	0.0033281	3.9	22Mar2023, 12:00	0.3
	W1B	0.0016406	2.3	22Mar2023, 12:00	0.2
	approach	0.0179687	8.2	22Mar2023, 12:15	1
	W2B	0.0022344	2.1	22Mar2023, 12:00	0.2
	W2A	0.000453125	0.6	22Mar2023, 12:00	0.1
	Culvert A ponding	0.0206562	9.6	22Mar2023, 12:15	1.2
POST 100-YR	offsite West	0.013	12.4	22Mar2023, 12:00	1
	W1A	0.0033281	6.2	22Mar2023, 12:00	0.5
	W1B	0.0016406	3.4	22Mar2023, 12:00	0.3
	approach	0.0179687	14.4	22Mar2023, 12:15	1.7
	W2B	0.0022344	3.6	22Mar2023, 12:00	0.3
	W2A	0.000453125	0.9	22Mar2023, 12:00	0.1
	Culvert A ponding	0.0206562	15.8	22Mar2023, 12:15	2.1

PREDEVELOPED

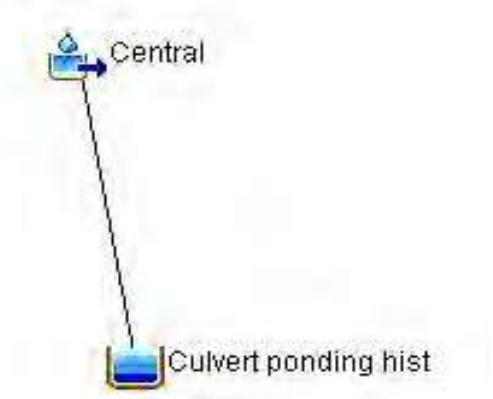


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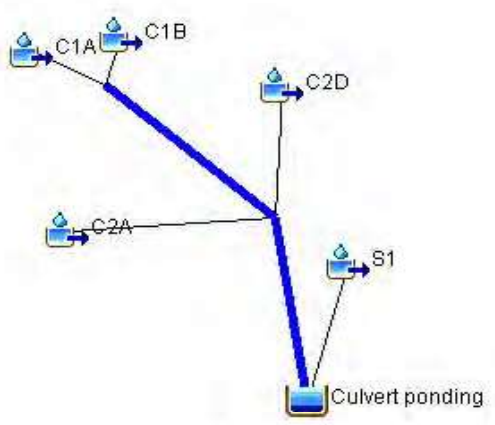


OUTFALL B HEC-HMS CALCS					
STORM	HYDROLOGIC ELEMENT	Drainage Area (mi^2)	Q_{PEAK} (CFS)	TIME OF PEAK	VOLUME (AF)
PRE-10-YR	Central	0.026	18.7	22Mar2023, 00:00	1.6
	Culvert ponding hist	0.026	15.6	22Mar2023, 00:10	1.6
PRE-100-YR	Central	0.026	34.1	22Mar2023, 00:00	3
	Culvert ponding hist	0.0261	19.3	22Mar2023, 00:20	2.9
POST 10-YR	C1B	0.0005	0.8	22Mar2023, 00:00	0.1
	C1A	0.0005	0.8	22Mar2023, 00:00	0.1
	C2D	0.0086	8.4	22Mar2023, 00:00	0.6
	C2A	0.0069	6.2	22Mar2023, 00:00	0.5
	C1-C2	0.001	1.3	22Mar2023, 00:10	0.1
	C2-Culvert	0.0165	13.6	22Mar2023, 00:10	1.2
	S1	0.0043	6	22Mar2023, 00:00	0.4
	Culvert ponding	0.0208	15.6	22Mar2023, 00:10	1.6
POST 100-YR	C1B	0.0005	1.1	22Mar2023, 00:00	0.1
	C1A	0.0005	1.1	22Mar2023, 00:00	0.1
	C2D	0.0086	14.5	22Mar2023, 00:00	1.1
	C2A	0.0069	10.8	22Mar2023, 00:00	0.9
	C1-C2	0.001	2	22Mar2023, 00:10	0.2
	C2-Culvert	0.0165	23.3	22Mar2023, 00:10	2.1
	S1	0.0043	9.1	22Mar2023, 00:00	0.7
	Culvert ponding	0.0208	19.2	22Mar2023, 00:20	2.7

PREDEVELOPED

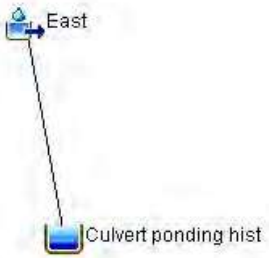


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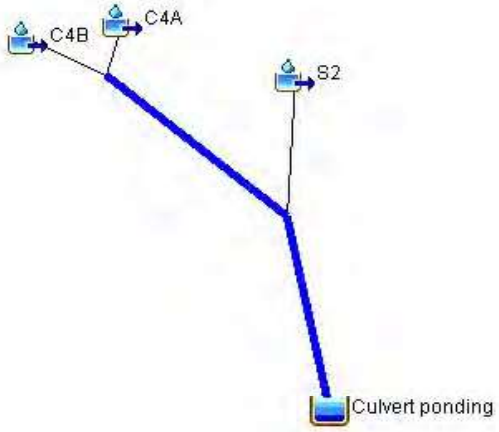


OUTFALL C HEC-HMS CALCS					
STORM	**HYDROLOGIC ELEMENT**	**Drainage Area (mi^2)**	**Q_{PEAK} (CFS)**	**TIME OF PEAK**	**VOLUME (AF)**
PRE-10-YR	East	0.009	6.6	22Mar2023, 00:00	0.5
	Culvert ponding hist	0.009	5.9	22Mar2023, 00:10	0.5
PRE-100-YR	East	0.009	12.2	22Mar2023, 00:00	1
	Culvert ponding hist	0.009	10.6	22Mar2023, 00:10	1
POST 10-YR	C4A	0.00798	8.8	22Mar2023, 00:00	0.7
	C4B	0.00202	2.9	22Mar2023, 00:00	0.2
	C4-S2	0.01	10.2	22Mar2023, 00:00	0.9
	S2	0.00181	2	22Mar2023, 00:00	0.1
	S2-CULVERT	0.01181	11.5	22Mar2023, 00:10	1.1
	Culvert ponding	0.01181	10.1	22Mar2023, 00:20	1.1
POST 100-YR	C4A	0.00798	13.9	22Mar2023, 00:00	1.2
	C4B	0.00202	4.5	22Mar2023, 00:00	0.3
	C4-S2	0.01	16.1	22Mar2023, 00:00	1.5
	S2	0.00181	3.3	22Mar2023, 00:00	0.2
	S2-CULVERT	0.01181	18.3	22Mar2023, 00:10	1.7
	Culvert ponding	0.01181	14.8	22Mar2023, 00:20	1.7

PREDEVELOPED



POSTDEVELOPED



	Hydrologic element	Drainage area (mi^2)	Q peak (cfs)	Time of peak	Volume (in)	Ponding depth (in)
Pre 10	Central	0.026	18.6	22Mar2023, 00:00	1.18	
	Culvert ponding hist	0.026	15.5	22Mar2023, 00:10	1.17	23.5
Pre 100	Central	0.026	34	22Mar2023, 00:00	2.14	
	Culvert ponding hist	0.026	19.3	22Mar2023, 00:20	2.11	35
Post 10	C1B	0.0005	0.8	22Mar2023, 00:00	2.12	
	C1A	0.0005	0.8	22Mar2023, 00:00	2.12	
	C2D	0.0086	8.4	22Mar2023, 00:00	1.32	
	C2A	0.0069	6.2	22Mar2023, 00:00	1.32	
	C1-C2	0.001	1.4	22Mar2023, 00:00	2.12	
	C2-Culvert	0.0165	14.2	22Mar2023, 00:10	1.37	
	S1	0.0043	6	22Mar2023, 00:00	1.91	
	Culvert ponding	0.0208	15.5	22Mar2023, 00:10	1.47	23.5
Post 100	C1B	0.0005	1.1	22Mar2023, 00:00	3.22	
	C1A	0.0005	1.1	22Mar2023, 00:00	3.22	
	C2D	0.0086	14.5	22Mar2023, 00:00	2.31	
	C2A	0.0069	10.8	22Mar2023, 00:00	2.31	
	C1-C2	0.001	2	22Mar2023, 00:00	3.22	
	C2-Culvert	0.0165	24.2	22Mar2023, 00:10	2.36	
	S1	0.0043	9.1	22Mar2023, 00:00	3	
	Culvert ponding	0.0208	19.2	22Mar2023, 00:20	2.46	35

Culvert of interest is Outfall B shown in the pre and post drainage plans

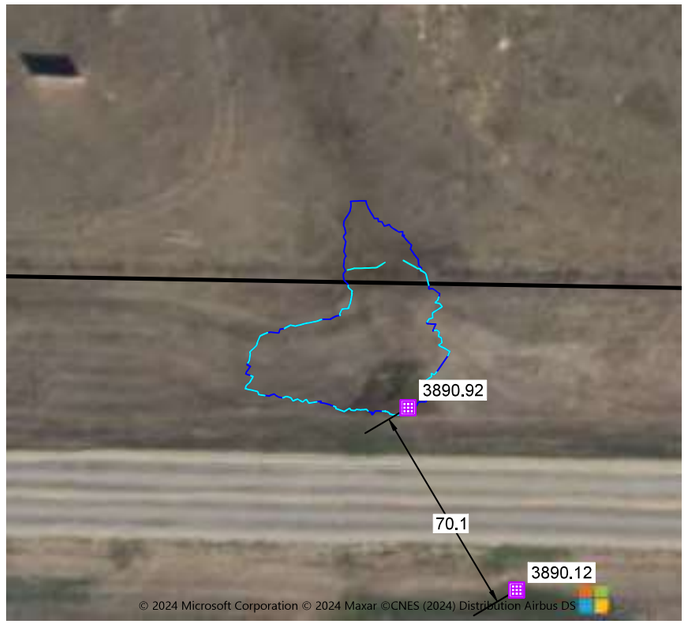
Area Capacity Table

Pre-developed		
Elevation (ft)	Area (acres)	Flow (cfs)
0	0.007	0
1	0.034	2.93
2	0.091	10
3	0.154	20
4	0.269	22
5	0.385	23.78
Post developed		
0	0.007	0
1	0.034	2.93
2	0.069	10
3	0.114	20
4	0.220	22
5	0.341	23.78

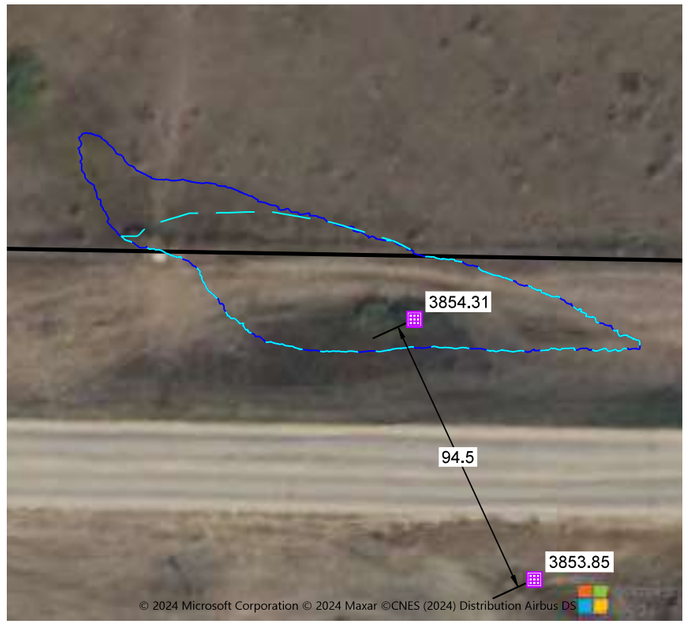
ponding depth (ft)	Q (cfs)	ponding depth (in)
0.00	0	0.0
0.08	1.223260918	1.0
0.17	4.468759494	2.0
0.25	5.546344068	3.0
0.33	6.404366481	4.0
0.42	7.160299402	5.0
0.50	7.843715002	6.0
0.58	8.472180507	7.0
0.67	9.057141936	8.0
0.75	3.765264506	9.0
0.83	4.738892961	10.0
0.92	5.734122862	11.0
1.00	6.843643443	12.0
1.08	7.983069617	13.0
1.17	9.160546452	14.0
1.25	10.4323354	15.0
1.33	11.80349101	16.0
1.42	13.20293973	17.0
1.50	13.5857129	18.0
1.58	13.95799314	19.0
1.67	14.3205988	20.0
1.75	14.67424709	21.0
1.83	15.01957074	22.0
1.92	15.35713133	23.0
2.00	15.68743	24.0
2.08	16.0109162	25.0
2.17	16.32799483	26.0
2.25	16.6390322	27.0
2.33	16.94436101	28.0
2.42	17.24428449	29.0
2.50	17.53907994	30.0
2.58	17.82900173	31.0
2.67	18.11428387	32.0
2.75	18.39514223	33.0
2.83	18.81274835	34.0
2.92	19.4461821	35.0
3.00	20.08589815	36.0
3.08	20.5177492	37.0
3.17	20.6702969	38.0
3.25	20.82172701	39.0
3.33	20.97206373	40.0
3.42	21.12133042	41.0
3.50	21.26954961	42.0
3.58	21.41674303	43.0
3.67	21.56293171	44.0
3.75	21.70813593	45.0
3.83	21.85237532	46.0
3.92	21.99566887	47.0
4.00	22.13803493	48.0
4.08	22.27949129	49.0
4.17	22.42005517	50.0
4.25	22.55974325	51.0
4.33	22.6985717	52.0
4.42	22.8365562	53.0
4.50	22.97371195	54.0
4.58	23.1100537	55.0
4.67	23.2455958	56.0
4.75	23.38035213	57.0
4.83	23.51433621	58.0
4.92	23.64756116	59.0
5.00	23.78003975	60.0

CULVERT PONDING SUMMARY								
CULVERT	*HISTORIC DRAINAGE AREA (ACRES)*	*HISTORIC WEIGHTED CN*	*POST-DEVELOPED DRAINAGE AREA (ACRES)*	*POST-DEVELOPED WEIGHTED CN*	*STORM RECURRENCE INTERVAL (YR)*	*HISTORIC PIPE FLOW (CFS)*	*POST-DEVELOPED PIPE FLOW (CFS)*	*PIPE FLOW VELOCITY (FPS)*
A (24")	16.77	83	13.22	83	10	12.2	9.6	4.55
					100	21.1	15.8	5.03
B (24")	16.69	87	13.65	95	10	15.6	15.6	4.97
					100	19.3	19.2	6.11
C (18")	5.80	86	7.56	94	10	5.9	10.6	7.40
					100	10.1	14.8	8.38

CULVERT A



CULVERT B



CULVERT C



100-YR WATER LINE

PRE-DEVELOPMENT

POST-DEVELOPMENT

N

0 25 50 75 100

GRAPHIC SCALE (FEET)

DETENTION POND C				
DEVELOPMENT	INFLOW (CFS)	OUTFLOW (CFS)	DESIGN STORM	NOTE
PRE	10.0	10.0	100-YR	NO POND
POST	14.8	10.0	100-YR	POND C



N

0 15 30 45 60

GRAPHIC SCALE (FEET)

K:\Sheridan\Story House Management\2023137 Story House Village\06GIS\23137_Story_House.aprx 4/19/2024 12:40 PM

LEGEND

- PARCEL
- PROJECT BOUNDARY
- DRAINAGE BASIN
- FLOW DIRECTION
- EXISTING CONTOURS
- SITE ROAD
- HISTORIC WATER LINE
- POST-DEVELOPED WATERLINE
- CULVERTS

NORTH
OFF-SITE WEST
WEST
CENTRAL
WYARNO ROAD (WY HWY 336)
INDUSTRIAL LANE
PRE-DEVELOPMENT VIEW
Maxar, Microsoft

N1A
N1B
N1C
N1D
N2
C1A
C1B
C2A
C2B
C2C
C2D
W1A
W1B
W2A
W2B
S1
WYARNO ROAD (WY HWY 336)
INDUSTRIAL L
POST-DEVELOPMENT VIEW

N

0 125 250 500
GRAPHIC SCALE: FEET

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC
STORY HOUSE VILLAGE - PHASE 1

CULVERT A DRAINAGE

SHERIDAN COUNTY, WYOMING

DESIGNED BY: KMM
DRAWN BY: CIG
CHECKED BY: SER
DATE: 4/19/2024

FIGURE
A

K:\Sheridan\Story House Management\2023137 Story House Village\06GIS\23137_Story_House.aprx 4/19/2024 12:40 PM

LEGEND

- PARCEL
- PROJECT BOUNDARY
- DRAINAGE BASIN
- FLOW DIRECTION
- EXISTING CONTOURS
- SITE ROAD
- HISTORIC WATER LINE
- POST-DEVELOPED WATERLINE
- CULVERTS

NORTH
EAST
CENTRAL
WEST
A
B
WYARNO ROAD (WY HWY 336)
WILDCAT ROAD
PRE-DEVELOPMENT VIEW
Maxar, Microsoft

N1A N1B N1C N1D W1A W1B W2A W2B C1A C1B C2A C2B C2C C2D N2 C4A C4B S1 S2
POST-DEVELOPMENT VIEW

N

0 125 250 500
GRAPHIC SCALE: FEET

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

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SHERIDAN, WY 82801
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STORY HOUSE PROPERTY COMPANY, LLC
STORY HOUSE VILLAGE - PHASE 1

CULVERT B DRAINAGE

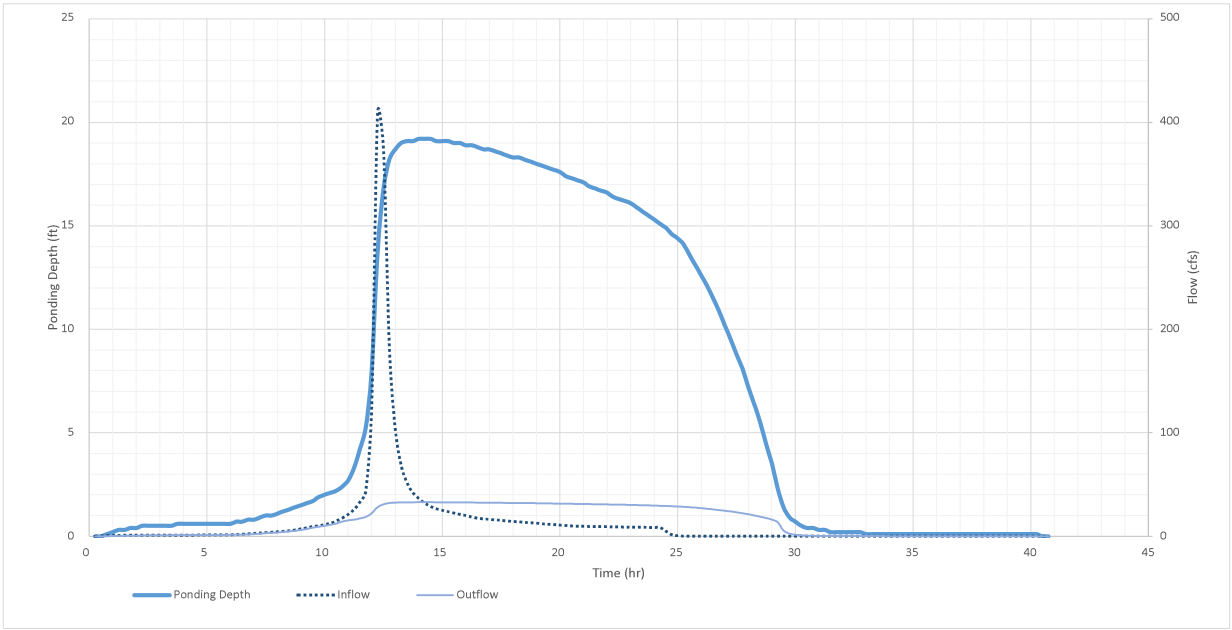
SHERIDAN COUNTY, WYOMING

DESIGNED BY: KMM
DRAWN BY: CIG
CHECKED BY: SER
DATE: 4/19/2024

FIGURE
B

TIME TO DRAIN (HR)

40.50



Culvert	Diameter (in)	Length (ft)	Slope (ft/ft)	Storm Recurrence Interval (yr)	Historic Runoff (cfs)	Post-Developed Pipe Flow (cfs)	Flowmaster Velocity (fps)
Secondary Access	24	217	0.0138	10	237	30.3	9.64
				100	409	32.9	10.47

10-yr Storm						
ELEMENT	DA (mi^2)	Q_{pk} (cfs)	Time	V_{runoff} (in)	V_{runoff} (AF)	Ponding depth (ft)
Subbasin-1	0.36	237.2	22Mar2024, 12:00	1.43	27.5	
SEculvertPonding	0.36	30.3	22Mar2024, 13:15	1.43	27.5	16.1
25-yr Storm						
Subbasin-1	0.36	303	22Mar2024, 12:00	1.81	34.8	
SEculvertPonding	0.36	31.3	22Mar2024, 13:30	1.81	34.8	17.4
100-yr Storm						
Subbasin-1	0.36	408.9	22Mar2024, 12:00	2.43	46.7	
SEculvertPonding	0.36	32.9	22Mar2024, 14:00	2.43	46.7	19.2

100-yr Storm				
time (hr)	inflow (cfs)	storage (AF)	Elevation (ft)	Outflow
0.25	0	0	0	0
0.50	0.3	0	0	0
0.75	0.7	0	0.1	0
1.00	0.8	0	0.2	0.1
1.25	0.8	0	0.3	0.2
1.50	0.9	0.1	0.3	0.4
1.75	0.9	0.1	0.4	0.5
2.00	0.9	0.1	0.4	0.6
2.25	0.9	0.1	0.5	0.7
2.50	1	0.1	0.5	0.8
2.75	1	0.1	0.5	0.9
3.00	1	0.1	0.5	0.9
3.25	1	0.1	0.5	0.9
3.50	1	0.1	0.5	1
3.75	1.1	0.1	0.6	1
4.00	1.1	0.1	0.6	1
4.25	1.1	0.1	0.6	1
4.50	1.1	0.1	0.6	1.1
4.75	1.2	0.1	0.6	1.1
5.00	1.2	0.1	0.6	1.1
5.25	1.2	0.1	0.6	1.2
5.50	1.3	0.1	0.6	1.2
5.75	1.3	0.1	0.6	1.2
6.00	1.4	0.1	0.6	1.3
6.25	1.6	0.1	0.7	1.4
6.50	1.9	0.1	0.7	1.5
6.75	2.3	0.1	0.8	1.8
7.00	2.7	0.1	0.8	2.1
7.25	3.1	0.1	0.9	2.5
7.50	3.5	0.2	1	2.9
7.75	3.9	0.2	1	3.3
8.00	4.3	0.2	1.1	3.7
8.25	4.7	0.2	1.2	4.2
8.50	5.3	0.2	1.3	4.7
8.75	6.1	0.2	1.4	5.3
9.00	7.1	0.2	1.5	6.1
9.25	8.3	0.3	1.6	7.1
9.50	9.4	0.3	1.7	8.2
9.75	10.2	0.3	1.9	9.3
10.00	11.1	0.3	2	10.2
10.25	12.6	0.3	2.1	11.1
10.50	14.8	0.4	2.2	12.4
10.75	17.5	0.4	2.4	14.1
11.00	21.1	0.5	2.7	15.3
11.25	25.9	0.7	3.3	15.9
11.50	33	1	4.2	17.2
11.75	44	1.4	5.3	18.7

12.00	125.4	2.7	8	22.1
12.25	408.9	7.7	13.8	28.2
12.50	374.8	15.2	16.8	30.9
12.75	183.1	20.3	18.2	32.1
13.00	103.9	22.6	18.7	32.5
13.25	68.5	23.7	19	32.7
13.50	51.7	24.3	19.1	32.8
13.75	42.1	24.6	19.1	32.8
14.00	36.4	24.7	19.2	32.9
14.25	32	24.7	19.2	32.9
14.50	28.8	24.7	19.2	32.9
14.75	26.5	24.6	19.1	32.8
15.00	25	24.4	19.1	32.8
15.25	23.7	24.2	19.1	32.8
15.50	22.4	24	19	32.7
15.75	21.1	23.8	19	32.7
16.00	20	23.6	18.9	32.7
16.25	18.6	23.3	18.9	32.6
16.50	17.4	23	18.8	32.5
16.75	16.8	22.7	18.7	32.5
17.00	16.2	22.3	18.7	32.4
17.25	15.8	22	18.6	32.4
17.50	15.3	21.6	18.5	32.3
17.75	14.8	21.3	18.4	32.2
18.00	14.3	20.9	18.3	32.2
18.25	13.9	20.6	18.3	32.1
18.50	13.5	20.2	18.2	32
18.75	13	19.8	18.1	32
19.00	12.6	19.4	18	31.9
19.25	12	19	17.9	31.8
19.50	11.6	18.6	17.8	31.7
19.75	11.3	18.2	17.7	31.6
20.00	10.7	17.7	17.6	31.5
20.25	10.3	17.3	17.4	31.4
20.50	9.9	16.9	17.3	31.3
20.75	9.6	16.4	17.2	31.2
21.00	9.6	16	17.1	31.1
21.25	9.4	15.5	16.9	31
21.50	9.3	15.1	16.8	30.9
21.75	9.3	14.6	16.7	30.8
22.00	9.2	14.2	16.6	30.7
22.25	9.1	13.8	16.4	30.6
22.50	9	13.3	16.3	30.5
22.75	8.8	12.9	16.2	30.4
23.00	8.7	12.4	16.1	30.3
23.25	8.7	12	15.9	30.1
23.50	8.7	11.5	15.7	29.9
23.75	8.5	11.1	15.5	29.8
24.00	8.4	10.7	15.3	29.6
24.25	8.4	10.2	15.1	29.4
24.50	4.9	9.8	14.9	29.2
24.75	1.5	9.2	14.6	29
25.00	0.5	8.6	14.4	28.7
25.25	0.1	8.1	14.1	28.5
25.50	0	7.5	13.6	28
25.75	0	6.9	13.1	27.6
26.00	0	6.3	12.6	27.1

26.25	0	5.8	12.1	26.6
26.50	0	5.2	11.5	25.9
26.75	0	4.7	10.9	25.3
27.00	0	4.2	10.2	24.6
27.25	0	3.7	9.5	23.9
27.50	0	3.2	8.8	23
27.75	0	2.7	8.1	22.2
28.00	0	2.3	7.2	21.2
28.25	0	1.9	6.4	20.1
28.50	0	1.5	5.5	18.9
28.75	0	1.1	4.5	17.6
29.00	0	0.7	3.5	16.1
29.25	0	0.4	2.3	13.4
29.50	0	0.2	1.4	5.5
29.75	0	0.1	0.9	2.5
30.00	0	0.1	0.7	1.4
30.25	0	0.1	0.5	0.9
30.50	0	0.1	0.4	0.6
30.75	0	0.1	0.4	0.4
31.00	0	0.1	0.3	0.3
31.25	0	0	0.3	0.3
31.50	0	0	0.2	0.2
31.75	0	0	0.2	0.2
32.00	0	0	0.2	0.1
32.25	0	0	0.2	0.1
32.50	0	0	0.2	0.1
32.75	0	0	0.2	0.1
33.00	0	0	0.1	0.1
33.25	0	0	0.1	0.1
33.50	0	0	0.1	0.1
33.75	0	0	0.1	0.1
34.00	0	0	0.1	0
34.25	0	0	0.1	0
34.50	0	0	0.1	0
34.75	0	0	0.1	0
35.00	0	0	0.1	0
35.25	0	0	0.1	0
35.50	0	0	0.1	0
35.75	0	0	0.1	0
36.00	0	0	0.1	0
36.25	0	0	0.1	0
36.50	0	0	0.1	0
36.75	0	0	0.1	0
37.00	0	0	0.1	0
37.25	0	0	0.1	0
37.50	0	0	0.1	0
37.75	0	0	0.1	0
38.00	0	0	0.1	0
38.25	0	0	0.1	0
38.50	0	0	0.1	0
38.75	0	0	0.1	0
39.00	0	0	0.1	0
39.25	0	0	0.1	0
39.50	0	0	0.1	0
39.75	0	0	0.1	0
40.00	0	0	0.1	0
40.25	0	0	0.1	0
40.50	0	0	0	0
40.75	0	0	0	0

Secondary Access 10-yr

Project Description	
Solve For	Headwater Elevation

Input Data	
Discharge	30.30 cfs
Centroid Elevation	1.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	24.0 in

Results	
Headwater Elevation	5.02 ft
Headwater Height Above Centroid	4.02 ft
Tailwater Height Above Centroid	-1.00 ft
Flow Area	3.1 ft²
Velocity	9.64 ft/s

Secondary Access 100-yr

Project Description	
Solve For	Headwater Elevation

Input Data	
Discharge	32.90 cfs
Centroid Elevation	1.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	24.0 in

Results	
Headwater Elevation	5.73 ft
Headwater Height Above Centroid	4.73 ft
Tailwater Height Above Centroid	-1.00 ft
Flow Area	3.1 ft^2
Velocity	10.47 ft/s

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LEGEND

- PARCEL
- PROJECT BOUNDARY
- DRAINAGE BASIN
- FLOW DIRECTION
- EXISTING CONTOURS
- SITE ROADS
- CULVERTS
- HISTORIC WATER LINE
- POST-DEVELOPED WATERLINE
- ROW

NORTH
EAST
CENTRAL
WEST
B
C
WYARNO ROAD (WY HWY 336)
WILDCAT ROAD
PRE-DEVELOPMENT VIEW
Maxar, Microsoft

N1A
N1B
N2
C2A
C2B
C2C
C2D
C4A
C4B
S1
S2
Pond C
POST-DEVELOPMENT VIEW

N

0 125 250 500
GRAPHIC SCALE: FEET

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801
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STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE - PHASE 1

CULVERT C DRAINAGE

SHERIDAN COUNTY, WYOMING

DESIGNED BY: KMM
DRAWN BY: CIG
CHECKED BY: SER
DATE: 4/19/2024

FIGURE
C

DETENTION CALCULATIONS

	P (in)		
	3.46		Formula
Basin	CN	Q_D (in)	Q_D=(B2-0.2*(1000/B4-10)^2/(B2+0.8(1000/B4-10)))
N1A	93	3.432	
N1B	98	3.458	
N1C	98	3.458	
N1D	93	3.432	
N2	87	3.364	
W1A	94	3.439	
W1B	94	3.439	
W2A	98	3.458	
W2B	89	3.391	
C1A	98	3.458	
C1B	98	3.458	
C2A	96	3.451	
C2B	89	3.391	
C2C	98	3.458	
C2D	95	3.446	
C4A	94	3.439	
C4B	96	3.451	
S1	94	3.439	
S2	91	3.414	

Basin	CN	Q_D (in)	Q_i	Q_o	A	K_r		
Total	91	3.414	142.73	121.01	50.96	53.33		
		Qo/Qi	V_r (ac*ft)		Vs		Vs/Vr	
		0.85	14.50		**2.25**		0.155	

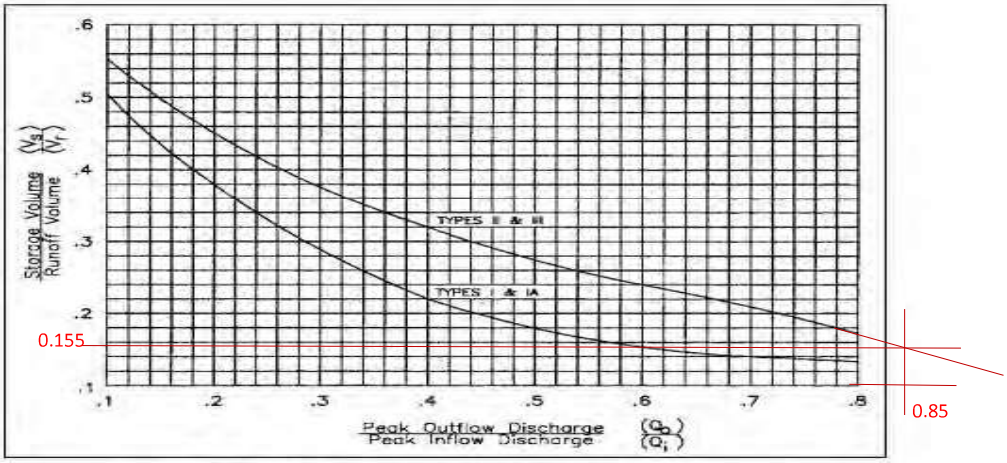


Figure 8-5. SCS detention basin routing curves.[13]

The procedure for using Figure 8-5 in estimating the detention storage required is described as follows:[13]

1. Determine the inflow and outflow discharges Q_i and Q_o
2. Compute the ratio Q_o/Q_i
3. Compute the inflow runoff volume, V_r, for the design storm

$$V_r = K_r Q_D A_m \quad (8\text{-}2)$$

where:

- V_r = Inflow volume of runoff, ha-mm (ac-ft)
- K_r = 1.00 (53.33 for English units)
- Q_D = Depth of direct runoff, mm (in)
- A_m = Area of watershed, ha (mi^2)

4. Using Figure 8-5, determine the ratio V_s/V_r
5. Determine the storage volume, V_s, as

$$V_s = V_r (V_s / V_r) \quad (8\text{-}3)$$

SCS Method Detention Calculation

	P (in)		
	3.46		Formula
Basin	CN	Q_D (in)	$Q_D=(\$B\$2-0.2*(1000/B4-10)^2/(\$B\$2+0.8(1000/B4-10)))$
C4A	94	3.439	
C4B	96	3.451	
S2	91	3.414	

Basin	CN	Q_D (in)	Q_i	Q_o	A	K_r		$Q_{HISTORIC}$
Total	94	3.439	14.8	10	7.56	53.33		10.1
		Qo/Qi	V_r (ac*ft)		Vs		Vs/Vr	
		0.68	2.17		**0.48**		0.22	

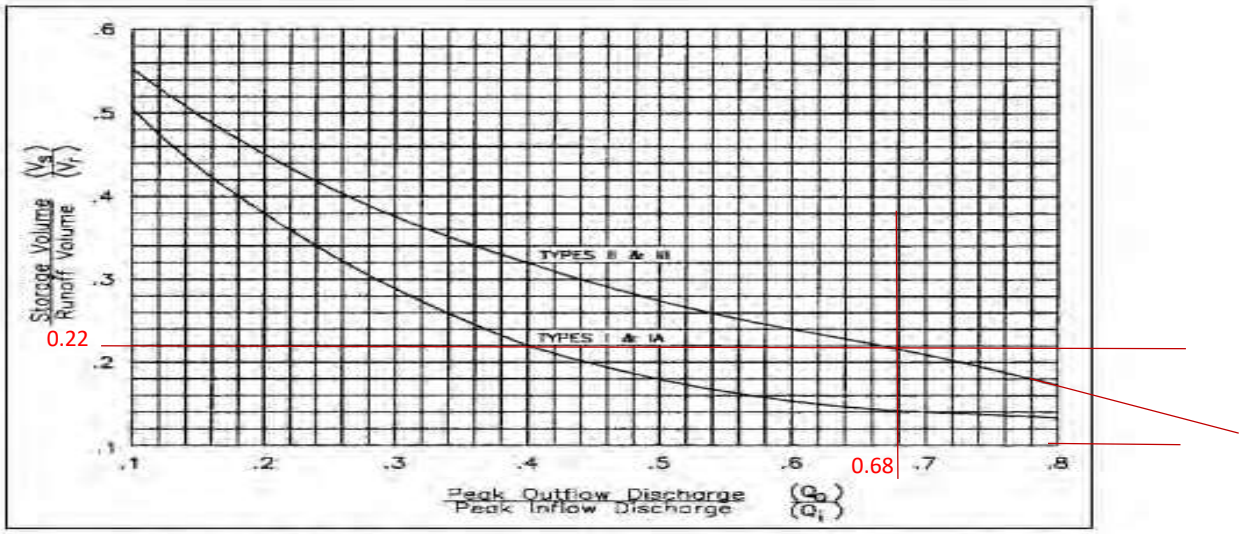


Figure 8-5. SCS detention basin routing curves.[13]

The procedure for using Figure 8-5 in estimating the detention storage required is described as follows:[13]

1. Determine the inflow and outflow discharges Q_i and Q_o
2. Compute the ratio Q_o/Q_i
3. Compute the inflow runoff volume, V_r, for the design storm

$$V_r = K_r Q_D A_m \qquad (8\text{-}2)$$

where:

V_r = Inflow volume of runoff, ha-mm (ac-ft)
K_r = 1.00 (53.33 for English units)
Q_D = Depth of direct runoff, mm (in)
A_m = Area of watershed, ha (mi^2)

4. Using Figure 8-5, determine the ratio V_s/V_r
5. Determine the storage volume, V_s, as

$$V_s = V_r (V_s / V_r) \qquad (8\text{-}3)$$

SCS Method Detention Calculation

$$WQV = \frac{(P)(Rv)(A)}{12}$$

WQV (acre-feet)	P (in)	A (acres)	Rv	% imp (decimal)
0.20	0.5	7.56	0.64	0.65
WQF (cfs)	qu (cfs/mi^2/in)			
3.72	991			

$$WQF = \frac{12(q_u)(WQV)}{640}$$

Table 8.2 – NRCS Unit Peak Discharge

Time of Concentration (minutes)*	q_u (cfs/mi²/inch)
6	991
12	796
18	658
24	558
30	496
45	388
60	316

*Either round down to the nearest time of concentration or interpolate for intermediate times of concentration

For circular orifices with C_o set equal to 0.6, the following equation results:

$Q = K_{or} D^2 H_o^{0.50}$ (8-18)

where:

K_{or} = 2.09 in SI units (3.78 in English units)
D = Orifice diameter, m (ft)

WQV		ACAP		DETENTION V	
V (af)	V (cuft)	A (sqft)	Elev (ft)	V (cuft)	V (af)
0.58	25171	8005	3849		
0.40	17621	7095	3848	7550	0.17
0.25	10955	6236	3847	14215.5	0.33
0.12	5122	5430	3846	20048.5	0.46
		4814	3845	25170.5	0.58

Worksheet for Pond C outlet

Project Description	
Solve For	Diameter

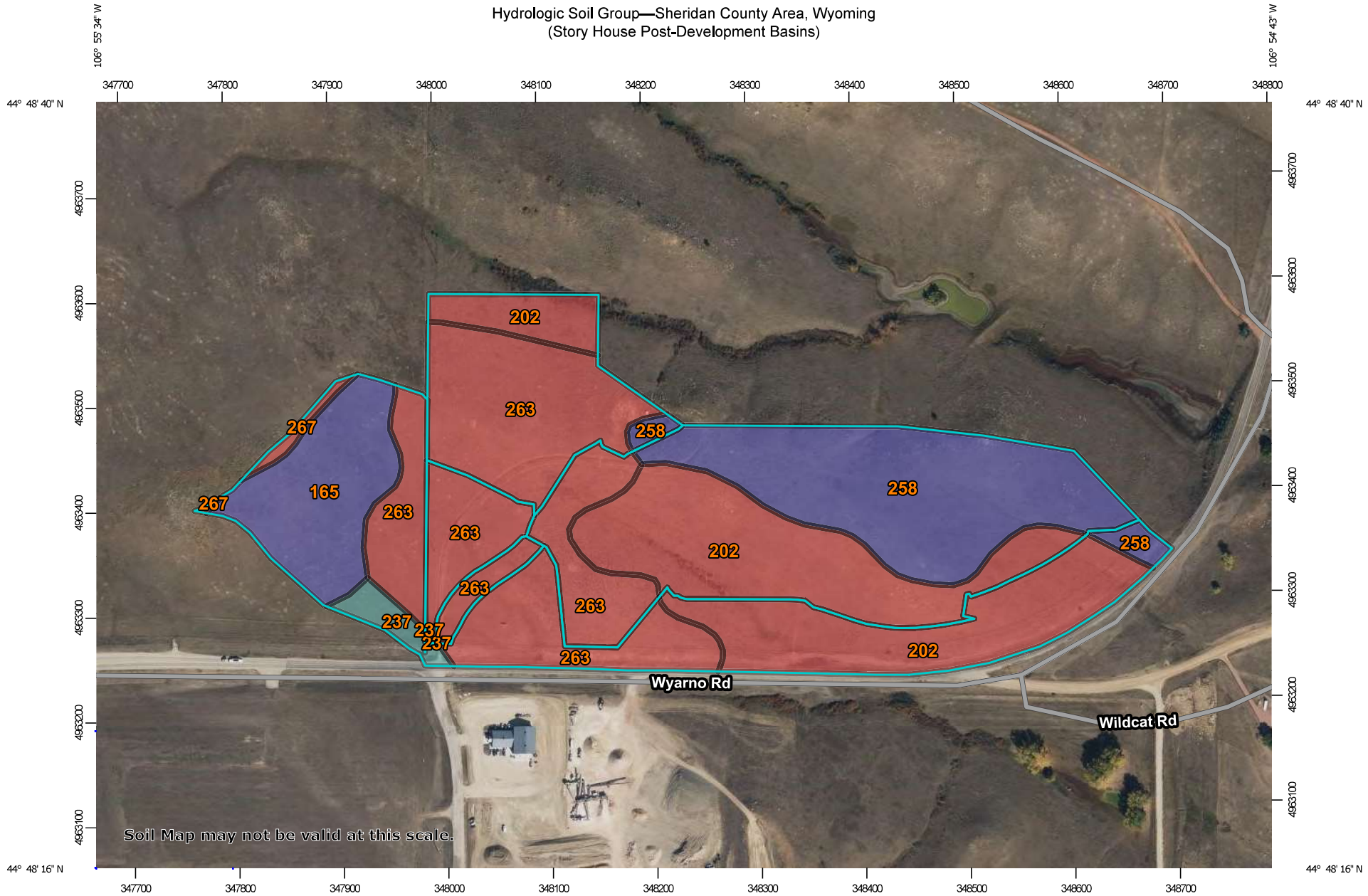
Input Data	
Discharge	10.00 cfs
Headwater Elevation	3.41 ft
Centroid Elevation	1.71 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600

Results	
Diameter	17.1 in
Headwater Height Above Centroid	1.71 ft
Tailwater Height Above Centroid	-1.71 ft
Flow Area	1.6 ft^2
Velocity	6.28 ft/s

APPENDIX C

Soil Data

Hydrologic Soil Group—Sheridan County Area, Wyoming
(Story House Post-Development Basins)



Map Scale: 1:5,140 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Sheridan County Area, Wyoming
Survey Area Data: Version 24, Sep 6, 2023

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

Date(s) aerial images were photographed: Sep 21, 2021—Sep 27, 2021

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
165	Hiland-Bowbac association, moist, 3 to 15 percent slopes	B	5.1	10.1%
202	Parmleed-Bidman association, moist, 3 to 9 percent slopes	D	16.4	32.1%
237	Renohill, moist-Ulm association, 3 to 10 percent slopes	C	0.8	1.5%
258	Shingle-Nihill complex, moist, 3 to 80 percent slopes	B	10.7	21.0%
263	Shingle-Samday clay loams, moist, 3 to 55 percent slopes	D	17.7	34.7%
267	Shingle-Theedle loams, moist, 45 to 75 percent slopes	D	0.3	0.6%
Totals for Area of Interest			**51.0**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

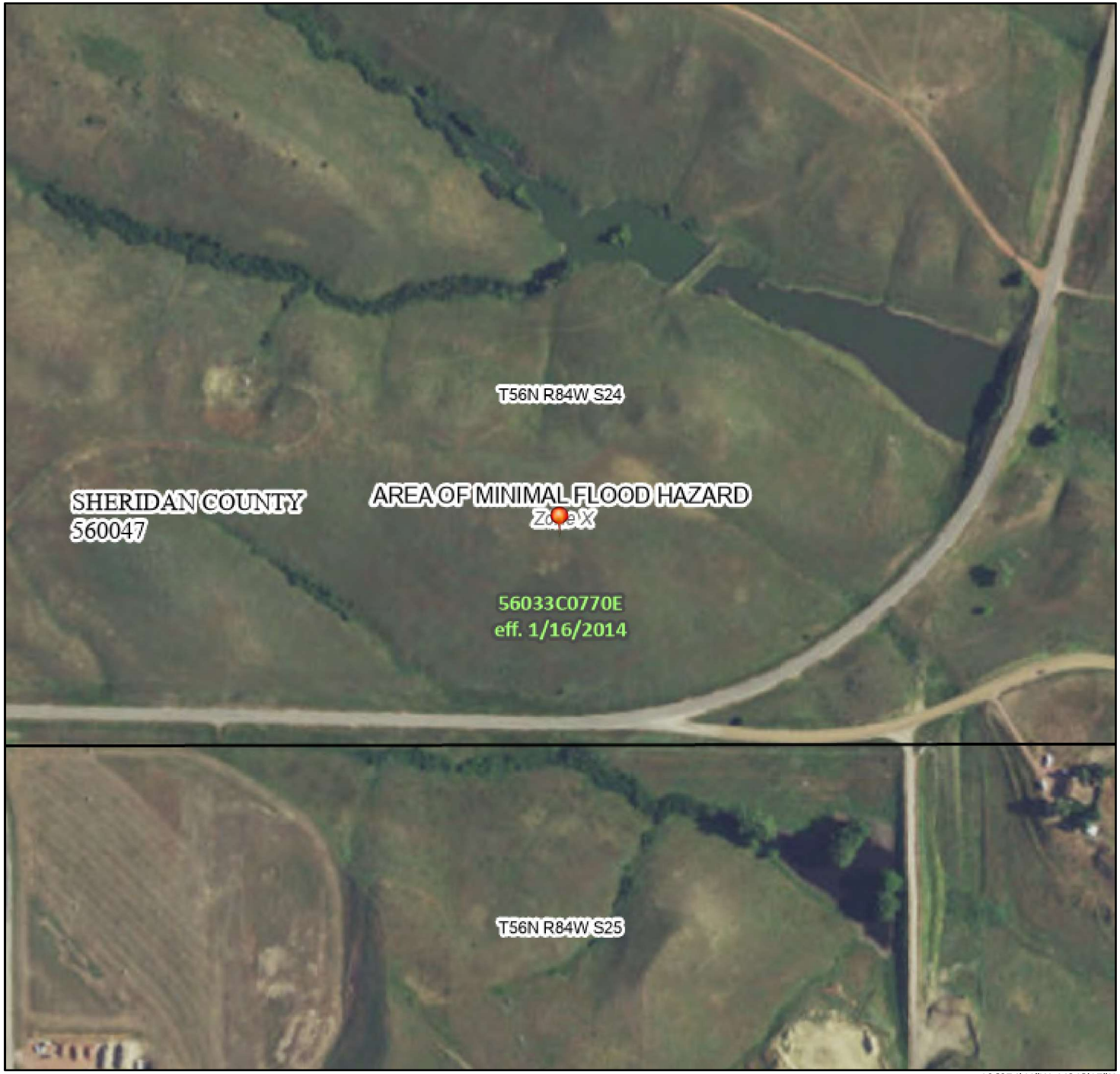
APPENDIX D

FEMA Information

National Flood Hazard Layer FIRMette

FEMA

106°55'19"W 44°48'40"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

106°54'41"W 44°48'15"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/18/2023 at 9:31 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Report of Geotechnical Exploration
Proposed Story House Village
Phase I Development

Wyarno Road
Sheridan, Wyoming

AET Project No. P-0022564

Date:
September 11, 2023
Revised December 15, 2023

Prepared for:
WWC Engineering
1849 Terra Avenue
Sheridan, Wyoming 82801

Geotechnical • Materials
Forensic • Environmental
Building Technology
Petrography/Chemistry

American Engineering Testing
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September 11, 2023
Revised December 15, 2023

WWC Engineering
1849 Terra Avenue
Sheridan, Wyoming 82801

Attn: Ms. Sarah Rohrer
srohrer@wwcengineering.com

RE: Report of Geotechnical Exploration
Proposed Story House Village
Phase I Development
Wyarno Road
Sheridan, Wyoming
AET Project No. P-0022564

Dear Ms. Rohrer:

American Engineering Testing, Inc. (AET) is pleased to present the results of our subsurface exploration program and geotechnical engineering review for the above referenced site on the northeast side of Sheridan Wyoming. These services were performed in general accordance with our proposal to you dated June 28, 2023 and WWC's written authorization to proceed provided on June 29, 2023. We are submitting one (1) electronic copy of the report to you.

Please contact me if you have any questions about the report. I can also be contacted for arranging observation and testing services during construction of the project. We highly recommend testing and observations be performed during construction at this site.

Sincerely,
American Engineering Testing, Inc.



Robert Temme PE
VP West Division Business Development
rtemme@teamaet.com
Phone: (605-391-5018)

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AMERICAN ENGINEERING TESTING

SIGNATURE PAGE

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APPENDIX B

Geotechnical Report Limitations and Guidelines for Use

1.0 INTRODUCTION

We understand the construction of the Story House Village Phase I Development is being proposed along Wyarno Road, on the northeast side of Sheridan Wyoming. Please refer to the Site Location Map included in Appendix A of this report for the location of the project. To assist with the planning and design, American Engineering Testing, Inc. (AET) has been authorized to conduct a subsurface exploration program at the site, conduct soil laboratory testing, and perform a geotechnical engineering review for the project. This report presents the results of the above services and provides our engineering recommendations based on this data.

Note that AET provided a Preliminary Geotechnical Report for this site under AET Project No. P-0010998, dated April 22, 2022. Two of the borings drilled in that study, Borings B-4 and B-5, are located in the area of the current development. These two borings are included in this report and the data gained from them have been used in the preparation of this report.

2.0 SCOPE OF SERVICES

AET's services were performed in general accordance with our proposal dated June 28, 2023. The authorized scope consists of the following:

- Five (5) Standard Penetration Test (SPT) borings across the proposed subdivision project site to depths ranging from approximately 10 -50 feet below existing grade.
- Soil laboratory testing.
- Geotechnical engineering analysis based on the gained data and preparation of this report.

These services are intended for geotechnical purposes only. The scope is not intended to explore for the presence or extent of environmental contamination in the soil or groundwater.

3.0 PROJECT INFORMATION

Based on the information provided, we understand the Site is moving into a development phase. Preliminary plans indicates roads, lots and utilities to be constructed at the Site.

We have assumed cuts and fill depth will be 10 feet or less, roads/street grades will be set based on the final grading of the site, standard utility depths are anticipated and residential structures may contain basement levels and will be constructed on the specific lots.

The purpose of the geotechnical study was to determine the subsurface conditions at the site and to evaluate the suitability of the site soils for their use in the overall grading, construction of streets and residential structures. Our foundation design assumptions include a minimum factor of safety of 3 with respect to the ultimate bearing capacity.

The previously stated information represents our understanding of the proposed construction. This information is an integral part of our engineering review. It is important that you contact us if there are changes from that described so that we can evaluate whether modifications to our recommendations are appropriate.

4.0 SUBSURFACE EXPLORATION AND TESTING

4.1 Field Exploration Program

The subsurface exploration program conducted for the project consisted of five (5) standard penetration test (SPT) borings drilled on August 16, 2023. The borings were drilled at locations selected by WWC Engineering.

The logs of the borings and details of the methods used appear in Appendix A. The logs contain information concerning soil layering, soil classification, geologic origins, and moisture condition. A density description or consistency is also noted for the natural soils, which is based on the standard penetration resistance (N-value).

The approximate boring locations are shown on Figure 2: Boring Location Map, included in Appendix A. Surface elevations were determined from GoogleEarth.

4.2 Laboratory Testing

The laboratory test program included natural moisture content, dry density, Atterberg Limits, sieve analysis, percent passing the No. 200 sieve, swell-consolidation, standard Proctor and California Bearing Ratio (CBR) tests. The test results of the moisture content, dry density, Atterberg Limits and percent passing the No. 200 sieve appear in Appendix A on the individual boring logs adjacent to the samples upon which they were performed.

Results of the sieve analysis, unconfined compression, swell-consolidation, standard Proctor and CBR tests are presented on the data sheets following the logs.

The swell/consolidation test is commonly performed to evaluate the swell or consolidation potential of soils or bedrock for determining foundation and concrete slab-on-grade design criteria. In this test, relatively undisturbed samples obtained directly from the ring-lined barrel sampler are placed in a laboratory device and saturated under a predetermined load. The swell-index is the resulting amount of swell (+) as a percent of the sample's thickness after the saturation period. Conversely, the consolidation index is the amount of consolidation (-) as a percent of the sample's thickness after consolidation under the confining load. Test results are summarized as follows:

Boring	Depth, ft	Soil Type	Swell (+) or Consolidation (-) Potential, %	Swell Pressure, psf
B-7	10	Lean Clay (CL)	+0.4	2,270

The results for the swell-consolidation test is included within Appendix A. Our judgement of the swell test results is that the site clay soils have a low swell potential with corresponding low to moderate swell pressures.

Results of the standard Proctor and CBR tests are summarized below. The CBR test was remolded to approximately 95% of maximum dry density at the optimum moisture content for the specific boring/material.

Boring	Soil Classification	Optimum Moisture Content, % [1]	Maximum Dry Density, pcf [1]	CBR Value[2]
B-6	Lean Clay (CL)	20.4	102.2	-
B-9	Lean Clay (CL)	20.2	101.9	2.2
B-10	Lean Clay with a little Sand (CL)	15.8	107.4	-

[1] Based on ASTM D 698 (standard proctor) [2] Remolded to 95% of maximum dry density

It should be noted the bulk soil samples represents a mixture of the soils encountered within the upper 1 to 5 foot interval of the borehole. As such, the soil classification as presented on the Moisture-Density Relationship (Proctor) and CBR data sheets may differ from the classifications of the individual soil layers identified on the respective Subsurface Boring Log.

5.0 SITE CONDITIONS

5.1 Surface Observations

In general, the site primarily consisted of a ridge used mainly as undeveloped grazing land and bordered on the north by a drainage with a small reservoir and bordered on the south by Wyarno Road. The Site topography slopes from west to east, with relief ranging from approximately 3,922 feet above sea level on the west side to 3,842 feet on the east.

5.2 Subsurface Soils/Geology

In general, below a thin layer of topsoil, the subsurface soils encountered within the borings consisted of native site alluvial soils overlying weathered and weathered claystone bedrock of the Wasatch Formation. The alluvial soils consisted of layers of approximately 5 to as much as 11 feet of firm to very stiff lean clay with sand and/or loose to medium dense clayey to silty sand.

Below the alluvial soils, weathered and unweathered claystone bedrock (silty lean clay) was encountered to the final depths drilled of approximately 51 feet. The bedrock ranged from very stiff to hard in consistency.

The Subsurface Boring Logs included in Appendix A give a more detailed description of the soils encountered within the borings.

5.3 Groundwater

At the time of our field work, ground water was not encountered within boring depths explored during our subsurface exploration. Temporary piezometers were installed in Borings B-6 and B-7. Water levels were checked in the piezometers on September 1, 2023 and as before, groundwater was not measured in any of the borings. The temporary piezometers were plugged and abandoned.

The lack of groundwater noted at the boring locations should not be taken as an accurate representation of the actual groundwater levels. Groundwater levels can fluctuate due to varying seasonal and annual rainfall and snow melt amounts, as well as other factors. A long period of time may be required for groundwater to stabilize in the soils present at the site; this period of time is generally not available during a typical subsurface exploration program.

6.0 RECOMMENDATIONS

6.1 Discussion

Our recommendations in the following sections are intended to minimize, to varying degrees, movement related problems for the proposed foundations and floor slabs of the residential structures. Even if our recommendations are followed, we cannot guarantee that some movement will not occur. The present state of the art is such that the risk of movement cannot be accurately assessed. It depends on a number of uncontrolled variables such as climatic conditions during and after construction, long term fluctuations of the groundwater level, utility line leakage, landscaping, and other similar aspects. The risk of detrimental movement must be assumed by the project owner.

The following recommendations are based on the soil conditions observed, and in the samples collected from the soil borings advanced at the time of the field activities. The location of the borings and the recommendations provided, were based on the information available to AET at the time of our field work. The soils encountered at each boring location and the soils encountered during excavation and site grading may vary due to the surficial geology of the site. Further, changes in climatic conditions between the time of exploration and the time of construction may also affect subsurface conditions, particularly groundwater levels and the moisture content of the soils. Due to the potential variations, we recommend that AET be retained to verify the soil conditions encountered during excavations match the information gained during our field investigation.

Final grading such as cuts and fills made on the site during construction may have a direct impact on the performance of the streets, residential structures and the following recommendations. AET must be allowed to review the final grading plans of the site to verify the following recommendations will remain applicable and/or if additional recommendations apply. Also note that modifications made to the completed structures and site, such as future additions and grade and drainage changes, may result in a direct impact to the performance of the original structures and site and cannot be addressed at this time.

Also, the following recommendations must be verified and observed in the field by the geotechnical engineer during construction. As the cost associated with the construction observations and testing will vary depending on the size and complexity of the structures and site, AET must be allowed to provide a proposal for these services during construction. The costs associated with the observations and testing services need to be included in the overall project construction cost.

To reduce the risk of movement of the bearing strata, good drainage must be maintained during and after construction. We recommend the final site grading be designed with positive drainage away from the buildings for at least a distance of 10 feet. We also recommend the excavations be left open a minimal amount of time to reduce the possible amount of surface water to accumulate in the base of the excavation.

6.2 Surficial Reconnaissance

AET visited the Site on August 16, 2023 to perform a surficial reconnaissance of the Site prior to drilling operations. AET gained access through a gate located along the north side of Wyarno Road. The access gate is located at the high point of the proposed Site development. Two drainages run through the Site from west to east. A small reservoir is located along the north drainage. The site is characterized by short grasses and shrubs and occasional cobbles and boulders. The Site is currently utilized for grazing livestock. Five soil borings were located by WWC engineering and each boring was visited to check access conditions for the drill rig. Access was deemed suitable for drilling operations.

6.3 Site Preparation

We recommend existing topsoil and any organic matter be removed from within the construction limits of the new residential structures, project streets and all areas to receive fill. Topsoil may be stockpiled on site for reuse once grading is complete; however, any organic material, and any old construction debris encountered should be wasted from the site.

We anticipate that cuts and fills of varying depths will be required within the streets and building footprints. Where required, grading should continue to the desired construction elevations. All exposed subgrades need to be scarified to a depth of approximately 8 to 12-inches, the moisture content of the scarified soils adjusted to within ±3% of their optimum moisture content and the scarified soils compacted to at least 95% of the maximum standard Proctor dry density (ASTM D 698).

The excavated soils, cleaned of all unsuitable/organic materials and rocks greater than 3-inches in nominal size, may be used obtain final grades or stockpiled on-site and reused as utility trench backfill and overlot fill. We recommend the soils to be used as fill be moisture conditioned to within ±3% of optimum moisture and compacted to at least 95% of the maximum dry density (ASTM D698). Imported fill material, if required, should be approved by the geotechnical engineer prior to use.

To reduce the potential for movement related distress and to provide a uniform bearing surface, we recommend, the concrete slab-on-grade floors systems for the residential structures, bear on at least 1 foot of compacted granular engineered fill material. placed directly on the recompacted site soils.

The imported granular engineered fill should be pre-approved by the geotechnical engineer prior to its use. The granular engineered fill above the water table, should be a non-expansive material with a maximum size of 2-inches, 40% to 85% passing the #4 sieve, and no more than 20% passing the #200 sieve, with a liquid limit of less than 30. All granular engineered fill to be placed above the water table, whether from on-site or imported, should be placed in 8-inch thick maximum loose lifts; the moisture content should be conditioned to within ±3% of optimum moisture and compacted to at least 95% of maximum standard Proctor (ASTM D 698) dry density.

We recommend all final cut and fill slopes be constructed with 3H:1V slopes or flatter. It is our opinion temporary cut slopes can be cut to slopes of 2H:1V.

As noted, groundwater was not encountered across the site. Temporary dewatering of excavations will be necessary if groundwater is encountered, or surface drainage is allowed to accumulate in the excavations. Contractors working on the project should be prepared to have equipment on-site that will lower and maintain the groundwater level a minimum of two feet below the base of the excavations. We recommend that the groundwater levels be check prior to and during construction operations on site.

For more information on site preparation see the Standard Sheets section of this report.

6.4 Foundation Design

Based on the information obtained from the borings and laboratory testing, as well as our analysis, it is our opinion the residential structures may be founded on conventional spread footing foundation systems placed directly on the reconditioned site soils and/or claystone bedrock. We anticipate full depth basement levels will be 7 to 8 feet below final grades.

If a basement level is to be constructed, we recommend the placement of a perimeter drain system at the bottom outside edge of the basement footing excavation. The perimeter drain system should be routed to a sump pumping system to remove water from below the basement level.

Footings can be designed for an allowable bearing capacity of 2,000 pounds per square foot (psf). We recommend all footings be placed at least 42-inches below final grades for frost protection. As constructed, the above loading should provide a theoretical safety factor of three or more with respect to a general shear or base failure of the footings.

6.5 Basement Wall Design Considerations

If basement levels are constructed, the basement or lower-level walls will be subject to lateral earth pressure from the backfill. These types of walls are normally designed for the “at-rest” earth pressure condition because the walls are restrained from rotating. If the site soils are used as backfill, a value of 75 pounds per square foot, per foot of depth, should be used for the at-rest lateral earth pressure against the basement walls. The lateral earth pressure does not include any factor of safety and it not applicable for submerged conditions or hydrostatic loading

6.6 Floor Slab Design

Due to the presence of clay soils at the site, floor slabs should be placed on at least 1 foot of compacted granular engineered fill. Prior to placement we recommend the exposed subgrade be scarified to a depth of one foot and moisture conditioned to within ±3% of the optimum moisture content and compacted to at least 95% of maximum standard Proctor (ASTM D 698) dry density. We also recommend the floor slabs be constructed independent of the foundations in the event some movement does occur.

We also recommend providing a 6-inch thick continuous sand and/or gravel cushion layer directly below the floor slab to prevent capillary moisture rise to the slab. This free-draining granular fill should contain less than 12% by weight passing the #200 sieve, and less than 40% passing the #40 sieve. This 6-inch thick sand and/or gravel cushion layer can be incorporated into the 1 feet of engineered fill, where appropriate.

Refer to the "Floor Slab Moisture/Vapor Protection" document in the Standard Sheets section of this report for additional information.

6.7 Utility Trench and Exterior Backfill Considerations

It is our opinion utility trench backfill and exterior backfill around the addition may consist of the excavated alluvial soils. Based on the existing moisture content of the site soils, processing and drying of the material will very likely be required prior to re-use as backfill material.

All recommendations are based on the standard Proctor method (ASTM: D698).

1. All backfill should be free of deleterious/frozen material, and construction debris, and have a maximum aggregate size of 2-inches.
2. Site clays soils should be moisture conditioned to within -1 to +3% of the optimum moisture content. All granular backfill should be moisture conditioned to within ±3% of optimum moisture content prior to being placed.
3. All backfill should be placed in loose lift thicknesses of 8-inches or less. If hand-operated compaction equipment is used, the loose lift thickness should be reduced to 4-inches or less.
4. Each lift should be compacted to at least 95% of maximum proctor density. We recommend the final lift of backfill be compacted to at least 97% of the maximum dry density.
5. Compaction density tests should be performed on alternating lifts to ensure the minimum density is maintained.
6. Utility lines entering or exiting the structures should be leak tested prior to the placement of the slab.

6.8 Trench Excavation

If excavation faces are not retained, the excavations should maintain maximum allowable slopes in accordance with *OSHA Regulations (Standards 29 CFR), Part 1926, Subpart P, "Excavations"* (can be found on www.osha.gov). Even with the required OSHA sloping, water seepage or surface runoff can potentially induce side slope erosion or running which could require slope maintenance. For trench excavations, it is our opinion the site clays and sand soils, can be classified as Type C soils with recommended slope laybacks of 1.5H:1V. For the weathered and unweathered claystone formation, it is our opinion the soils can be classified as Type A soils with recommended slope laybacks of 3/4H:1V.

These classifications should be considered preliminary and should be verified in the field on a daily basis by the contractor and/or geotechnical engineer. Excavations deeper than 20 feet and/or in saturated soils or below the ground water table should be considered on an individual basis. Water levels, due to climatic conditions should be evaluated at the time of construction. If the above trench layback recommendations are not feasible, due to space limitations or other factors, the OSHA rules should be consulted for alternative trench stabilization methods. Trench boxes or shoring in compliance with OSHA rules may be acceptable alternatives.

6.9 Pavements

6.9.1 Considerations

The following pavement section was designed based on the City of Sheridan Standard Specifications and the procedures outlined in the 1993 AASHTO Empirical Equation for Flexible Pavements and Rigid Pavements.

It is anticipated that pavement subgrade soils will consist of sandy lean clay soils. Based on our laboratory results, a California Bearing Ratio (CBR) value of 2.2 was used in the pavement design analysis utilizing the site lean clay soils as the subgrade material. We have used a correlation of 1500 x CBR value to estimate the resilient modulus (MR).

A Traffic Impact Study report, prepared by Sustainable Traffic Solutions, was provided by WWC Engineering. Based on our review of the data contained in that report, we have assumed the proposed subdivision streets will be utilized by moderate traffic volumes consisting primarily of passenger trucks and cars with a smaller amount of truck related traffic such as seen from garbage and general delivery/service vehicles. Based on the subdivision layout, we have assumed the east half of the subdivision will be exposed to lighter traffic loads (residential) as the portion of the subdivision will be residential housing.

The west half of the subdivision, which will provide apartment and commercial space, will experience the higher traffic and truck related traffic. Therefore, an equivalent 20-year design 18-kip single axle load (ESAL) of 45,000 was utilized for the Phase I subdivision residential streets and an equivalent 20-year design 18-kip single axle load (ESAL) of 125,000 was utilized for the multi-family housing and commercial lots within the subdivision streets.

The 20-year design period is considered to be the interval over which, with proper maintenance, the pavement will not require major repairs. A continuing regular maintenance program should be implemented to maintain satisfactory serviceability over the design life. The maintenance program should include sealing cracks and repairing minor deficiencies. Please notify us if any of the parameters used in the pavement design do not adequately define the anticipated conditions.

6.9.2 Subgrade Preparation

Prior to placement of base course or any fill to obtain final subgrade elevations, the exposed subgrade soils should be scarified to a depth of 8-inches, the moisture content of the scarified soils adjusted to near optimum moisture content and the material compacted to at least 95% of maximum standard Proctor dry density (ASTM: D 698).

All prepared subgrades should be proof rolled to verify a firm and unyielding subgrade has been obtained prior to the placement of new fill and/or base course materials. To obtain a firm and unyielding subgrade, on which to construct the new pavement section, scarification and drying of the subgrade soils should be anticipated. If project schedules do not allow for sufficient time to dry the soil back to acceptable levels, use of a geo-textile stabilization/separation material can be incorporated in the design. The geo-textile should be placed on top of the graded subgrade and below the aggregate base course layer. Please note the pavement section, including base course thickness, may be subject to change if incorporating a geo-textile stabilization material into the design.

Prior to placement of the base course, an observed proof roll should be performed to confirm a firm and unyielding subgrade. Any areas that "pump" under the loaded dump truck should be evaluated by a geotechnical engineer, or their representative, to determine whether additional excavation and replacement with a coarse, clean rock or the use of a geo-textile fabric should be used to stabilize the subgrade. Once the subgrade has been proof rolled and approved by the engineer, base course may be placed.

6.9.3 Aggregate Base Course

Aggregate base course should be moisture conditioned to within ±3% of optimum and compacted to a minimum of 95% of maximum density as determined by the standard proctor method (ASTM: D698) and should meet the requirements as outlined in the City of Sheridan Standard Specifications.

6.9.4 Pavement Section Recommendations

Based on the above stated information and our analysis, we recommend the following pavement sections be used for this project:

Recommended Pavement Section Thickness (inches)				
Traffic Area	**Flexible (Asphalt), in.**	**Rigid (Concrete), in**	**Aggregate Base Course, in.**	**Total, in.**
Residential – Story House Lane, Baldwin Avenue, Mockingbird Lane, Canterbury Lane	4	--	9	13
	--	6	5	11
Blocks 1,2,3,8 of Story House Lane, Story House Village, Baldwin Lane	5	-	12	17
	-	6.5	5	11.5

Aggregate base course used in the pavement section can typically be reduced by about 25% when utilizing a geotextile separation/stabilization fabric or a geogrid. We recommend the geotextile manufacturer, such as Tensar or Mirafi, be contacted for design parameters and additional considerations for the pavement sections.

The asphalt should be obtained from an approved mix design within the City of Sheridan Standard Specifications. Mix designs should be submitted prior to construction to verify their adequacy. Asphalt material should be placed in maximum 3-inch lifts and compacted to the minimum standards outlined in the City of Sheridan Standard Specifications.

If Portland Cement Concrete (PCC) pavement is selected for use at this site, the concrete pavement should conform to City of Sheridan Standard Specifications. Longitudinal and transverse joints should be provided as needed in concrete pavements for expansion/contraction and isolation. The location and extent of joints should be based

upon the final pavement geometry. Sawed joints should be cut within 24-hours of concrete placement. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

6.10 General Site Recommendations

6.10.1 Surface Water Management

Surface water runoff is important to the long-term performance of the foundation systems and paved surfaces. The site should slope away from all structures constructed on site, directing water away from all foundation elements. All hard surfacing should have a minimum slope of 1% to facilitate the rapid removal of water from these surfaces.
In landscaped areas, a minimum slope of 2% should be maintained, directing water away from any structures on site. Additionally, in landscaped areas, water should not be allowed to pond behind any curb and gutter systems on site. We recommend that a French drain be installed in areas where water would be likely to pond on landscaped areas.

6.10.2 Site Excavations and Deleterious Soils

We anticipate that the soils encountered on site, within the depths explored during our field services, will be able to be excavated using conventional earth moving equipment. If deleterious soils/material is encountered it should be removed from the construction limits, site soils cleaned of all deleterious substances may be used for backfilling, in areas where deleterious substances are encountered. The following are considered deleterious substances/soils; coal, lignite, organic material, construction debris, mud, site soils significantly disturbed by construction traffic, any material greater than 6 inches in diameter, and any site soils with moisture content greater than 6% above the optimum moisture as determined by ASTM D698. If coal or lignite is encountered during site excavations and grading the geotechnical engineer should be contacted to observe and assist in developing a plan for removal and replacement with suitable material.

During construction, operations care should be taken to avoid unnecessary disturbance of the site soils. Disturbance of the site soils may result in additional over excavation and replacement of the disturbed soils. Excessively disturbed soils may occur from construction traffic over unprotected soft or wet subgrades, excessive erosion, deposition and scouring from surface water runoff during construction. To mitigate potential disturbed soils during construction operations, we recommend that construction traffic be limited to the minimum necessary for construction of the project, and in areas where high construction traffic is anticipated we recommend that a temporary gravel/rock surfacing

be used to minimize potential damage to subgrade soils.

6.10.3 Site Landscaping Recommendations

We suggest avoiding the planting of deep rooted trees within 10 feet of the structure to minimize changes in the moisture content of the subsurface soils. We recommend that hard surfacing be placed directly against the structure extending a minimum of 5 feet away from foundation walls, and sloping away from the structure. Additionally, we recommend that any landscape sprinkler systems be designed so that no water from the sprinklers is spread within 5 feet of any structures on site.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Potential Difficulties

7.1.1 Soft Subgrade Soils

Depending on the time of year in which construction takes place, unstable subgrade soils could be encountered during the site and building grading operations. If encountered, additional conditioning of the soils may be required to obtain moisture contents which allow for firm and unyielding subgrade and/or compaction.

Localized areas of soft wet subgrades can be remedied with additional excavation to expose firmer soils, placement of coarse rock to provide a solid base on which to place additional fill and/or the use of geotextiles between the soft soils and the overlying fill and/or pavement sections. The appropriate means of subgrade stabilization should be evaluated by the geotechnical engineer at the time of construction.

7.1.2 Runoff Water in Excavation

Water can be expected to collect in the excavation bottom during times of inclement weather or snow melt. To allow observation of the excavation bottom, to reduce the potential for soil disturbance, and to facilitate filling operations, we recommend water be removed from within the excavation during construction. Based on the soils encountered, we anticipate the groundwater can be handled with conventional sump pumping.

7.1.3 Disturbance of Soils

The on-site soils can be disturbed under construction traffic, especially if the soils are wet. If soils become disturbed, they should be subcut to the underlying undisturbed soils. The subcut soils can then be dried and recompacted back into place, or they should be removed and replaced with drier imported fill.

7.2 Excavation Backsloping

If excavation faces are not retained, the excavations should maintain maximum allowable slopes in accordance with *OSHA Regulations (Standards 29 CFR), Part 1926, Subpart P, "Excavations"* (can be found on www.osha.gov). Even with the required OSHA sloping, water seepage or surface runoff can potentially induce sideslope erosion or sloughing which could require slope maintenance.

7.3 Observation and Testing

The recommendations in this report are based on the subsurface conditions found at our test boring locations. Since the soil conditions can be expected to vary away from the soil boring locations, we recommend on-site observation by a geotechnical engineer/technician during construction to evaluate these potential changes. Soil density testing should also be performed on new fill placed in order to document that project specifications for compaction have been satisfied.

8.0 LIMITATIONS

Within the limitations of scope, budget, and schedule, we have endeavored to provide our services according to generally accepted geotechnical engineering practices at this time and location. Other than this, no warranty, expressed or implied, is intended. Important information regarding risk management and proper use of this report is given in Appendix B entitled "Geotechnical Report Limitations and Guidelines for Use."

Standard Sheets

EXCAVATION AND REFILLING FOR STRUCTURAL SUPPORT

EXCAVATION

Excavations for structural support at soil boring locations should be taken to depths recommended in the geotechnical report. Since conditions can vary, recommended excavation depths between and beyond the boring location should be evaluated by geotechnical field personnel. If groundwater is present, the excavation should be dewatered to avoid the risk of unobservable poor soils being left in-place. Excavation base soils may become disturbed due to construction traffic, groundwater or other reasons. Such soils should be subcut to underlying undisturbed soils.

Soil stresses under footings spread out with depth. Therefore, the excavation bottom and subsequent fill system should be laterally oversized beyond footing edges to support the footing stresses. A lateral oversize equal to the depth of fill below the footing (i.e., 1:1 oversize) is usually recommended. The lateral oversize is usually increased to 1.5:1 where compressible organic soils are exposed on the excavation sides. Variations in oversize requirements may be recommended in the geotechnical report or can be evaluated by the geotechnical field personnel.

Unless the excavation is retained, the backslopes should be maintained in accordance with OSHA Regulations (Standards-29 CFR), Part 1926, Subpart P, "Excavations" (found on www.osha.gov). Even with the required OSHA sloping, groundwater can induce sideslope raveling or running which could require that flatter slopes or other approaches be used.

FILLING

Filling should proceed only after the excavation bottom has been approved by the geotechnical engineer/technician. Approved fill material should be uniformly compacted in thin lifts to the compaction levels specified in the geotechnical report. The lift thickness should be thin enough to achieve specified compaction through the full lift thickness with the compaction equipment utilized. Fine grained soils are moisture sensitive and are often wet (water content exceeds the "optimum moisture content" defined by a Proctor test). In this case, the soils should be scarified and dried to achieve a water content suitable for compaction. This drying process can be time consuming, labor intensive, and requires favorable weather.

Filling operations for structural support should be closely monitored for fill type and compaction by a geotechnical technician. Monitoring should be on a full-time basis in cases where vertical fill placement is rapid; during freezing weather conditions; where groundwater is present; or where sensitive bottom conditions are present.

EXCAVATION/REFILLING DURING FREEZING TEMPERATURES

Soils that freeze will heave and lose density. Upon thawing, these soils will not regain their original strength and density. The extent of heave and density loss depends on the soil type and moisture condition; and is most pronounced in clays and silts. Foundations, slabs, and other improvements should be protected from frost intrusion during freezing weather. For earthwork during freezing weather, the areas to be filled should be stripped of frozen soil, snow and ice prior to new fill placement. In addition, new fill should not be allowed to freeze during or after placement. For this reason, it may be preferable to do earthwork operations in small plan areas so grade can be quickly attained instead of large areas where much frost stripping may be needed.

FREEZING WEATHER EFFECTS ON BUILDING CONSTRUCTION

GENERAL

Because water expands upon freezing and soils contain water, soils which are allowed to freeze will heave and loose density. Upon thawing, these soils will not regain their original strength and density. The extent of heave and density/strength loss depends on the soil type and moisture condition. Heave is greater in soils with higher percentages of fines (silts/clays). High silt content soils are most susceptible, due to their high capillary rise potential which can create ice lenses. Fine grained soils generally heave about 1/4" to 3/8" for each foot of frost penetration. This can translate to 1" to 2" of total frost heave. This total amount can be significantly greater if ice lensing occurs.

DESIGN CONSIDERATIONS

Clayey and silty soils can be used as perimeter backfill, although the effect of their poor drainage and frost properties should be considered. Basement areas will have special drainage and lateral load requirements which are not discussed here. Frost heave may be critical in doorway areas. Stoops or sidewalks adjacent to doorways could be designed as structural slabs supported on frost footings with void spaces below. With this design, movements may then occur between the structural slab and the adjacent on-grade slabs. Non-frost susceptible granular soils (with less than 12% passing a #200 sieve) can be used below such areas. Depending on the function of surrounding areas, the granular soil layer may need a thickness transition away from the area where movement is critical. With granular soil placement over slower draining soils, subsurface drainage would be needed for the granular layer. High density extruded insulation could be used within the granular soils to reduce frost penetration, thereby reducing the granular soil thickness needed. We caution that insulation placed near the surface can increase the potential for ice glazing of the surface.

The possible effects of adfreezing should be considered if clayey or silty soils are used as backfill. Adfreezing occurs when backfill adheres to rough surfaced foundation walls and lifts the wall as it freezes and heaves. This occurrence is most common with masonry block walls, unheated or poorly heated building situations and clay backfill. The potential is also increased where backfill soils are poorly compacted and become saturated. The risk of adfreezing can be decreased by placing a low friction separating layer between the wall and backfill.

Adfreezing can occur on exterior piers (such as deck, fence or other similar pier footings), even if a smooth surface is provided. This is more likely in poor drainage situations where soils become saturated. Additional footing embedment and/or widened footings below the frost zones (which include tensile reinforcement) can be used to resist uplift forces. Specific designs would require individual analysis.

CONSTRUCTION CONSIDERATIONS

Foundations, slabs, and other improvements which may be affected by frost movements should be insulated from frost penetration during freezing weather. If filling takes place during freezing weather, all frozen soils, snow, and ice should be stripped from areas to be filled prior to new fill placement. The new fill should not be allowed to freeze during transit, placement, or compaction. This should be considered in the project scheduling, budgeting, and quantity estimating. It is usually beneficial to perform cold weather earthwork operations in small areas where grade can be attained quickly rather than working large areas where a greater amount of frost stripping may be needed. If slab subgrade areas freeze, we recommend the subgrade be thawed prior to floor slab placement. The frost action may also require reworking and recompaction of the thawed subgrade.

FLOOR SLAB MOISTURE/VAPOR PROTECTION

Floor slab design relative to moisture/vapor protection should consider the type and location of two elements, a granular layer and a vapor membrane (vapor retarder, water resistant barrier or vapor barrier). In the following sections, the pros and cons of the possible options regarding these elements will be presented, such that you and your specifier can make an engineering decision based on the benefits and costs of the choices.

GRANULAR LAYER

In American Concrete Institute (ACI) 302.1-96, a "base material" is recommended, rather than the conventional cleaner "sand cushion" material. The manual maintains that clean sand (common "cushion" sand) is difficult to compact and maintain until concrete placement is complete. ACI recommends a clean, fine graded material (with at least 10% to 30% of particles passing a #100 sieve) which is not contaminated with clay, silt or organic material. We refer you to ACI 302.1-96 for additional details regarding the requirements for the base material.

In cases where potential static water levels or significant perched water sources appear near or above the floor slab, an underfloor drainage system may be needed wherein a drain tile system is placed within a thicker clean sand or gravel layer. Such a system should be properly engineered depending on subgrade soil types and rate/head of water inflow.

VAPOR MEMBRANE

The need for a vapor membrane depends on whether the floor slab will have a vapor sensitive covering, will have vapor sensitive items stored on the slab, or if the space above the slab will be a humidity controlled area. If the project does not have this vapor sensitivity or moisture control need, placement of a vapor membrane may not be necessary. Your decision will then relate to whether to use the ACI base material or a conventional sand cushion layer. However, if any of the above sensitivity issues apply, placement of a vapor membrane is recommended. Some floor covering systems (adhesives and flooring materials) require a vapor membrane to maintain a specified maximum slab moisture content as a condition of their warranty.

VAPOR MEMBRANE/GRANULAR LAYER PLACEMENT

A number of issues should be considered when deciding whether to place the vapor membrane above or below the granular layer. The benefits of placing the slab on a granular layer, with the vapor membrane placed below the granular layer, include reduction of the following:

- Slab curling during the curing and drying process.
- Time of bleeding, which allows for quicker finishing.
- Vapor membrane puncturing.
- Surface blistering or delamination caused by an extended bleeding period.
- Cracking caused by plastic or drying shrinkage.

The benefits of placing the vapor membrane over the granular layer include the following:

- The moisture emission rate is achieved faster.
- Eliminates a potential water reservoir within the granular layer above the membrane.
- Provides a "slip surface", thereby reducing slab restraint and the associated random cracking.

If a membrane is to be used in conjunction with a granular layer, the approach recommended depends on slab usage and the construction schedule. The vapor membrane should be placed above the granular layer when:

- Vapor sensitive floor covering systems are used or vapor sensitive items will be directly placed on the slab.
- The area will be humidity controlled, but the slab will be placed before the building is enclosed and sealed from rain.
- Required by a floor covering manufacturer's system warranty.

The vapor membrane should be placed below the granular layer when:

- Used in humidity controlled areas (without vapor sensitive coverings/stored items), with the roof membrane in place, and the building enclosed to the point where precipitation will not intrude into the slab area. Consideration should be given to slight sloping of the membrane to edges where draintile or other disposal methods can alleviate potential water sources, such as pipe or roof leaks, foundation wall damp proofing failure, fire sprinkler system activation, etc.

Appendix A

Geotechnical Field Exploration and Testing
Boring Log Notes
Unified Soil Classification System
Figure 1: Site Location Map
Figure 2: Boring Location Map
Subsurface Boring Logs
Sieve Analysis Test Results
Swell-Consolidation Results

A.1 FIELD EXPLORATION

The subsurface conditions at the site were explored by drilling and sampling standard penetration test borings. The locations of the borings appear on Figure 2, preceding the Subsurface Boring Logs in this appendix.

A.2 SAMPLING METHODS

A.2.1 Split-Spoon Samples (SS) - Calibrated to N_{60} Values

Standard penetration (split-spoon) samples were collected in general accordance with ASTM: D1586 with one primary modification. The ASTM test method consists of driving a 2-inch O.D. split-barrel sampler into the in-situ soil with a 140-pound hammer dropped from a height of 30 inches. The sampler is driven a total of 18 inches into the soil. After an initial set of 6 inches, the number of hammer blows to drive the sampler the final 12 inches is known as the standard penetration resistance or N-value. Our method uses a modified hammer weight, which is determined by measuring the system energy using a Pile Driving Analyzer (PDA) and an instrumented rod.

In the past, standard penetration N-value tests were performed using a rope and cathead for the lift and drop system. The energy transferred to the split-spoon sampler was typically limited to about 60% of its potential energy due to the friction inherent in this system. This converted energy then provides what is known as an N_{60} blow count.

The most recent drill rigs incorporate an automatic hammer lift and drop system, which has higher energy efficiency and subsequently results in lower N-values than the traditional N_{60} values. By using the PDA energy measurement equipment, we are able to determine actual energy generated by the drop hammer. With the various hammer systems available, we have found highly variable energies ranging from 55% to over 100%. Therefore, the intent of AET's hammer calibrations is to vary the hammer weight such that hammer energies lie within about 60% to 65% of the theoretical energy of a 140-pound weight falling 30 inches. The current ASTM procedure acknowledges the wide variation in N-values, stating that N-values of 100% or more have been observed. Although we have not yet determined the statistical measurement uncertainty of our calibrated method to date, we can state that the accuracy deviation of the N-values using this method is significantly better than the standard ASTM Method.

A.2.2 Disturbed Samples (DS)/Spin-up Samples (SU)

Sample types described as "DS" or "SU" on the boring logs are disturbed samples, which are taken from the flights of the auger. Because the auger disturbs the samples, possible soil layering and contact depths should be considered approximate.

A.2.3 Sampling Limitations

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

Determining the thickness of "topsoil" layers is usually limited, due to variations in topsoil definition, sample recovery, and other factors. Visual-manual description often relies on color for determination, and transitioning changes can account for significant variation in thickness judgment. Accordingly, the topsoil thickness presented on the logs should not be the sole basis for calculating topsoil stripping depths and volumes. If more accurate information is needed relating to thickness and topsoil quality definition, alternate methods of sample retrieval and testing should be employed.

A.3 CLASSIFICATION METHODS

Soil descriptions shown on the boring logs are based on the Unified Soil Classification (USC) system. The USC system is described in ASTM: D2487 and D2488. Where laboratory classification tests (sieve analysis or Atterberg Limits) have been performed, accurate classifications per ASTM: D2487 are possible. Otherwise, soil descriptions shown on the boring logs are visual-manual judgments. Charts are attached which provide information on the USC system, the descriptive terminology, and the symbols used on the boring logs.

The boring logs include descriptions of apparent geology. The geologic depositional origin of each soil layer is interpreted primarily by observation of the soil samples, which can be limited. Observations of the surrounding topography, vegetation, and development can sometimes aid this judgment.

A.4 WATER LEVEL MEASUREMENTS

The ground water level measurements are shown at the bottom of the boring logs. The following information appears under "Water Level Measurements" on the logs:

- Date and Time of measurement
- Sampled Depth: lowest depth of soil sampling at the time of measurement
- Casing Depth: depth to bottom of casing or hollow-stem auger at time of measurement
- Cave-in Depth: depth at which measuring tape stops in the borehole
- Water Level: depth in the borehole where free water is encountered
- Drilling Fluid Level: same as Water Level, except that the liquid in the borehole is drilling fluid

The true location of the water table at the boring locations may be different than the water levels measured in the boreholes. This is possible because there are several factors that can affect the water level measurements in the borehole. Some of these factors include: permeability of each soil layer in profile, presence of perched water, amount of time between water level readings, presence of drilling fluid, weather conditions, and use of borehole casing.

A.5 LABORATORY TEST METHODS

A.5.1 Water Content Tests
Conducted per AET Procedure 01-LAB-010, which is performed in general accordance with ASTM: D2216 and AASHTO: T265.

A.5.2 Atterberg Limits Tests
Conducted per AET Procedure 01-LAB-030, which is performed in general accordance with ASTM: D4318 and AASHTO: T89, T90.

A.5.3 Sieve Analysis of Soils (thru #200 Sieve)
Conducted per AET Procedure 01-LAB-040, which is performed in general conformance with ASTM: D6913, Method A.

A.5.4 Particle Size Analysis of Soils (with hydrometer)
Conducted per AET Procedure 01-LAB-050, which is performed in general accordance with ASTM: D422 and AASHTO: T88.

A.5.5 Unconfined Compressive Strength of Cohesive Soil
Conducted per AET Procedure 01-LAB-080, which is performed in general accordance with ASTM: D2166 and AASHTO: T208.

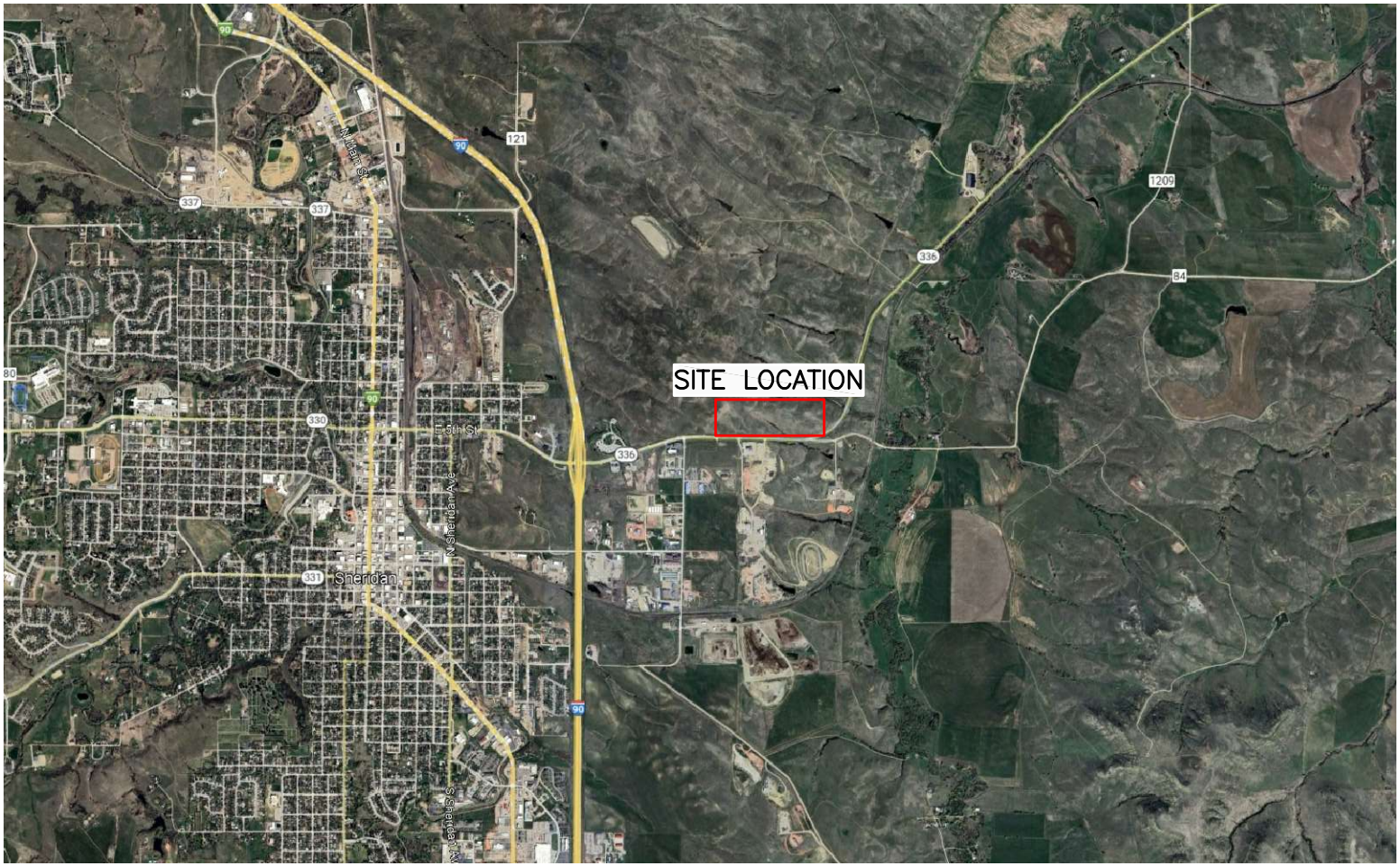
A.5.6 Laboratory Soil Resistivity using the Wenner Four-Electrode Method
Conducted per AET Procedure 01-LAB-090, which is performed using Soil Box apparatus in the laboratory in general accordance with ASTM: G57

A.6 TEST STANDARD LIMITATIONS

Field and laboratory testing is done in general conformance with the described procedures. Compliance with any other standards referenced within the specified standard is neither inferred nor implied.

A.7 SAMPLE STORAGE

Unless notified to do otherwise, we routinely retain representative samples of the soils recovered from the borings for a period of 30 days.

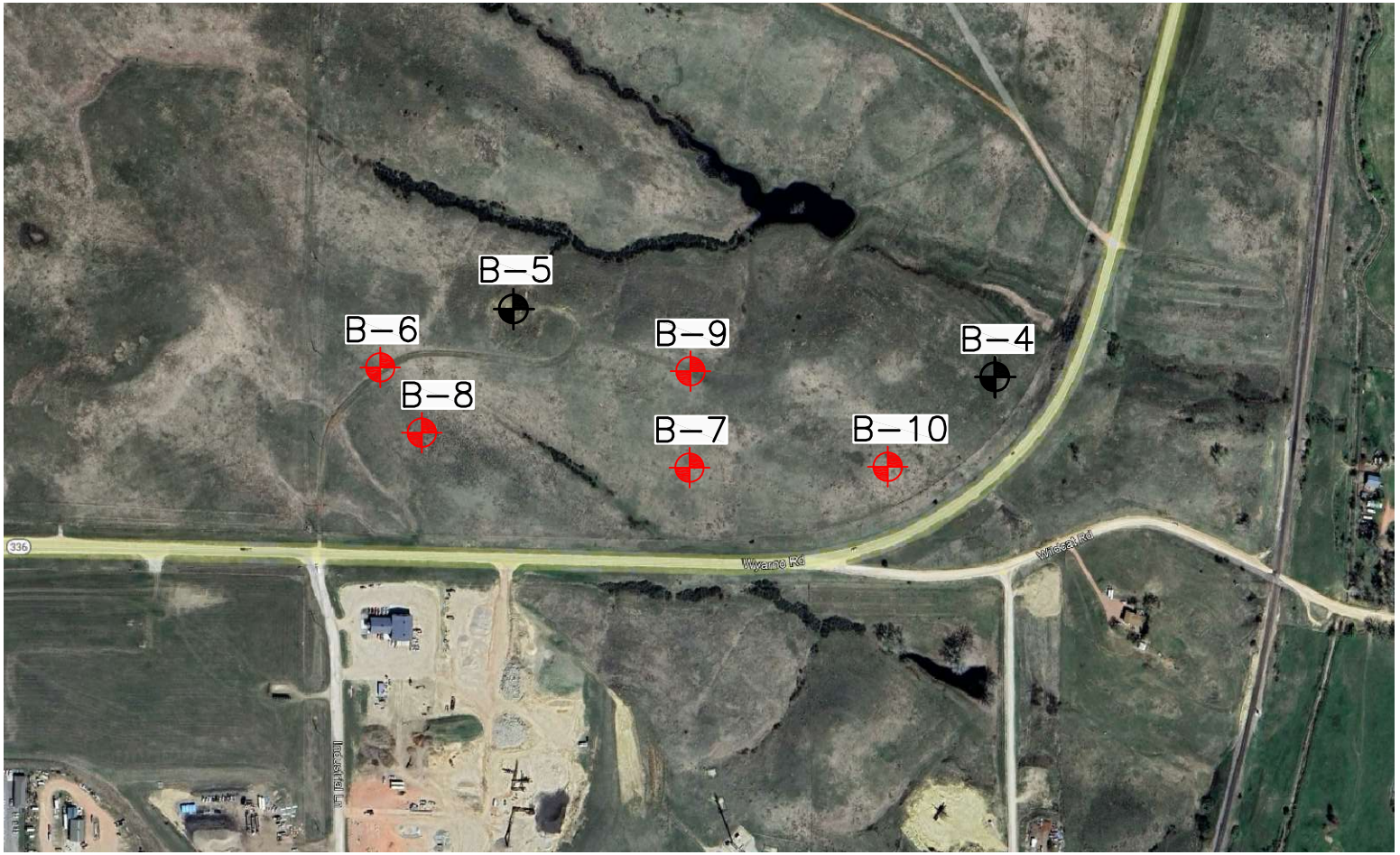


SCALE
(FEET)

0 4000

AMERICAN
ENGINEERING TESTING

PROJECT: STORY HOUSE VILLAGE PHASE I DEVELOPMENT– WYARNO ROAD SHERIDAN, WYOMING		PROJECT NO. P–0022564
SUBJECT: FIGURE 1: SITE LOCATION MAP		DATE: AUGUST 21, 2023
SCALE: 1 INCH = 4000 FEET	DRAWN BY: KK	REVIEWED BY: RT



SCALE (FEET)
0 600

BORINGS DRILLED 8/16/2023

BORINGS DRILLED 3/31/2022

AMERICAN ENGINEERING TESTING

PROJECT: STORY HOUSE VILLAGE PHASE I DEVELOPMENT, WYARNO ROAD SHERIDAN, WYOMING		PROJECT NO. P–0022564
SUBJECT: FIGURE 2: BORING LOCATION MAP		DATE: AUGUST 21, 2023
SCALE: 1 INCH = 600 FEET	DRAWN BY: KK	REVIEWED BY: RT

SUBSURFACE BORING LOG

AET No: **P-0010998** Log of Boring No. **B-4 (p. 1 of 1)**

Project: **Prairie Hills LLC; Wyarno Road - Sheridan, Wyoming**

DEPTH IN FEET	MATERIAL DESCRIPTION (Surface Elevation 3842.0)	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
0	TOPSOIL, cobbles & boulders present										
1	CLAYEY SAND, brown, loose (SC)		10	M	SS						
3	CLAYEY SAND, tan/gray, medium dense, blocky, trace gypsum (SC) (Weathered bedrock)		25	D/M	CAL		9		40	22	44.6
6			37	D/M	SS						
8	CLAYEY SAND, tan, very dense (SC)		50/0.3	M	CAL		6				
10	SILTY SAND, tan, very dense (SM)		54	M	SS		12		29	24	46.3
13			59	M	CAL						
15			82/0.9	M	SS						
20	POORLY-GRADED SAND with clay, brown, very dense (SP)		53	M	CAL		11				
	Bottom of Boring										

DEPTH:	DRILLING METHOD
21.5	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/31/22	**9:00**	**21.5**	**20.0**	**NA**	**NA**	**None**
4/8/22	**8:00**	**21.5**	**20.0**	**NA**	**NA**	**None**

BORING COMPLETED: **3/31/22**

DR: **JS** LG: **CC** Rig: **D-50**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0010998 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

SUBSURFACE BORING LOG

AET No: **P-0010998** Log of Boring No. **B-5 (p. 1 of 1)**

Project: **Prairie Hills LLC; Wyarno Road - Sheridan, Wyoming**

DEPTH IN FEET	Surface Elevation **3907.0** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
0	TOPSOIL										
1	CLAYEY SAND, brown, loose (SC)		5	M	SS						
3			9	M	CAL		8				
6			7	M	SS						
8			6	M	CAL						
10	Very dense at 10 feet		3	M	SS		15				16.8
13	CLAYEY SAND, brown, very dense (SC) (Weathered Bedrock)		86	M	CAL						
16			58	M	SS						
21			73	M	CAL		10				
	Bottom of Boring										

DEPTH:	DRILLING METHOD
21.5	**3.25" HSA**

BORING COMPLETED: **3/31/22**

DR: **JS** LG: **CC** Rig: **D-50**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
3/31/22	**10:45**	**21.5**	**20.0**	**NA**	**NA**	**None**
4/8/22	**8:00**	**21.5**	**20.0**	**NA**	**NA**	**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0010998 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

SUBSURFACE BORING LOG

AET No: **P-0022564** Log of Boring No. **B-6 (p. 1 of 1)**

Project: **Story House Village Phase I Development; Wyarno Road, Sheridan, Wyoming**

Surface Elevation **3922.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	**TOPSOIL** with cobblestones	TOPSOIL	7	M	SS	100					
2	**LEAN CLAY** with fine sand, trace organics, brown, firm (CL)	ALLUVIUM									
3			7	M	MC	100					
4											
5	**CLAYEY SAND**, brown and light grey, loose (SC)										
6			14	M	SS	100	14		44	21	
7	**LEAN CLAY** with gypsum, light grey and brown, stiff (CL)	WASATCH FORMATION									
8			58	M	MC	100					
9	**WEATHERED CLAYSTONE**, silty lean clay,										
10											
11	trace gypsum, greyish brown, hard (CL)		42	M	SS	100	11	109	35	19	
12											
13	with red oxidation, trace fine sand, grey		62	M	MC	100					
14											
15											
16			57	M	SS	100	10	117			
17											
18	**CLAYSTONE**, silty lean clay with red										
19	oxidation, grey, hard (CL)										
20											
21			50/.75	M	MC	75					
22											
23											
24											
25											
26	with gypsum		100	M	SS	100	12	113			
27											
28											
29											
30											
31	lense of coal, black		50/.5	M	MC	50					
32											
33											
34											
35											
36			50/.5	M	SS	75					
37											
38											
39											
40											
41	with fine sand, tan		50/.5	M	MC	50					
42											
43											
44											
45											
46	dark brown		50/.5		SS						
47											
48											
49											
50											
51	lense of coal, dark brown		50/.5	M	MC	25					
	Bottom of Boring										

DEPTH:	DRILLING METHOD
50.0	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/16/23	**10:50**	**51.5**	**50.0**	**NA**	**NA**	**None**
9/1/23		**51.5**	**50.0**	**NA**	**NA**	**None**

BORING COMPLETED: **8/16/23**

DR: **JS** LG: **CB** Rig: **99**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0022564 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

SUBSURFACE BORING LOG

AET No: **P-0022564** Log of Boring No. **B-7 (p. 1 of 1)**

Project: **Story House Village Phase I Development; Wyarno Road, Sheridan, Wyoming**

Surface Elevation **3890.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	**TOPSOIL** with cobblestones	TOPSOIL	7	M	SS	100	15		46	27	
2	**LEAN CLAY** with coarse sand, trace organics, dark brown, very stiff (CL)	ALLUVIUM									
3	with red oxidation, light brown		16	M	MC	100					
5	**SILTY SAND**, light tan, loose (SM)		9	M	SS	100	11	91			
8	**SILT**, light tan, stiff (ML)		11	M	MC	100					
10	**WEATHERED CLAYSTONE**, lean clay with trace fine sand, red oxidation, brown to dark brown, very stiff (CL)	WASATCH FORMATION	22	M	SS	100	17	101			
13			22	M	MC	100					
14	**COAL**, black, soft		6	M	SS	100					
17	**CLAYSTONE**, lean clay, dark grey, hard (CL)		50/.75	M	MC	80	14				
25	with red oxidation, grey		70	M	SS	100					
30			50/.5	M	MC	75					
35	light tan		50/.5	M	SS	30					
36	Bottom of Boring										

DEPTH: **35.0** DRILLING METHOD: **3.25" HSA**

BORING COMPLETED: **8/16/23**

DR: **JS** LG: **CB** Rig: **99**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/16/23	**13:55**	**36.5**	**35.0**	**NA**	**NA**	**None**
9/1/23		**36.5**	**35.0**	**NA**	**NA**	**None**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0022564 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

SUBSURFACE BORING LOG

AET No: **P-0022564** Log of Boring No. **B-8 (p. 1 of 1)**

Project: **Story House Village Phase I Development; Wyarno Road, Sheridan, Wyoming**

Surface Elevation **3920.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	TOPSOIL with cobblestones	TOPSOIL									
1	**SILTY LEAN CLAY** with trace gypsum, organics, light brown, stiff (CL)	ALLUVIUM	9	M	SS	100					
2	**SILTY SAND**, light brown, medium dense (SM)	WASATCH FORMATION									
3			25	M	MC	100	10	103			
4											
5	**WEATHERED CLAYSTONE**, silty lean clay with trace gypsum, light brown and reddish to greyish brown, very stiff (CL)										
6			22	M	SS	100					
7											
8	**WEATHERED CLAYSTONE**, lean clay with fine sand, light reddish brown, hard (CL)		63	M	MC	100	11	113	38	21	
9											
10											
11			36	M	SS	100					
	Bottom of Boring										

DEPTH:	DRILLING METHOD
10.0	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/16/23	**15:40**	**11.5**	**10.0**	**NA**	**NA**	**None**

BORING COMPLETED: **8/16/23**

DR: **JS** LG: **CB** Rig: **99**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0022564 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

SUBSURFACE BORING LOG

AET No: **P-0022564** Log of Boring No. **B-9 (p. 1 of 1)**

Project: **Story House Village Phase I Development; Wyarno Road, Sheridan, Wyoming**

Surface Elevation **3915.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	TOPSOIL with cobblestones	TOPSOIL									
1	**LEAN CLAY** with fine sand, trace gypsum, light brown, stiff (CL)	ALLUVIUM	12	M	SS	100					
2											
3			12	M	MC	100					
4											
5											
6			9	M	SS	100	12	104	44	23	
7	**WEATHERED CLAYSTONE**, silty lean clay with red oxidation, light greyish brown, very stiff (CL)	WASATCH FORMATION									
8			28	M	MC	100					
9											
10											
11			25	M	SS	100	14	113			41.1
	Bottom of Boring										

DEPTH:	DRILLING METHOD
10.0	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/16/23	**16:25**	**11.5**	**10.0**	**NA**	**NA**	**None**

BORING COMPLETED: **8/16/23**

DR: **JS** LG: **CB** Rig: **99**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0022564 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

SUBSURFACE BORING LOG

AET No: **P-0022564** Log of Boring No. **B-10 (p. 1 of 1)**

Project: **Story House Village Phase I Development; Wyarno Road, Sheridan, Wyoming**

Surface Elevation **3884.0**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
	TOPSOIL with cobblestones	TOPSOIL									
1	**LEAN CLAY** with trace fine sand, organics, brown to light brown, stiff to very stiff (CL)	ALLUVIUM	10	M	SS	100					
2											
3	trace gypsum		17	M	MC	100	12	108	34	18	
4											
5	**CLAYEY SAND**, light brown, loose to medium dense (SC)										
6			10	M	SS	100					
7											
8			26	M	MC	100	9		29	16	26.8
9											
10											
11			16	M	SS	100					
	Bottom of Boring										

DEPTH:	DRILLING METHOD
10.0	**3.25" HSA**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/16/23	**17:10**	**11.5**	**10.0**	**NA**	**NA**	**None**

BORING COMPLETED: **8/16/23**

DR: **JS** LG: **CB** Rig: **99**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0022564 LOGS.GPJ AET+CPT+WELL.GDT 9/11/23

American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-128494-S4

Client: Story House Management, LLC **CC:**

Project: Story House Village PI, Sheridan, WY
GEO-23

Sheridan WY
Job No: P-0022564

Draft Report - Subject to change pending final review

Date of Issue: 8/28/2023

Sample Details

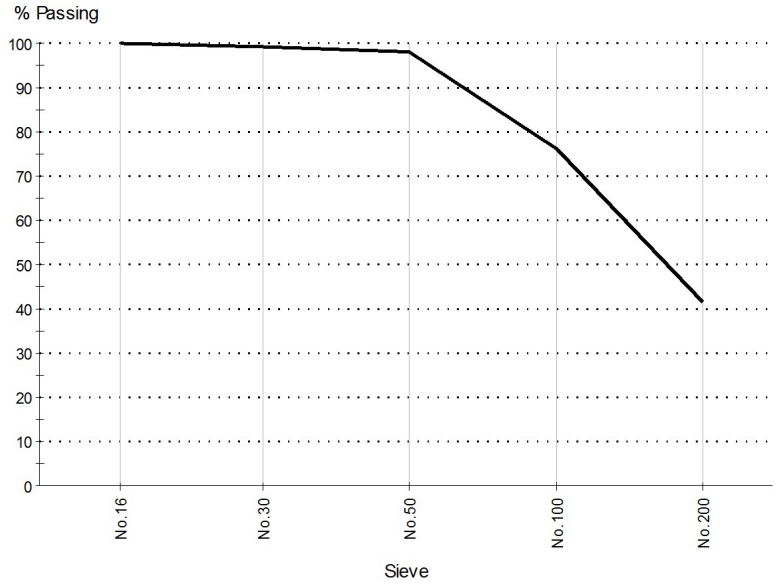
Sample ID	AET-128494-S4
Field Sample ID	
Date Sampled	8/16/2023
Source	
Material	Silty Sand
Specification	Gradation + Hydrometer
Sampling Method	
Location	Boring B-7 5'
Date Submitted	

Other Test Results

Description	Method	Result	Limits
Fineness Modulus	ASTM C 136, ASTM C 117	N/A	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Particle Size Distribution

ASTM C 136, ASTM C 117



Date Tested:
Tested By:

Sieve Size	% Passing	Limits
No.16	99.9	
No.30	99.1	
No.50	97.9	
No.100	76.0	
No.200	41.6	

Comments

N/A

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Sheridan, WY 82801
(607) 675-1862
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Material Test Report

Report No: MAT:AET-128494-S5

Client: Story House Management, LLC **CC:**

Project: Story House Village PI, Sheridan, WY
GEO-23

Sheridan WY

Job No: P-0022564

Draft Report - Subject to change pending final review

Date of Issue: 8/28/2023

Sample Details

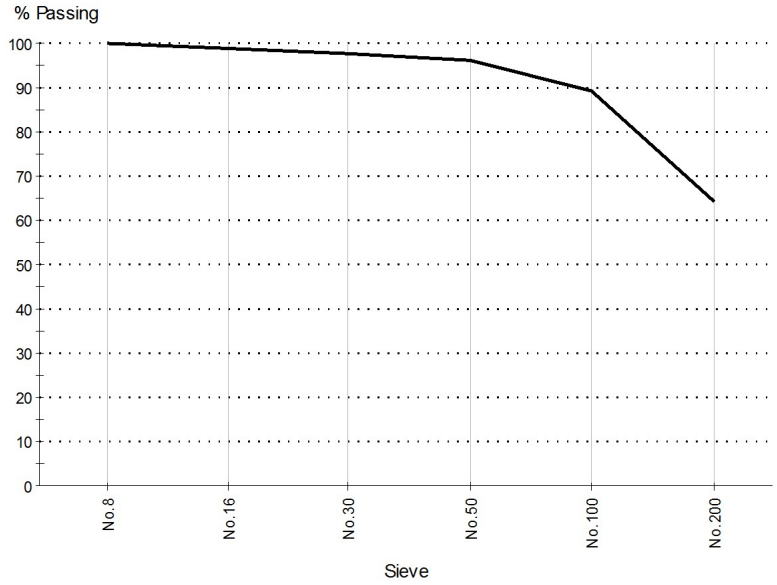
Sample ID	AET-128494-S5
Field Sample ID	B8 2.5'
Date Sampled	8/16/2023
Source	
Material	Sandy Clay
Specification	Gradation + Hydrometer
Sampling Method	
Location	Boring B-8 2.5'
Date Submitted	

Other Test Results

Description	Method	Result	Limits
Fineness Modulus	ASTM C 136, ASTM C 117	N/A	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Particle Size Distribution

ASTM C 136, ASTM C 117



Date Tested:
Tested By:

Sieve Size	% Passing	Limits
No.8	99.9	
No.16	98.9	
No.30	97.6	
No.50	96.0	
No.100	89.4	
No.200	64.1	

Comments

N/A

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72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Material Test Report

Report No: MAT:AET-128494-S6

Client: Story House Management, LLC **CC:**

Project: Story House Village PI, Sheridan, WY
GEO-23

Sheridan WY

Job No: P-0022564

Draft Report - Subject to change pending final review

Date of Issue: 8/28/2023

Sample Details

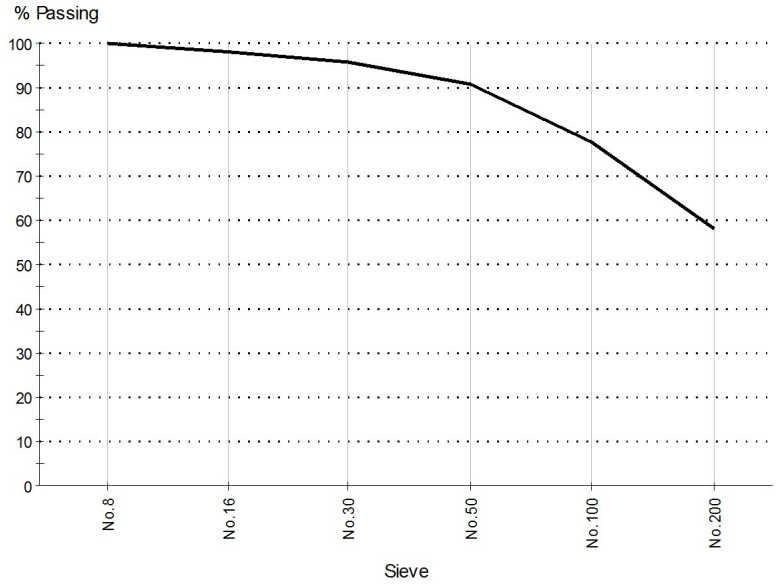
Sample ID	AET-128494-S6
Field Sample ID	
Date Sampled	8/16/2023
Source	
Material	Sandy Clay
Specification	Gradation + Hydrometer
Sampling Method	
Location	Boring B-8 7.5'
Date Submitted	

Other Test Results

Description	Method	Result	Limits
Fineness Modulus	ASTM C 136, ASTM C 117	N/A	
Curvature Coefficient		N/A	
Uniformity Coefficient		N/A	

Particle Size Distribution

ASTM C 136, ASTM C 117



Date Tested:
Tested By:

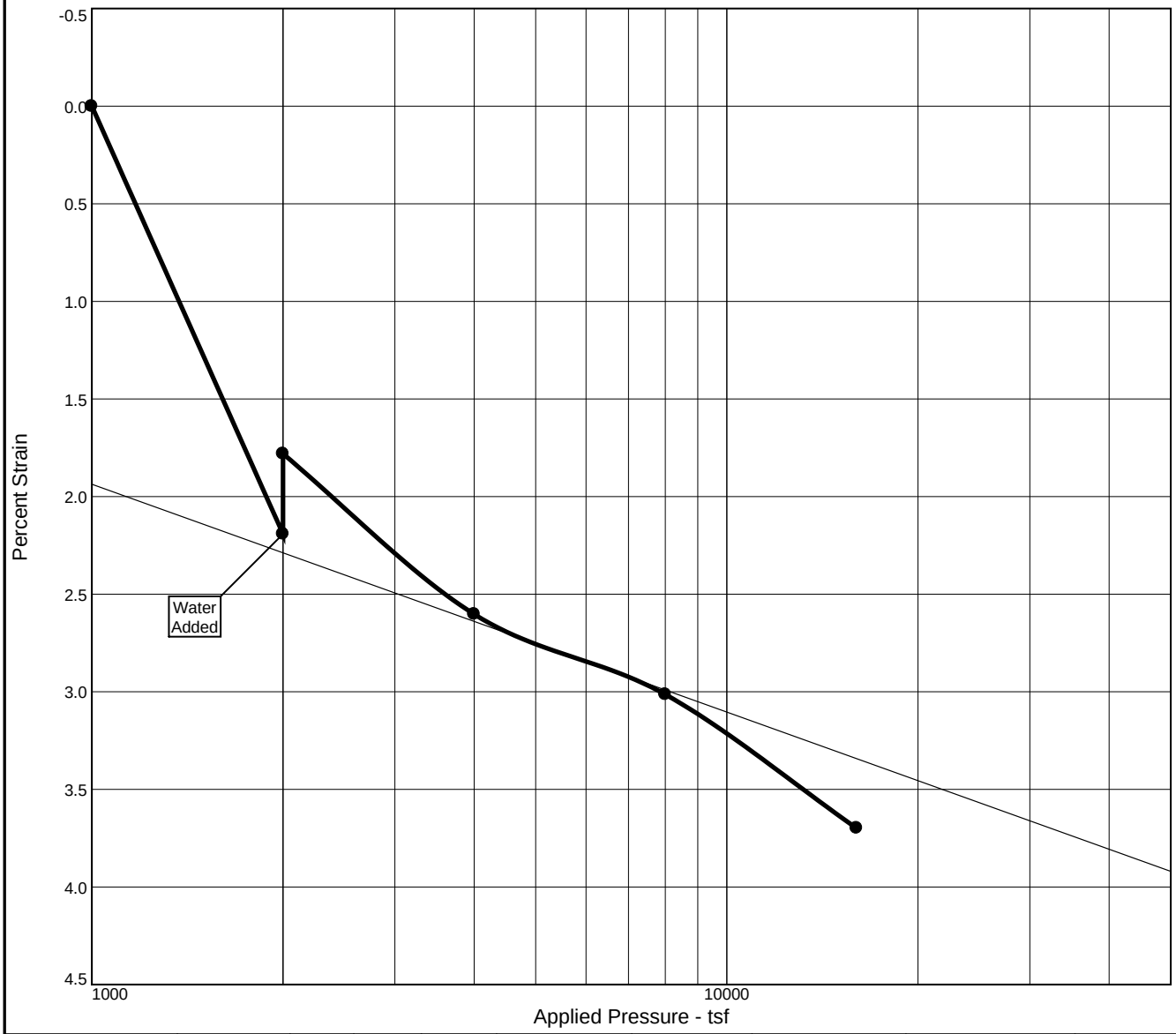
Sieve Size	% Passing	Limits
No.8	99.9	
No.16	98.2	
No.30	95.8	
No.50	90.9	
No.100	77.8	
No.200	58.1	

Comments

N/A

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CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	e_o	Swell Press. (tsf)	Swell %	C_r
90.9 %	17.0 %	105.6			2.65	1000	0.496	2771.5	0.4	

MATERIAL DESCRIPTION	USCS	AASHTO
LEAN CLAY, TRACE FINE SAND, RED OXIDATION		

Project No. P-0022564 **Client:** WWC ENGINEERING

Project: Story House Village Phase I Development

Location: B7 **Depth:** 10 **Sample Number:** 5

Remarks:
SPLIT SPOON

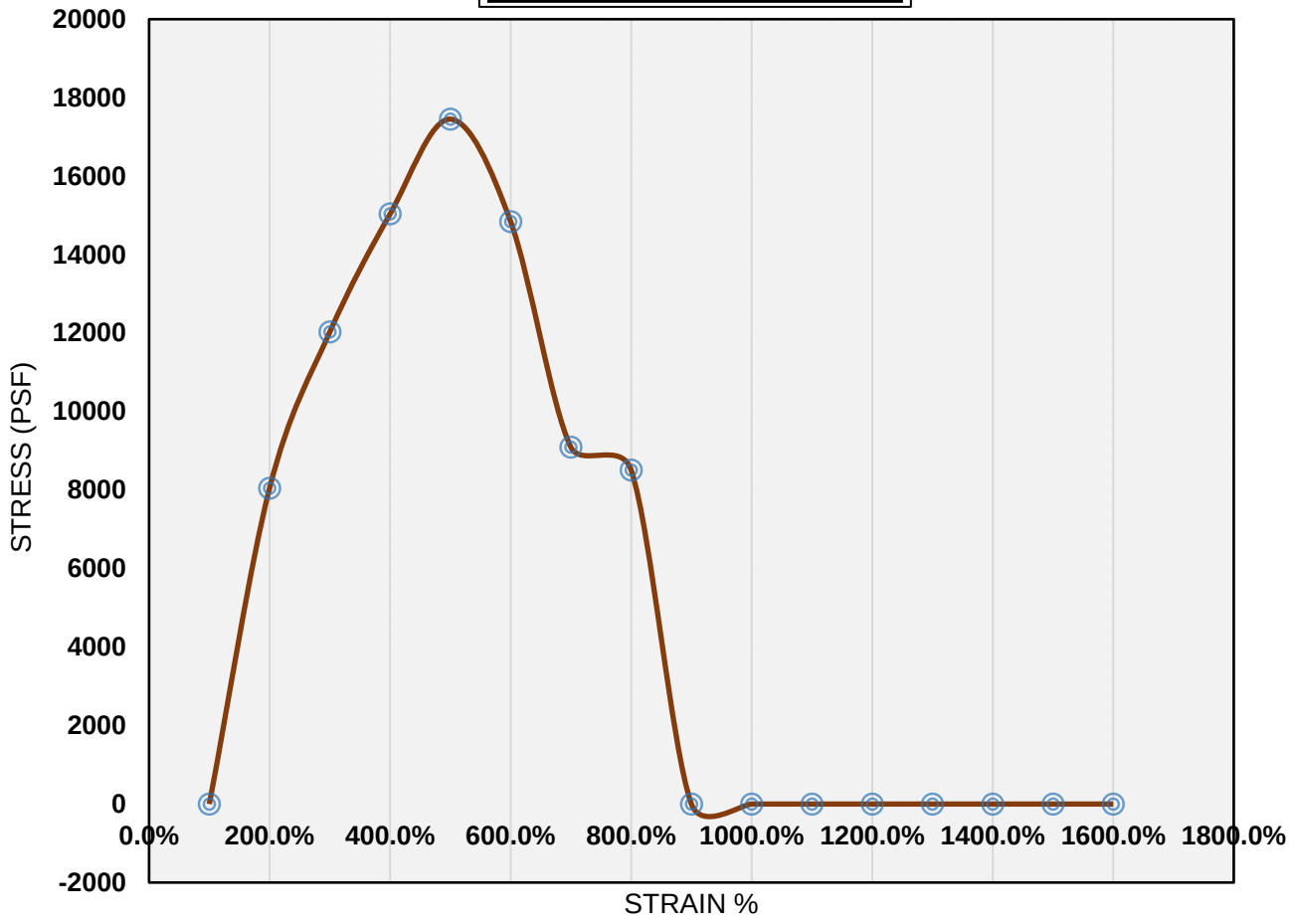
American Engineering Testing, Inc.

Gillette, WY

Figure

Tested By: EC

Stress vs. Strain



Test Results

Boring	Depth	L/D Ratio	Stress At Failure (psf)	Strain At Failure	Strain Rate (in/min)	Strain Rate (%/min)
B6	15'	1.72	17452	8.15%	0.04892	2.04%

Date Sampled	Sample Type	Dry Density (pcf)	Wet Density (pcf)	% Moisture	N Value
8/16/2023	Other	130.1	114.9	13.2%	NA

Sample Description Claystone- Silty Lean Clay (CL)

Notes/Remarks: SPLIT SPOON

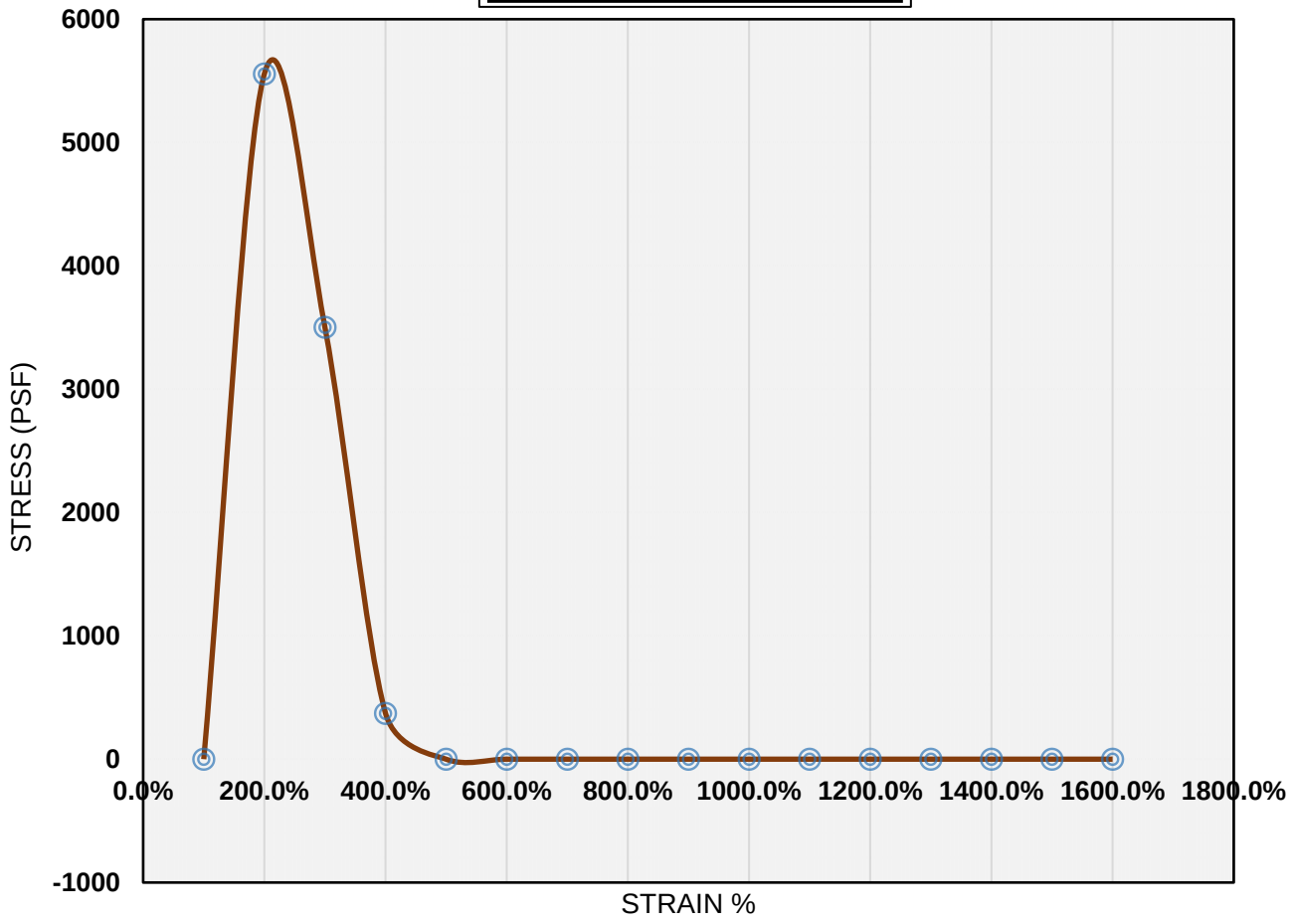
Project Information

Project:	Story House Village Phase I	**Job Number:**	P-0022564
Location:	Wyarno Road, Sheridan, WY	**Date Tested:**	8/22/2023

AMERICAN ENGINEERING TESTING

UNCONFINED COMPRESSION TEST RESULTS
(ASTM D2166)

Stress vs. Strain



Test Results

Boring	Depth	L/D Ratio	Stress At Failure (psf)	Strain At Failure	Strain Rate (in/min)	Strain Rate (%/min)
B7	20'	1.72	5556	1.48%	0.04892	1.48%

Date Sampled	Sample Type	Dry Density (pcf)	Wet Density (pcf)	% Moisture	N Value
8/16/2023	California Tube	128.8	110.2	16.8%	NA

Sample Description Claystone- Lean Clay (CL)

Notes/Remarks: SAMPLE HAD CRACKS PRESENT WHEN EXTRACTED FROM TUBE AND PRIOR TO TESTING

Project Information

Project:	Story House Village Phase I	**Job Number:**	P-0022564
Location:	Wyarno Road, Sheridan, WY	**Date Tested:**	8/22/2023

AMERICAN ENGINEERING TESTING

UNCONFINED COMPRESSION TEST RESULTS

(ASTM D2166)

American Engineering Testing, Inc.
Sheridan
72 E Ridge Rd Unit D
Sheridan, WY 82801
(607) 675-1862
www.teamAET.com

Proctor Report

Report No: PTR:AET-128494-S1

Client: Story House Management, LLC **CC:**

Project: Story House Village PI, Sheridan, WY
GEO-23

Sheridan WY

Job No: P-0022564

Draft Report - Subject to change pending final review

Date of Issue: 8/28/2023

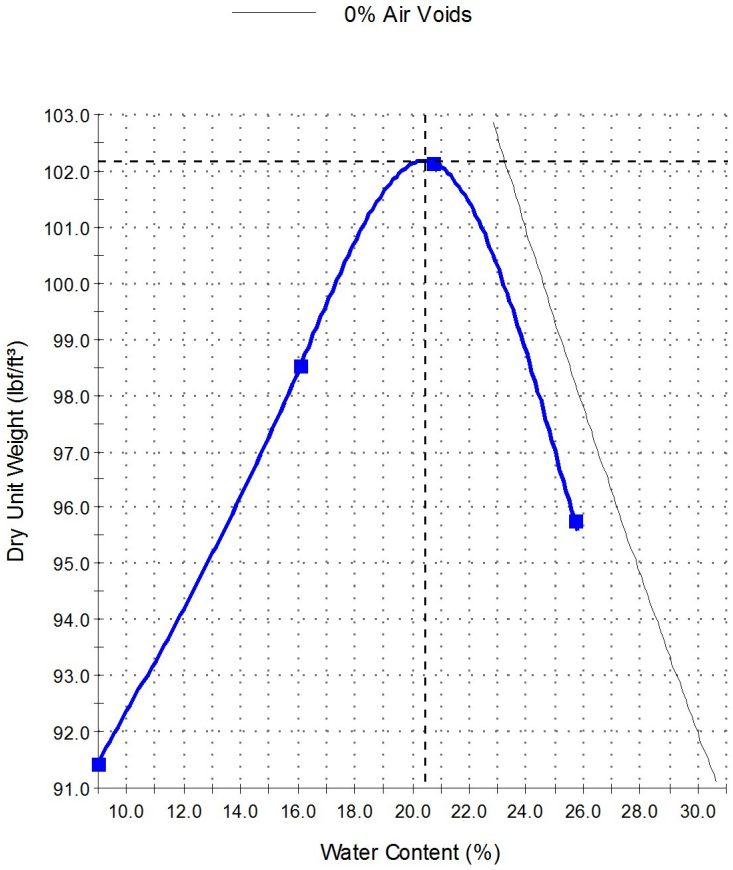
Sample Details

Sample ID: AET-128494-S1 **Field ID:** B6 BULK

Date Sampled: 8/16/2023

Location:

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 698

Maximum Dry Unit Weight (lbf/ft³):	**102.2**
Optimum Water Content (%):	**20.4**
Method:	A
Preparation Method:	Moist
Specific Gravity (Fines):	2.65
Specific Gravity Method:	ASSUMED
Retained Sieve No 4 (4.75mm) (%):	0
Passing Sieve No 4 (4.75mm) (%):	100
Tested By:	
Date Tested:	

Comments

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Proctor Report

Report No: PTR:AET-128494-S2

Client: Story House Management, LLC **CC:**

Project: Story House Village PI, Sheridan,WY
GEO-23

Sheridan WY

Job No: P-0022564

Draft Report - Subject to change pending final review

Date of Issue: 8/28/2023

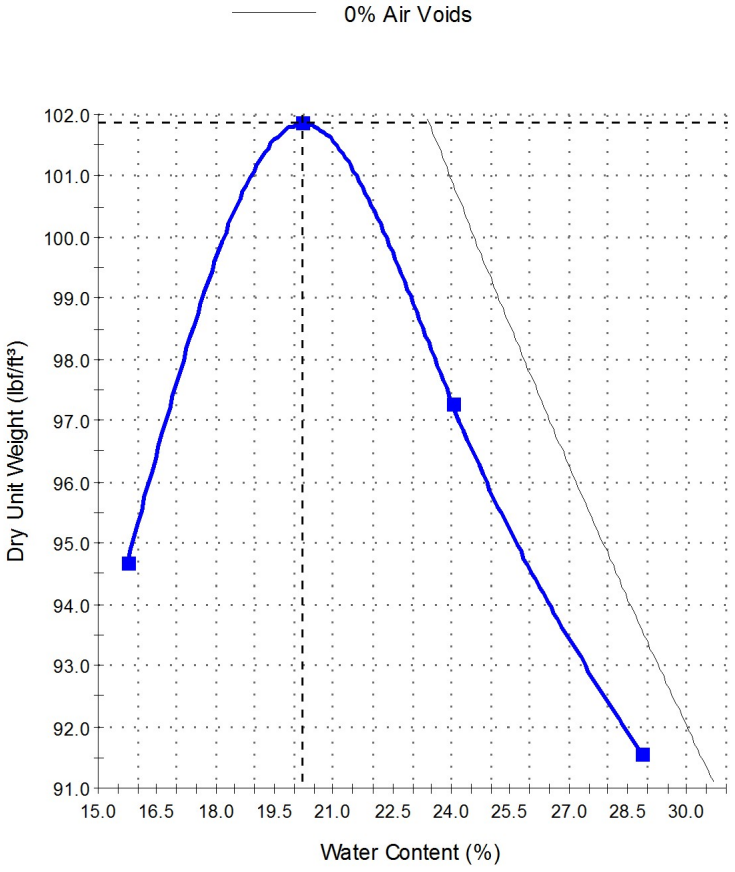
Sample Details

Sample ID: AET-128494-S2 **Field ID:** B9 BULK

Date Sampled: 8/16/2023

Location:

Dry Unit Weight - Water Content Relationship



Test Results

ASTM D 698

Maximum Dry Unit Weight (lbf/ft³):	**101.9**
Optimum Water Content (%):	**20.2**
Method:	A
Preparation Method:	Moist
Specific Gravity (Fines):	2.65
Specific Gravity Method:	ASSUMED
Retained Sieve No 4 (4.75mm) (%):	1
Passing Sieve No 4 (4.75mm) (%):	99
Tested By:	
Date Tested:	

Comments

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Sheridan
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Sheridan, WY 82801
(607) 675-1862
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Proctor Report

Report No: PTR:AET-128494-S3

Client: Story House Management, LLC **CC:**

Project: Story House Village PI, Sheridan, WY
GEO-23

Sheridan WY

Job No: P-0022564

Draft Report - Subject to change pending final review

Date of Issue: 8/28/2023

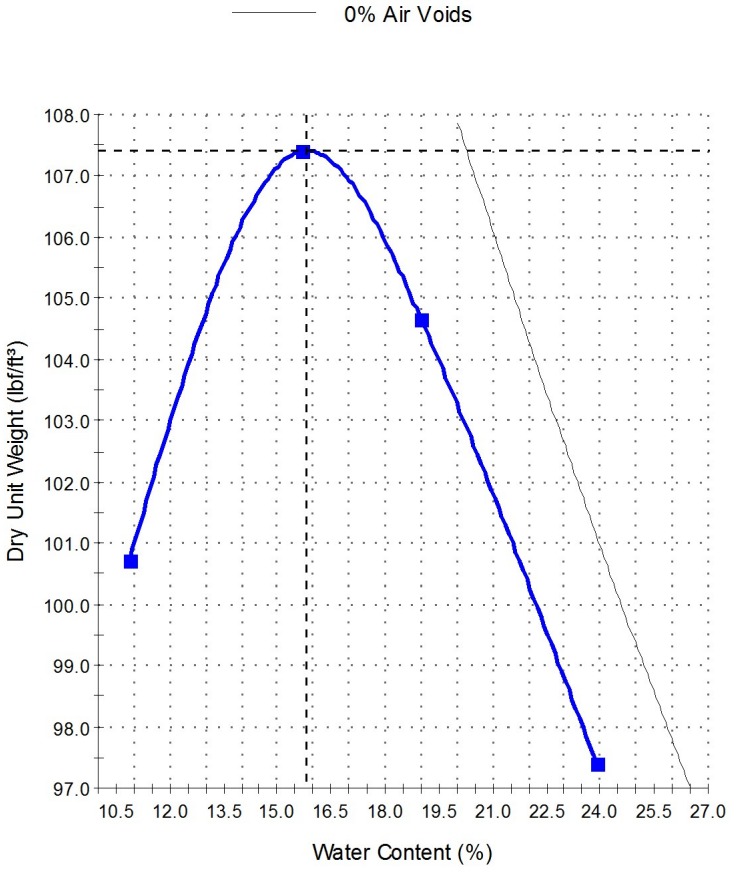
Sample Details

Sample ID: AET-128494-S3 **Field ID:** B10 BULK

Date Sampled: 8/16/2023

Location:

Dry Unit Weight - Water Content Relationship



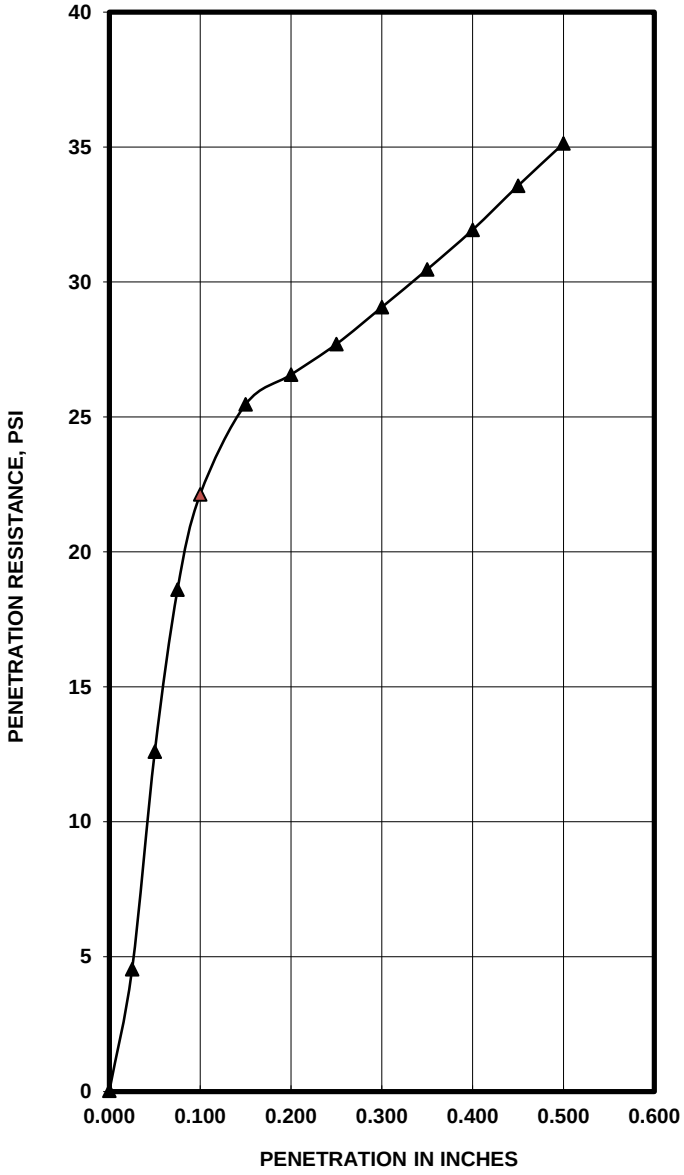
Test Results

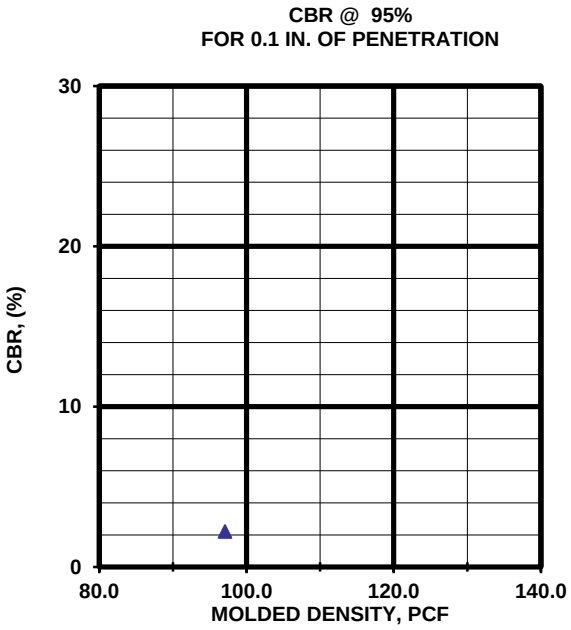
ASTM D 698

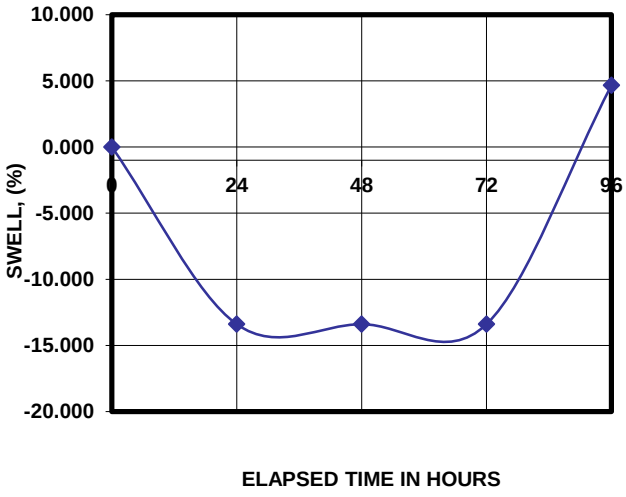
Maximum Dry Unit Weight (lbf/ft³):	**107.4**
Optimum Water Content (%):	**15.8**
Method:	A
Preparation Method:	Moist
Specific Gravity (Fines):	2.65
Specific Gravity Method:	ASSUMED
Retained Sieve No 4 (4.75mm) (%):	0
Passing Sieve No 4 (4.75mm) (%):	100
Tested By:	
Date Tested:	

Comments

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MOLDED			SOAKED			CBR	(%)	PEN.	SWELL
DENS.	% MAX	% MOIST.	DENS.	% MAX	% MOIST.	0.1 IN.	0.2 IN.	SURCHG	%
97.1	95.3	20.4	92.6	90.8	28.5	2.2	1.8	10	4.663

MATERIAL DESCRIPTION	USCS	MAX. DEN.	OPT. MOIST.	LL	PI
0	0	101.9	20.2	28	18

PROJECT #: P-0022564 **Boring No.** B9 Bulk

PROJECT: Story House Village PI

DATE: 8/30/2023

Test Descr. / Remarks

CBR PER ASTM D1883

PROCTOR PER ASTM D698

AMERICAN ENGINEERING TESTING

BEARING RATIO TEST REPORT

Appendix B

Geotechnical Report Limitations and Guidelines for Use

Appendix B
Geotechnical Report Limitations and Guidelines for Use
AET Project No. P-0022564

B.1 REFERENCE

This appendix provides information to help you manage your risks relating to subsurface problems which are caused by construction delays, cost overruns, claims, and disputes. This information was developed and provided by GBA[1], of which, we are a member firm.

B.2 RISK MANAGEMENT INFORMATION

B.2.1 Understand the Geotechnical Engineering Services Provided for this Report

Geotechnical engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical engineering services is typically a geotechnical engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

B.2.2 Geotechnical Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared solely for the client.

Likewise, geotechnical engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. If you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

1 Geoprofessional Business Association, 1300 Piccard Drive, LL14, Rockville, MD 20850
Telephone: 301/565-2733: www.geoprofessional.org, 2019

B.2.3 Read the Full Report

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. Read and refer to the report in full.

B.2.4 You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, always inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

B.2.5 Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

B.2.6 This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations only after observing actual subsurface conditions exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.

B.2.7 This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

B.2.8 Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical engineering report, along with any attachments or appendices, with your contract documents, but be certain to note conspicuously that you've included the material for information purposes only. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, only from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and be sure to allow enough time to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

B.2.9 Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials

with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

B.2.10 Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical engineering study. For that reason, a geotechnical engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated subsurface environmental problems have led to project failures. If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

B.2.11 Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. Geotechnical engineers are not building-envelope or mold specialists.

Story House

Traffic Impact Study

WWC Engineering

Sheridan, Wyoming

October 6, 2023

Prepared By:



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Story House

Traffic Impact Study

1.0 Introduction

The Story House project is a mixed use development that is planned east of I-90 on the north side of Wyarno Road (Wyoming 336). Figure 1 shows the location of the Story House project and a general layout is contained in Figure 2. The development is proposed in three phases as shown in Figure 2. For Phase I, the primary access will be through the west access that aligns with Industrial Lane. The internal street network will be developed in Phase II so that there will be two accesses to the development. The laneage and traffic control at the existing intersections is contained in Figure 3.

This study was completed based on WYDOT and the City of Sheridan requirements for traffic impact studies[1,2].

2.0 Study Assumptions

The following assumptions were utilized for this study.

Short-Term Horizons. The study assumes the following development horizons. Refer to Figure 2 for the portions of the development that are included in each phase.

- Phase I – Year 2026
- Phase II – Year 2031
- Phase III – Year 2034

Long-Term Horizon. The long-term horizon will be Year 2043 because it is 20 years in the future.

Growth in Background Traffic. An annual growth rate of 0.6% was calculated using Sheridan County population estimates that are contained in the Sheridan County Comprehensive Plan[3]. Through volumes on Wyarno Road and the volumes associated with Industrial Lane were inflated for each of the volume scenarios.

Saturation Flow Rate. The saturation flow rate was assumed to be 1,600 passenger cars / hour / lane recognizing Wyoming motorists' driving habits and data collected in Cheyenne during the Yellowstone Road corridor signal timing project.

1 Access Manual, 2014 Edition. Wyoming Department of Transportation, Traffic Program. January 6, 2014.

2 Public Infrastructure Standards. City of Sheridan Public works Department. 2017 Edition.

3 Sheridan County Comprehensive Plan. Sheridan County. Adopted February 4, 2020.

Peak Hour Factor (PHF). The PHF for the existing intersections was based on the data collected for the study. At the site accesses, the PHF was assumed to be 0.85 for all movements.

Truck Percentage. Vehicle classification data were collected with the turning movement count data and are summarized in Appendix A. Little, or no truck traffic was observed for most of the movements at the study area intersections, so the truck percentage was assumed to be 2% for these movements. Movements with higher truck percentages are highlighted in the tables. Those percentages were used in the analysis. Two percent trucks were assumed for all new movements associated with the development.

3.0 Existing Traffic Conditions

3.1 Traffic Counts

Turning movement count data were collected by WWC Engineering on average weekdays in July 2023. A summary of the data is included in Appendix A, and the existing peak hour volumes are contained in Figures 4 and 5. Existing and future daily volumes are summarized in Table 1.

3.2 Existing Peak Hour Level of Service

To evaluate the performance of the intersections within the study area, the level of service (LOS) was calculated using PTV VISTRO software. This software package utilizes criteria described in the Highway Capacity Manual[4]. LOS is a measure used to describe operational conditions at an intersection. LOS categories ranging from A to F are assigned based on the predicted delay in seconds per vehicle for the intersection as a whole, as well as for individual turning movements. LOS A indicates very good operations, and LOS F indicates poor, congested operations. Based on WYDOT standards, acceptable intersection operation is LOS C or better.

The results of the analysis are summarized in the following table. The analysis shows that the existing study area intersections are operating at acceptable levels of service. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value. Detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix B.

Year 2023 Traffic Volumes

Intersection	Control	Peak Hour	
		AM	PM
1 - Wyarno Road / Industrial Lane / West Site Access	Side-Street Stop	B	A
2 - Wyarno Road / Wildcat Road	Side-Street Stop	A	A

[4] Highway Capacity Manual, 7th Edition. National Academy of Sciences, Engineering, and Medicine. 2022.

3.3 Crash Data

The most recent three years of crash data were requested from WYDOT for the study area intersections and for the sweeping curve along the frontage of the development. The data shows that there was one property damage only crash reported at the Industrial Lane intersection, and no crashes reported at the Wildcat Road intersection. Based on a conversation with Melinda Harmon at WYDOT, the sweeping curve along the frontage of the development begins at approximately MP 2. A review of the crash data shows that there were no crashes reported along the curve. The crash data are contained in Appendix C.

4.0 Trip Generation

In order to estimate the traffic impacts associated with this development, the amount of traffic generated by the project was calculated using trip generation rates contained in the Institute of Transportation Engineers Trip Generation manual[5]. The trip generation for the three phases of development is contained in Tables 3 through 5.

5.0 Trip Distribution and Assignment

The trips that are expected to be generated by the Story House development were distributed based on the existing traffic patterns in the vicinity of the site. These trips were then assigned to the network based on the trip distribution. The trip distribution is contained in Figure 6 and the trip assignment is contained in Figures 7 through 12.

6.0 Year 2026 Traffic Conditions

Phase I as shown in Figure 2 is expected to be completed in Year 2026. Background traffic volumes contained in Figures 13 and 14 were developed by inflating the existing traffic volumes by the annual growth rate that is discussed in Section 2.0. The total traffic volume scenarios were developed by adding the peak hour trip assignment to the background volumes (see Figures 15 and 16).

The results of the analysis of the background and total traffic volume scenarios are summarized in the following table. The analysis shows that both of the intersections are expected to operate at acceptable levels of service. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value. The laneage and traffic control that were assumed for the analysis are contained in Figure 17.

[5] Trip Generation, 11th Edition. Institute of Transportation Engineers. September 2021.

Year 2026 Traffic Conditions

Intersection	Control	Background		Total	
		AM	PM	AM	PM
1 - Wyarno Road / Industrial Lane / West Site Access	Side-Street Stop	A	A	C	C
2 - Wyarno Road / Wildcat Road	Side-Street Stop	A	A	A	A

Detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix B.

7.0 Year 2031 Traffic Conditions

Phase II is expected to be completed in Year 2031. The volume scenarios for this horizon were completed in the same manner as the Year 2026 traffic volume scenarios (see Section 6.0). The background traffic volume scenarios are contained in Figures 18 and 19, and the total traffic volume scenarios are contained in Figures 20 and 21.

The results of the analysis of the background and total traffic volume scenarios are summarized in the following table. The analysis shows that the intersections are expected to operate at acceptable levels of service except for the Industrial Lane intersection in the total traffic volume scenarios. That intersection is expected to operate at LOS F during the morning and evening peak hours. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value.

Year 2031 Traffic Conditions

Intersection	Control	Background		Total	
		AM	PM	AM	PM
1 - Wyarno Road / Industrial Lane / West Site Access	Side-Street Stop	C	C	F	F
2 - Wyarno Road / Wildcat Road	Side-Street Stop	A	A	B	B
3 - Wyarno Road / East Access	Side-Street Stop	---		B	B

The detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix B. The laneage and traffic control assumed in the analysis are contained in Figure 22.

8.0 Year 2034 Traffic Conditions

Phase III is expected to be completed in Year 2034. The volume scenarios for this horizon were completed in the same manner as the Year 2026 traffic volume scenarios (see Section 6.0). The background traffic volume scenarios are contained in Figures 23 and 24, and the total traffic volume scenarios are contained in Figures 25 and 26.

The results of the analysis of the background and total traffic volume scenarios are summarized in the following table. The analysis shows that the Industrial Lane intersection is expected to operate at LOS F during both peak hours in the background and total traffic volume scenarios. The other intersections are expected to operate at LOS B. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value. It isn't unusual for stop controlled approaches on arterial streets to operate poorly.

2034 Traffic Conditions

Intersection	Control	Background		Total	
		AM	PM	AM	PM
1 - Wyarno Road / Industrial Lane / West Site Access	Side-Street Stop	F	F	F	F
2 - Wyarno Road / Wildcat Road	Side-Street Stop	B	B	B	B
3 - Wyarno Road / East Access	Side-Street Stop	B	B	B	B

The detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix B. The laneage and traffic control assumed in the analysis are contained in Figure 22.

9.0 Year 2043 Traffic Conditions

Traffic volume scenarios for the long-term horizon were completed in the same manner as the Year 2026 traffic volume scenarios (see Section 6.0). The background traffic volume scenarios are contained in Figures 27 and 28, and the total traffic volume scenarios are contained in Figures 29 and 30.

The results of the analysis of the background and total traffic volume scenarios are summarized in the following table. The analysis shows that the Industrial Lane intersection is expected to operate at LOS F during both peak hours in the total traffic volume scenarios. The other intersections are expected to operate at LOS A and LOS B. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value. It isn't unusual for stop controlled approaches on arterial streets to operate poorly.

2043 Traffic Conditions

Intersection	Control	Background		Total	
		AM	PM	AM	PM
1 - Wyarno Road / Industrial Lane / West Site Access	Side-Street Stop	B	A	F	F
2 - Wyarno Road / Wildcat Road	Side-Street Stop	A	A	B	B
3 - Wyarno Road / East Access	Side-Street Stop	---		B	B

The detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix B. The laneage and traffic control assumed in the analysis are contained in Figure 22.

10.0 Auxiliary Lane Analysis

The need for left and right turn deceleration lanes on Wyarno Road was determined based on criteria contained in Chapter 18 of the WYDOT Traffic Studies Manual[6]. Figure 9-36 from A Policy on Geometric Design of Highways and Streets[7] was used to determine the need for left turn deceleration lanes. As shown in Table 6, an eastbound left turn lane will be warranted by development traffic at Industrial Lane and the east access. At Industrial Lane, the traffic from Phase I will warrant the left turn lane. At the east access, the traffic from Phase II will warrant the left turn lane. To review the need for right turn lanes, Figure 18-1 from the WYDOT Traffic Studies Manual was used. Figures 31, 32, and 33 contain a review of the need for right turn lanes. An eastbound right turn lane is currently warranted at Industrial Lane (see Figure 31). Westbound right turn lanes will not be warranted at either access (see Figures 32 and 33).

11.0 Traffic Signal Warrant Study

A traffic signal warrant study was performed to determine if a traffic signal will be warranted at Wyarno Road / Industrial Lane. The study was performed based on the requirements contained in the Manual on Uniform Traffic Control Devices[8]. The peak hour warrants were evaluated.

The following assumptions were used for the analysis.

Speed Limit. The posted speed limit is greater than 40 MPH on Wyarno Road.

Number of Main-Street Lanes. One lane was assumed in each direction on Wyarno Road.

Number of Side-Street Lanes. One side-street lane was assumed on the Industrial Lane approaches.

Side-Street Right Turning Traffic. 50% of the side-street right turning traffic was included in the warrant analysis because some vehicles will be able to turn into gaps in traffic without the aid of a traffic signal.

The analysis shows that a traffic signal is not expected to be warranted by the Year 2043 total traffic volumes. The signal warrant analysis is contained in Appendix D. Refer to the fourth page of the warrant analysis to see the results.

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6 WYDOT Traffic Studies Manual. Wyoming Department of Transportation. March 2011.

7 A Policy on Geometric Design of Highways and Streets, 7th Edition. American Association of Highways and Streets. 2018.

8 Manual on Uniform Traffic Control Devices. Federal Highway Administration. Revised July 2022.

12.0 Speed Study on Wyarno Road

A speed study was performed on Wyarno Road east of Industrial Lane based on the requirements in Chapter 13 of the WYDOT Traffic Studies Manual. The roadway has posted speed limits of 40 MPH west of Ridge Road and 70 MPH east of Ridge Road. A large radius curve along the frontage of the development has an advisory speed of 50 MPH. Figure 34 summarizes the data collection and the existing speed limits.

Speed data were collected at three locations along the roadway using Jamar radar data collection devices. The data collection locations and results of the data analysis are summarized in the following table. A summary of the speed data is contained in Appendix E.

Location	Data Collection		
	Days	Observations	
		EB	WB
E/O Industrial Lane	10	4,060	4,564
W/O Wildcat Road	2	511	543
E/O Large Radius Curve	2	440	417

While the data were collected with a machine rather than a visual study using a radar gun to only collect the speed of free flowing traffic, the traffic volumes on Wyarno Road are low enough that the majority of the data were collected on vehicles that were free flowing.

The 85th percentile speeds show that speeds are lower near Industrial Lane compared to the data collection locations to the east. The data were processed using the WYDOT Form RT-11 spreadsheet. All of the 85th percentile speeds and recommended speed limits are lower than the 70 MPH speed limit. Considering that the speed limit changes from 70 MPH to 40 MPH at Ridge Road and the 85th percentile speeds and recommended speeds are all lower than 70 MPH, STS recommends that the speed limit be lowered to 60 MPH east of Ridge Road. With the recommended change, the speed change will only be 20 MPH rather than 30 MPH and it will be in line with the 85th percentile speeds and recommended speeds. WYDOT will need to collect additional speed data farther east on Wyarno Road to determine the appropriate speed limit in the foothills.

13.0 Conclusions and Recommendations

The following conclusions were drawn based on the analysis performed for the study.

Intersection Operation.

- **Wyarno Road / Industrial Lane / Site Access.** This intersection is currently operating at LOS A and LOS B. Following the development of Phase I, it is

expected to operate at LOS C. The operation of the intersection is expected to degrade to LOS F following the completion of Phase II. This intersection is assumed to have side-street stop control because it is not expected to warrant signalization. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value. It isn't unusual for stop controlled approaches on arterial streets to operate poorly.

- **Wyarno Road / Wildcat Road.** This intersection is currently operating at LOS A. The operation of the intersection is expected to transition to LOS B as traffic volumes grow on Wyarno Road.
- **Wyarno Road / East Access.** This intersection is expected to operate at LOS B through the Year 2043 total traffic volume scenarios.

Auxiliary Lane Analysis. The need for auxiliary lanes was reviewed based on criteria contained in Chapter 18 of the WYDOT Traffic Studies Manual. An eastbound left turn lane will be warranted at Industrial Lane and the east access by the development of the Story House project. A right turn lane is currently warranted for eastbound Wyarno Road at Industrial Lane.

Traffic Signal Warrant Study. A traffic signal is not expected to be warranted at Wyarno Road / Industrial Lane through the Year 2043 total traffic volume scenarios.

Speed Study on Wyarno Road. Spot speed data were collected at three locations on Wyarno Road for the purpose of reviewing the 70 MPH speed limit east of Ridge Road. The 85th percentile speeds ranged from 56 MPH to 66 MPH and the recommended speed limits ranged from 55 MPH to 65 MPH. STS recommends that WYDOT lower the speed limit to 60 MPH east of Ridge Road.

Tables

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Table 4 – Trip Generation Estimate – Phase I + II
Table 5 – Trip Generation Estimate – Phase I + II + III
Table 6 – Need for Left Turn Lanes on Wyarno Road

This table is formatted to be printed on 11" x 17" paper.

Table 1. Estimated Daily Volumes for Key Links in the Study Area

Link	Year 2023 [1]	Phase I Development	Year 2026 Background Traffic	Year 2026 Total Traffic	Phase I + II Development	Year 2031 Background Traffic	Year 2031 Total Traffic	Phase I + II + III Development	Year 2034 Background Traffic	Year 2034 Total Traffic	Year 2043 Background	Year 2043 Total
Wyarno Road west of Industrial Lane	1,970	2,930	2,010	4,940	7,030	2,070	9,100	7,510	2,100	9,610	2,220	9,730
Wyarno Road East of Industrial Lane	1,130	150	1,150	1,300	2,960	1,190	4,150	3,160	1,210	4,370	1,270	4,430
Wyarno Road west of the East Access	1,060	150	1,080	1,230	2,960	1,110	4,070	3,160	1,130	4,290	1,190	4,350
Wyarno Road east of the East Access	800	150	810	960	370	840	1,210	400	850	1,250	900	1,300
West Access north of Wyarno Road	0	3,090	0	3,090	4,440	0	4,440	4,750	0	4,750	0	4,750
East Access north of Wyarno Road	0	0	0	0	2,960	0	2,960	3,160	0	3,160	0	3,160
Industrial Lane south of Wyarno Road	900	0	920	920	0	940	940	0	960	960	1,010	1,010

1. The Year 2023 daily volumes were estimated using the peak hour to daily ratio for the evening peak hour.

Table 2. Intersection Operational Summary

Stop-Controlled Intersections [1]	Year 2021 Factored				Year 2026 Background				Year 2026 Total				Year 2031 Background				Year 2031 Total			
	Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1 - Wyarno Road / Industrial Lane / West Site Access	10.20	B	9.80	A	10.00	A	9.70	A	18.40	C	18.10	C	18.50	C	18.30	C	156.50	F	66.00	F
	NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT	
2 - Wyarno Road / Wildcat Road	9.00	A	9.30	A	9.10	A	9.30	A	9.10	A	9.80	A	9.20	A	9.40	A	11.30	B	12.70	B
	NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT	
3 - Wyarno Road / East Access	---				---				---				---				12.30	B	11.30	B
																	EBLT		EBLT	

Stop-Controlled Intersections [1]	Year 2034 Background				Year 2034 Total				Year 2043 Background				Year 2043 Total			
	Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1 - Wyarno Road / Industrial Lane / West Site Access	165.60	F	67.90	F	211.80	F	95.50	F	10.20	B	10.00	A	246.40	F	113.80	F
	NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT	
2 - Wyarno Road / Wildcat Road	11.30	B	12.70	B	11.50	B	13.10	B	9.10	A	9.40	A	11.60	B	13.20	B
	NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT	
3 - Wyarno Road / East Access	12.30	B	11.40	B	12.40	B	11.70	B	---				12.40	B	11.70	B
	EBLT		EBLT		EBLT		EBLT						EBLT		EBLT	

Notes

1. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value.

This table is formatted to be printed on 11" x 17" paper.

Table 3. Trip Generation Estimate - Phase I

Pad	Land Use	ITE Code [1]	Size	Unit	Average Daily Trips				Morning Peak Hour Trips				Evening Peak Hour Trips			
					Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
1	Multifamily Housing (Mid-Rise)	221	171	DU	4.54	776	388	388	0.37	63	15	48	0.39	67	41	26
	Mini-Warehouse [2]	151	65.3	1,000 ft^2	1.45	94	47	47	0.09	5	3	2	0.15	10	5	5
2	Single-Family Attached Housing [3]	215	17.4	DU	7.2	126	63	63	0.48	8	2	6	0.57	10	6	4
	Strip Retail Plaza (<40k) [3]	822	8.7	1,000 ft^2	54.45	474	237	237	2.36	21	12	9	6.59	58	29	29
	General Office Building [3]	710	8.7	1,000 ft^2	10.84	94	47	47	1.52	13	12	1	1.44	13	2	11
3	Single-Family Attached Housing [3]	215	17.4	DU	7.2	124	62	62	0.48	8	2	6	0.57	10	6	4
	Strip Retail Plaza (<40k) [3]	822	8.7	1,000 ft^2	54.45	474	237	237	2.36	21	12	9	6.59	58	29	29
	General Office Building [3]	710	8.7	1,000 ft^2	10.84	94	47	47	1.52	13	12	1	1.44	13	2	11
4	Single-Family Detached Housing	210	14	DU	9.43	132	66	66	0.7	10	2	8	0.94	13	8	5
5	Single-Family Attached Housing	215	60	DU	7.2	432	216	216	0.48	29	7	22	0.57	34	20	14
6	Single-Family Attached Housing	215	48	DU	7.2	346	173	173	0.48	23	6	17	0.57	27	16	11
7	Single-Family Detached Housing	210	46	DU	9.43	434	217	217	0.7	32	8	24	0.94	43	27	16
	Single-Family Attached Housing	215	15	DU	7.2	108	54	54	0.48	7	2	5	0.57	9	5	4
8	General Office Building [3]	710	7.1	1,000 ft^2	10.84	78	39	39	1.52	11	10	1	1.44	10	2	8
---	Internal Capture [4]	---	---	---	---	-700	-350	-350	---	-26	-13	-13	---	-102	-51	-51
---	**Total**	**---**	**---**	**---**	**---**	**3,086**	**1,543**	**1,543**	**---**	**239**	**92**	**146**	**---**	**273**	**146**	**126**

Notes:

1. The trip generation estimate is based on rates contained in Trip Generation, 11th Edition (Institute of Transportation Engineers, September 2021).
2. A 0.75 FAR was assumed.
3. A 0.2 FAR was assumed. The second floor condos were assumed to be 1,000 ft^2.
4. The internal capture was estimated using the NCHRP 684 Internal Capture Estimation Tool.

Table 4. Trip Generation Estimate - Phase I + Phase II

Land Use	ITE Code [1]	Size	Unit	Average Daily Trips				Morning Peak Hour Trips				Evening Peak Hour Trips			
				Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
Single-Family Detached Housing	210	12	DU	9.43	114	57	57	0.7	8	2	6	0.94	11	7	4
Single-Family Attached Housing	215	48	DU	7.2	346	173	173	0.48	23	6	17	0.57	27	16	11
Single Tenant Office Building	715	60	Employees	3.85	232	116	116	0.54	32	29	3	0.51	31	5	26
Single-Family Attached Housing	215	40	DU	7.2	288	144	144	0.48	19	5	14	0.57	23	13	10
General Light Industrial [2]	110	60.9	1,000 ft^2	4.87	298	149	149	0.74	45	40	5	0.65	40	6	34
Strip Retail Plaza (<40k) [3]	822	21.75	1,000 ft^2	54.45	1,184	592	592	2.36	51	31	20	6.59	144	72	72
General Office Building [3]	710	21.75	1,000 ft^2	10.84	236	118	118	1.52	33	29	4	1.44	31	5	26
Strip Retail Plaza (<40k) [3]	822	29.15	1,000 ft^2	54.45	1,588	794	794	2.36	69	41	28	6.59	192	96	96
Supermarket	850	10	1,000 ft^2	93.84	938	469	469	2.86	29	17	12	8.95	90	45	45
Hotel	320	100	Rooms	3.35	336	168	168	0.35	35	13	22	0.36	36	19	17
General Light Industrial [3]	110	191.4	1,000 ft^2	4.87	932	466	466	0.74	142	125	17	0.65	124	17	107
Phase 1	---	---	---	---	3,786	1,893	1,893	---	265	105	159	---	375	197	177
Internal Capture [4]	---	---	---	---	-2,878	-1,439	-1,439	---	-120	-60	-60	---	-444	-222	-222
Total	**---**	**---**	**---**	**---**	**7,401**	**3,700**	**3,700**	**---**	**631**	**383**	**247**	**---**	**680**	**276**	**403**

Notes:

1. The trip generation estimate is based on rates contained in Trip Generation, 11th Edition (Institute of Transportation Engineers, September 2021).

2. A 0.1 FAR was assumed.

3. A 0.2 FAR was assumed.

4. The internal capture was estimated using the NCHRP 684 Internal Capture Estimation Tool.

Table 5. Trip Generation Estimate - Phase I + Phase II + Phase III

Land Use	ITE Code [1]	Size	Unit	Average Daily Trips				Morning Peak Hour Trips				Evening Peak Hour Trips			
				Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
Single Family Detached Housing	210	54	DU	9.43	510	255	255	0.7	38	9	29	0.94	51	32	19
Phase I + Phase II	---	---	---	---	7,401	3,700	3,700	---	631	383	247	---	680	276	403
Total	---	---	---	---	7,911	3,955	3,955	---	669	392	276	---	731	308	422

Notes:

1. The trip generation estimate is based on rates contained in Trip Generation, 10th Edition (Institute of Transportation Engineers, September 2017).

Table 6. Need for Left Turn Lanes on Wyarno Road

Industrial Lane

Peak Hour	Volume				EBLT Warranted?	WBLT Warranted?
	EBLT	EB Total	WBLT	WB Total		
2026 Total AM	87	230	0	59	Yes	No
2026 Total PM	139	307	0	42	Yes	No
2031 Total AM	218	494	0	158	Yes	No
2031 Total PM	157	192	0	189	Yes	No
2034 Total AM	223	505	0	170	Yes	No
2034 Total PM	176	382	0	202	Yes	No
2043 Total AM	223	516	0	180	Yes	No
2043 Total PM	176	388	0	209	Yes	No

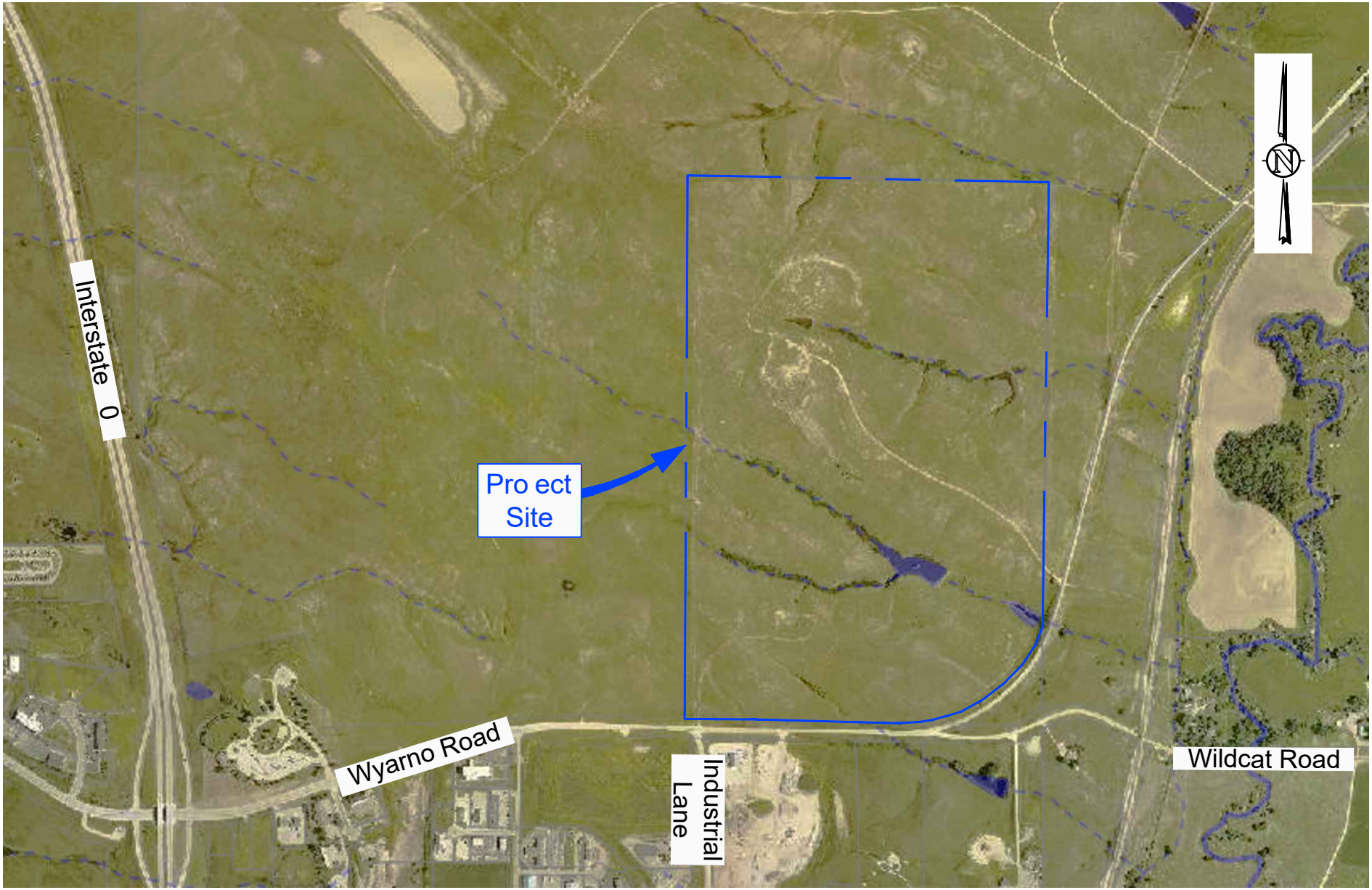
East Access

Peak Hour	Volume		EBLT Warranted?
	EBLT	EB Total	
2031 Total AM	146	174	Yes
2031 Total PM	105	165	Yes
2034 Total AM	149	178	Yes
2034 Total PM	117	178	Yes
2043 Total AM	149	180	Yes
2043 Total PM	117	181	Yes

Figures

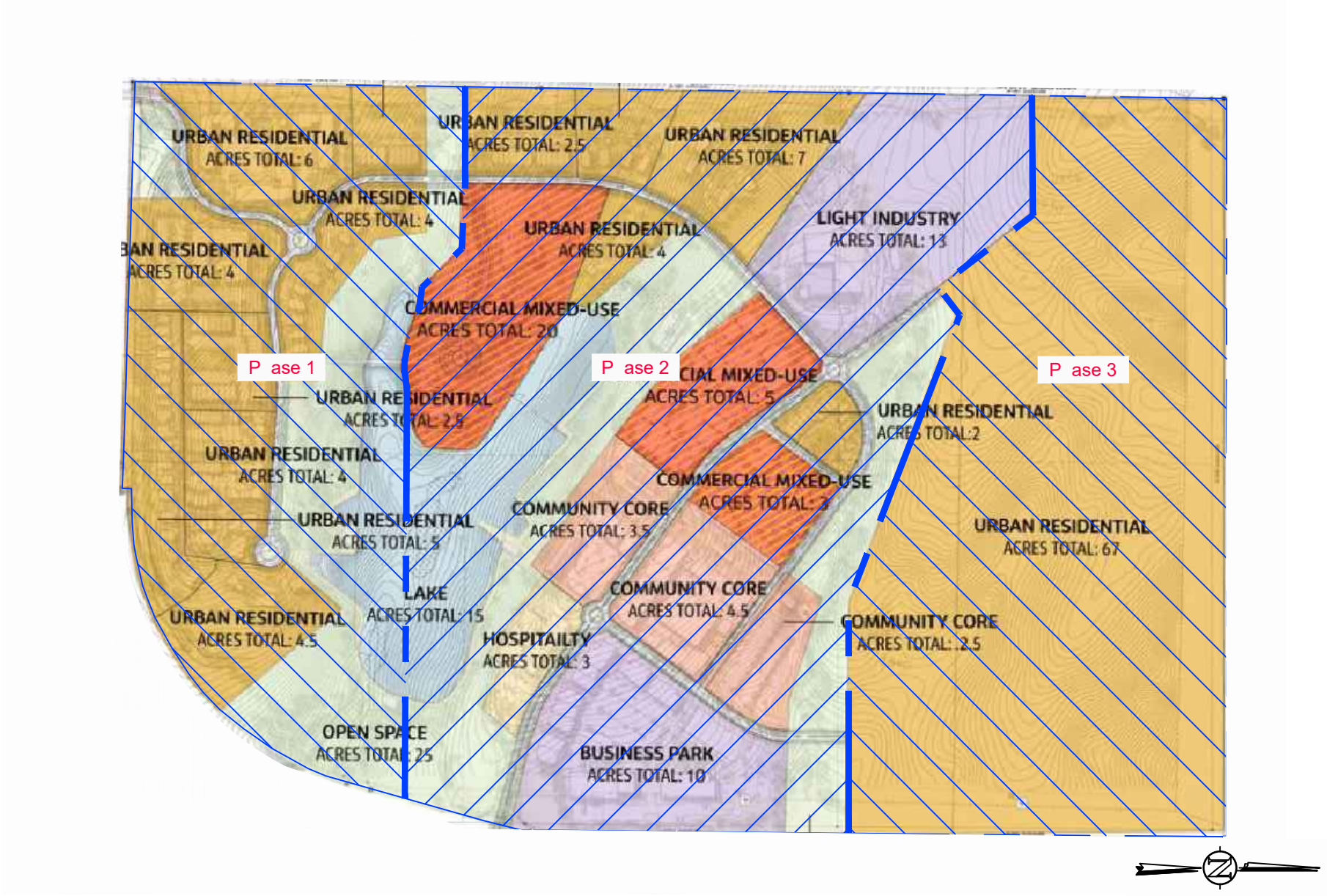
Figure 1 – Vicinity Map
Figure 2 – Site Plan
Figure 3 – Laneage and Traffic Control – Existing
Figure 4 – Existing Traffic Volumes – Morning Peak Hour
Figure 5 – Existing Traffic Volumes – Evening Peak Hour
Figure 6 – Trip Distribution
Figure 7 – Phase I Trip Assignment – Morning Peak Hour
Figure 8 – Phase I Trip Assignment – Evening Peak Hour
Figure 9 – Phase I + II Trip Assignment – Morning Peak Hour
Figure 10 – Phase I + II Trip Assignment – Evening Peak Hour
Figure 11 – Phase I + II + III Trip Assignment – Morning Peak Hour
Figure 12 – Phase I + II + III Trip Assignment – Evening Peak Hour
Figure 13 – Year 2026 Background Traffic Volumes – Morning Peak Hour
Figure 14 – Year 2026 Background Traffic Volumes – Evening Peak Hour
Figure 15 – Year 2026 Total Traffic Volumes – Morning Peak Hour
Figure 16 – Year 2026 Total Traffic Volumes – Evening Peak Hour
Figure 17 – Laneage and Traffic Control – Year 2026
Figure 18 – Year 2031 Background Traffic Volumes – Morning Peak Hour
Figure 19 – Year 2031 Background Traffic Volumes – Evening Peak Hour
Figure 20 – Year 2031 Total Traffic Volumes – Morning Peak Hour
Figure 21 – Year 2031 Total Traffic Volumes – Evening Peak Hour
Figure 22 – Laneage and Traffic Control – Year 2031
Figure 23 – Year 2034 Background Traffic Volumes – Morning Peak Hour
Figure 24 – Year 2034 Background Traffic Volumes – Evening Peak Hour
Figure 25 – Year 2034 Total Traffic Volumes – Morning Peak Hour
Figure 26 – Year 2034 Total Traffic Volumes – Evening Peak Hour
Figure 27 – Year 2043 Background Traffic Volumes – Morning Peak Hour
Figure 28 – Year 2043 Background Traffic Volumes – Evening Peak Hour
Figure 29 – Year 2043 Total Traffic Volumes – Morning Peak Hour
Figure 30 – Year 2043 Total Traffic Volumes – Evening Peak Hour

Figure 31 – Need for an Eastbound Right Turn Lane at Industrial Lane
Figure 32 – Need for a Westbound Right Turn Lane at Industrial Lane
Figure 33 – Need for a Westbound Right Turn Lane at the East Access
Figure 34 – Wyarno Road Speed Study



Story House Traffic Impact Study
VICINITY MAP

Scale	1" = 1,000'	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	1



Story House Traffic Impact Study
SITE PLAN

Scale	NTS	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	2

Figure 3 – Laneage and Traffic Control – Existing



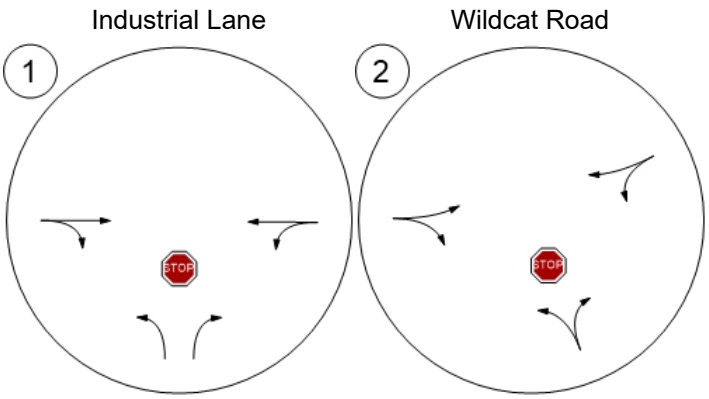


Figure 4 – Existing Traffic Volumes – Morning Peak Hour



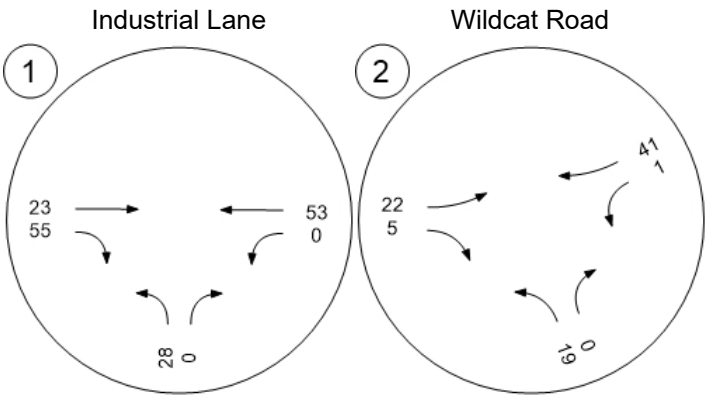
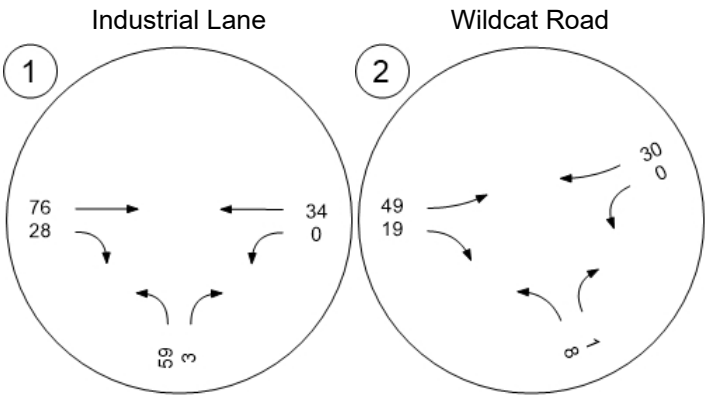
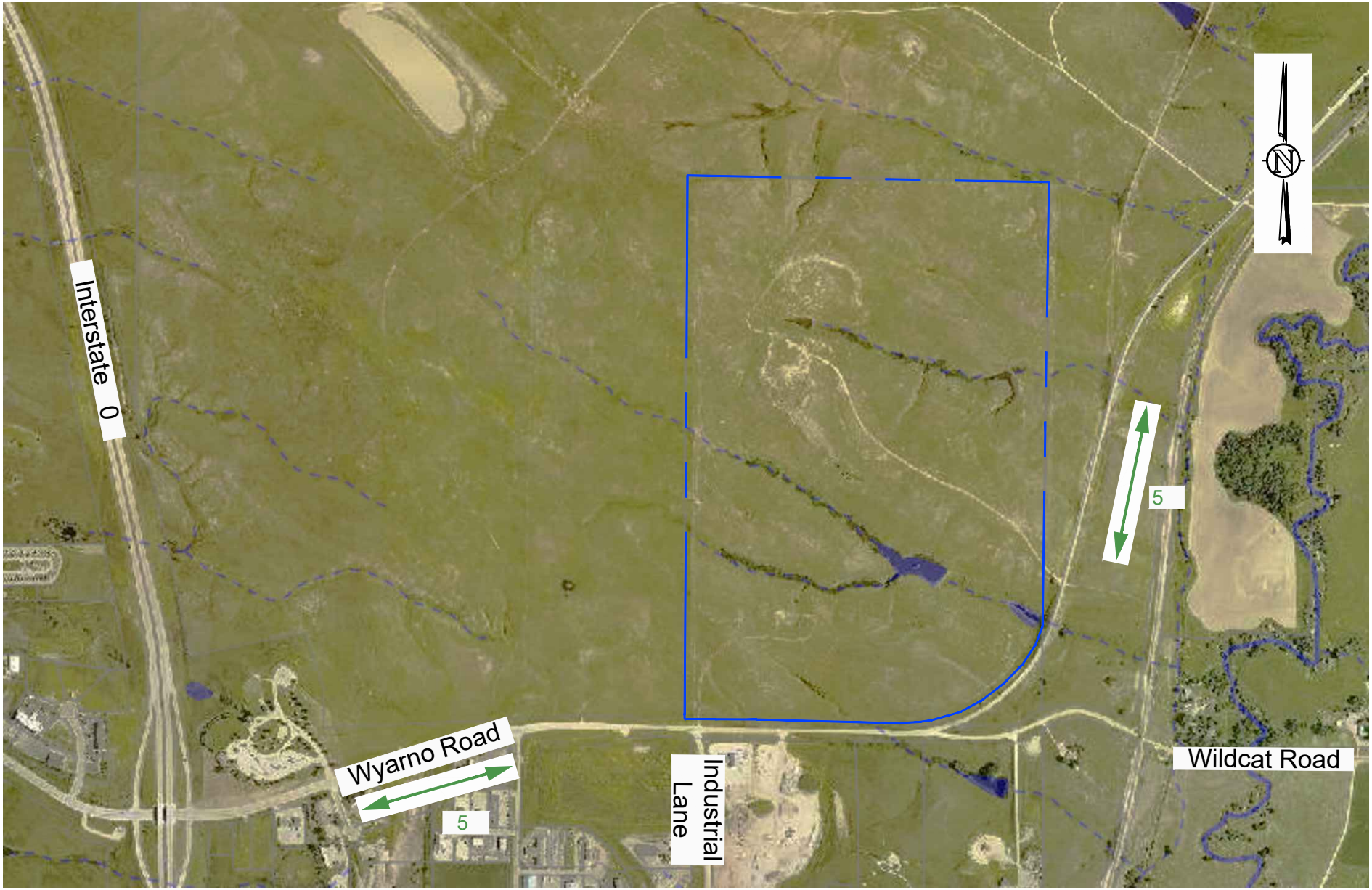


Figure 5 – Existing Traffic Volumes – Evening Peak Hour







Story House Traffic Impact Study
TRIP DISTRIBUTION

Scale	1" = 1,000'	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	6

Figure 7 – Phase I Trip Assignment – Morning Peak Hour



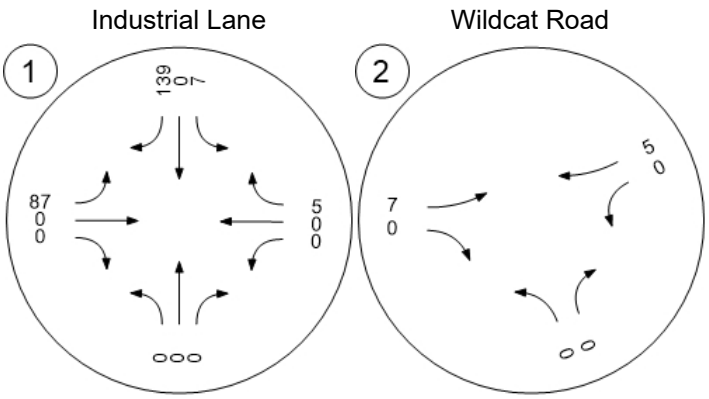


Figure 8 – Phase I Trip Assignment – Evening Peak Hour



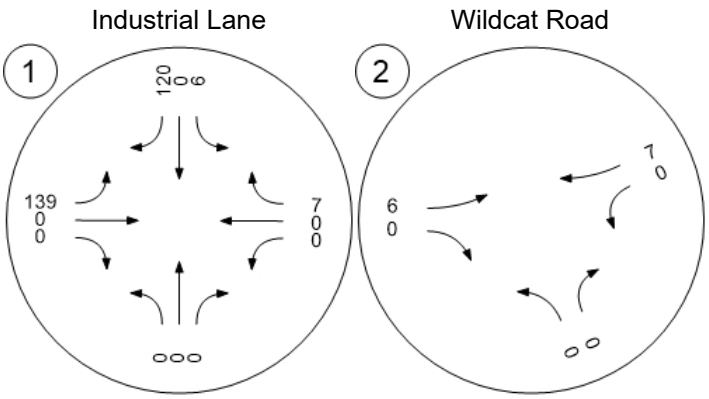
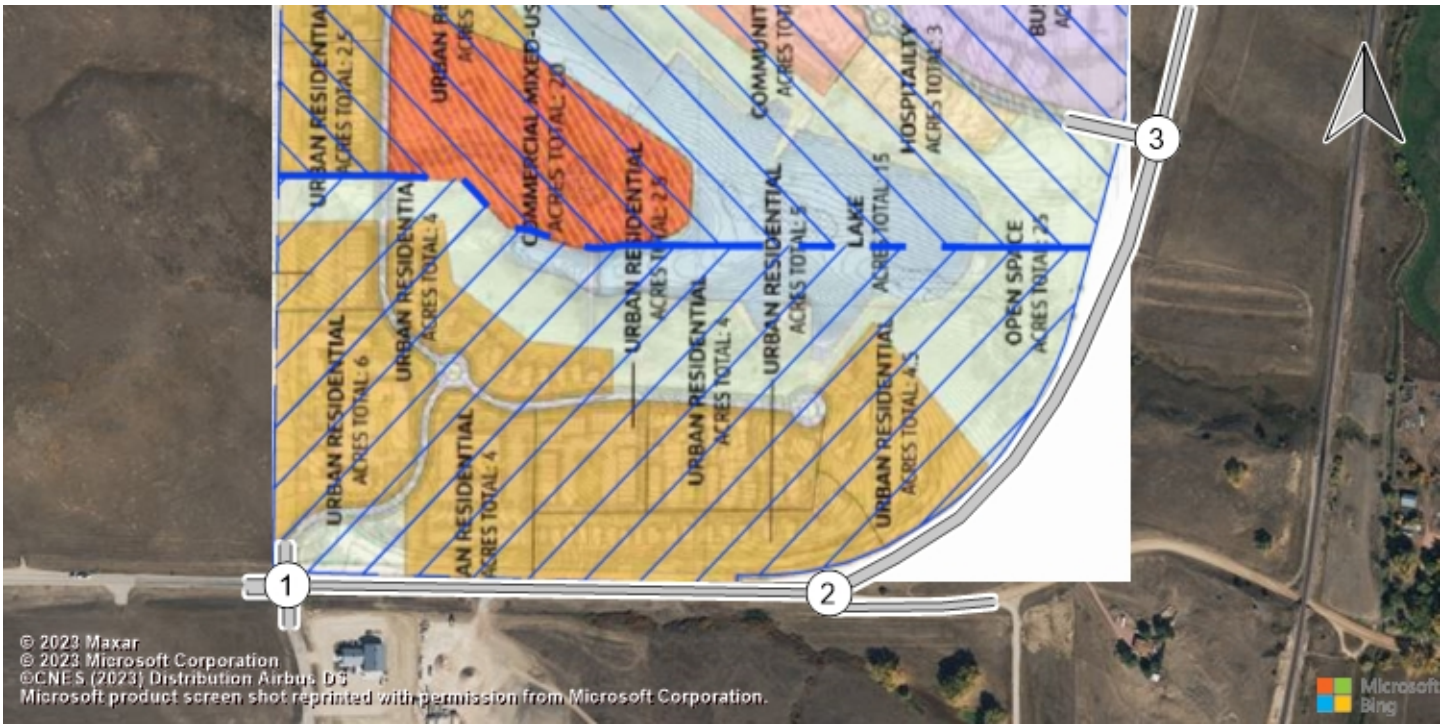


Figure 9 – Phase I + II Trip Assignment – Morning Peak Hour



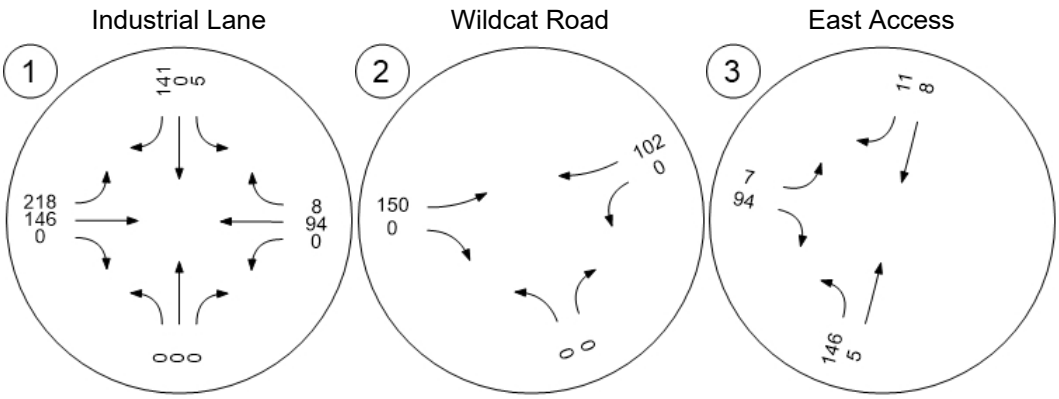


Figure 10 – Phase I + II Trip Assignment – Evening Peak Hour



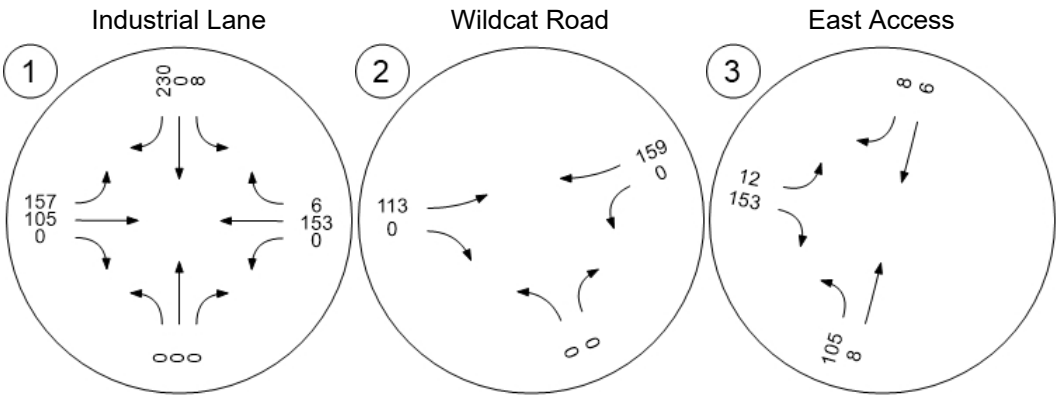
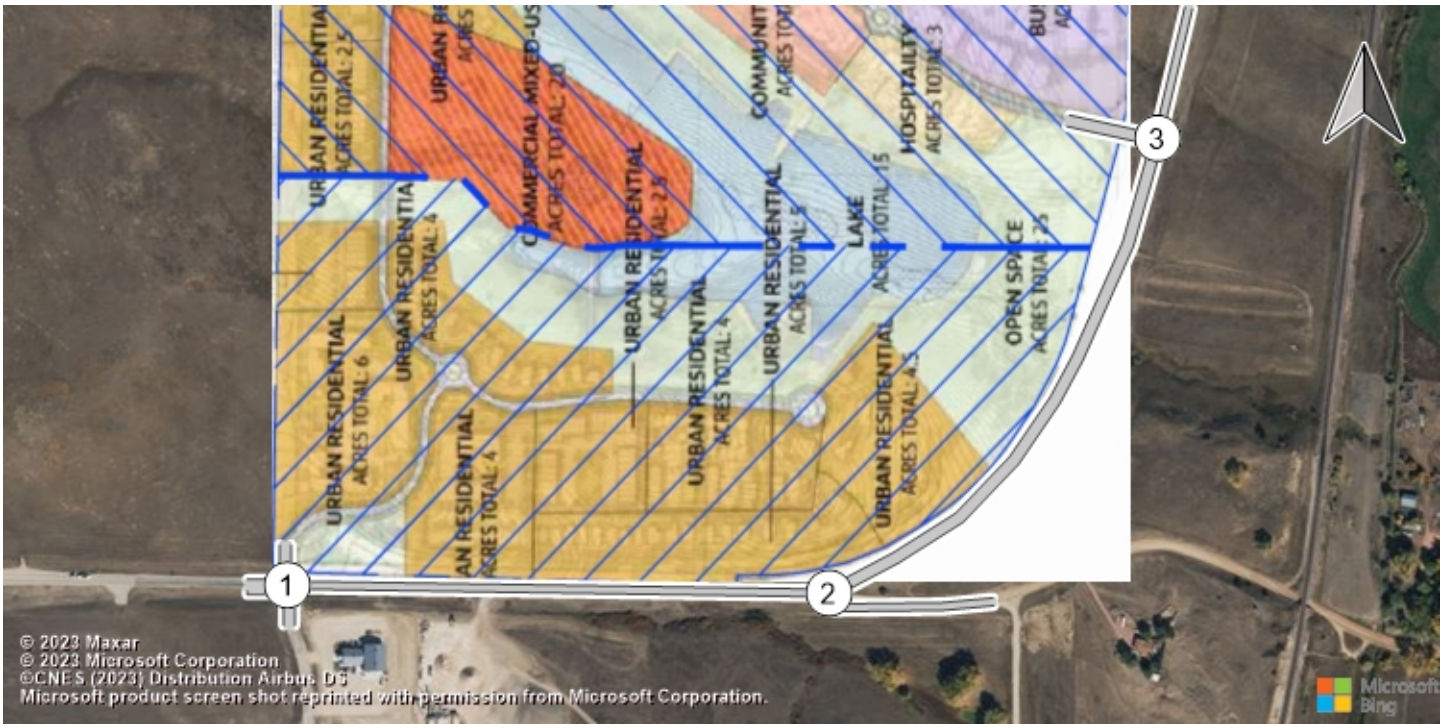


Figure 11 – Phase I + II + III Trip Assignment – Morning Peak Hour



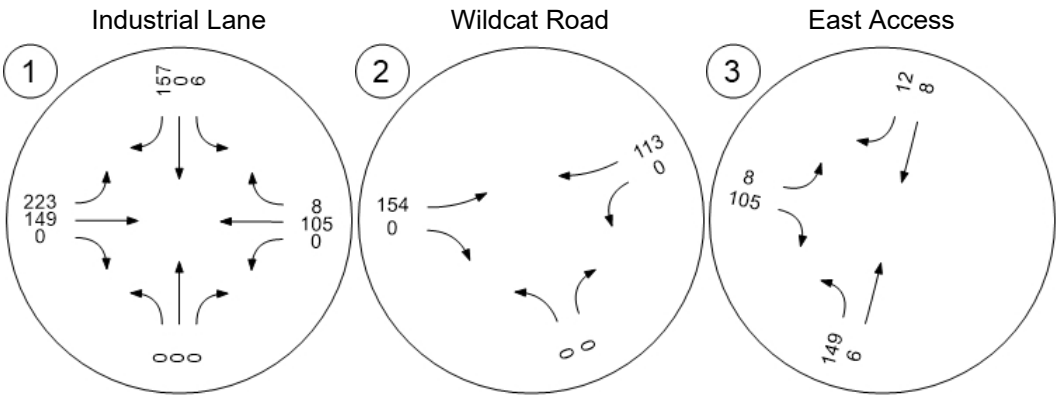


Figure 12 – Phase I + II + III Trip Assignment – Evening Peak Hour



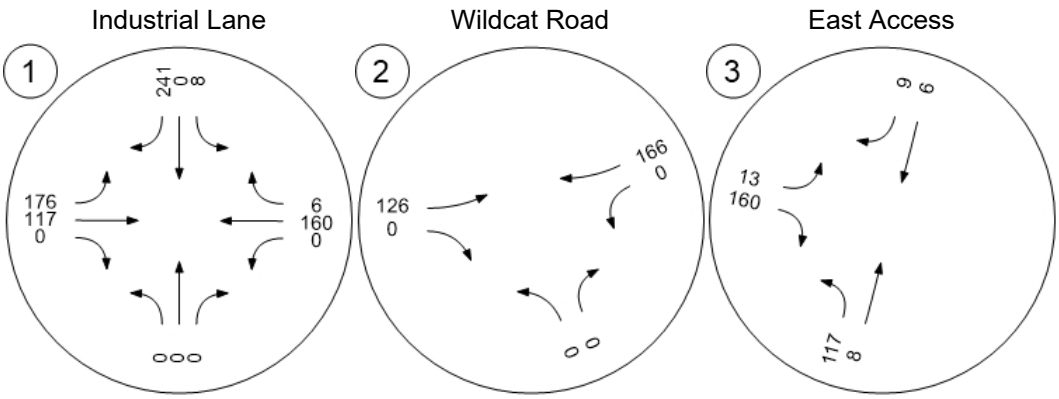


Figure 13 – Year 2026 Background Traffic Volumes – Morning Peak Hour



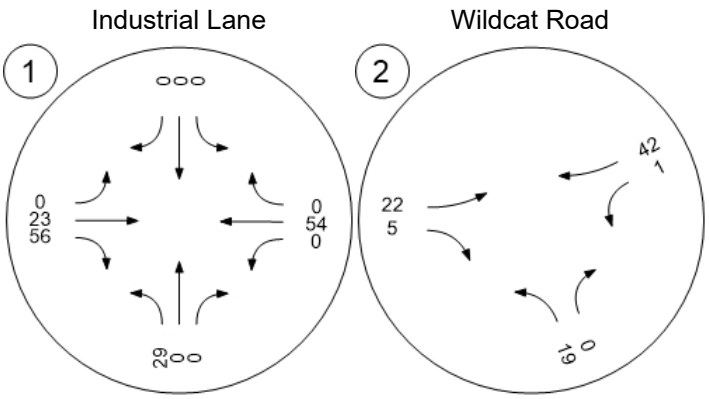


Figure 14 – Year 2026 Background Traffic Volumes – Evening Peak Hour



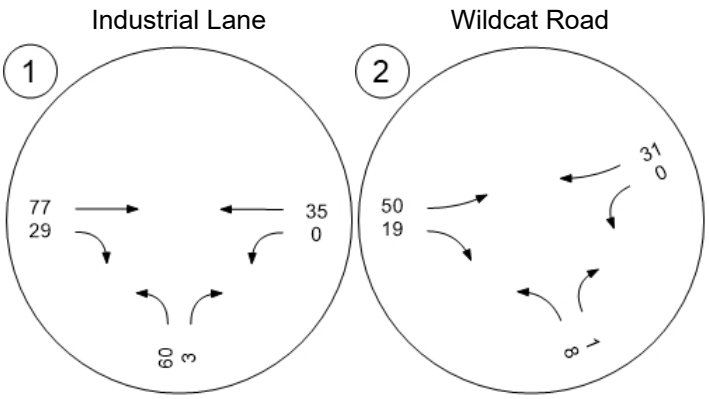


Figure 15 – Year 2026 Total Traffic Volumes – Morning Peak Hour



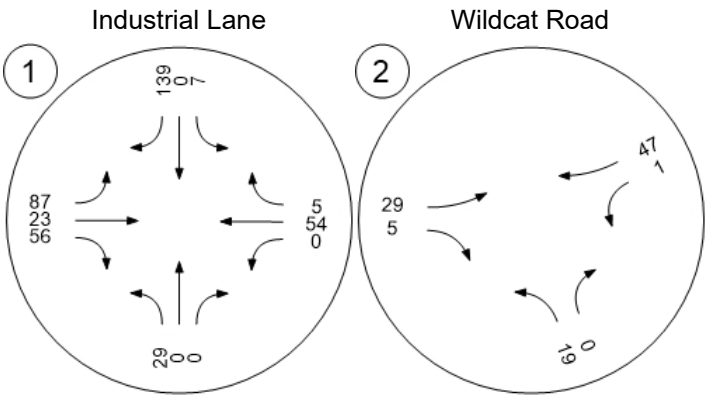


Figure 16 – Year 2026 Total Traffic Volumes – Evening Peak Hour



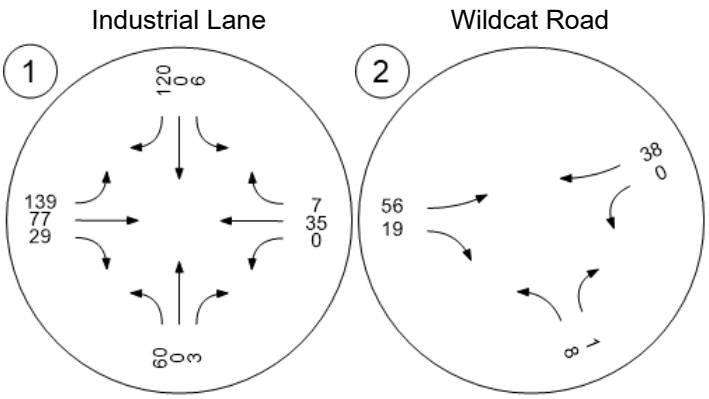


Figure 17 – Laneage and Traffic Control – Year 2026



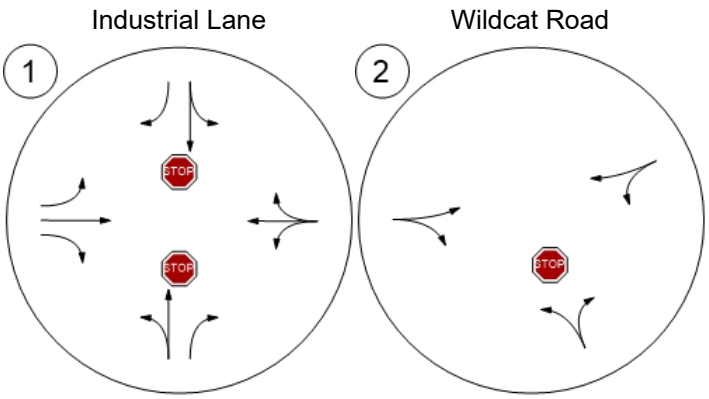


Figure 18 – Year 2031 Background Traffic Volumes – Morning Peak Hour



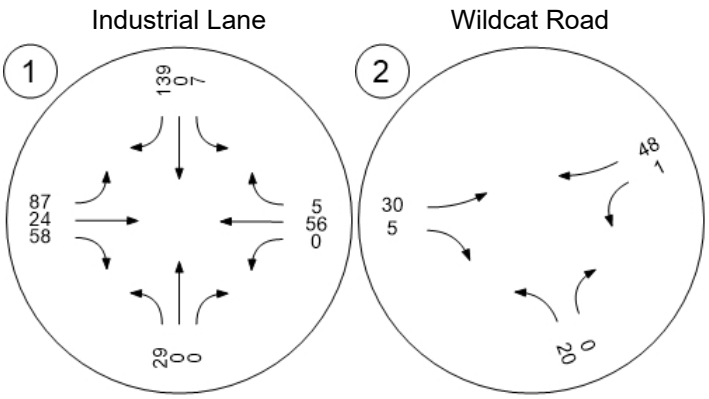


Figure 19 – Year 2031 Background Traffic Volumes – Evening Peak Hour



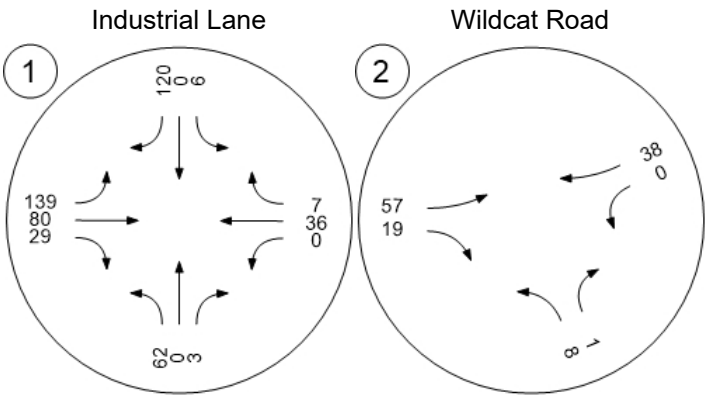
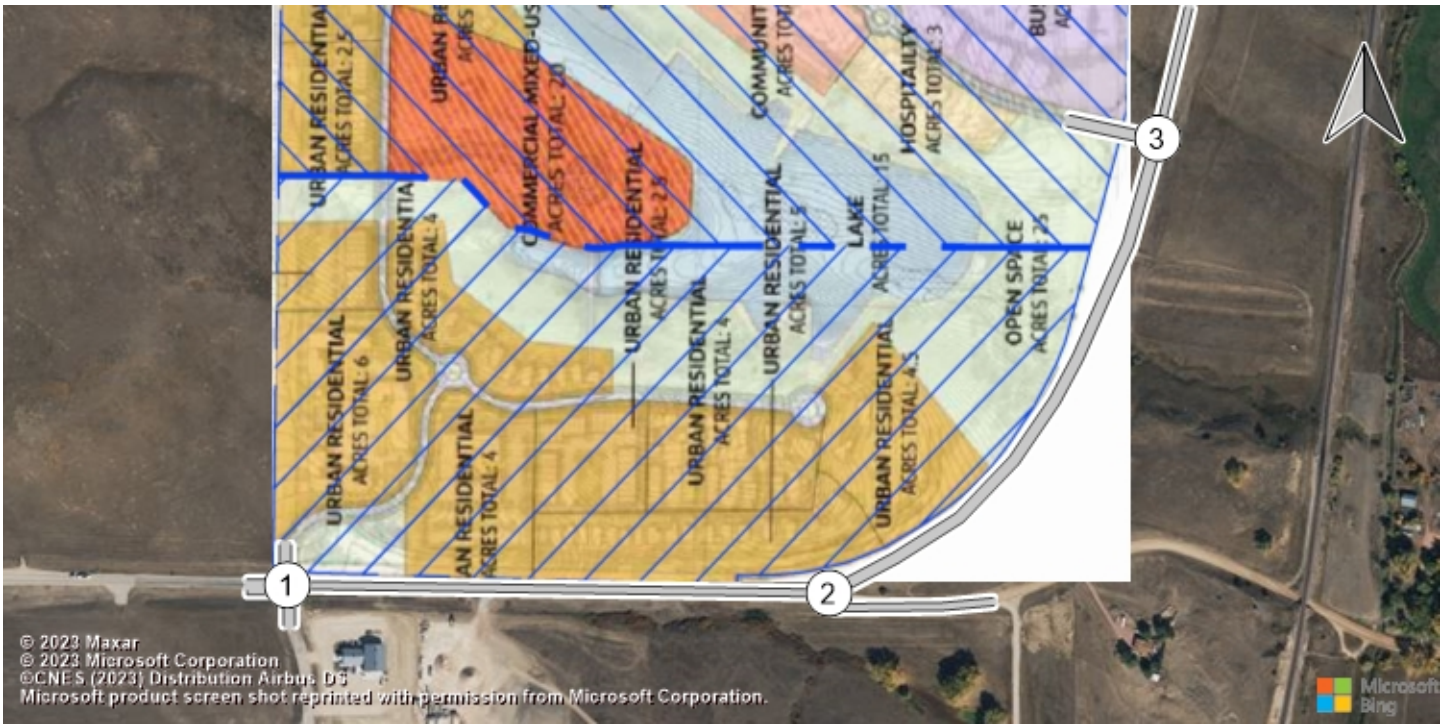


Figure 20 – Year 2031 Total Traffic Volumes – Morning Peak Hour



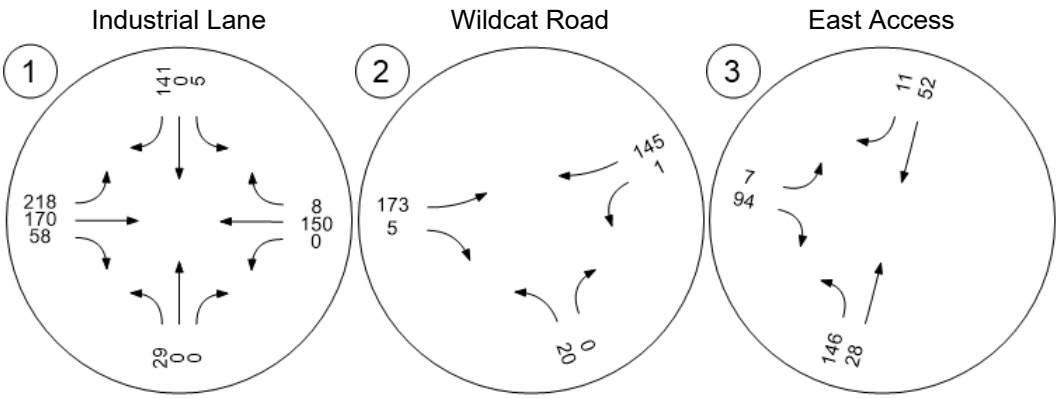


Figure 21 – Year 2031 Total Traffic Volumes – Evening Peak Hour



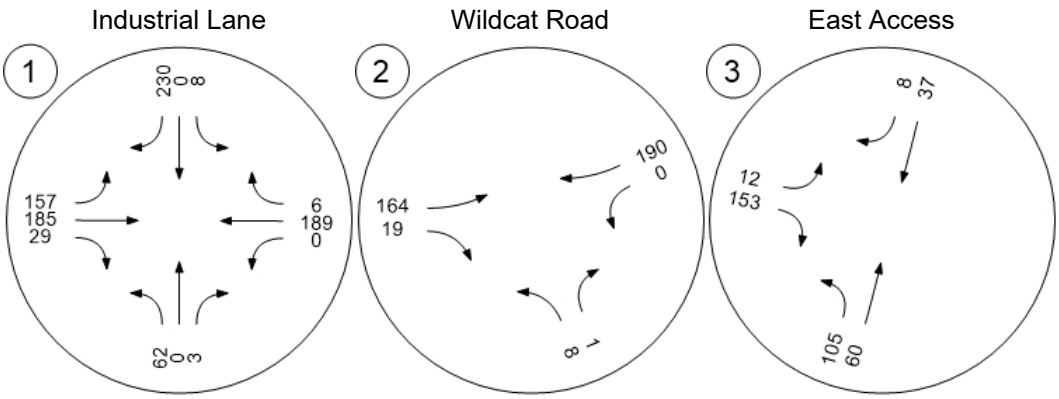
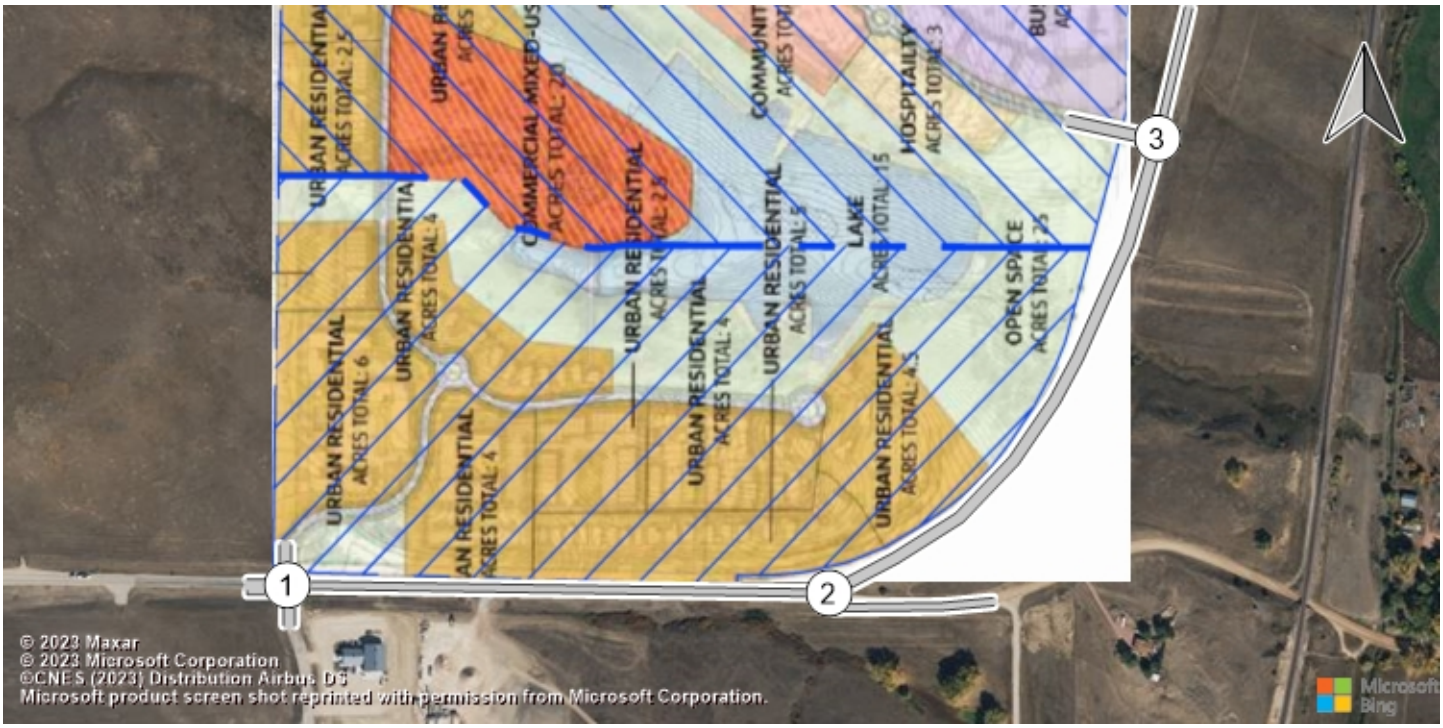


Figure 22 – Laneage and Traffic Control – Year 2031



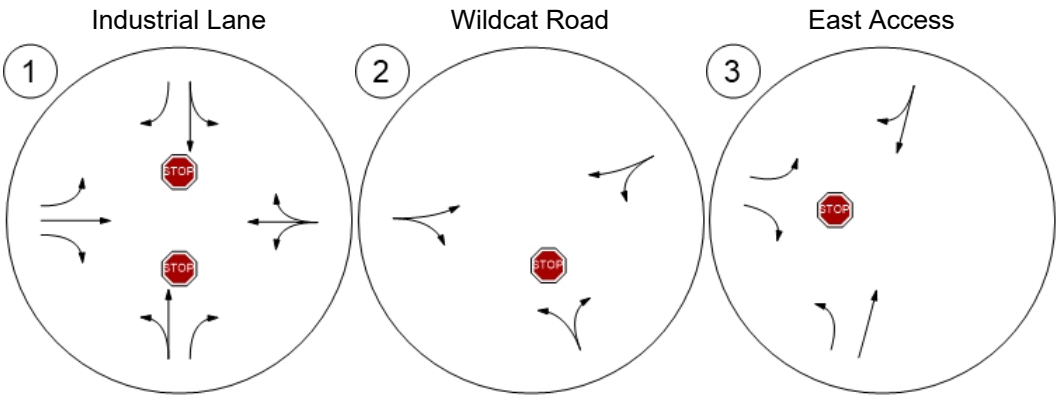
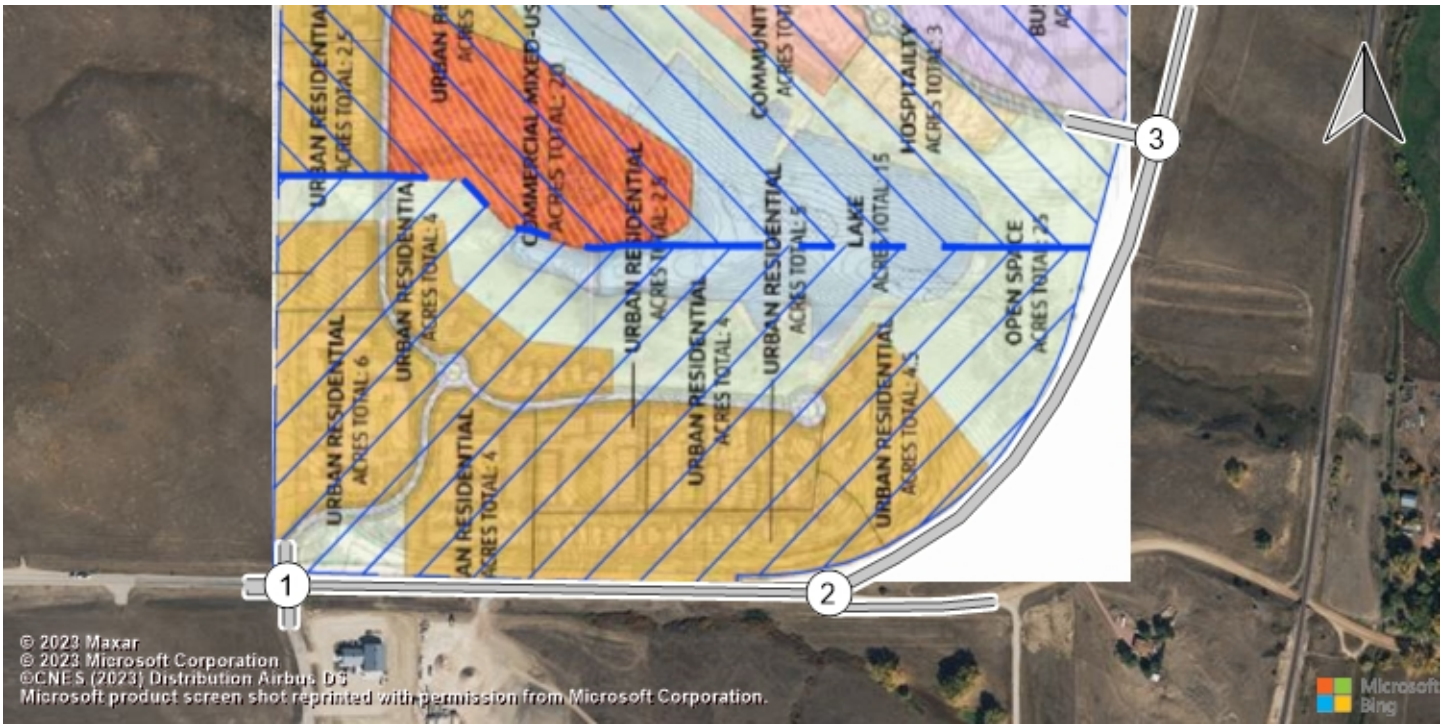


Figure 23 – Year 2034 Background Traffic Volumes – Morning Peak Hour



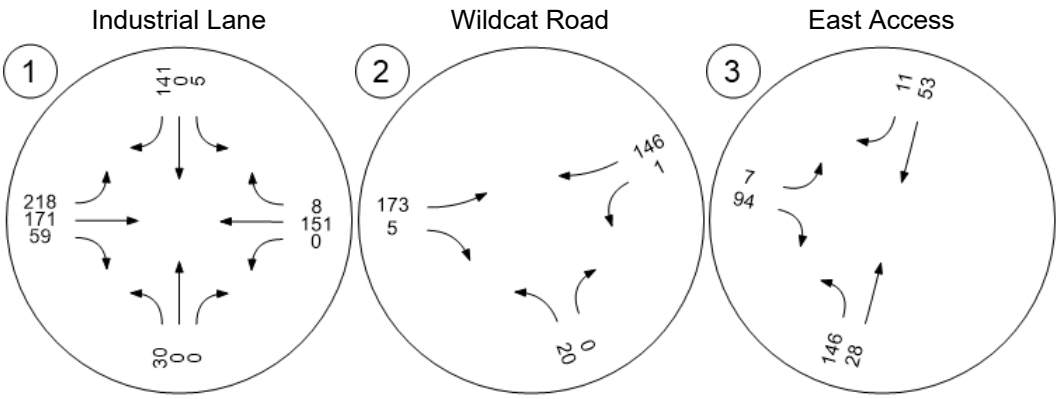


Figure 24 – Year 2034 Background Traffic Volumes – Evening Peak Hour



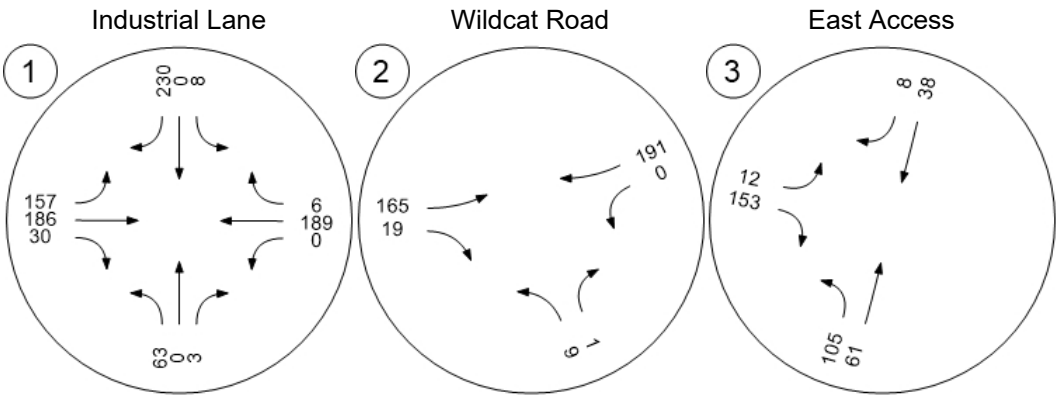
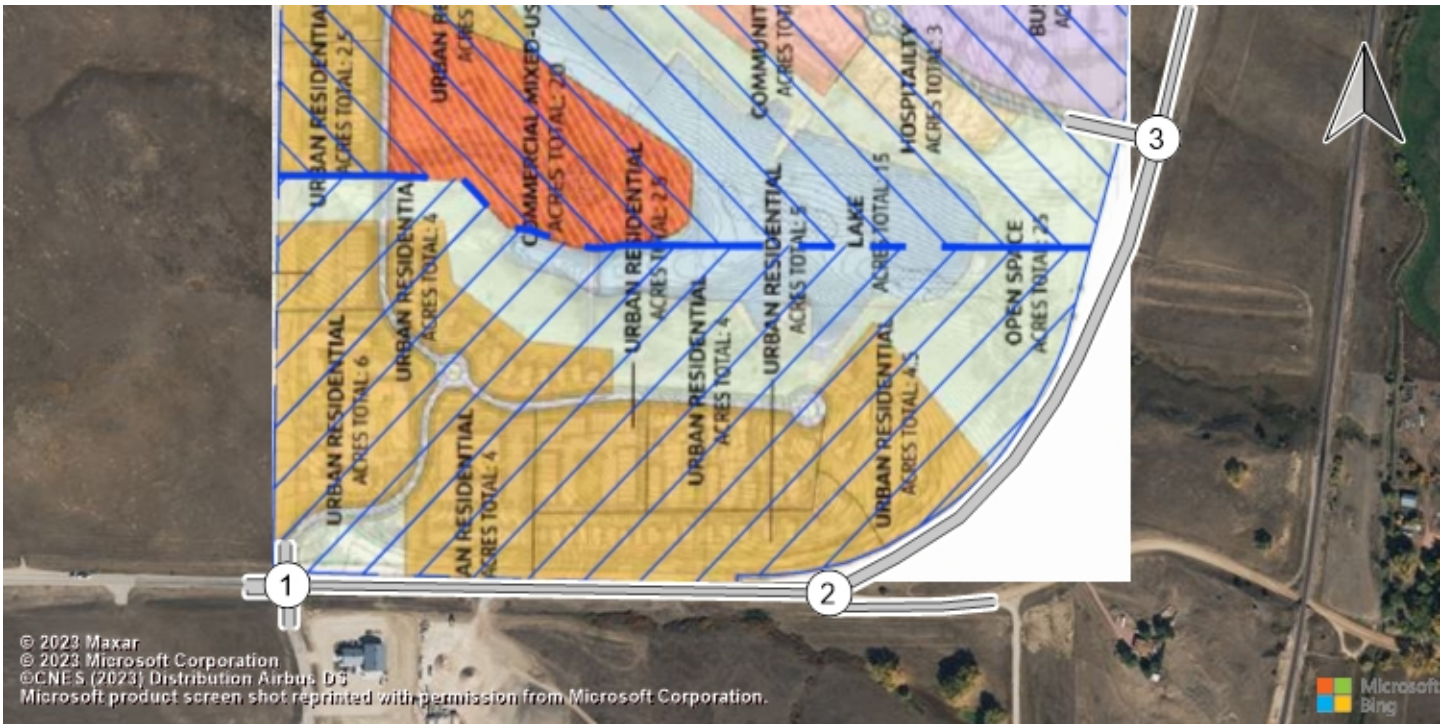


Figure 25 – Year 2034 Total Traffic Volumes – Morning Peak Hour



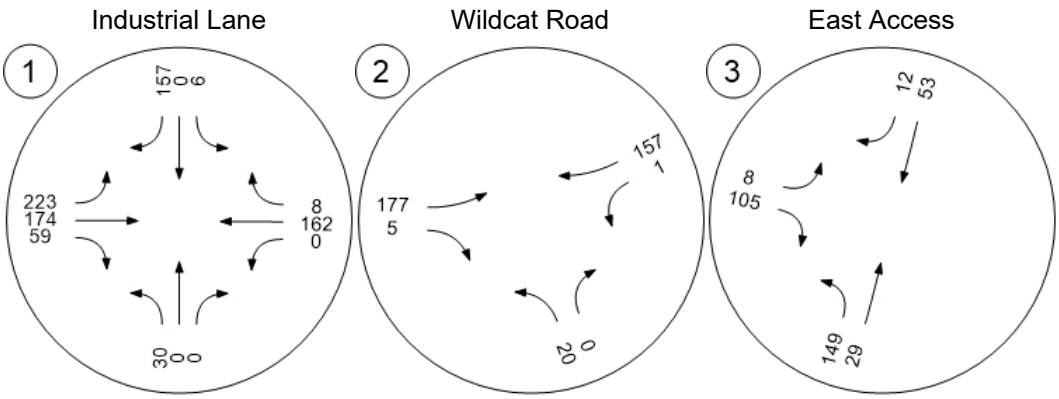


Figure 26 – Year 2034 Total Traffic Volumes – Evening Peak Hour



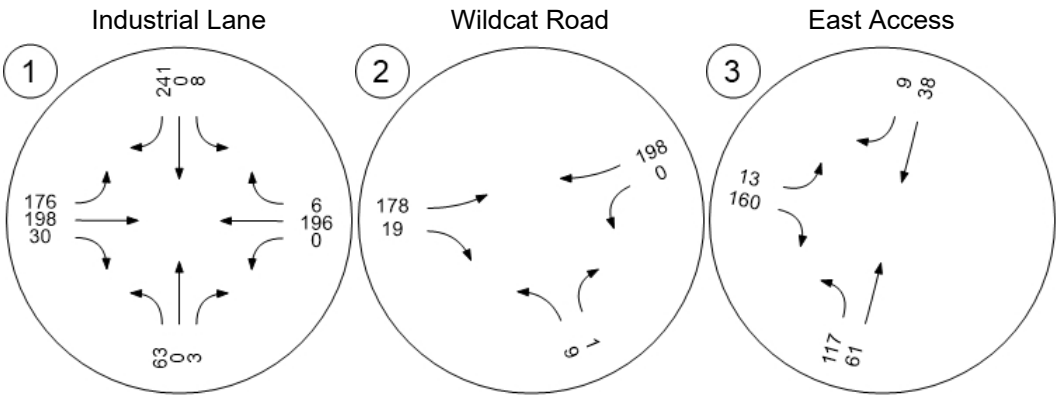


Figure 27 – Year 2043 Background Traffic Volumes – Morning Peak Hour



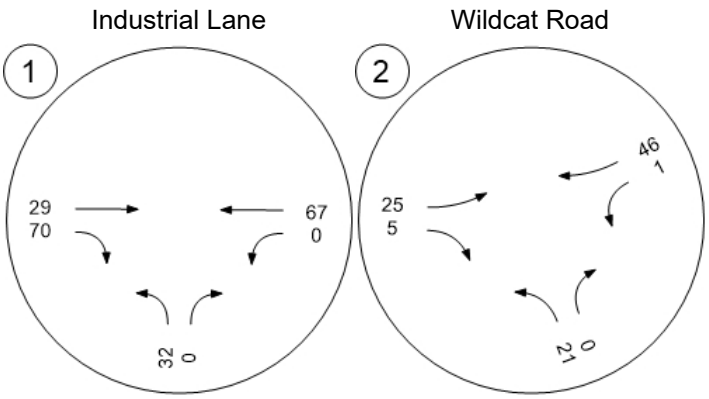


Figure 28 – Year 2043 Background Traffic Volumes – Evening Peak Hour



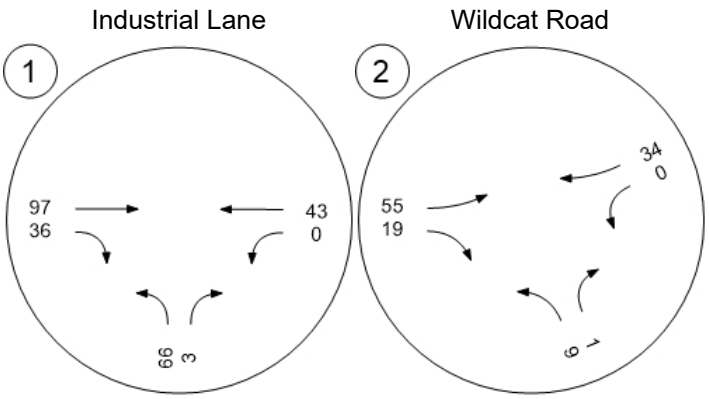
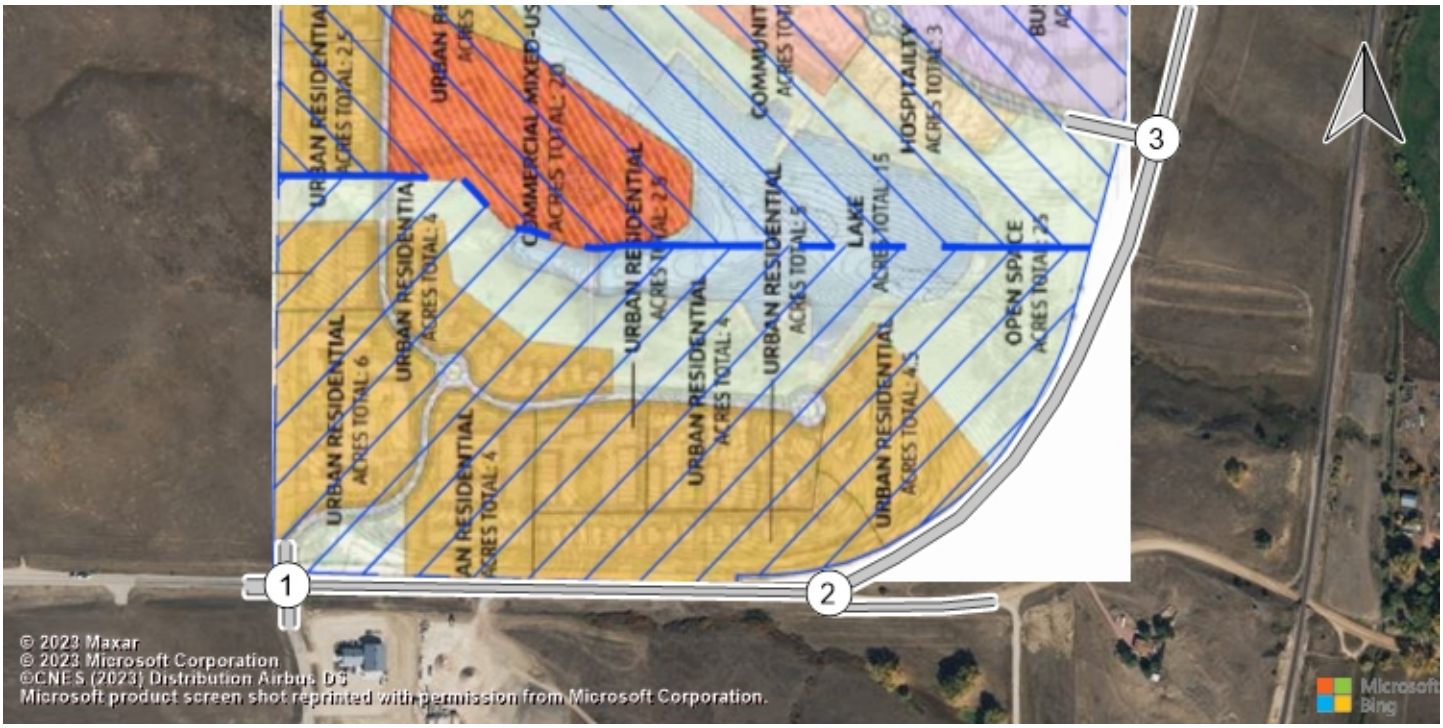


Figure 29 – Year 2043 Total Traffic Volumes – Morning Peak Hour



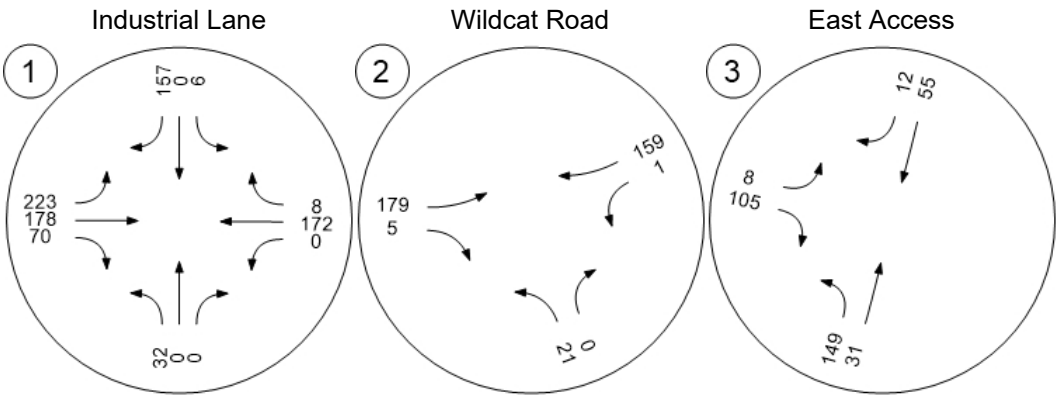


Figure 30 – Year 2043 Total Traffic Volumes – Evening Peak Hour



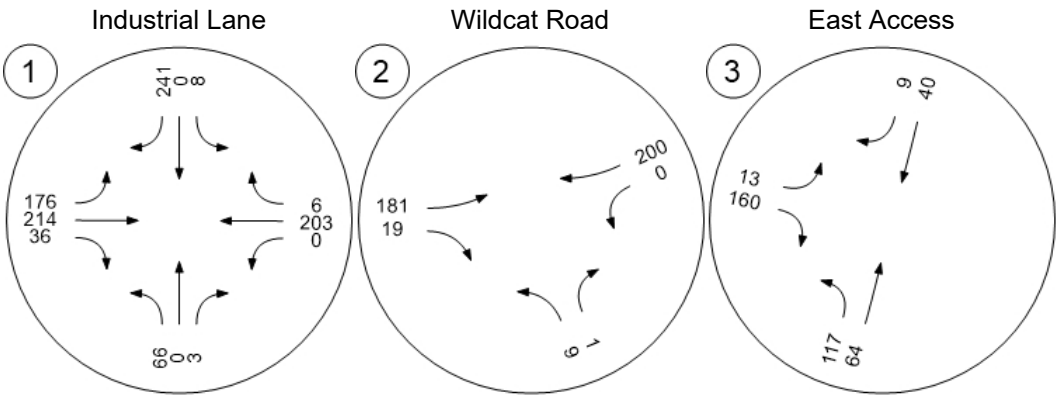
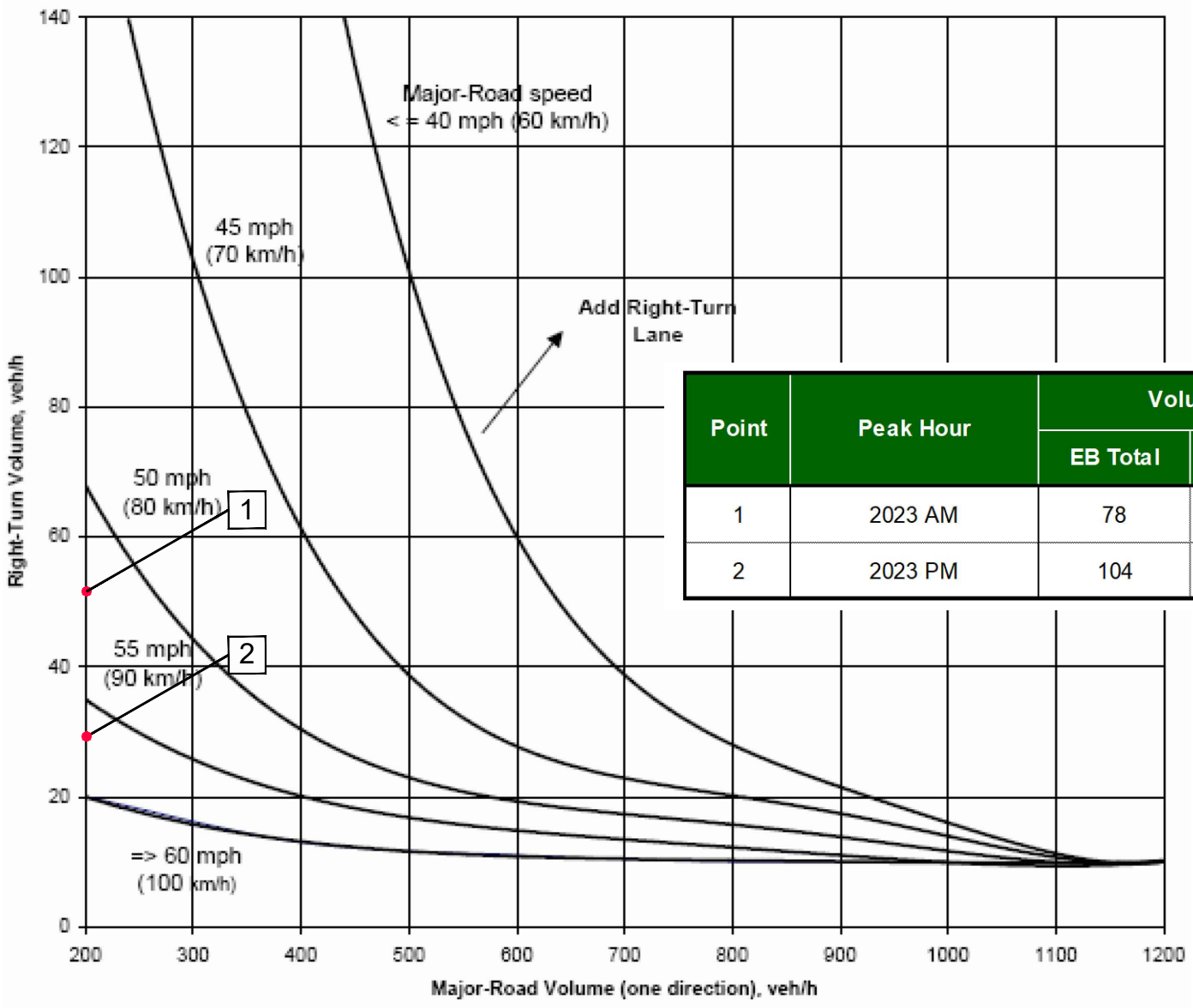


Figure 18-1 Right Turn Lane Guidelines for Two-Lane Highways

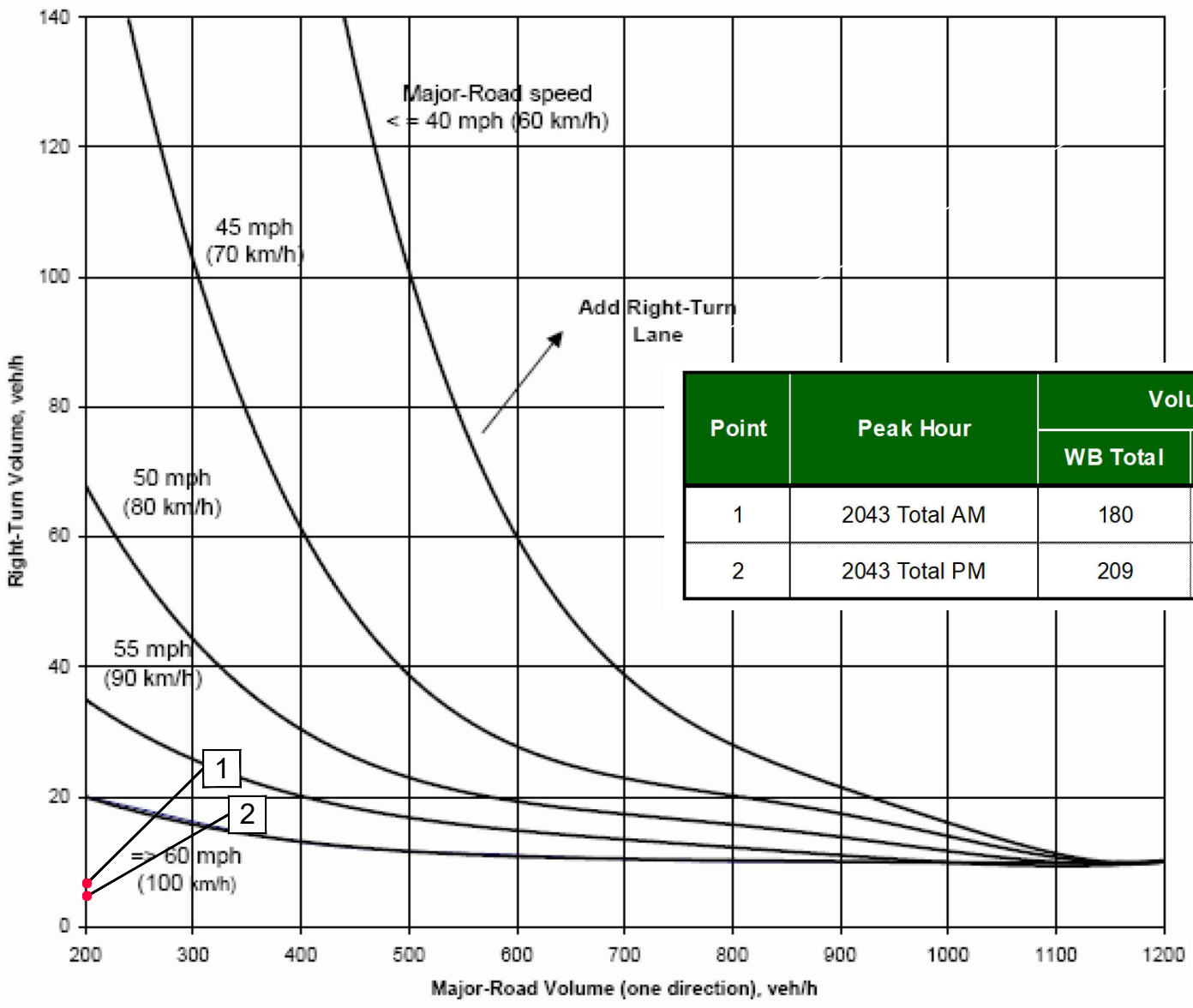


Point	Peak Hour	Volume	
		EB Total	EBRT
1	2023 AM	78	55
2	2023 PM	104	28

Story House Traffic Impact Study
NEED FOR AN EASTBOUND RIGHT TURN LANE AT INDUSTRIAL LANE

Scale	NTS	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	31

Figure 18-1 Right Turn Lane Guidelines for Two-Lane Highways

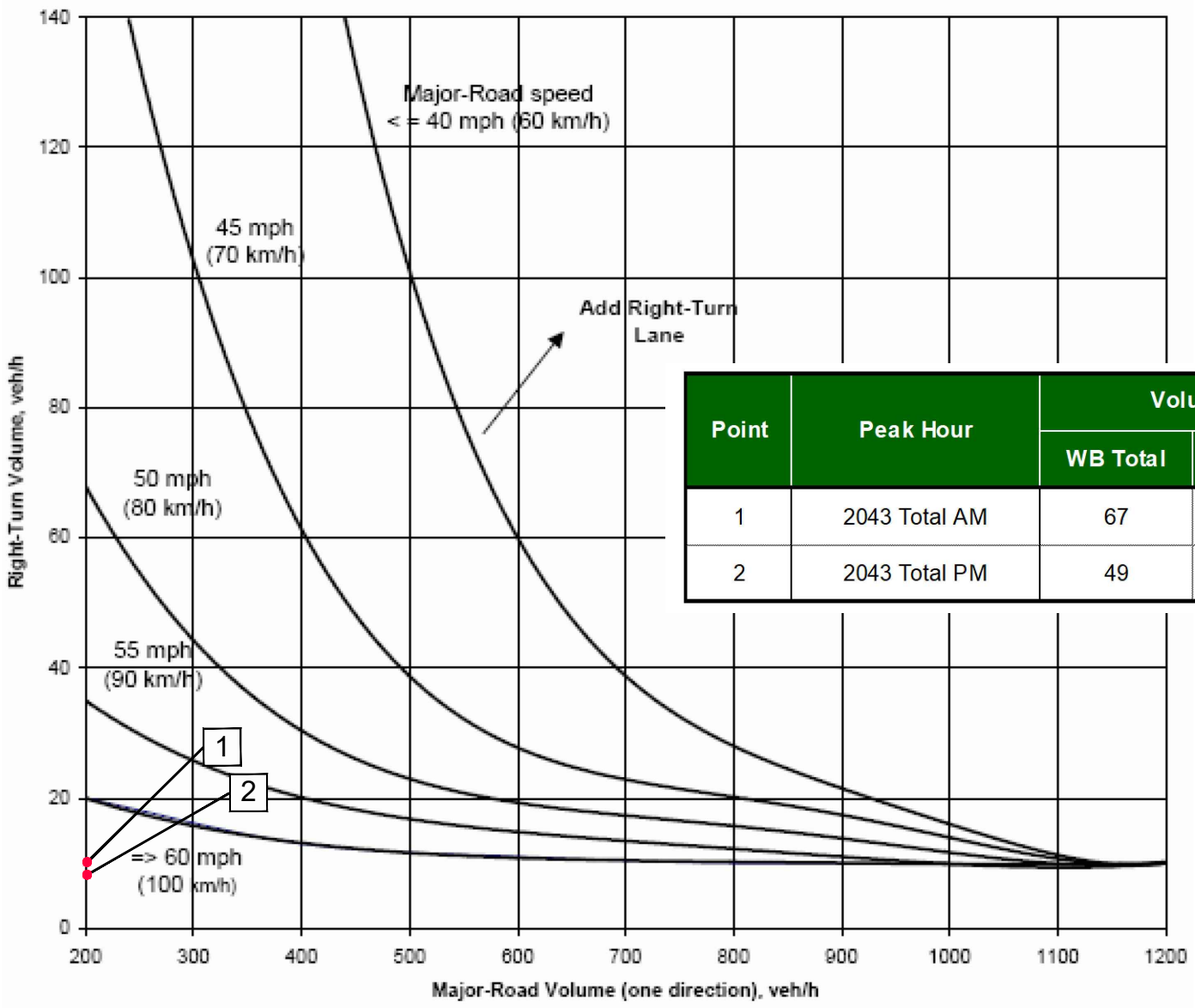


Point	Peak Hour	Volume	
		WB Total	WBRT
1	2043 Total AM	180	8
2	2043 Total PM	209	6

Story House Traffic Impact Study
NEED FOR A WESTBOUND RIGHT TURN LANE AT INDUSTRIAL LANE

Scale	NTS	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	32

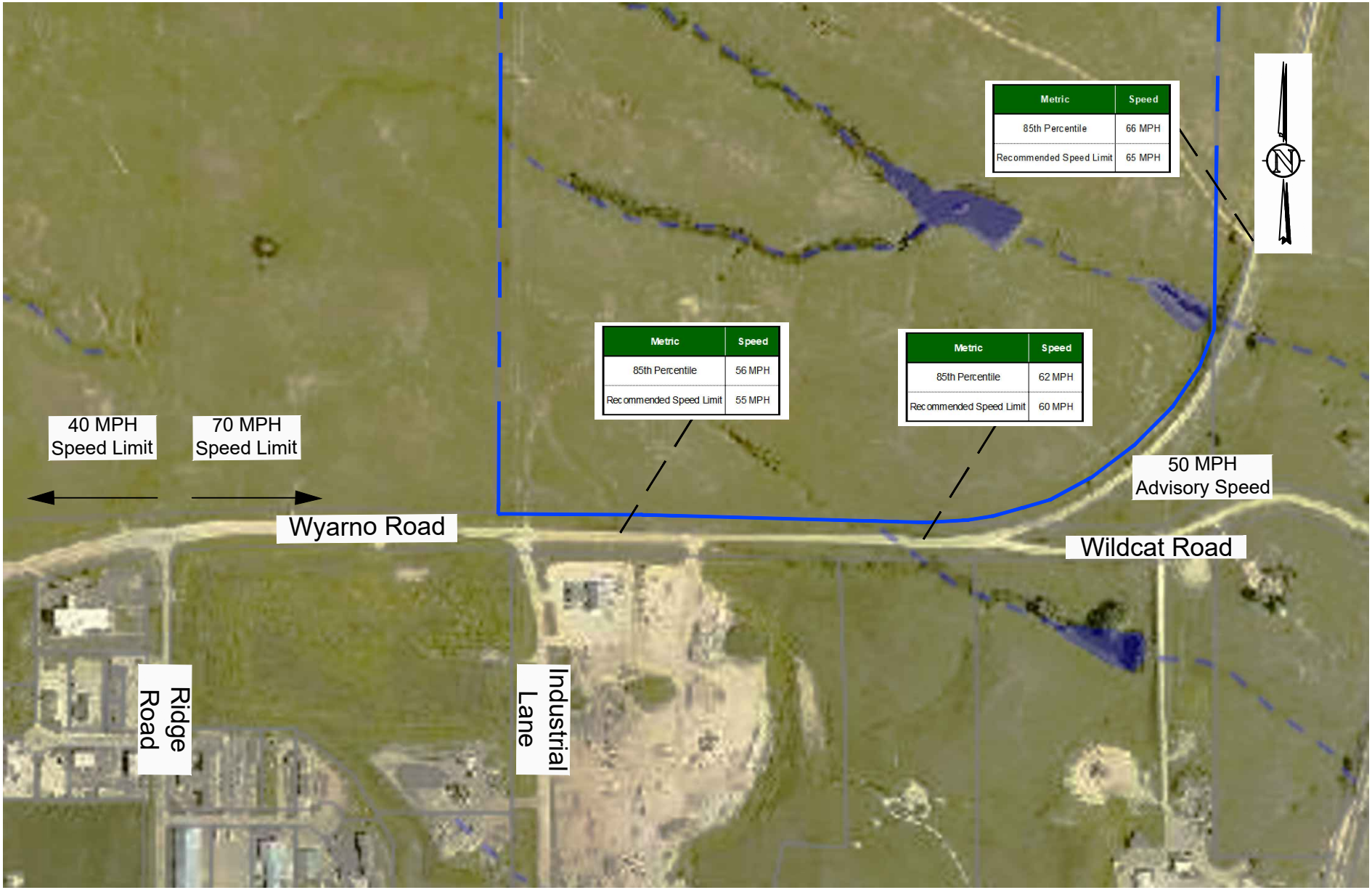
Figure 18-1 Right Turn Lane Guidelines for Two-Lane Highways



Point	Peak Hour	Volume	
		WB Total	WBRT
1	2043 Total AM	67	12
2	2043 Total PM	49	9

Story House Traffic Impact Study
NEED FOR A WESTBOUND RIGHT TURN LANE AT THE EAST ACCESS

Scale	NTS	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	33



STS

Story House Traffic Impact Study
WYARNO ROAD SPEED STUDY

Scale	1" = 500'	Date	October 6, 2023	Drawn by	JLH	Job #	WWC Engineering	Figure	34

Appendix A

Traffic Count Data

Industrial Lane

Morning Peak Hour

Date: July 19, 2023 (Wednesday)

Interval Starts	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
6:30	3	0	0	0	0	0	0	8	22	0	9	0
6:45	4	0	0	0	0	0	0	8	24	0	15	0
7:00	8	0	0	0	0	0	0	2	4	0	12	0
7:15	13	0	0	0	0	0	0	5	5	0	17	0
Peak	**28**	**0**	**0**	**0**	**0**	**0**	**0**	**23**	**55**	**0**	**53**	**0**
PHF		**0.54**			**0.00**			**0.61**			**0.78**	

Evening Peak Hour

Date: July 19, 2023 (Wednesday)

Interval Starts	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
16:45	10	0	1	0	0	0	0	18	8	0	7	0
17:00	19	0	1	0	0	0	0	15	12	0	11	0
17:15	20	0	0	0	0	0	0	21	8	0	8	0
17:30	10	0	1	0	0	0	0	22	0	0	8	0
Peak	**59**	**0**	**3**	**0**	**0**	**0**	**0**	**76**	**28**	**0**	**34**	**0**
PHF		**0.78**			**0.00**			**0.90**			**0.77**	

Wildcat Road

Morning Peak Hour

Date: July 20, 2023 (Thursday)

Interval Starts	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:00	5	0	0	0	0	0	0	7	1	0	5	0
7:15	5	0	0	0	0	0	0	8	0	0	15	0
7:30	5	0	0	0	0	0	0	5	1	1	8	0
7:45	4	0	0	0	0	0	0	2	3	0	13	0
Peak	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**5**	**1**	**41**	**0**
PHF		**0.95**			**0.00**			**0.84**			**0.70**	

Evening Peak Hour

Date: July 20, 2023 (Thursday)

Interval Starts	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
16:30	1	0	0	0	0	0	0	8	3	0	9	0
16:45	2	0	1	0	0	0	0	18	5	0	13	0
17:00	0	0	0	0	0	0	0	11	6	0	2	0
17:15	5	0	0	0	0	0	0	12	5	0	6	0
Peak	**8**	**0**	**1**	**0**	**0**	**0**	**0**	**49**	**19**	**0**	**30**	**0**
PHF		**0.45**			**0.00**			**0.74**			**0.58**	

Traffic Count Summary

Industrial Lane Morning Peak Hour

Interval Starts	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
6:30	3	0	0	0	0	0	0	8	22	0	9	0	42
6:45	4	0	0	0	0	0	0	8	24	0	15	0	51
7:00	8	0	0	0	0	0	0	2	4	0	12	0	26
7:15	13	0	0	0	0	0	0	5	5	0	17	0	40
7:30	15	0	0	0	0	0	0	5	5	0	11	0	36
7:45	12	0	0	0	0	0	0	8	9	0	19	0	48
8:00	8	0	0	0	0	0	0	6	6	0	10	0	30
8:15	8	0	0	0	0	0	0	10	6	0	12	0	36
Light	35	0	0	0	0	0	0	51	64	0	105	0	
Medium	1	0	0	0	0	0	0	1	1	0	0	0	
Heavy	35	0	0	0	0	0	0	0	16	0	0	0	
% Med + Hvy	51%	0%	0%	0%	0%	0%	0%	2%	21%	0%	0%	0%	

Peak Hour Calculator				
6:30-7:15	6:45-7:30	7:00-7:45	7:15-8:00	7:30-8:15
159	153	150	154	150

Industrial Lane Evening Peak Hour

Interval Starts	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00	7	0	0	0	0	0	0	15	5	0	16	0	43
4:15	1	0	0	0	0	0	0	11	7	0	9	0	28
4:30	8	0	0	0	0	0	0	14	8	0	7	0	37
4:45	10	0	1	0	0	0	0	18	8	0	7	0	44
5:00	19	0	1	0	0	0	0	15	12	0	11	0	58
5:15	20	0	0	0	0	0	0	21	8	0	8	0	57
5:30	10	0	1	0	0	0	0	22	0	0	8	0	41
5:45	2	0	0	0	0	0	0	11	1	0	6	0	20
Light	66	0	3	0	0	0	0	126	22	0	70	0	
Medium	0	0	0	0	0	0	0	0	0	0	1	0	
Heavy	11	0	0	0	0	0	0	1	27	0	1	0	
% Med + Hvy	14%	0%	0%	0%	0%	0%	0%	1%	55%	0%	3%	0%	

Peak Hour Calculator				
4:00-4:45	4:15-5:00	4:30-5:15	4:45-5:30	5:00-5:45
152	167	196	200	176

Traffic Count Summary

Wildcat Road Morning Peak Hour

Interval Starts	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
6:30	2	0	0	0	0	0	0	4	3	0	6	0	15
6:45	3	0	0	0	0	0	0	3	2	0	10	0	18
7:00	5	0	0	0	0	0	0	7	1	0	5	0	18
7:15	5	0	0	0	0	0	0	8	0	0	15	0	28
7:30	5	0	0	0	0	0	0	5	1	0	8	1	20
7:45	4	0	0	0	0	0	0	2	3	0	13	0	22
8:00	4	0	1	0	0	0	0	6	0	0	6	0	17
8:15	1	0	1	0	0	0	0	6	2	0	7	0	17
Light	29	0	2	0	0	0	0	36	12	0	70	1	
Medium	0	0	0	0	0	0	0	5	0	0	0	0	
Heavy	0	0	0	0	0	0	0	0	0	0	0	0	
% Med + Hvy	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%	

Peak Hour Calculator				
6:30-7:15	6:45-7:30	7:00-7:45	7:15-8:00	7:30-8:15
79	84	88	87	76

Wildcat Road Evening Peak Hour

Interval Starts	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00	0	0	0	0	0	0	0	10	3	0	7	0	20
4:15	0	0	0	0	0	0	0	3	1	0	4	0	8
4:30	1	0	0	0	0	0	0	8	3	0	9	0	21
4:45	2	0	1	0	0	0	0	18	5	0	13	0	39
5:00	0	0	0	0	0	0	0	11	6	0	2	0	19
5:15	5	0	0	0	0	0	0	12	5	0	6	0	28
5:30	1	0	0	0	0	0	0	7	3	0	8	0	19
5:45	2	0	0	0	0	0	0	7	5	0	6	0	20
Light	11	0	1	0	0	0	0	74	30	0	51	0	
Medium	0	0	0	0	0	0	0	1	0	0	1	0	
Heavy	0	0	0	0	0	0	0	1	1	0	3	0	
% Med + Hvy	0%	0%	0%	0%	0%	0%	0%	3%	3%	0%	7%	0%	

Peak Hour Calculator				
4:00-4:45	4:15-5:00	4:30-5:15	4:45-5:30	5:00-5:45
88	87	107	105	86

Appendix B

VISTRO Analysis Results

Year 2023 Volumes

Story House TIS

Vistro File: C:\...\AM.vistro
Report File: C:\...\2023 AM.pdf

Scenario 1 2023 AM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.070	10.2	B
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.022	9.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	10.2
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.070

Intersection Setup

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	28	0	23	55	0	53
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	21.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	0	23	55	0	53
Peak Hour Factor	0.5400	0.5400	0.6100	0.6100	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	0	9	23	0	17
Total Analysis Volume [veh/h]	52	0	38	90	0	68
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.24	8.69	0.00	0.00	7.47	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.23	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	5.67	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.24		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	2.15					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.022

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	19	0	22	5	1	41
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	7	1	0	15
Total Analysis Volume [veh/h]	20	0	26	6	1	59
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.05	8.53	0.00	0.00	7.28	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.68	1.68	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	9.05		0.00		0.12	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.68					
Intersection LOS	A					

Story House TIS

Vistro File: C:\...\PM.vistro
Report File: C:\...\2023 PM.pdf

Scenario 1 2023 PM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.093	9.8	A
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.021	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	9.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.093

Intersection Setup

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	59	3	76	28	0	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	55.00	2.00	3.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	59	3	76	28	0	34
Peak Hour Factor	0.7800	0.7800	0.9000	0.9000	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	1	21	8	0	11
Total Analysis Volume [veh/h]	76	4	84	31	0	44
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.83	8.78	0.00	0.00	7.44	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.30	0.01	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	7.62	0.32	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.78		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.27					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.021

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	1	49	19	0	30
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	17	6	0	13
Total Analysis Volume [veh/h]	18	2	66	26	0	52
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.27	8.76	0.00	0.00	7.40	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.76	1.76	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.22		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.12					
Intersection LOS	A					

Year 2026 Traffic Volume Scenarios

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.070	10.0	B
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.022	9.1	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.070

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.0180	1.0180	1.0180	1.0000	1.0000	1.0000	1.0000	1.0180	1.0180	1.0180	1.0180	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	0	0	0	0	0	23	56	0	54	0
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	0	0	0	0	0	0	9	23	0	17	0
Total Analysis Volume [veh/h]	54	0	0	0	0	0	0	38	92	0	69	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.04	9.95	8.48	9.42	10.17	8.62	7.35	0.00	0.00	7.47	0.00	0.00
Movement LOS	B	A	A	A	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	5.65	5.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.04			9.40			0.00			0.00		
Approach LOS	B			A			A			A		
d_I, Intersection Delay [s/veh]	2.14											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.022

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0180	1.0000	1.0180	1.0000	1.0000	1.0180
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	19	0	22	5	1	42
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	7	1	0	15
Total Analysis Volume [veh/h]	20	0	26	6	1	60
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.05	8.53	0.00	0.00	7.28	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.69	1.69	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	9.05		0.00		0.12	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.67					
Intersection LOS	A					

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.092	9.7	A
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.021	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	9.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.092

Intersection Setup

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	59	3	76	28	0	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	55.00	2.00	3.00
Growth Factor	1.0180	1.0180	1.0180	1.0180	1.0180	1.0180
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	60	3	77	29	0	35
Peak Hour Factor	0.7800	0.7800	0.9000	0.9000	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	1	21	8	0	11
Total Analysis Volume [veh/h]	77	4	86	32	0	45
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.75	8.72	0.00	0.00	7.45	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.30	0.01	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	7.59	0.31	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.70		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.22					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.021

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0180	1.0000	1.0180	1.0000	1.0000	1.0180
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	1	50	19	0	31
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	17	6	0	13
Total Analysis Volume [veh/h]	18	2	68	26	0	53
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.28	8.77	0.00	0.00	7.40	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.76	1.76	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.23		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.11					
Intersection LOS	A					

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.168	18.4	C
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.022	9.1	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	18.4
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.168

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.0180	1.0180	1.0180	1.0000	1.0000	1.0000	1.0000	1.0180	1.0180	1.0180	1.0180	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	7	0	139	87	0	0	0	0	5
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	0	7	0	139	87	23	56	0	54	5
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	0	0	2	0	41	36	9	23	0	17	2
Total Analysis Volume [veh/h]	54	0	0	8	0	164	143	38	92	0	69	6
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.17	0.00	0.00	0.02	0.00	0.17	0.09	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	18.43	14.61	8.48	12.69	13.40	9.36	7.61	0.00	0.00	7.47	0.00	0.00
Movement LOS	C	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.59	0.59	0.00	0.05	0.05	0.59	0.31	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	14.86	14.86	0.00	1.28	1.28	14.80	7.75	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	18.43			9.51			3.98			0.00		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	6.48											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.022

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0180	1.0000	1.0180	1.0000	1.0000	1.0180
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	7	0	0	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	19	0	29	5	1	47
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	9	1	0	17
Total Analysis Volume [veh/h]	20	0	35	6	1	67
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.14	8.57	0.00	0.00	7.30	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.72	1.72	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	9.14		0.00		0.11	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.47					
Intersection LOS	A					

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.219	18.1	C
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.022	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	18.1
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.219

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	59	0	3	0	0	0	0	76	28	0	34	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	55.00	2.00	3.00	2.00
Growth Factor	1.0180	1.0180	1.0180	1.0000	1.0000	1.0000	1.0000	1.0180	1.0180	1.0180	1.0180	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	120	139	0	0	0	0	7
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	60	0	3	6	0	120	139	77	29	0	35	7
Peak Hour Factor	0.7800	0.7800	0.7800	0.8500	0.8500	0.8500	0.9000	0.9000	0.9000	0.7700	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	0	1	2	0	35	39	21	8	0	11	2
Total Analysis Volume [veh/h]	77	0	4	7	0	141	154	86	32	0	45	9
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.00	0.00	0.02	0.00	0.14	0.10	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	18.11	15.76	8.72	12.99	13.31	9.10	7.58	0.00	0.00	7.45	0.00	0.00
Movement LOS	C	C	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.82	0.82	0.01	0.05	0.05	0.48	0.33	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	20.57	20.57	0.31	1.16	1.16	11.99	8.25	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	17.65			9.28			4.29			0.00		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	7.15											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.022

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0180	1.0000	1.0180	1.0000	1.0000	1.0180
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	6	0	0	7
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	1	56	19	0	38
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	19	6	0	16
Total Analysis Volume [veh/h]	18	2	76	26	0	66
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.41	8.82	0.00	0.00	7.42	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.81	1.81	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.35		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.99					
Intersection LOS	A					

Year 2031 Traffic Volume Scenarios

Story House TIS

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.169	18.5	C
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.024	9.2	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	18.5
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.169

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.0490	1.0490	1.0490	1.0000	1.0000	1.0000	1.0000	1.0490	1.0490	1.0490	1.0490	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	7	0	139	87	0	0	0	0	5
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	0	7	0	139	87	24	58	0	56	5
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	0	0	2	0	41	36	10	24	0	18	2
Total Analysis Volume [veh/h]	54	0	0	8	0	164	143	39	95	0	72	6
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.17	0.00	0.00	0.02	0.00	0.17	0.09	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	18.55	14.69	8.49	12.75	13.48	9.38	7.61	0.00	0.00	7.48	0.00	0.00
Movement LOS	C	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.60	0.60	0.00	0.05	0.05	0.59	0.31	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	14.99	14.99	0.00	1.29	1.29	14.87	7.77	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	18.55			9.53			3.93			0.00		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	6.42											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0490	1.0000	1.0490	1.0000	1.0000	1.0490
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	7	0	0	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	0	30	5	1	48
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	9	1	0	17
Total Analysis Volume [veh/h]	21	0	36	6	1	69
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.16	8.58	0.00	0.00	7.30	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.82	1.82	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	9.16		0.00		0.10	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.50					
Intersection LOS	A					

Story House TIS

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.227	18.3	C
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.022	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	18.3
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.227

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	59	0	3	0	0	0	0	76	28	0	34	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	55.00	2.00	3.00	2.00
Growth Factor	1.0490	1.0490	1.0490	1.0000	1.0000	1.0000	1.0000	1.0490	1.0490	1.0490	1.0490	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	120	139	0	0	0	0	7
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	62	0	3	6	0	120	139	80	29	0	36	7
Peak Hour Factor	0.7800	0.7800	0.7800	0.8500	0.8500	0.8500	0.9000	0.9000	0.9000	0.7700	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	0	1	2	0	35	39	22	8	0	12	2
Total Analysis Volume [veh/h]	79	0	4	7	0	141	154	89	32	0	47	9
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.02	0.00	0.14	0.10	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	18.35	15.96	8.73	13.05	13.37	9.11	7.58	0.00	0.00	7.45	0.00	0.00
Movement LOS	C	C	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.86	0.86	0.01	0.05	0.05	0.48	0.33	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	21.46	21.46	0.31	1.17	1.17	12.03	8.27	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	17.88			9.30			4.25			0.00		
Approach LOS	C			A			A			A		
d_I, Intersection Delay [s/veh]	7.17											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.022

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0490	1.0000	1.0490	1.0000	1.0000	1.0490
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	6	0	0	7
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	1	57	19	0	38
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	19	6	0	16
Total Analysis Volume [veh/h]	18	2	77	26	0	66
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.41	8.82	0.00	0.00	7.42	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.81	1.81	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.35		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.99					
Intersection LOS	A					

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Scenario 5 2031 Total AM
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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.793	156.5	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.036	11.3	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.016	12.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	156.5
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.793

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.0490	1.0490	1.0490	1.0000	1.0000	1.0000	1.0000	1.0490	1.0490	1.0490	1.0490	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	5	0	141	218	146	0	0	94	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	0	5	0	141	218	170	58	0	150	8
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	0	0	1	0	41	89	70	24	0	48	3
Total Analysis Volume [veh/h]	54	0	0	6	0	166	357	279	95	0	192	10
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.79	0.00	0.00	0.05	0.00	0.20	0.26	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	156.47	129.71	9.74	38.69	36.37	10.31	8.55	0.00	0.00	8.04	0.00	0.00
Movement LOS	F	F	A	E	E	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	3.71	3.71	0.00	0.17	0.17	0.73	1.05	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	92.65	92.65	0.00	4.16	4.16	18.20	26.22	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	156.47			11.30			4.18			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	11.60											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.036

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0490	1.0000	1.0490	1.0000	1.0000	1.0490
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	150	0	0	102
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	0	173	5	1	145
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	51	1	0	52
Total Analysis Volume [veh/h]	21	0	206	6	1	207
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.32	9.55	0.00	0.00	7.65	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.76	2.76	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	11.32		0.00		0.04	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.56					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	12.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	22	42	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0490	1.0490	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	146	5	8	11	7	94
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	146	28	52	11	7	94
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	8	15	3	2	28
Total Analysis Volume [veh/h]	172	33	61	13	8	111
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.00	0.00	0.00	0.02	0.11
d_M, Delay for Movement [s/veh]	7.79	0.00	0.00	0.00	12.26	9.07
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.40	0.00	0.00	0.00	0.05	0.38
95th-Percentile Queue Length [ft/ln]	9.96	0.00	0.00	0.00	1.21	9.38
d_A, Approach Delay [s/veh]	6.53		0.00		9.28	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.14					
Intersection LOS	B					

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Scenario 5 2031 Total PM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.596	66.0	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.037	12.7	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.024	11.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	66.0
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	59	0	3	0	0	0	0	76	28	0	34	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	55.00	2.00	3.00	2.00
Growth Factor	1.0490	1.0490	1.0490	1.0000	1.0000	1.0000	1.0000	1.0490	1.0490	1.0490	1.0490	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	8	0	230	157	105	0	0	153	6
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	62	0	3	8	0	230	157	185	29	0	189	6
Peak Hour Factor	0.7800	0.7800	0.7800	0.8500	0.8500	0.8500	0.9000	0.9000	0.9000	0.7700	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	0	1	2	0	68	44	51	8	0	61	2
Total Analysis Volume [veh/h]	79	0	4	9	0	271	174	206	32	0	245	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.60	0.00	0.00	0.04	0.00	0.34	0.13	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	66.04	52.03	9.33	19.74	19.19	11.92	8.16	0.00	0.00	7.71	0.00	0.00
Movement LOS	F	F	A	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	3.05	3.05	0.01	0.11	0.11	1.53	0.46	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	76.14	76.14	0.36	2.75	2.75	38.28	11.43	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	63.30			12.17			3.45			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	9.81											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0490	1.0000	1.0490	1.0000	1.0000	1.0490
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	113	0	0	159
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	1	164	19	0	190
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	55	6	0	82
Total Analysis Volume [veh/h]	18	2	222	26	0	328
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	12.68	9.77	0.00	0.00	7.73	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.12	0.12	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.07	3.07	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	12.38		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.42					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	50	30	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	2.00	7.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0490	1.0490	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	105	8	6	8	12	153
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	105	60	37	8	12	153
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	18	11	2	4	45
Total Analysis Volume [veh/h]	124	71	44	9	14	180
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.02	0.18
d_M, Delay for Movement [s/veh]	7.53	0.00	0.00	0.00	11.34	9.28
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.26	0.00	0.00	0.00	0.07	0.64
95th-Percentile Queue Length [ft/ln]	6.53	0.00	0.00	0.00	1.85	15.97
d_A, Approach Delay [s/veh]	4.79		0.00		9.43	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.25					
Intersection LOS	B					

Year 2034 Traffic Volume Scenarios

Story House TIS

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Scenario 10 2034 Back AM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.828	165.6	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.036	11.3	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.016	12.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	165.6
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.828

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.0680	1.0680	1.0680	1.0000	1.0000	1.0000	1.0000	1.0680	1.0680	1.0680	1.0680	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	5	0	141	218	146	0	0	94	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	0	0	5	0	141	218	171	59	0	151	8
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	0	0	1	0	41	89	70	24	0	48	3
Total Analysis Volume [veh/h]	56	0	0	6	0	166	357	280	97	0	194	10
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.83	0.00	0.00	0.05	0.00	0.20	0.26	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	165.56	138.59	9.74	38.94	36.62	10.32	8.56	0.00	0.00	8.05	0.00	0.00
Movement LOS	F	F	A	E	E	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	3.91	3.91	0.00	0.17	0.17	0.73	1.05	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	97.82	97.82	0.00	4.19	4.19	18.26	26.28	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	165.56			11.32			4.16			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	12.24											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.036

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0680	1.0000	1.0680	1.0000	1.0000	1.0680
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	150	0	0	102
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	0	173	5	1	146
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	51	1	0	52
Total Analysis Volume [veh/h]	21	0	206	6	1	209
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.33	9.56	0.00	0.00	7.65	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.77	2.77	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	11.33		0.00		0.04	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.55					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	12.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	22	42	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0680	1.0680	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	146	5	8	11	7	94
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	146	28	53	11	7	94
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	8	16	3	2	28
Total Analysis Volume [veh/h]	172	33	62	13	8	111
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.00	0.00	0.00	0.02	0.11
d_M, Delay for Movement [s/veh]	7.79	0.00	0.00	0.00	12.27	9.07
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.40	0.00	0.00	0.00	0.05	0.38
95th-Percentile Queue Length [ft/ln]	9.97	0.00	0.00	0.00	1.21	9.39
d_A, Approach Delay [s/veh]	6.53		0.00		9.29	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.13					
Intersection LOS	B					

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Scenario 10 2034 Back PM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.613	67.9	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.041	12.7	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.024	11.4	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	67.9
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	59	0	3	0	0	0	0	76	28	0	34	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	55.00	2.00	3.00	2.00
Growth Factor	1.0680	1.0680	1.0680	1.0000	1.0000	1.0000	1.0000	1.0680	1.0680	1.0680	1.0680	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	8	0	230	157	105	0	0	153	6
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	63	0	3	8	0	230	157	186	30	0	189	6
Peak Hour Factor	0.7800	0.7800	0.7800	0.8500	0.8500	0.8500	0.9000	0.9000	0.9000	0.7700	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	0	1	2	0	68	44	52	8	0	61	2
Total Analysis Volume [veh/h]	81	0	4	9	0	271	174	207	33	0	245	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.61	0.00	0.00	0.04	0.00	0.34	0.13	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	67.94	53.90	9.34	19.77	19.23	11.92	8.16	0.00	0.00	7.71	0.00	0.00
Movement LOS	F	F	A	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	3.17	3.17	0.01	0.11	0.11	1.53	0.46	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	79.29	79.29	0.36	2.76	2.76	38.28	11.43	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	65.18			12.17			3.43			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	10.05											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.041

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0680	1.0000	1.0680	1.0000	1.0000	1.0680
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	113	0	0	159
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	1	165	19	0	191
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	1	56	6	0	82
Total Analysis Volume [veh/h]	20	2	223	26	0	329
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	12.73	9.81	0.00	0.00	7.73	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.14	0.14	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.41	3.41	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	12.46		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.46					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	50	30	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	2.00	7.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0680	1.0680	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	105	8	6	8	12	153
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	105	61	38	8	12	153
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	18	11	2	4	45
Total Analysis Volume [veh/h]	124	72	45	9	14	180
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.02	0.18
d_M, Delay for Movement [s/veh]	7.53	0.00	0.00	0.00	11.36	9.29
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.26	0.00	0.00	0.00	0.07	0.64
95th-Percentile Queue Length [ft/ln]	6.54	0.00	0.00	0.00	1.85	15.99
d_A, Approach Delay [s/veh]	4.77		0.00		9.44	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.23					
Intersection LOS	B					

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Scenario 6 2034 Total AM
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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.939	211.8	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.037	11.5	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.018	12.4	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	211.8
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.939

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.0680	1.0680	1.0680	1.0000	1.0000	1.0000	1.0000	1.0680	1.0680	1.0680	1.0680	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	157	223	149	0	0	105	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	0	0	6	0	157	223	174	59	0	162	8
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	0	0	2	0	46	91	71	24	0	52	3
Total Analysis Volume [veh/h]	56	0	0	7	0	185	366	285	97	0	208	10
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.94	0.00	0.00	0.07	0.00	0.22	0.27	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	211.80	179.45	9.77	42.00	39.26	10.60	8.65	0.00	0.00	8.06	0.00	0.00
Movement LOS	F	F	A	E	E	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	4.36	4.36	0.00	0.21	0.21	0.86	1.10	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	108.99	108.99	0.00	5.31	5.31	21.38	27.61	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	211.80			11.75			4.23			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	14.24											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.0680	1.0000	1.0680	1.0000	1.0000	1.0680
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	154	0	0	113
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	0	177	5	1	157
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	0	53	1	0	56
Total Analysis Volume [veh/h]	21	0	211	6	1	224
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.51	9.60	0.00	0.00	7.66	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.11	0.11	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.84	2.84	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	11.51		0.00		0.03	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.54					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	12.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	22	42	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0680	1.0680	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	149	6	8	12	8	105
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	29	53	12	8	105
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	44	9	16	4	2	31
Total Analysis Volume [veh/h]	175	34	62	14	9	124
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.00	0.00	0.00	0.02	0.12
d_M, Delay for Movement [s/veh]	7.80	0.00	0.00	0.00	12.38	9.14
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.41	0.00	0.00	0.00	0.06	0.43
95th-Percentile Queue Length [ft/ln]	10.17	0.00	0.00	0.00	1.38	10.65
d_A, Approach Delay [s/veh]	6.53		0.00		9.36	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.24					
Intersection LOS	B					

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Scenario 6 2034 Total PM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.726	95.5	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.043	13.1	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.027	11.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	95.5
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.726

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	59	0	3	0	0	0	0	76	28	0	34	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	55.00	2.00	3.00	2.00
Growth Factor	1.0680	1.0680	1.0680	1.0000	1.0000	1.0000	1.0000	1.0680	1.0680	1.0680	1.0680	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	8	0	241	176	117	0	0	160	6
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	63	0	3	8	0	241	176	198	30	0	196	6
Peak Hour Factor	0.7800	0.7800	0.7800	0.8500	0.8500	0.8500	0.9000	0.9000	0.9000	0.7700	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	0	1	2	0	71	49	55	8	0	64	2
Total Analysis Volume [veh/h]	81	0	4	9	0	284	196	220	33	0	255	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.73	0.00	0.00	0.04	0.00	0.36	0.15	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	95.47	77.92	9.41	21.83	20.99	12.24	8.26	0.00	0.00	7.74	0.00	0.00
Movement LOS	F	F	A	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	3.92	3.92	0.01	0.13	0.13	1.67	0.53	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	98.12	98.12	0.37	3.14	3.14	41.85	13.25	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	91.42			12.53			3.60			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	11.98											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	13.1
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.043

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.0680	1.0000	1.0680	1.0000	1.0000	1.0680
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	126	0	0	166
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	1	178	19	0	198
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	1	60	6	0	85
Total Analysis Volume [veh/h]	20	2	241	26	0	341
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.06	9.94	0.00	0.00	7.78	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.14	0.14	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.56	3.56	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	12.78		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.45					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	11.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	50	30	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	2.00	7.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0680	1.0680	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	117	8	6	9	13	160
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	61	38	9	13	160
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	18	11	3	4	47
Total Analysis Volume [veh/h]	138	72	45	11	15	188
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.03	0.18
d_M, Delay for Movement [s/veh]	7.56	0.00	0.00	0.00	11.70	9.34
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.29	0.00	0.00	0.00	0.08	0.68
95th-Percentile Queue Length [ft/ln]	7.36	0.00	0.00	0.00	2.09	16.89
d_A, Approach Delay [s/veh]	4.97		0.00		9.51	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.34					
Intersection LOS	B					

Year 2043 Traffic Volume Scenarios

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.078	10.2	B
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.025	9.1	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	10.2
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.078

Intersection Setup

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	28	0	23	55	0	53
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	21.00	2.00	2.00
Growth Factor	1.1270	1.1270	1.2700	1.2700	1.2700	1.2700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	0	29	70	0	67
Peak Hour Factor	0.5400	0.5400	0.6100	0.6100	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	0	12	29	0	21
Total Analysis Volume [veh/h]	59	0	48	115	0	86
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.16	8.53	0.00	0.00	7.54	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.25	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	6.33	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	10.16		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.95					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.025

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.1270	1.0000	1.1270	1.0000	1.0000	1.1270
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	0	25	5	1	46
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	0	7	1	0	16
Total Analysis Volume [veh/h]	22	0	30	6	1	66
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.11	8.56	0.00	0.00	7.29	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.08	0.08	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.88	1.88	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	9.11		0.00		0.11	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.66					
Intersection LOS	A					

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.106	10.0	B
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.024	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.106

Intersection Setup

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Industrial Lane		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	59	3	76	28	0	34
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	55.00	2.00	3.00
Growth Factor	1.1270	1.1270	1.2700	1.2700	1.2700	1.2700
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	3	97	36	0	43
Peak Hour Factor	0.7800	0.7800	0.9000	0.9000	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	21	1	27	10	0	14
Total Analysis Volume [veh/h]	85	4	108	40	0	56
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.04	8.82	0.00	0.00	7.51	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.36	0.01	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	8.89	0.32	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.98		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.03					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.1270	1.0000	1.1270	1.0000	1.0000	1.1270
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	1	55	19	0	34
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	1	19	6	0	15
Total Analysis Volume [veh/h]	20	2	74	26	0	59
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.36	8.82	0.00	0.00	7.41	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.08	0.08	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.98	1.98	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.31		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.13					
Intersection LOS	A					

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	1.032	246.4	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.039	11.6	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.018	12.4	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	246.4
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.032

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			70.00			70.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	28	0	0	0	0	0	0	23	55	0	53	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	51.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	21.00	2.00	2.00	2.00
Growth Factor	1.1270	1.1270	1.1270	1.0000	1.0000	1.0000	1.0000	1.2700	1.2700	1.2700	1.2700	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	157	223	149	0	0	105	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	0	0	6	0	157	223	178	70	0	172	8
Peak Hour Factor	0.5400	0.5400	0.5400	0.8500	0.8500	0.8500	0.6100	0.6100	0.6100	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	0	0	2	0	46	91	73	29	0	55	3
Total Analysis Volume [veh/h]	59	0	0	7	0	185	366	292	115	0	221	10
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.03	0.00	0.00	0.07	0.00	0.23	0.27	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	246.44	212.36	9.82	44.05	41.39	10.72	8.71	0.00	0.00	8.13	0.00	0.00
Movement LOS	F	F	A	E	E	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	4.82	4.82	0.00	0.22	0.22	0.87	1.12	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	120.51	120.51	0.00	5.59	5.59	21.84	28.02	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	246.44			11.94			4.12			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	15.95											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.039

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	19	0	22	5	1	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	12.00	2.00	2.00	2.00
Growth Factor	1.1270	1.0000	1.1270	1.0000	1.0000	1.1270
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	154	0	0	113
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	0	179	5	1	159
Peak Hour Factor	0.9500	0.9500	0.8400	0.8400	0.7000	0.7000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	0	53	1	0	57
Total Analysis Volume [veh/h]	22	0	213	6	1	227
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.57	9.62	0.00	0.00	7.67	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.12	0.12	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.00	3.00	0.00	0.00	0.04	0.04
d_A, Approach Delay [s/veh]	11.57		0.00		0.03	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.56					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	12.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		70.00		70.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	22	42	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.1270	1.1270	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	149	6	8	12	8	105
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	149	31	55	12	8	105
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	44	9	16	4	2	31
Total Analysis Volume [veh/h]	175	36	65	14	9	124
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.00	0.00	0.00	0.02	0.13
d_M, Delay for Movement [s/veh]	7.81	0.00	0.00	0.00	12.43	9.16
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.41	0.00	0.00	0.00	0.06	0.43
95th-Percentile Queue Length [ft/ln]	10.20	0.00	0.00	0.00	1.39	10.69
d_A, Approach Delay [s/veh]	6.47		0.00		9.38	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.18					
Intersection LOS	B					

Story House TIS

Vistro File: C:\...\PM.vistro
Report File: C:\...\2043 Total PM.pdf

Scenario 7 2043 Total PM
10/5/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Industrial Lane	Two-way stop	HCM 7th Edition	NB Left	0.802	113.8	F
2	Wildcat Road	Two-way stop	HCM 7th Edition	NB Left	0.043	13.2	B
3	East Access	Two-way stop	HCM 7th Edition	EB Left	0.027	11.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Industrial Lane

Control Type:	Two-way stop	Delay (sec / veh):	113.8
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.802

Intersection Setup

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Industrial Lane			West Access			Wyarno Road			Wyarno Road		
Base Volume Input [veh/h]	59	0	3	0	0	0	0	76	28	0	34	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	55.00	2.00	3.00	2.00
Growth Factor	1.1270	1.1270	1.1270	1.0000	1.0000	1.0000	1.0000	1.2700	1.2700	1.2700	1.2700	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	8	0	241	176	117	0	0	160	6
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	3	8	0	241	176	214	36	0	203	6
Peak Hour Factor	0.7800	0.7800	0.7800	0.8500	0.8500	0.8500	0.9000	0.9000	0.9000	0.7700	0.7700	0.7700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	21	0	1	2	0	71	49	59	10	0	66	2
Total Analysis Volume [veh/h]	85	0	4	9	0	284	196	238	40	0	264	8
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.80	0.00	0.00	0.04	0.00	0.37	0.15	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	113.80	95.12	9.52	22.71	21.80	12.37	8.29	0.00	0.00	7.80	0.00	0.00
Movement LOS	F	F	A	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	4.49	4.49	0.02	0.13	0.13	1.70	0.53	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	112.13	112.13	0.38	3.30	3.30	42.58	13.37	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	109.11			12.69			3.43			0.00		
Approach LOS	F			B			A			A		
d_I, Intersection Delay [s/veh]	13.34											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Wildcat Road

Control Type:	Two-way stop	Delay (sec / veh):	13.2
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.043

Intersection Setup

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wildcat Road		Wyarno Road		Wyarno Road	
Base Volume Input [veh/h]	8	1	49	19	0	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	3.00	3.00	2.00	7.00
Growth Factor	1.1270	1.0000	1.1270	1.0000	1.0000	1.1270
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	126	0	0	166
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	1	181	19	0	200
Peak Hour Factor	0.4500	0.4500	0.7400	0.7400	0.5800	0.5800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	1	61	6	0	86
Total Analysis Volume [veh/h]	20	2	245	26	0	345
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.15	9.97	0.00	0.00	7.79	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.14	0.14	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	3.59	3.59	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	12.86		0.00		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.44					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 3: East Access

Control Type:	Two-way stop	Delay (sec / veh):	11.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

Intersection Setup

Name	Wyarno Road		Wyarno Road		East Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Wyarno Road		Wyarno Road		East Access	
Base Volume Input [veh/h]	0	50	30	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.00	2.00	7.00	2.00	2.00	2.00
Growth Factor	1.0000	1.1270	1.1270	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	117	8	6	9	13	160
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	64	40	9	13	160
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	19	12	3	4	47
Total Analysis Volume [veh/h]	138	75	47	11	15	188
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.03	0.19
d_M, Delay for Movement [s/veh]	7.57	0.00	0.00	0.00	11.74	9.35
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.29	0.00	0.00	0.00	0.08	0.68
95th-Percentile Queue Length [ft/ln]	7.37	0.00	0.00	0.00	2.10	16.94
d_A, Approach Delay [s/veh]	4.90		0.00		9.53	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	6.28					
Intersection LOS	B					

Appendix C

Crash Data

Gmail **Joe Henderson <thetrafficczar@gmail.com>**

Data Request

2 messages

Melinda Harmon <melinda.harmon1@wyo.gov> Thu, Oct 5, 2023 at 1:23 PM
To: Joe Henderson <joe@sustainabletrafficsolutions.com>
Cc: Keri Bohlmann <keri.bohlmann@wyo.gov>, Kari Fictum <kari.fictum1@wyo.gov>

Hello Joe,

Attached are your requested data reports.
Please let me know if you have any questions or concerns.

Thank you
Sincerely,
Melinda Harmon
Records and Data Management Analyst

WYDOT HIGHWAY SAFETY

P (307) 777-3910 F (307) 777--3853
5300 Bishop Blvd. Cheyenne, WY 82009-3340

E-Mail to and from me, in connection with the transaction
of public business, is subject to the Wyoming Public Records
Act and may be disclosed to third parties.

3 attachments

Intersection History Report - 5th St-WY 336 & Wyarno RD (ID104704) 2020-2022.pdf
51K

Intersection History Report - Wildcat Rd & Wyarno RD (ID104316) 2020-2022.pdf
45K

Segment History Report - Wyarno Rd (ML1704B) MP 0-11.52 2020-2022.pdf
58K

Joe Henderson <joe@sustainabletrafficsolutions.com> Thu, Oct 5, 2023 at 1:29 PM
To: Melinda Harmon <melinda.harmon1@wyo.gov>
Cc: Keri Bohlmann <keri.bohlmann@wyo.gov>, Kari Fictum <kari.fictum1@wyo.gov>

Melinda,

The request that I submitted for the big sweeping curve east of Wildcat Road. Are those crashes included in these reports? if so, how would I identify them?

Joe
[Quoted text hidden]
--
Joseph L. Henderson, PE, PTOE
Principal
Sustainable Traffic Solutions, Inc.
823 West 124th Drive
Westminster, CO 80234
303.589.6875
joe@sustainabletrafficsolutions.com

sustainabletrafficsolutions.com

Licensed in CO, WY, and IA



INTERSECTION CRASH HISTORY REPORT FOR 5TH ST/WY 336 & INDUSTRIAL LANE (ID104704) FOR THE YEARS 2020 - 2022

DATE	TIME	ID #	CRASH STEET	CROSS STREET	JUNCTION RELATION	INTERSECTION TYPE	MANNER OF COLLISION	CRASH SEVERITY	FATAL INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	#	VEHICLE DIRECTION	VEHICLE MANEUVER	DRIVER ACTION	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #
2021																										
06/08/2021	1812	104704	INDUSTRIAL LN	5TH ST | WY 336	Intersection	T Intersection	Angle (Front to Side), Opposing Direction	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	1	West	Straight Ahead	1	No Improper Driving	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806426	-106.922159	21-0006006
													2	West	Turning Left	2	Failed to Yield ROW	2	Driver	Shoulder and Lap Belt	No Apparent Injury							

REPORT SUMMARY

TOTAL CRASHES: 1

FATAL CRASHES: 0 **TOTAL FATALITIES:** 0

INJURY CRASHES: 0 **TOTAL INJURIES:** 0

PDO CRASHES: 1

	CRASH COUNTS				SEVERITY COUNTS			INJURY COUNTS				
YEAR	FATAL CRASHES	INJURY CRASHES	PDO CRASHES	TOTAL CRASHES	CRITICAL CRASHES*	SERIOUS CRASHES*	DAMAGE CRASHES*	FATAL INJURIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLE INJURIES	NO INJURIES
2021	0	0	1	1	0	0	1	0	0	0	0	2
	0	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**

* PDO = Property Damage Only Crashes
* Critical Crashes = Fatal & Suspected Serious Injury Crashes
* Serious Crashes = Suspected Minor Injury & Possible Injury Crashes
* Damage Crashes = No Apparent Injury & Unknown Injury Crashes

INTERSECTION CRASH HISTORY REPORT FOR WILDCAT RD & WYARNO RD (ID104316) FOR THE YEARS 2020 - 2022

DATE	TIME	ID #	CRASH STEET	CROSS STREET	JUNCTION RELATION	INTERSECTION TYPE	MANNER OF COLLISION	CRASH SEVERITY	FATAL INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	#	VEHICLE DIRECTION	VEHICLE MANEUVER	DRIVER ACTION	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #

REPORT SUMMARY

TOTAL CRASHES: 0

FATAL CRASHES: 0 **TOTAL FATALITIES:**

INJURY CRASHES: 0 **TOTAL INJURIES:**

PDO CRASHES: 0

* PDO = Property Damage Only Crashes
* Critical Crashes = Fatal & Suspected Serious Injury Crashes
* Serious Crashes = Suspected Minor Injury & Possible Injury Crashes
* Damage Crashes = No Apparent Injury & Unknown Injury Crashes

SEGMENT CRASH HISTORY REPORT FOR WYARNO RD (ML1704B) MP 0-11.52 FOR THE YEARS 2020 - 2022

LRS ID	CRASH STREET	MILE POST	CROSS STREET	DATE	TIME	CRASH SEVERITY	FATAL	INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	MANNER OF COLLISION	JUNCTION RELATION	VEHICLE #	VEHICLE DIRECTION	VEHICLE MANEUVER	DRIVER ACTION	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #
ML1704B	5TH ST | WY 336	0.012		01/25/2022	647	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Straight Ahead	1 Other Improper Action	1 Driver	Unknown	No Apparent Injury	Dawn	Snowing	Ice/Frost	N	N	44.806858	-106.955460	22P000561
													2	West	Stopped in Traffic	2 No Improper Driving	2 Driver	Unknown	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.012		07/06/2021	1540	POSSIBLE INJURY	0	3	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Slowing	1 Other Improper Action	1 Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806858	-106.955460	21P005478
													2	West	Stopped in Traffic	2 No Improper Driving	2 Driver	Shoulder and Lap Belt	Possible Injury								
													3	West	Stopped in Traffic	3 No Improper Driving	2 Passenger	Shoulder and Lap Belt	Possible Injury								
																	3 Driver	Shoulder and Lap Belt	Possible Injury								
ML1704B	5TH ST | WY 336	0.016		03/22/2022	1540	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Straight Ahead	1 Following too Close	1 Driver	Unknown	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806884	-106.955376	22P002097
													2	West	Stopped in Traffic	2 No Improper Driving	2 Driver	Unknown	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.124		07/09/2021	1537	SUSPECTED MINOR INJURY	0	1	Motor Vehicle in Transport on Roadway	On Roadway	Sideswipe Opposite Direction (Meeting)	Non-Junction	1	West	Straight Ahead	1 Erratic/Reckless/Careless/Aggressive	1 Driver	None Used	Suspected Minor Injury	Daylight	Clear	Dry	N	N	44.806849	-106.953175	21P005579
													2	East	Straight Ahead	2 No Improper Driving	1 Passenger	None Used	No Apparent Injury								
																	2 Driver	Unknown	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.158		02/04/2020	754	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Slowing	1 Drove too Fast for Conditions	1 Driver	Unknown	No Apparent Injury	Daylight	Clear	Ice/Frost	N	N	44.806842	-106.952466	20P000911
													2	West	Straight Ahead	2 No Improper Driving	2 Driver	Unknown	No Apparent Injury								
													3	West	Straight Ahead	3 No Improper Driving	3 Driver	Unknown	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.169		04/09/2021	1437	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	East	Straight Ahead	1 Following too Close	1 Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806838	-106.952225	21P002768
													2	East	Stopped in Traffic	2 No Improper Driving	2 Driver	Shoulder and Lap Belt	No Apparent Injury								
													3	East	Stopped in Traffic	3 No Improper Driving	3 Driver	Shoulder and Lap Belt	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.208		06/29/2022	802	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Straight Ahead	1 Following too Close	1 Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806862	-106.951436	22P005338
													2	West	Slowing	2 No Improper Driving	2 Driver	Shoulder and Lap Belt	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.362		10/07/2021	1448	SUSPECTED MINOR INJURY	0	1	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Straight Ahead	1 Failed to Yield ROW	1 Driver	Unknown	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806845	-106.948266	21P008760
													2	West	Stopped in Traffic	2 No Improper Driving	2 Driver	Unknown	No Apparent Injury								
																	2 Passenger	Unknown	Suspected Minor Injury								
ML1704B	5TH ST | WY 336	0.364		07/15/2020	1614	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	West	Straight Ahead	1 Following too Close	1 Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806833	-106.948219	20P005296
													2	West	Stopped in Traffic	2 No Improper Driving	2 Driver	Shoulder and Lap Belt	No Apparent Injury								
																	2 Passenger	Shoulder and Lap Belt	No Apparent Injury								
																	2 Passenger	Shoulder and Lap Belt	No Apparent Injury								
																	2 Passenger	None Used	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.478		01/04/2021	1535	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Intersection Related	1	East	Straight Ahead	1 Following too Close	1 Driver	Unknown	Unknown	Dusk	Clear	Dry	N	N	44.806836	-106.945882	21P000080
													2	East	Stopped in Traffic	2 No Improper Driving	2 Driver	Shoulder and Lap Belt	No Apparent Injury								

LRS ID	CRASH STREET	MILE POST	CROSS STREET	DATE	TIME	CRASH SEVERITY	FATAL	INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	MANNER OF COLLISION	JUNCTION RELATION	#	VEHICLE DIRECTION	VEHICLE MANEUVER	#	DRIVER ACTION	#	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #
ML1704B	5TH ST | WY 336	0.492		02/11/2021	1508	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Sideswipe Same Direction (Passing)	Intersection Related	1	West	Straight Ahead	1	Drove too Fast for Conditions	1	Driver	Unknown	No Apparent Injury	Daylight	Clear	Ice/Frost	N	N	44.806836	-106.945589	21P001063
													2	West	Slowing	2	No Improper Driving	2	Driver	Unknown	No Apparent Injury								
																		2	Passenger	Unknown	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.546		02/19/2021	1509	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Driveway Related	1	West	Straight Ahead	1	Erratic/Reckless/Careless/Aggressive	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.806868	-106.944466	21P001297
													2	West	Slowing	2	No Improper Driving	2	Driver	Shoulder and Lap Belt	No Apparent Injury								
ML1704B	5TH ST | WY 336	0.552		07/09/2021	2145	SUSPECTED MINOR INJURY	0	1	Parked Motor Vehicle	Shoulder	Rear End (Front to Rear)	Non-Junction	1	West	Straight Ahead	1	Avoiding Non-Motorist	1	Driver	Unknown	Suspected Minor Injury	Darkness Lighted	Clear	Dry	N	N	44.806851	-106.944352	21P005587
													2	West	Parked	1	Failed to Keep Proper Lane												
ML1704B	5TH ST | WY 336	0.749		05/07/2022	2055	PROPERTY DAMAGE ONLY	0	0	Deer	On Roadway			1		Negotiating a Curve	1	No Improper Driving	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Darkness Lighted	Clear	Dry			44.805607	-106.940742	22-00044084
ML1704B	5TH ST | WY 336	0.939		07/20/2020	1630	PROPERTY DAMAGE ONLY	0	0	Motor Vehicle in Transport on Roadway	On Roadway	Rear End (Front to Rear)	Non-Junction	1	East	Straight Ahead	1	Following too Close	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry	N	N	44.804694	-106.937145	200720S04
													2	East	Stopped in Traffic	2	No Improper Driving	2	Driver	Shoulder and Lap Belt	No Apparent Injury								
ML1704B	WY 336	3.101		08/31/2020	1710	PROPERTY DAMAGE ONLY	0	0	Deer	On Roadway			1		Straight Ahead	1	No Improper Driving	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry			44.819247	-106.903624	P2020118377
ML1704B	WY 336	4.757		08/28/2022	2100	FATAL INJURY	1	0	Other Non-Collision (MC Loss of Control)	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	East	Negotiating a Curve	1	Ran Off Road	1	Driver	None Used	Fatal Injury	Darkness Unlighted	Clear	Dry	Y	N	44.834898	-106.877954	22-00093766
ML1704B	WY 336	5.344		06/21/2021	1930	PROPERTY DAMAGE ONLY	0	0	Other Traffic Sign Support	Off Roadway	Not a Collision w/2 Vehicles in Transport	Non-Junction	1	Unknown	Straight Ahead	1	Ran Off Road	1	Driver	Unknown	No Apparent Injury	Unknown	Unknown	Unknown	N	N	44.836579	-106.866123	21P004957
ML1704B	WY 336	6.264		12/12/2020	1730	PROPERTY DAMAGE ONLY	0	0	Deer	On Roadway			1		Straight Ahead	1	No Improper Driving	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Darkness Unlighted	Snowing	Ice/Frost			44.838645	-106.847498	20-00168340
ML1704B	WY 336	9.375		11/22/2021	1550	PROPERTY DAMAGE ONLY	0	0	Deer	On Roadway			1		Straight Ahead	1	No Improper Driving	1	Driver	Shoulder and Lap Belt	No Apparent Injury	Daylight	Clear	Dry			44.822381	-106.788802	21-00133806
																		1	Passenger	Shoulder and Lap Belt	No Apparent Injury								
ML1704B	WY 336	9.518		09/22/2022	1946	PROPERTY DAMAGE ONLY	0	0	Deer	On Roadway			1		Straight Ahead	1	No Improper Driving	1	Driver	Unknown	No Apparent Injury	Darkness Unlighted	Clear	Wet			44.821355	-106.786240	220922S06
																		1	Passenger	Unknown	No Apparent Injury								

LRS ID	CRASH STREET	MILE POST	CROSS STREET	DATE	TIME	CRASH SEVERITY	FATAL	INJURY	FIRST HARMFUL EVENT (FHE)	FHE LOCATION	MANNER OF COLLISION	JUNCTION RELATION	#	VEHICLE DIRECTION	MANEUVER	DRIVER ACTION	PERSON TYPE	SAFETY EQUIPMENT USED	INJURY STATUS	LIGHTING	WEATHER CONDITION	ROAD CONDITION	ALCOHOL INVOLVED	DRUGS INVOLVED	LATITUDE	LONGITUDE	CRASH CASE #

REPORT SUMMARY

TOTAL CRASHES:	21		
FATAL CRASHES:	1	**TOTAL FATALITIES:**	1
INJURY CRASHES:	4	**TOTAL INJURIES:**	6
PDO CRASHES:	16		

* PDO = Property Damage Only Crashes
* Critical Crashes = Fatal & Suspected Serious Injury Crashes
* Serious Crashes = Suspected Minor Injury & Possible Injury Crashes
* Damage Crashes = No Apparent Injury & Unknown Injury Crashes

	CRASH COUNTS				SEVERITY COUNTS			INJURY COUNTS				
YEAR	FATAL CRASHES	INJURY CRASHES	PDO CRASHES	TOTAL CRASHES	CRITICAL CRASHES*	SERIOUS CRASHES*	DAMAGE CRASHES*	FATAL INJURIES	SERIOUS INJURIES	MINOR INJURIES	POSSIBLE INJURIES	NO INJURIES
2020	0	0	5	5	0	0	5	0	0	0	0	12
2021	0	4	6	10	0	4	6	0	0	3	3	18
2022	1	0	5	6	1	0	5	1	0	0	0	9
	1	**4**	**16**	**21**	**1**	**4**	**16**	**1**	**0**	**3**	**3**	**39**

Appendix D

Traffic Signal Warrant Study

Traffic Signal Warrant Analysis

Project Name	**Story House**
Project/File #	**WWC Engineering**
Scenario	**Year 2043 Total - AM Peak**

Intersection Information	
Major Street Name	Wyarno Road
North/South or East/West	E/W
Speed Limit	45 mph or greater
# of Approach Lanes	1
% of Right Turn Traffic to Include	100%
Minor Street Name	Industrial Lane
# of Approach Lanes	1
% of Right Turn Traffic to Include	50%
Isolated Community < 10,000 pop	No

What Additional Warrants to Consider?	
Warrant 3, Peak Hour (A - Vol. and Delay)	Yes
Warrant 4, Pedestrian Volume	No
Warrant 5, School Crossing	No
Warrant 6, Coordinated Signal System	No
Warrant 7, Crash Experience	No
Warrant 8, Roadway Network	No
Warrant 9, Intersection Near a Grade Crossing	No
All-Way Stop Warrant	No

Sustainable Traffic Solutions, Inc.

Traffic Signal Warrant Analysis

Wyarno Road (Major Street) Volume

Eastbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM	223	178	70	
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM				
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			471	0

Westbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM	0	172	8	
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM				
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			180	0

Industrial Lane (Minor Street) Volume

Northbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM	32	0	0	
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM				
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			32	0

Southbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM	6	0	157	
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM				
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			163	0

Traffic Signal Warrant Analysis

Additional Inputs for Warrants 3 to 9 and the Multi-Way Stop Warrants

Warrant 3: Peak Hour Delay Additional Information	
T-intersection or 4-legged?	4
Peak Hour Reviewed?	PM Peak
Wyarno Road (Major Street) Data	
Combined Approach Volume	651
Industrial Lane (Minor Street) Data	
High Volume Side Volume	163
High Volume Side Average Delay (Sec.)	11.49
High Volume Side # of Approach Lanes	1
Low Volume Side Volume (leave blank if T)	0

Warrant 4: Pedestrian Volume Additional Information	
Include Right Turn Reduction for Vehicular Volume?	No
300 feet or more to nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross?	No
If no, will a traffic control signal restrict the progressive movement of traffic?*	N/A
15th-percentile crossing speed of pedestrians less than 3.5 feet per second?**	No
If yes, then percent reduction to apply to crossing volume? (up to 50%)	N/A

* Include supporting documentation of no progressive movement impact.

** Not common. Include supporting documentation of low crossing speed.

Warrant 5: School Crossing	
Schoolchildren (elementary through high school) crossing the major street (Wyarno	No
Consideration given to other remedial measures (warning signs/flashers, school speed zones, school crossing guards, or a grade-separated crossing)?	No
300 feet or more to nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross?	No
If no, will a traffic control signal restrict the progressive movement of traffic?*	N/A
Minimum of 20 schoolchildren crossing during the highest crossing hour?	No
Engineering study completed showing the number of adequate gaps in the traffic stream during the period when schoolchildren are using the crossing is less than the number of minutes in the same period?**	No

* Include supporting documentation of no progressive movement impact.

** May need to include supporting documentation of inadequate gaps in traffic.

Warrant 6: Coordinated Signal System	
One-way or Two-way Street?	Two-Way
Adjacent traffic control signals do not provide the necessary degree of platooning, but will collectively provide a progressive operation with the proposed traffic control signal?	No
Resultant spacing of traffic control signals 1,000 feet or more?	No

Warrant 7: Crash Experience	
Number of reportable crashes (*types susceptible to correction by a traffic control signal*) within a 12-month period?*	4 or less
Adequate trial of alternatives with satisfactory observance and enforcement failed to reduce crash frequency?**	No
Include Right Turn Reduction for Vehicular Volume?	No

* May need to include supporting documentation of crash details.

** May need to include supporting documentation of alternative trail(s) and results.

Warrant 8: Roadway Network	
Common intersection of two major routes?*	No
Projected entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday?	No
5-Year projected traffic volumes meet one or more of Warrants 1, 2, and 3 during an average weekday?	No
Total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday)?	No

* Major Route defined as:

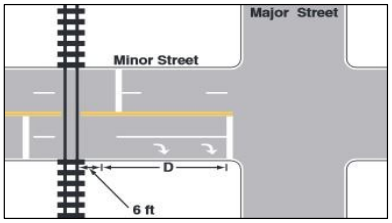
- Part of the street or highway system that serves as the principal roadway network for through traffic flow.
- Rural or suburban highways outside, entering, or traversing a city.
- Appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

Warrant 9: Intersection Near a Grade Crossing	
Tracks cross which Industrial Lane approach?	Southbound
Consideration given to other alternatives/trial of alternative failed to alleviate the safety concerns?*	No
Distance between STOP or YIELD controlled approach and center of track nearest to the intersection within 140 feet?	No
Clear storage distance (Distance D) between the tracks and the intersection? (See Below)	70 feet
Number of approach lanes at the crossing?	2 or more
Rail traffic per day?	3-5
Percentage of high-occupancy buses?**	0%
Percentage of Tractor-Trailer Trucks?	7.6%-12.5%

* Alternatives to consider or try should include:

- Providing additional pavement that would enable vehicles to clear the track or provide space for an evasive maneuver.
- Reassigning the stop controls at the intersection to make the approach across the track non-stopping.

** High-occupancy is defined as a bus occupied by at least 20 people.



Multi-Way Stop Warrant Additional Information	
Traffic control signal warranted & justified with existing traffic?	No
Number of *correctable* crashes* in 12-month period?	4
Peak Hour high volume approach average delay (Sec.)	11.49

* Crashes include right-turn and left-turn collisions as well as right-angle collisions.

Traffic Signal Warrant Analysis

Warrants 1 - 3 (Volume Warrants)

Project Name	Story House
Project/File #	WWC Engineering
Scenario	Year 2043 Total - AM Peak

Intersection Information			
Major Street (E/W Road)	Wyarno Road	Minor Street (N/S Road)	Industrial Lane
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	651 vehicles	Total Approach Volume	195 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	50 percent applied

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

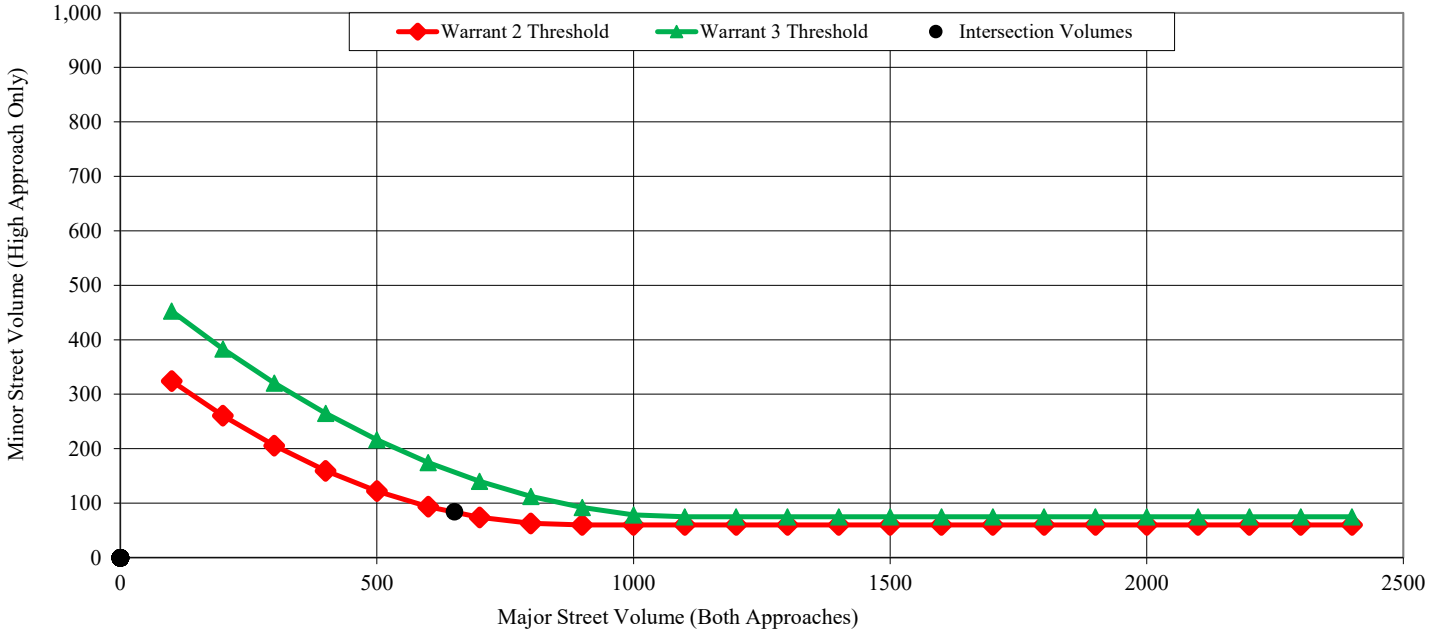
Warrant 1, Eight Hour Vehicular Volume			
	Condition A	**Condition B**	**Condition A+B***
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**	**Not Satisfied**
Required values reached for	0 hours	1 hour	1 (Cond. A) & 1 (Cond. B)
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume	
Condition Satisfied?	**Not Satisfied**
Required values reached for	1 hour
Criteria	See Figure Below

Warrant 3, Peak Hour Vehicular Volume		
	Condition A	**Condition B**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	814 total, 163 minor, 0.5 delay	0 hours
Criteria - Total Approach Volume (veh in one hour)	800	See Figure Below
Criteria - Minor Street High Side Volume (veh in one hour)	100	
Criteria - Minor Street High Side Delay (veh-hrs)	4	

Figure 4C-2 (Warrant 2 - 70% Factor) & Figure 4C-4 (Warrant 3 - 70% Factor)



Pedestrian Crossing Volume

Traffic Signal Warrant Analysis

Project Name	**Story House**
Project/File #	**WWC Engineering**
Scenario	**Year 2043 Total - PM Peak**

Intersection Information	
Major Street Name	Wyarno Road
North/South or East/West	E/W
Speed Limit	45 mph or greater
# of Approach Lanes	1
% of Right Turn Traffic to Include	100%
Minor Street Name	Industrial Lane
# of Approach Lanes	1
% of Right Turn Traffic to Include	50%
Isolated Community < 10,000 pop	No

What Additional Warrants to Consider?	
Warrant 3, Peak Hour (A - Vol. and Delay)	Yes
Warrant 4, Pedestrian Volume	No
Warrant 5, School Crossing	No
Warrant 6, Coordinated Signal System	No
Warrant 7, Crash Experience	No
Warrant 8, Roadway Network	No
Warrant 9, Intersection Near a Grade Crossing	No
All-Way Stop Warrant	No

Sustainable Traffic Solutions, Inc.

Traffic Signal Warrant Analysis

Wyarno Road (Major Street) Volume

Eastbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM				
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM	176	214	36	
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			426	0

Westbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM				
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM	0	203	6	
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			209	0

Industrial Lane (Minor Street) Volume

Northbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM				
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM	66	0	3	
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			69	0

Southbound Volume by Hour				
Time	Left Turns	Through	Right Turns	Peds/Bikes
12 - 1 AM				
1 - 2 AM				
2 - 3 AM				
3 - 4 AM				
4 - 5 AM				
5 - 6 AM				
6 - 7 AM				
7 - 8 AM				
8 - 9 AM				
9 - 10 AM				
10 - 11 AM				
11 - 12 PM				
12 - 1 PM				
1 - 2 PM				
2 - 3 PM				
3 - 4 PM				
4 - 5 PM				
5 - 6 PM	8	0	241	
6 - 7 PM				
7 - 8 PM				
8 - 9 PM				
9 - 10 PM				
10 - 11 PM				
11 - 12 AM				
Total Vehicles (unadjusted)			249	0

Traffic Signal Warrant Analysis

Additional Inputs for Warrants 3 to 9 and the Multi-Way Stop Warrants

Warrant 3: Peak Hour Delay Additional Information	
T-intersection or 4-legged?	4
Peak Hour Reviewed?	PM Peak
Wyarno Road (Major Street) Data	
Combined Approach Volume	635
Industrial Lane (Minor Street) Data	
High Volume Side Volume	249
High Volume Side Average Delay (Sec.)	12.69
High Volume Side # of Approach Lanes	1
Low Volume Side Volume (leave blank if T)	69

Warrant 4: Pedestrian Volume Additional Information	
Include Right Turn Reduction for Vehicular Volume?	No
300 feet or more to nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross?	No
If no, will a traffic control signal restrict the progressive movement of traffic?*	N/A
15th-percentile crossing speed of pedestrians less than 3.5 feet per second?**	No
If yes, then percent reduction to apply to crossing volume? (up to 50%)	N/A

* Include supporting documentation of no progressive movement impact.

** Not common. Include supporting documentation of low crossing speed.

Warrant 5: School Crossing	
Schoolchildren (elementary through high school) crossing the major street (Wyarno	No
Consideration given to other remedial measures (warning signs/flashers, school speed zones, school crossing guards, or a grade-separated crossing)?	No
300 feet or more to nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross?	No
If no, will a traffic control signal restrict the progressive movement of traffic?*	N/A
Minimum of 20 schoolchildren crossing during the highest crossing hour?	No
Engineering study completed showing the number of adequate gaps in the traffic stream during the period when schoolchildren are using the crossing is less than the number of minutes in the same period?**	No

* Include supporting documentation of no progressive movement impact.

** May need to include supporting documentation of inadequate gaps in traffic.

Warrant 6: Coordinated Signal System	
One-way or Two-way Street?	Two-Way
Adjacent traffic control signals do not provide the necessary degree of platooning, but will collectively provide a progressive operation with the proposed traffic control signal?	No
Resultant spacing of traffic control signals 1,000 feet or more?	No

Warrant 7: Crash Experience	
Number of reportable crashes (*types susceptible to correction by a traffic control signal*) within a 12-month period?*	4 or less
Adequate trial of alternatives with satisfactory observance and enforcement failed to reduce crash frequency?**	No
Include Right Turn Reduction for Vehicular Volume?	No

* May need to include supporting documentation of crash details.

** May need to include supporting documentation of alternative trail(s) and results.

Warrant 8: Roadway Network	
Common intersection of two major routes?*	No
Projected entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday?	No
5-Year projected traffic volumes meet one or more of Warrants 1, 2, and 3 during an average weekday?	No
Total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday)?	No

* Major Route defined as:

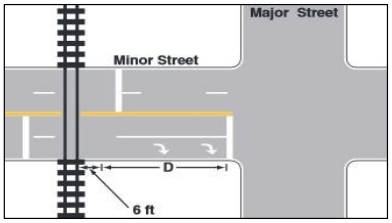
- Part of the street or highway system that serves as the principal roadway network for through traffic flow.
- Rural or suburban highways outside, entering, or traversing a city.
- Appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

Warrant 9: Intersection Near a Grade Crossing	
Tracks cross which Industrial Lane approach?	Southbound
Consideration given to other alternatives/trial of alternative failed to alleviate the safety concerns?*	No
Distance between STOP or YIELD controlled approach and center of track nearest to the intersection within 140 feet?	No
Clear storage distance (Distance D) between the tracks and the intersection? (See Below)	70 feet
Number of approach lanes at the crossing?	2 or more
Rail traffic per day?	3-5
Percentage of high-occupancy buses?**	0%
Percentage of Tractor-Trailer Trucks?	7.6%-12.5%

* Alternatives to consider or try should include:

- Providing additional pavement that would enable vehicles to clear the track or provide space for an evasive maneuver.
- Reassigning the stop controls at the intersection to make the approach across the track non-stopping.

** High-occupancy is defined as a bus occupied by at least 20 people.



Multi-Way Stop Warrant Additional Information	
Traffic control signal warranted & justified with existing traffic?	No
Number of *correctable* crashes* in 12-month period?	4
Peak Hour high volume approach average delay (Sec.)	12.69

* Crashes include right-turn and left-turn collisions as well as right-angle collisions.

Traffic Signal Warrant Analysis

Warrants 1 - 3 (Volume Warrants)

Project Name	Story House
Project/File #	WWC Engineering
Scenario	Year 2043 Total - PM Peak

Intersection Information			
Major Street (E/W Road)	Wyarno Road	Minor Street (N/S Road)	Industrial Lane
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	635 vehicles	Total Approach Volume	318 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	50 percent applied

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

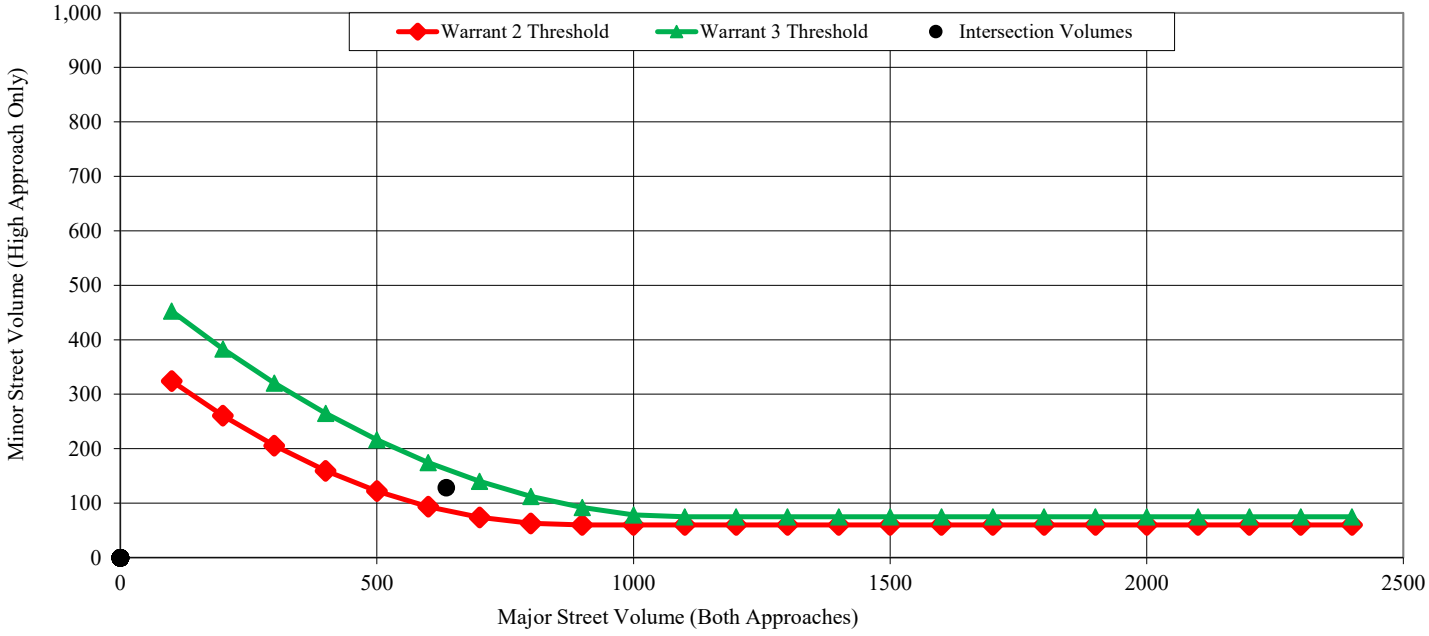
Warrant 1, Eight Hour Vehicular Volume			
	Condition A	**Condition B**	**Condition A+B***
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**	**Not Satisfied**
Required values reached for	1 hour	1 hour	1 (Cond. A) & 1 (Cond. B)
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume	
Condition Satisfied?	**Not Satisfied**
Required values reached for	1 hour
Criteria	See Figure Below

Warrant 3, Peak Hour Vehicular Volume		
	Condition A	**Condition B**
Condition Satisfied?	**Not Satisfied**	**Not Satisfied**
Required values reached for	953 total, 249 minor, 0.9 delay	0 hours
Criteria - Total Approach Volume (veh in one hour)	800	See Figure Below
Criteria - Minor Street High Side Volume (veh in one hour)	100	
Criteria - Minor Street High Side Delay (veh-hrs)	4	

Figure 4C-2 (Warrant 2 - 70% Factor) & Figure 4C-4 (Warrant 3 - 70% Factor)



Appendix E

Wyarno Road Speed Data Summary

Form TR-11

Revised 3/4/11

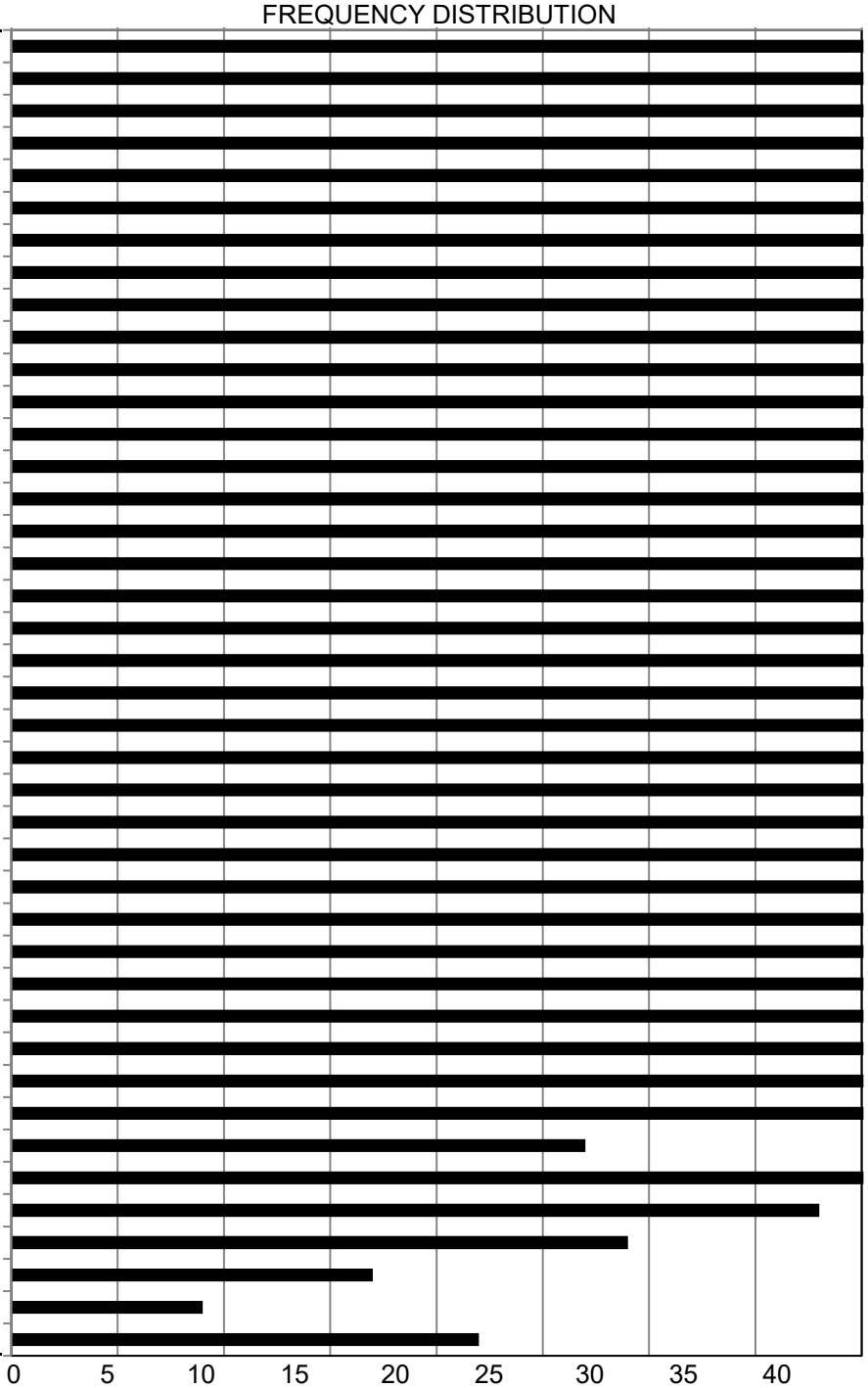
SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: EB/WB Comb.
LOCATION: E/O Industrial Lane
OBSERVER: JAMAR Radar Device
START TIME: 0
WEATHER: Summer
######
END TIME: 0
COMMENTS: Location 1

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
30	122	122	1.4
31	47	169	2.0
32	111	280	3.2
33	53	333	3.9
34	145	478	5.5
35	212	690	8.0
36	127	817	9.5
37	272	1089	12.6
38	125	1214	14.1
39	311	1525	17.7
40	394	1919	22.3
41	211	2130	24.7
42	497	2627	30.5
43	464	3091	35.8
44	237	3328	38.6
45	538	3866	44.8
46	277	4143	48.0
47	566	4709	54.6
48	504	5213	60.4
49	217	5430	63.0
50	431	5861	68.0
51	226	6087	70.6
52	396	6483	75.2
53	371	6854	79.5
54	167	7021	81.4
55	284	7305	84.7
56	145	7450	86.4
57	240	7690	89.2
58	236	7926	91.9
59	83	8009	92.9
60	161	8170	94.7
61	60	8230	95.4
62	96	8326	96.5
63	93	8419	97.6
64	27	8446	97.9
65	63	8509	98.7
66	38	8547	99.1
67	29	8576	99.4
68	17	8593	99.6
69	9	8602	99.7
70	22	8624	100

FREQUENCY DISTRIBUTION



AVERAGE SPEED = 47.0
50th PERCENTILE = 47
67th PERCENTILE = 50
85th PERCENTILE = 56
95th PERCENTILE = 61

PACE SPEED = 39 to 48
VEHICLES IN PACE = 3999
% IN PACE = 46
% BELOW PACE = 14
% ABOVE PACE = 40

STANDARD DEVIATION = 8.04
% EXCEEDING POSTED LIMIT = 0

RECOMMENDED SPEED LIMIT = 55

Form TR-11

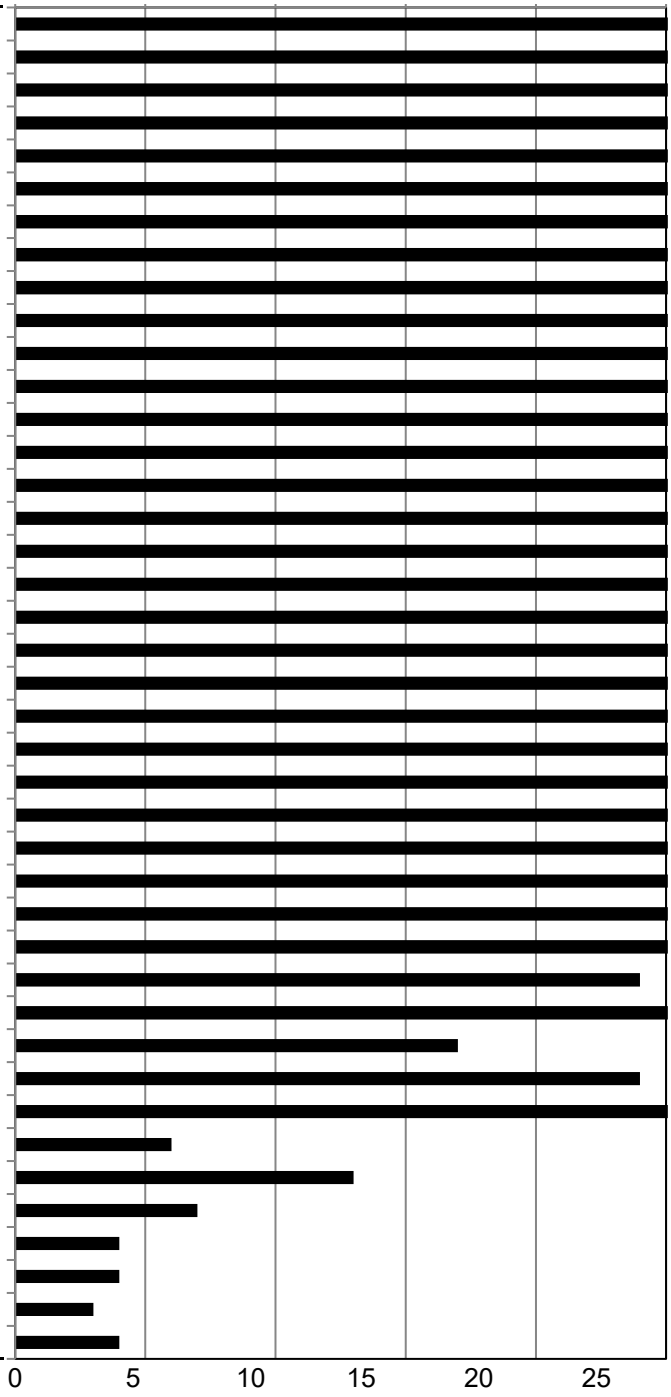
Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: Eastbound
LOCATION: E/O Industrial Lane
OBSERVER: JAMAR Radar Device
START TIME:
WEATHER: Summer
DATE: 7/16/23-7/25/23
END TIME:
COMMENTS: Location 1

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
30	88	88	2.2
31	36	124	3.1
32	79	203	5.0
33	34	237	5.8
34	97	334	8.2
35	147	481	11.8
36	82	563	13.9
37	183	746	18.4
38	76	822	20.2
39	192	1014	25.0
40	231	1245	30.7
41	124	1369	33.7
42	285	1654	40.7
43	253	1907	47.0
44	122	2029	50.0
45	276	2305	56.8
46	117	2422	59.7
47	257	2679	66.0
48	218	2897	71.4
49	97	2994	73.7
50	171	3165	78.0
51	91	3256	80.2
52	153	3409	84.0
53	120	3529	86.9
54	48	3577	88.1
55	89	3666	90.3
56	48	3714	91.5
57	79	3793	93.4
58	83	3876	95.5
59	24	3900	96.1
60	46	3946	97.2
61	17	3963	97.6
62	24	3987	98.2
63	32	4019	99.0
64	6	4025	99.1
65	13	4038	99.5
66	7	4045	99.6
67	4	4049	99.7
68	4	4053	99.8
69	3	4056	99.9
70	4	4060	100



AVERAGE SPEED = 44.8
50th PERCENTILE = 45
67th PERCENTILE = 48
85th PERCENTILE = 53
95th PERCENTILE = 58

PACE SPEED = 39 to 48
VEHICLES IN PACE = 2075
% IN PACE = 51
% BELOW PACE = 20
% ABOVE PACE = 29

STANDARD DEVIATION = 7.67
% EXCEEDING POSTED LIMIT = 0

RECOMMENDED SPEED LIMIT = 55

Form TR-11

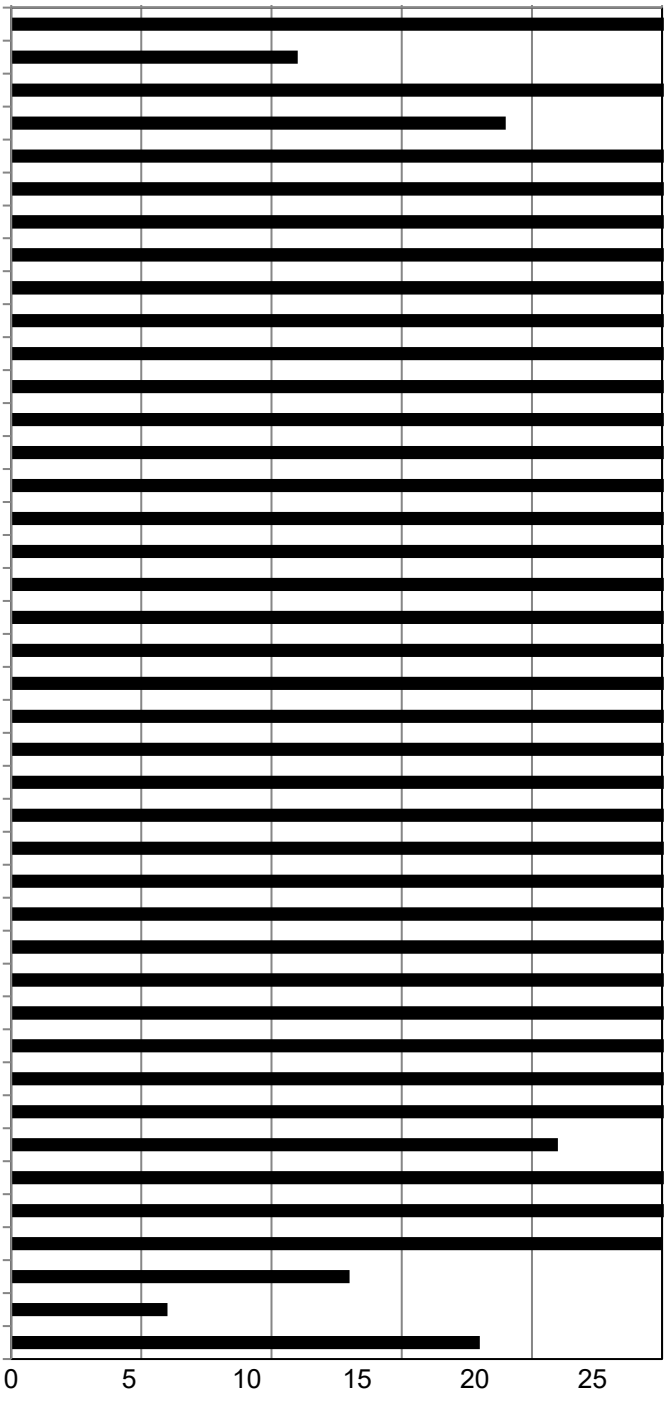
Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: Westbound
LOCATION: E/O Industrial Lane
OBSERVER: JAMAR Radar Device
START TIME:
WEATHER: Summer
DATE: 7/16/23-7/25/23
END TIME:
COMMENTS: Location 1

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
30	34	34	0.7
31	11	45	1.0
32	32	77	1.7
33	19	96	2.1
34	48	144	3.2
35	65	209	4.6
36	45	254	5.6
37	89	343	7.5
38	49	392	8.6
39	119	511	11.2
40	163	674	14.8
41	87	761	16.7
42	212	973	21.3
43	211	1184	25.9
44	115	1299	28.5
45	262	1561	34.2
46	160	1721	37.7
47	309	2030	44.5
48	286	2316	50.7
49	120	2436	53.4
50	260	2696	59.1
51	135	2831	62.0
52	243	3074	67.4
53	251	3325	72.9
54	119	3444	75.5
55	195	3639	79.7
56	97	3736	81.9
57	161	3897	85.4
58	153	4050	88.7
59	59	4109	90.0
60	115	4224	92.6
61	43	4267	93.5
62	72	4339	95.1
63	61	4400	96.4
64	21	4421	96.9
65	50	4471	98.0
66	31	4502	98.6
67	25	4527	99.2
68	13	4540	99.5
69	6	4546	99.6
70	18	4564	100



AVERAGE SPEED = 48.9
50th PERCENTILE = 48
67th PERCENTILE = 52
85th PERCENTILE = 57
95th PERCENTILE = 62

PACE SPEED = 45 to 54
VEHICLES IN PACE = 2145
% IN PACE = 47
% BELOW PACE = 28
% ABOVE PACE = 25

STANDARD DEVIATION = 7.87
% EXCEEDING POSTED LIMIT = 0

RECOMMENDED SPEED LIMIT = 55

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 7/16/2023 to 7/25/2023

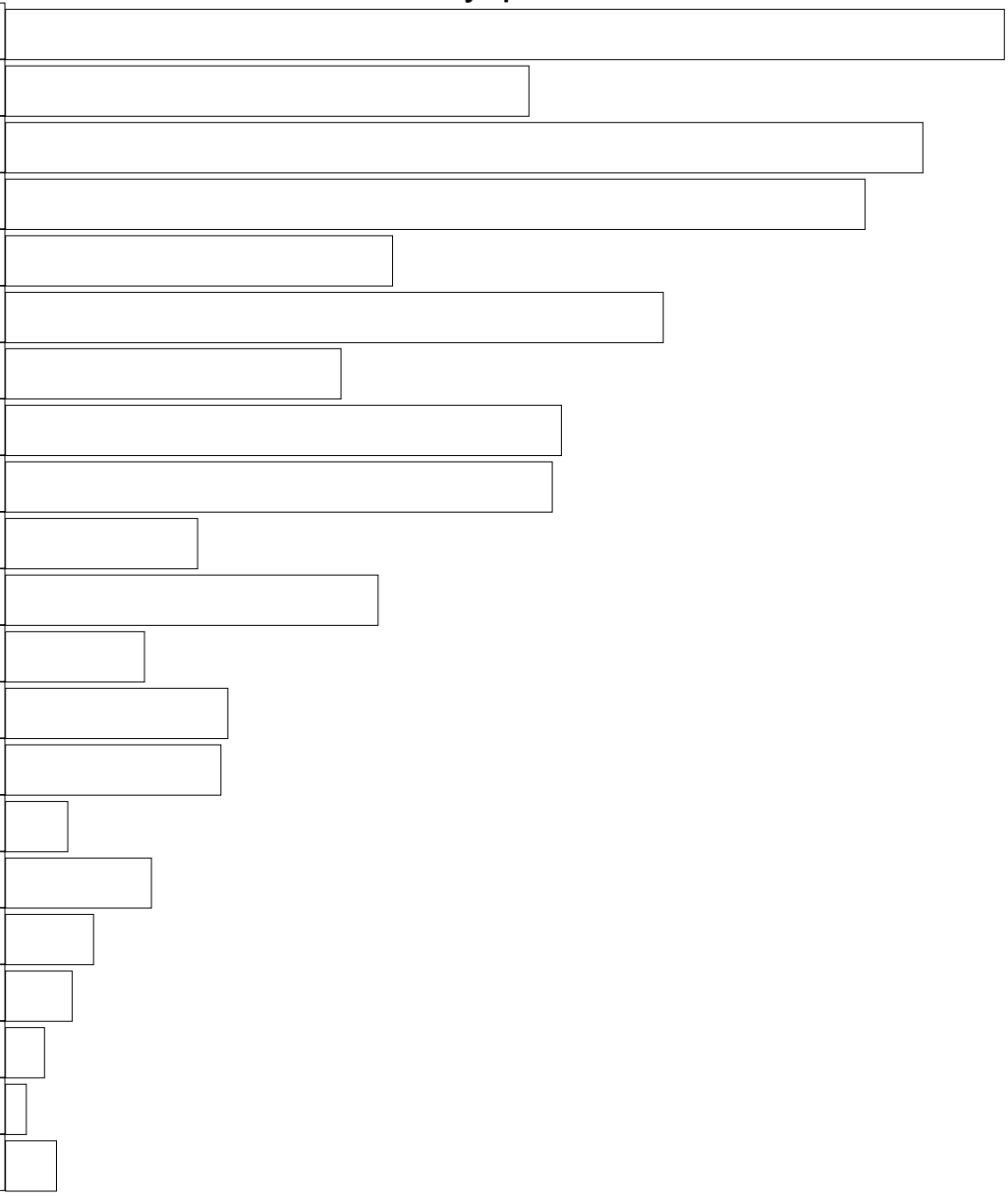
Combined

Speed (MPH)	Volume
20	13
21	30
22	24
23	19
24	40
25	67
26	35
27	57
28	31
29	74
30	122
31	47
32	111
33	53
34	145
35	212
36	127
37	272
38	125
39	311
40	394
41	211
42	497
43	464
44	237
45	538
46	277
47	566
48	504
49	217

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 7/16/2023 to 7/25/2023

50	431
51	226
52	396
53	371
54	167
55	284
56	145
57	240
58	236
59	83
60	161
61	60
62	96
63	93
64	27
65	63
66	38
67	29
68	17
69	9
70	22



Sheridan Police Department
JAMAR Speed Study

Eastbound

Volume Sorted by Speed for 7/16/2023 to 7/25/2023

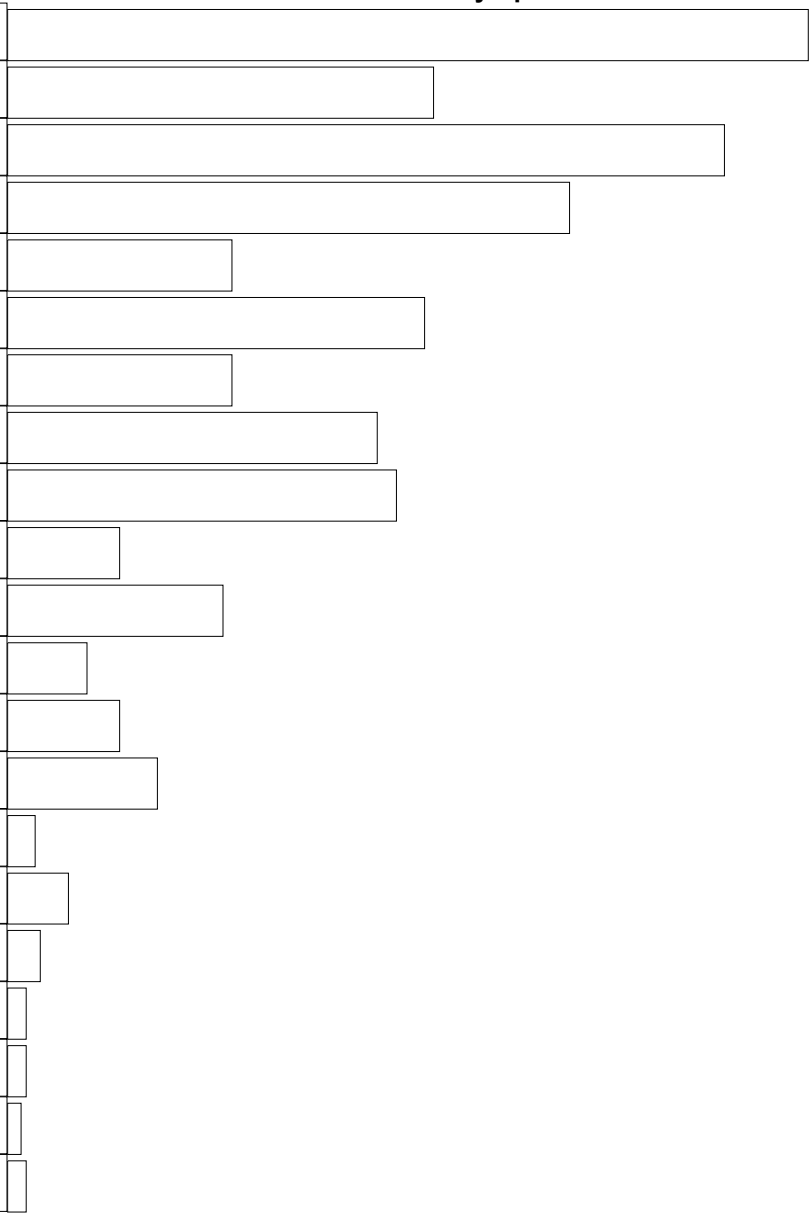
Direction X, Lane 1

Speed (MPH)	Volume
20	3
21	7
22	12
23	7
24	20
25	27
26	21
27	35
28	27
29	59
30	88
31	36
32	79
33	34
34	97
35	147
36	82
37	183
38	76
39	192
40	231
41	124
42	285
43	253
44	122
45	276
46	117
47	257
48	218
49	97

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 7/16/2023 to 7/25/2023

50	171
51	91
52	153
53	120
54	48
55	89
56	48
57	79
58	83
59	24
60	46
61	17
62	24
63	32
64	6
65	13
66	7
67	4
68	4
69	3
70	4



Sheridan Police Department
JAMAR Speed Study

Westbound

Volume Sorted by Speed for 7/16/2023 to 7/25/2023

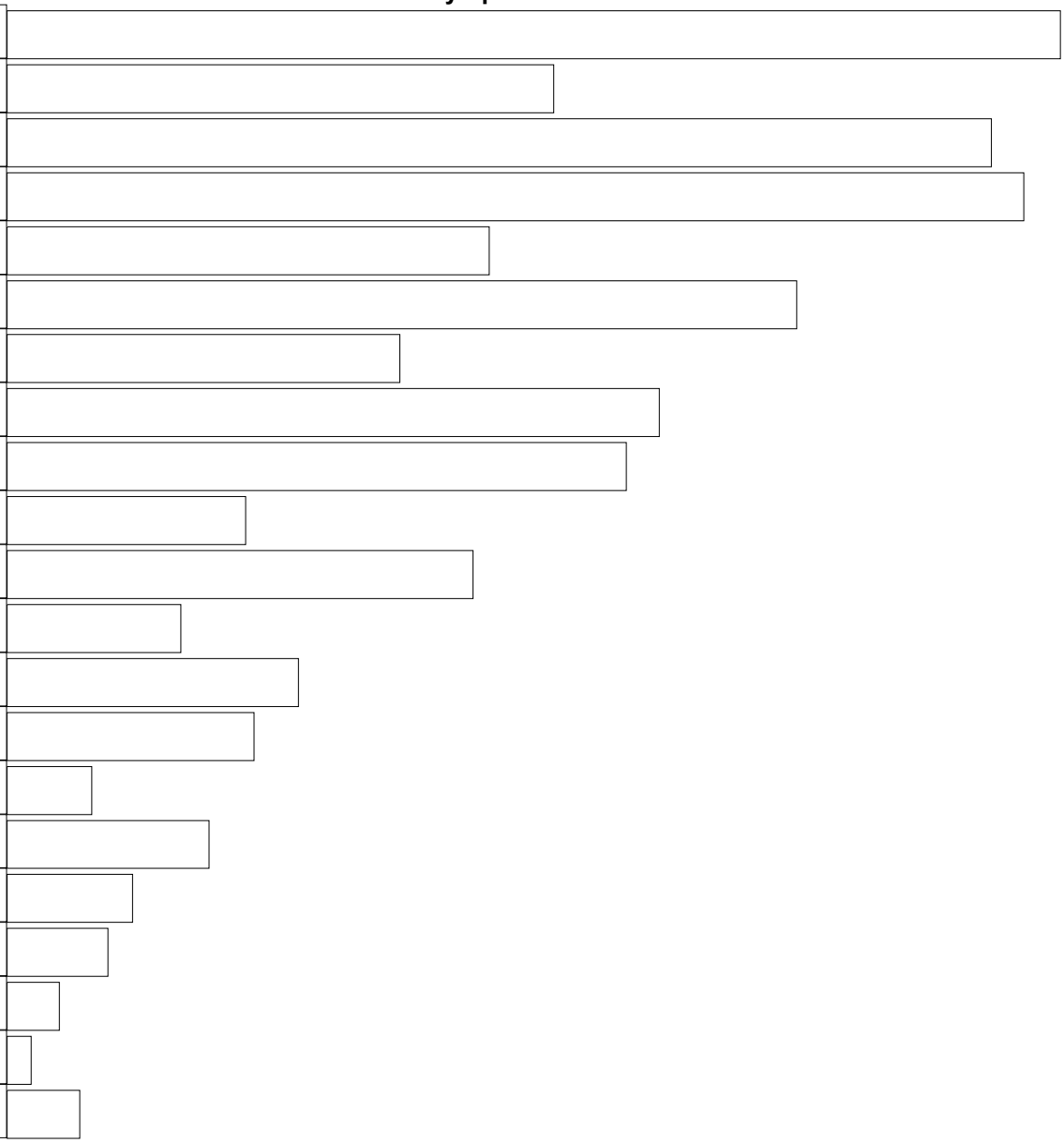
Direction X, Lane 2

Speed (MPH)	Volume
20	10
21	23
22	12
23	12
24	20
25	40
26	14
27	22
28	4
29	15
30	34
31	11
32	32
33	19
34	48
35	65
36	45
37	89
38	49
39	119
40	163
41	87
42	212
43	211
44	115
45	262
46	160
47	309
48	286
49	120

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 7/16/2023 to 7/25/2023

50	260
51	135
52	243
53	251
54	119
55	195
56	97
57	161
58	153
59	59
60	115
61	43
62	72
63	61
64	21
65	50
66	31
67	25
68	13
69	6
70	18



Form TR-11

Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
SPEED LIMIT: 70 MPH
OBSERVER: 0
######

COUNTY: Sheridan
DIRECTION: EB/WB Comb.
START TIME: 0
END TIME: 0

ROUTE: Wyarno Road
LOCATION: W/O Wildcat Road
WEATHER: Summer
COMMENTS: Location 2

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
30	5	5	0.5
31	1	6	0.6
32	3	9	0.9
33	2	11	1.0
34	3	14	1.3
35	3	17	1.6
36	4	21	2.0
37	10	31	2.9
38	2	33	3.1
39	9	42	4.0
40	12	54	5.1
41	5	59	5.6
42	26	85	8.1
43	29	114	10.8
44	16	130	12.3
45	33	163	15.5
46	15	178	16.9
47	56	234	22.2
48	51	285	27.0
49	24	309	29.3
50	57	366	34.7
51	31	397	37.7
52	70	467	44.3
53	81	548	52.0
54	35	583	55.3
55	61	644	61.1
56	25	669	63.5
57	62	731	69.4
58	55	786	74.6
59	29	815	77.3
60	47	862	81.8
61	14	876	83.1
62	61	937	88.9
63	35	972	92.2
64	13	985	93.5
65	20	1005	95.4
66	20	1025	97.2
67	7	1032	97.9
68	8	1040	98.7
69	6	1046	99.2
70	8	1054	100

FREQUENCY DISTRIBUTION



AVERAGE SPEED = 53.3
50th PERCENTILE = 53
67th PERCENTILE = 57
85th PERCENTILE = 62
95th PERCENTILE = 65

PACE SPEED = 50 to 59
VEHICLES IN PACE = 506
% IN PACE = 48
% BELOW PACE = 29
% ABOVE PACE = 23

STANDARD DEVIATION = 7.60
% EXCEEDING POSTED LIMIT = 0

RECOMMENDED SPEED LIMIT = 60

Form TR-11

Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: Eastbound
LOCATION: W/O Wildcat Road
OBSERVER:
START TIME:
WEATHER: Summer
DATE: 8/8/23-8/9/23
END TIME:
COMMENTS: Location 2

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
30	4	4	0.8
31	1	5	1.0
32	2	7	1.4
33	2	9	1.8
34	0	9	1.8
35	2	11	2.2
36	3	14	2.7
37	4	18	3.5
38	1	19	3.7
39	6	25	4.9
40	8	33	6.5
41	3	36	7.0
42	13	49	9.6
43	12	61	11.9
44	8	69	13.5
45	17	86	16.8
46	5	91	17.8
47	37	128	25.0
48	26	154	30.1
49	13	167	32.7
50	35	202	39.5
51	16	218	42.7
52	35	253	49.5
53	45	298	58.3
54	14	312	61.1
55	31	343	67.1
56	14	357	69.9
57	28	385	75.3
58	27	412	80.6
59	11	423	82.8
60	17	440	86.1
61	7	447	87.5
62	25	472	92.4
63	14	486	95.1
64	4	490	95.9
65	7	497	97.3
66	6	503	98.4
67	2	505	98.8
68	2	507	99.2
69	3	510	99.8
70	1	511	100



AVERAGE SPEED = 52.3
50th PERCENTILE = 53
67th PERCENTILE = 55
85th PERCENTILE = 60
95th PERCENTILE = 63

PACE SPEED = 47 to 56
VEHICLES IN PACE = 266
% IN PACE = 52
% BELOW PACE = 18
% ABOVE PACE = 30

STANDARD DEVIATION = 7.41
% EXCEEDING POSTED LIMIT = 0

RECOMMENDED SPEED LIMIT = 60

Form TR-11

Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: Westbound
LOCATION: W/O Wildcat Road
OBSERVER:
START TIME:
WEATHER: Summer
DATE: 8/8/23-8/9/23
END TIME:
COMMENTS: Location 2

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
30	1	1	0.2
31	0	1	0.2
32	1	2	0.4
33	0	2	0.4
34	3	5	0.9
35	1	6	1.1
36	1	7	1.3
37	6	13	2.4
38	1	14	2.6
39	3	17	3.1
40	4	21	3.9
41	2	23	4.2
42	13	36	6.6
43	17	53	9.8
44	8	61	11.2
45	16	77	14.2
46	10	87	16.0
47	19	106	19.5
48	25	131	24.1
49	11	142	26.2
50	22	164	30.2
51	15	179	33.0
52	35	214	39.4
53	36	250	46.0
54	21	271	49.9
55	30	301	55.4
56	11	312	57.5
57	34	346	63.7
58	28	374	68.9
59	18	392	72.2
60	30	422	77.7
61	7	429	79.0
62	36	465	85.6
63	21	486	89.5
64	9	495	91.2
65	13	508	93.6
66	14	522	96.1
67	5	527	97.1
68	6	533	98.2
69	3	536	98.7
70	7	543	100



AVERAGE SPEED = 54.3
50th PERCENTILE = 55
67th PERCENTILE = 58
85th PERCENTILE = 62
95th PERCENTILE = 66

PACE SPEED = 51 to 60
VEHICLES IN PACE = 258
% IN PACE = 48
% BELOW PACE = 30
% ABOVE PACE = 22

STANDARD DEVIATION = 7.66
% EXCEEDING POSTED LIMIT = 0

RECOMMENDED SPEED LIMIT = 60

Sheridan Police Department
JAMAR Speed Study

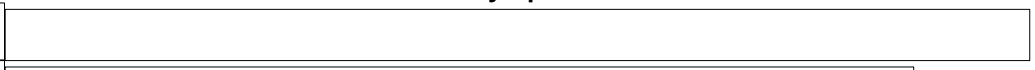
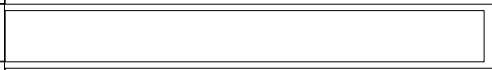
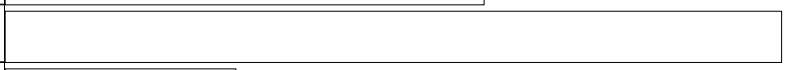
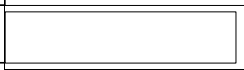
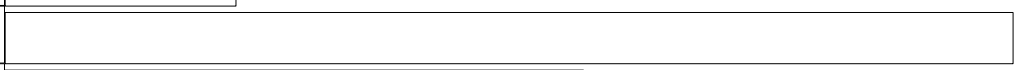
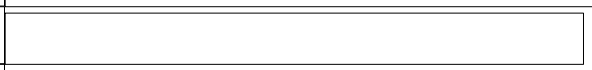
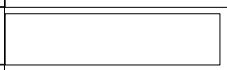
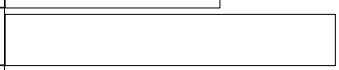
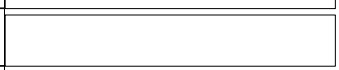
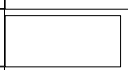
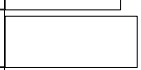
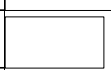
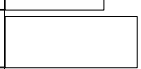
Volume Sorted by Speed for 8/8/2023 to 8/9/2023

Combined

Speed MPH	Volume
27	1
2	0
2	3
30	5
31	1
32	3
33	2
34	3
35	3
36	4
37	10
3	2
3	
40	12
41	5
42	26
43	2
44	16
45	33
46	15
47	56
4	51
4	24
50	57
51	31
52	70
53	1
54	35
55	61
56	25

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/8/2023 to 8/9/2023

57	62	
5	55	
5	2	
60	47	
61	14	
62	61	
63	35	
64	13	
65	20	
66	20	
67	7	
6		
6	6	
70		
71	4	
72	3	
73	5	
74	1	
75	1	
76	3	
77	1	

Sheridan Police Department
JAMAR Speed Study

Eastbound

Volume Sorted by Speed for 8/8/2023 to 8/9/2023

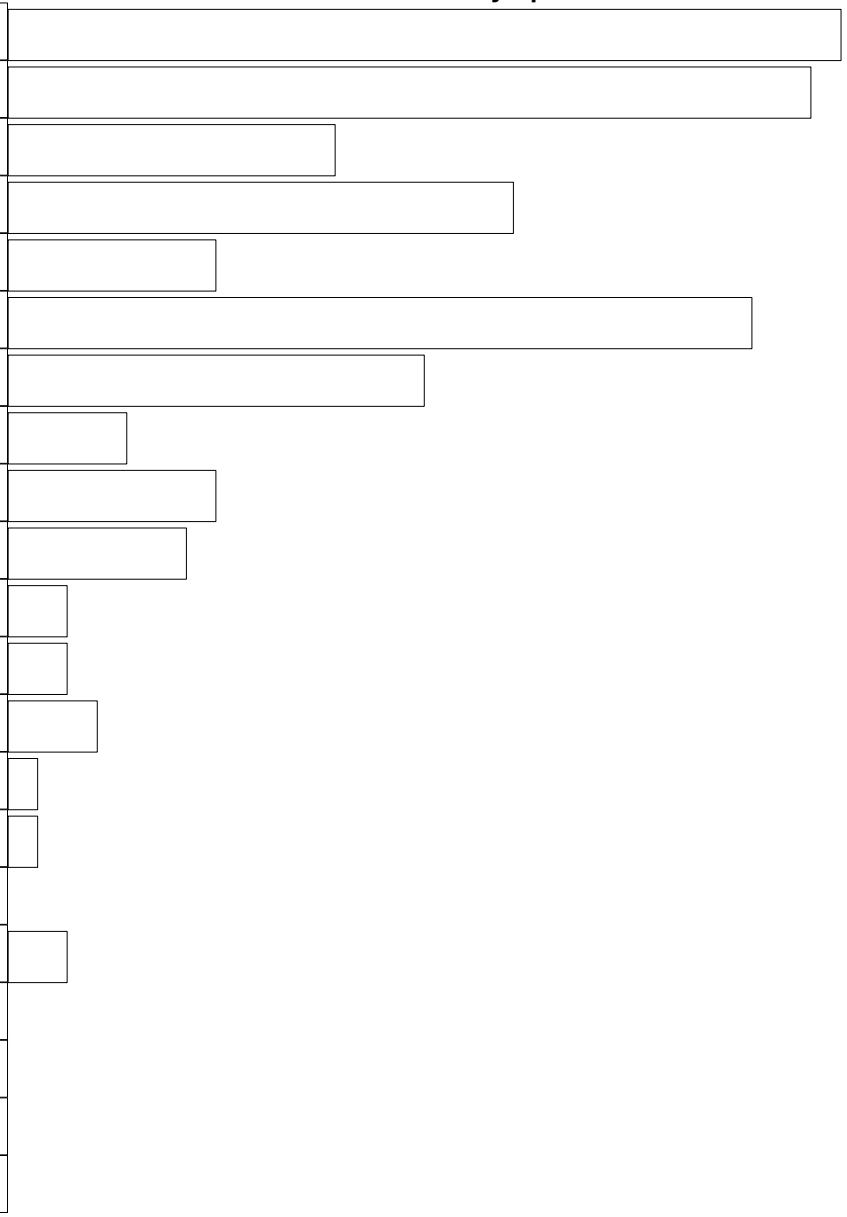
Direction X, Lane 1

Speed MPH	Volume
27	1
2	0
2	2
30	4
31	1
32	2
33	2
34	0
35	2
36	3
37	4
3	1
3	6
40	
41	3
42	13
43	12
44	
45	17
46	5
47	37
4	26
4	13
50	35
51	16
52	35
53	45
54	14
55	31
56	14

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/8/2023 to 8/9/2023

57	2
5	27
5	11
60	17
61	7
62	25
63	14
64	4
65	7
66	6
67	2
6	2
6	3
70	1
71	1
72	0
73	2
74	0
75	0
76	0
77	0



Sheridan Police Department
JAMAR Speed Study

Westbound

Volume Sorted by Speed for 8/8/2023 to 8/9/2023

Direction X, Lane 2

Speed MPH	Volume
27	0
2	0
2	1
30	1
31	0
32	1
33	0
34	3
35	1
36	1
37	6
3	1
3	3
40	4
41	2
42	13
43	17
44	
45	16
46	10
47	1
4	25
4	11
50	22
51	15
52	35
53	36
54	21
55	30
56	11

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/8/2023 to 8/9/2023

57	34
5	2
5	1
60	30
61	7
62	36
63	21
64	
65	13
66	14
67	5
6	6
6	3
70	7
71	3
72	3
73	3
74	1
75	1
76	3
77	1

Form TR-11

Revised 3/4/11

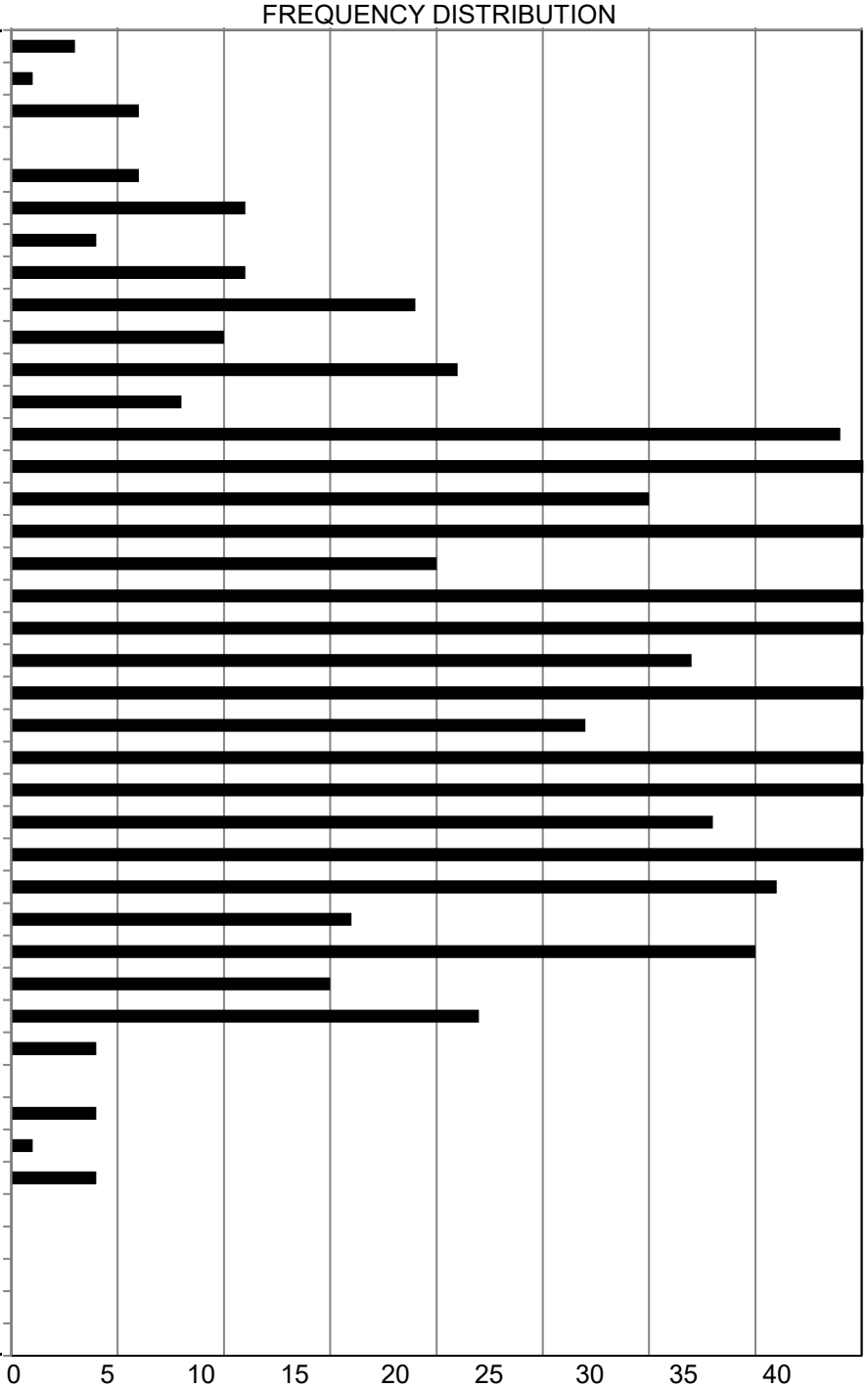
SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: WB/EB Comb.
LOCATION: E/O Wildcat Road
OBSERVER: JAMAR Radar Device
START TIME: 0
WEATHER: Summer
######
END TIME: 0
COMMENTS: Location 3

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
40	3	3	0.4
41	1	4	0.5
42	6	10	1.2
43	0	10	1.2
44	6	16	1.9
45	11	27	3.2
46	4	31	3.6
47	11	42	4.9
48	19	61	7.1
49	10	71	8.3
50	21	92	10.7
51	8	100	11.7
52	39	139	16.2
53	46	185	21.6
54	30	215	25.1
55	49	264	30.8
56	20	284	33.1
57	45	329	38.4
58	81	410	47.8
59	32	442	51.6
60	64	506	59.0
61	27	533	62.2
62	53	586	68.4
63	57	643	75.0
64	33	676	78.9
65	44	720	84.0
66	36	756	88.2
67	16	772	90.1
68	35	807	94.2
69	15	822	95.9
70	22	844	98.5
71	4	848	98.9
72	0	848	98.9
73	4	852	99.4
74	1	853	99.5
75	4	857	100.0
76	0	857	100.0
77	0	857	100.0
78	0	857	100.0
79	0	857	100.0
80	0	857	100

FREQUENCY DISTRIBUTION



AVERAGE SPEED = 58.9
50th PERCENTILE = 59
67th PERCENTILE = 62
85th PERCENTILE = 66
95th PERCENTILE = 69

PACE SPEED = 57 to 66
VEHICLES IN PACE = 472
% IN PACE = 55
% BELOW PACE = 33
% ABOVE PACE = 12

STANDARD DEVIATION = 6.51
% EXCEEDING POSTED LIMIT = 2

RECOMMENDED SPEED LIMIT = 65

Form TR-11

Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: Westbound
LOCATION: E/O Wildcat Road
OBSERVER: JAMAR Radar Device
START TIME:
WEATHER: Summer
DATE: 8/9/23-8/10/23
END TIME:
COMMENTS: Location 3

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
40	1	1	0.2
41	0	1	0.2
42	2	3	0.7
43	0	3	0.7
44	2	5	1.2
45	6	11	2.6
46	1	12	2.9
47	7	19	4.6
48	7	26	6.2
49	6	32	7.7
50	7	39	9.4
51	3	42	10.1
52	14	56	13.4
53	20	76	18.2
54	12	88	21.1
55	21	109	26.1
56	6	115	27.6
57	23	138	33.1
58	41	179	42.9
59	13	192	46.0
60	27	219	52.5
61	11	230	55.2
62	28	258	61.9
63	31	289	69.3
64	20	309	74.1
65	22	331	79.4
66	22	353	84.7
67	9	362	86.8
68	25	387	92.8
69	8	395	94.7
70	16	411	98.6
71	1	412	98.8
72	0	412	98.8
73	3	415	99.5
74	0	415	99.5
75	2	417	100.0
76	0	417	100.0
77	0	417	100.0
78	0	417	100.0
79	0	417	100.0
80	0	417	100



AVERAGE SPEED = 59.8
50th PERCENTILE = 60
67th PERCENTILE = 63
85th PERCENTILE = 67
95th PERCENTILE = 70

PACE SPEED = 57 to 66
VEHICLES IN PACE = 238
% IN PACE = 57
% BELOW PACE = 28
% ABOVE PACE = 15

STANDARD DEVIATION = 6.52
% EXCEEDING POSTED LIMIT = 1

RECOMMENDED SPEED LIMIT = 65

Form TR-11

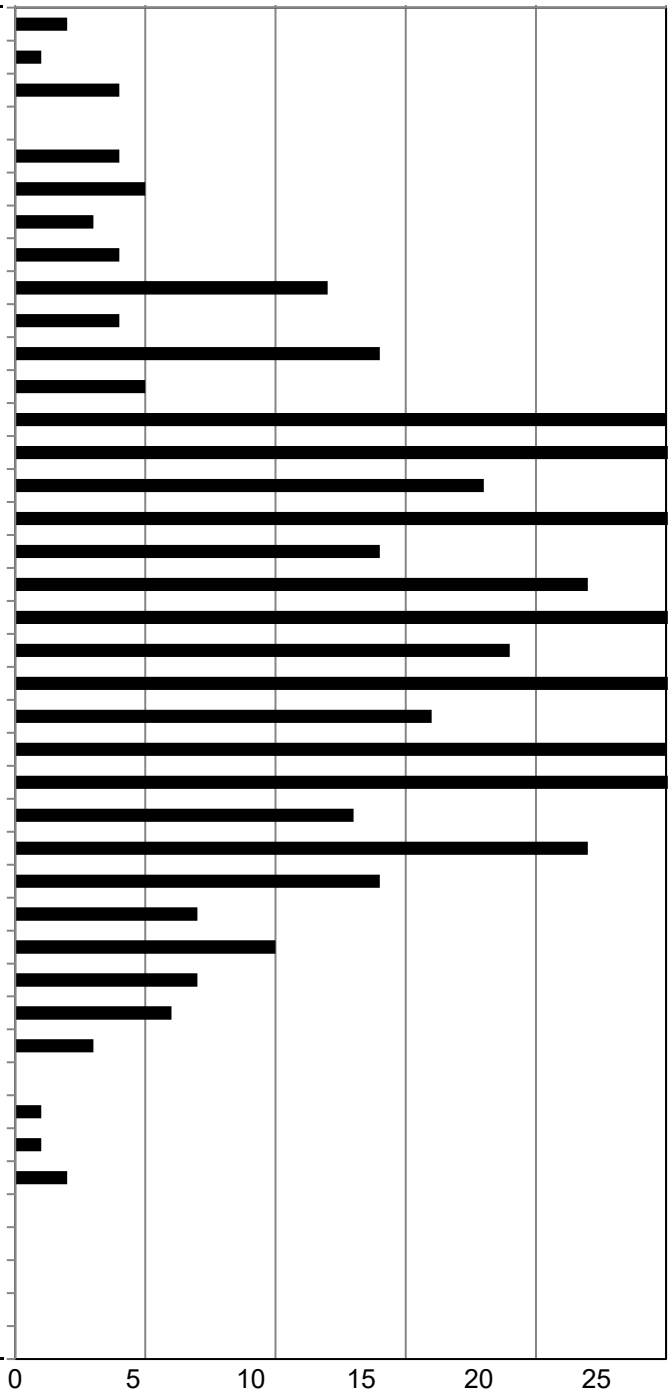
Revised 3/4/11

SPEED STUDY

Wyoming Department of Transportation

CITY: Sheridan
COUNTY: Sheridan
ROUTE: Wyarno Road
SPEED LIMIT: 70 MPH
DIRECTION: Eastbound
LOCATION: E/O Wildcat Road
OBSERVER: JAMAR Radar Device
START TIME:
WEATHER: Summer
DATE: 8/9/23-8/10/23
END TIME:
COMMENTS: Location 3

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
40	2	2	0.5
41	1	3	0.7
42	4	7	1.6
43	0	7	1.6
44	4	11	2.5
45	5	16	3.6
46	3	19	4.3
47	4	23	5.2
48	12	35	8.0
49	4	39	8.9
50	14	53	12.0
51	5	58	13.2
52	25	83	18.9
53	26	109	24.8
54	18	127	28.9
55	28	155	35.2
56	14	169	38.4
57	22	191	43.4
58	40	231	52.5
59	19	250	56.8
60	37	287	65.2
61	16	303	68.9
62	25	328	74.5
63	26	354	80.5
64	13	367	83.4
65	22	389	88.4
66	14	403	91.6
67	7	410	93.2
68	10	420	95.5
69	7	427	97.0
70	6	433	98.4
71	3	436	99.1
72	0	436	99.1
73	1	437	99.3
74	1	438	99.5
75	2	440	100.0
76	0	440	100.0
77	0	440	100.0
78	0	440	100.0
79	0	440	100.0
80	0	440	100



AVERAGE SPEED = 58.1
50th PERCENTILE = 58
67th PERCENTILE = 61
85th PERCENTILE = 65
95th PERCENTILE = 68

PACE SPEED = 52 to 61
VEHICLES IN PACE = 245
% IN PACE = 56
% BELOW PACE = 13
% ABOVE PACE = 31

STANDARD DEVIATION = 6.40
% EXCEEDING POSTED LIMIT = 2

RECOMMENDED SPEED LIMIT = 65

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/9/2023 to 8/10/2023

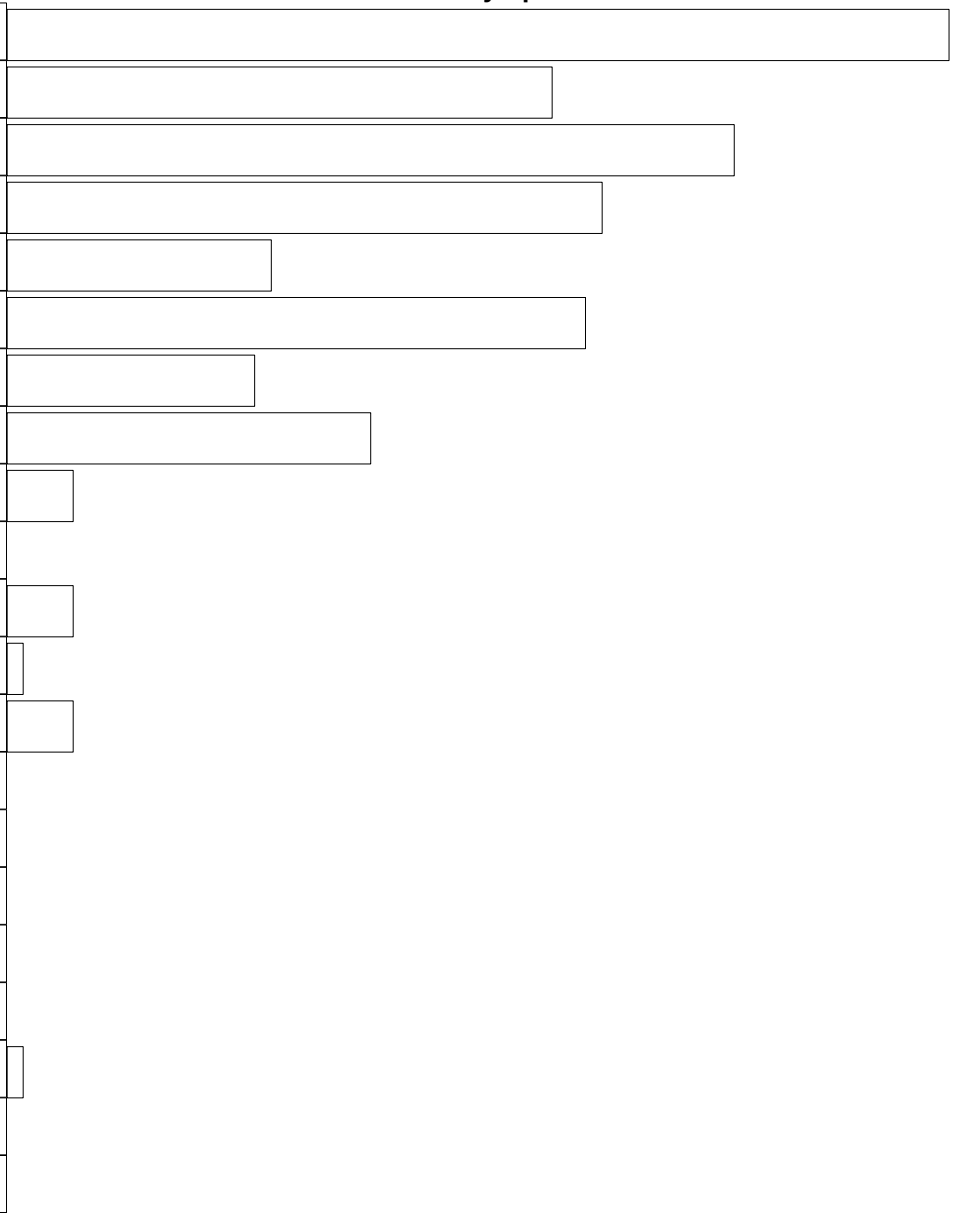
Combined

Speed MPH	Volume
33	0
34	0
35	1
36	0
37	2
3	0
3	0
40	3
41	1
42	6
43	0
44	6
45	11
46	4
47	11
4	1
4	10
50	21
51	
52	3
53	46
54	30
55	4
56	20
57	45
5	1
5	32
60	64
61	27
62	53

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/9/2023 to 8/10/2023

63	57
64	33
65	44
66	36
67	16
6	35
6	15
70	22
71	4
72	0
73	4
74	1
75	4
76	0
77	0
7	0
7	0
0	0
1	1
2	0
3	0



Sheridan Police Department
JAMAR Speed Study

Westbound

Volume Sorted by Speed for 8/9/2023 to 8/10/2023

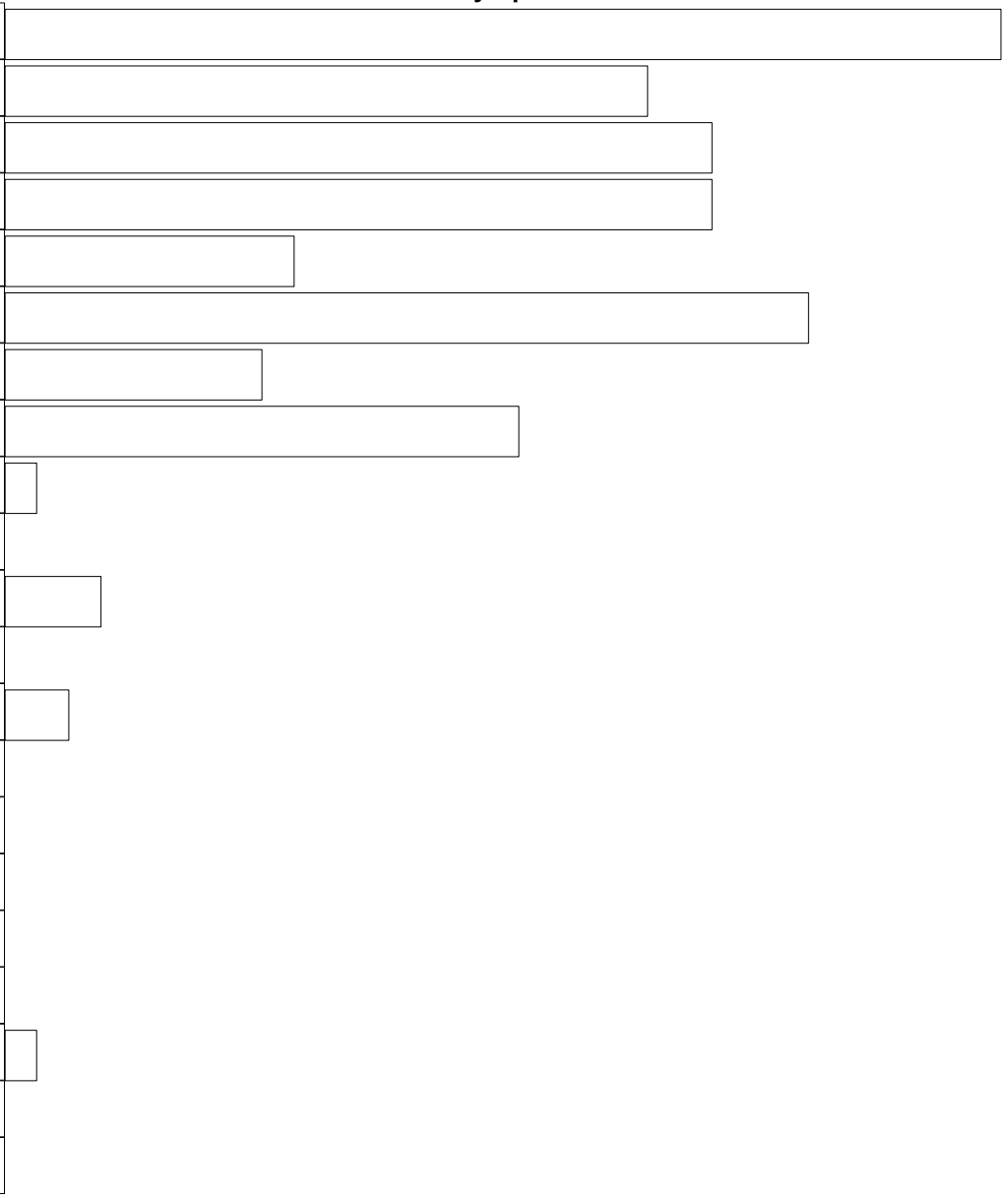
Direction X, Lane 1

Speed MPH	Volume
33	0
34	0
35	0
36	0
37	1
3	0
3	0
40	1
41	0
42	2
43	0
44	2
45	6
46	1
47	7
4	7
4	6
50	7
51	3
52	14
53	20
54	12
55	21
56	6
57	23
5	41
5	13
60	27
61	11
62	2

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/9/2023 to 8/10/2023

63	31
64	20
65	22
66	22
67	
6	25
6	
70	16
71	1
72	0
73	3
74	0
75	2
76	0
77	0
7	0
7	0
0	0
1	1
2	0
3	0



Sheridan Police Department
JAMAR Speed Study

Eastbound

Volume Sorted by Speed for 8/9/2023 to 8/10/2023

Direction X, Lane 2

Speed MPH	Volume
33	0
34	0
35	1
36	0
37	1
3	0
3	0
40	2
41	1
42	4
43	0
44	4
45	5
46	3
47	4
4	12
4	4
50	14
51	5
52	25
53	26
54	1
55	2
56	14
57	22
5	40
5	1
60	37
61	16
62	25

Sheridan Police Department
JAMAR Speed Study

Volume Sorted by Speed for 8/9/2023 to 8/10/2023

63	26
64	13
65	22
66	14
67	7
6	10
6	7
70	6
71	3
72	0
73	1
74	1
75	2
76	0
77	0
7	0
7	0
0	0
1	0
2	0
3	0

STORY HOUSE VILLAGE PUD PHASE 1

WATER AND SEWER REPORT

PREPARED FOR:

CITY OF SHERIDAN

ON BEHALF OF:

STORY HOUSE PROPERTY COMPANY, LLC

WWC ENGINEERING

April 2024

STORY HOUSE VILLAGE PUD - PHASE 1
WATER AND SEWER REPORT

Prepared for:	City of Sheridan 55 Grinnell Plaza Sheridan, WY 82801
On Behalf of:	Story House Property Company, LLC 40 E Works Street #1B Sheridan, WY 82801
Prepared by:	WWC Engineering 1849 Terra Avenue Sheridan, WY 82801 (307) 672-0761
Principal Authors:	Tristan Greve, E.I. Sarah Rohrer, P.E. Marcus Dufort, P.E.
Reviewed by:	Jeff Barron, P.E., Civil Department Manager Chad Reed, P.E., Sheridan Branch Manager

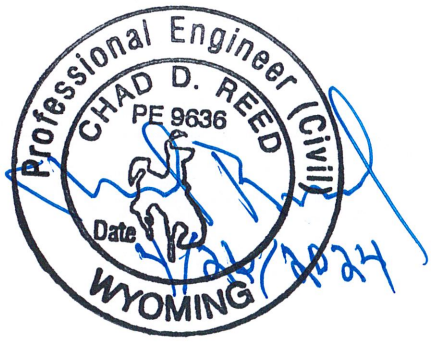


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INTRODUCTION

This amended report provides information regarding water and sanitary sewer design for the Story House Village Planned Unit Development (PUD) Phase 1 (Project) located in Sheridan, WY. The changes that have occurred in the design since the original March 1, 2024 submittal includes the removal of the wastewater treatment plant and all associated primary treatment tanks, pumping station, and discharge piping. The sanitary sewer design has been revised to flow the PUD's sanitary sewer to a lift station that is then routed back to the existing City of Sheridan gravity sanitary sewer system on Valley View Drive using a force main and gravity main sanitary sewer system. An allowable density for the proposed Story House Village PUD Phase 1 has been agreed upon with the City of Sheridan to result in the PUD's allowable sanitary sewer effluent flow rates to the existing City's system. A more detailed discussion is included later in the report. All other changes to the report are a result of comments received from WDEQ on March 27, 2024.

The Project includes the expansion of a water system within the development connecting to the City of Sheridan's (City) existing water system adjacent to the Project. The Project also includes the installation of a sanitary sewer system that involves a gravity sanitary sewer system to a lift station and a force main and gravity sanitary sewer system to connect to the City's existing sanitary sewer system. This report encompasses only Phase 1 of the overall PUD. Future phases of development may occur on the remainder of the property and will be evaluated at that time. The water and sanitary sewer system described herein were designed in accordance with Sections 301 and 401 of the City's Public Infrastructure Design Standards, 2017 Edition (City, 2017), herein referred to as the City Design Standards, and current WDEQ Water Quality Rules and Regulations Chapters 11 and 12 (WDEQ, 2018 and WDEQ, 2023). This report includes a comparison of the proposed system improvements with City and WDEQ requirements and appendices containing supporting information.

LOCATION

The Project is located east of Interstate 90 north of State Highway 336, also known as Wyarno Road. It is bound by Wyarno Road to the south and private property to the north, west, and east. The Project encompasses approximately 44.86 acres within the southern half of the southeast quarter of Section 24, T56N, R84W as shown on Figure 1. The Project and proposed improvements are provided in the PUD plat and Construction Drawings included in Appendix A.

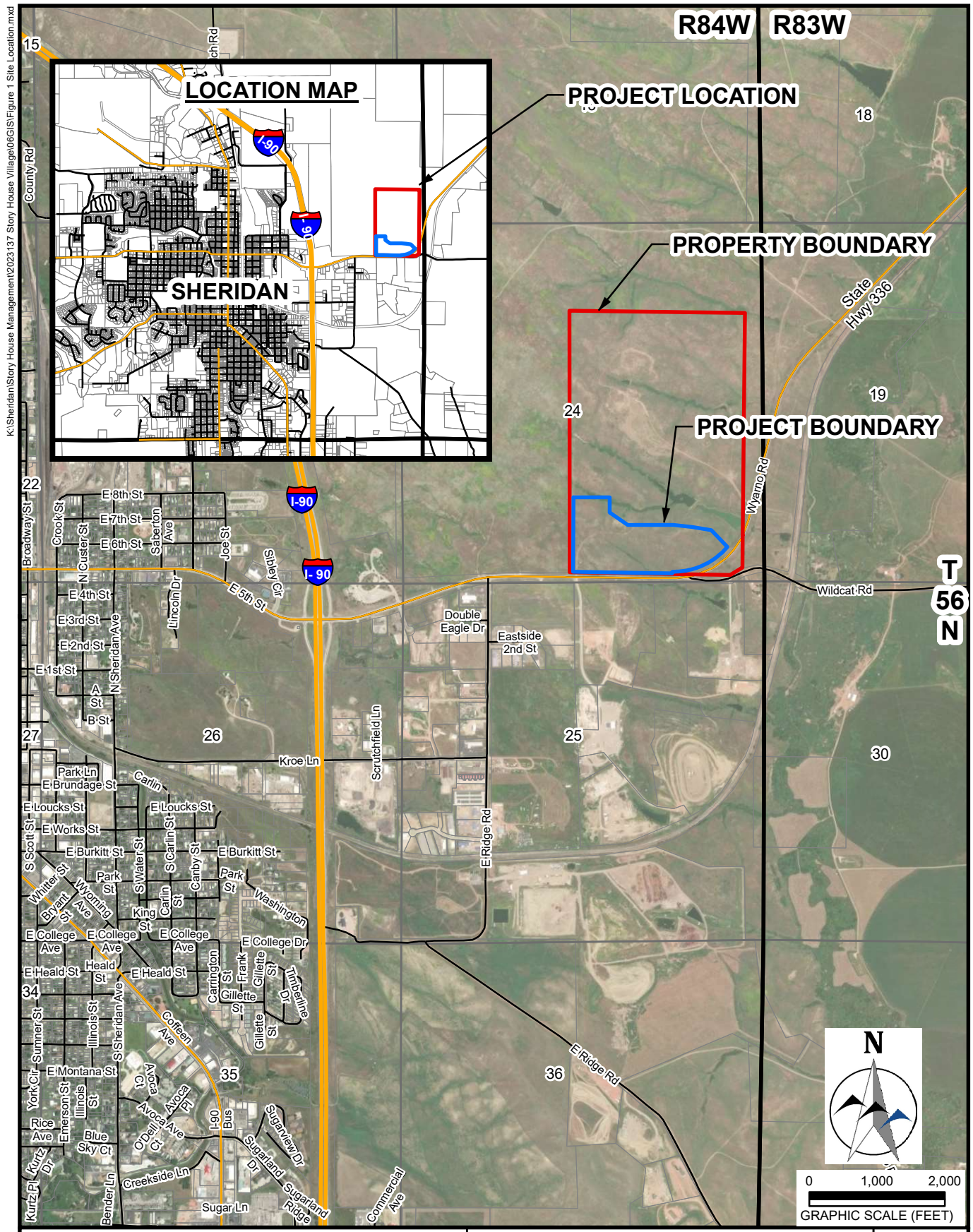
EXISTING WATER DISTRIBUTION & SANITARY SEWER SYSTEM

POTABLE WATER SYSTEM

The City's existing water distribution system adjacent to the proposed development consists of a 12-inch PVC water main along Wyarno Road that terminates with a cap just east of Industrial Lane beyond a fire hydrant.

SANITARY SEWER SYSTEM

Connection to the City's existing sanitary sewer infrastructure will occur at Valley View Dr. An extension of a gravity sanitary sewer system and a force main/lift station will be necessary to reach the existing infrastructure. The existing City of Sheridan's sanitary sewer system's



Water and Sewer Plan

GENERAL LOCATION

STORY HOUSE VILLAGE PUD - PHASE 1

DESIGNED BY: SER
DRAWN BY: RAV
CHECKED BY: SER
DATE: 10/02/2023

WWC ENGINEERING
1849 TERRA AVENUE
SHERIDAN, WY 82801
307-672-0761

FIGURE 1

capacity needs to meet WDEQ's line sizing requirement that "lines shall be sized for 200 percent of maximum daily flow or more" (WDEQ, 2018). Confirmation of the available capacity in the Valley View Dr sanitary sewer pipe was received from DOWL Engineering, the City of Sheridan's consultant for the sanitary sewer system (DOWL, 2024), an email of which is included in Appendix B. The sewer capacity available for Story House for this Project has been confirmed by the City's Utilities Department (Martineau, 2024), an email of which is provided in Appendix B. Densities for the Project have been revised to match the available sewer capacity. As shown in Table 1 below, the existing system has the capacity for 265 gpm to be in accordance with WDEQ regulations. The maximum daily flows being used for current developments are 107 gpm of the 265 gpm capacity. The remaining available capacity for this Project is 158 gpm. The proposed densities are 359 residential units and 3 commercial units. Details of the design flow rates are detailed in the Proposed Sanitary Sewer Improvements section later in the report. In addition, the City of Sheridan has requested a watershed analysis that shows potential flows for the entire sewershed tributaries. This analysis was completed and is also included in Appendix B.

Table 1. Sanitary Sewer Existing Conditions

Sanitary Sewer Main	*Existing Conditions*
Calculated Maximum Daily Peaking Factor[1]	2.43
Full Pipe Capacity (gpm)[1]	529
200% Maximum Daily Flow Capacity (gpm)	265
Current Maximum Daily Flow (gpm)[1]	107
Available Maximum Daily Capacity (gpm)	158
Maximum Daily Flow Available for Story House (gpm)	158

[1]Data provided from Jeffrey Rosenlund and included in Appendix B – (DOWL, 2024)

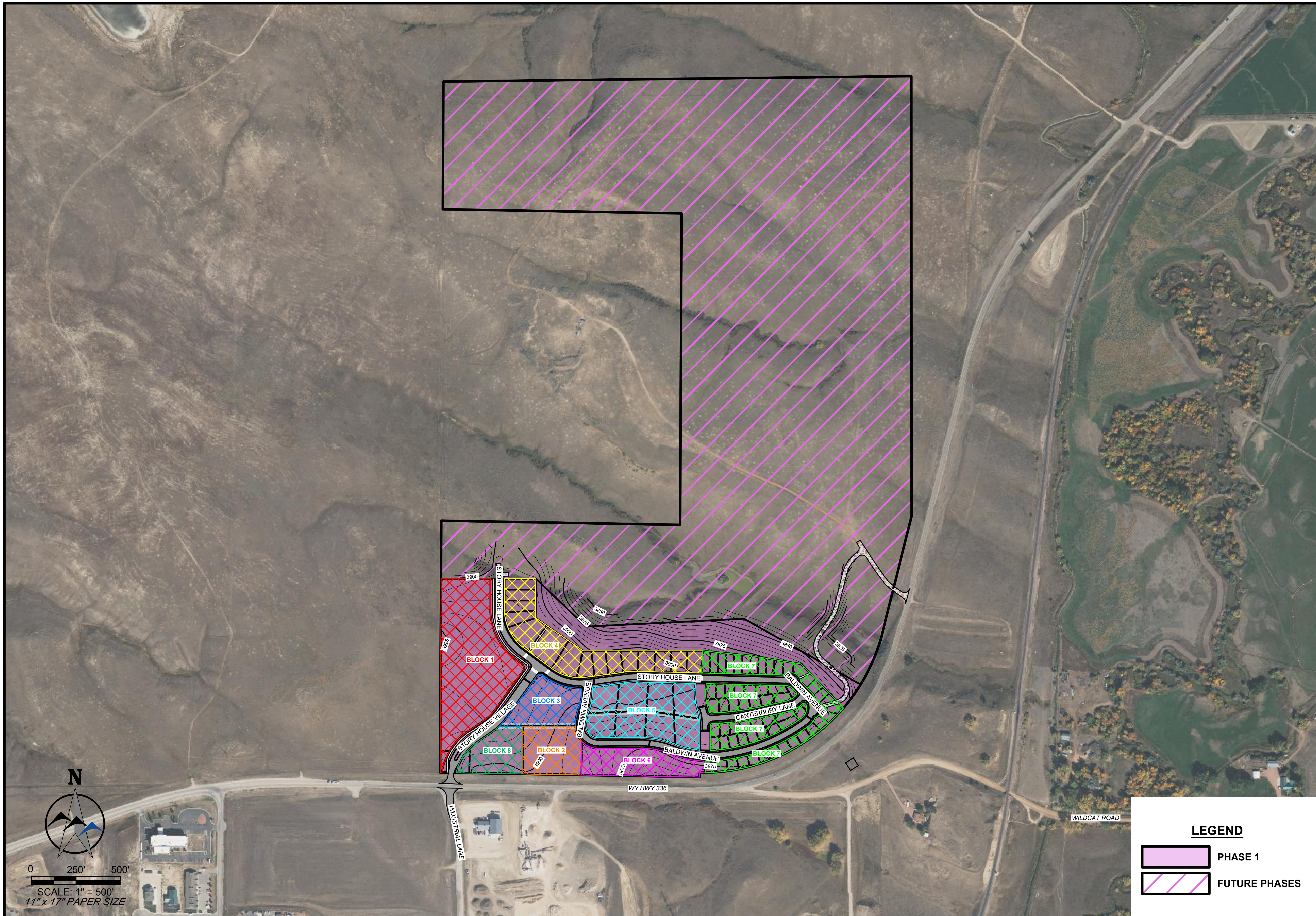
PROPOSED DEVELOPMENT

The proposed development is a PUD that includes both commercial and residential development. The PUD will include the installation of a potable water system and a sanitary sewer system comprised of on-site gravity sanitary sewer which enters a lift station and is conveyed to the City's sanitary sewer network via a combination force main/gravity sanitary sewer system. Roadways will include curb and gutter, sidewalks, and pathways. All infrastructure will be designed and constructed in accordance with the City's Standard Specifications and Details for Street and Utility Construction, 2016 Edition (City, 2016), herein referred to as the City Specifications. The following sections outline the proposed potable water and sanitary sewer system improvements to be constructed as part of the Project. The water and sanitary sewer analysis described herein is based on the land use, area, and density provided in Table 2. The amended proposed density of the Project is 359 residential units and 3 commercial units which has been changed from the original 407 residential units and 3 commercial units that was originally proposed. Design flow rates equivalent to the proposed density are detailed in the Proposed Sanitary Sewer Improvements section later in the report. Figure 2 shows the proposed Phase 1 of Story House Village and the block numbering.

Table 2. PUD Proposed Development

Block	*Acreage*	*Land Use*	*Units*
1	6.75	Residential	**171**
2	2.03	Commercial	**1**
3	2.00	Commercial	**1**
4	4.65	Residential	**20**
5	4.53	Residential	**64**
6	2.22	Residential	**24**
7	5.95	Residential	**80**
8	1.61	Commercial	**1**
		Total Residential Units	**359**
		Total Commercial Units	**3**

K:\Sheridan\Story House Management\2023137 Story House Village\05CAD\Sheets\DEQ\23137_VILG_DEQ_SITE_PLAN.dwg PUD_PHS 4/25/2024 1:56:46 PM



NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY

WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE PUD - PHASE 1

PROPOSED DEVELOPMENT PLAN

SHERIDAN COUNTY, WYOMING

DESIGNED BY: *SER*
DRAWN BY: *CIM*
CHECKED BY: *CDR*
DATE: *03/26/2024*

FIGURE
2

Proposed Potable Water System Improvements

Demand Criteria

The following table presents the system demands and the water system's design criteria used in estimating demand for Phase 1 of the proposed PUD only.

Table 3. Water System Demand Criteria

Demand	Per Capital Usage Rates (gpcd)
Average Day	210
Peak Day	555
Peak Hour	882
Peaking Factors	
Ave. Day/Peak Day	2.65
Ave. Day/Peak Hour	4.20
Average Day Demand (gpcd) for Future Population	
Residential	125
Other Design Criteria (gpm for 2 hr)	
Single Family Residential (units less than 3,500 sf)	1,000
All Other Residential	1,500
Commercial	2,500

Water System Hydraulics

The City's current WaterCAD® water system model was supplied to WWC by DOWL. It is assumed the model provided was calibrated and in working order for our analysis. The elevation of the ground served by the proposed water main at the Project varies. Table 4 summarizes the project daily and peak flows required by the Project as calculated from the land use tabulated in Table 2 and the demand criteria in Table 3. The Project falls within the City's pressure zone of 4040. The water model was used to analyze existing and proposed hydraulic conditions for the proposed PUD and immediate surrounding area. The water system hydraulics within the Project are shown in Table 5. Results of the WaterCAD® modeling are provided in Appendix C.

Table 4. Projected Water Use Requirements

*Block**	*Total Capita*	*Average Day (gpm)*	*Number of Lots*	*Average Day (gpm per lot)*	*Peak Day (gpm per lot)*	*Peak Hour (gpm per lot)*
1	427.50	62.34	1	62.34	165.21	261.84
2	36.54	5.33	1	5.33	14.12	22.38
3	36.00	5.25	1	5.25	13.91	22.05
4	50.00	7.29	15	0.49	1.29	2.04
5	160.00	23.33	8	2.92	7.73	12.25
6	60.00	8.75	1	8.75	23.19	36.75
7	200.00	29.17	60	0.49	1.29	2.04
8	28.98	4.23	1	4.23	11.20	17.75
Total	**999.02**	**145.69**	**88.00**	**89.79**	**237.94**	**377.11**

*Refer to Table 2 for Land Use & Density
**18 persons/acre used for commercial, 2.5 persons/unit used for residential

Table 5. Water System Hydraulics

	2024 Peak Day		2024 Peak Hour	
Location	**Flows (gpm)**	**Pressures (psi)**	**Flows (gpm)**	**Pressures (psi)**
STA: 0+50	393	56	613	53
STA: 10+00	0.5	61	1	58
STA: 15+70	202	50	585	47
STA: 18+68	187	54	560	50
STA: 31+55	36	69	93	66
STA: 46+50	78	61	217	56
STA: 63+00	8.7	66	24	62

The fire flow scenario is the highest flowrate scenario and as required by WDEQ, Chapter 12, the following conditions need to be satisfied:

1. Chapter 12, Section 16.a, 2018 TSS 8.2.1, all water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system shall be not less than 35 psi, and

2. According to Chapter 12, Section 16.a, 2018 TSS 8.2.3, when fire protection is to be provided, system design shall be such that fire flows can be served.

Fire flows were modeled under a peak day demand condition using peak day demand plus fire flow demand. The resulting pressures at representative points for fire flows are shown in Table 6. Commercial development, requiring a minimum of 2,500 gpm for fire flow, is proposed within Blocks 1, 2, 3, and 8 of the PUD. Single family and multi-family residential dwellings are proposed within Blocks 4, 5, 6, and 7 of the PUD, as such the "All Other Residential" fire flow requirement of 1,500 gpm was used. As shown in Table 6, the available fire flows meet or exceed 2,500 gpm and 1,500 gpm for commercial and residential requirements, respectively, with acceptable pressure drops within the system.

The WaterCAD® model analysis was performed by iteratively increasing the flow rate at the proposed fire hydrant until the pressure dropped to 20 psi anywhere within the pressure zone. The maximum available fire flow and residual pressures at each of the pressure zone fire hydrants are summarized in Table 6 below and provided in Appendix C.

POTABLE WATER MAIN

The proposed water main will be 8-inch and 12-inch C900 DR18 PVC bell and spigot pipe meeting the requirements of the WDEEQ and City of Sheridan's specifications and details. Water service lines will be properly sized depending on the type of structure and in accordance with the latest edition of International Plumbing Code requirements (ICC, 2021). A summary of the WDEQ Chapter 12 requirements and the City of Sheridan design standards for the potable water main is provided in Table 7. A summary of the 2018 TSS requirements under WDEQ and the design parameters for the potable water main is provided in Table 8.

Table 6. Fire Flow Data

Location	2024 Pressure (psi)	2024 Fire Flow (gpm)
STA: 3+98*	22	2,841
STA: 7+57*	20	2,676
STA: 10+75*	20	2,580
STA: 14+17*	20	2,580
STA: 23+49	20	1,913
STA: 28+31	24	2,020
STA: 32+83	29	2,009
STA: 37+03	21	2,090
STA: 41+15	21	2,141
STA: 45+20	21	2,181
STA: 49+10	20	2,105
STA: 59+97	20	1,544
STA: 64+28	24	1,847

*Commercial fire flow of 2,500 gpm required

Table 7. Water Main Design Requirements

WDEQ Chapter 12	*Requirement*	*Design Parameter*
16.a	2018 TSS, parts 8.2-8.2.4(b), system design; 8.3, valves; 8.4-8.4.4(d), hydrants; 8.5-8.5.2(c), air relief valves; 8.6, valve, meter, and blow-off chambers; 8.7.3, installation of water mains, cover; 8.7.4, installation of water mains, blocking; 8.7.6, installation of water mains, pressure and leakage testing; 8.7.7, installation of water mains, disinfection; 8.7.8, installation of water mains, external corrosion; 8.7.9, installation of water mains, separation from other utilities; 8.8.2-8.8.2(b), separation distances from contamination sources, parallel installation; 8.8.3-8.8.3(b), separation distances from contamination sources, crossings; 8.8.6, separation distances from contamination sources, sewer manholes, inlets, and structures; 8.9- 8.9.1, surface water crossings, above-water crossings; 8.9.2-8.9.2(c); surface water crossings, under water crossings; 8.11.1, water services and plumbing, plumbing; 8.12, service meters; are herein incorporated by reference.	See Table 8 that addresses these additional requirements.
16.b.i	Distribution systems shall be constructed of commercial pipe that conforms to the following standards: PVC Pipe: ASTM D2241, less than 4" diameter (10 cm); AWWA C900: 4" (10 cm) and larger diameter.	Water distribution pipe will be PVC meeting AWWA C900 standards and City Specification Section 02710.
16.d	New water mains shall be sized after the hydraulic analysis required by Section 9(l)(i) of this Chapter and the design shall demonstrate that at maximum day demand plus current State of Wyoming-required fire flow, or the fire flow of an authority having jurisdiction, the pressure in the municipal distribution system will not fall below 20 pounds per square inch (psi); and the normal system working pressure shall be greater than 35 psi.	The calculations show all applicable flow scenarios and associated pressures and flow rates at fire hydrants are met.
16.f.i	Hydrants shall have hydrant leads that are a minimum of six inches in diameter.	Hydrant leads are six inches or eight inches in diameter.
16.f.ii	Hydrants shall have valves installed.	All hydrants have a valve installed on the lead.
16.f.iii	Hydrants shall be protected from freezing at hydrant leads and barrels.	All hydrant leads and barrels will be protected from freezing. Leads will be installed with a minimum of 6 feet of cover to the top of the pipe as required by City Specification Section 02644.
16.f.iv	Where groundwater levels are above the gravel drain area, hydrants shall be pumped dry or otherwise dewatered and hydrant weep holes shall not be used	All hydrant gravel drains are above groundwater.

Table 7. Water Main Design Requirements (Cont.)

WDEQ Chapter 12	*Requirement*	*Design Parameter*
COS Section 301 modification to 14.2.vi	All waterlines shall be looped. Permanent dead-end lines are prohibited with the exception of lines extending into cul-de-sacs serving no more than twenty (20) single family residential units or equivalent demand. For those dead-end lines that are allowed as describe above shall be terminated with a fire hydrant or other flushing device.	Waterlines are looped where possible, and the permanent dead-end on Canterbury services less than 20 residential units and terminates with a fire hydrant. There is a temporary dead-end on Story House Lane pending future construction that terminates with a flushing hydrant.
COS Section 301 modification to 14.2.vii	Services. The International Plumbing Code, latest adopted edition shall be generally used as the basis of design for water service lines. There shall be only one tap and water service line from the main to the property line for each lot. Multiple services on one lot may be divided at the property line with each individual service having a meter and a curb stop. Where multiple structures are on one lot which could be subdivided in the future, one tap and water service line from the main to the property line for each main structure will be allowed only upon approval by the Public Utilities Director. Services larger than 2" must be approved by the Public Utilities Director and will require a "Permit to Construct." That portion of the service line between the main and the property line shall be one continuous length of Type K copper pipe or HDPE pipe, installed perpendicular from the main to a meter pit or curb stop and box at the property line. Service lines shall be installed at least ten (10) feet laterally, from any foreign nonpotable conduit and a minimum of five (5) feet from the side property line of the lot being served. In accordance with the International Plumbing Code, water and sewer services can be installed within the same trench provided the sewer service piping system is constructed using Sch. 40 PVC. When serving lots at the end of a cul-de-sac, the length of the service line between the main and the property line shall not exceed seventy (70) feet. Under no circumstances shall any tap be made on a fire hydrant lateral line.	All water service lines shall be installed per City Specification Section 02645.

Table 7. Water Main Design Requirements (Cont.)

WDEQ Chapter 12	*Requirement*	*Design Parameter*
COS Section 301 modification to 14.2.vii (cont.)	Service lines shall be adequate to supply the requirements of the property being served. The minimum size allowed for a water service line is 1 inch with a 3/4-inch meter. The corporation stop, the meter, and that portion of the service pipe between the meter and the corporation stop on the main, shall all be of the same size for services larger than one (1) inch in the City of Sheridan. For individual service lines, larger than one (1) inch, used for (a) domestic flows and (b) fire suppression system supply, the meter(s) used to record domestic and irrigation flows (non-fire suppression supply) may be of a different size than the shared service pipe as long as the meter is sized appropriately for the anticipated flows. The size for a service line from the City water main to any unit being served shall be selected such that the following design criteria are not exceeded during total peak demand flow: A. Eighty (80) percent of the manufacturer's maximum meter capacity B. Service line pipe flow velocity does not exceed fifteen (15) feet per second (fps). C. The pressure drop from the City water main to any unit being served shall not be greater than thirty (30) psi and the minimum residual pressure at the finish floor elevation to any unit shall not be less than twenty (20) psi. The water requirements of the property being served shall be defined as "total peak demand flow." Peak domestic water requirements shall be calculated in accordance with the latest edition of the International Plumbing Code and the American Water Works Association M22 Standard. The irrigation demand flow and continuous load demands (when applicable) shall be added to the peak designed flow to get the total peak demand flow. Meter pits are required on all water service connections in areas served by the SAWSJPB and DNISD. For areas served by the City of Sheridan, meters will be installed accordingly: 1. All meters shall be installed within a full-depth basement, or in a location within 3 feet of the access if in a crawl space. 2. The service line between the curb-stop and the meter shall be a single, continuous (un-spliced) section and will be buried to prevent future connections prior to the meter.	All water service lines shall be installed per City Specification Section 02645.

Table 7. Water Main Design Requirements (Cont.)

WDEQ Chapter 12	*Requirement*	*Design Parameter*
COS Section 301 modification to 14.2.vii (cont.)	3. If the aforementioned requirements of 1. and 2. cannot be met, a meter pit to be located immediately after the curb stop will be allowed, provided the meter pit conforms to other requirements within adopted City Standard Specifications. 4. Depending on the hazard classification of the building, an appropriate backflow prevention device may be installed in the meter pit; however, for high-hazard installations, the required backflow prevention device might need to be installed within the mechanical room of the new building provided appropriate floor drains exist to dispense water discharged from the device during a back-pressure situation.	
COS Section 301 modification to 14.b.x	Water main shall be designed to minimize the number of fittings. All fittings shall be in conformance with the City Standard Specifications.	The water main has been designed to minimize fittings and all fittings shall be installed per City Specification Section 02710.
COS Section 301 modification to 14.c	Valves shall be provided on water mains so inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than five hundred (500) foot intervals on distribution and lateral mains and one thousand (1000) foot intervals on transmission mains. Valves will be placed at all pipe junctions so that the total number of valves at the junction is one less than the number of branches, except as otherwise approved by the Public Utilities Director. Line valves shall also be placed: Such that no more than one (1) fire hydrant is isolated at any one time. At each end of a line running through an easement on private property. On each side of a creek, channel crossing, or Arterial Street/Highway crossing. On fire hydrant laterals.	The valve spacing meets these requirements and all valves shall be installed per City Specification Section 02641.
COS Section 301 modification to 14.f.i	Excavation. Shall be in conformance with the City Standard Specifications and O.S.H.A. Regulations.	The water main trench shall be installed per City Specification Sections 02221 and 02401.
COS Section 301 modification to 14.f.ii	Bedding. Shall be in conformance with the City Standard Specifications	Pipe bedding gradations will adhere to City Specification Section 02221.
COS Section 301 modification to 14.f.v	Water mains shall have a minimum cover of six (6) feet and a maximum cover of seven (7) feet to top of pipe, except as otherwise approved by the Public Utilities Director.	The water main will be installed with a minimum of 6 feet of cover to the top of the pipe as required by City Specification Section 02710.

Table 7. Water Main Design Requirements (Cont.)

WDEQ Chapter 12	*Requirement*	*Design Parameter*
COS Section 301 modification to 14.i	Cross Connection Control. All water services connected to the public water system shall comply with the City's "Cross Connection Control Program" as described within City of Sheridan Ordinance No. 1946. (A full copy of Ordinance No. 1946 has been provided at the end of Section 301.)	There will be no connections from the water main until the water enters the existing water distribution network.
16.f.v	Hydrants shall have drains that are not connected to or located within 10 feet of a sanitary sewer or storm drain.	All hydrant gravel drains are greater than 10 feet away from a sanitary sewer or storm drain.
16.g	Fire hydrants or active service taps may be substituted for air relief in 6- and 8-inch lines.	Fire hydrants or active service taps will act as air relief valves at any high points in the system.
16.h	Where excavation is performed for distribution systems: The trench bottom shall be excavated for the bell of the pipe; All rock shall be removed within six inches of the pipe; and The trench shall be dewatered for all work.	The water main trench shall be installed per City Specification Sections 02221 and 02401.
16.i	Distribution system bedding for rigid pipe shall be designed in accordance with ASTM C16 Classes A, B, or C. Flexible pipe bedding shall be designed in accordance with ASTM D2321 Class I, II, or III.	Pipe bedding gradations will adhere to City Specification Section 02221.
16.j.ii	Distribution system pipe shall be joined to ensure a watertight fitting and installed in accordance with the following standards, as applicable: For PVC pipe, AWWA M23	The water main will be installed to the manufacturer's recommendations. Pressure and leakage testing will be performed on all installed pipe in accordance with City Specification Section 02766.
16.k	Backfill for distribution systems shall: Be performed without disturbing pipe alignment; Not contain debris, frozen material, unstable material, or large clods; Not contain rocks or stones that are greater than three inches in diameter within two feet of pipe; and Be compacted to a density equal to or greater than the surrounding soil.	Backfill will be performed to meet City Specification Section 02221 and 02710.
16.l.i	Distribution systems shall meet the following requirements for separation of water mains from sanitary and storm sewers: Where the minimum vertical or horizontal separation distances required by incorporation by reference of 2018 TSS parts 8.8.2 and 8.8.3 of paragraph (a) of this Section cannot be met, the sewer or water line shall be placed in a separate conduit pipe or meet the flow-fill requirements of paragraphs (ii) and (iii) of this Paragraph (l).	Separation with sewers will be maintained as required by City Specification Section 02710. A minimum of 10 feet horizontal separation and 18 inches vertical separation will be maintained, and water main crossings shall be located so both water and sewer line joints are as far as possible from each other. Where 18 inches of separation cannot be met, the pipe will be encased in flowable fill.

Table 7. Water Main Design Requirements (Cont.)

WDEQ Chapter 12	*Requirement*	*Design Parameter*
16.h.ii	Underwater crossings. A minimum cover of 2 feet (0.61 m) shall be provided over the pipe. When crossing water courses which are greater than 15 feet (4.6 m) in width additional provisions shall be provided as required.	There are no proposed underwater crossings.
16.m	Cross-connections.	There will be no connections from the water main until the water enters the existing water distribution network.

Table 8. Water Main 2018 TSS Design Requirements

2018 TSS Section	*Requirement*	*Design Parameter*
8.2.4 (b)	Dead end mains shall be equipped with a means to provide adequate flushing. Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. They may be provided with a fire hydrant if flow and pressure are sufficient. No flushing device shall be directly connected to any sewer.	Dead end mains terminate with a flushing hydrant or a fire hydrant to provide adequate flushing.
8.3	A sufficient number of valves shall be provided on water mains to minimize inconvenience and sanitary hazards during repairs. Valves should be located at not more than 500-foot intervals in commercial districts and at not more than one block or 800-foot intervals in other districts. Where systems serve widely scattered customers and where future development is not expected, the valve spacing should not exceed one mile.	Valves are appropriately located throughout the PUD and are less than 500 feet and 800 feet apart in commercial and residential districts, respectively.
8.5.1	At high points in water mains where air can accumulate provisions shall be made to remove the air by means of air relief valves. Use of manual air relief valves is preferred wherever possible. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur unless equipped with an inflow preventer conforming to AWWA C 514 and as approved by the reviewing authority.	Air relief valves are provided at high points on the 12-inch water main. Fire hydrants and services are located at high points in the water main and act as air relief valves per WDEQ Ch.12 Section 16.g on the 8-inch water main.
8.6	Wherever possible, chambers, pits or manholes containing valves, blow-offs, meters, or other such appurtenances to a distribution system, shall not be located in areas subject to flooding or in areas of high groundwater. Such chambers or pits should drain to the ground surface, or to absorption pits underground. The chambers, pits and manholes shall not connect directly to any storm drain or sanitary sewer. Blow-offs shall not connect directly to any storm drain or sanitary sewer.	Chambers, pits, and manholes are located above areas subject to flooding and high groundwater. They are also not directly connected to any storm drain or sanitary sewers.
8.7.3	Water mains shall be covered with sufficient earth or other insulation to prevent freezing.	The water main will be installed with a minimum of 6 feet of cover to the top of the pipe as required by City Specification Section 02710.
8.7.4	All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement.	The water main will be installed with thrust blocking and/or joint restraints as required by City Specification Section 02710.

Table 8. Water Main 2018 TSS Design Requirements

2018 TSS Section	*Requirement*	*Design Parameter*
8.7.6	Installed pipe shall be pressure tested and leakage tested in accordance with the appropriate **AWWA** Standards.	The water main will have pressure and leakage testing as required by City Specification Section 02766.
8.7.7	New, cleaned and repaired water mains shall be disinfected in accordance with AWWA Standard C651. The specifications shall include detailed procedures for the adequate flushing, disinfection, and microbiological testing of all water mains. In an emergency or unusual situation, the disinfection procedure shall be discussed with the reviewing authority.	All water mains will be disinfected as required by City Specification Section 02766.
8.9.2	A minimum cover of five feet shall be provided over the pipe unless otherwise approved by the reviewing authority.	The water main will be installed with a minimum of 6 feet of cover to the top of the pipe as required by City Specification Section 02710.
8.11.1	Water services and plumbing shall conform to the applicable local and/or state plumbing codes. Refer to Section 2.21 for information regarding material requirements and restrictions.	Water services and plumbing conforms to City Specification Section 02645.

PROPOSED SANITARY SEWER SYSTEM IMPROVEMENTS

The Project will consist of a gravity sanitary sewer system within the Phase 1 area conveying all flows to an on-site lift station that will be owned and maintained by the City of Sheridan. The lift station will pump sanitary sewer through a force main to convey flows to the highest topographical point near East Ridge Road at which point the sanitary sewer system will convert to a gravity system down to the City's sewer system connection at Valley View Drive. The City of Sheridan will own and operate the entirety of the sanitary sewer system. Plan and profile sheets detailing the sanitary sewer system are included in the Construction Drawings in Appendix A. Calculations to support the design of the system are provided in Appendix D. The following sections describe the proposed sanitary sewer system improvements.

SANITARY SEWER MAIN & SERVICES

The proposed gravity sanitary sewer system serving Phase 1 of the PUD will consist of 8-inch diameter SDR 35 PVC main lines. Gravity sewer main lines will be constructed on Story House Lane, Canterbury Lane, and Baldwin Avenue flowing east to the lift station. Sewer service laterals to each lot will be properly sized depending on the type of structure and in accordance with current IPC requirements. Details of the proposed gravity system are included in the Construction Drawings in Appendix A, calculations are included in Appendix D.

LIFT STATION

All flows collected in the gravity main sanitary sewer system will drain to an on-site lift station located northeast of Block 7 in the PUD. The current capacity allows for discharge from the lift station at a rate of 151 gpm. The lift station is designed as a submersible pump station with a 7.5' inside diameter and 20' depth manhole with duplex submersible pumps mounted on a guiderail system to allow for easy pump removal and replacement. The duplex pump system is designed based on a 10-minute pump run time. The required storage volume of the lift station is based on a 100-year life cycle and 56 cycles per day based on average flows. Levels for each pump to turn on and a high-water alarm level were determined based on the design conditions. The proposed pumps are 30 HP cutter-type-sewage and wastewater pumps. Dimensions, performance curves, and sectional views of the pumps are shown in Appendix E. Additional details of the proposed lift station system are included in the Construction Drawings in Appendix A, calculations are included in Appendix D.

A backup generator has been sized based on the duplex pump system to be used as an alternate power source. The generator is sized to handle the duplex 30 HP pumps (22kW) to be wired using 346/600V 3-phase power and operate with diesel. The location of the generator is shown in the Construction Drawings in Appendix A. Details of the generator are shown in the manufacturer cut sheets included in Appendix E.

An uplift analysis was performed to demonstrate that the proposed lift station will withstand uplift pressures and is included in Appendix D. The weight of concrete and weight of the soil is greater than the weight of water that could be displaced by the wet well demonstrating no additional need for flotation protection. No groundwater has been found in the proposed location as determined by a geotechnical investigation conducted on the site.

Force Main

Flows from the on-site lift station will be pumped into a force main sanitary sewer system. The proposed force main sanitary sewer system will consist of 4-inch diameter ductile iron to the first bend of pipe leaving the lift station which will then transition to 4-inch DR14 PVC for the rest of the force main line. Details of the proposed force main system are included in the Construction Drawings in Appendix A, calculations are included in Appendix D. The alignment will route from the lift station to the adjacent WYDOT ROW on the north side of Wyarno Road. The force sewer main will then run within the WYDOT ROW until it reaches a high topographical point near East Ridge Road to transition to a gravity sewer system.

Gravity Sewer Main

Near East Ridge Road, the force main sanitary sewer system will transition to a gravity sewer system. The proposed gravity sanitary sewer system will consist of 8-inch diameter SDR 35 PVC main lines installed in the WYDOT ROW on the north side of Wyarno Road. Once reaching Valley View Drive, the gravity sewer main will cross Wyarno Road to tie into the existing manhole on Valley View Drive. The sanitary crossing of Wyarno Road be bored and placed inside a steel casing per WYDOT requirements. Details of the proposed gravity system are included in the Construction Drawings in Appendix A, calculations are included in Appendix D.

Design Criteria

According to WDEQ Rules and Regulations Section 9(C)(i)(A) (WDEQ, 2018), sewers shall be located to protect them from freezing and frost heave as prudently possible provided they meet the requirements outlined in the policy. The City of Sheridan design standards add that wastewater mains shall have a minimum of eight (8) feet of cover so that adjacent lots with basements may have service for floor drains. Table 9 presents the sanitary sewer design criteria used in estimating demand for the proposed PUD from Section 401 of the City's Public Infrastructure Design Standards and WDEQ Chapter 11 regulations.

Table 9. Sanitary Sewer Design Criteria

Land Use	Unit Density (dwellings/acre)	Equivalent Population (persons/acre)
Single Family Residential[1]	3.0	6.6
Multi-family Residential[1]	12.0	26.5
Commercial[1]		18.0
Slope, Flow & Peaking Factors		
Minimum Design Slope[2] = 0.40 ft/100 ft (8" Sewer Pipe)		
Persons per Dwelling Unit[1] = 2.21		
Avg. Daily Per Capita Flow[1] (gpd) = 100		
Avg. Day to Peak Day[1] = 2.43		
Avg. Day to Peak Hour[1] = 2.74		

[1] City of Sheridan Public Infrastructure Design Standards, Section 401
[2] WDEQ Chapter 11 Regulations

The population served by the proposed PUD will include 359 residential dwelling units and 3 commercial units. Table 10 shows the proposed allocation of residential dwelling units and commercial units within the proposed PUD and the calculated population served within each block.

Table 10. Sanitary Sewer System Population Served

Block	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. Of Residential Dwellings	Persons per Dwelling	Capita (persons)
Block 1	Multifamily	--	--	171	2.21	378
Block 2	Commercial	2.03	18	--	--	37
Block 3	Commercial	2.00	18	--	--	36
Block 4	Single Family	--	--	20	2.21	44
Block 5	Multifamily	--	--	64	2.21	141
Block 6	Multifamily	--	--	24	2.21	53
Block 7	Single Family	--	--	80	2.21	177
Block 8	Commercial	1.61	18	--	--	29
Total		3 Commercial Units		359 Residential Units		796

SANITARY SEWER SYSTEM HYDRAULICS

The design criteria in Table 9 and the population calculations in Table 10 were used to analyze, size, and design the sanitary sewer system for the proposed Phase 1 PUD. Sanitary sewer system design flow calculations are included in Table 11. As evidenced by the hydraulic calculations in Appendix D, the 8" PVC sanitary sewer mains have more than sufficient capacity to handle sanitary flows from the Phase 1 PUD.

Table 11. Sanitary Sewer System Design Flow Calculations

	Average Day		Peak Day		Peak Hour		200% Peak Day	
Block	Average Daily Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Block 1	37,791	89,494	91,832	217,471	103,547	245,214	183,664	434,941
Block 2	3,660		8,893		10,028		17,787	
Block 3	3,600		8,748		9,864		17,496	
Block 4	4,420		10,741		12,111		21,481	
Block 5	14,144		34,370		38,755		68,740	
Block 6	5,304		12,889		14,533		25,777	
Block 7	17,680		42,962		48,443		85,925	
Block 8	2,895		7,035		7,933		14,070	

A summary of the WDEQ Chapter 11 requirements and the design parameters for the sanitary sewer system is provided in Table 12. A summary of the WDEQ Chapter 11 requirements and the design parameters for the on-site lift station is provided in Table 13. Product data sheets for the on-site lift station are provided in Appendix E.

Table 12. Sanitary Sewer System Design Requirements

WDEQ Chapter 11	Requirement	Design Parameter
Section 9	Design of Sewers.	The proposed sanitary sewer system includes the design of both gravity and low-pressure sewers.
9.a	Separate sewers. Separate sewers shall be provided for collection of stormwater and wastewater. Roof, areaway, drive, or foundation drains shall not be connected to sanitary sewers.	This project includes design of separate sanitary sewer and stormwater conveyance systems that do not connect.
9.b	Pipe materials.	Sanitary sewer gravity system pipes will be 8" SDR 35 PVC pipe meeting City Standard Specifications Section 02712.
9.b.i	Wastewater characteristics. Pipe materials shall resist acid and alkaline solutions, organic solvents and other wastewater constituents and environmental conditions encountered.	The sanitary sewer system pipe shall be SDR 35 PVC AWWA C900 pipe meeting City Standard Specification 02712 which meets these standards.
9.b.ii	Pipe loadings. Pipe materials shall be chosen, and the pipeline shall be designed to withstand all trench and superimposed surface live loads with a minimum factor of safety. Rigid pipes shall have a minimum factor of safety of 1.5, and flexible pipes shall have a minimum factor of safety of 1.25.	Sanitary sewer pipe will be installed in accordance with City Standard Specifications Section 02712.
9.b.iii	Soil characteristics. Pipe materials shall be chosen to resist corrosion due to aggressive soil characteristics by the soil it contacts. Iron or steel pipe shall be protected from corrosion with polyethylene encasement or cathodic protection.	Sanitary sewer pipe will be SDR 35 PVC pipe which is highly corrosion resistant.
9.b.iv	Joints. Pipe joints shall be flexible, durable, and designed to minimize infiltration/exfiltration and exclude roots.	SDR 35 PVC pipe joints are the bell and spigot type joints. These joints are flexible, durable, and designed to minimize infiltration/exfiltration and exclude roots.
9.b.v	Performance tests. Piping shall be subjected to leakage tests. Leakage tests shall be infiltration, exfiltration, or air tests.	All proposed piping will undergo sewer testing as required by City Standard Specifications Section 02712.
9.c	Collection piping design, construction, and testing. A sewage collection line is any conduit that carries wastewater that originates from two (2) or more separate buildings or from a single building that generates more than 2,000 gpd (7.6 m^3/d) of average daily flow.	The proposed sewer system meets this criterion.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.c.i	Gravity system	The proposed sanitary sewer system is designed as a gravity system.
9.c.i.A	Depth. Sewers shall be located to protect them from freezing and frost heave as prudently possible. City Public Infrastructure Design Standards Section 401. Waste water mains shall have a minimum of eight (8) feet of cover so that adjacent lots with basements may have service for floor drains. Waste water mains with less than eight (8) feet of cover will be considered on an individual basis and will be allowed only upon approval by the Public Utilities Director.	All sanitary sewer gravity mains shall have a minimum cover of six (6) feet to protect mains from freezing and frost heave. All sanitary sewer mains with service connections shall have a minimum of eight (8) feet of cover to allow sewer services to adjacent lots with basement floor drains.
9.c.i.B	Size. Sewers to be aligned straight shall be 8-inch (20.3 cm) diameter or larger except 6-inch (15.2 cm) sewers may be used in cul-de-sacs, or other dead-end locations where the sewer cannot be extended in the future. 18-inch (45.7 cm) or larger sewers may be laid on curves. Lines shall be sized for 200 percent of maximum daily flow or more. In the absence of data deriving maximum daily flow, the chart on Figure 1-1 shall be used to determine maximum daily flow. City Public Infrastructure Design Standards Section 401. Waste water lines subject to having service connections thereon and hereafter referred to as laterals and submains shall be sized to flow at a maximum of seventy five (75) percent full at peak hour flow rates with the minimum size no less than eight (8) inches in diameter. City designated collector, trunk, and outfall lines, lines which require specific City approval for service connections, shall be sized to flow at a maximum of ninety (90) percent full at peak hour flow rates. All waste water lines shall be installed in a straight alignment and on a uniform slope between manholes. Curvilinear alignment between manholes will not be allowed.	All sanitary sewer gravity main piping will be 8" SDR 35 PVC pipe. All lines will be installed in a straight alignment and on a uniform slope between manholes. The proposed sanitary sewer system has sufficient capacity to handle well over 200 percent of maximum daily flow and are sized to flow at no more than 75 percent full at peak hour flow rates as provided in the calculations shown in Appendix D.
9.c.i.C	Slope. Sewers shall be laid with uniform slope between manholes. Maximum slopes without the use of concrete anchors shall be 20 percent.	Sewers are designed to have a uniform slope between manholes. Minimum slopes are followed for 8" sewer pipe. No pipe slopes exceed 20 percent, therefore concrete anchors are not proposed in this design.
9.c.i.D	Velocity. Minimum velocities shall be 2 fps (0.6 mps) when flowing full. Velocities greater than 10 fps (3.0 mps) require special design considerations.	Velocity calculations meet the minimum and maximum velocity requirements. Calculations are provided in Appendix D.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.c.i.E	Increasing size. All sewer pipe size changes shall be at manholes. Pipe size shall not be decreased in the direction of flow. The energy gradient line should be maintained when a smaller sewer joins a larger one.	All gravity sewer system piping will be consistently sized 8" diameter SDR 35 PVC pipe.
9.c.i.F.I	Excavation. Trench width from the trench bottom to a point one foot above the top of the pipe shall be no less than the outside diameter of the pipe plus eight (8) inches (20.3 cm) but not more than twenty-four (24) inches (61 cm) plus the pipe O.D. The trench bottom shall be excavated for the pipe bell. All rock shall be removed within six (6) inches (15.2 cm) of pipe. The trench shall be dewatered for all work. City Public Infrastructure Design Standards Section 401. Excavation. Excavation shall conform to the City Standard Specifications and O.S.H.A. Regulations	All trench excavations will be conducted per City Specifications Section 02221 and OSHA regulations.
9.c.i.F.II	Bedding. Bedding shall be designed in accordance with ASTM C12-81, Rigid Pipe and ASTM D2321-74, Flexible Pipe. City Public Infrastructure Design Standards Section 401. Bedding. Bedding shall conform to the City Standard Specifications.	Pipe bedding will be installed following City Specifications Section 02221.
9.c.i.F.III	Backfill. Backfill shall be performed without disturbing pipe alignment. Backfill shall not contain debris, frozen material, unstable material, or large clods. Stones greater than three (3) inches (7.6 cm) in diameter shall not be placed within two (2) feet (0.6 m) of pipe. Compaction shall be to a density equal to or greater than the surrounding soil. City Public Infrastructure Design Standards Section 401. Backfill. Backfill shall conform to the City Standard Specifications.	Pipe backfill will be installed following City Specifications Section 02221.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.c.ii	Force mains and pressure sewers	A portion of the proposed sewer system is designed as a pressure sewer system.
9.c.ii.A	Depth. Force mains shall be located to protect them from freezing and frost heave.	All sanitary sewer force mains will have a minimum of six (6) feet of cover to protect from freezing and frost heave.
9.c.ii.B	Size. Force mains shall be four (4) inches diameter or greater. Pressure sewer collection system piping shall be one (1) inch minimum.	The proposed sanitary sewer force main system will be constructed of four (4) inch diameter pipe.
9.c.ii.C	Velocity. Minimum velocity shall be 2.5 fps.	Velocity calculations meet the minimum velocity requirement. Calculations are provided in Appendix D.
9.c.ii.D	Air release. Air release facilities shall be provided at the high point in the piping whenever the pipe crown elevation falls below the pipe invert elevation. Access to air release manholes shall not be in traffic-ways.	Air release valves are provided at the high points in the piping.
9.c.ii.E	Cleanouts. Cleanouts shall be provided at 400-foot maximum spacing in pressure piping four-inch diameter or less.	Cleanouts are provided at 400-foot maximum spacing in the proposed four-inch diameter line.
9.c.ii.F	Pressure sewer systems. Pressure sewer collection systems shall be preceded by grinder pumps or septic tanks.	The pressure sewer collection system will be preceded by grinder pumps in the lift station.
9.c.ii.G	Pressure sewer collection system pumps. Pumps shall be provided with isolation and check valves. If a septic tank is not provided before the pump, a grinder pump shall be required. Pump holding sumps shall not be steel, iron, or coated metal. The sump chamber shall be fifty (50) gallon volume, minimum.	Pressure sewer collection system pumps are not included in this design, therefore this criterion does not apply.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.c.iii	Service connections. A service connection is any conduit that carries wastewater that is not defined as a sewage collection line. Service connections shall conform to the requirements for sewage collection lines (Section 9(c)(i) and (ii)) with the following modifications: City Public Infrastructure Design Standards Section 401. Service connections. Service connections shall be designed and installed in accordance with the International Plumbing Codes latest adopted edition. Piping system materials shall be Schedule 40 PVC. A minimum of one sewer service line, from the tap to the property line, shall be required for each lot, zoned lot or building to be served.	Sanitary sewer service connections will be sized in accordance with the current IPC and City Public Infrastructure Design Standards Section 401 requirements. All service connections will be SCH 40 PVC and installed following City Specifications Section 02712. A minimum of one sewer service line will be constructed from the sewer main to the property line at each lot.
9.c.iii.A	Size: minimum size shall be four (4) inches (10.2 cm).	Sanitary sewer service lines will be a minimum of 4 inches. 4-inch services will be provided to residential lots and 6-inch services will be provided to commercial lots.
9.c.iii.B	Slope: minimum slope shall be 2 feet/100 feet (2 m/100 m).	Sanitary sewer service lines will be sloped at a minimum 2 feet/100 feet.
9.c.iii.C	Flow: flow shall be determined from a fixture unit count and the sewage size based on flowing full. City Public Infrastructure Design Standards Section 401. Four (4) inch services will be provided for normal residential lots. Commercial and industrial lot sewer services shall be sized according to the latest adopted addition of the International Plumbing Code. Sewer services larger than 6-inches will require a “Permit to Construct.” All services eight (8) inch and larger shall enter the public sewer at a manhole. Manholes will be installed at all changes in pipe size, vertical or horizontal alignment, pipe intersections, and the end of lines in accordance with 9.d.i.	Sanitary sewer service lines will be sized in accordance with the latest edition of IPC requirements. 4-inch services will be provided to residential lots and 6-inch services will be provided to commercial lots. Sewer services larger than 6-inches are not proposed in this design.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.c.iii.D	Connections: all service connections to sewage collection lines shall be made with a wye or tee for new construction and a tapping saddle for connection to existing collection lines. City Public Infrastructure Design Standards Section 401. Connections: All service connections to waste water collection lines shall be made with wye for new construction, except as identified above, and a tapping saddle or wye for connection to existing collection lines. On vitrified clay mains, tapping saddles shall only be installed by a certified master plumber in accordance with Sheridan City Code. The City discourages the connection of Four-inch or Six inch sewer services directly into manholes; however, these connections will be considered on an individual basis and will be allowed only upon written approval by the Public Utilities Director. In general, sewer services will be extended to a point on each lot, which is ten (10) feet from the lowest (elevation) property corner.	Sanitary sewer service connections will be installed following City Specifications Section 02712. All proposed 4-inch and 6-inch sewer service connections to sewer mains will be made with a wye. Service connections made directly into manholes are not proposed in this design.
9.d.i	Manhole Location. Manholes shall be located at all changes in pipe size, vertical or horizontal alignment, pipe intersections, and the end of lines. Terminal sewer cleanouts may be provided at the end of sewer lines if they are not more than 150 feet (45.7 m) from the nearest downstream manhole. The cleanout shall be constructed using 45-degree bends to the upturned pipe coming to the surface of the ground. The diameter of the cleanout shall be the same as the pipe size. Lampholes shall not be used. City Public Infrastructure Design Standards Section 401. Manholes shall be installed at the end of each main and at changes in direction, size, or slope of the main. The maximum spacing of manholes shall be four hundred (400) feet. Dead-end lateral lines shall terminate in a manhole. Plugged inlets set in the direction of future line expansion shall be provided in the terminating manhole. Upstream terminating manholes shall be located within ten (10) feet of the most distant property line of the lot or building site being served or perimeter line of a new development. In general, sewers that are in the street should be designed so that manholes are located seven (7) feet from the centerline of the streets. Manholes outside the street area must be accessible to City maintenance vehicles. A minimum horizontal spacing of ten (10) feet (clear separation) or a minimum vertical spacing of eighteen (18) inches (clear separation) must be maintained from water mains. Where vertical or horizontal clearances cannot be maintained, the waste water line shall be placed in a separate conduit pipe.	All sanitary sewer gravity main piping will be installed in a straight alignment and on a uniform slope between manholes. Sewer mains will be located within the paved roadways as close to the centerline as possible will still maintaining horizontal and vertical separation from water mains and water services. Manholes will be located at all changes in vertical and horizontal alignment, and at the end of lines. Manholes will be installed at least every 400 ft and within the street areas wherever possible to allow access by City maintenance vehicles. Horizontal and vertical separation from water mains and water services will be adhered to at all times and installed in accordance with City Specifications Section 02645, 02710, and 02712. Terminal sewer cleanouts and lampholes are not included in this design.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.d.ii	Manhole Size. Minimum manhole interior size is four (4) feet (1.2 m). City Public Infrastructure Design Standards Section 401. Manholes of forty eight (48) inches minimum inside diameter shall be used on eight (8) inch through twenty four (24) inch mains. Larger mains and crowded intersecting mains will have oversized manholes.	The interior size of all proposed manholes is four (4) feet. All sanitary sewer piping will be a maximum 8" diameter.
9.d.iii	Drop manhole. Drop manholes must be constructed where the change in elevation between two lines is greater than twenty-four (24) inches (0.6 m). Concrete encasement shall be provided around the drop pipe.	Drop manholes are not proposed in this design.
9.d.iv	Invert. Manhole inverts shall be constructed to conform to the shape of the sewer. The bench shall drain to the invert. Connections to the manhole shall be watertight and allow differential settlement between the manhole and pipe. Minimum fillet height shall be one half of the pipe diameter. City Public Infrastructure Design Standards Section 401. Flow through inverts in manholes shall provide a minimum of one tenth (0.1) foot drop in a "straight-through" manhole or a manhole angled at ninety (90) degrees to two hundred and seventy (270) degrees; and two tenths (0.2) foot drop in manholes angled less than ninety (90) degrees or greater than two hundred and seventy (270) degrees. In manholes where the downstream sewer line is larger in diameter than the upstream line, the pipe crown elevations of the two pipes shall match.	Manhole inlet and outlet pipe inverts are designed per these requirements.
9.d.v	Cover. The manhole cover shall be suitable to withstand all loads, including impact loading without deformation, slip or rattle. The manhole cover shall be watertight in areas subject to flooding and a bolt-down type in areas subject to unauthorized dumping or vandals.	The manhole cover will be suitable to withstand all loads. No manholes are proposed in areas subject to flooding or unauthorized dumping or vandals.
9.d.vi	Steps. Access to manholes shall be with portable ladders, or with cast iron manhole steps spaced at sixteen (16) inches (40.6 cm) maximum. City Public Infrastructure Design Standards Section 401. Permanent access to manholes (like steps cast into barrel sections) shall not be provided. Access to manholes shall be in accordance with O.S.H.A. confined space entry procedures using portable equipment, under the supervision of a competent person.	Access to manholes will be provided portable ladders only. Manhole steps are not proposed in this design.

Table 12. Sanitary Sewer System Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
9.d.vii	Materials. Manholes shall be constructed watertight and durable using cast-in-place concrete, or precast concrete with gasketed joints. Where precast concrete bases are used, the first twelve (12) inches (30 cm) of wall will be monolithically cast with the base.	Manholes will be constructed as specified.
9.d.viii	Access. A twenty-two (22) inch (56 cm) minimum diameter clear opening shall be provided on all manholes. All manholes shall be located to be accessible by motorized equipment for maintenance.	All proposed manholes will have a twenty-four (24) inch diameter clear opening. All proposed manholes are located in a place accessible by motorized equipment.
9.e	Special structures.	No special structures (i.e. inverted siphons, aerial crossings, stream crossings) will be used in this project, therefore, this criterion does not apply.
9.f	Potable water supply protection.	
9.f.i	Cross connections. There shall be no cross-connections between sewer lines and potable water lines.	No cross connections are included in this design.
9.f.ii	Horizontal and vertical separation from water mains. Minimum horizontal separation shall be ten (10) feet (3 m) where the water main is less than 1.5 feet (0.46 m) above the elevation of the sewer. Minimum vertical separation shall be 1.5 feet (0.46 m) at crossing. Joints in sewers at crossing shall be located at least ten (10) feet (3 m) from water mains. The upper line of a crossing shall be specially supported. Where vertical and/or horizontal clearances cannot be maintained, the sewer shall be placed in a separate conduit pipe.	Horizontal and vertical separation from water mains and water services will be adhered to at all times and installed in accordance with City Specification Section 02645, 02710, and 02712.

Table 13. Pumping Station Design Requirements

WDEQ Chapter 11	Requirement	Design Parameter
Section 10	Pumping stations.	The proposed sanitary sewer system includes a lift station designed to meet WDEQ's Section 10 and City of Sheridan Standards.
10.a	Design Conditions.	
10.a.i	Total dynamic head. The total dynamic head rating of pumping units shall be based on pipe friction, pressure losses from piping entrances, exits, appurtenances (bends, valves, etc.), and static head at the rated flow.	The total dynamic head rating of pumping units is designed to meet these requirements.
10.a.ii	Grit. Where no grit removal is provided ahead of the pumping station, equipment and piping design shall minimize the deleterious effects of grit in the sewage.	Lift station equipment and piping are designed to minimize the deleterious effects of grit in the sewage.
10.a.iii	Screening. Screens or comminutors shall be provided ahead of pumps where the average daily flow is in excess of 1.0 mgd (3,784 m3/d) to prevent solids larger than 2 ½ inches (6.4 cm) from entering the pump.	Average daily flow is less than 1.0 mgd, therefore this criterion does not apply.
10.a.iv	Minimum pump opening. Except for grinder pumps, raw sewage pumps shall be capable of passing spheres of at least three (3) inches (7.6 cm) in diameter. Pump suction and discharge piping in all sewage and sludge services shall be no smaller than four (4) inches in diameter (10 cm).	Lift station shall be equipped with grinder pumps.
10.a.v	Pump cycle time. Intermittently operated pumps shall be designed to start no more often than once every ten (10) minutes at the minimum operating interval.	Lift station pumps are designed to start no more often than once every ten (10) minutes at the minimum operating interval.
10.a.vi	Removal of equipment. Pumping stations shall be designed to permit removal of all items of equipment including pumps, valves, electrical and control equipment. Equipment located in wetwells shall be removable without entering the wetwell.	Lift station pumps shall be installed on rails to allow for easy removal during maintenance. Valves, electrical and control equipment shall be located above ground within a covered structure.
10.a.vii	Surge control. Piping systems shall be designed to withstand the maximum possible surge (water hammer) from the pumping station, or adequate surge control provided to protect the piping. Pressure relief valves are not acceptable surge control.	The lift station discharge piping system shall be 4" ductile iron to the first bend beyond the lift station, capable of withstand the maximum possible surge from the discharge pump.

Table 13. Pumping Station Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
10.a.viii	Net positive suction head. Pumps shall be selected so that the net positive suction head required at maximum flow (NPSHR) is less than the NPSH available minus four feet (1.2 m) based on the hydraulic conditions and altitude of the pumping station.	The lift station pumps are designed to meet these standards.
10.a.ix	Uplift. The pumping station chambers shall resist hydrostatic uplift pressures. Siting requirements.	Uplift calculations are included in Appendix D. Geotechnical borings near the lift station indicate no presence of groundwater to a 20' depth.
10.b	Siting requirements.	
10.b.i	Access. Pumping stations shall be located so that they are readily accessible to operating and maintenance personnel at all times of day or night, and under all weather conditions. Pumping stations shall be located off of traffic ways.	An all-weather access road will provide personnel access to the proposed lift station at all times of day or night, and under all weather conditions. The lift station will be located off of traffic ways.
10.b.ii	Flood protection. Pumping stations shall be designed so there is no equipment or structural damage in the 100-year flood, and so the pumping station's operation is uninterrupted by the 25-year flood.	The proposed lift station will be located outside of all flood zones. A FEMA FIRMette is provided in Appendix F.
10.b.iii	Security. The pumping station shall be designed to discourage unauthorized entry.	The lift station will be installed below grade. Access lids will have locking devices to discourage unauthorized entry.
10.c	Pumping station types.	
10.c.i.A	Dry wells. Access. Pumping station dry wells and equipment rooms shall be accessible for equipment inspection, operation and maintenance. Ladder and stair dimensions, locations of landings, and structural design shall comply with the Wyoming OHSA (1982). Equipment shall be removable from pumping stations without making structural changes to the station.	Dry wells are not proposed in this design, therefore this criterion does not apply.
10.c.i.B	Separation from wetwell. Dry wells and equipment rooms shall be completely separated from wetwells with no hatches, untrapped drains, or other connecting accessways.	Dry wells are not proposed in this design, therefore this criterion does not apply.
10.c.i.C	Dewatering. Dry pits and below-grade equipment rooms shall be provided with sump pumps sized to remove infiltration of water during normal seepage and leakage.	Dry pits and below-grade equipment rooms are not proposed in this design, therefore this criterion does not apply.

Table 13. Pumping Station Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
10.c.ii	Wetwell design. Wetwells shall be designed to prevent vortexing and unstable pump operation. Pumps shall be located below the minimum water level, except suction lift pumps. Suction intakes shall be bell-mouthed. Provisions shall be made for isolating, bypassing and/or dewatering portions of the wetwell for maintenance. Hopper walls of wetwells shall be sloped at no less than 1.75 vertical to one (1) horizontal.	The lift station wet well is designed to prevent vortexing and unstable pump operation. Pumps shall be located below the minimum water level. Suction intakes and hopper walls are not proposed in this design.
10.c.iii	Submersible pumping stations. Submersible pumping stations shall be designed specifically for totally submerged operation and so that pumps may be readily removed from the wetwell without dewatering the wetwell or disconnecting piping in the wetwell. Submersible pumps shall have an adequate means of indicating motor seal failure. Electrical equipment shall be suitable for Class 1, Division 1, Groups C and D hazardous environments, as defined in the National Electrical Code (1982).	The proposed lift station is designed specifically for totally submerged operation. Pumps will be mounted on tracks to allow removal of pumps without dewatering the wet well or disconnecting piping in the wetwell. The pump control panel will be equipped with alarms to indicate motor seal failure. All equipment shall be suitable for Class 1, Division 1, Groups C and D hazardous environments, as defined in the NEC (1982).
10.c.iv	Suction lift. Pumping stations utilizing suction lift pumps shall have adequate priming means to prime the pumps quickly and shall be designed for priming the pumps when the water level in the wetwell is one (1) foot (0.3 m) below the lead pump starting elevation in the suction wetwell, and for maintaining prime when the wetwell level is one (1) foot (0.3 m) below the lead pump stopping level. Valving shall not be located in the wetwell.	Suction lift pumps are not proposed in this design, therefore this criterion does not apply.
10.c.v	Pneumatic ejectors. Pneumatic ejectors shall be limited to design flows equivalent to 25 residential connections. One standby compressor shall be provided.	Pneumatic ejector pumps are not proposed in this design, therefore this criterion does not apply.
10.c.vi	Grinder pumps. Grinder pumps shall be limited to design flows equivalent to 25 residential connections.	Lift station pumps shall be grinder pumps.
10.d	Piping and valves.	
10.d.i.A	Suction. Suction intake. Suctions shall be located so the pump is below the minimum water level. Suction intakes shall be bell-mouthed. Suction intakes shall be located against the far wall from the wetwell inlet.	Suction intakes are not proposed in this design, therefore this criterion does not apply.

Table 13. Pumping Station Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
10.d.ii.A	Piping. Size. Sewage and sludge piping shall be no smaller than four (4) inches (10.2 cm) diameter, except as required for metering, or where grinder pumps are provided.	The proposed lift station discharge piping shall be a minimum four (4) inches diameter.
10.d.ii.B	Velocity. Piping and pumping systems shall be designed to maintain a minimum velocity of 2.5 fps (0.76 mps), and a maximum velocity of 5 fps (1.52 mps) for suction piping.	Velocity calculations meet the minimum and maximum velocity requirements. Calculations are provided in Appendix D.
10.d.ii.C	Design pressure. Piping shall be designed for the maximum operating pressure and for the maximum value of any surges (water hammer) that may occur, taking into account any surge protection provided.	Piping systems within the lift station and for the first 40 feet of force main will be ductile iron designed to withstand the maximum possible surge from the discharge pump.
10.d.ii.D	Restraints. Piping shall be blocked and otherwise restrained to prevent damaging movement under the maximum anticipated pressure (including test pressure).	All lift station piping will be secured to prevent movement.
10.d.ii.E	Cleanouts. Cleanouts shall be provided in pump suctions.	Suction intakes are not included in this design, therefore this criterion does not apply.
10.d.iii.A	Valves. Valves shall not be located in wetwells. Shutoff. Except on submersible pumps and suction lift pumps, a shutoff valve shall be provided on the suction of all pumps. A shutoff valve shall be provided on the discharge of all pumps, regardless of type or service.	All lift station pumps shall be equipped with a shutoff valve on the discharge end. Valves will be located above ground, outside of the lift station vault.
10.d.iii.B	Check. All pumps shall be provided with a check valve located between the pump and the discharge shutoff valve, except where arranged so that backflow is not possible under normal operating conditions.	All lift station pumps shall be equipped with a check valve located between the pump and the discharge shutoff valve. Check valves will be located above ground, outside of the lift station vault.
10.d.iii.C	Air release. Air release valves shall be provided at the high points in piping whenever the pipe crown elevation falls below the pipe invert elevation. On sewage lines, air or air and vacuum release valves shall be specifically designed for sewage service.	Air release valves are provided at the high points in the piping.
10.e	Reliability.	
10.e.i	Multiple units. Every pumping station shall have not less than two (2) pumping units. The number of units and their size shall be sufficient to permit pumping the maximum design flow with the largest pumping unit out of service.	The proposed lift station will have a minimum of two (2) pumping units. The number of units and their size is designed to permit the maximum design flow with the largest pumping unit out of service.

Table 13. Pumping Station Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
10.e.ii.A	One of the following shall be provided: Alternative power source. Where the pumping station serves more than fifty (50) residential units, alternative power shall be provided. Alternative power shall be permanently installed or portable engine generator sets, permanently installed or portable engine driven pumps or a separate, independent utility source provided. Where manual starting is required, sufficient storage shall be provided to allow notifying the operator and performing whatever tasks are necessary to get the pumping station in service. Where permanently installed engine driven equipment is provided, sufficient fuel shall be provided for at least eight hours operation under the maximum flow condition. Where more than one (1) pumping station is affected by a power outage and portable equipment is planned for alternative power source, sufficient portable equipment shall be provided to provide alternative power to all pumping stations under maximum flow conditions.	An alternative power source is being provided as a permanently installed generator utilizing diesel fuel.
10.e.ii.B	Generators. Generators shall be sized to permit starting the largest pump in the pumping station with all other pumps except one running. If the generator is not capable of starting all pumps simultaneously, suitable controls shall be provided to stagger the pump starts to remain within the capabilities of the equipment. Generators shall be diesel-fired, natural gas-fired or bottled gas-fired. The use of gasoline or digester gas-fired generators for permanently installed standby service is unacceptable. Gasoline-fired portable generators are acceptable.	The generator is sized to handle the duplex 30 HP pumps (22kW) to be wired using 346/600V 3-phase power and operate with diesel. The location of the generator is shown in the Construction Drawings in Appendix A. Details of the generator are shown in the manufacturer cut sheets included in Appendix E.
10.e.ii.C	Engine driving pumps. Engine driven pumps shall be sized for maximum design flow. Diesel, natural gas and bottled gas are acceptable fuels for portable engines only. Digester gas is unacceptable for standby fuel. Quick connecting couplings shall be provided for portable engine driven pumps.	Engine driving pumps are not included in this design, therefore this criterion does not apply.
10.e.ii.D	Storage. Wastewater storage may be provided in the form of underground storage or surface ponds or tanks in lieu of alternative power supplies. Storage shall be sized for the maximum anticipated power outage, but not less than twenty-four (24) hours at average design flow. Storage shall be water tight and arranged to drain back to the pumping station wetwell.	Additional wastewater storage for power outages is not included in this design, therefore this criterion does not apply.

Table 13. Pumping Station Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
10.f	Electrical.	
10.f.i	Equipment location. All electrical equipment, including motors, motor starters and controls shall be located so as to be undamaged by the 100-year flood.	All lift station electrical equipment will be located outside of flood zones. A FEMA FIRMette is provided in Appendix F.
10.f.ii	Controls. Controls shall include a separate start/stop device for each pump or for each pumping position in the control sequence. Controls shall be arranged so that the failure of any one control system component will affect only the operation of one pumping unit. Manual override shall be provided for normal pump operating control.	A separate start/stop control device is provided for each pump.
10.f.iii	Code requirements. All electrical work shall comply with the National Electrical Code as adopted and amended by the Wyoming Department of Fire Prevention and Electrical Safety. Electrical equipment in enclosed wetwells, which may be subject to explosive 11-19 concentration of hazardous gases or flammable fluids, including all raw sewage wetwells, shall comply with the NEC requirements for Class 1, Division 1, Groups C and D areas.	All electrical work shall comply with current NEC standards.
10.f.iv	Alarms. An alarm system shall be provided for each pumping station. As a minimum, alarms shall include high wetwell level and high water level in the dry well. For pumping stations having a capacity of 0.5 mgd (1890 m3/d) or more, the alarm shall be telemetered to a facility that is manned twenty-four (24) hours a day. For pumping stations having a capacity of 0.5 mgd (1890 m3/d) or less, an audio and visual alarm shall be provided in a conspicuous location.	The pumping station is designed to have high water alarms that will be telemetered by the City of Sheridan's SCADA system which is manned twenty-four (24) hours a day.
10.g	Safety.	

Table 13. Pumping Station Design Requirements (Cont.)

WDEQ Chapter 11	Requirement	Design Parameter
10.g.i	Ventilation. All accessible pumping station areas shall be ventilated. Ventilation may be continuous or intermittent. If intermittent, ventilation in areas normally visited by operating personnel shall be started automatically at not greater than 30-minute intervals. Permanently installed dry well ventilation shall provide at least six air changes per hour if continuous, and twelve (12) air changes per hour if intermittent. Permanently installed wetwell ventilation shall provide twelve (12) complete air changes per hour if continuous, and thirty (30) complete air changes per hour if intermittent. Wetwell ventilation shall be positive pressure, forcing air into the wetwell rather than exhaustion from it. All ventilation equipment shall be of a non-sparking design. Intermittent ventilating equipment shall insure starting upon entry of operating personnel. Wetwells may be ventilated by gravity means if normal access by operating personnel is unnecessary. Wetwells that are accessed infrequently shall be designed to permit the use of portable blowers that will exhaust the space and continue to supply fresh air during access periods.	The wetwell of the proposed lift station will not require normal access by operating personnel. The wetwell will be ventilated by gravity means. The wetwell will have access doors at the surface to allow for portable blowers to exhaust the space and continue to supply fresh air in the event access is required. A forced air vent will be required on the wet well as shown on the lift station detail in Appendix A.
10.g.ii	Hoists. Where required for removing equipment, hoists shall be rated for not less than 50 percent more than the weight of the heaviest single item to be lifted by the hoist.	Hoists are not included in this design, therefore this criterion does not apply. Portable hoist equipment and/or mobile cranes will be used my maintenance personnel as needed.
10.g.iii	Lighting. Lighting levels shall be sufficient to permit safe operation and maintenance of all equipment within the pumping station, but not less than 30 foot-candles. All areas shall be lit in such a manner that the failure of one lighting fixture or lamp will not cause the area to be completely dark.	Lift station valves, electrical and control equipment shall be located above ground within a covered structure. Portable lighting may be used by maintenance personnel as needed.
10.g.iv	Equipment guards. Provide shields to protect from rotating or moving machinery.	No rotating or moving machinery hazards will exist during normal operation, therefore this criterion does not apply.
10.g.v	Warning signs. Provide warning signs for nonpotable water, electrical hazards, chemical hazards, or other unsafe features. Warning signs shall be permanently attached to the structure or appropriate equipment.	Adequate warning signs will be placed to meet these standards.
10.g.vi	Safety. Comply with the Wyoming Occupational Health and Safety Rules and Regulations.	All service and maintenance shall comply with these set standards.

REFERENCES

City of Sheridan, Public Works Department, 2016, City of Sheridan Standard Specifications & Details for Street and Utility Construction, 2016 Edition. Available on the Internet as of March 2024: https://www.sheridanwy.gov.

_____, 2017, Public Infrastructure Design Standards. Available on the Internet as of March 2024: https://www.sheridanwy.gov.

International Code Council, 2021, 2021 International Plumbing Code. Available on the Internet as of March 2024: https://codes.iccsafe.org/content/IPC2018P3

Martineau, Jacob, 2024, Personal communication between Jacob Martineau, Assistant Utilities Director, City of Sheridan, and Sarah Rohrer, WWC Engineering, including available densities for Story House, April 18, 2024.

Recommended Standards for Water Works, Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, (2018), referred to as "2018 TSS," available at on the Internet as of March 2024: https://www.mngovpublications.com/catalog/Default.asp?CatalogID=21656&Provider_ID=1241868

Rosenlund, Jeffrey, 2024, Personal communication between Jeffrey Rosenlund, PE, Senior Water Resources Engineer, DOWL, and Sarah Rohrer, WWC Engineering, including City of Sheridan sanitary sewer main capacity, April 10, 2024.

Wyoming Department of Environmental Quality, Water Quality Division, July 2023, Wyoming Water Quality Rules and Regulations, Chapter 12, Design and Construction Standards for Public Water Supplies. Available on the Internet as of March 2024: https://rules.wyo.gov/Search.aspx?mode=1.

_____, June 2018, Wyoming Water Quality Rules and Regulations, Chapter 11, Design and Construction Standards for Sewerage Systems, treatment works, disposal systems or other facilities capable of causing or contributing to pollution and mobile home park and campground sewerage and public water supply distribution systems. Available on the Internet as of March 2024: https://rules.wyo.gov/Search.aspx?mode=1.

APPENDIX A

Plat and Construction Drawings

APPENDIX B

City of Sheridan Sewershed Analysis

Sarah Rohrer

From: Jeffrey Rosenlund <JRosenlund@dowl.com>
Sent: Wednesday, April 10, 2024 3:57 PM
To: Sarah Rohrer
Cc: Jacob Martineau
Subject: RE: [EXT] RE: Sanitary Sewer Capacity - East 5th Street

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Hi, Sarah. Good questions.

The 529 gpm is full capacity of the pipe and doesn't have anything to do with peaking factors.

Population is based on the remaining capacity divided by the 100gpcpd times the peaking factor. The remaining capacity is half of the full flow capacity minus the existing max day flow.

Thanks,

Jeffrey Rosenlund, PE, PTP
Senior Water Resources Engineer

DOWL

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(307) 751-6235 | cell

dowl.com

From: Sarah Rohrer <srohrer@wwcengineering.com>
Sent: Wednesday, April 10, 2024 3:41 PM
To: Jeffrey Rosenlund <JRosenlund@dowl.com>
Cc: Jacob Martineau <jmartineau@sheridanwy.gov>
Subject: RE: [EXT] RE: Sanitary Sewer Capacity - East 5th Street

Jeff,

Thanks for providing this. Just to clarify our understanding, the 529 gpm (existing) capacity, that is max day capacity using the 2.43 peaking factor? Also, can you explain how the population for each scenario is being determined?

Thanks!
Sarah

WWC ENGINEERING
SARAH ROHRER, P.E. | Project Manager
1849 Terra Ave | Sheridan, WY 82801
O: 307.672.0761 | D: 307.278.7037 | C: 307.763.8354
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From: Jeffrey Rosenlund <JRosenlund@dowl.com>
Sent: Wednesday, April 10, 2024 1:04 PM
To: Sarah Rohrer <srohrer@wwcengineering.com>

Cc: Jacob Martineau <jmartineau@sheridanwy.gov>
Subject: RE: [EXT] RE: Sanitary Sewer Capacity - East 5th Street

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Hi, Sarah.
Here's a table showing remaining capacity in the line, and calculating the number of lots that could be served based on the 50% full at max day.

	Existing	With Sab-Sher Replaced	With Skeels-Lincoln Replaced
Calculated Max Day PF	2.43	2.34	2.31
Capacity (gpm)	529	708	770
Half full capacity (gpm)	264.5	354	385
Current max day flow (gpm)	107	107	107
Half full capacity remaining (gpm)	157	247	278
Calculated population	933	1522	1732
Number of lots (2.21/lot)	422	688	784

I'm also copying Jacob Martineau on this to keep him in the loop.

Thanks,

Jeffrey Rosenlund, PE, PTP
Senior Water Resources Engineer

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From: Sarah Rohrer <srohrer@wwcengineering.com>
Sent: Wednesday, April 10, 2024 12:18 PM
To: Jeffrey Rosenlund <JRosenlund@dowl.com>
Subject: RE: [EXT] RE: Sanitary Sewer Capacity - East 5th Street

Jeff,

Can you provide us with this same information in a flow rate in terms of 50% full capacity for daily flow? This will be permitted through WDEQ which does not allow for design at 75% full at peak hour. The City provided us with recent comments they have received from WDEQ that their design standards are not in line with Chapter 11.

Thanks!
Sarah

"Section 301.1.3D – This proposed change does not comply with Chapter 11, Section 9(c)(i)(B). We will only allow 200% of the daily flow. 75% full at peak hour is not an acceptable alternative"

"It should also be noted that WDEQ does not allow for sewer mains to flow up to 90%. Any new application attempting to connect to a sewer main flowing greater than 50% will be denied."

(B) Size. Sewers to be aligned straight shall be 8-inch (20.3 cm) diameter or larger except 6-inch (15.2 cm) sewers may be used in cul-de-sacs, or other dead end locations where the sewer cannot be extended in the future. 18-inch (45.7 cm) or larger sewers may be laid on curves. Lines shall be sized for 200 percent of maximum daily flow or more. In the absence of data deriving maximum daily flow, the chart on Figure 1-1 shall be used to determine maximum daily flow.

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From: Jeffrey Rosenlund <JRosenlund@dowl.com>
Sent: Wednesday, April 10, 2024 8:45 AM
To: Sarah Rohrer <srohrer@wwcengineering.com>
Cc: Dan Roberts <droberts@sheridanwy.gov>; Hanns Mercer <hmercer@sheridanwy.gov>; Stuart McRae <smcrae@sheridanwy.gov>; Jeff Barron <jbarron@wwcengineering.com>; Chad Reed <creed@wwcengineering.com>; Jacob Martineau <jmartineau@sheridanwy.gov>
Subject: RE: [EXT] RE: Sanitary Sewer Capacity - East 5th Street

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Hi, Sarah. Here's the information I provided the City on this in the attached email.

Thanks,

Jeffrey Rosenlund, PE, PTP
Senior Water Resources Engineer

DOWL

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dowl.com

From: Sarah Rohrer <srohrer@wwcengineering.com>
Sent: Wednesday, April 10, 2024 8:25 AM
To: Jeffrey Rosenlund <JRosenlund@dowl.com>
Cc: Dan Roberts <droberts@sheridanwy.gov>; Hanns Mercer <hmercer@sheridanwy.gov>; Stuart McRae <smcrae@sheridanwy.gov>; Jeff Barron <jbarron@wwcengineering.com>; Chad Reed <creed@wwcengineering.com>
Subject: [EXT] RE: Sanitary Sewer Capacity - East 5th Street

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Hi Jeff,

I'm following up about the data request below. Sorry to be so persistent, but we really need this to keep our project moving forward. If it's possible to access this data from a more calibrated model, if you provide us the model, we can pull the information. If you have already provided this information to the City and it is quicker to get it from them, please let us know.

Thanks!
Sarah

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From: Sarah Rohrer
Sent: Monday, April 8, 2024 2:42 PM
To: Jeffrey Rosenlund <JRosenlund@dowl.com>
Cc: Dan Roberts <droberts@sheridanwy.gov>; Hanns Mercer <hmercer@sheridanwy.gov>; Stuart McRae <smcrae@sheridanwy.gov>; Jeff Barron <jbarron@wwcengineering.com>; Chad Reed <creed@wwcengineering.com>
Subject: Sanitary Sewer Capacity - East 5th Street

Hi Jeff,

With permission received from the City, can you please provide us the results of the sanitary sewer capacity analysis along E. 5th Street that DOWL recently did, specifically the following:

- Current available capacity at Valley View Dr – average daily flow (gal/day)
- Future available capacity at Valley View Dr with $500K upgrades near Saberton Ave/Skeel St– average daily flow (gal/day)



Thanks!
Sarah

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Sarah Rohrer

From: Jacob Martineau <jmartineau@sheridanwy.gov>
Sent: Thursday, April 18, 2024 3:10 PM
To: Sarah Rohrer
Cc: Dan Roberts; Chad Reed; Jeff Barron
Subject: Re: Story House Available Densities

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Sarah,

I have spoken with Dan Roberts and we agree with your analysis concluding in a current available capacity of 158 gpm in this sewer shed.
Respectfully,
***Jacob Martineau**, Asst Utilities Director*
Office: (307) 675-4231 Cell: (307) 751-6447

On Wed, Apr 17, 2024 at 4:35 PM Sarah Rohrer <srohrer@wwcengineering.com> wrote:

Jacob,

To confirm for WDEQ, the below table shows the current available capacity as 158 gpm remaining in the sanitary sewer system and from our phone conversations Story House is able to use up to158 gpm. Story House plans to reduce densities down to 359 residential units + 3 commercial units and only utilize 151 gpm. We will include a sewershed analysis that incorporates the undeveloped lots within the sewershed, but they will not be allotted any of the remaining 158 gpm capacity.

Table 3 - Sanitary Sewer Main Capacity

	Existing	With Saberton-Sheridan Replaced	With Skeels-Lincoln Replaced
Calculated Max Day Peaking Factor[1]	2.43	2.34	2.31
Full Pipe Capacity (gpm)[1]	529	708	770
Half Full Capacity (gpm)	265	354	385
Current Max Day Flow (gpm)[1]	107	107	107
Available Max Day Capacity (gpm)	158	247	278
Remaining Max Daily Flow for Story House (gpm)	**158**	**247**	**278**

[1]Data provided from Jeffrey Rosenlund - DOWL via email 4/10/24

Thanks!

Sarah

WWC ENGINEERING

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Table 1 - Sewershed - Platted Lots

Subdivision	Number of Lots	Total Subdivision Area (acres)	Total Lot Area Developed On (acres)	Acreage Developed (%)	Acreage Undeveloped (%)	Undeveloped (acreage)	Current Zoning	Best Project Land Use	Equivalent Population (Persons/Acre)	Average Daily Per Capita Flow Factor (gal/day)	Average Daily Flow (gal/day)
West View Addition[1]	20	5.926	4.268	72.024	27.976	1.658	B-2	Commercial	18	100	2,983.9
RRLC 2 Subdivision[2]	3	3.136	1.539	49.070	50.930	1.597	B-2	Commercial	18	100	2,874.6
Mountain View Business Park[3]	6	10.44	6.708	64.257	35.743	3.732	B-2	Commercial	18	100	6,716.8
Museum Subdivision	2	3.16	3.160	100.000	0.000	0.000	B-2	Commercial	18	100	-
Sheridan East Business Park 2	3	3.267	0	0.000	100.000	3.267	B-1	Commercial	18	100	5,880.6
Valley Park Addition[4]	2	9.600	8.908	92.792	7.208	0.692	B-1	Commercial	18	100	1,245.6
Valley Park 2nd Addition	2	4.690	1.66	35.394	64.606	3.030	B-1	Commercial	18	100	5,454.0
Valley Park 3rd Addition[5]	2	8.520	0	0.000	100.000	8.520	B-1	Residential	10	100	8,600.0
Double Eagle Tech Park	9	10.106	7.58	75.005	24.995	2.526	B-2	Commercial	18	100	4,546.8
East Ridge Addition	1	15.503	10.107	65.194	34.806	5.396	B-2	Commercial	18	100	9,712.8
Eastside Industrial Park One	8	10.619	9.668	91.044	8.956	0.951	B-2	Commercial	18	100	1,711.8
WDT Subdivision[6]	1	13.338	0	0.000	100.000	13.338	B-2	Commercial	18	100	24,007.8
765 E. 7th St[7]	1	36.900	0	0.000	100.000	36.900	R-1	Residential	6.6	100	24,354.0
Mooselodge[7]	1	3.957	0	0.000	100.000	3.957	B-1	Commercial	18	100	7,122.6
1025 KROE Lane[8]	1	14.906	0	0.000	100.000	14.906	R-1	Residential	6.6	100	9,838.0
										Total Flow (gpd)	**115,050.0**
										Total Flow (gpm)	**79.9**

[1]Only includes Blocks 4 and 9 within this sewershed.

[2]Does not include Lot 1 as it is outside of the sewershed.

[3]Includes the 13.60 total acreage from the original Mountain View Business Park with the acreage from the Museum Subdivision removed to avoid duplicity.

[4]Includes the 22.81 total acreage from the original 1993 Valley Park Addition with the acreage from the 2nd and 3rd Additions of Valley Park removed to avoid duplicity.

[5]Provided Flow from Jacob Martineau - City of Sheridan via email 4/10/24

[6]Platted lot outside of the sewershed. 400 ft offset area from E. Ridge Road and Wyarno Rd was included.

[7]Unplatted land within the sewershed.

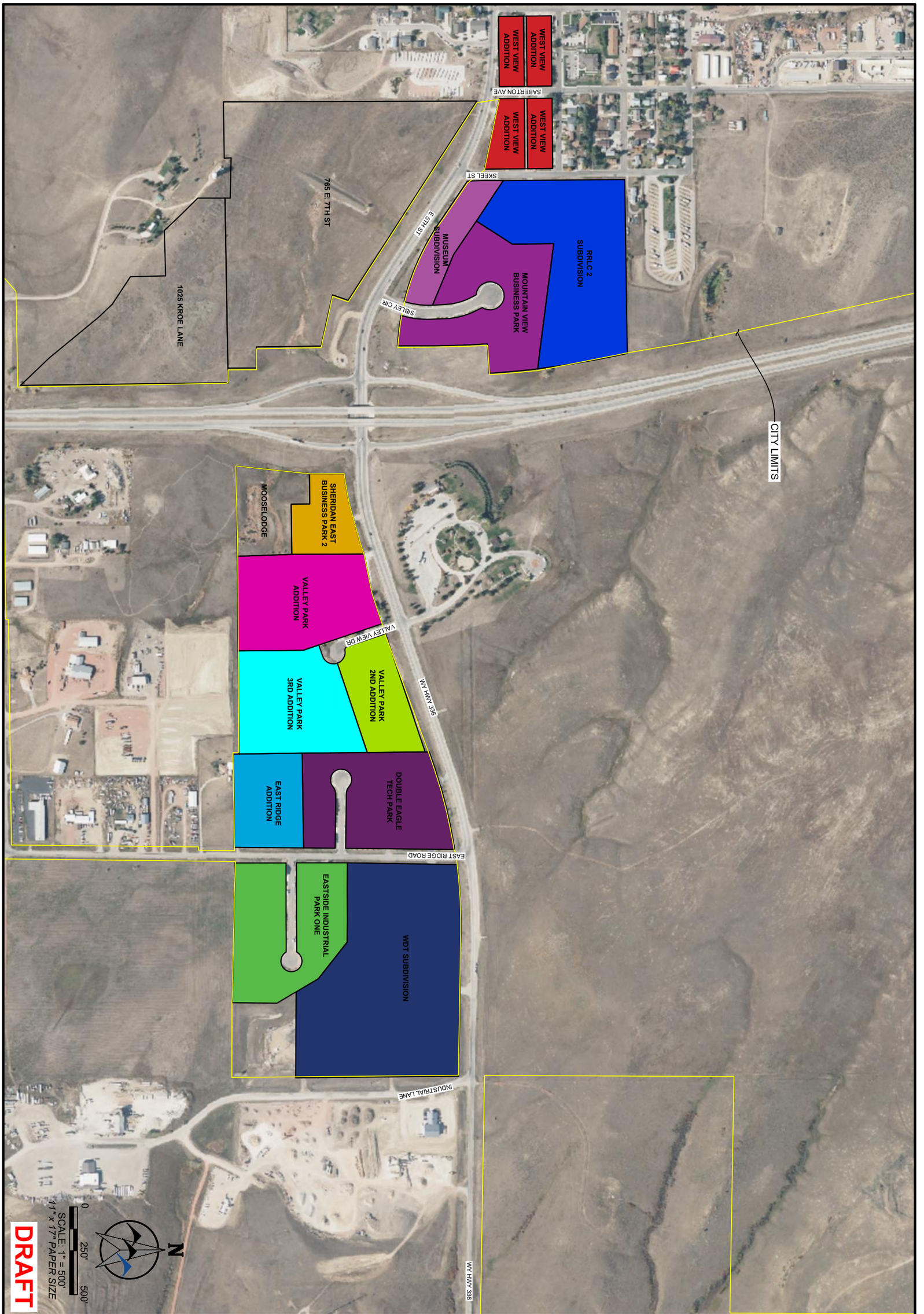
[8]Unplatted land within the sewershed. Already developed according to R-1 zoning, but a portion was included for potential future development.

Table 2 - Design and Conversion Factors

Value	Description
100	Average Daily Per Capita Flow Factor (gal/day)[1]
6.6	Single Family Land Use Equivalent Population (Persons/Acre)[1]
18	Commercial Land Use Equivalent Population (Persons/Acre)[1]
2.21	Persons per Dwelling Units[1]
1440	Conversion Gallon/Day to Gallon/Minute

[1]Per City of Sheridan Public Infrastructure Design Standards Section 401 - Section 6

K:\Sheridan\Story House Management\2023137 Story House Village\05CAD\Sheets\WORK\23137_VILG_SEWER SHED.dwg SEWER SHEDS (2) 4/18/2024 3:53:42 PM



STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE PUD - PHASE 1

SEWER SHED SUBDIVISIONS

SHERIDAN COUNTY, WYOMING

DESIGNED BY: SER
DRAWN BY: CJM
CHECKED BY: CDR
DATE: 02/14/2024

FIGURE 1

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

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CITY LIMITS

APPROXIMATE SEWERSHED BOUNDARY
(MODIFIED BASED ON EXISTING
INFRASTRUCTURE AND CITY LIMITS)

INCLUDED IN ANALYSIS - UNDEVELOPED WITHIN SEWER SHED

INCLUDED IN ANALYSIS - DEVELOPED WITHIN SEWER SHED

NOT INCLUDED - NOT WITHIN SEWER SHED

SABERTON AVE
SKEEL ST
E 5TH ST
SIBLEY CIR
WY HWY 336
VALLEY VIEW DR
EAST RIDGE ROAD
INDUSTRIAL LANE

N

0 250 500'
SCALE: 1" = 500'
11" x 17" PAPER SIZE

DRAFT

NO.	REVISION	BY	DATE

PROJECT NO. 2023-137

PREPARED BY
WWC ENGINEERING
1849 TERRA AVE.
SHERIDAN, WY 82801
(307) 672-0761
www.wwcengineering.com

STORY HOUSE PROPERTY COMPANY, LLC

STORY HOUSE VILLAGE PUD - PHASE 1

SEWER SHED ANALYSIS

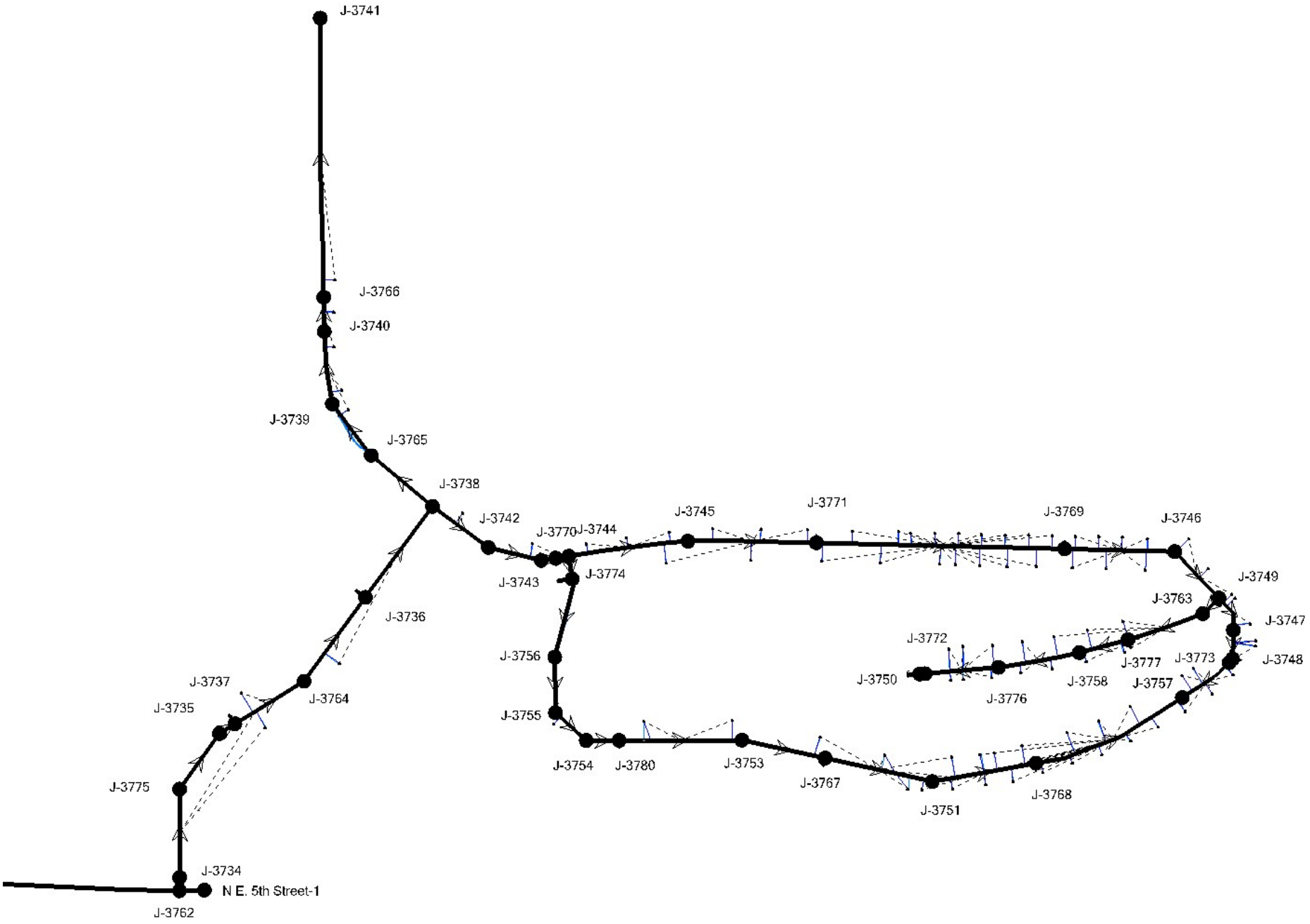
SHERIDAN COUNTY, WYOMING

DESIGNED BY: SER
DRAWN BY: CIM
CHECKED BY: CDR
DATE: 02/14/2024

FIGURE
2

APPENDIX C

Water Calculations


J-3741
J-3766
J-3740
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J-3780
J-3753
J-3767
J-3768
J-3775
J-3751
J-3734
N E. 5th Street-1
J-3762

Peak Day – Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Pressure (Stop) (psi)	Velocity (ft/s)
61479	P-1066	26	J-3762	J-3734	12	PVC	135	387.52	56	1.1
61481	P-1068	35	J-3735	J-3737	12	PVC	135	376.32	52	1.07
61483	P-1070	219	J-3736	J-3738	12	PVC	135	204.16	50	0.58
61485	P-1072	141	J-3739	J-3740	12	PVC	135	5.16	51	0.01
61781	P-1069(1)	157	J-3737	J-3764	12	PVC	135	293.72	49	0.83
61782	P-1069(2)	201	J-3764	J-3736	12	PVC	135	211.11	50	0.6
61786	P-1071(1)	155	J-3738	J-3765	12	PVC	135	6.45	50	0.02
61787	P-1071(2)	126	J-3765	J-3739	12	PVC	135	6.45	50	0.02
61791	P-1073(1)	67	J-3740	J-3766	12	PVC	135	2.58	52	0.01
61843	P-1067(1)	171	J-3734	J-3775	12	PVC	135	381.92	54	1.08
61844	P-1067(2)	132	J-3775	J-3735	12	PVC	135	376.32	53	1.07
61792	P-1073(2)	540	J-3766	J-3741	12	PVC	135	0.65	61	0
61487	P-1074	134	J-3738	J-3742	8	PVC	135	190.10	52	1.21
61488	P-1075	105	J-3742	J-3743	8	PVC	135	189.46	54	1.21
61490	P-1077	233	J-3744	J-3745	8	PVC	135	94.28	53	0.6
61492	P-1079	124	J-3746	J-3749	8	PVC	135	28.53	69	0.18
61493	P-1080	74	J-3749	J-3747	8	PVC	135	7.24	70	0.05
61494	P-1081	56	J-3747	J-3748	8	PVC	135	5.3	70	0.03
61499	P-1086	80	J-3754	J-3755	8	PVC	135	-77.84	60	0.5
61500	P-1087	108	J-3755	J-3756	8	PVC	135	-84.9	58	0.54
61503	P-1089	44	J-3749	J-3763	8	PVC	135	18.06	69	0.12
61797	P-1084(1)	213	J-3751	J-3767	8	PVC	135	-42.41	66	0.27
61798	P-1084(2)	165	J-3767	J-3753	8	PVC	135	-62.38	67	0.4
61802	P-1083(1)	315	J-3757	J-3768	8	PVC	135	-10.82	65	0.07
61803	P-1083(2)	204	J-3768	J-3751	8	PVC	135	-20.5	64	0.13
61809	P-1078(2)	213	J-3769	J-3746	8	PVC	135	34.98	69	0.22
61812	P-1076(1)	28	J-3743	J-3770	8	PVC	135	189.46	54	1.21
61813	P-1076(2)	26	J-3770	J-3744	8	PVC	135	188.82	54	1.21
61817	P-1078(1)(1)	249	J-3745	J-3771	8	PVC	135	82.68	53	0.53

Peak Day – Pipe Table (Cont.)

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Pressure (Stop) (psi)	Velocity (ft/s)
61818	P-1078(1)(2)	481	J-3771	J-3769	8	PVC	135	56.25	64	0.36
61823	P-1091(2)	11	J-3772	J-3750	8	PVC	135	0	59	0
61827	P-1082(1)	10	J-3748	J-3773	8	PVC	135	4.01	70	0.03
61828	P-1082(2)	114	J-3773	J-3757	8	PVC	135	0.14	69	0
61839	P-1088(1)	156	J-3756	J-3774	8	PVC	135	-91.96	55	0.59
61840	P-1088(2)	44	J-3774	J-3744	8	PVC	135	-91.96	54	0.59
61846	P-1091(1)(1)	159	J-3758	J-3776	8	PVC	135	9.68	62	0.06
61847	P-1091(1)(2)	143	J-3776	J-3772	8	PVC	135	3.87	59	0.02
61852	P-1090(1)	153	J-3763	J-3777	8	PVC	135	14.84	68	0.09
61853	P-1090(2)	98	J-3777	J-3758	8	PVC	135	11.61	66	0.07
61859	P-1085(1)	238	J-3753	J-3780	8	PVC	135	-70.11	63	0.45
61860	P-1085(2)	64	J-3780	J-3754	8	PVC	135	-77.84	61	0.5
61788	P-1093	8	H-1727	J-3765	8	PVC	135	0	50	0
61793	P-1094	11	H-1728	J-3766	8	PVC	135	0	52	0
61862	P-1107	20	H-1726	J-3737	8	PVC	135	0	52	0
61865	P-1108	22	H-1738	J-3736	8	PVC	135	0	50	0
61799	P-1095	15	H-1730	J-3767	6	PVC	135	0	66	0
61804	P-1096	11	H-1731	J-3768	6	PVC	135	0	65	0
61810	P-1097	14	H-1733	J-3769	6	PVC	135	0	64	0
61819	P-1099	14	H-1734	J-3771	6	PVC	135	0	53	0
61829	P-1101	9	H-1732	J-3773	6	PVC	135	0	70	0
61841	P-1102	29	J-3774	H-1729	6	PVC	135	0	54	0
61850	P-1104	24	J-3750	H-1736	6	PVC	135	0	59	0
61855	P-1105	16	H-1735	J-3777	6	PVC	135	0	68	0
61861	P-1106	14	H-1737	J-3780	6	PVC	135	0	63	0

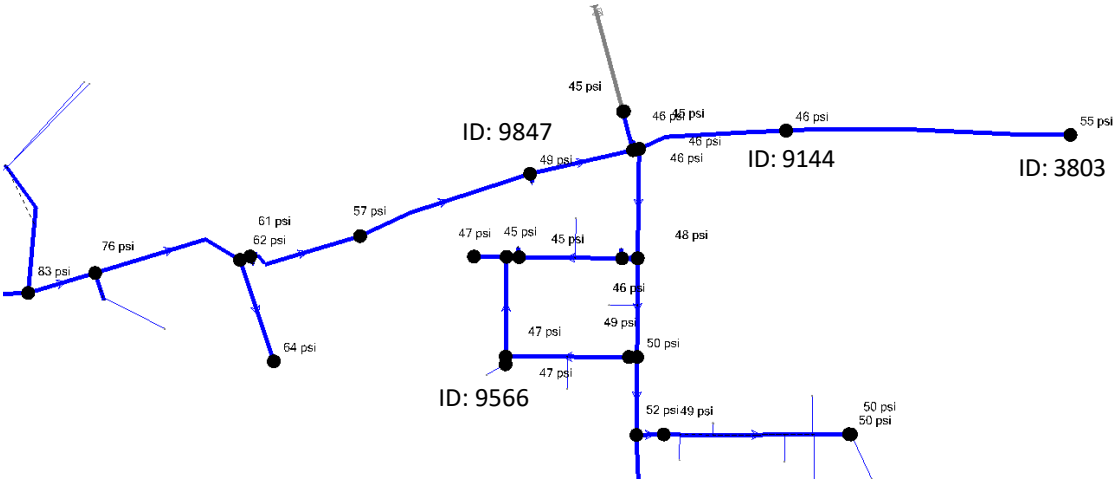
Peak Hour – Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Pressure (Stop) (psi)	Velocity (ft/s)
61479	P-1066	26	J-3762	J-3734	12	PVC	135	613.83	53	1.74
61481	P-1068	35	J-3735	J-3737	12	PVC	135	596.08	49	1.69
61483	P-1070	219	J-3736	J-3738	12	PVC	135	585.05	47	1.66
61485	P-1072	141	J-3739	J-3740	12	PVC	135	6.12	48	0.02
61781	P-1069(1)	157	J-3737	J-3764	12	PVC	135	596.08	46	1.69
61782	P-1069(2)	201	J-3764	J-3736	12	PVC	135	596.08	47	1.69
61786	P-1071(1)	155	J-3738	J-3765	12	PVC	135	10.2	47	0.03
61787	P-1071(2)	126	J-3765	J-3739	12	PVC	135	9.18	47	0.03
61791	P-1073(1)	67	J-3740	J-3766	12	PVC	135	3.06	49	0.01
61843	P-1067(1)	171	J-3734	J-3775	12	PVC	135	604.95	51	1.72
61844	P-1067(2)	132	J-3775	J-3735	12	PVC	135	596.08	50	1.69
61792	P-1073(2)	540	J-3766	J-3741	12	PVC	135	1.02	58	0
61487	P-1074	134	J-3738	J-3742	8	PVC	135	562.8	49	3.59
61488	P-1075	105	J-3742	J-3743	8	PVC	135	561.78	50	3.59
61490	P-1077	233	J-3744	J-3745	8	PVC	135	196.67	49	1.26
61492	P-1079	124	J-3746	J-3749	8	PVC	135	92.59	66	0.59
61493	P-1080	74	J-3749	J-3747	8	PVC	135	58.92	66	0.38
61494	P-1081	56	J-3747	J-3748	8	PVC	135	55.86	66	0.36
61499	P-1086	80	J-3754	J-3755	8	PVC	135	-75.79	56	0.48
61500	P-1087	108	J-3755	J-3756	8	PVC	135	-217.9	54	1.39
61503	P-1089	44	J-3749	J-3763	8	PVC	135	28.56	65	0.18
61797	P-1084(1)	213	J-3751	J-3767	8	PVC	135	-19.64	62	0.13
61798	P-1084(2)	165	J-3767	J-3753	8	PVC	135	-51.29	63	0.33
61802	P-1083(1)	315	J-3757	J-3768	8	PVC	135	30.36	61	0.19
61803	P-1083(2)	204	J-3768	J-3751	8	PVC	135	15.06	60	0.1
61809	P-1078(2)	213	J-3769	J-3746	8	PVC	135	102.79	65	0.66
61812	P-1076(1)	28	J-3743	J-3770	8	PVC	135	561.78	50	3.59
61813	P-1076(2)	26	J-3770	J-3744	8	PVC	135	560.76	50	3.58
61817	P-1078(1)(1)	249	J-3745	J-3771	8	PVC	135	178.3	50	1.14

Peak Hour – Pipe Table (Cont.)

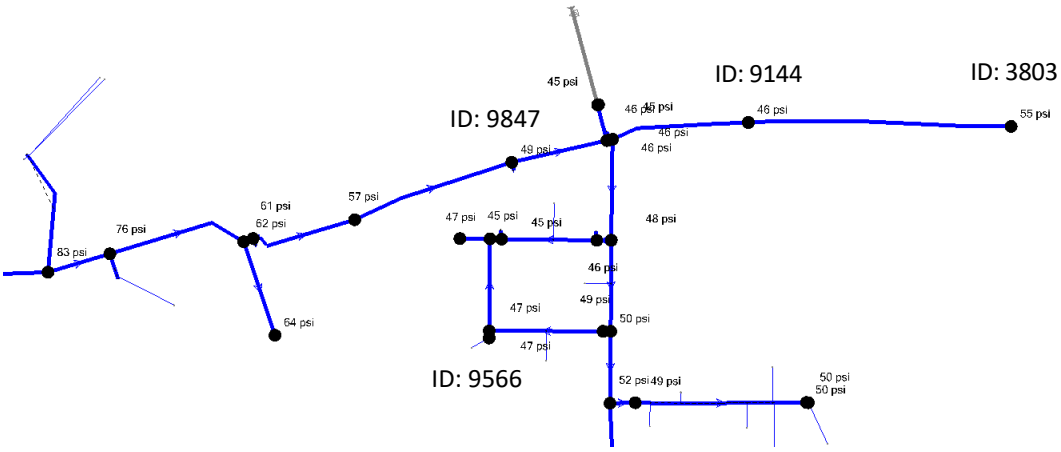
ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Pressure (Stop) (psi)	Velocity (ft/s)
61818	P-1078(1)(2)	481	J-3771	J-3769	8	PVC	135	136.46	60	0.87
61823	P-1091(2)	11	J-3772	J-3750	8	PVC	135	0	55	0
61827	P-1082(1)	10	J-3748	J-3773	8	PVC	135	53.82	66	0.34
61828	P-1082(2)	114	J-3773	J-3757	8	PVC	135	47.7	65	0.3
61839	P-1088(1)	156	J-3756	J-3774	8	PVC	135	-360.01	51	2.3
61840	P-1088(2)	44	J-3774	J-3744	8	PVC	135	-360.01	50	2.3
61846	P-1091(1)(1)	159	J-3758	J-3776	8	PVC	135	16.32	58	0.1
61847	P-1091(1)(2)	143	J-3776	J-3772	8	PVC	135	5.1	55	0.03
61852	P-1090(1)	153	J-3763	J-3777	8	PVC	135	27.54	64	0.18
61853	P-1090(2)	98	J-3777	J-3758	8	PVC	135	24.48	62	0.16
61859	P-1085(1)	238	J-3753	J-3780	8	PVC	135	-63.54	59	0.41
61860	P-1085(2)	64	J-3780	J-3754	8	PVC	135	-75.79	58	0.48
61788	P-1093	8	H-1727	J-3765	8	PVC	135	0	47	0
61793	P-1094	11	H-1728	J-3766	8	PVC	135	0	49	0
61862	P-1107	20	H-1726	J-3737	8	PVC	135	0	49	0
61865	P-1108	22	H-1738	J-3736	8	PVC	135	0	47	0
61799	P-1095	15	H-1730	J-3767	6	PVC	135	0	62	0
61804	P-1096	11	H-1731	J-3768	6	PVC	135	0	61	0
61810	P-1097	14	H-1733	J-3769	6	PVC	135	0	60	0
61819	P-1099	14	H-1734	J-3771	6	PVC	135	0	50	0
61829	P-1101	9	H-1732	J-3773	6	PVC	135	0	66	0
61841	P-1102	29	J-3774	H-1729	6	PVC	135	0	50	0
61850	P-1104	24	J-3750	H-1736	6	PVC	135	0	55	0
61855	P-1105	16	H-1735	J-3777	6	PVC	135	0	64	0
61861	P-1106	14	H-1737	J-3780	6	PVC	135	0	59	0

Existing Peak Day (City of Sheridan Model):



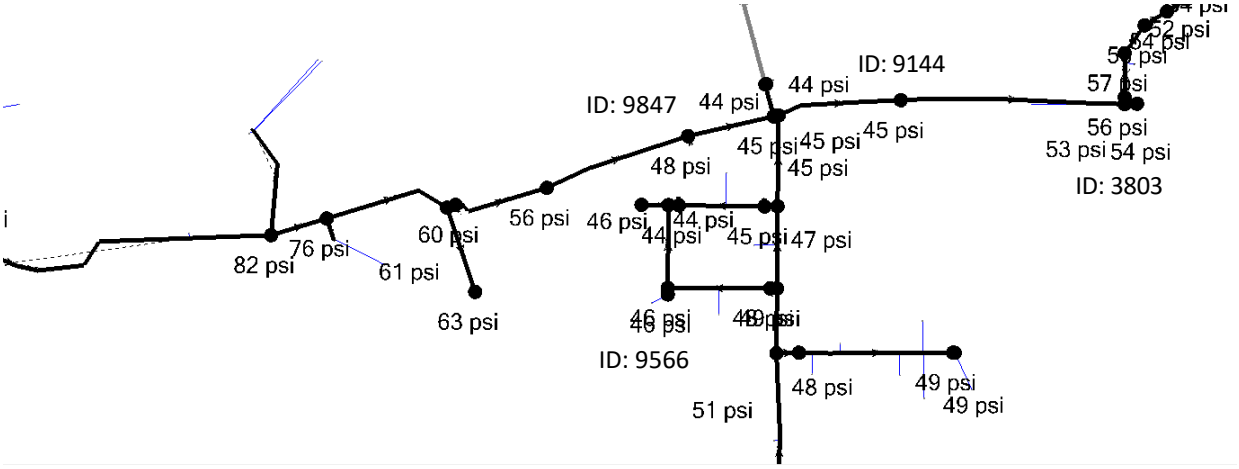
Junction ID (From Water Gems)	Pressure (psi)
3803	55
9144	46
9847	49
9566	47

Existing Peak + Fire Flow (City of Sheridan Model):



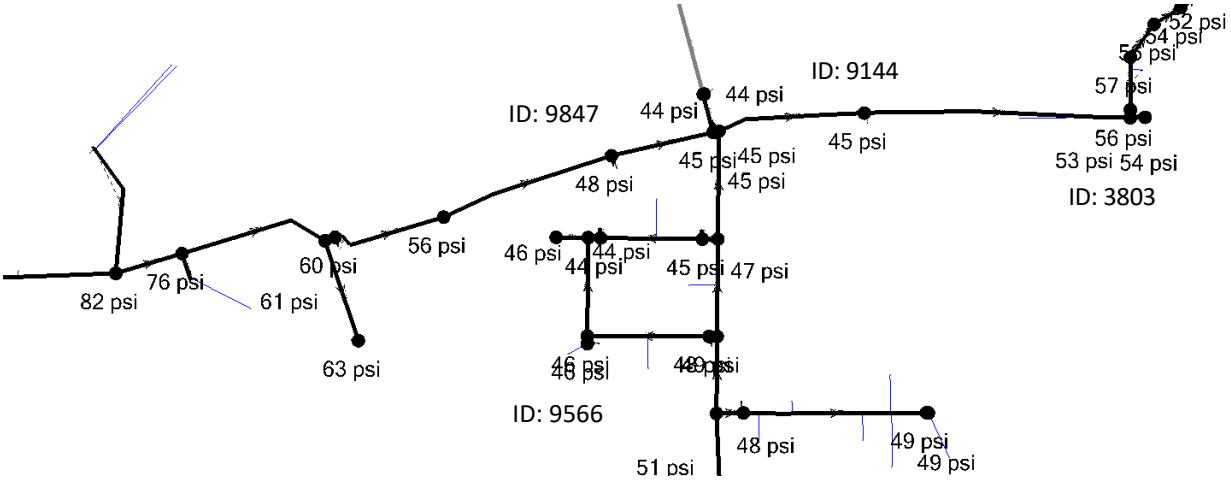
Junction ID (From Water Gems)	Pressure (psi)
3803	55
9144	46
9847	49
9566	47

Existing Peak Day (City of Sheridan Model + Story House):



Junction ID (From Water Gems)	Pressure (psi)
3803	54
9144	45
9847	48
9566	46

Existing Peak + Fire Flow (City of Sheridan Model + Story House):



Junction ID (From Water Gems)	Pressure (psi)
3803	54
9144	45
9847	48
9566	46

APPENDIX D

Sanitary Sewer Calculations

Table D-1: Sanitary System Design Flow Calculations

							Average Day		Peak Day			Peak Hour			200% Peak Day	
	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. of Dwellings	Persons per Dwelling Unit	Average Daily Per Capita Flow (gal/person/day)	Average Daily Flow (gpd)	Totals (gpd)	Average Day to Peak Day Factor	Flow (gpd)	Totals (gpd)	Average Day to Peak Hour Factor	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Block 1	Multifamily	--	--	171	2.21	100	37,791		2.43	91,832		2.74	103,547		183,664	
Block 2	Commercial	2.03	18	--	--	100	3,660		2.43	8,893		2.74	10,028		17,787	
Block 3	Commercial	2.00	18	--	--	100	3,600		2.43	8,748		2.74	9,864		17,496	
Block 4	Single Family	--	--	20	2.21	100	4,420		2.43	10,741		2.74	12,111		21,481	
Block 5	Multifamily	--	--	64	2.21	100	14,144	89,494	2.43	34,370	217,471	2.74	38,755	245,214	68,740	434,941
Block 6	Multifamily	--	--	24	2.21	100	5,304		2.43	12,889		2.74	14,533		25,777	
Block 7	Single Family	--	--	80	2.21	100	17,680		2.43	42,962		2.74	48,443		85,925	
Block 8	Commercial	1.61	18	--	--	100	2,895		2.43	7,035		2.74	7,933		14,070	

Table D-2: Story House Lane - 8" Gravity Sewer Main

							Average Day		Peak Day			Peak Hour			200% Peak Day	
	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. of Dwellings	Persons per Dwelling Unit	Average Daily Per Capita Flow (gal/person/day)	Average Daily Flow (gpd)	Totals (gpd)	Average Day to Peak Day Factor	Flow (gpd)	Totals (gpd)	Average Day to Peak Hour Factor	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Block 4	Single Family	--	--	20	2.21	100	4,420		2.43	10,741		2.74	12,111		21,481	
Story House Lane	Block 1	Multifamily	--	--	171	2.21	100	37,791	49,946	2.43	91,832	121,369	2.74	103,547	136,852	183,664	242,738
Block 7 - North	Single Family	--	--	35	2.21	100	7,735		2.43	18,796		2.74	21,194		37,592	

Table D-3: Baldwin Avenue - 8" Gravity Sewer Main

							Average Day		Peak Day			Peak Hour			200% Peak Day	
	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. of Dwellings	Persons per Dwelling Unit	Average Daily Per Capita Flow (gal/person/day)	Average Daily Flow (gpd)	Totals (gpd)	Average Day to Peak Day Factor	Flow (gpd)	Totals (gpd)	Average Day to Peak Hour Factor	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Block 8	Commercial	1.61	18	--	--	100	2,895		2.43	7,035		2.74	7,933		14,070	
Block 3	Commercial	2.00	18	--	--	100	3,600		2.43	8,748		2.74	9,864		17,496	
Block 2	Commercial	2.03	18	--	--	100	3,660		2.43	8,893		2.74	10,028		17,787	
Baldwin Avenue	Block 5 - South	Multifamily	--	--	32	2.21	100	7,072	27,614	2.43	17,185	67,102	2.74	19,377	75,662	34,370	134,204
Block 6	Multifamily	--	--	24	2.21	100	5,304		2.43	12,889		2.74	14,533		25,777	
Block 7 - South	Single Family	--	--	23	2.21	100	5,083		2.43	12,352		2.74	13,927		24,703	

Table D-4: Canterbury Lane - 8" Gravity Sewer Main

							Average Day		Peak Day			Peak Hour			200% Peak Day	
	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. of Dwellings	Persons per Dwelling Unit	Average Daily Per Capita Flow (gal/person/day)	Average Daily Flow (gpd)	Totals (gpd)	Average Day to Peak Day Factor	Flow (gpd)	Totals (gpd)	Average Day to Peak Hour Factor	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Canterbury Lane	Block 5 - North	Multifamily	--	--	32	2.21	100	7,072	11,271	2.43	17,185	27,389	2.74	19,377	30,883	34,370	54,777
Block 7 - Central	Single Family	--	--	19	2.21	100	4,199		2.43	10,204		2.74	11,505		20,407	

Table D-5: Story House Lane & Canterbury Lane Confluence - 8" Gravity Sewer Main

							Average Day		Peak Day			Peak Hour			200% Peak Day	
	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. of Dwellings	Persons per Dwelling Unit	Average Daily Per Capita Flow (gal/person/day)	Average Daily Flow (gpd)	Totals (gpd)	Average Day to Peak Day Factor	Flow (gpd)	Totals (gpd)	Average Day to Peak Hour Factor	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Block 4	Single Family	--	--	20	2.21	100	4,420		2.43	10,741		2.74	12,111		21,481	
Block 1	Multifamily	--	--	171	2.21	100	37,791		2.43	91,832		2.74	103,547		183,664	
Story House Lane & Canterbury Lane Confluence	Block 7 - North	Single Family	--	--	35	2.21	100	7,735	61,880	2.43	18,796	150,368	2.74	21,194	169,551	37,592	300,737
Block 5 - North	Multifamily	--	--	32	2.21	100	7,072		2.43	17,185		2.74	19,377		34,370	
Block 7 - Central	Single Family	--	--	19	2.21	100	4,199		2.43	10,204		2.74	11,505		20,407	
Block 7 - East	Single Family	--	--	3	2.21	100	663		2.43	1,611		2.74	1,817		3,222	

Table D-6: Trunk Line to Lift Station - 8" Gravity Sewer Main

							Average Day		Peak Day			Peak Hour			200% Peak Day	
	Land Use	Area (acres)	Equivalent Population (persons/acre)	No. of Dwellings	Persons per Dwelling Unit	Average Daily Per Capita Flow (gal/person/day)	Average Daily Flow (gpd)	Totals (gpd)	Average Day to Peak Day Factor	Flow (gpd)	Totals (gpd)	Average Day to Peak Hour Factor	Flow (gpd)	Totals (gpd)	Flow (gpd)	Totals (gpd)
Block 1	Multifamily	--	--	171	2.21	100	37,791		2.43	91,832		2.74	103,547		183,664	
Block 2	Commercial	2.03	18	--	--	100	3,660		2.43	8,893		2.74	10,028		17,787	
Block 3	Commercial	2.00	18	--	--	100	3,600		2.43	8,748		2.74	9,864		17,496	
Block 4	Single Family	--	--	20	2.21	100	4,420		2.43	10,741		2.74	12,111		21,481	
Block 5 - North	Multifamily	--	--	32	2.21	100	7,072		2.43	17,185		2.74	19,377		34,370	
Trunk Line to Lift Station	Block 5 - South	Multifamily	--	--	32	2.21	100	7,072	89,494	2.43	17,185	217,471	2.74	19,377	245,214	34,370	434,941
Block 6	Multifamily	--	--	24	2.21	100	5,304		2.43	12,889		2.74	14,533		25,777	
Block 7 - North	Single Family	--	--	35	2.21	100	7,735		2.43	18,796		2.74	21,194		37,592	
Block 7 - Central	Single Family	--	--	19	2.21	100	4,199		2.43	10,204		2.74	11,505		20,407	
Block 7 - South	Single Family	--	--	23	2.21	100	5,083		2.43	12,352		2.74	13,927		24,703	
Block 7 - East	Single Family	--	--	3	2.21	100	663		2.43	1,611		2.74	1,817		3,222	
Block 8	Commercial	1.61	18	--	--	100	2,895		2.43	7,035		2.74	7,933		14,070	

Table D-7: 8" Gravity Sewer Main Hydraulics

	Story House Lane - 8"	Baldwin Ave - 8"	Canterbury Lane - 8"	Story House Lane & Canterbury Lane Confluence - 8"	Trunk Line to Lift Station - 8"	Wyarno Gravity Sewer - 8"
Minimum Slope	0.0045 ft/ft	0.0045 ft/ft	0.0075 ft/ft	0.0228 ft/ft	0.0289 ft/ft	0.0100 ft/ft
Maximum Slope	0.0528 ft/ft	0.0609 ft/ft	0.0513 ft/ft	0.0228 ft/ft	0.0289 ft/ft	0.0600 ft/ft
Pipe Diameter	8.000 inch	8.000 inch	8.000 inch	8.000 inch	8.000 inch	8.000 inch
Average Day (gpd)	49946 gpd	27614 gpd	11271 gpd	61880 gpd	89494 gpd	89494 gpd
Average Day (gpm)	34.68 gpm	19.18 gpm	7.83 gpm	42.97 gpm	62.15 gpm	62.15 gpm
Average Day (cfs)	0.077 cfs	0.043 cfs	0.017 cfs	0.096 cfs	0.138 cfs	0.138 cfs
Velocity (min slope)	1.76 ft/sec	1.48 ft/sec	1.35 ft/sec	3.32 ft/sec	4.03 ft/sec	2.77 ft/sec
Percent Full (min slope)	18.3 %	13.8 %	7.8 %	13.7 %	15.5 %	20.0 %
Discharge Full (min slope)	1.05 cfs	1.05 cfs	1.36 cfs	2.37 cfs	2.67 cfs	1.57 cfs
Velocity (max slope)	4.17 ft/sec	3.66 ft/sec	2.61 ft/sec	3.32 ft/sec	4.03 ft/sec	5.21 ft/sec
Percent Full (max slope)	10.1 %	7.4 %	5.0 %	13.7 %	15.5 %	13.0 %
Discharge Full (max slope)	3.61 cfs	3.88 cfs	3.56 cfs	2.37 cfs	2.67 cfs	3.85 cfs
Peak Day (gpd)	121369 gpd	67102 gpd	27389 gpd	150368 gpd	217471 gpd	217471 gpd
Peak Day (gpm)	84.28 gpm	46.60 gpm	19.02 gpm	104.42 gpm	151.02 gpm	151.02 gpm
Peak Day (cfs)	0.188 cfs	0.104 cfs	0.042 cfs	0.233 cfs	0.336 cfs	0.336 cfs
Velocity (min slope)	1.88 ft/sec	1.92 ft/sec	1.76 ft/sec	4.32 ft/sec	5.24 ft/sec	3.58 ft/sec
Percent Full (min slope)	28.6 %	21.2 %	12.0 %	21.2 %	23.9 %	31.4 %
Discharge Full (min slope)	1.05 cfs	1.05 cfs	1.36 cfs	2.37 cfs	2.67 cfs	1.57 cfs
Velocity (max slope)	5.45 ft/sec	4.80 ft/sec	3.42 ft/sec	4.32 ft/sec	5.24 ft/sec	6.77 ft/sec
Percent Full (max slope)	15.5 %	11.3 %	7.7 %	21.2 %	23.9 %	20.0 %
Discharge Full (max slope)	3.61 cfs	3.88 cfs	3.56 cfs	2.37 cfs	2.67 cfs	3.85 cfs
Peak Hour (gpd)	136852 gpd	75662 gpd	30883 gpd	169551 gpd	245214 gpd	245214 gpd
Peak Hour (gpm)	95.04 gpm	52.54 gpm	21.45 gpm	117.74 gpm	170.29 gpm	170.29 gpm
Peak Hour (cfs)	0.212 cfs	0.117 cfs	0.048 cfs	0.262 cfs	0.379 cfs	0.379 cfs
Velocity (min slope)	2.36 ft/sec	1.99 ft/sec	1.83 ft/sec	4.47 ft/sec	5.42 ft/sec	3.71 ft/sec
Percent Full (min slope)	30.4 %	22.5 %	12.8 %	22.4 %	25.5 %	33.4 %
Discharge Full (min slope)	1.05 cfs	1.05 cfs	1.36 cfs	2.37 cfs	2.67 cfs	1.57 cfs
Velocity (max slope)	5.65 ft/sec	4.97 ft/sec	3.60 ft/sec	4.47 ft/sec	5.42 ft/sec	7.02 ft/sec
Percent Full (max slope)	16.5 %	11.9 %	8.1 %	22.4 %	25.5 %	21.2 %
Discharge Full (max slope)	3.61 cfs	3.88 cfs	3.56 cfs	2.37 cfs	2.67 cfs	3.85 cfs
200% Peak Day (gpd)	242738 gpd	134204 gpd	54777 gpd	300737 gpd	434941 gpd	434941 gpd
200% Peak Day (gpm)	168.57 gpm	93.20 gpm	38.04 gpm	208.85 gpm	302.04 gpm	302.04 gpm
200% Peak Day (cfs)	0.376 cfs	0.208 cfs	0.085 cfs	0.465 cfs	0.673 cfs	0.673 cfs
Velocity (min slope)	2.77 ft/sec	2.35 ft/sec	2.17 ft/sec	5.27 ft/sec	6.37 ft/sec	4.33 ft/sec
Percent Full (min slope)	41.3 %	30.1 %	16.9 %	30.0 %	34.3 %	45.7 %
Discharge Full (min slope)	1.05 cfs	1.05 cfs	1.36 cfs	2.37 cfs	2.67 cfs	1.57 cfs
Velocity (max slope)	6.69 ft/sec	5.91 ft/sec	4.26 ft/sec	5.27 ft/sec	6.37 ft/sec	8.29 ft/sec
Percent Full (max slope)	21.8 %	15.7 %	10.7 %	30.0 %	34.3 %	28.3 %
Discharge Full (max slope)	3.61 cfs	3.88 cfs	3.56 cfs	2.37 cfs	2.67 cfs	3.85 cfs

8" PVC Gravity Main (Flowing Full - Minimum Slope)

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0045 ft/ft
Normal Depth	8.000 in
Diameter	8.0 in

Results	
Discharge	1.0538 cfs
Flow Area	0.3 ft²
Wetted Perimeter	2.1 ft
Hydraulic Radius	2.000 in
Top Width	0.00 ft
Critical Depth	5.845 in
Percent Full	100.0 %
Critical Slope	0.0058 ft/ft
Velocity	3.02 ft/s
Velocity Head	0.14 ft
Specific Energy	0.81 ft
Froude Number	(N/A)
Maximum Discharge	1.1335 cfs
Discharge Full	1.0538 cfs
Slope Full	0.0045 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	2.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.000 in
Critical Depth	5.845 in
Channel Slope	0.0045 ft/ft
Critical Slope	0.0058 ft/ft

8" PVC Gravity Main (Maximum Flow - Minimum Slope)

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0045 ft/ft
Normal Depth	7.530 in
Diameter	8.0 in

Results	
Discharge	1.1335 cfs
Flow Area	0.3 ft²
Wetted Perimeter	1.8 ft
Hydraulic Radius	2.313 in
Top Width	0.31 ft
Critical Depth	6.059 in
Percent Full	94.1 %
Critical Slope	0.0061 ft/ft
Velocity	3.33 ft/s
Velocity Head	0.17 ft
Specific Energy	0.80 ft
Froude Number	0.562
Maximum Discharge	1.1335 cfs
Discharge Full	1.0538 cfs
Slope Full	0.0052 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	2.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.530 in
Critical Depth	6.059 in
Channel Slope	0.0045 ft/ft
Critical Slope	0.0061 ft/ft

Story House Lane - 8" Gravity Main (Peak Day)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0045 ft/ft
Diameter	8.0 in
Discharge	0.1880 cfs

Results	
Normal Depth	2.286 in
Flow Area	0.1 ft²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.313 in
Top Width	0.60 ft
Critical Depth	2.388 in
Percent Full	28.57 %
Critical Slope	0.0038 ft/ft
Velocity	2.285 ft/s
Velocity Head	0.08 ft
Specific Energy	0.27 ft
Froude Number	1.090
Maximum Discharge	1.1335 cfs
Discharge Full	1.0538 cfs
Slope Full	0.0001 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	28.57 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.286 in
Critical Depth	2.388 in
Channel Slope	0.0045 ft/ft
Critical Slope	0.0038 ft/ft

Story House Lane - 8" Gravity Main (Peak Hour)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.0045	ft/ft
Diameter	8.0	in
Discharge	0.2120	cfs

Results		
Normal Depth	2.434	in
Flow Area	0.1	ft^2
Wetted Perimeter	0.8	ft
Hydraulic Radius	1.383	in
Top Width	0.61	ft
Critical Depth	2.544	in
Percent Full	30.43	%
Critical Slope	0.0038	ft/ft
Velocity	2.360	ft/s
Velocity Head	0.09	ft
Specific Energy	0.29	ft
Froude Number	1.088	
Maximum Discharge	1.1335	cfs
Discharge Full	1.0538	cfs
Slope Full	0.0002	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.000	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.000	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	30.43	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.434	in
Critical Depth	2.544	in
Channel Slope	0.0045	ft/ft
Critical Slope	0.0038	ft/ft

Story House Lane - 8" Gravity Main (Peak Day 200%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0045 ft/ft
Diameter	8.0 in
Discharge	0.3760 cfs

Results	
Normal Depth	3.300 in
Flow Area	0.1 ft²
Wetted Perimeter	0.9 ft
Hydraulic Radius	1.753 in
Top Width	0.66 ft
Critical Depth	3.423 in
Percent Full	41.25 %
Critical Slope	0.0040 ft/ft
Velocity	2.768 ft/s
Velocity Head	0.12 ft
Specific Energy	0.39 ft
Froude Number	1.073
Maximum Discharge	1.1335 cfs
Discharge Full	1.0538 cfs
Slope Full	0.0006 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	41.25 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.300 in
Critical Depth	3.423 in
Channel Slope	0.0045 ft/ft
Critical Slope	0.0040 ft/ft

Baldwin Avenue - 8" Gravity Main (Peak Day)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0045 ft/ft
Diameter	8.0 in
Discharge	0.1040 cfs

Results	
Normal Depth	1.698 in
Flow Area	0.1 ft²
Wetted Perimeter	0.6 ft
Hydraulic Radius	1.017 in
Top Width	0.55 ft
Critical Depth	1.766 in
Percent Full	21.22 %
Critical Slope	0.0038 ft/ft
Velocity	1.923 ft/s
Velocity Head	0.06 ft
Specific Energy	0.20 ft
Froude Number	1.076
Maximum Discharge	1.1335 cfs
Discharge Full	1.0538 cfs
Slope Full	0.0000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	21.22 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.698 in
Critical Depth	1.766 in
Channel Slope	0.0045 ft/ft
Critical Slope	0.0038 ft/ft

Baldwin Avenue - 8" Gravity Main (Peak Hour)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0045 ft/ft
Diameter	8.0 in
Discharge	0.1170 cfs

Results	
Normal Depth	1.800 in
Flow Area	0.1 ft²
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.071 in
Top Width	0.56 ft
Critical Depth	1.872 in
Percent Full	22.50 %
Critical Slope	0.0038 ft/ft
Velocity	1.990 ft/s
Velocity Head	0.06 ft
Specific Energy	0.21 ft
Froude Number	1.080
Maximum Discharge	1.1335 cfs
Discharge Full	1.0538 cfs
Slope Full	0.0001 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	22.50 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.800 in
Critical Depth	1.872 in
Channel Slope	0.0045 ft/ft
Critical Slope	0.0038 ft/ft

Baldwin Avenue - 8" Gravity Main (Peak Day 200%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.0045	ft/ft
Diameter	8.0	in
Discharge	0.2080	cfs

Results		
Normal Depth	2.410	in
Flow Area	0.1	ft²
Wetted Perimeter	0.8	ft
Hydraulic Radius	1.372	in
Top Width	0.61	ft
Critical Depth	2.519	in
Percent Full	30.13	%
Critical Slope	0.0038	ft/ft
Velocity	2.348	ft/s
Velocity Head	0.09	ft
Specific Energy	0.29	ft
Froude Number	1.088	
Maximum Discharge	1.1335	cfs
Discharge Full	1.0538	cfs
Slope Full	0.0002	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.000	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.000	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	30.13	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.410	in
Critical Depth	2.519	in
Channel Slope	0.0045	ft/ft
Critical Slope	0.0038	ft/ft

Canterbury Lane - 8" Gravity Main (Peak Day)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0075 ft/ft
Diameter	8.0 in
Discharge	0.0420 cfs

Results	
Normal Depth	0.963 in
Flow Area	0.0 ft²
Wetted Perimeter	0.5 ft
Hydraulic Radius	0.605 in
Top Width	0.43 ft
Critical Depth	1.111 in
Percent Full	12.03 %
Critical Slope	0.0042 ft/ft
Velocity	1.763 ft/s
Velocity Head	0.05 ft
Specific Energy	0.13 ft
Froude Number	1.326
Maximum Discharge	1.4634 cfs
Discharge Full	1.3604 cfs
Slope Full	0.0000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	12.03 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.963 in
Critical Depth	1.111 in
Channel Slope	0.0075 ft/ft
Critical Slope	0.0042 ft/ft

Canterbury Lane - 8" Gravity Main (Peak Hour)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0075 ft/ft
Diameter	8.0 in
Discharge	0.0480 cfs

Results	
Normal Depth	1.027 in
Flow Area	0.0 ft²
Wetted Perimeter	0.5 ft
Hydraulic Radius	0.643 in
Top Width	0.45 ft
Critical Depth	1.186 in
Percent Full	12.84 %
Critical Slope	0.0042 ft/ft
Velocity	1.832 ft/s
Velocity Head	0.05 ft
Specific Energy	0.14 ft
Froude Number	1.333
Maximum Discharge	1.4634 cfs
Discharge Full	1.3604 cfs
Slope Full	0.0000 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	12.84 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.027 in
Critical Depth	1.186 in
Channel Slope	0.0075 ft/ft
Critical Slope	0.0042 ft/ft

Canterbury Lane - 8" Gravity Main (Peak Day 200%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.0075	ft/ft
Diameter	8.0	in
Discharge	0.0850	cfs

Results		
Normal Depth	1.355	in
Flow Area	0.0	ft²
Wetted Perimeter	0.6	ft
Hydraulic Radius	0.831	in
Top Width	0.50	ft
Critical Depth	1.585	in
Percent Full	16.94	%
Critical Slope	0.0040	ft/ft
Velocity	2.171	ft/s
Velocity Head	0.07	ft
Specific Energy	0.19	ft
Froude Number	1.368	
Maximum Discharge	1.4634	cfs
Discharge Full	1.3604	cfs
Slope Full	0.0000	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.000	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.000	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	16.94	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.355	in
Critical Depth	1.585	in
Channel Slope	0.0075	ft/ft
Critical Slope	0.0040	ft/ft

Confluence - 8" Gravity Main (Peak Day)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0228 ft/ft
Diameter	8.0 in
Discharge	0.2330 cfs

Results	
Normal Depth	1.694 in
Flow Area	0.1 ft²
Wetted Perimeter	0.6 ft
Hydraulic Radius	1.015 in
Top Width	0.54 ft
Critical Depth	2.669 in
Percent Full	21.17 %
Critical Slope	0.0038 ft/ft
Velocity	4.322 ft/s
Velocity Head	0.29 ft
Specific Energy	0.43 ft
Froude Number	2.422
Maximum Discharge	2.5515 cfs
Discharge Full	2.3719 cfs
Slope Full	0.0002 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	21.17 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.694 in
Critical Depth	2.669 in
Channel Slope	0.0228 ft/ft
Critical Slope	0.0038 ft/ft

Confluence - 8" Gravity Main (Peak Hour)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0228 ft/ft
Diameter	8.0 in
Discharge	0.2620 cfs

Results	
Normal Depth	1.795 in
Flow Area	0.1 ft²
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.068 in
Top Width	0.56 ft
Critical Depth	2.837 in
Percent Full	22.44 %
Critical Slope	0.0038 ft/ft
Velocity	4.473 ft/s
Velocity Head	0.31 ft
Specific Energy	0.46 ft
Froude Number	2.431
Maximum Discharge	2.5515 cfs
Discharge Full	2.3719 cfs
Slope Full	0.0003 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	22.44 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.795 in
Critical Depth	2.837 in
Channel Slope	0.0228 ft/ft
Critical Slope	0.0038 ft/ft

Confluence - 8" Gravity Main (Peak Day 200%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0228 ft/ft
Diameter	8.0 in
Discharge	0.4650 cfs

Results	
Normal Depth	2.402 in
Flow Area	0.1 ft²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.368 in
Top Width	0.61 ft
Critical Depth	3.825 in
Percent Full	30.02 %
Critical Slope	0.0041 ft/ft
Velocity	5.274 ft/s
Velocity Head	0.43 ft
Specific Energy	0.63 ft
Froude Number	2.448
Maximum Discharge	2.5515 cfs
Discharge Full	2.3719 cfs
Slope Full	0.0009 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	30.02 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.402 in
Critical Depth	3.825 in
Channel Slope	0.0228 ft/ft
Critical Slope	0.0041 ft/ft

Trunk Line to Lift Station - 8" Gravity Main (Peak Day)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0289 ft/ft
Diameter	8.0 in
Discharge	0.3360 cfs

Results	
Normal Depth	1.913 in
Flow Area	0.1 ft²
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.129 in
Top Width	0.57 ft
Critical Depth	3.229 in
Percent Full	23.92 %
Critical Slope	0.0039 ft/ft
Velocity	5.241 ft/s
Velocity Head	0.43 ft
Specific Energy	0.59 ft
Froude Number	2.752
Maximum Discharge	2.8726 cfs
Discharge Full	2.6704 cfs
Slope Full	0.0005 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	23.92 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.913 in
Critical Depth	3.229 in
Channel Slope	0.0289 ft/ft
Critical Slope	0.0039 ft/ft

Trunk Line to Lift Station - 8" Gravity Main (Peak Hour)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0289 ft/ft
Diameter	8.0 in
Discharge	0.3790 cfs

Results	
Normal Depth	2.036 in
Flow Area	0.1 ft²
Wetted Perimeter	0.7 ft
Hydraulic Radius	1.191 in
Top Width	0.58 ft
Critical Depth	3.438 in
Percent Full	25.45 %
Critical Slope	0.0040 ft/ft
Velocity	5.415 ft/s
Velocity Head	0.46 ft
Specific Energy	0.63 ft
Froude Number	2.750
Maximum Discharge	2.8726 cfs
Discharge Full	2.6704 cfs
Slope Full	0.0006 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	25.45 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.036 in
Critical Depth	3.438 in
Channel Slope	0.0289 ft/ft
Critical Slope	0.0040 ft/ft

Trunk Line to Lift Station - 8" Gravity Main (Peak Day 200%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.0289	ft/ft
Diameter	8.0	in
Discharge	0.6730	cfs

Results		
Normal Depth	2.740	in
Flow Area	0.1	ft^2
Wetted Perimeter	0.8	ft
Hydraulic Radius	1.522	in
Top Width	0.63	ft
Critical Depth	4.644	in
Percent Full	34.25	%
Critical Slope	0.0045	ft/ft
Velocity	6.366	ft/s
Velocity Head	0.63	ft
Specific Energy	0.86	ft
Froude Number	2.746	
Maximum Discharge	2.8726	cfs
Discharge Full	2.6704	cfs
Slope Full	0.0018	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.000	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.000	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	34.25	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.740	in
Critical Depth	4.644	in
Channel Slope	0.0289	ft/ft
Critical Slope	0.0045	ft/ft

Wyarno Road - 8" Gravity Main (Peak Day)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0100 ft/ft
Diameter	8.0 in
Discharge	0.3360 cfs

Results	
Normal Depth	2.514 in
Flow Area	0.1 ft²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.420 in
Top Width	0.62 ft
Critical Depth	3.228 in
Percent Full	31.42 %
Critical Slope	0.0039 ft/ft
Velocity	3.578 ft/s
Velocity Head	0.20 ft
Specific Energy	0.41 ft
Froude Number	1.620
Maximum Discharge	1.6898 cfs
Discharge Full	1.5709 cfs
Slope Full	0.0005 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	31.42 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.514 in
Critical Depth	3.228 in
Channel Slope	0.0100 ft/ft
Critical Slope	0.0039 ft/ft

Wyarno Road - 8" Gravity Main (Peak Hour)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0100 ft/ft
Diameter	8.0 in
Discharge	0.3790 cfs

Results	
Normal Depth	2.674 in
Flow Area	0.1 ft²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.493 in
Top Width	0.63 ft
Critical Depth	3.438 in
Percent Full	33.42 %
Critical Slope	0.0040 ft/ft
Velocity	3.708 ft/s
Velocity Head	0.21 ft
Specific Energy	0.44 ft
Froude Number	1.621
Maximum Discharge	1.6898 cfs
Discharge Full	1.5709 cfs
Slope Full	0.0006 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	33.42 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.674 in
Critical Depth	3.438 in
Channel Slope	0.0100 ft/ft
Critical Slope	0.0040 ft/ft

Wyarno Road - 8" Gravity Main (Peak Day 200%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.0100 ft/ft
Diameter	8.0 in
Discharge	0.6730 cfs

Results	
Normal Depth	3.656 in
Flow Area	0.2 ft²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.885 in
Top Width	0.66 ft
Critical Depth	4.642 in
Percent Full	45.71 %
Critical Slope	0.0045 ft/ft
Velocity	4.329 ft/s
Velocity Head	0.29 ft
Specific Energy	0.60 ft
Froude Number	1.577
Maximum Discharge	1.6898 cfs
Discharge Full	1.5709 cfs
Slope Full	0.0018 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.000 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.000 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	45.71 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.656 in
Critical Depth	4.642 in
Channel Slope	0.0100 ft/ft
Critical Slope	0.0045 ft/ft

Given:

1. City of Sheridan will allow only 151 gpm to discharge into City gravity sewer.
    a. Design discharge at 151 gpm
2. Peak day flow rates are 151 gpm for first phase build out. Average flow rates are 62 gpm for the first phase.
3. 1 ft^3 = 7.48 gallons
4. Future phase buildouts will need to expand sewer storage capacity. The proposed lift station vault will provide future connection stubs.
5. Lift station designed in accordance with Section 10 of Chapter 11 DEQ Rules & Regulations.

Assumptions:

1. GPM flows occur over a 24-hour period
2. No groundwater is present (based on geotech report) so no uplift calculations are necessary.
3. Lift station will be constructed as a submersible pump station, mounted on guiderail systems to allow for easy pump removal and replacement.
4. Duplex pumping system provide a minimum of 10 minutes between cycles.

Find:

1. Required storage volume of lift station based on 10 min pump run time.

$$10\,\text{min} * 150\ gpm = 1{,}500\ gallons\ (\text{min})$$

Use 90" (7.5') diameter concrete lift station vault.

Diameter: 7.5'

$$Area: \frac{\pi * 7.5^2}{4} = 44\ ft^2 = 331\ gal/ft$$

Volume required for 10 min flow = 1,500 gallons

Depth: 4.83'

2. Additional storage for 2nd pump on volume, high alarm level, and pump submersion.
3. Required storage volume of lift station based on 100-year life cycle and 56 cycles per day*.

$$\frac{24\frac{hr}{day} * 60\frac{min}{hr}}{25.8\ min} = 56\ cycles$$

Based on pressure, flow, and cycles per day using C-900 Appendix B criteria, 56 cycles per day is the limiting cycle per day limit.

*Pump cycles are based on average flows because most of the time the lift station will operate during average flows, not peak day flows.

*56 Cycles per day is the maximum cycles over the 100-year life cycle. Volume required for cyclical surge exceeds that required for the 10 minute between pump cycles.

Storage volume is based on peak day flows.

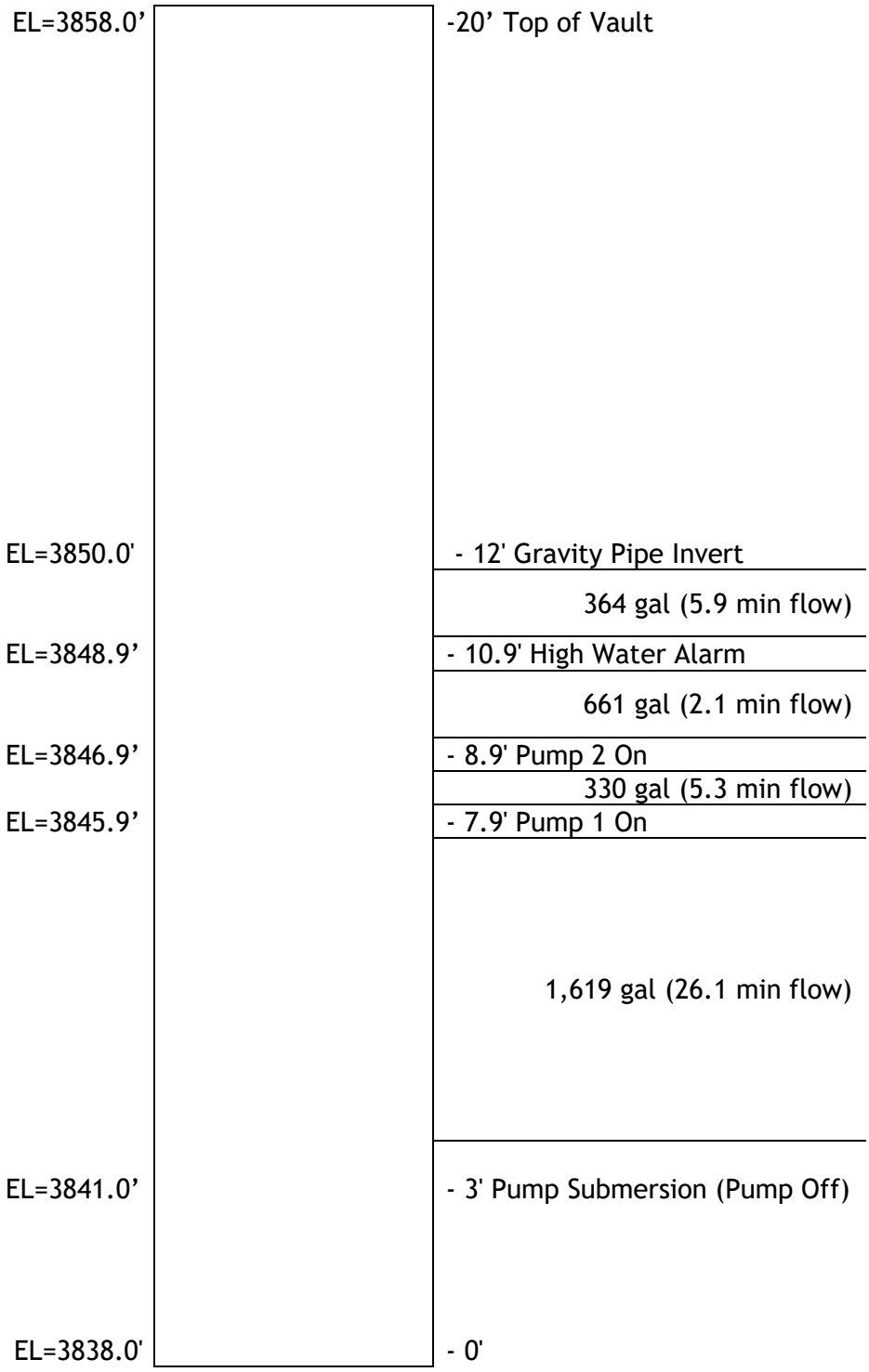
$$\frac{24\frac{hr}{day} * 60\frac{min}{hr}}{56\frac{cycles}{day}} = 25.8\,min$$

$$25.8\,\text{min} * average\ flow\ 62\ gpm = 1{,}600\ gal$$

$$Pumping\ time: \frac{1{,}600 gal}{151\ gal/min} = 10.6\,min$$

*Value is conservative as flow will continue to enter lift station. Run/fill time is used to define the number of cycles per day in the C-900 cyclical surge analysis.

10.6 min to discharge and 25.8 min to fill to pump on level.



7.5 ' Diameter
Manhole

Not to Scale

*Top of lift station 2’ above existing grade

Volume of sewage generated:	Peak Day (gal/day)	217,463
	Average Daily Flow (gal/day)	89,491
Volume of sewer discharge:	Max Allowed Discharge (gpm)	151
	Max Allowed Discharge (gpd)	217,440
Volume of storage required:	Storage Volume (gal)	23

Use Vaughn Concrete 7.5-foot Precast lift station.

Diameter (ft):	90"
Area (sf):	7.5
Depth (ft):	44
Volume (gal):	**17.00**
Volume (gal) /ft:	5618
	330

Use 7.5' Concrete Precase Lift Station

Pump Cylical surge & pump on/off is based on the average flow

Average daily flow (gpd):	89,491
Average daily flow (gpm):	62
Vol for "on" at pump 1 (gal):	5,618
Pump discharge (gpm):	151
Time to fill at avg flow (min):	90.4
Pump Cycles per day (ea)*:	16
Time to empty at pump flow (min):	37.2

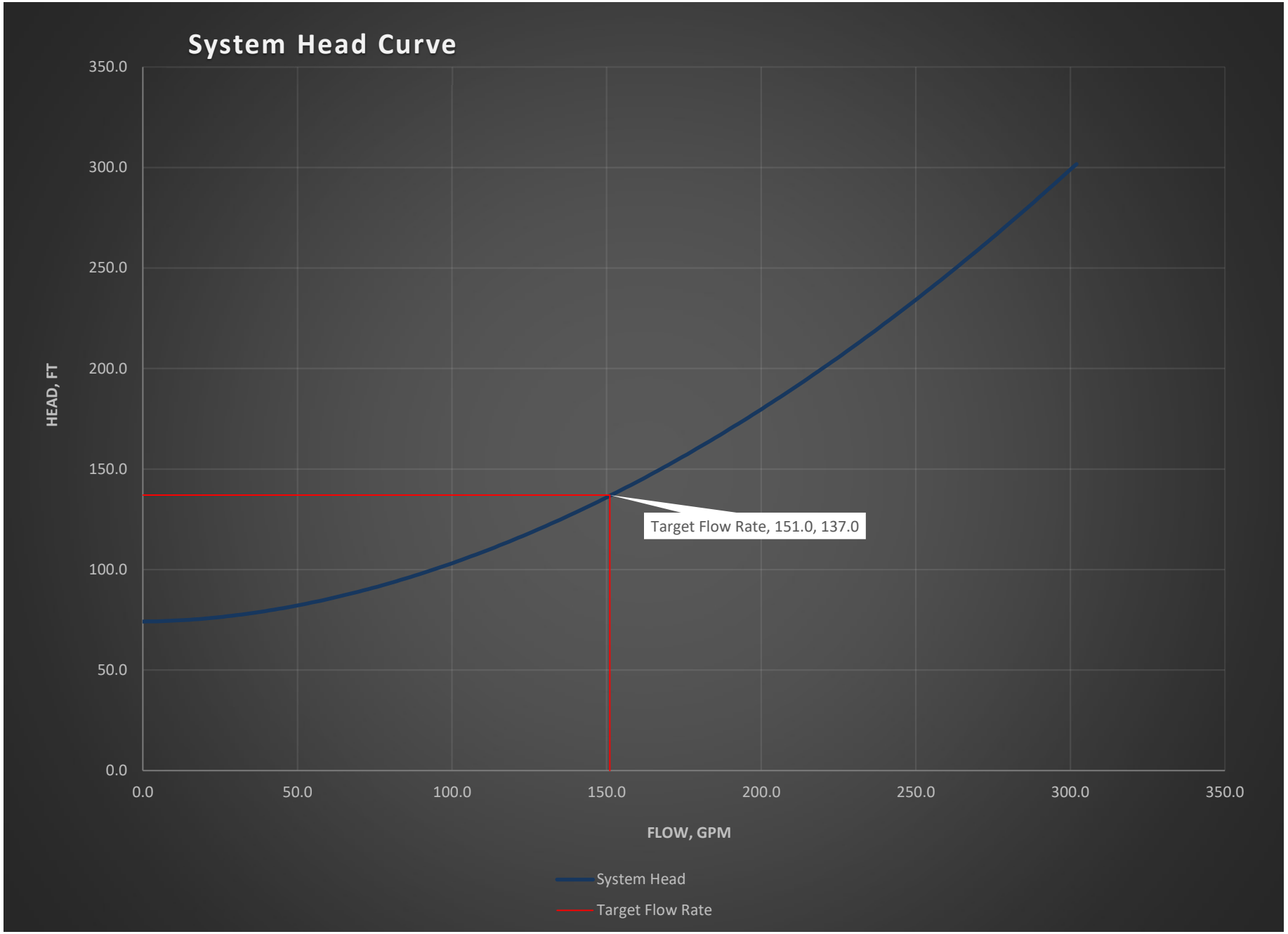
*Refer to C-900 Appendix B Calculations

Control Level Settings

	Height from Bottom	Volume (gal)	Time (min)
Pump Off:	3.0	991	
Pump 1 On:	7.9	1619	26.06
Pump 2 On:	8.9	330	5.32
High Water Alarm:	10.9	661	10.63
Top:	12.0	364	5.85

Total Vol (gal): 3965

System Head Curve Calculations


System Head Curve
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
HEAD, FT
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
FLOW, GPM
Target Flow Rate, 151.0, 137.0
System Head
Target Flow Rate

Storeyhouse Force Main

SYSTEM CURVE ANALYSIS 5/10/24 - TJS

Design Life	100
Number of Cycles per Day	56

Convert ft of head to psi: 137.0 ft = 59.4 psi

Convert ft of head to psi: 74.1 ft = 32.1 psi

Static and Pumping WSEL Inputs	
Ground Elev	3858
Init DTW	3845.9
Static WSEL	3841
Draw down	3845.9
Outlet Elevation	3920

Operating Pressure At Demand Node*	32.1

*If pumping to atmospheric pressure sets automatically

Pump Discharge		
Pump Discharge Low	0	gpm
Pump Discharge High	302	gpm
Target Discharge	151	gpm

Pipe *Spreadsheet is intended to be used with only one pipe size at a time*					
Diameter (4")	***4***	inch	4"	**DR is Appropriate, Try a Higher DR Value**	**Pipe Cycles Work**
Length	***3960***	foot			
Pipe Coefficient	140	C_{HW}			

DR Assumption *DROP DOWN LIST	14	Typical DR Values: 14, 18, 25

Operating Temperature	50	Degrees F

Pumping System Headloss

Hazen-Williams Formula

$V=1.318C_hR^{0.63}S^{0.54}$

Where:

V=mean velocity in ft/s

C_h=Hazen-Williams coef.

R=hydraulic radius in ft

$S=h_f/L$ (slope of EGL)

Fitting Head Loss Eqn

$h_L=K(V^2/2g)$

Where:

V=mean velocity in ft/s

K=loss coefficient for fitting

g=accel. due to gravity

Static Lift: 0.00

DYNAMIC HEADLOSS
(WELL AND PUMPHOUSE)

Target Discharge(GPM): 151 | 151

Rearanged

$h_f=3.02LD^{-1.67}(V/C_h)^{1.85}$

$h_f=3.022(Q/(\pi D^2/4)^{1.85}L_{ft}/(C^{1.85}D^{1.17})$

	Description	Diameter (in)	Diameter (ft)	Velocity (fps)	Pipe Length (ft)	Pipe C	Pipe h_f (ft)	Fitting K	Fitting Quantity	Fitting Loss (h_l) (ft)
1	Diameter (4")	4.00	0.33	3.86	3960	140	56.24			
2	Diameter (6")	6.00	0.50	1.71	0	140	0.00			
	Diameter (8")	8.00	0.67	0.96	0	140	0.00			
	Diameter (10")	10.00	0.83	0.62	0	140	0.00			
	Diameter (12")	12.00	1.00	0.43	0	140	0.00			
2	Entrance loss (4")	4.00	0.33	3.86				0.80	1	0.18
3	Exit loss (4")	4.00	0.33	3.86				0.80	1	0.18
	Entrance loss (6")	6.00	0.50	1.71				0.80	0	0.00
	Exit loss (6")	6.00	0.50	1.71				0.80	0	0.00
	Entrance loss (8")	8.00	0.67	0.96				0.80	0	0.00
	Exit loss (8")	8.00	0.67	0.96				0.80	0	0.00
	Entrance loss (10")	10.00	0.83	0.62				0.80	0	0.00
	Exit loss (10")	10.00	0.83	0.62				0.80	0	0.00
	Entrance loss (12")	12.00	1.00	0.43				0.80	0	0.00
	Exit loss (12")	12.00	1.00	0.43				0.80	0	0.00
4	**4" Fittings**							hl		
	Tee, Flanged, Dividing Line Flow	4	0.333333	3.855				0.2	9	0.42
	Tee, Threaded, Dividing Line Flow							0.9	0	0.00
	Tee, Flanged, Dividing Branched Flow							1	1	0.23
	Tee, Threaded , Dividing Branch Flow							2	0	0.00
	Union, Threaded							0.08	0	0.00
	Elbow, Flanged Regular 90°							0.3	0	0.00
	Elbow, Threaded Regular 90°							1.5	0	0.00
	Elbow, Threaded Regular 45°							0.4	0	0.00
	Elbow, Flanged Long Radius 90°							0.2	0	0.00
	Elbow, Threaded Long Radius 90°							0.7	0	0.00
	Elbow, Flanged Long Radius 45°							0.2	24	1.11
	Return Bend, Flanged 180°							0.2	0	0.00
	Return Bend, Threaded 180°							1.5	0	0.00
	Globe Valve, Fully Open							10	1	2.31
	Angle Valve, Fully Open							2	0	0.00
	Gate Valve, Fully Open							0.15	5	0.17
	Gate Valve, 1/4 Closed							0.26	0	0.00
	Gate Valve, 1/2 Closed							2.1	0	0.00
	Gate Valve, 3/4 Closed							17	0	0.00
	Swing Check Valve, Forward Flow							2	1	0.46
	Ball Valve, Fully Open							0.05	0	0.00
	Ball Valve, 1/3 Closed							5.5	0	0.00
	Ball Valve, 2/3 Closed							200	0	0.00
	Diaphragm Valve, Open							2.3	0	0.00
	Diaphragm Valve, Half Open							4.3	0	0.00
	Diaphragm Valve, 1/4 Open							21	0	0.00
	Water meter							7	1	1.62

Total Pipe Losses	56.2	Total Minor Losses		6.68
		PSI		
Major and Minor Losses	62.9		27.28	
Pressure Tak	74.1			
TOTAL HEADLOSS	137.0			

Pressure (psi):	59

AWWA-C900 (Appendix B) Cyclical Surge Analysis

C-900 PVC Pipe DR Evaluation

Project Conditions:

Pipe Diameter:	4 Inch
Working Pressure (WP):	**92**

Recurring Surge:

Anticipated Cycles Per Day:	56
Factor of Safety on Number of Cycles:	2.0
Design Life:	100
Anticipated recurring surge pressure (PRS): (+/-)	62.36

Occasional Surge:

Anticipated Occasional Instantaneous Change in Flow Velocity:	3.86
Sustained Operating Temperature:	50
Pressure Rating Reduction Factor:	**1.00**

Pipe Dimension Ratio:	
DR	14
Pressure Class:	305
Occasional Surge Pressure Capacity:	488

Is a Temperature Reduction Factor Needed?	NO

Check Working Pressure vs. Pressure Class: PC x F_T	
Allowable Pressure:	305
Working Pressure:	92
Result:	OK

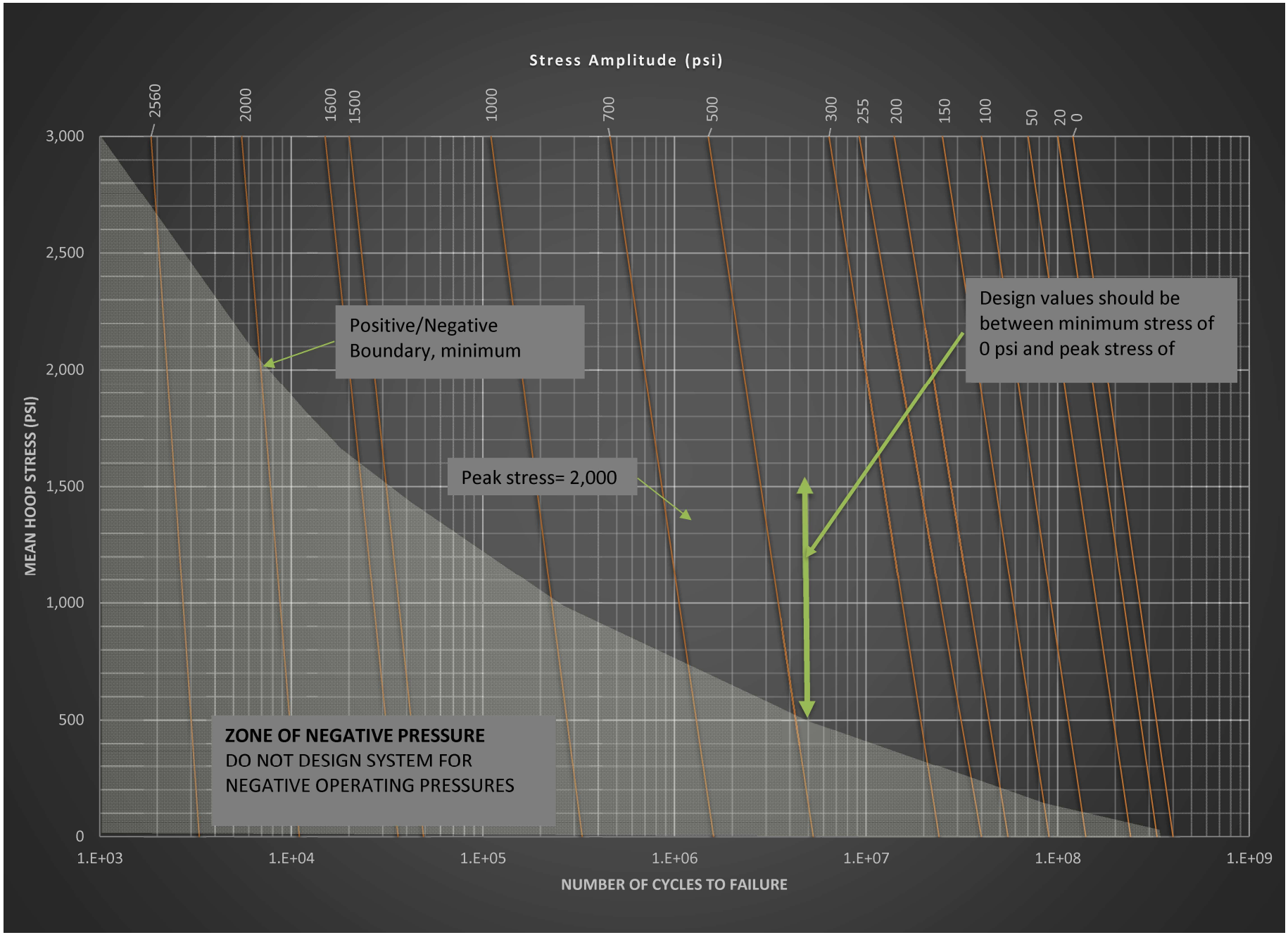
Check Occasional Surge Pressure Capacity: WP + P_{OS}	
Anticipated Occasional Surge Pressure, POS	62
Anticipated Occasional Surge Pressure, WP + POS	154
Allowable Occasional Surge Pressure Capacity, 1.60 x PC x FT	488
Check Allowable vs. Anticipated	OK

Check Recurring Surge Pressure Capacity, WP + P_{RS}	
Maximum Design Pressure: Pmax=(WP+PRS)	153.90
Minimum Design Pressure: Pmin=(WP-PRS)	29.18

Design Stresses:

Mean Hoop Stress (Pmax + Pmin)(DR-1)/4	595
Stress Amplitude (Pmax - Pmin)(DR-1)/4	405

Number of Cycles = (# cycles/day) x (365 days/year) x (design life yrs)	2.04E+06
Factor of Safety	2
Required Number of Cycles	4.09E+06


Stress Amplitude (psi)
2560
2000
1600
1500
1000
700
500
300
255
200
150
100
50
20
0
3,000
2,500
2,000
1,500
1,000
500
0
MEAN HOOP STRESS (PSI)
Positive/Negative Boundary, minimum
Peak stress= 2,000
Design values should be between minimum stress of 0 psi and peak stress of
ZONE OF NEGATIVE PRESSURE
DO NOT DESIGN SYSTEM FOR NEGATIVE OPERATING PRESSURES
1.E+03
1.E+04
1.E+05
1.E+06
1.E+07
1.E+08
1.E+09
NUMBER OF CYCLES TO FAILURE

Buoyancy Calculations

Wet well Outside Dimensions	**8.60**	Feet
Wet well Inside Dimensions	7.50	Feet
Wet well Top Slab Elevation	3858.00	Feet
Wet well Invert Elevation	3838.00	Feet
Extended Base Slab Diameter	**11.00**	Feet
Extended Base Slab Thickness	**1.00**	Feet
Top Slab Thickness	**0.50**	Feet

Calculate Total Volume of Wet well Structure

Volume of Wet well Riser Sections=	1161	cf
Volume of Wet well Extended Base=	95	cf
Total Volume of Wet well Structure=	1256	cf

Calculate Total Volume of Water Displaced

H20 Displaced = (Volume of Wet well Structure) * (62.4 lbs/cf)

H20 Displaced= 78384 lbs

Calculate Weight of Wet well Components

Section	Total Ht	Weight
Top Slab Thickness (ft.)	0.50	4357
Riser - Total Vertical Ft.	20.00	41728
Base Slab Thickness (ft.)	1.00	14255
Totals=	21.5	60340

Total Weight of Concrete in Wet well= 60340 lbs.

Calculate Submerged Weight of Soil Above Extended Base/Footing

Total Area of Extended Base	95	sf
Total Area of Wet well Riser	58	sf
Area of Extended Base less Wet well	37	sf
Height of Soil Above Extended Base	20	ft
Volume of Soil Above Extended Base	720	cf
Weight of Soil Above Extended Base (estimated)	**58**	lbs/cf
Total Weight of Soil Above Extended Base	41785	lbs/cf

Flotation Protection Required?

Weight of Concrete and Weight of Soil Above Extended Base:	102125	lbs
Weight of Water Displaced By Wet Well:	78384	lbs
Flotation Protection Required?	NO	
Factor of Safety	1.3	

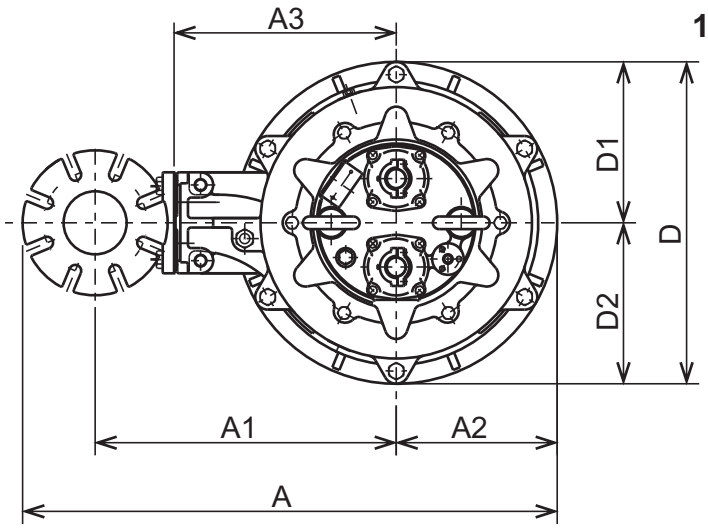
APPENDIX E

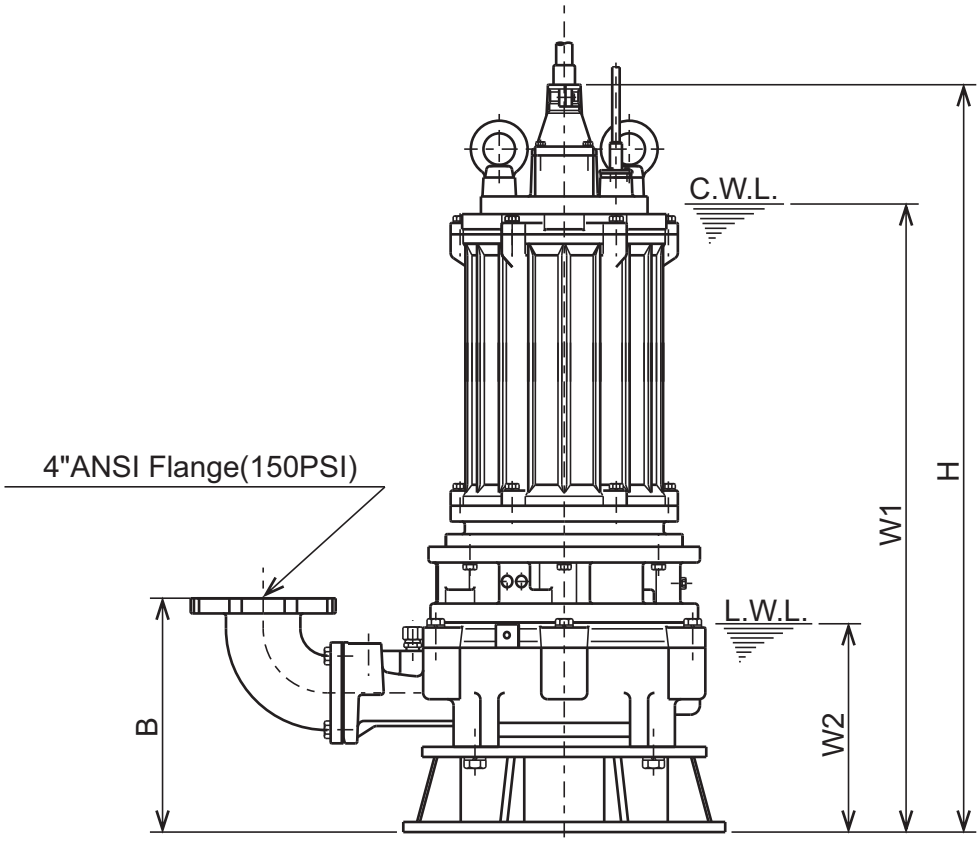
Product Data Sheets

TSURUMI PUMP | **C - SERIES** CUTTER-TYPE - SEWAGE & WASTEWATER PUMPS | **DIMENSIONS**

100C222-CR -61

Bend Model:
BEND100-100 ANSI





C.W.L. : Continuous running Water Level
L.W.L. : Lowest running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM.	Pump & Motor									C.W.L.	L.W.L.	Wt.
		SIZE	A	A1	A2	A3	B	D	D1	D2	H	W1	W2	(lbs.)
100C222-CR-61	30	4"	33 3/4	19 3/16	10 1/16	13 3/4	14 5/8	20 1/16	10 1/16	10 1/16	46 5/8	39 1/8	13	915

*Excluding Cable

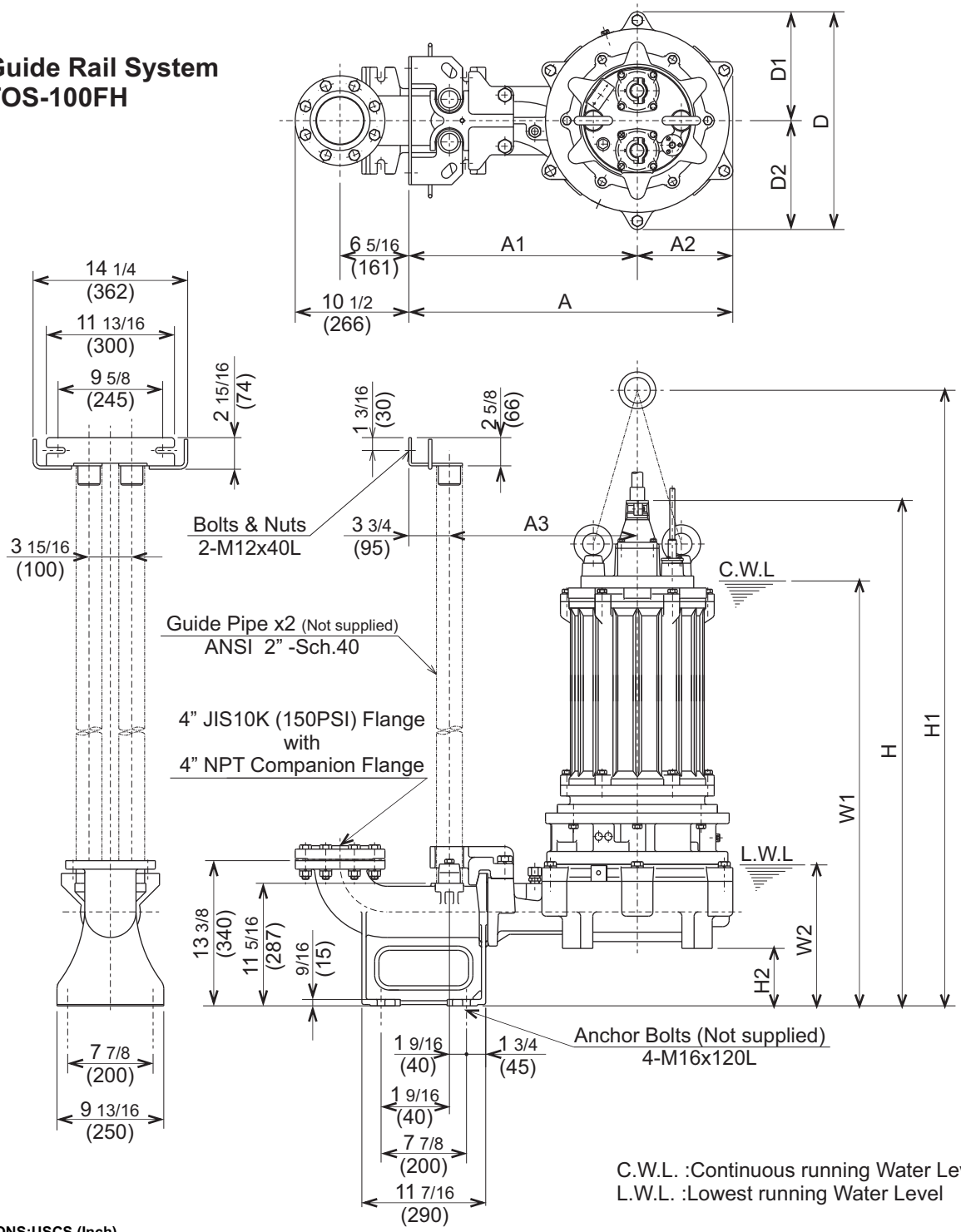
DIMENSIONS:METRIC (mm)

Model	kW	NOM.	Pump & Motor									C.W.L.	L.W.L.	Wt.
		SIZE	A	A1	A2	A3	B	D	D1	D2	H	W1	W2	(kg)
100C222-CR-61	22	100	857	487	255	350	371	510	255	255	1184	995	330	415

TSURUMI PUMP | C - SERIES CUTTER-TYPE - SEWAGE & WASTEWATER PUMPS | DIMENSIONS

TOS100C222-CR-61

Guide Rail System
TOS-100FH



C.W.L. :Continuous running Water Level
L.W.L. :Lowest running Water Level

DIMENSIONS:USCS (Inch)

Model	HP	NOM. SIZE	Pump & Motor										C.W.L.	L.W.L.	Wt.
			A	A1	A2	A3	D	D1	D2	H	H1	H2	W1	W2	(lbs.)
TOS100C222-CR-61	30	4"	29 7/8	21 1/16	8 13/16	17 5/16	20 1/16	10 1/16	10 1/16	46 5/8	56 3/4	5 5/16	39 3/16	13	840

DIMENSIONS:METRIC (mm)

Model	kW	NOM. SIZE	Pump & Motor										C.W.L.	L.W.L.	Wt.
			A	A1	A2	A3	D	D1	D2	H	H1	H2	W1	W2	(kg)
TOS100C222-CR-61	22	100	759	535	224	440	510	255	255	1184	1440	135	995	330	380

TSURUMI PUMP

C - SERIES
CUTTER-TYPE - SEWAGE & WASTEWATER PUMPS

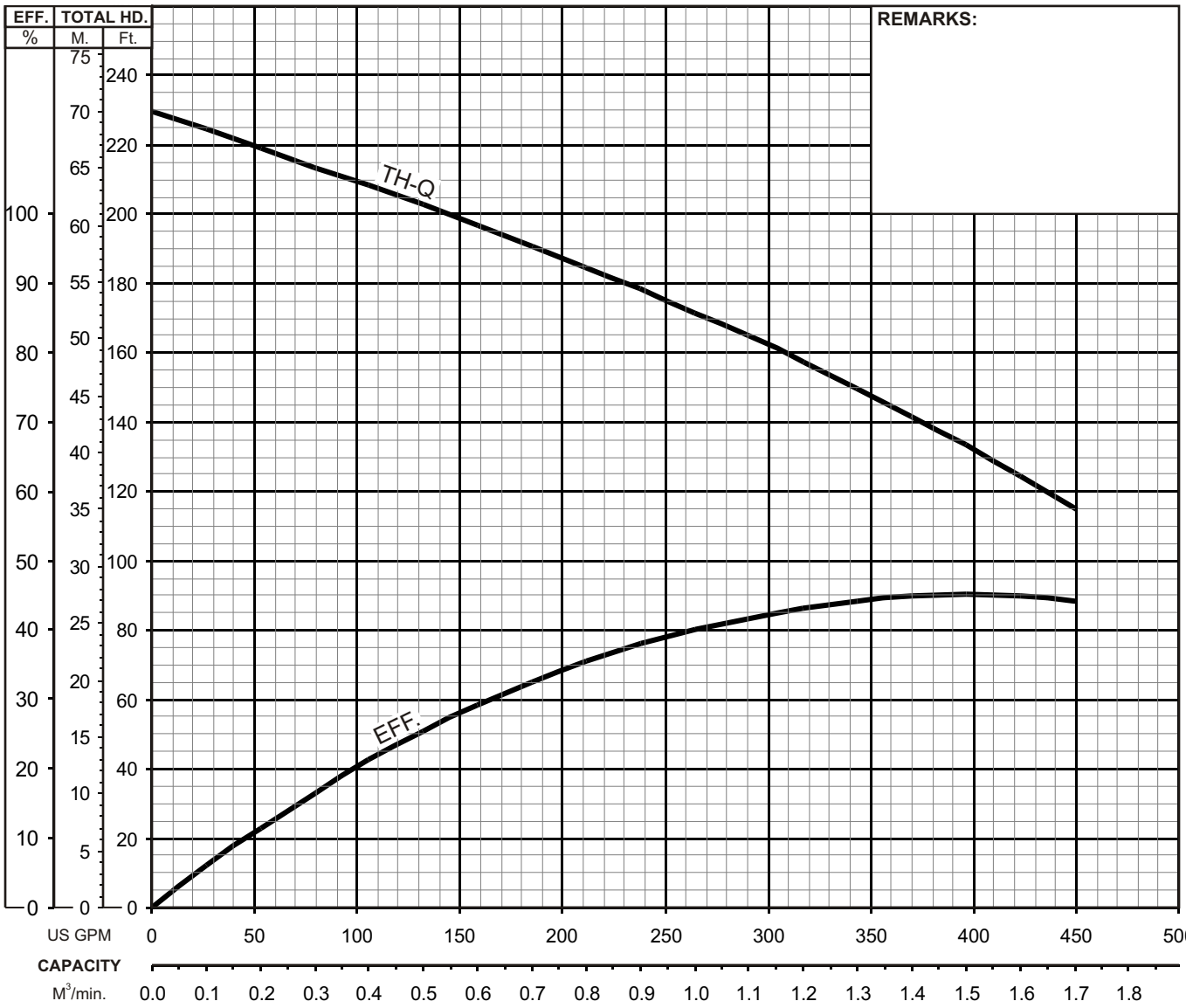
PERFORMANCE CURVE

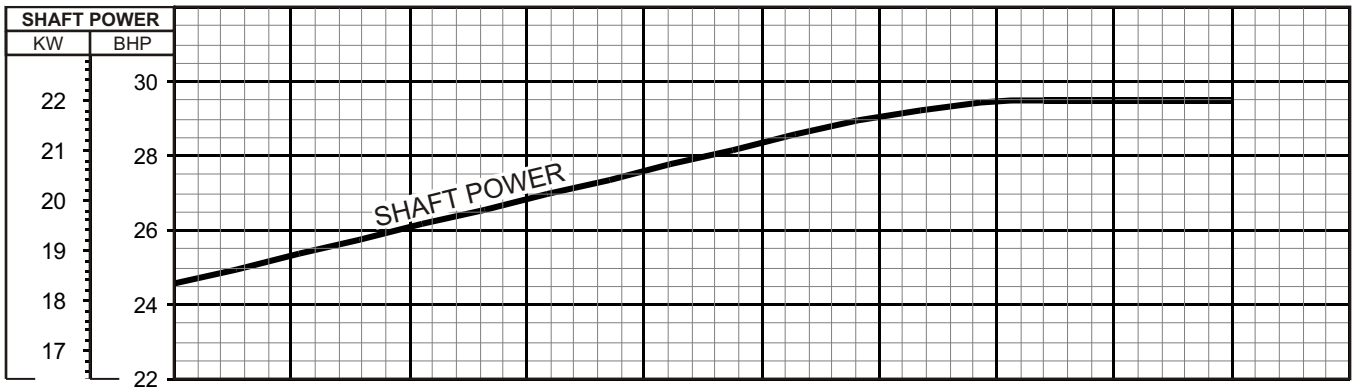
MODEL	BORE	HP	KW	RPM	SOLIDS DIA	LIQUID	SG.	VISCOSITY	TEMP.
(TOS) 100C222-CR -61	4"/100mm	30	22	3490	1.02"/26mm	Water	1.0	1.123 cSt.	60°F

PUMP TYPE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
Cutter-Type - Sewage & Wastewater	3	460 / 575	35 / 28	60	Star-Delta	F

CURVE No.	DATE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS. CLASS
-	-	-	-	-	-	-	-

REMARKS:

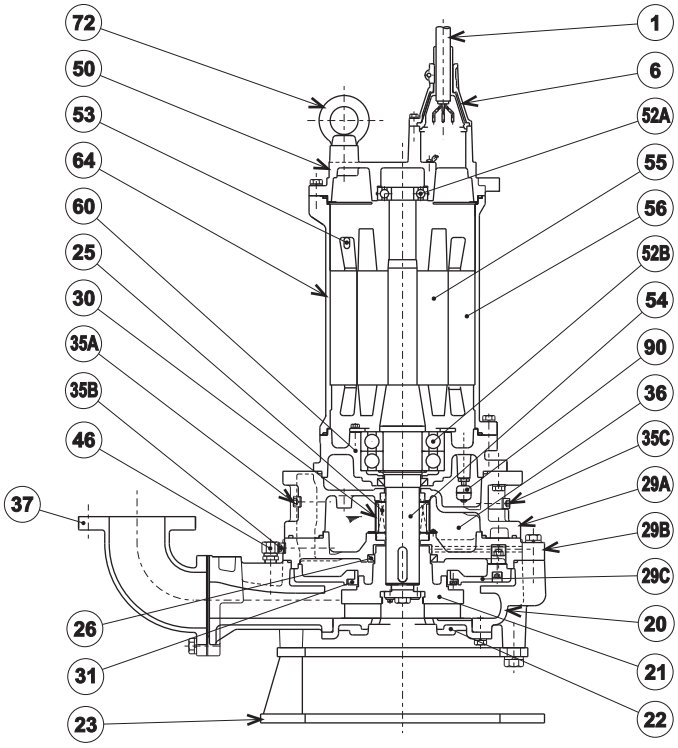




TSURUMI PUMP

C - SERIES
CUTTER - TYPE - SEWAGE & WASTEWATER PUMPS

SECTIONAL VIEW



100C222-CR-61

PART#	DESCRIPTION	MAIN MATERIAL / NOTE	ASTM, AISI CODE	RELATED DIN CODE	QTY
1	Power Cable	Chloroprene Sheath AWG6/4-32ft			1
	Power Cable	Chloroprene Sheath AWG6/3-32ft			1
	Control Cable	Chloroprene Sheath AWG16/4-32ft			1
6	Stuffing Box	Cast Iron	A48M Class30B	EN 1561 GJL-200	2
20	Pump Casing	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
21	Impeller	High Chrome Cast Iron W/Tungsten Carbide	A532 ClassⅢTypeA	DIN 1695 G-X260Cr27	1
22	Suction Cover	High Chrome Cast Iron	A532 ClassⅢTypeA	DIN 1695 G-X260Cr27	1
23	Pumpr Stand	Steel	A283 Grade D	EN 10025 S275	1
25	Mechanical Seal	Silicon Carbide / H-60			1
26	Oil Seal	NBR / TC10012513			1
29A	Casing Cover	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
29B	Oil Casing	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
29C	Casing Plate	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
30	Oil Lifter	Steel (Cold Rolled)	A109/A1008	EN 10130	1
31	Wear Ring	Stainless Steel Casting	A743 CF-8M	GX5CrNiMo19-11-2	1
35A	Oil Plug	Stainless Steel	S 30400	1.4301	2
35B	Oil Plug	Stainless Steel	S 30400	1.4301	1
35C	Drain Plug	Stainless Steel	S 30400	1.4301	1
36	Lubricant	Turbine Oil ISO VG32 or SAE10W-20			1
37	Discharge Bend	Cast Iron / 4"ANSI Flange(150PSI)	A48M Class30B	EN 1561 GJL-200	1
46	Air Release Valve	Stainless Steel	S 30400	1.4301	1
50	Motor Bracket	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
52A	Upper Bearing	#6308ZZC3			1
52B	Lower Bearing	#6314ZZD2C3			1
53	Motor Protector				3
54	Shaft	Stainless Steel	S 42000	1.4028	1
55	Rotor				1
56	Stator				1
60	Bearing Housing	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
64	Motor Housing	Cast Iron	A48M Class30B	EN 1561 GJL-200	1
72	Lifting Lug Bolt	Stainless Steel	S 30400	1.4301	2
90	Leak Sensor (Float)				1

SD275 | 10.3L | 275 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

Standby Power Rating
275 kW, 344 kVA, 60 Hz

Prime Power Rating*
248 kW, 309 kVA, 60 Hz

*Assembled in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the US or its Territories

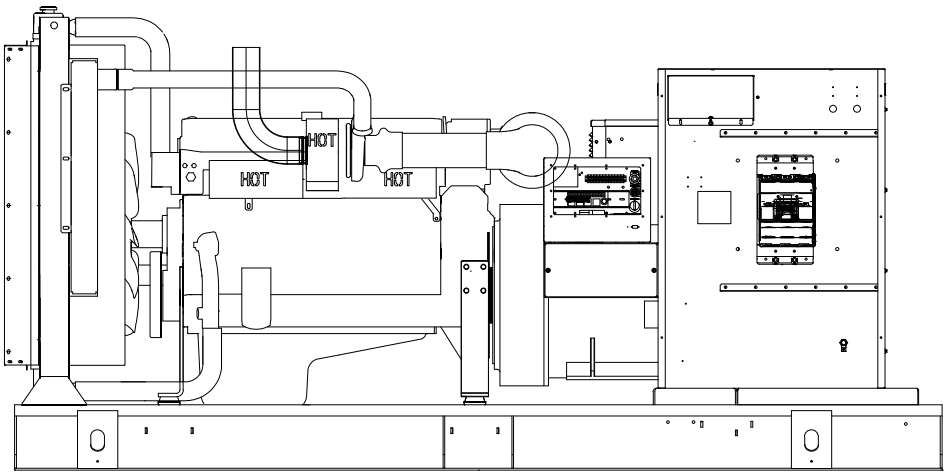


Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

UL2200, UL6200, UL1236, UL489, UL142

CSA C22.2, ULC S601

BS5514 and DIN 6271

SAE J1349

NFPA 37, 70, 99, 110

NEC700, 701, 702, 708

ISO 3046, 7637, 8528, 9001

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

Powering Ahead

For over 60 years, Generac has provided innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial applications under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

SD275 | 10.3L | 275 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

STANDARD FEATURES

ENGINE SYSTEM

- Oil Drain Extension
- Level 1 Fan and Belt Guards (Open Set Only)
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil and Coolant
- Radiator Duct Adapter (Open Set Only)

FUEL SYSTEM

- Fuel Lockoff Solenoid
- Primary Fuel Filter

COOLING SYSTEM

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene Glycol Antifreeze
- Engine Coolant Heater

ELECTRICAL SYSTEM

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- 12 Leads (3-Phase, Non 600V)
- Class H Insulation Material
- Vented Rotor
- 2/3 Pitch
- Skewed Stator
- Auxiliary Voltage Regulator Power Winding
- Permanent Magnet Excitation
- Sealed Bearing
- Automated Manufacturing (Winding, Insertion, Lacing, Varnishing)
- Rotor Dynamically Spin Balanced
- Amortisseur Winding
- Full Load Capacity Alternator
- Protective Thermal Switch

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Limited Warranty (Standby Rated Units)
- 1 Year Limited Warranty (Prime Rated Units)
- Silencer Mounted in the Discharge Hood (Enclosed Unit Only)

ENCLOSURE (If Selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (Sound Attenuated Enclosures)
- Gasketed Doors
- Upward Facing Discharge Hoods (Radiator and Exhaust)
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- RhinoCoat™ - Textured Polyester Powder Coat Paint

FUEL TANKS (If Selected)

- UL 142/ULC S601
- Double Wall
- Vents
- Sloped Top
- Sloped Bottom
- Factory Pressure Tested - 2 psi
- Rupture Basin Alarm
- Fuel Level
- Check Valve In Supply and Return Lines
- RhinoCoat™ - Textured Polyester Powder Coat Paint
- Stainless Steel Hardware

CONTROL SYSTEM



Digital H Control Panel- Dual 4x20 Display

Program Functions

- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable Logic Controller
- RS-232/485 Communications
- All Phase Sensing Digital Voltage Regulator
- 2-Wire Start Capability
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/Sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus® Protocol
- Predictive Maintenance Algorithm
- Sealed Boards
- Password Parameter Adjustment Protection
- Single Point Ground
- 16 Channel Remote Trending
- 0.2 msec High Speed Remote Trending
- Alarm Information Automatically Annunciated on the Display

Full System Status Display

- Power Output (kW)
- Power Factor
- kW Hours, Total, and Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency

Alarms and Warnings

- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Overspeed
- Battery Voltage
- Alarms and Warnings Time and Date Stamped
- Snap Shots of Key Operation Parameters During Alarms and Warnings
- Alarms and Warnings Spelled Out (No Alarm Codes)

SD275 | 10.3L | 275 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

CONFIGURABLE OPTIONS

ENGINE SYSTEM

- ○ Block Heater
- ○ Oil Heater
- ○ Level 1 Fan and Belt Guards (Enclosed Units Only)
- ○ Heavy Duty Air Cleaner
- ○ Radiator Stone Guard
- ○ Air Filter Restriction Indicator

FUEL SYSTEM

- ○ NPT Flexible Fuel Line

ELECTRICAL SYSTEM

- ○ 10A UL Listed Battery Charger
- ○ Battery Warmer

ALTERNATOR SYSTEM

- ○ Alternator Upsizing
- ○ Anti-Condensation Heater
- ○ Tropical Coating

CIRCUIT BREAKER OPTIONS

- ○ Main Line Circuit Breaker
- ○ 2nd Main Line Circuit Breaker
- ○ Shunt Trip and Auxiliary Contact
- ○ Electronic Trip Breakers

GENERATOR SET

- ○ Extended Factory Testing
- ○ IBC Seismic Certification
- ○ 12 Position Load Center
- ○ Spring Vibration Isolators

ENCLOSURE

- ○ Weather Protected Enclosure
- ○ Level 1 Sound Attenuated
- ○ Level 2 Sound Attenuated
- ○ Level 2 Sound Attenuated with Motorized Dampers
- ○ Steel Enclosure
- ○ Aluminum Enclosure
- ○ Door Open Alarm Horn
- ○ Up to 200 MPH Wind Load Rating (Contact Factory for Availability)
- ○ AC/DC Enclosure Lighting Kit
- ○ Enclosure Heater (with Motorized Dampers Only)

FUEL TANKS (Size on Last Page)

- ○ 8 in (203.2 mm) Fill Extension
- ○ 13 in (330.2 mm) Fill Extension
- ○ 19 in (482.6 mm) Fill Extension

CONTROL SYSTEM

- ○ NFPA 110 Compliant 21-Light Remote Annunciator
- ○ Remote Relay Assembly (8 or 16)
- ○ Oil Temperature Sender with Indication Alarm
- ○ Remote E-Stop (Break Glass-Type, Surface Mount)
- ○ Remote E-Stop (Red Mushroom-Type, Surface Mount)
- ○ Remote E-Stop (Red Mushroom-Type, Flush Mount)
- ○ 100 dB Alarm Horn
- ○ Ground Fault Annunciator
- ○ 120 V GFCI and 240 Outlet
- ○ Flush Mount Annunciator Kit
- ○ Remote Communication - Modem
- ○ 10A Engine Run Relay
- ○ Damper Alarm Contacts (with Motorized Dampers Only)

WARRANTY

- ○ 2 Year Extended Limited Warranty
- ○ 5 Year Limited Warranty
- ○ 5 Year Extended Limited Warranty
- ○ 7 Year Extended Limited Warranty
- ○ 10 Year Extended Limited Warranty

ENGINEERED OPTIONS

ENGINE SYSTEM

- ○ Coolant Heater Ball Valves
- ○ Fluid Containment Pan

CONTROL SYSTEM

- ○ Spare Inputs (x4) / Outputs (x4)
- ○ Battery Disconnect Switch

ALTERNATOR SYSTEM

- ○ 3rd Breaker System

GENERATOR SET

- ○ Special Testing

FUEL TANKS

- ○ Overfill Protection Valve
- ○ UL2085 Tank
- ○ Special Fuel Tanks
- ○ Vent Extensions

SD275 | 10.3L | 275 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Iveco/FPT
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emission Data Sheet
Cylinder #	6
Type	In-Line
Displacement - in^3 (L)	628.54 (10.3)
Bore - in (mm)	4.92 (125)
Stroke - in (mm)	5.51 (140)
Compression Ratio	16.5:1
Intake Air Method	Turbocharged/Aftercooled
Cylinder Head	4-Valve
Piston Type	Aluminum
Crankshaft Type	Dropped Forged Steel

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full Flow
Crankcase Capacity - qt (L)	31.68 (30)

Cooling System

Cooling System Type	Closed Recovery
Water Pump Type	Pre-Lubed, Self Sealing
Fan Type	Pusher
Fan Speed - RPM	2,250
Fan Diameter - in (mm)	30 (762)

Fuel System

Fuel Type	Ultra Low Sulfur Diesel Fuel #2
Fuel Specifications	ASTM
Fuel Filtering (Microns)	5
Fuel Inject Pump	Electronic
Fuel Pump Type	Engine Driven Gear
Injector Type	Common Rail
Engine Type	Direct Injection
Fuel Supply Line - in (mm)	0.5 (12.7) NPT
Fuel Return Line - in (mm)	0.5 (12.7) NPT

Engine Electrical System

System Voltage	24 VDC
Battery Charger Alternator	Standard
Battery Size	See Battery Index 0161970SBY
Battery Voltage	(2)-12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	K0275124Y21
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5%
Telephone Interference Factor (TIF)	<50

Standard Excitation	Permanent Magnet
Bearings	Single Sealed Cartridge
Coupling	Direct via Flexible Disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

SD275 | 10.3L | 275 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

OPERATING DATA

POWER RATINGS

		Standby
Three-Phase 120/208 VAC @0.8pf	275 kW	Amps: 954
Three-Phase 120/240 VAC @0.8pf	275 kW	Amps: 827
Three-Phase 277/480 VAC @0.8pf	275 kW	Amps: 414
Three-Phase 346/600 VAC @0.8pf	275 kW	Amps: 331

MOTOR STARTING CAPABILITIES (skVA)

SkVA vs. Voltage Dip

277/480 VAC	30%	208/240 VAC	30%
K0275124Y21	790	K0275124Y21	609
K0350124Y21	1,001	K0350124Y21	801
K0400124Y21	953	K0400124Y21	717

FUEL CONSUMPTION RATES*

Fuel Pump Lift - ft (m)
3 (1)

Total Fuel Pump Flow (Combustion + Return) - gph (Lph)
31 (117)

Diesel - gph (Lph)

Percent Load	Standby
25%	6.8 (25.7)
50%	11.7 (44.2)
75%	15.8 (59.8)
100%	19.6 (74.2)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Coolant Flow	gpm (Lpm)	95 (360)
Coolant System Capacity	gal (L)	13.0 (49.2)
Heat Rejection to Coolant	BTU/hr (kW)	722,612 (211.8)
Inlet Air	cfm (m^3/hr)	14,505 (411)
Maximum Operating Radiator Air Temperature	°F (°C)	110 (43.3)
Maximum Ambient Temperature (Before Derate)		See Bulletin No. 0199280SSD
Maximum Additional Radiator Backpressure	in H_2O (kPa)	0.5 (0.12)

COMBUSTION AIR REQUIREMENTS

	Standby
Flow at Rated Power - cfm (m^3/min)	780 (22.1)

ENGINE

		Standby
Rated Engine Speed	RPM	1,800
Horsepower at Rated kW**	hp	449
Piston Speed	ft/min (m/min)	1,654 (504)
BMEP	psi (kPa)	308 (2,124)

EXHAUST

		Standby
Exhaust Flow (Rated Output)	cfm (m^3/min)	2,050 (58.1)
Maximum Allowable Backpressure	inHg (kPa)	1.5 (5.1)
Exhaust Temperature (Rated Output)	°F (°C)	950 (510)

** Refer to “Emissions Data Sheet” for maximum bHP for EPA and SCAQMD permitting purposes.

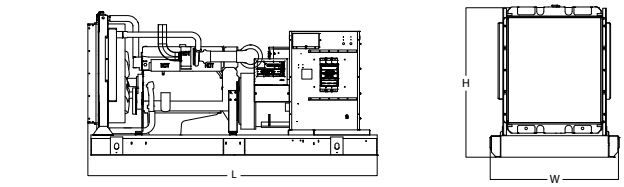
Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528, and DIN6271 standards.
Standby - See Bulletin 10000018933
Prime - See Bulletin 10000018926

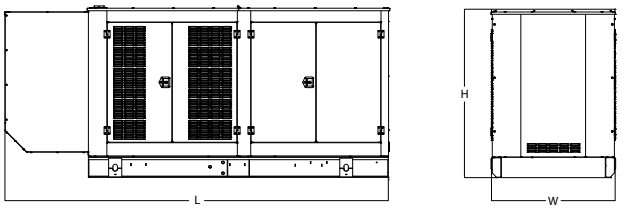
SD275 | 10.3L | 275 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

DIMENSIONS AND WEIGHTS*



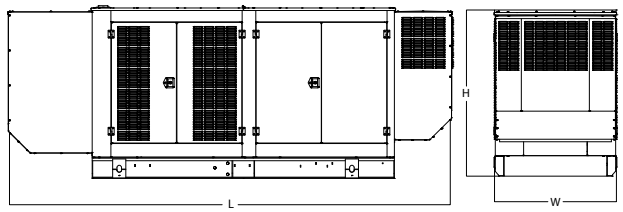


OPEN SET

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg)
No Tank	-	137.5 (3,493) x 57.6 (1,463) x 67.8 (1,722)	6,121 - 7,457 (2,776 - 3,382)
9	183 (693)	137.5 (3,493) x 57.6 (1,463) x 80.8 (2,052)	7,069 - 8,405 (3,206 - 3,812)
22	438 (1,659)	137.5 (3,493) x 57.6 (1,463) x 92.8 (2,357)	7,381 - 8,717 (3,348 - 3,954)
35	693 (2,624)	137.5 (3,493) x 57.6 (1,463) x 104.8 (2,662)	7,717 - 9,053 (3,500 - 4,106)
48	946 (3,581)	208.3 (5,220) x 57.6 (1,463) x 122.0 (3,100)	9,146 - 10,482 (4,148 - 4,754)
67	1,325 (5,015)	277.8 (7,055) x 57.6 (1,463) x 120.9 (3,072)	10,161 - 11,497 (4,659 - 5,265)

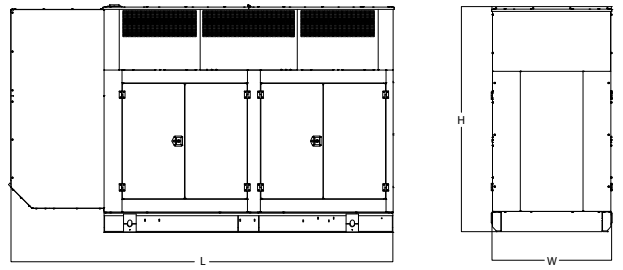
WEATHER PROTECTED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	174.7 (4,437) x 53.0 (1,346) x 77.8 (1,977)	1,521 (690)	727 (330)
9	183 (693)	174.7 (4,437) x 53.0 (1,346) x 90.8 (2,307)		
22	438 (1,659)	174.7 (4,437) x 53.0 (1,346) x 102.8 (2,612)		
35	693 (2,624)	174.7 (4,437) x 53.0 (1,346) x 114.8 (2,917)		
48	946 (3,581)	208.3 (5,220) x 53.0 (1,346) x 132.0 (3,355)		
67	1,325 (5,015)	277.8 (7,055) x 53.0 (1,346) x 130.9 (3,327)		



LEVEL 1 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	200.2 (5,084) x 57.5 (1,460) x 90.8 (2,306)	1,984 (900)	926 (421)
9	183 (693)	200.2 (5,084) x 57.5 (1,460) x 90.8 (2,306)		
22	438 (1,659)	200.2 (5,084) x 57.5 (1,460) x 102.8 (2,611)		
35	693 (2,624)	200.2 (5,084) x 57.5 (1,460) x 114.8 (2,916)		
48	946 (3,581)	200.2 (5,084) x 57.5 (1,460) x 132.0 (3,354)		
67	1,325 (5,015)	277.8 (7,055) x 57.5 (1,460) x 130.9 (3,326)		



LEVEL 2 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	180.7 (4,588) x 57.5 (1,460) x 107.3 (2,725)	2,557 (1,160)	1,173 (531)
9	183 (693)	180.7 (4,588) x 57.5 (1,460) x 120.3 (3,055)		
22	438 (1,659)	180.7 (4,588) x 57.5 (1,460) x 132.3 (3,360)		
35	693 (2,624)	180.7 (4,588) x 57.5 (1,460) x 144.3 (3,665)		
48	946 (3,581)	180.7 (4,588) x 57.5 (1,460) x 161.5 (4,103)		
67	1,325 (5,015)	277.8 (7,055) x 57.5 (1,460) x 160.4 (4,075)		

* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

Generac Power Systems, Inc. | P.O.Box 8 | Waukesha, WI 53189
P: (262) 544-4811 ©2021 Generac Power Systems, Inc. All rights reserved. All specifications are subject to change without notice.

Part No. 0185610SBY
Rev. F 07/13/2021

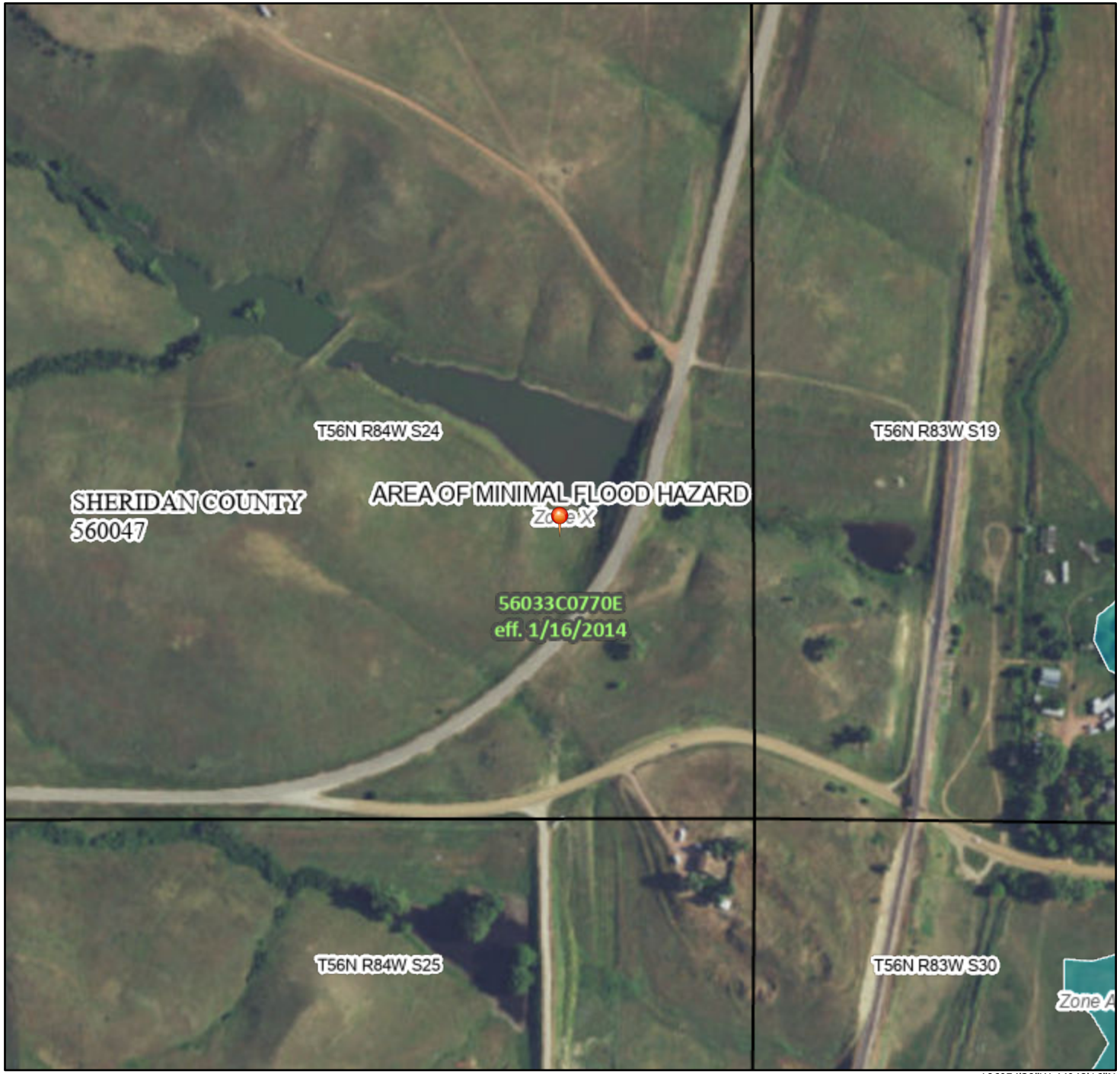
APPENDIX F

FEMA FIRMette

National Flood Hazard Layer FIRMette

FEMA

106°55'7"W 44°48'42"N



106°54'29"W 44°48'16"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/19/2024 at 11:34 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables shown on this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Floodway Data table shown on this FIRM.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1998 or later.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

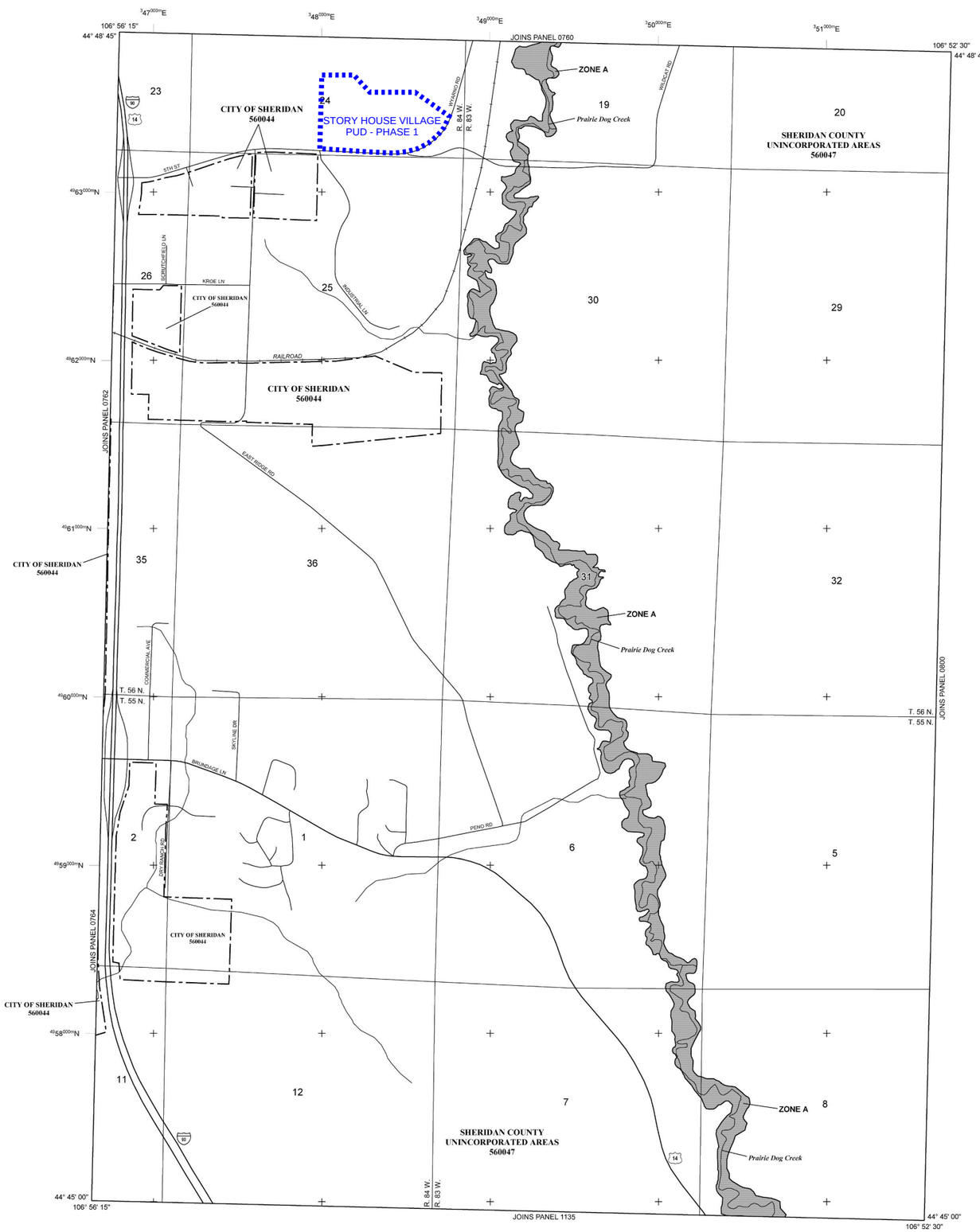
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 4998000mN — 1000-meter Universal Transverse Mercator grid values, zone 13
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 16, 2014

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

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

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0770E

FIRM

FLOOD INSURANCE RATE MAP

SHERIDAN COUNTY, WYOMING AND INCORPORATED AREAS

PANEL 770 OF 1625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SHERIDAN COUNTY	560047	0770	E
SHERIDAN, CITY OF	560044	0770	E

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

MAP NUMBER
56033C0770E
EFFECTIVE DATE
JANUARY 16, 2014

Federal Emergency Management Agency

ORDINANCE NO 2278

AN ORDINANCE amending Ordinance No. 826, the Zoning Ordinance of the City of Sheridan, to zone the entirety of the land more particularly described in Appendix A Section 1., and shown on the attached Exhibit A, from an B-2 Business District to a Planned Unit Development (PUD); for the property designated as Story House Village Planned Unit Development Phase 1 to the City of Sheridan, Wyoming containing +/-44.86 acres.

WHEREAS, the owner of the following described land has petitioned the City Governing Body to rezone the same from an B-2 Business District to PUD, and a public hearing having been held thereon by the City Governing Body;

THEREFORE BE IT ORDAINED BY THE CITY OF SHERIDAN GOVERNING BODY:

Section 1.
The following described land is hereby rezoned from a B-2 Business District to a PUD, to wit:

A tract of land situated in the S½SE¼ of Section 24, Township 56 North, Range 84 West of the Sixth Principal Meridian, City of Sheridan, Sheridan County, Wyoming, as shown on said tract being more particularly described as follows:

Commencing at the south quarter corner of said Section 24 (monumented with a 3¼" Aluminum Cap per PLS 6594); thence N00°15'50"E, 120.65 feet along the west line of said S½SE¼ to a 2" Aluminum Cap per PLS 6812 being the POINT OF BEGINNING this tract;

thence N00°16'03"E, 1094.87 feet along said west line to a 2" Aluminum Cap per PLS 5369;

thence N90°00'00"E, 535.01 feet to a 2" Aluminum Cap per PLS 5369;

thence S46°17'47"E, 391.87 feet to a 2" Aluminum Cap per PLS 5369;

thence N87°07'39"E, 893.32 feet to a 2" Aluminum Cap per PLS 5369;

thence S60°32'45"E, 756.24 feet to a 2" Aluminum Cap per PLS 5369 lying on the north right of way line of Wyarno Road (AKA State Highway No. 336);

thence along said north right of way line, through a curve to the right, having a central angle of 59°23'00", a radius of 1045.92 feet, an arc length of 1084.03 feet, a chord bearing of S61°18'38"W and a chord distance of 1036.15 feet to a standard WYDOT right of way monument at the end of said curve to the right;

thence along said north right of way line S01°14'12"W, 24.84 feet to a standard WYDOT right of way monument;

thence N89°00'40"W, 1464.84 feet along said north right of way line to the POINT OF BEGINNING.

Said tract containing 44.87 Acres of land, more or less. Bearings are based on the Wyoming Coordinate System, NAD 1983, East Central Zone. Distances are multiplied to surface by the Project Adjustment Factor of 1.00023549.

Section 2.
That Ordinance No. 826, The Zoning Ordinance of the City of Sheridan is hereby amended to conform herewith.

Section 3.
From the City of Sheridan Ordinance Appendix B Article 803, the PUD is found to:

1. Be compatible with the goals and policies of the City Master Plan and other applicable adopted plans and policies.
2. Be compatible with the area surrounding the project site.
3. Place no greater demand on existing City facilities and services than can be furnished by the City.

4. Insofar as practicable, preserves the landscape in its natural state by minimizing tree and soil removal.
5. Promotes the efficient use of land by means of more economical arrangement of buildings/lots, circulation systems, land uses, densities, and utilities.
6. Provides for useable and suitably located open space such as, but not limited to, bicycle paths, playground areas, courtyards, tennis courts, swimming pools, planned gardens, outdoor seating areas, outdoor picnic areas, and similar open space.
7. Demonstrates flexibility and quality in design to permit diversification in the location, type, and uses of structures.
8. Combines and coordinates architectural styles, building forms, and building relationships within the development and in concert with adjacent and surrounding land and development.
9. Be designed and controlled as a whole under the control of one (1) owner, partnership, corporation, or agency.
10. Give special attention to vehicular and pedestrian circulation and parking, the location and number of access points to public streets, width of interior drives and access points, general interior circulation, separation of pedestrian and vehicular traffic, and the arrangement of parking areas that are safe and convenient and, insofar as practicable, do not detract from the design of proposed structures and neighboring properties.

Section 3.
If any provision or portion of this ordinance is declared by any court of competent jurisdiction to be void, unconstitutional, or unenforceable, than all remaining provisions and portions of this ordinance shall remain in full force and effect.

Section 4.
The Developer and the City of Sheridan shall enter into a Development Agreement which shall be controlling and binding over the rest of the property owned by the Developer, known as “Story House” and is currently zoned B-2. The City shall not grant or authorize any permit for construction or development of Story House property until such time as both parties have entered into the Development Agreement.

Section 5.
That this ordinance shall be in full force and effect immediately upon its passage and publication as provided by law.

PASSED, APPROVED, AND ADOPTED this _____ day of _____, 2024.

ATTEST: _____
Richard Bridger, Mayor

_____
Cecilia Good, City Clerk
State of Wyoming)
)SS
County of Sheridan)

Subscribed and sworn to (or affirmed) before me this _____day of

_____, 2024 by _____.

_____
Notary Public

My commission expires _____.

DEVELOPMENT AGREEMENT

This Agreement is entered into as of the date executed by the last party, by and among the City of Sheridan, a Wyoming municipal corporation (hereinafter "City"); Story House Property Company, LLC (hereinafter "Developer"), referred to collectively as the "Parties".

RECITALS

WHEREAS, Developer owns undeveloped real property located and described as shown in **Exhibit A**; and

WHEREAS, Developer's real property (referred to as "the Real Property"), is located, as of the date of this Agreement, within both the City jurisdiction and County jurisdiction and this Agreement is intended to be binding on that portion of the Real Property annexed to the City and to contemplate the remainder of the Real Property to be annexed in the future; and

WHEREAS, the parties find it necessary to establish an agreement to memorialize the understanding of the parties and set forth the terms and conditions for the development of the Real Property; and

WHEREAS, the annexations of Story House were done in conformity with City Ordinance and Wyoming Statute; and

THEREFORE, in consideration of the promises and mutual covenants contained in this Agreement, the legal sufficiency of which are hereby expressly acknowledged, the parties agree as follows:

PURPOSE:

The purpose of this Agreement is to establish the terms, conditions and expectations of the parties necessary to ensure an efficient and effective phased development of the Real Property as a Planned Unit Development (PUD) for the benefit of the Developer, the City of Sheridan and the Sheridan community, as the PUD plan is approved by the City of Sheridan simultaneously with this Agreement.

ARTICLE I – HISTORY AND PROPERTY CONDITIONS

1.1 Water Availability. The City's water system currently has limited capacity to serve the Real Property, but is able to serve the lands identified as Phase I, herein, and for any use in B1 zoning or less. The City intends to construct a section of a water transmission line which is planned to loop adjacent to the Real Property and is commonly referred to as the NorthEast Extension project. City will prioritize the construction with the intention that it be completed by the 2025-26 construction season.

As a condition of this Agreement, the City commits that it will keep the North East

Extension Project as a priority in the City's intended use plan for drinking water projects. When the North East Extension Project is completed, it is anticipated the City's water system would be capable of serving the Story House Real Property at its annexed B-2 level.

1.2 Sewer Availability; Alternative On-Site Plant. The City's sanitary sewer system is not adjacent to the Real Property. The City has no plans and does not intend to extend sewer to the Real Property.

As an alternative, the City and Developer agree that Developer may construct a decentralized sewer system on the Real Property in compliance with WDEQ regulations and applicable codes, at its cost. The construction of the system shall be done in a manner which will allow for a future connection to City centralized sewer. The City will assume operation and maintenance of the decentralized sewer system in accordance with the Subdivision Improvement Agreement required by City Ordinance Appendix B Article 7 .

1.3 Jurisdiction. The Real Property subject to this Agreement is located within both the City and County jurisdictions. The term "Real Property" shall include the real property located in both jurisdictions. The term "Real Property in the City" shall only include real property which is located within the City municipal boundary. The term "Real Property in the County" shall only include real property located outside of the City municipal boundary.

1.4 Gravel Pit. The Real Property has a permitted gravel pit which is currently located outside the City jurisdiction. Developer intends to utilize the gravel pit. The City currently lacks sufficient zoning and permitting ordinances to allow for the operation of the gravel pit. The City intends to adopt necessary ordinances to allow for the gravel pit operation within the City jurisdiction . Developer shall meet all permitting requirements of the State. If the City adopts the intended ordinances and the gravel pit is annexed by the City, then Developer agrees to meet the permitting requirements for the City that allow for the development anticipated hereunder.

1.5 Zoning. The Real Property is currently zoned B-2. Developer has submitted a phased PUD Master Plan for the accepted development of the Real Property so that Phase I can be immediately commenced and the remaining Phases constructed thereafter.

1.6 Story House Phase I. The Developer has proposed Phase I of the Story House Development with the plans and uses set forth herein and the City approves the same, subject to the conditions hereof.

ARTICLE II – MASTER PLAN and USE

2.1 Conceptual Plans. Developer has submitted conceptual plans for Phases I, II and III for the immediate development of the Real Property. Phase I is anticipated to be no more dense than 600 residential units and the identified commercial areas. The remaining Real

Property is intended to be developed in accordance with the Conceptual Plan which is attached and incorporated at **Exhibit C**.

Master Plan. Developer has created a Master Plans for Story House Phase I-, which is attached and incorporated at **Exhibit D**. Future property development of Phase I shall substantially conform to the approved Master Plan. In the event that the Developer, or their successor, assign or transferee, requests material changes to the Master Plan, which significantly alters uses and/or density, the City may require a Master Plan amendment which must be approved pursuant to City of Sheridan Ordinance in effect as of the date of this Agreement. Provided, upon substantial completion of infrastructure in each Phase, all amendments to the Master Plan shall comply with the City Ordinance in effect at the time of the requested amendment.

2.2 Open Space. The open space necessary for all Phases shall be met and satisfied in accordance with Article 3.1 below.

2.3 De-annexation. The Developer reserves the right to petition the City for removal of the Real Property from the corporate limits. Any request to remove property from the corporate limits of the City shall be at the owner's cost and in compliance with Wyoming Statute the City will have discretion to approve or deny the request subject to Wyoming Statute.

2.4 Current Use. The parties acknowledge that the Real Property has historically been used in a ranch operation, and that such use is a pre-existing non-conforming use, including but not limited to the keeping and grazing of horses and cattle, that will be allowed to continue. As each lot is developed to a residential or commercial use, the right of non-conforming use of each occupied lot shall expire.

2.5 Gravel Pit. Upon the City adopting ordinances necessary to permit a gravel pit inside the corporate boundary of the City, the City will work with Developer to annex the Real Property in the County and allow for the continuation of gravel quarrying or other development anticipated in Developer's conceptual plans. The Developer, by this agreement, waives all rights to contest the annexation if the gravel pit ordinances allow for the development anticipated in the conceptual plans. Operation of the gravel pit will thereafter be in accordance with a gravel permit approved by the City of Sheridan.

a. Regardless of the annexation, the gravel pit shall be subject to the following conditions:
    i. No residential uses shall be allowed within 300 feet of the active mining area of the permitted gravel pit.
    ii. The active mining area within the gravel pit shall be fenced with fencing which prevents uninvited guests or trespassers from accessing the permitted gravel pit not later than when any residential unit(s) are constructed within 500' of the permitted gravel pit.
    iii. Gravel pit operations shall only occur during daylight hours.
    iv. Gravel trucks and equipment shall only use truck routes designated on the map attached hereto, or along routes otherwise approved by the City.

ARTICLE III – OPEN SPACE

3.1 Open Space.

3.1.1 The Real Property consists of approximately 224.24 acres, of which 176 acres is annexed to the City. . In accordance with Article 805.7, a minimum of twenty percent (20%) of the gross area of Story Houseshall be open space, which may be dedicated as open space as each phase is developed. Once all phases are completed 44.84 acres will be dedicated as open space., The park will consist of not less than 35 acres. with the balance consisting of open space, pathways or other qualified types of open space. As the remainder of the Real Property is annexed and made part of the PUD, additional area shall be committed to open space in proportion to the open space requirements for the Real Property.

a. Phase I has proposed 8.48 acres of open space which is .49 acre less than the required 8.97. The .49 acres shall be added to the required open space in Phase II.

b. The real property located southeast of the property on the other side of State Highway 336 shall not be open space that the City will accept to meet the ordinance requirements.

The required open space is to consist of a City park, pathways and/or other eligible areas allowed by Article 805.7. The City park shall consist of not less than 35 acres and referred herein as "the Story House Park". Story House Park shall be dedicated in three phases. Each phase shall dedicate up to 20% of the phase gross area for the Story House Park, not to exceed a total dedication among all three phases of 35 acres. All other remaining open space requirements shall be dedicated by the Developer as agreed to by the parties. Upon the annexation of the remainder of the Real Property now in the County the Developer and City will identify how any remaining open space is to be utilized. ,

c. Story House Park.

i. Use of Open Space During Construction: The area dedicated for open space shall be available for Developer's use during construction of the infrastructure, which includes but is not limited to Developer retaining the ability to design, excavate/grade, cut/fill areas and develop the water feature(s) in the open space, at the Developer's design, during the construction process of each phase.

ii. City Maintenance: Story House Park will be a public park maintained by the City after the Developer's design and construction noted above is completed. .

iii. Developer Construction of Playground: Developer will construct an improved area in Phase I that includes playground equipment and landscaping. Upon completion of the improvements, the City will assume maintenance of the park.

iv. Construction of Story House Park: After Developer has completed its design, cut/fill and establishment of the water features, Story House Park shall be developed and improved as an active park by Developer. It shall be maintained by the City in accordance with City adopted standards and Ordinances. The City shall be under no obligation to install or construct any building or facility except for those obligations and requirements imposed by local, state or federal law. It is intended that Story House Park will be developed in a similar fashion to other active parks. Prior to the construction of every improvement, building or facility, engineering and construction plans shall be submitted to the City Public Works Director for approval. The City Public Work Director shall evaluate all park improvements for the purpose of ensuring the City's capability of maintenance and the health, safety and welfare of the public. The approval shall not be unreasonably withheld.

v. Irrigation. The Developer and City will coordinate on the use of the reservoir to be constructed on the Real Property for irrigation of the Story House Park, as water is available for such use. Irrigation from the reservoir is subject to adequate water availability. he City agrees to assume all costs associated with the maintenance and operation of the irrigation it uses for the public open space once the system has been constructed by Developer. The City shall be granted the necessary easements to effectuate the Story House Park irrigation.

3.1.2 The Developer shall establish proper easements for use of owners within the Real Property of the pathways located throughout the Real Property, in locations generally shown in **Exhibit A**, with the goal of ensuring adequate pedestrian access to the Story House Park, and a pathway will be dedicated for public access from 5th Street to the Story House Park in the location identified on Exhibit A..

3.2 Application of Open Space.

~~3.2.1~~ The City finds and warrants that the designation of open space by this Agreement meets all terms and conditions of City code, regardless of which use is utilized by the Developer within any phase of the PUD, and no additional open space shall be required to be provided by Developer or subsequent Developer for the Real Property~~.~~

3.3 Lot Requirements. The availability of open space shall not be deemed a variance or waiver of any setback requirements, minimum lot sizes, building heights or other lot or building requirements of the City of Sheridan.

ARTICLE IV – WATER AND SEWER

4.1 Water availability. City water availability is currently limited to the residential and commercial uses described in Phase 1 of the Master Plan. Any commercial water availability shall be strictly limited to B-1 zoned uses. City water shall not be made available for any use which requires a flow rate greater than available at the time of this Agreement. Upon the construction of the water transmission line described in **Exhibit E**, water availability shall be determined by the capacity of the newly constructed line.

4.2 Water Line. Contingent on the funding described above, the City intends to construct a water transmission line located approximately as shown in **Exhibit E**. The North East Water Transmission line shall be planned, designed and constructed in accordance with the Sheridan Area Water System Master Plan, the City of Sheridan Public Infrastructure Design Standards, and the City of Sheridan Standard Specifications and Details for Street and Utility Construction.

a. The City intends to construct the proposed water transmission line as described herein not later than February of 2026. The construction of the water line is not a condition,for this Agreement. Any other water line to be constructed on the Real Property shall be constructed at the cost of the Developer and in accordance with all applicable City code and standards.

b. The availability of funding and financing for the water line construction is solely at the discretion of the City Governing Body.

4.3 Sewage Disposal. It shall be the responsibility of Developer to construct an on-site sewage disposal system to serve all construction in Phase I, which will be subject to the approval of the City and which will include the following: . All sewer lines shall be constructed in accordance with all applicable laws and standards. .

a. The decentralized design will be completed by Developers engineers and subject to approval by the City.

b. After construction, the City will own and operate the on-site sewage plant and associated infrastructure.

c. No plant investment fees will be charged for any connection to the system.

d. For the initial five years after the system is assumed by the City, the City shall charge no more than the standard sewer rates to other property owners on the City's centralized sewer system. Thereafter, the City may undertake a "cost to serve analysis" to determine if the sewer rate of the Story House Development should be adjusted, either up or down, depending if the actual cost of service is more or less than the otherwise-standard sewer rate charged to each property owner for the centralized system.

e.

f. The Sewer plant and all associated pipes shall set in a utility easement in favor of the City.

ARTICLE VI – EASEMENTS, RIGHT OF WAYS and PERMITS

6.1 Future Easements. All necessary easement and rights-of-way associated with any future development of Developer shall be dedicated by Developer, at Developer's expense, with the approval of a final plat or the granting of a building permit. Easements and rights-of-ways for each phase will be laid out and granted to accommodate the development of other properties where deemed necessary by the City at the time of review and approval of each future subdivision or development.

6.2 Existing Easements. Easements currently in place within the Development shall be confirmed and carried over into any future platting of the property so as to protect the infrastructure it is intended to cover unless such infrastructure is relocated or abandoned as provided by law. Developer reserves the right to abandon any easement not occupied for the intended purpose.

6.3 Vacation of Easements. Unless reviewed and approved by the City, easements currently encumbering the Property for municipal utilities and infrastructure shall not be vacated or extinguished by a future platting of the Property or action of Developer.

6.4 WDOT and WDEQ Permits. City agrees that conditional approval of the final plat of Phase I of the Real Property can occur without WDOT access permit or the WDEQ permits n The plat shall not be filed until such permits have been acquired.

ARTICLE VII – SIDEWALKS

7.1 Sidewalks. Sidewalk construction in each phase shall not be required until the construction of a street is required when a Phase commences building construction. All sidewalks shall meet the description approved in the Master Plan, or otherwise meets the building code requirements adopted at the time of construction. All sidewalk maintenance and snow removal shall be the responsibility of the adjacent property owner if required by City of Sheridan Ordinance or adopted Code.

ARTICLE VIII – TRAFFIC

8.1 Traffic Study. The City may request, and Developer shall provide, updated traffic studies needed by the City or State for additional phases or increased densities. The traffic studies must follow the requirements of the most recently-adopted City of Sheridan Public Infrastructure Design Standards.

ARTICLE IX – LIGHTING

9.1 Street Lighting. The City may require street lighting to be installed on roadways in accordance with the Phase I plan . The streetlights shall be decorative and chosen by Developer and shall comply with City Code . Developer shall be responsible for the cost of purchase and installation of the streetlights. The City shall be responsible for the cost of electricity for the streetlights.

ARTICLE X – IMPROVEMENTS & DESIGN REQUIREMENTS

10.1 Improvements. Developer shall develop the property according to any plat approved by the City and shall extend, install or provide at the Developer's cost the following, as described in the PUD Master Plan:

a. Paved Streets, curb, gutter and sidewalks;

b. A drainage study, to be reviewed and approved by the City and WYDOT if applicable. If Developer has already obtained a study, the City may request the Developer update the study as Story House is subdivided. Storm drainage system shall be built in compliance with City Code and the drainage study;

c. A water distribution system adequate to serve the needs of the residents and businesses connected to the water mains of the City or other water utility, including fire hydrants, valves and other required system structures and equipment, for and as each Phase of the PUD is constructed;

d. A non-potable water supply system for irrigation to be extended, where feasible, to each common area, greenbelt, park, or other areas within each Phase of the Real Property that uses irrigation water. Developer agrees to maintain ownership of said non-potable water system or turn said system over to a homeowner's association. The City will not be responsible for operating or maintaining said system. Provided, any non-potable water system utilized for public open space, shall be maintained and operated at the City's cost.

e. A sanitary sewer system adequate to serve the needs of the residents and businesses , which may be connected to a future sanitary sewer mains of the City when City sewer mains are extended to the Real Property, including manholes and other required system structures and equipment;

f. Street signs, traffic control devices and building address numbering system as may be agreed to by the parties;

g. All electrical, telephone and cable television service and any other utility shall be installed underground;

h. Appropriate designs, plans, specifications, engineering studies, or surveys as required by the City for the foregoing improvements.

10.2 Effects of Construction. During any construction, Developer shall be responsible for using proper dust and erosion control, obtaining necessary local and state permits, and be responsible for maintaining the streets in such a manner that they may be traveled upon until dedication. Any damage to streets or public facilities shall be promptly repaired in a manner acceptable to the City. Developer shall not use any chemicals hazardous to the future residents of the area, or which may remain in the soil for more than one growing season.

10.3 Improvement Warranty. Upon completion of any improvements and subsequent dedication to the City, such improvements shall be warranted for a period of one (1) year from the date of final acceptance. Developer shall warrant that the improvements will be free from defects for a period of one (1) year from the date of final acceptance. Record drawings of infrastructure improvements shall be provided to the City upon completion of said improvements.

10.4 Subdivision Improvement Contract. Developer shall be required to enter into the Subdivision Improvement Contract required by City Ordinance Appendix B Article 7 for each Phase, which will include phased financial assurances through the development of each phase.

10.5 Project Phasing. The development of Story House will be constructed in phases, as described in the PUD Master Plan incorporated herein. With the phasing plan approved by the City Governing Body, infrastructure and public improvements shall be completed for each phase prior to the issuance of building permits for that phase, except those that are allowed in the Sheridan City Code. Infrastructure that is not necessary for a particular phase need not be completed prior to the completion of the public improvements for that particular phase. Developer recognizes that each phase must be approved by the City..

10.6 Services. The City and Developer agree that the development shall be entitled to such services as the City currently provides to other residents of the City provided that the services have been extended to the Real Property. Extension of City utilities, which are required, to serve this site will be the responsibility of Developer except and unless agreed to be extended by the City, or unless mutual contracts for services are agreed upon by both the City and Developer.

ARTICLE XI – DEFAULT

11.1 Notice of Default. If either party claims the other is in default or breach of this Agreement, the claiming party shall notify the other of the alleged default in writing. The party who is in default shall cure said default within thirty (30) days of receiving notice.

11.2 Developer Remedies. If the City is in default and fails to cure, Developer shall be entitled to injunctive relief, specific performance or to de-annex from the City , all as provided by law.

11.3 City Remedies. If Developer is in default and fails to cure, the City will be entitled to any remedy allowed which may be cumulative, including injunctive relief, actual damages and allowed by Federal, State or Law.

ARTICLE XII – NOTICE

Any notice required or permitted under this Agreement will be deemed received when delivered personally in writing or five (5) days after notice has been deposited with the U.S. Postal Service, postage prepaid, certified mail, return receipt requested, and addressed as follows:

If to Developer:
_____
_____
_____
_____

If to City:
Attn: Public Works Director
City of Sheridan
55 E. Grinnell Plaza
Sheridan, WY 82801

ARTICLE XIII – MISCELLANEOUS

13.1 Term. All rights and obligations set forth in this Agreement shall continue in perpetuity and shall not be considered complete upon the completion of any portion of any development or upon all available space having been developed in Story House.

13.2 Benefit. The rights and obligations created by this Agreement shall inure to the benefit of the Developers, their successors and assigns unless stated otherwise herein. The parties expressly agree that a "successor" includes, but is not limited to, any person or party who acquires a portion of property from the Developer in fee simple. The obligation of such successor or assign shall extend not only to the lot or parcel acquired by that successor or assign, but shall include all applicable requirements of this Agreement.

13.3 Severability. If any term, condition or provision of this Agreement is held by a Court of competent jurisdiction to be invalid and unenforceable, the remainder of this Agreement shall continue in full force and effect as if the offending term, condition or provision were never a part of this Agreement.

13.4 Future Acts. Following execution of this Agreement, City and Developer agree to do all acts, including the execution of appropriate documents, when requested by the other, where such acts are reasonably required to fulfill the performing party's obligations under this Agreement.

13.5 No Merger. No part of this Agreement shall be considered to have merged or to have been completed upon the approval of a plat or acceptance of an improvement as the Agreement is contemplated to have survived the approval or acceptance.

13.6 Binding Effect. This Agreement shall be recorded with the Clerk and Recorder of the County of Sheridan, State of Wyoming, and shall constitute a covenant running with the land. This Agreement shall be binding on future assigns, Developer, and all persons who may purchase land described herein from the Developer or any persons hereafter having interest in the property.

13.7 Integrated Agreement. This Agreement supersedes any and all prior agreements between the parties, whether written or oral. Any modifications to this Agreement shall be memorialized either in a writing executed by both parties or printed in the minutes of a regular or special meeting of the City of Sheridan Governing Body.

13.8 Vested Rights. Unless otherwise expressly provided herein, this Agreement shall not create detrimental reliance that will stop or prevent the City from modifying its building, zoning, or subdivision ordinances or regulations. The Property shall be subdivided according to a plat or plats or as otherwise allowed by City Ordinance. Except as expressly provided herein, all future development and subdivisions shall be subject to applicable Sheridan City Code or Wyoming Statute at the time of platting or at the time an appropriate development application is filed with the City.

13.9 Captions. The captions for sections used in this Agreement are for convenience of reference only and shall not be considered a material part of this Agreement, nor shall they be used as an aid in interpreting the Agreement.

13.10 Legal Claims. Any legal action taken by either party shall be filed in the proper Court located in the Fourth Judicial District for Sheridan County, State of Wyoming.

13.11 Government Immunity. The City of Sheridan does not waive its governmental immunity by entering into this Agreement and specifically retains all immunities and defenses available to pursuant to W.S. l-39-104(a) and all other state laws.

IN WITNESS WHEREOF, the parties execute this agreement as of the date set forth above.

For the City of Sheridan:

_____

Richard Bridger
Mayor

For the Developer:

_____

Story House Property Company, LLC
By: (Authorized Agent)

Attest:

The above and foregoing Agreement was
Subscribed, Sworn to, and Acknowledged

before me by _____ this_____ day
of _____, 2023.
My commission expires_____

_____
City Clerk

_____
Notary Public

CITY OF SHERIDAN, WYOMING
55 Grinnell Street, P.O. Box 848, Sheridan Wyoming 82801
Ph (307) 674-6483 Fax (307) 674-2195

Clerk

MEMORANDUM

RE: Resolution 18-24, Support for a SEEDA Grant to the Wyoming Business Council Business Ready Community Program

From: Cecilia Good, City Clerk

To: City Council

CC:

Date:

Discussion:

See the attached memo and Resolution.

Attachments

Memo

Example Grant Agreement

SEEDA WBC Resolution of Support

SEEDA
Sheridan Economic and
Educational Development Authority

TO: SHERIDAN CITY COUNCIL
FROM: ROBERT BRIGGS, SEEDA ADMIN
DATE: 5/16/2024
RE: SEEDA WBC COMMUNITY READINESS GRANT APPLICATION – SHERIDAN HIGH-TECH PARK PHASE II

Post-Work Session Update:
At the work session there was a question raised about what requirements the Wyoming Business Council placed upon grant recipients by way of grant agreements. Included with this updated memo is a copy of the grant agreement executed for the Kennon Project. Please note that this project also had a development agreement and operations and maintenance agreement because the grant was for a building to be leased to a business. Wyoming Business Council funding for the Business Ready Community Grant and loan program comes solely from state funding, so there are no direct federal program funding requirements. There is a non-discrimination clause (Section O), which references the Civil Rights Act of 1964, the Wyoming Fair Practices Employment Act, 42 U.S.C. § 12101 (regarding discrimination against persons with disabilities), and the Age Discrimination Act of 1975. The state agreement primarily focuses on topics such as grant performance and responsible use of funds for their intended purpose.

Also raised at the work session were concerns over workforce and attainable housing, additional pressures on housing that may come from business investment associated with the project, and what efforts SEEDA might take in this regard. These concerns are being passed to the SEEDA Board as part of the materials for their meeting on May 22, 2024.

Background:
The Sheridan High-Tech Park has been one of the community's most successful ongoing economic development efforts. The 43.5 acre park currently contains three businesses that employ approximately 300 area residents in light manufacturing and R&D jobs. Occupants of the tech park include Kennon, Weatherby, and Vacutech, all in the advanced manufacturing industry. Over the last decade, the Sheridan High-Tech Park has served as an important showcase for business recruitment due to its prime location and project ready property. The park currently has one remaining 4.45 acre site that is appropriately sized for development and not committed to another project. The other remaining site is approximately .93 acres in size.

SEEDA secured planning grant funding from the Wyoming Business Council (WBC) for a feasibility assessment that evaluated several large parcels in the community for their practicality in developing the tech park expansion. The SEEDA Board ultimately selected a 45.29 acre site north of Yellowtail Dr. as the preferred location for the next phase of the Sheridan High-Tech Park based on a proposal from the current property owner.

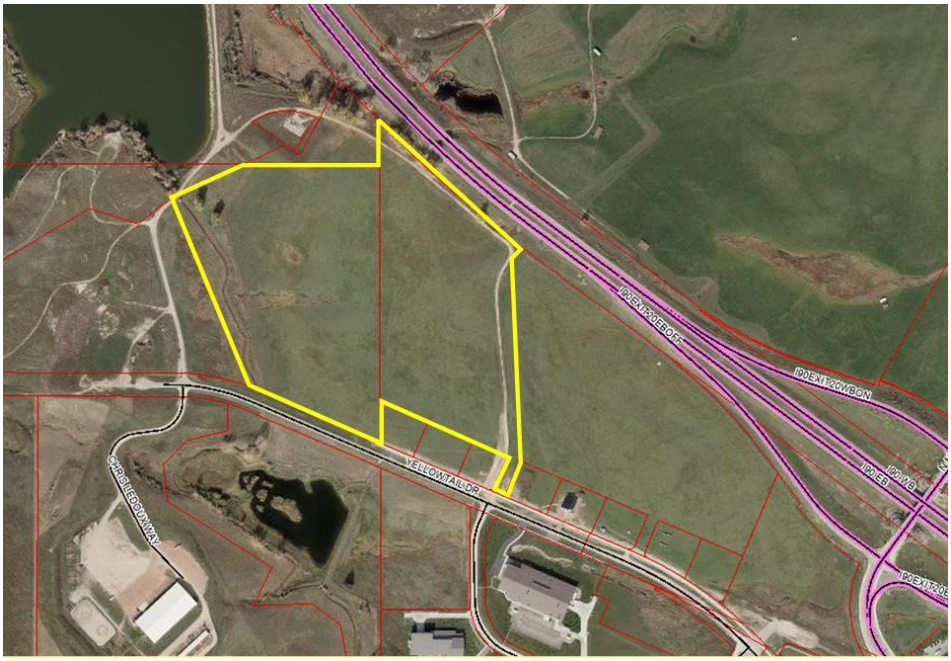


Figure 1. Preferred Location, Sheridan High-Tech Park Phase II

The proposal from Rice and Sons, Inc. included offering 35 acres to SEEDA for purchase for $2.5 million, and gifting an additional 10.29 acres to use as an in kind contribution towards securing infrastructure funding. SEEDA utilized the services of MC2 Engineering Construction to further develop a conceptual design for the site.



Figure 2. Conceptual Layout, Sheridan High-Tech Park Phase II

SEEDA is now seeking Wyoming Business Council funding through the Business Ready Community Grant and Loan Program, in the form of a Community Readiness Grant, to acquire the property and develop it into project ready sites with roadway and public infrastructure. The total estimated cost of the project is as follows:

Project Budget:

Project Scope

Land Acquisition	$3,000,000	(includes value of gifted parcel)
Roadway and Public Infrastructure	$2,532,500	(includes design and contingency)
Total	**$5,532,500**	

Funding Sources

SEEDA Funds	$606,500
In-Kind Land Contribution (10.29 acres)	$500,000
Wyoming Business Council Grant	$4,426,000
Total	**$5,532,500**

As part of the application process, each SEEDA partner entity (Sheridan City Council and NWCCD Board of Trustees) needs to consider resolutions of support. The SEEDA Board will consider a resolution on the grant application at their May 22, 2024, meeting. The attached draft resolution includes the scope of the project, the public benefits derived, and proposed funding sources.

SEEDA representatives will be on hand at the work session to make a brief presentation and answer any questions.

Attachments: Draft Resolution of Support, Kennon Grant Agreement

ORIGINAL
191708

BUSINESS READY COMMUNITY GRANT AND LOAN PROGRAM GRANT AGREEMENT BETWEEN THE WYOMING BUSINESS COUNCIL AND THE SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY JOINT POWERS BOARD

1. **Parties.** The parties to this Grant Agreement (Agreement) are the Wyoming Business Council (Council), whose address is 214 West 15th Street, Cheyenne, Wyoming 82002, and the Sheridan Economic and Educational Development Authority Joint Powers Board (Grantee), whose address is 55 Grinnell Plaza; P.O. Box 848, Sheridan, Wyoming 82801.

2. **Purpose of Agreement.** The purpose of this Agreement is to set forth the terms and conditions by which the Council shall provide Business Ready Community Grant and Loan Program (BRC) Business Committed funds to Grantee in an amount not to exceed two million eight hundred fifty thousand dollars ($2,850,000.00), to undertake and complete materials, projects and/or services (collectively, the Project) described in Attachment A, Project Summary, Attachment B, Development and Contingency Agreement, Attachment C, Operation and Maintenance Agreement, and Attachment D, Revenue Recapture Plan, which are attached to and incorporated into this Agreement by this reference. Performance by Grantee of the requirements of this Agreement and compliance with all BRC program rules and regulations is a condition of this Agreement.

3. **Term of Agreement.** This Agreement is effective when all parties have executed it (Effective Date). All construction services shall be completed by June 30, 2021, unless an extension is approved by Council. This Agreement shall terminate on June 30, 2025, unless otherwise amended or terminated in accordance with the terms and conditions specifically provided herein. This Agreement may be extended by agreement of both parties in writing and subject to the required approvals. There is no right or expectation of extension and any extension will be determined at the discretion of the Council.

4. **Payment.**

   A. The Council agrees to pay the Grantee for the work described in Attachment A, Project Summary. The total payment to Grantee under this Agreement shall not exceed two million, eight hundred fifty thousand dollars ($2,850,000.00). Payment shall be made from Council's BRC budget pursuant to the schedule shown in Attachment A following Grantee's delivery to Council of invoices detailing services performed in connection with the Project. Payment shall be made within forty-five (45) days after submission of invoice pursuant to Wyo. Stat. § 16-6-602. Grantee shall submit invoices in sufficient detail to ensure that payments may be made in conformance with this Agreement.

   B. No payment shall be made for work performed before the Effective Date of this Agreement. Should the Grantee fail to perform in a manner consistent with the terms and conditions set forth in this Agreement, payment under this Agreement may be withheld until such time as the Grantee performs its duties and

responsibilities to the satisfaction of Council.

C. Except as otherwise provided in this Agreement, the Grantee shall pay all costs and expenses, including travel, incurred by Grantee or on its behalf in connection with Grantee's performance and compliance with all of Grantee's obligations under this Agreement.

5. **Responsibilities of Grantee.** The Grantee agrees to:

A. Provide the services described in Attachment A;

B. Provide the responsibilities described in Attachment B, Development and Contingency Agreement;

C. Provide the responsibilities described in Attachment C, Operation and Maintenance Agreement; and

D. Provide the responsibilities described in Attachment D, Revenue Recapture Plan.

6. **Responsibilities of Council.** The Council agrees to:

A. Pay Grantee in accordance with Section 4 above.

B. At its discretion, assist in providing Grantee access to information, including, without limitation, information concerning BRC program requirements, rules and regulations and other relevant and applicable statutes and regulations referred to herein, and cooperate with Grantee whenever possible.

C. Have no further obligations regarding the Project or its performance.

7. **Special Provisions.**

A. **Assumption of Risk.** The Grantee shall assume the risk of any loss of state funds due to the Grantee's failure to comply with state requirements, including but not limited to misappropriation of state funds, fraud, or spending practices that unreasonably put state funds at risk of loss. The Council shall notify the Grantee of any state determination of noncompliance with state requirements.

B. **Budget.** The budget for the Project is described in the Project Grant Expenditure Schedule (Budget) in Attachment A.

(i) Grantee agrees it will not exceed any of the line item totals listed in the Budget in Attachment A by more than twenty percent (20%) without prior approval from Council. Such changes will not result in any change in the total Project costs, or a change in the Grant amount.

(ii) As used in the Budget, the term "Soft Costs" (non-construction costs) include appraisal, architectural, engineering, and Project inspection fees,

while "Hard Costs" (construction costs) include: site work, materials, labor, utilities, and contingencies.

(iii) In accordance with the budget schedule in Attachment A, Council will incrementally provide funds to Grantee as Grantee incurs reimbursable costs.

(iv) Grantee shall submit one (1) reimbursement request per monthly cycle or one (1) request every thirty (30) days. If more than one (1) request is received during that monthly cycle, the Council may return each additional request to Grantee for submittal in the next appropriate monthly cycle.

(v) The Council will release funds only after payment vouchers or invoices approved by the Grantee are submitted to the Council. After Council receives cash requests and billing documentation from Grantee, it will pay the amounts of invoices at sixty-six percent (66%) for Hard Costs, and one hundred percent (100%) for Soft Costs. Verification of all in-kind contributions must be submitted to the Council.

(vi) If actual costs of the Project are more than the Budget indicated in Attachment A, Grantee agrees to pay the difference in the amount of funds awarded through the BRC Program and the actual costs of the completed Project.

C. **Default and Remedies.** In the event Grantee or any subgrantee of Grantee under this Agreement defaults or is deficient in the performance of any term of this Agreement or any requirements of the BRC Program rules and regulations, Council may, at its discretion, exercise any and all applicable remedies provided by law or in equity. Such remedies may include, but are not necessarily limited to, the following:

(i) Immediate termination of this Agreement without further liability or obligation of Council;

(ii) Issuance of a letter of warning advising Grantee of the deficiency and putting the Grantee on notice that additional action will be taken if the deficiency is not corrected or is repeated;

(iii) Recommendation to or request that Grantee submit proposals for corrective actions, including the correction or removal of the causes of the deficiency;

(iv) Advising Grantee to suspend disbursement of funds for the deficient activity;

(v) Advising Grantee to reimburse any amounts improperly expended and reprogram the use of the funds in accordance with applicable requirements;

(vi) Changing the method of payment to Grantee; and

(vii) Reducing, withdrawing, or adjusting the amount of the Grant.

D. **Extension of Construction.** Council may, at its discretion, by amendment to this Agreement, extend the construction services date if Grantee provides written justification for the extension and that the completion of construction services will not exceed six (6) months from the construction services date established herein. A construction services date extension of six (6) months or less will not change the termination date established herein unless specified.

E. **Kickbacks.** The Grantee certifies and warrants that no gratuities, kickbacks or contingency fees were paid in connection with this Agreement, nor were any fees, commissions, gifts, or other considerations made contingent upon the award of this Agreement. If the Grantee breaches or violates this warranty, the Council may, at its discretion, terminate this Agreement without liability to the Council, or deduct from the Agreement or consideration, or otherwise recover, the full amount of any gratuities, kickbacks or contingency fees.

F. **Monitoring Activities.** The Council shall have the right to monitor all activities related to this Agreement that are performed by the Grantee or its subcontractors. This shall include, but not be limited to, the right to make site inspections at any time and with reasonable notice; to bring experts and consultants on site to examine or evaluate completed work or work in progress; to examine the books, ledgers, documents, papers, and records pertinent to this Agreement; and to observe personnel in every phase of performance of Agreement related work.

G. **No Finder's Fees.** Neither party shall pay a finder's fee, employment agency fee, or other such fee related to the procurement of this Agreement.

H. **Non-Supplanting Certification.** Grantee hereby affirms that BRC Grant funds will be used to supplement existing funds and will not replace (or supplant) other funds that have been appropriated to Grantee for the same purpose.

I. **Operations and Maintenance.** Grantee will be required to provide an operations and maintenance plan for the Project in accordance with the Project Operations and Maintenance Plan attached hereto as Attachment C, commencing upon the completion of construction and shall include defined roles, projected expenses and project income sources for the life of the asset.

J. **Performance Measures.** Grantee will be required to provide information as requested by the State of Wyoming, by and through the Council, about lease arrangements, job creation, revenue recapture, additional investments, marketing, business recruitment, and business development efforts. Performance Measures are more particularly described in Attachment A.

K. **Procurement Requirements.** Grantee is required to provide a letter from a qualified engineer certifying the construction completion of the Project and that all required construction standards were adhered to during the construction of this Project. Upon completion of construction of this Project, Grantee shall provide the Council a letter from Grantee's attorney confirming:

(i) Grantee has followed all procurement standards per Wyo. Stat. § 15-1-113 and Wyo. Stat. § 16-6-101 *et seq.*;

(ii) Grantee has followed the Wyoming Preference Act (Wyo. Stat. § 16-6-201 through 16-6-206); and

L. **Reporting.** Within fifteen (15) calendar days after the conclusion of each calendar quarter during the Term of this Agreement, Grantee shall furnish Council with a progress report. Each progress report shall set forth, in narrative form, the Project work accomplished under the Agreement during the quarter or any other information requested by Council. At the end of construction of the Project, Grantee shall furnish Council with annual reports for five (5) years of project outcomes against established measures. At the end of the term of this Agreement, Grantee shall furnish Council with a comprehensive report of the Project accomplishments, a cumulative detailed financial report reflecting total grant expenditures, cash and in-kind match expenditures, and private funds leveraged pursuant to this Agreement. Grantee shall provide a letter from a qualified engineer certifying the completion of the Project and that all required construction standards were adhered to relative to the construction of this Project.

M. **Retention of Records.** Grantee agrees to retain all records related to the Project which are required to be retained pursuant to this Agreement or the BRC program rules and regulations for five (5) years following Council's date of notice to Grantee of closeout of the Grant, provided all audit requirements have been fulfilled.

N. **Revenue Recapture.** Grantee's intention to return recaptured revenue to the Council does not bind, encumber, be chargeable, or create a debt of any kind on the behalf of or against Grantee, the Grantee's assets, general obligation funds, or any other revenues or properties whatsoever. In the event of default with respect to the terms and conditions of this Agreement, or with respect to the terms and conditions of any related Project agreements between any of the parties, neither the Council nor any other party shall have the right to seek re-capture from Grantee. The Revenue Recapture Plan for the Project is attached hereto as Attachment D, Revenue Recapture Plan.

O. **Unused or Misused Funds.** The Council shall be entitled to recover from the Grantee any full or partial payment made under this Agreement for:

(i) Any payments used for unauthorized purposes or for services performed outside this Agreement;

(ii) Any payments for services the Grantee is unable to provide; and

(iii) Any payments for services the Grantee did not provide but was required to provide under the terms of this Agreement.

8. General Provisions

A. **Amendments.** Any changes, modifications, revisions or amendments to this Agreement which are mutually agreed upon by the parties to this Agreement shall be incorporated by written instrument, executed by all parties to this Agreement.

B. **Applicable Law, Rules of Construction, and Venue.** The construction, interpretation, and enforcement of this Agreement shall be governed by the laws of the State of Wyoming, without regard to conflicts of law principles. The terms "hereof," "hereunder," "herein," and words of similar import, are intended to refer to this Agreement as a whole and not to any particular provision or part. The Courts of the State of Wyoming shall have jurisdiction over this Agreement and the parties. The venue shall be the First Judicial District, Laramie County, Wyoming.

C. **Assignment Prohibited and Agreement Shall Not be Used as Collateral.** Neither party shall assign or otherwise transfer any of the rights or delegate any of the duties set out in this Agreement without the prior written consent of the other party. Grantee shall not use this Agreement, or any portion thereof, for collateral for any financial obligation, without the prior written permission of Council.

D. **Audit and Access to Records.** The Council and any of its representatives shall have access to any books, documents, papers, electronic data, and records of the Grantee which are pertinent to this Agreement.

E. **Availability of Funds.** Each payment obligation of the Council is conditioned upon the availability of government funds that are appropriated or allocated for the payment of this obligation and which may be limited for any reason including, but not limited to congressional, legislative, gubernatorial, or administrative action. If funds are not allocated and available for continued performance of the Agreement, the Agreement may be terminated by the Council at the end of the period for which the funds are available. The Council shall notify the Grantee at the earliest possible time of the services that will or may be affected by a shortage of funds. No penalty shall accrue to the Council in the event this provision is exercised, and the Council shall not be obligated or liable for any future payments due or for any damages as a result of termination under this section.

F. **Award of Related Agreements.** The Council may award supplemental or successor agreements for work related to this Agreement or may award contracts to other grantees for work related to this Agreement. The Grantee shall cooperate fully with other grantees and the Council in all such cases.

G. **Compliance with Laws.** The Grantee shall keep informed of and comply with all applicable federal, state and local laws and regulations in the performance of this Agreement.

H. **Confidentiality of Information.** Except when disclosure is required by the Wyoming Public Records Act or court order, all documents, data compilations, reports, computer programs, photographs, data, and other work provided to or produced by the Grantee in the performance of this Agreement shall be kept confidential by the Grantee unless written permission is granted by the Council for its release. If and when Grantee receives a request for information subject to this Agreement, Grantee shall notify Council within ten (10) days of such request and shall not release such information to a third party unless directed to do so by Council.

I. **Entirety of Agreement.** This Agreement, consisting of eleven (11) pages; Attachment A, Project Summary, consisting of five (5) pages; Attachment B, Development and Contingency Agreement, consisting of six (6) pages; Attachment C, Operations and Maintenance Plan, consisting of seven (7) pages, and Attachment D, Revenue Recapture Plan, consisting of two (2) pages, represent the entire and integrated Agreement between the parties and supersede all prior negotiations, representations, and agreements, whether written or oral. In the event of conflict or inconsistency between the language of this Agreement and the language of any attachment or document incorporated by reference, the language of this Agreement shall control.

J. **Ethics.** Grantee shall keep informed of and comply with the Wyoming Ethics and Disclosure Act (Wyo. Stat. § 9-13-101, *et seq.*) and any and all ethical standards governing Grantee's organization.

K. **Extensions.** Nothing in this Agreement shall be interpreted or deemed to create an expectation that this Agreement will be extended beyond the term described herein. Any extension of this Agreement shall be initiated by the Council and shall be accomplished through a written amendment between the parties entered into before the expiration of the original Agreement or any valid amendment thereto and shall be effective only after it is reduced to writing and executed by all parties to the Agreement.

L. **Force Majeure.** Neither party shall be liable for failure to perform under this Agreement if such failure to perform arises out of causes beyond the control and without the fault or negligence of the nonperforming party. Such causes may include, but are not limited to, acts of God or the public enemy, fires, floods, epidemics, quarantine restrictions, freight embargoes, and unusually severe weather. This provision shall become effective only if the party failing to perform immediately notifies the other party of the extent and nature of the problem, limits delay in performance to that required by the event and takes all reasonable steps to minimize delays.

M. **Indemnification.** Each party to this Agreement shall assume the risk of any liability arising from its own conduct. Neither party agrees to insure, defend or indemnify the other.

N. **Independent Contractor.** The Grantee shall function as an independent contractor for the purposes of this Agreement and shall not be considered an employee of the State of Wyoming for any purpose. Consistent with the express terms of this Agreement, the Grantee shall be free from control or direction over the details of the performance of services under this Agreement. The Grantee shall assume sole responsibility for any debts or liabilities that may be incurred by the Grantee in fulfilling the terms of this Agreement and shall be solely responsible for the payment of all federal, state, and local taxes which may accrue because of this Agreement. Nothing in this Agreement shall be interpreted as authorizing the Grantee or its agents or employees to act as an agent or representative for or on behalf of the State of Wyoming or the Council or to incur any obligation of any kind on behalf of the State of Wyoming or the Council. The Grantee agrees that no health or hospitalization benefits, workers' compensation, unemployment insurance or similar benefits available to State of Wyoming employees will inure to the benefit of the Grantee or the Grantee's agents or employees as a result of this Agreement.

O. **Nondiscrimination.** The Grantee shall comply with the Civil Rights Act of 1964, the Wyoming Fair Employment Practices Act (Wyo. Stat. § 27-9-105 *et seq.*), the Americans with Disabilities Act (ADA), 42 U.S.C. § 12101, *et seq.*, and the Age Discrimination Act of 1975 and any properly promulgated rules and regulations thereto and shall not discriminate against any individual on the grounds of age, sex, color, race, religion, national origin, or disability in connection with the performance under this Agreement.

P. **Notices.** All notices arising out of, or from, the provisions of this Agreement shall be in writing either by regular mail or delivery in person at the addresses provided under this Agreement.

Q. **Ownership and Return of Documents and Information.** Council is the official custodian and owns all documents, data compilations, reports, computer programs, photographs, data and other work provided to or produced by the Grantee in the performance of this Agreement. Upon termination of services, for any reason, Grantee agrees to return all such original and derivative information and documents to the Council in a usable format. In the case of electronic transmission, such transmission shall be secured. The return of information by any other means shall be by a parcel service that utilizes tracking numbers.

R. **Patent or Copyright Protection.** The Grantee recognizes that certain proprietary matters or techniques may be subject to patent, trademark, copyright, license, or other similar restrictions, and warrants that no work performed by the Grantee or its subcontractors will violate any such restriction. The Grantee shall

defend and indemnify the Council for any infringement or alleged infringement of such patent, trademark, copyright, license, or other restrictions.

S. **Prior Approval.** This Agreement shall not be binding upon either party, no services shall be performed, and the Wyoming State Auditor shall not draw warrants for payment, until this Agreement has been fully executed and approved as to form by the Office of the Attorney General.

T. **Insurance Requirements.** Grantee is protected by the Wyoming Governmental Claims Act, Wyo. Stat. § 1-39-101, et seq., and certifies that it is a member of the Wyoming Association of Risk Management (WARM) pool or the Local Government Liability Pool (LGLP), Wyo. Stat. § 1-42-201, et seq., and shall provide a letter verifying its participation in the WARM or LGLP to the Council.

U. **Publicity.** Any publicity given to the projects, programs or services provided herein, including, but not limited to, notices, information, pamphlets, press releases, research, reports, signs, and similar public notices in whatever form, prepared by or for the Grantee, shall identify the Council as the sponsoring agency and shall not be released without prior written approval from the Council.

V. **Severability.** Should any portion of this Agreement be judicially determined to be illegal or unenforceable, the remainder of this Agreement shall continue in full force and effect, and the parties may renegotiate the terms affected by the severance.

W. **Sovereign Immunity.** Pursuant to Wyo. Stat. § 1-39-104(a), the State of Wyoming and Council expressly reserve sovereign immunity by entering into this Agreement and the Grantee expressly reserves governmental immunity. Each of them specifically retains all immunities and defenses available to them as sovereigns or governmental entities pursuant to Wyo. Stat. § 1-39-101, et seq., and all other applicable law. The parties acknowledge that the State of Wyoming has sovereign immunity and only the Wyoming Legislature has the power to waive sovereign immunity. The parties further acknowledge that there are constitutional and statutory limitations on the authority of the State of Wyoming and its agencies or instrumentalities to agree to certain terms and conditions supplied by the Grantee, including, but not limited to, the following: liability for damages; choice of law; conflicts of law; venue and forum-selection clauses; defense or control of litigation or settlement; liability for acts or omissions of third parties; payment of attorneys' fees or costs; additional insured provisions; dispute resolution, including, but not limited to, arbitration; indemnification of another party; and confidentiality. Any such provisions in the Agreement or any attachments or documents incorporated by reference will not be binding on the State of Wyoming. Designations of venue, choice of law, enforcement actions, and similar provisions shall not be construed as a waiver of sovereign immunity. The parties agree that any ambiguity in this Agreement shall not be strictly construed, either against or for either party, except that any ambiguity as to immunity shall be construed in favor of immunity.

X. **Taxes.** The Grantee shall pay all taxes and other such amounts required by federal, state, and local law, including, but not limited to, federal and social security taxes, workers' compensation, unemployment insurance, and sales taxes.

Y. **Termination of Agreement.** This Agreement may be terminated, without cause, by the Council upon thirty (30) days written notice. This Agreement may be terminated by the Council immediately for cause if the Grantee fails to perform in accordance with the terms of this Agreement. If at any time during the performance of this Agreement, in the opinion of the Council, the work is not progressing satisfactorily or within the terms of this Agreement, then, at the sole discretion of the Council and after written notice to the Grantee, the Council may terminate this Agreement or any part of it.

Z. **Third Party Beneficiary Rights.** The parties do not intend to create in any other individual or entity the status of third-party beneficiary, and this Agreement shall not be construed so as to create such status. The rights, duties, and obligations contained in this Agreement shall operate only between the parties to this Agreement and shall inure solely to the benefit of the parties to this Agreement. The provisions of this Agreement are intended only to assist the parties in determining and performing their obligations under this Agreement.

AA. **Time is of the Essence.** Time is of the essence in all provisions of this Agreement.

BB. **Titles Not Controlling.** Titles of sections are for reference only and shall not be used to construe the language in this Agreement.

CC. **Waiver.** The waiver of any breach of any term or condition in this Agreement shall not be deemed a waiver of any prior or subsequent breach. Failure to object to a breach shall not constitute a waiver.

DD. **Counterparts.** This Agreement may be executed in counterparts. Each counterpart, when executed and delivered, shall be deemed an original and all counterparts together shall constitute one and the same Agreement. Delivery by the Grantee of an originally signed counterpart of this Agreement by facsimile or PDF shall be followed up immediately by delivery of the originally signed counterpart to the Council.

THE REMAINDER OF THIS PAGE WAS INTENTIONALLY LEFT BLANK

9. **Signatures.** The parties to this Agreement, either personally or through their duly authorized representatives, have executed this Agreement on the dates set out below, and certify that they have read, understood, and agreed to the terms and conditions of this Agreement.

The Effective Date of this Agreement is the date of the signature last affixed to this page.

WYOMING BUSINESS COUNCIL

Shawn Reese — 4.11.19

Shawn Reese
Chief Executive Officer
Date

Julie Kozlowski — 4/9/19

Julie Kozlowski, Director
Community Development Division
Date

SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY JOINT POWERS BOARD

Paul R Young — 4/3/19

Dr. Paul Young, Chairman
SEEDA JPB
Date

Attest: Richard Bridger, Secretary, 4/3/19

ATTORNEY GENERAL'S OFFICE APPROVAL AS TO FORM

Margaret Schwartz #191708 — Mar. 28, 2019

Margaret A. R. Schwartz
Assistant Attorney General
Date

ATTACHMENT A TO THE BUSINESS READY COMMUNITY GRANT AND LOAN PROGRAM GRANT AGREEMENT BETWEEN THE WYOMING BUSINESS COUNCIL AND THE SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY JOINT POWERS BOARD

	SEEDA Kennon High-Tech Business Park					
Purpose	The Sheridan Economic and Educational Development Authority Joint Powers Board requests a $2,850,000 Business Committed grant, and a $1,510,761 BRC loan to construct a 34,000 - 40,000 square-foot manufacturing facility on a 4-acre site located in the High-Tech Business Park for the expansion of Kennon Products, Inc.					
Project Budget	**Projected Grant Expenditure Schedule**					
	Description	**BRC**	**Match**		**Total**	
			Cash	In-Kind		
	Land	$ -	$ -	$ 348,480	$	348,480
	Non-Construction Costs	$ 550,675	$ -	$ -	$	550,675
	Construction Costs	$ 2,299,325	$ 3,769,320	$ -	$	6,068,645
	Total Project Cost	$ 2,850,000	$ 3,769,320	$ 348,480	$	6,967,800
	Percentage BRC Grant of all cash:		**66%**			
Performance Measures	**Measure**		**Quantity**	**Notes**		
	Businesses Assisted		1	Kennon Products, Inc.		
	Return on Investment			**to be determined**		
	Loan Repayment		$ 2,102,833.26	Based on 20 year term at 3.5%		
	Revenue Recapture		$ 2,511,613.23	20 year lease payments minus loan		
	County Median Wage		$ 21.86	Based on 2017 figures		
	Median Wage of Jobs Created		$ 27.46	After year five		
	Jobs to be Created (5 Year Projection)		39	Full time equivalents		
	Jobs to be Retained		0			
	Additional Investment		$ 2,258,559	EDA Grant - awarded October 2018		
	Estimated Capital Expenditures Year One		$ 500,000			
	Estimated Capital Expenditures Year Two		$ 500,000			
	Estimated Capital Expenditures Year Three		$ 150,000			
	Estimated Capital Expenditures Year Four		$ 150,000			
	Estimated Capital Expenditures Year Five		$ 250,000			
	Estimated Payroll Increase Year One		16%			
	Estimated Payroll Increase Year Two		9%			
	Estimated Payroll Increase Year Three		15%			
	Estimated Payroll Increase Year Four		15%			
	Estimated Payroll Increase Year Five		23%			
	Estimated Taxable Sales Year One		$ 8,082,905			
	Estimated Taxable Sales Year Two		$ 9,391,540			
	Estimated Taxable Sales Year Three		$ 10,537,113			
	Estimated Taxable Sales Year Four		$ 11,665,878			
	Estimated Taxable Sales Year Five		$ 14,665,878			
Project Infrastructure	Acres Developed		4	Minimum site size.		
	New Building Construction		34,500	Square-Feet based on conceptual design.		

Project Description

The Sheridan Economic and Educational Development Authority (SEEDA) Joint Powers Board requests a $2,850,000 Business Ready Community (BRC) Business Committed grant and a $1,510,761 BRC loan for the construction of a manufacturing facility (up to 40,000 square-feet), offices and parking lot on approximately four acres in the Sheridan High Tech Gateway Subdivision.

The new facility will allow for Kennon Products, Inc. to expand and increase their capacity to deliver new products to clients and take advantage of emerging opportunities. The cost to construct the new facility is approximately $162.87 per square-foot.

SEEDA was awarded a $2,258,559 Economic Development Administration (EDA) grant from the U.S. Department of Commerce as match for the construction of the building's shell.

Vacutech, a commercial vacuum technology manufacturer and Weatherby, a premier firearms manufacturer, are currently located in the High-Tech business park. Of the original 43.5-acres of the park, 13.16-acres remains available. If this project is awarded, a balance of 9 acres will be available for expansion of current businesses or relocation of new companies in the park.

The Business

Kennon Products, Inc. specializes in the manufacture of protective coverings for high-value assets, ranging from aircraft to human life. The company was founded in 1984 and relocated to Sheridan in 1989. Kennon employs 39 skilled technical professionals from industrial sewing professionals to research engineers. They successfully deployed a business model combining research and development with skilled manufacturing. Kennon has achieved above-average success in gaining Small Business Innovation Research Program (SBIR) awards and developing these projects to full commercialization (Phase III).

To date Kennon has received:

- 16 Phase 0 awards totaling $80,000;
- 6 Phase I awards totaling $689,275;
- 3 Phase II awards totaling $3,646,454; and
- 2 Phase III (full commercialization) awards totaling $3,141,860.

Kennon is a multifaceted company that manufactures products and provides engineering services to markets including the Department of Defense (DoD), NASA, and behavioral healthcare. The company has strong existing product lines and strives to add one to two sustainable products each year. These additional products derived from funded engineering projects developed for customers like Original Equipment Manufacturers (OEMs) and the U.S. military. Sales to the Defense Logistics Agency (DLA) are for pre- approved products with a National Stock Number (NSN). Kennon owns 73 NSNs and continues to add to their portfolio to provide approved aircraft covers to the U.S. military.

Kennon's two main manufacturing markets include military aviation with protective aircraft coverings, and behavioral healthcare through the Soft Suicide Prevention Door (SSPD). The company has three significant engineering efforts under development; KC-46 Thermal Radiation Shields, emergency life preserver units (LPUs) for the Navy and the V-22 Composite Armor Systems.

All three begin production between late 2019 and mid-2021. These products represent a 20% growth for the company and will account for $39 million in additional revenue in the next 10 years.

The company plans to hire an additional 39 employees in the next five years to staff full production of both existing products and those under development. Kennon owns and occupies an 11,000 square-foot facility at 2071 Main Street in Sheridan. This facility served the company adequately, but the building is now at full capacity and will not accommodate further growth.

Kennon has added four storage containers (which occupy 2,000 square-feet) to store patterns, raw goods and miscellaneous production equipment. The company added a second shift in March 2018 to accommodate the increase in production demands and the lack of space to add production workstations and staffing. Kennon is also leasing 2,200 square-feet of space in a building located a block away from their main facility to house the ballistics and life preserver unit development teams. The leased space houses several pieces of equipment that could not fit at their current facility. The equipment includes a CNC laser cutting table, CNC sewing machines, hydraulic press, specialized sewing machine and custom CNC machines developed by Kennon.

Project Goals and Public Benefits

Project Goals include:

- Construction of a new manufacturing facility up to 40,000 square-feet.
- Creation of 39 full-time jobs with above median wage, benefit packages and eligibility as participants in the company's Employee Stock Ownership Program.
- Increased capacity for company competitiveness on national level contracts.
- Company's committed capital expenditures for equipment and fixtures exceeding $1.3 million.

Sources	
BRC Grant amount	$2,850,000
Cash Match (EDA Grant, BRC Loan)	$3,769,320
In-Kind Match - Land Value	$ 348,480
Total eligible project cost	**$6,967,800**
BRC % of total eligible project costs	66%
Uses	
Land Acquisition Costs	
Land	$ 348,480
Non-Construction Costs	
Architectural and Engineering fees	$ 468,675
Other fees (surveys, tests, etc.)	$ 82,000
Construction Costs	
Site work	$ 886,000
Building Components:	
Electrical Systems	$ 690,000
Mechanical, plumbing, HVAC systems	$1,125,500
Foundation and/or Structural Framing system	$1,506,600
Interior Finishes	$ 531,000
Fire Protection	$ 155,250
Other - General Conditions/Mobilization	$ 885,210
Contingencies (5%)	$ 289,085
Total Uses	**$6,967,800**

Public Goals include:

- Leveraging $2,258,559 in federal EDA funding for coal-impacted communities.
- Increasing payroll 23% by year five.
- Estimated $39 million in additional revenue over the next ten years.
- Recruitment of skilled workforce.
- Successful attraction of light manufacturing companies to Sheridan.
- Continued success promoting Sheridan and Northeast Wyoming as a viable location for targeted industries.
- Increasing the research and development sector in Wyoming through Kennon's mentoring of companies seeking to use the SBIR Program; strengthening partnerships with Sheridan/Johnson County Next Generation Sector Partnership working group and providing resources, expertise and hands-on training in advanced manufacturing to the Northern Wyoming Community College District.

Loan Terms

Total Project: $6,967,800 Total Loan: $1,510,761 Total Grant: $2,850,000

Collateral: Land value of 4-acre site $348,480; and constructed facility Term: 20 years

Interest Rate: 3.5%

Other fees: $2,500 loan servicing fee ($125 per year for a term of 20 years)

SEEDA is proposing that interest not begin to compound on the loan for the first two years of the project SEEDA will repay the loan with lease revenue received from Kennon.

Lease and Revenue Recapture

SEEDA will enter a 21-year lease with Kennon Products, Inc. Kennon will pay a monthly triple-net lease rate of $6.00 per square-foot for the first seven years. The lease will have two seven-year renewals and the lease rate will increase to $6.25 per-square-foot in year eight, then increase by 1.5% each year thereafter.

SEEDA will repay the BRC loan with lease revenue from Kennon Products. WBC will recapture approximately $2.1 million in principal and interest on the loan.

SEEDA will recapture approximately $2.5 million in lease payments minus loan repayment (75%) and will use those funds for the following economic development purposes:

- 25% of recaptured funds will be set aside for SEEDA initiatives for development of capital projects, workforce training or job creation initiatives in Sheridan County.
- 25% of recaptured funds will be committed toward the further development and maintenance of project-ready property in the High-Tech Business Park or other locations identified by the SEEDA board.
- 50% will be held in reserve for other business recruitment efforts identified by the SEEDA board.

Attorney General Opinion

Received January 14, 2019.

WBC Deliberation

Board members Kensey and Sopko declared a conflict of interest and recused themselves from project discussion and the vote.

The board heard from Sheridan Mayor Roger Miller. He gave a brief history of the project, the development of the High-Tech Business Park and the partnerships with UW and Sheridan College.

Board member Wandler added that Kennon Products was a great company and the need for this type of company to highlight innovation and advanced manufacturing in Wyoming.

WBC Recommendation

WBC unanimously recommends funding as requested.

SLIB Decision APPROVED UNANIMOUSLY JANUARY 17, 2019.

ATTACHMENT B TO THE BUSINESS READY COMMUNITY GRANT AND LOAN PROGRAM GRANT AGREEMENT BETWEEN THE WYOMING BUSINESS COUNCIL AND THE SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY JOINT POWERS BOARD

DEVELOPMENT AND CONTIGENCY AGREEMENT BETWEEN SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY AND KENNON PRODUCTS, INC.

WHEREAS, the Sheridan Economic and Educational Development Authority ("SEEDA") is a Wyoming, joint powers board formed in accordance with Wyoming law by the City of Sheridan and the Northern Wyoming Community College District, whose address is 55 Grinnell Plaza, Sheridan, Wyoming 82801; and

WHEREAS, SEEDA desires to further economic development in the City of Sheridan and Sheridan County and support and grow new and existing business; and

WHEREAS, Kennon Products, Inc. ("Kennon") is a Sheridan-based manufacturing and engineering company that protects high value assets primarily in whose address is 2071 North Main St. Sheridan, Wyoming 82801; and

WHEREAS, Kennon is committed to growing its business in Sheridan, has been a vital contributor to job creation the community, and is experiencing steady growth since locating in Sheridan; and

WHEREAS, Kennon's business plan recognizes the need for the expansion of facilities to meet the needs of current and future growth; and

WHEREAS, Kennon plans to employ an additional 39 full time equivalent positions over the next 5 years.

WHEREAS, numerous community planning documents including SEEDA's Target Industry Profiles and CTET Strategy Recommendations report have identified light manufacturing as a target industry; and

WHEREAS, SEEDA and Kennon recognize the opportunities of the Wyoming Business Council Business Ready Community Grant and Loan Program as a way to leverage significant private capital and resources; and

WHEREAS, the public benefit of this project will be the promotion of economic development by creating and sustaining jobs in the Sheridan community and by Sheridan and generating revenue for SEEDA to be used to advance additional economic development efforts in Sheridan; and

WHEREAS, the parties desire to enter into the Development and Contingency Agreement to facilitate and develop real property which will be owned by SEEDA.

THEREFORE:

This Development and Contingency Agreement (hereinafter referred to as "Agreement") is made and entered into on this 14th day of March, 2019 by and between SEEDA and Kennon (individually a "Party" and collectively the "Parties").

1. **Purpose.** The purpose of this project (the "Project") is to fund construction and operation of a new 34,000 to 40,000 sq. ft. manufacturing facility (the "Facility") located at Sheridan's High-Tech Park. The Facility will be constructed and owned by SEEDA, leased to Kennon. The Project will promote economic development in the City of Sheridan and Sheridan County by assisting Kennon with the consolidation and expansion of its

manufacturing business in Sheridan, stimulating job creation, and generating revenue for SEEDA to be used for additional economic development efforts in Sheridan. This Agreement is contingent upon the Wyoming Business Council awarding grant and loan funds to SEEDA as set forth herein for implementation of the Project.

2. **Real Property.** The Facility will be located on a portion of Lot B of the Sheridan High Tech Gateway Subdivision, Sheridan, WY 82801.

3. **Term of Agreement.** This Agreement is effective upon the date it is signed by both Parties and will remain effective until the earlier of: 1) termination of this Agreement as set forth herein; 2) a final decision by the Wyoming Business Council to not fund the Grant and Loan as set forth herein; or 3) expiration of the Facility lease between the Parties.

4. **Responsibilities of SEEDA.**

   SEEDA agrees to support this Project by applying to the Wyoming Business Council for a Business Ready Communities Business Committed Grant in the amount of $2,850,000 (the "Grant") and applying to the Wyoming Business Council ("WBC") for a Business Ready Communities Business Committed Loan in the amount of $1,510,761 (the "Loan). The capital from the Grant and Loan will be used by SEEDA to construct the Facility. Upon award of the Grant and Loan, SEEDA shall:

   a. Administer all Project funds including the Grant funds for the entire Grant amount. This administration includes making all necessary reports and draw down requests for Grant and Loan funds to the Wyoming Business Council and maintaining all required records for the duration required by the Business Council. SEEDA shall monitor the overall Project budget.

   b. Establish a Project Steering Committee to oversee the Project and, provide a representative to the Committee to ensure compliance with Grant and Loan requirements, and to safeguard SEEDA's interest in the Project. The Project Steering Committee shall consist of one representative each from SEEDA and Kennon. The Project Steering Committee shall supervise, administer, manage, and complete the construction of the Project in compliance with any State statutes, applicable building and zoning codes and ordinances and the plans and specifications. The Project Steering Committee will also oversee the contract for the construction of the Project as the Project Administrator to ensure compliance of all contractors and subcontractors with all terms of the Contract, including but not limited to, that all contractors or subcontractors meet any insurance requirements and name SEEDA as an additional insured. A SEEDA representative shall have final decision-making power on any aspect of the Project.

   c. In consultation with Kennon, provide the plans, specifications and building design of the Project, pursuant to applicable building and zoning codes and ordinances and the aesthetic and program requirements of Kennon. SEEDA agrees to enter into a contract for the design of the Facility. The costs incurred by SEEDA for the design and construction of the Facility including any fees for building permits and associated fees shall not exceed the amount of Grant and Loan funds SEEDA

receives from the Wyoming Business Council together with matching funds identified in the grant application for the Project.

d. Ensure that the State statutory requirements for municipal procurement are followed for all expenditures of public dollars.

e. Facilitate, advertise and solicit bids for construction of the Facility in compliance with Wyoming State statutes including preparation of bid documents and construction documents, contract drafting, publication of all notices required by statute, ordinance or administrative rule, handle pre-bid conferences, bid receipt and recommendations, and entering into a contract with the qualified bidder for the construction of the Project.

f. Facilitate timely disbursement of funds to the appropriate contractors, consultants and all other obligors under the construction, and require appropriate lien releases for all such expenditures.

g. Be responsible for ensuring project completion in accordance with any schedule agreed upon with the WBC, barring any approved extensions of that schedule by the WBC, as well as ensuring completion in the event of cost overruns from the estimated cost of Project completion prepared for the Grant and Loan application.

h. Create and retain quarterly reports of the progress of the Project on or before the 10th day after that last business day of each quarter. Each progress report shall set forth in narrative the work accomplished under the grant during the quarter and shall include a financial status report. At the end of the Project, SEEDA shall maintain records including a comprehensive report of the Project and cumulative financial statement reflecting total expenditures.

i. Maintain fire and all peril insurance on the buildings located upon the demised premises. In the event of partial loss by fire or other casualty, the insurance moneys shall be used in reconstructing the improvements on the demised premises unless SEEDA and Kennon agree otherwise.

j. Develop a draft lease as set forth herein and negotiate the final terms of the lease in good faith with Kennon.

5. **Commitment by Kennon.** Kennon agrees to support SEEDA's efforts to secure the Grant and Loan. Upon award of the Grant and Loan by the Wyoming Business Council Kennon shall:

   a. Shall provide a representative to the Project Steering Committee.

   b. Provide SEEDA with any and all information necessary, and at its disposal, to allow for prompt submission of quarterly reports to the Wyoming Business Council.

   c. Retain all of its own records related to the Project for five (5) years following Kennon's date of notice to the Wyoming Business Council of the closeout of the Grant.

d. Carry Builder's Risk insurance for the Project throughout construction for the awarded bid price, and in the event of claim, pay any required deductible.

e. At its sole discretion, provide such staff support and expertise it deems necessary or expedient to meet its responsibilities under this Agreement.

f. Finance Project items which are ineligible for Grant funding, including approximately $1.1 million in capital equipment investments over five years, as well as any Project costs in excess of the estimated Project costs included in the Grant and Loan application.

Following completion of the Facility, Kennon shall:

a. Enter into a lease agreement with SEEDA to lease the Facility for three consecutive 7-year terms. Such lease shall establish a $6.00/square foot lease rate for the first seven years. Thereafter, the lease rate shall be set at $6.25/share foot and appreciate by 1.5% each year thereafter.

b. Comply with all business and operational performance measures required by SEEDA and approved by the WBC in awarding the Grant or Loan; document all performance in conjunction with quarterly and annual reports required by the WBC, collect necessary data, and prepare any required reports for compliance with the Grant or Loan.

c. As detailed in the Grant and Loan applications and in the absence of unforeseen economic factors, after completion of the project and within the five years of operation, Kennon will employ up to an additional 39 full time equivalent (FTE) positions of staff in addition to those already employed by Kennon, at an average salary above the Sheridan County median wage. If economic conditions change in such a manner that would not allow Kennon to achieve the project numbers listed above, Kennon will submit an updated plan with revised employment numbers and an explanation of the change in economic factors causing the need to revise the employment numbers.

d. Maintain in its name, all utility services required on the premises, including gas, electricity, telephone, fiber optic or cable communications, water, and sewer connections and services; and pay all charges as they become due.

e. Remain liable for any injury or damages to the equipment or service lines of the utility suppliers that are located on the demised premises, resulting from the negligent or deliberate acts of Kennon, or the agents or employees of Kennon.

f. Pay and discharge when due, as part of the rental of the demised premises all federal, state, municipal, and local taxes, assessments, levies and other charges, general and special, ordinary and extraordinary, or whatever name, nature, and kind that are or may be during the term of the lease agreement.

g. Maintained the demised premises and appurtenances to the demised premises in good repair and in at least as good condition as that in which they were

delivered, including the exterior, grounds, and sidewalk maintenance, allowing for ordinary wear and tear.

h. Maintain liability insurance and ensure that the liability coverage offered extends to operation of the Project, and furnish a copy of notice of coverage to SEEDA.

a. Finance Project items which are ineligible for Grant funding, as well as any Project costs in excess of the estimated Project costs included in the Grant and Loan application.

6. **Termination of this Agreement.** SEEDA and Kennon shall each have the right to terminate this Agreement at any time for any reason prior to SEEDA's expenditure of any Grant or Loan funds it received from WBC for the Project. Termination of this Agreement prior to expenditure of Grant or Loan funds shall be accomplished by providing the other party written notice thereof. In the event of such termination prior to expenditure of Grant or Loan funds, each Party shall be released from performing all obligations, covenants and promises contained in the Agreement and each Party shall bear and be solely responsible for the payment of all costs and expenses of any kind or nature that they have incurred pursuant to this Agreement.

   After expenditure of any Grant or Loan funds for the Project, termination of this Agreement shall only occur by mutual agreement in writing of both Parties, and only when accompanied by a SEEDA-approved plan to resolve all outstanding matters pertaining to the terms and conditions of the grant award.

7. **Sovereign Immunity.** SEEDA does not waive sovereign immunity by entering into this Agreement and specifically retains the immunity and defenses available to it pursuant to Wyo. Stat. Ann. 1-39-104 and all other state laws.

8. **General Provisions**.

   a. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns for the respective Parties hereto, and any entities resulting from the reorganization, consolidation or merger of either Party hereto.

   b. The Parties may request changes to this Agreement. Any changes, modifications, revisions or amendments to this Agreement that are mutually agreed upon by and between the Parties shall be incorporated by written instrument, and effective when executed and signed by all Parties to this Agreement.

   c. The laws of the State of Wyoming shall govern the construction, interpretation and enforcement of this Agreement. The courts of the State of Wyoming shall have jurisdiction over any action arising out of this Agreement.

   d. The Parties shall not assign or otherwise transfer any rights or delegate any of the duties set forth in this Agreement without prior written consent of the other Parties.

   e. This Agreement constitutes the entire understanding and agreement between the Parties relating to the subject matter hereof and supersedes all prior

agreements, representations or understandings between the parties relating to the subject matter hereof.

f. This Agreement may be signed counterparts.

g. The undersigned representative of Kennon represents and warrants that they have the approval and authority of Kennon to sign and execute this Agreement on behalf of Kennon.

h. All notices, demands, requests and other writing required or permitted to be given hereunder shall be deemed duly given if delivered or if mailed by certified mail and addressed to the following:

If to SEEDA — Sheridan Economic and Educational Development Authority
Attn: Robert Briggs
1 Whitney Way
Sheridan, WY 82801

If to Kennon: — Kennon Products, Inc.
Joe Wright, P.E., CEO
2071 North Main St.
Sheridan, WY 82801

i. Any of the Parties shall reserve the right to specify in writing in the manner provided, another address to which subsequent notices or writings to such Party shall be given. Any notice given hereunder shall be deemed to have been given as of the date delivered or mailed.

SIGNED AND EXECUTED by the Parties effective as of the date set forth above.

SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY

By: Paul Young
Paul Young, Chair

ATTEST:

Rich Bridger
Rich Bridger, Secretary

KENNON PRODUCTS, INC.

By: Joe Wright
Joe Wright, CEO

ATTACHMENT C TO THE BUSINESS READY COMMUNITY GRANT AND LOAN PROGRAM GRANT AGREEMENT BETWEEN THE WYOMING BUSINESS COUNCIL AND THE SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY JOINT POWERS BOARD

OPERATIONS AND MAINTENANCE AGREEMENT
BETWEEN THE SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY
AND
KENNON PRODUCTS, INC

This Agreement (hereinafter referred to as "Agreement") is made and entered into on this 14th day of ~~Month~~ March, 2019, by and between the Sheridan Economic & Educational Development Authority, a joint powers board, (hereinafter referred to as "SEEDA") whose address is 55 Grinnell Plaza, Sheridan, Wyoming 82801; and Kennon Products, Inc. (hereinafter referred to as "Kennon"), a Wyoming for profit corporation, whose address is 2071 North Main St., , Sheridan, WY 82801.

1. **Purpose.** The purpose of this agreement is to establish the mutually agreed upon terms and conditions for the operation by Kennon of the manufacturing facility and grounds owned by SEEDA, with a physical address of a portion of Lot B of the Sheridan High Tech Gateway Subdivision (hereinafter referred to as "Facility"). Further, this Agreement outlines the responsibilities of each party in ensuring compliance with the terms and conditions of the $2,850,000 in Wyoming Business Counsel grant funding and $1,510,761 in Wyoming Business Council loan funding used to construct the Facility. In accepting funding from the Wyoming Business Council, SEEDA, embraced the following goals for the Facility:

    a. Increase funding for SEEDA to be used for additional economic development activities.

    b. Increase the number of jobs in the manufacturing sector in Sheridan.

    c. Support growth of target industries and realize increased development at the Sheridan High-Tech Park.

    d. Grow the local tax base.

2. **Terms of Agreement.** This Agreement is effective upon the date of this Agreement and will remain effective for as long as Kennon and SEEDA are bound by a lease agreement for the Facility and associated grounds.

3. **Responsibilities of SEEDA.**

    a. Lease Agreement. Subject to the terms of a separate lease agreement, SEEDA shall lease the Facility to Kennon for the purposes outlined below in Section 4.b.

    b. Grant Reporting and Record Keeping. SEEDA shall ultimately be responsible for demonstrating grant agreement compliance for the facility, and for preparing all annual reporting to the Wyoming Business Council. SEEDA shall maintain records of all correspondence and reports to the Wyoming Business Council.

    c. Support. SEEDA shall endeavor to support Kennon in any way it deems appropriate to aid Kennon in meeting its responsibilities outlined in this Agreement.

4. **Responsibilities of Kennon.**

a. Lease Agreement. Kennon shall be subject to a separate lease agreement which shall govern Kennon's tenancy of the Facility.

b. Grant Reporting and Record Keeping. Kennon shall maintain programmatic and financial records sufficient to allow SEEDA to meet the grant reporting requirements of the Wyoming Business Council. Given reasonable notice, Kennon shall provide the following information to SEEDA to support their annual report to the Wyoming Business Council.

i. Employment including: Number of jobs, job type, annual wages, and benefits created to date as a result of operation of the Facility.

ii. Activities and assessments/evaluations that document or show support in meeting the goals outlined in the original grant application:

1. Increase job growth in Sheridan County in the near term.

2. Catalyze future job growth in Sheridan.

3. Generate revenue for SEEDA for additional economic development activities.

iii. Other narrative that conveys the accomplishments, trends, issues and concerns related to the operation of the Facility.

iv. Other documentation: If available, any other documentation of the operation of the Facility such as photographs and newspaper reports.

c. Operation of Facility

i. Use of Facility Generally. Kennon shall design, develop, and manufacture engineered products to protect high value assets primarily within the aviation industry.

ii. Positions employed. Working under the assumptions of the Business Plan, Kennon shall endeavor to employ a total of 39 full time equivalent positions in the first 5 years of commencing operations at the Facility. If economic conditions change in such a manner that would not allow Kennon to achieve the project numbers listed above, Kennon will submit an updated plan with revised employment numbers and an explanation of the change in economic factors causing the need to revise the employment numbers.

d. Professional Development Opportunities. Working in conjunction with Sheridan College and other appropriate state and local entities, Kennon shall seek to provide professional development opportunities to local students looking to pursue a career in manufacturing.

e. Reporting. Kennon shall prepare the following at its own expense:

i. Quarterly Reports. Kennon shall report quarterly to SEEDA on the following:

1. A summary of Kennon's activities and pursuit of Facility goals.
2. Current employment levels.
3. Professional development opportunities offered.
4. A summary of revenues and expenditures.

ii. Annual Financial Report. Kennon shall provide SEEDA with copies of its IRS Form 1065 within 90 days of its filing each year. Kennon shall also provide unaudited financial statements with limited verification performed by a SEEDA designee on items such as:

1. Payment of payroll taxes.
2. Insurance status.
3. Grant compliance with other funding agencies.
4. Pending litigation

5. **Sovereign Immunity.** SEEDA does not waive sovereign immunity by entering into this Agreement, and specifically retains the immunity and defenses available to it pursuant to Wyo. Stat. § 1-39-104(a) and all other state laws.

6. **Maintenance Responsibilities.**

a. Responsibilities of SEEDA. SEEDA will be responsible for operation and maintenance responsibilities throughout the term of the leases as specified:

i. Site/Grounds

1. Provide proper drainage of the site to keep water away from the building and to eliminate puddles and ice buildup.
2. Provide any necessary fencing.
3. Provide and maintain proper traffic control signage.
4. Repair or replace broken, damaged underground sprinkler system and winterize underground sprinkler system each year.

ii. Building Exterior

1. Provide water tight, secure, insulated building envelope. Maintain sealants, coatings, paints, and other materials for functional, attractive exterior.
2. Replacement of damaged or dilapidated building components such as roof assembly, doors, windows, siding, fascia, soffits, etc.

iii. Building Structure

1. Repair or replace all falling, damaged, or improperly functioning interior components and finishes.

iv. Building Interiors

1. Provide finished, safe, code compliant properly functioning interior components and finishes.
2. Replace dilapidated interior finishes such as wall and ceiling finishes, flooring, plastic laminate casework, countertops, etc.

v. Mechanical systems and equipment

1. Repair or replace failing or dilapidated HVAC, plumbing, or fire protection equipment.
2. Yearly inspection of all mechanical equipment, with tenant present.

vi. Electrical Systems and Equipment

1. Repair or replace failing or dilapidated primary or secondary electrical gear, lighting Fixtures, electrical receptacles, and all other electrical fixtures and equipment.
2. Maintain and certify proper operation of fire alarm systems.
3. Provide raceways and access for telephone, and IT systems.

vii. Other

1. Review and approve all improvements as they become necessary for needs of tenant's operations prior to any improvements.

b. Kennon responsibilities. Kennon will be responsible for operation and maintenance responsibilities throughout the term of the leases as specified:

i. General Responsibilities

1. Provide SEEDA with an annual plan of maintenance activities related to the responsibilities found in subsections ii through viii below.
2. Provide SEEDA evidence that the annual maintenance plan is being followed in a timely manner.

ii. Site/Grounds

1. Keep grounds clean of debris, snow and ice such that water cannot puddle and freeze or be held against the building
2. Remove snow and debris from parking lot, driveways, sidewalks and gutters for safe access to and from the building.
3. Maintain latches, hinges and locks on gates and maintain any fencing for cleanliness and safety.

4. Provide and install any signage specific to tenant operations.
5. Maintain and water lawn, trees and shrubs and keep site and grounds clean.

iii. Building Exterior

1. Keep building exterior clean including walls, windows, doors, and roofs and keep gutters and downspouts clean and free of debris to allow proper drainage.
2. Minor repairs and maintenance of roofing, doors, windows, siding, fascia, soffits, etc.

iv. Building Structure

1. Protect structural elements from excessive loading, cutting, or modifications.

v. Building Interiors

1. Protect interior components and finishes from abuse. (It is expected that normal wear of interior components and finishes will occur)
2. Repair or replace interior components or finishes that are damaged as a direct result or abuse or accidental damage of the tenant's operations.

vi. Mechanical systems and equipment

1. Maintain HVAC, plumbing, and fire protection equipment with routine scheduled maintenance.
2. Quarterly inspection of all mechanical equipment including a written report of results of inspection to landlord within 30 days after the inspection.

vii. Electrical Systems and Equipment

1. Protect electrical fixtures and equipment from abuse and from unauthorized overloading or modifications. Provide proper lamp and bulb replacement in light fixtures.
2. Maintain and certify proper operation of fire alarm systems.
3. Maintain and certify proper operation of security systems.
4. Provide and install equipment and wiring for rewiring for telephone, and IT systems as approved by Landlord.

viii. Other

1. Improvements as they become necessary for needs of tenant's operations.

7. **General Provisions.**

a. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns for the respective parties hereto, and any entities resulting from the reorganization, consolidation or merger of either party hereto.

b. The parties may request changes to this Agreement. Any changes modifications, revisions or amendments to this Agreement that are mutually agreed upon by and between the parties shall be incorporated by written instrument, and effective when executed and signed by all parties to this Agreement.

c. The laws of the State of Wyoming shall govern the construction, interpretation and enforcement of this Agreement. The courts of the State of Wyoming shall have jurisdiction over any action arising out of this Agreement.

d. The parties shall not assign or otherwise transfer any of the rights or delegate any of the duties set forth in this Agreement without prior written consent of the other parties.

e. This Agreement constitutes the entire understanding and agreement between the parties relating to the subject matter hereof and supersedes all prior agreements, representations or understandings between the parties relating to the subject matter hereof.

f. The undersigned representative of SEEDA and KENNON represents and warrants that he has approval and authority of SEEDA and/or KENNON to sign and execute this Agreement on behalf of SEEDA and KENNON.

g. All notices, demands, requests and other writings required or permitted to be given hereunder shall be deemed duly given if delivered or of mailed by certified mail, and addressed to the following:

If to SEEDA: Sheridan Economic and Educational Development Authority
Attn: Robert Briggs
1 Whitney Way
Sheridan, WY 82801

If to KENNON: Kennon Products, Inc.
Joe Wright, P.E., CEO
2071 North Main St.
Sheridan, WY 82801

h. Either of the two parties shall reserve the right to specify in writing in the manner provided, another address to which subsequent notices or writings to such party shall be given. Any notice given hereunder shall be deemed to have been given as of the date delivered or mailed.

IN WITNESS WHEREOF, the parties execute this agreement as of the date set forth above.

SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY

By:_____
Paul Young, Chair

ATTEST:

_____
Rich Bridger, Secretary

KENNON PRODUCTS, INC

By:_____
Joe Wright P.E., CEO

ATTACHMENT D TO THE BUSINESS READY COMMUNITY GRANT AND LOAN PROGRAM GRANT AGREEMENT BETWEEN THE WYOMING BUSINESS COUNCIL AND THE SHERIDAN ECONOMIC DEVELOPMENT AUTHORITY JOINT POWERS BOARD

Revenue Recapture Narrative

SEEDA presently manages the recaptured funds from both the Sheridan Hi-Tech Park and the Sheridan Commercial Park projects, which both utilized WBC Community Readiness grant funds to install infrastructure to create project ready properties. SEEDA has realized revenue in the form of sales and compensation for property within the parks. Below is a summary accounting of revenues and expenditures related to those funds:

Revenue Recapture as of 6/30/2018		
Revenues		
Sheridan Hi-Tech Park: Lot 3	$ 145,161.00	
Sheridan Hi-Tech Park: Lot A	$ 110,940.00	
Sheridan Hi-Tech Park: North Sheridan Interchange	$ 470,541.00	
Sheridan Commercial Park: Lot 1	$ 551,990.00	
Sheridan Commercial Park: Lot 9	$ 271,326.00	**$ 1,549,958.00**
Expenditures and Committed Funds		
Matching Funds: CTET Strategy and Target Industry Study	$ 16,625.00	
Wyoming Theater Festival	$ 145,000.00	
Matching Funds - Creative Economy Study	$ 16,667.00	
Matching Funds - WYO Performing Arts Phase II (Hallmark)	$ 200,000.00	
Matching Funds and Local Expenses - Project Enterprise	$ 342,704.39	
Sheridan Startup Challenge	$ 50,000.00	
Deck Rd. Property Redevelopment Project	$ 95,000.00	
SEEDA Facility Maintenance and Insurance	$ 73,076.24	
Prof. and Contract Services in Support of Economic Activites	$ 38,765.38	**$ 977,838.01**
		$ 572,119.99

As demonstrated by the number of activities funded by existing revenue recapture funds, SEEDA actively uses recapture dollars to leverage additional resources for local economic development projects. This includes providing matching funds for other Wyoming Business Council funded projects. The SEEDA Board has not opted to commit recaptured funds to this project in large part due to the loan associated as part of the finance package. Since Kennon will pay a competitive lease, the loan is in essence a commitment on the part of SEEDA to allocate future recapture funds to the project in the form of the debt service on the loan.

By incorporating a loan into the project, SEEDA is able to preserve existing recapture funds to use towards projects where the immediate availability of funds is more important to catalyzing the project or leveraging additional dollars, and in cases where the revenue stream for the project may not be as consistent. If SEEDA had not requested a loan, the Board would have committed recapture dollars as a matching committment.

Expenses related to the project
SEEDA will pay expenses related to the project and not covered by the tenant and withhold those expenses from future remittances to the Wyoming Business Council. Expenses may include but are not limited to major maintenance not included in the triple net lease, inspections, owner's insurance, and legal fees related to the management, lease and sale of the property. Specifically, in the lease agreement SEEDA commits that it "shall keep, maintain, repair and replace as necessary or appropriate the foundations, roof, and structural portions of THE BUILDING in good operating condition and in compliance with all requirements of applicable governmental authorities."

Economic Development Activities Supported by SEEDA Recapture
SEEDA will retain 75% of the revenue recaptured from this project and use those funds for the following economic development purposes:

- 25% of recaptured funds to be set aside as project funds for SEEDA initiatives for development of capital projects, workforce training or job creation initiatives in Sheridan County; for the purposes of economic and educational development of the Sheridan Community. This includes further development of workforce related educational training opportunities, and helping catalyze economic activity in identified target industries.

- 25% of recaptured funds to be committed toward the further development and maintenance of project ready property in the Sheridan High-Tech Park or other locations identified by the SEEDA board.

- 50% to be held in reserve for other business recruitment and retention efforts identified by the SEEDA board.

Management of Funds
SEEDA, and its member entities, have many years of experience administering grant and loan funding. In accordance with SEEDA by-laws and in keeping with the activities listed above, SEEDA will be responsible for the management and utilization of recaptured funds.

Ken Thorpe, Chair
Sheridan Economic & Educational Development Authority

8/27/18
Date

DRAFT

RESOLUTION OF SUPPORT

RESOLUTION NO. XX-XX

A RESOLUTION AUTHORIZING SUBMISSION OF APPLICATION TO THE WYOMING BUSINESS COUNCIL UNDER THE BUSINESS READY COMMUNITY GRANT AND LOAN PROGRAM FOR A COMMUNITY READINESS GRANT ON BEHALF OF THE GOVERNING BODY OF THE SHERIDAN ECONOMIC AND EDUCATIONAL DEVELOPMENT AUTHORITY

FOR THE PURPOSE OF: SHERIDAN HIGH-TECH PARK, PHASE II

WITNESSETH

WHEREAS, the Governing Body of the Sheridan Economic and Educational Development Authority (SEEDA) Joint Powers Board desires to participate in the Business Ready Community Grant and Loan Program to assist in financing this project; and

WHEREAS, the Sheridan City Council together with Governing Body of the Sheridan Economic and Educational Development Authority recognizes the need for project ready properties for business recruitment and strategic expansion of existing local businesses, and believes this project will address those needs; and

WHEREAS, the public benefit(s) of this project will be the creation of project ready property that can be used to attract and catalyze business investment and job creation in the community (both through recruitment and expansion) and the consideration is the acquisition of the site for an expansion of the Sheridan High-Tech Park and the installation of public roadway and utility infrastructure; and

WHEREAS, the specific goals and measures of success of this project are:

- Acquisition of a 35 acre site north of the existing Sheridan High-Tech Park site (with an additional 10.29 acres being gifted to the project).
- Installation of public infrastructure to the site including water, sewer, and roadway.

; and

WHEREAS, the Business Ready Community Grant and Loan Program requires that certain criteria be met, as described in the Wyoming Business Council's Rules governing the program, and to the best of our knowledge this application meets those criteria; and

WHEREAS, the Governing Body of the SEEDA Joint Powers Board plans to provide cash match to this Business Ready Community Grant and Loan Program Planning project from the following source(s):

A cash match of up to $606,500 from SEEDA's general funds.

; and

WHEREAS, the Governing Body of the SEEDA Joint Powers Board plans to provide in-kind match to this Business Ready Community Grant and Loan Program Enhancement project from the following source(s):

A 10.29 acre additional tract of land for the project with an appraised value of $500,000.

; and

WHEREAS, the Governing Body for the City of Sheridan has a comprehensive operation and maintenance plan for all public infrastructure which will extend the life of the public infrastructure; and

WHEREAS, the Governing Body for SEEDA Joint Powers Board will use the revenue recaptured from this project for the following economic development purposes:

- Project funds for SEEDA initiatives for development of capital projects, workforce training or job creation initiatives in Sheridan County; for the purposes of economic and educational development of the Sheridan Community. This includes further development of workforce related educational training opportunities, and helping catalyze economic activity in identified target industries.

- Further development and maintenance of project ready property in the Sheridan High-Tech Park or other locations identified by the SEEDA board.

- Other business recruitment, expansion and retention efforts identified by the SEEDA board.

WHEREAS, In the event of any project cost overruns, the SEEDA will provide funding in the amount necessary to complete the project utilizing SEEDA's general or reserve funds; and

WHEREAS, the Governing Body for the SEEDA Joint Powers Board has considered other possible funding solutions for this project which include available SEEDA project dollars from its general fund and US EDA grant funds; and

WHEREAS, SEEDA is working in partnership with Sheridan College, and the City of Sheridan; and

WHEREAS, the City Council heard public comments during the meeting on May 20, 2024, and the SEEDA Joint Powers Board will hold a public hearing on May 22, 2024, to solicit testimony from citizens, and will give full consideration to all comments received;

NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF SHERIDAN, that a grant application in the amount of $4,426,000 be submitted to the Wyoming Business Council for consideration of assistance in funding the Sheridan High-Tech Park, Phase II project.

DRAFT

BE IT FURTHER RESOLVED, that the Northern Wyoming Community College District is hereby designated as the authorized representatives of SEEEDA to act on behalf of the Governing Body on all matters relating to this grant application.

PASSED, APPROVED AND ADOPTED THIS 20th day of May, 2024.

By: _____
Rich Bridger, Mayor

ATTEST:

_____
Cecilia Good, City Clerk

CERTIFICATE

I, _____, hereby certify that the foregoing Resolution was adopted by the Sheridan City Council at a public meeting held on May 20, 2024, and that the meeting was held accordingly to law; and that said Resolution has been duly entered in the minutes of the Sheridan City Council.

_____
Cecilia Good, City Clerk