formerly Territorial Landworks, Inc.

WATER & SANITATION REPORT

for

River View Subdivision

Legally Described as:

That property described as Plat of the West Half (W1/2) of Lot 9 of Cobban and Dinsmores Orchard Homes Addition No. 2 in Missoula County, Montana, the same being laid out upon a portion of the northwest one-quart of the northeast one quarter (NW ¼ NE ¼) of Section 20, Township 13 North, Range 19 West, Principal Meridian, Montana, Missoula County Montana.

Containing a total of 2.38 acres, more or less.

Published: October 5th, 2021

Prepared For:
Homes for Missoula, LLC
1923 River Rd
Missoula, MT 59801

Prepared By:
IMEG
1817 South Avenue West, Suite A
Missoula, MT 59801

J.1. **Map.** A vicinity map or plan that shows:

a. The location, within 100 feet outside of the exterior property line of the subdivision and on the proposed lots, of flood plains; surface water features; springs; irrigation ditches;
A vicinity map is provided in Section B showing the location of the property in relation to the surrounding area. A more detailed and extensive exhibit is provided in the Supplemental Data Sheets included in Section A showing all the required information outlined in Sections J.1, J.2, and J.3 of the subdivision application. There are no irrigation ditches that cross through the property. There is an irrigation ditch located South of the subject property. The are no other surface waters or floodplains associated with the property within 100 feet of the proposed subdivision. There are no other small intermittent drainage ways located within 100 feet of the proposed subdivision.

b. Existing, previously approved, and, for parcels fewer than 20 acres, proposed water wells and wastewater treatment systems; for parcels less than 20 acres, mixing zones;
The subdivision property has an existing home that was built in 1954 according to the property tax database. This home is served by the city of Missoula's wastewater system and has a permit on record. There are no proposed wells, wastewater treatment systems, or mixing zones associated with this property as the proposed subdivision will utilize existing infrastructure. All existing and previously approved water wells and wastewater treatment systems have been shown within 100 feet of the property boundary.

c. The representative drainfield site used for the soil profile description; and
Onsite wastewater systems utilizing drainfields are not proposed for this site.

d. The location, within 500 feet outside of the exterior property line of the subdivision, of public water and sewer facilities.
The location of existing public water and sewer facilities adjacent and surrounding the subdivision have been shown on the Supplemental Data Sheets.

J.2. **Description.** A description of the proposed subdivision's water supply systems, storm water systems, solid waste disposal systems, and wastewater treatment systems, including whether the water supply and wastewater treatment systems are individual, shared, multiple user, or public as those systems are defined in rules published by the Montana Department of Environmental Quality (DEQ).
The proposed subdivision will be served by Missoula Water and City of Missoula Sewer. An Intent to Serve letter will be issued by Missoula Public Works and Mobility Department to IMEG. This Intent to Serve letter will be issued in Stage 2 engineering of the proposed subdivision. There will need to be a water main extension south to the proposed park for the potential to loop the water main in the future. The proposed sewer connections will require no new infrastructure. The storm water system will be comprised of onsite mitigation and infiltration based on Missoula City requirements, see Grading and Drainage Report in Section D of this application for more details on the storm water system. The water supply system and wastewater treatment system for the proposed subdivision will both utilize public system connection to Missoula City Water and Wastewater systems.

J.3. Lot Layout. A drawing of the conceptual lot layout at a scale no smaller than 1 inch equal to 200 feet that shows all information required for a lot layout document in rules adopted by the Montana Department of Environmental Quality pursuant to 76-4-104, MCA.
A drawing of the Supplemental Data Sheets at a scale of 1-inch equals 200 feet that shows all the information required pursuant to 76-4-104, MCA is included.

J.4. Suitability. Evidence of suitability for new on-site wastewater treatment systems that, at a minimum, include:

a. A soil profile description from a representative drain-field site identified on the vicinity map that complies with standards published by the Montana Department of Environmental Quality;
No drainfields are proposed; this requirement is not applicable.

b. Demonstration that the soil profile contains a minimum of 4 feet of vertical separation distance between the bottom of the permeable surface of the proposed wastewater treatment system and a limiting layer; and
No drainfields are proposed; this requirement is not applicable.

c. In cases in which the soil profile or other information indicates that ground water is within 7 feet of the natural ground surface, evidence that the ground water will not exceed the minimum vertical separation distance of 4 feet.
No drainfields are proposed; this requirement is not applicable.

J.5. Water Quantity. For new water supply systems, unless cisterns are proposed, evidence of adequate water availability:

a. obtained from well logs or testing of onsite or nearby wells;
This is not applicable as Missoula Water, a regulated public water supply, is providing water to this proposed subdivision.

b. obtained from information contained in published hydro-geological reports; or
This is not applicable as Missoula Water, a regulated public water supply, is providing water to this proposed subdivision.

c. as otherwise specified by rules adopted by the Montana Department of Environmental Quality pursuant to 76-4-104, MCA.
This is not applicable as Missoula Water, a regulated public water supply, is providing water to this proposed subdivision.

J.6. Water Quality. Evidence of sufficient water quality in accordance with rules adopted by the Montana Department of Environmental Quality pursuant to 76-4-104, MCA.
This is not applicable as Missoula Water, a regulated public water supply, is providing water to this proposed subdivision.

I.7. Impacts to groundwater quality. Preliminary analysis of potential impacts to ground water quality from new wastewater treatment systems, using as guidance rules adopted by the board of environmental review pursuant to 75-5-301, MCA and 75-5-303, MCA related to standard mixing zones for ground water, source specific mixing zones, and non-significant changes in water quality. The preliminary analysis may be based on currently available information and must consider the effects of overlapping mixing zones from proposed and existing wastewater treatment systems within and directly adjacent to the subdivision. Instead of performing the preliminary analysis, the sub-divider may perform a complete non-degradation analysis in the same manner as is required for an application that is reviewed under Title 76, Chapter 4.
The impacts to groundwater quality are not applicable for new wastewater treatment systems as the proposed wastewater treatment system for this subdivision is connection to the Missoula City Sewer System. The wastewater from this subdivision will be processed and discharged to surface water at the Missoula Wastewater Treatment Facility.

Prepared by:
IMEG

Joe Dehnert, Land Use Planner

River View Subdivision

Groundwater Monitoring

	Mon. Well #1			Mon. Well #2		
Height from EG to Top of Pipe (ft)	0.5833			0.4167		
Date	GW to top of pipe (ft)	GW to EG (ft)	Soil Condition	GW to top of pipe (ft)	GW to EG (ft)	Soil Condition
4/23/2021	20.9	20.3	Dry	21.0	20.6	Dry
4/30/2021	20.9	20.3	Dry	21.0	20.6	Dry
5/6/2021	21.0	20.4	Dry	20.8	20.4	Dry
5/14/2021	21.0	20.4	Mud	20.7	20.3	Mud
5/21/2021	19.8	19.2	Wet	20.0	19.6	Wet
5/28/2021	18.3	17.7	Wet	18.5	18.1	Wet
6/4/2021	17.1	16.5	Wet	17.3	16.9	Wet
6/11/2021	17.3	16.7	wet	17.5	17.1	wet
6/18/2021	17.9	17.3	wet	18.1	17.7	wet
6/25/2021	18.6	18.0	wet	18.8	18.4	wet
7/1/2021	19.2	18.6	wet	19.4	19.0	wet

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Go to GWIC website
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (4/3/2009 12:53:07 PM)

Site Name: TYLER KARL
GWIC Id: 152138
DNRC Water Right: 95923

Section 1: Well Owner(s)

1) TYLER, KARL (MAIL)
10115 MULLAN RD
MISSOULA MT 59802 [08/28/1995]

Section 2: Location

Township	Range	Section	Quarter Sections
13N	19W	20	NW¼ NE¼

County	Geocode
MISSOULA	

Latitude	Longitude	Geomethod	Datum
46.876392	-114.026899	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Monday, August 28, 1995

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	60	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
60	60	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 30
Water Temperature:

Air Test *

30 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

JEROMES FILE NO: 6313

Section 9: Well Log

Geologic Source

112ALVM - ALLUVIUM (PLEISTOCENE)

From	To	Description
0	2	SOIL
2	30	SAND GRAVEL COBBLES
30	60	SAND GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: JEROMES DRILLING CO
License No: WWC-249
Date Completed: 8/28/1995

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Go to GWIC website
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (4/3/2009 12:51:50 PM)

Site Name: LAFRAY CURTIS
GWIC Id: 68897

Section 1: Well Owner(s)

1) LAFRAY, CURTIS (MAIL)
2011 RIVER RD
MISSOULA MT N/A [04/09/1972]

Section 2: Location

Township	Range	Section	Quarter Sections
13N	19W	20	NW¼ NE¼

County	Geocode
MISSOULA	

Latitude	Longitude	Geomethod	Datum
46.876392	-114.026899	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
3223			

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: CABLE
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Sunday, April 9, 1972

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	57	5				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
57	57	5			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 57
Static Water Level: 6
Water Temperature:

Air Test *

45 gpm with drill stem set at _ feet for 2.5 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 9 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

111ALVM - ALLUVIUM (HOLOCENE)

From	To	Description
0	2.5	TOPSOIL
2.5	7	COARSE GRAVEL AND SOME SAND
7	25	COARSE GRAVEL SAND AND WATER
25	29	SAND AND WATER
29	43	SAND GRAVEL AND WATER
43	48	RED CLAY NO WATER
48	52	SAND AND WATER
52	57	GRAVEL AND WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: PICKENS
License No: WWC-71
Date Completed: 4/9/1972

MEMORANDUM

DATE: August 5, 2021

TO: City of Missoula
Public Works & Mobility

FROM: IMEG Corp.
Andrew Mill, P.E. (Andrew.J.Mill@imegcorp.com)

RE: River View Subdivision Supplement Storm Drainage
Preliminary Storm Drainage Discussion (as part of Stage 2 submittal)

To Whom This Concerns,

As preliminary designs of the River View Subdivision occur, we are tasked with evaluating the storm drainage on-site in relation to the pre- and post-development 100-year storm. As part of the Missoula Public Works Manual, we will be proposing to mitigate the difference between the pre-and post-development 100-year 24-hour storm event. Our intent is to discharge no more stormwater runoff than was discharged off the site in the past before development.

This drainage memo only covers proposed impervious coverage in the right-of-way (roads, sidewalks and driveways). We anticipate this to be a rather straight forward storm water design, as the soils in this area have historically been found to be conducive to the installation of dry well sumps. Additionally, we have designed that no drywell sump will infiltrate more than 8,000 square feet of impervious coverage, which is the City typical standard rule-of-thumb right now. Please refer to the attached Drainage Basin Exhibit for information on basin delineation, impervious coverage, general site grading and proposed drywell sump locations.

Groundwater monitoring has been completed in two separate locations for this project to prove adequate separation distance between sumps and groundwater. Based on the monitoring from this spring, these results show the groundwater at 16.5' below ground at the highest point. With a standard 8-foot drywell sump and then the 2 feet of drain rock underneath (for 10 feet total depth), exceeds the minimum 4 feet of separate between groundwater and bottom of drywell, which should be adequate for the use of drywell sumps. Groundwater monitoring data has been included within this memo as an attachment.

Project Summary

The River View Subdivision is a major subdivision which proposes 19 lots to be utilized for residential purposes. All lots will be utilized for single family homes. The property is located directly adjacent to the south of River Road between Missy's Way and Skyla Court. The site is currently utilized for one single family home. This existing home will be removed as part of the development of the site. The proposed lots will be connected to the City of Missoula water and sewer systems. A road with a preliminary name of Road A has been proposed within the subdivision. This roadway proposes singular access off of River Road which will form a hammerhead at a dead-end turn-around within the proposed subdivision.

100-Year Storm Calculations

The SCS Curve Number Method was used to calculate the stormwater runoff from both the pre- and post-development 100-year storm. Calculations are attached within this memo to provide a summary of the peak flowrate and total volume for both design storms. The soil for this area is characterized as "Urban", which does not have a soil type associated with it. For the purpose of our calculations, we have used soil Type C to come up with curve numbers. Curve numbers of 74, 79, and 98 were used for existing ground, good condition landscaping and impervious coverage, respectively. See below for a table outlining the difference in the pre- and post-development storm runoff and refer to the attached calculations for total volume and peak flow.

Basin	Δ Peak Flow (CFS)	Δ Volume (CF)
A	0.17	352
B	0.33	724
C	0.032	65
D	0.057	120
E	0.31	659
F	0.19	431

Stormwater Runoff Mitigation

We have proposed one (1) drywell sump per drainage basin for the project to mitigate the stormwater runoff shown in the table above. We have determined that each sump has the capacity to store approximately 155 cubic feet of water, without taking any infiltration into account. Refer to the typical sump calculation sheet attached with this memo. Additionally, we have assumed an infiltration rate of 125 in/hr for this preliminary drainage memo, which allows for a flowrate of 0.145 cfs. We will be conducting percolation tests as per the City of Missoula Public Works Manual for the future final drainage report. With the anticipated infiltration rate of 0.145 cfs, the drywell sumps in basins A, B, E & F will not be able to keep up with the peak flow of the 100-year storm. We have provided calculations for Basin B (Basin with largest amount of impervious coverage) which show the volume of stormwater which will pond in the road to be 326 cf. We have also provided calculations which show that approximately 210 cf of this volume will be contained within the curb with the excess (116 cf) overtopping the curb line but withheld in the boulevard or overtopping grades into the adjacent basin.

Based on these preliminary calculations, assuming that assumptions are correct versus the final percolation test results and geotechnical report, one drywell sump per basin should be more than adequate to mitigate the difference between the pre- and post-development 100-year storm. Each basin will be designed such that if any one sump fails, stormwater runoff will be diverted to the next downstream basin before inundating any buildings.

Once we have an infiltration rate provided by the Geotechnical Engineer, we will be able to apply this to the drywell sump and have more accurate calculations on how much ponding should occur during the 100-year storm. Future finalized calculations will be provided once more on-site testing is completed by the Geotechnical Engineer.

Attachments:

- Groundwater Monitoring Results
- Post-Development Drainage Basin Exhibit
- Pre- and Post-Development 100-Year Storm Runoff Calculations
- Sump Overflow Volume Calculation
- Typical Sump & Road Section Volume Calculation
- Preliminary Road, Grading, and Drainage Construction Plans

Prepared By:
IMEG Corp.,

Mike Mayen, E.I.

Reviewed By:
IMEG Corp.,

Andrew Mill, P.E.

\\files\Active\Projects\2021\21001296.00\Design\Civil\1_ENG DESIGN\5_DEQ8 (Storm Drainage)\Memo.2021-08-05.CityMsla.Stage 2.Drainage River Rd Sub.docx

River View Subdivision

Groundwater Monitoring

	Mon. Well #1			Mon. Well #2		
Height from EG to Top of Pipe (ft)	0.5833			0.4167		
Date	GW to top of pipe (ft)	GW to EG (ft)	Soil Condition	GW to top of pipe (ft)	GW to EG (ft)	Soil Condition
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4/30/2021	20.9	20.3	Dry	21.0	20.6	Dry
5/6/2021	21.0	20.4	Dry	20.8	20.4	Dry
5/14/2021	21.0	20.4	Mud	20.7	20.3	Mud
5/21/2021	19.8	19.2	Wet	20.0	19.6	Wet
5/28/2021	18.3	17.7	Wet	18.5	18.1	Wet
6/4/2021	17.1	16.5	Wet	17.3	16.9	Wet
6/11/2021	17.3	16.7	wet	17.5	17.1	wet
6/18/2021	17.9	17.3	wet	18.1	17.7	wet
6/25/2021	18.6	18.0	wet	18.8	18.4	wet
7/1/2021	19.2	18.6	wet	19.4	19.0	wet

LEGEND

POST-DEVELOPMENT BASIN "A"
TOTAL AREA = 5,801 SF
IMPERVIOUS AREA = 4,533 SF

POST-DEVELOPMENT BASIN "B"
TOTAL AREA = 9,697 SF
IMPERVIOUS AREA = 7,717 SF

POST-DEVELOPMENT BASIN "C"
TOTAL AREA = 1,311 SF
IMPERVIOUS AREA = 1,065 SF

POST-DEVELOPMENT BASIN "D"
TOTAL AREA = 1,552 SF
IMPERVIOUS AREA = 1,249 SF

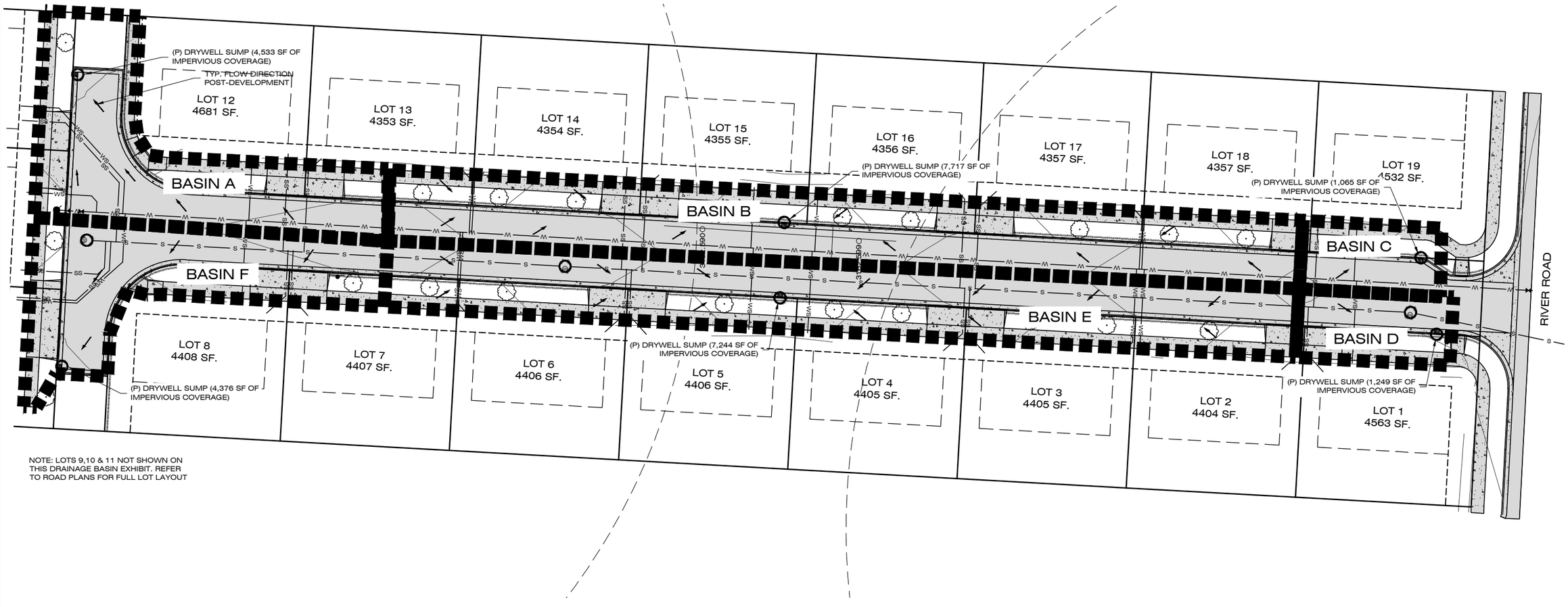
POST-DEVELOPMENT BASIN "E"
TOTAL AREA = 9,367 SF
IMPERVIOUS AREA = 7,244 SF

POST-DEVELOPMENT BASIN "F"
TOTAL AREA = 4,891 SF
IMPERVIOUS AREA = 4,376 SF

PROPOSED FLOW DIRECTION

DRAINAGE BASIN DELINEATION

20 0 20 40
SCALE IN FEET



NOTE: LOTS 9,10 & 11 NOT SHOWN ON THIS DRAINAGE BASIN EXHIBIT. REFER TO ROAD PLANS FOR FULL LOT LAYOUT

TERRITORIAL LANDWORKS, INC.
CIVIL ENGINEERING • SURVEYING • LAND USE CONSULTING
www.TerritorialLandworks.com
P.O. Box 3851
Missoula, MT 59806
Ph: 406/721-0142
Fax: 406/721-5224

PLOT DATE: 10/6/2021 12:44 PM

REVISIONS	DATE

DESIGNED: AM
DRAFTED: JW
CHECKED: CD
DATE: MAR. 2021

LOCATION: W1/2 LOT 9, COBBAN & DINSMORE'S #2 SECTION 20, T.13N, R.19W, P.M.M. MISSOULA COUNTY, MONTANA

PREPARED FOR:

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: PROPOSED DRAINAGE BASIN EXHIBIT

PROJECT NO. 19-5458

SHEET: 2 OF 2

DWG LOCATION: I:\FILES\ACTIVE\PROJECTS\2021\21001296.00\DESIGN\CIVIL\3_DRAFTING\1_DRAWINGS\AUTOCAD\EXHIBITS\21001296-DRAINAGE BASIN.DWG

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.153	2	718	307	------	------	------	Basin A
2	SCS Runoff	0.258	2	718	519	------	------	------	Basin B
3	SCS Runoff	0.035	2	718	71	------	------	------	Basin C
4	SCS Runoff	0.041	2	718	83	------	------	------	Basin D
5	SCS Runoff	0.258	2	718	519	------	------	------	Basin E
6	SCS Runoff	0.129	2	718	260	------	------	------	Basin F

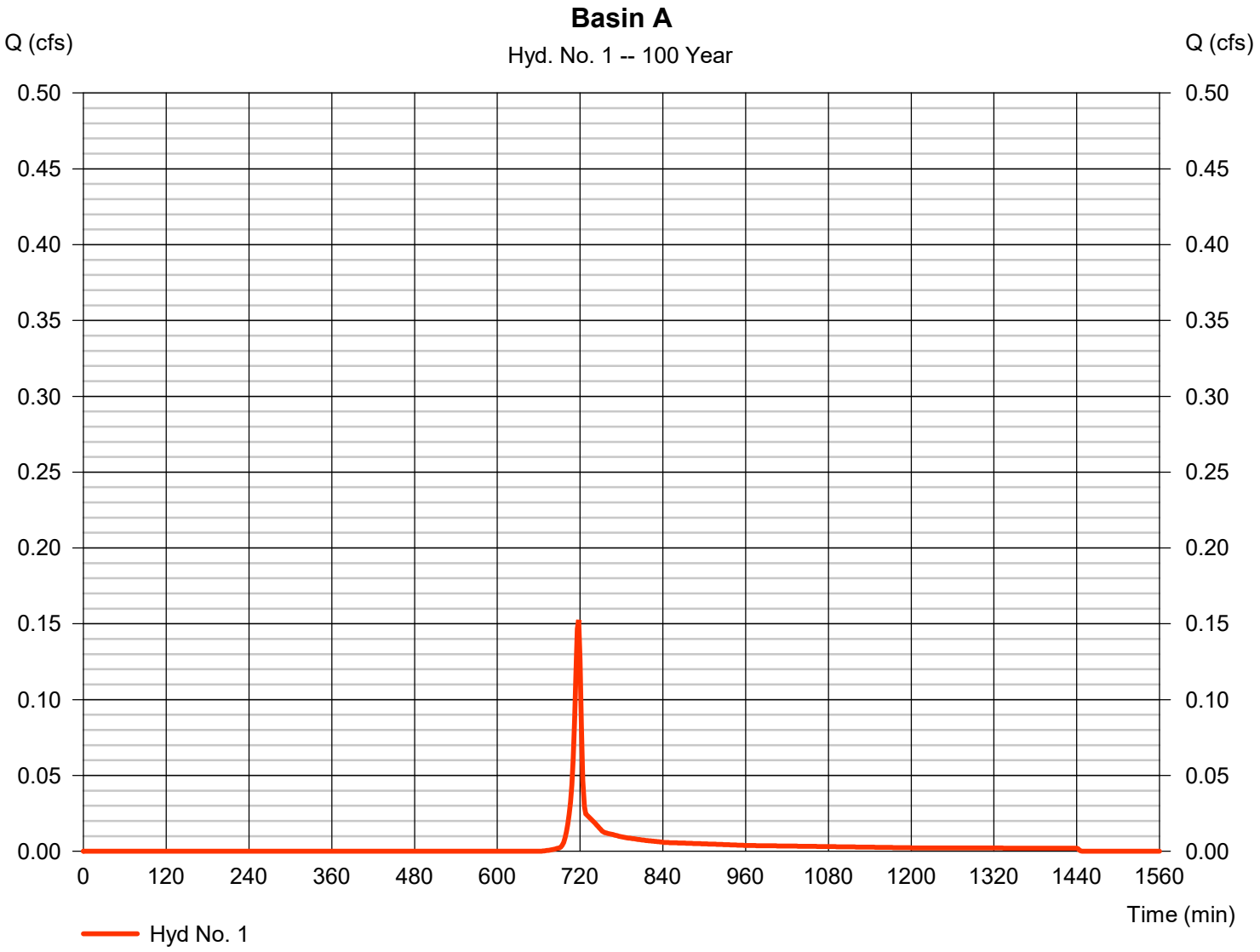
Hydrograph Report

Hyd. No. 1

Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.153 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 307 cuft
Drainage area	= 0.130 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.130 x 79)] / 0.130



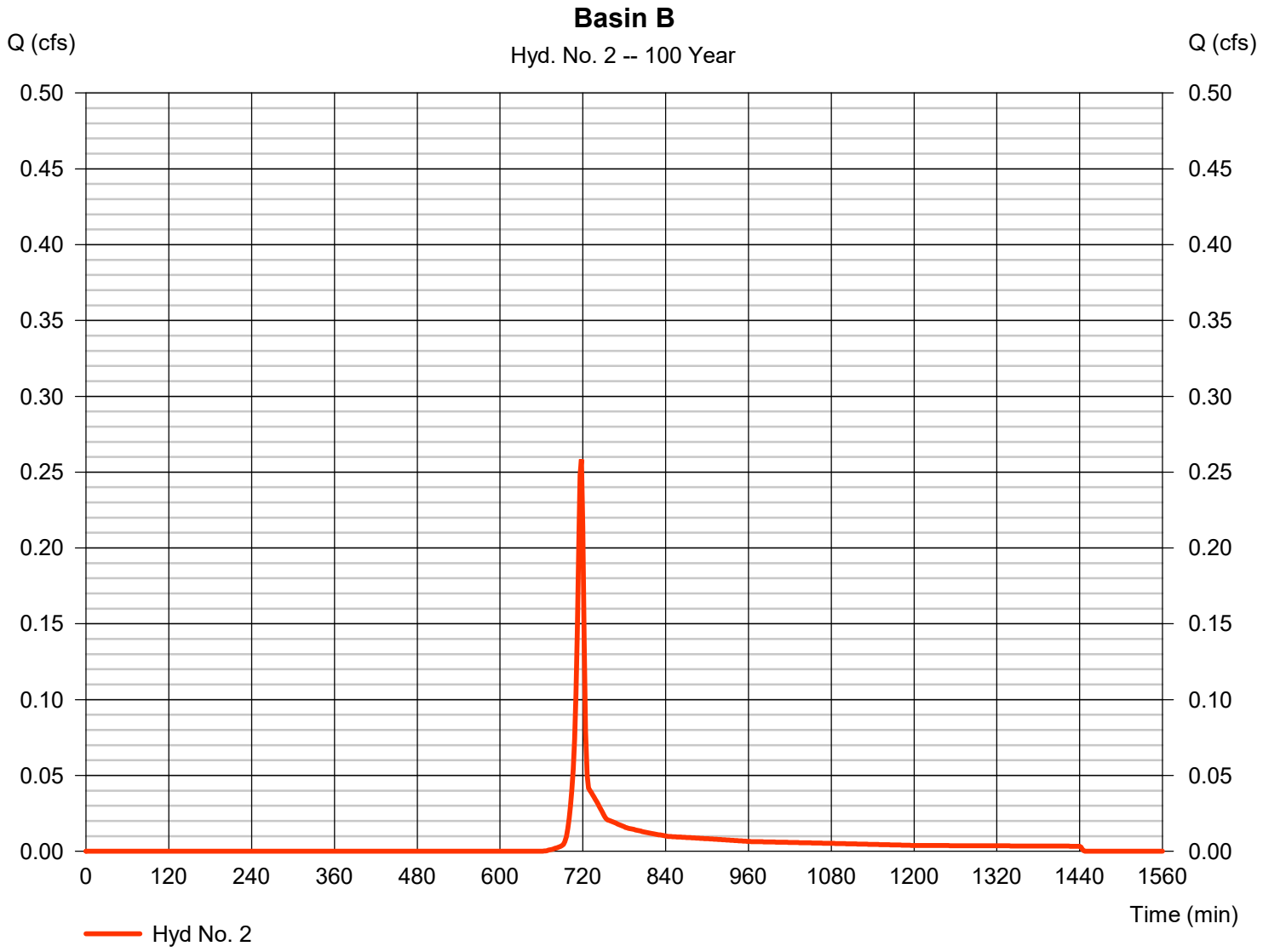
Hydrograph Report

Hyd. No. 2

Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.258 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 519 cuft
Drainage area	= 0.220 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.220 x 79)] / 0.220



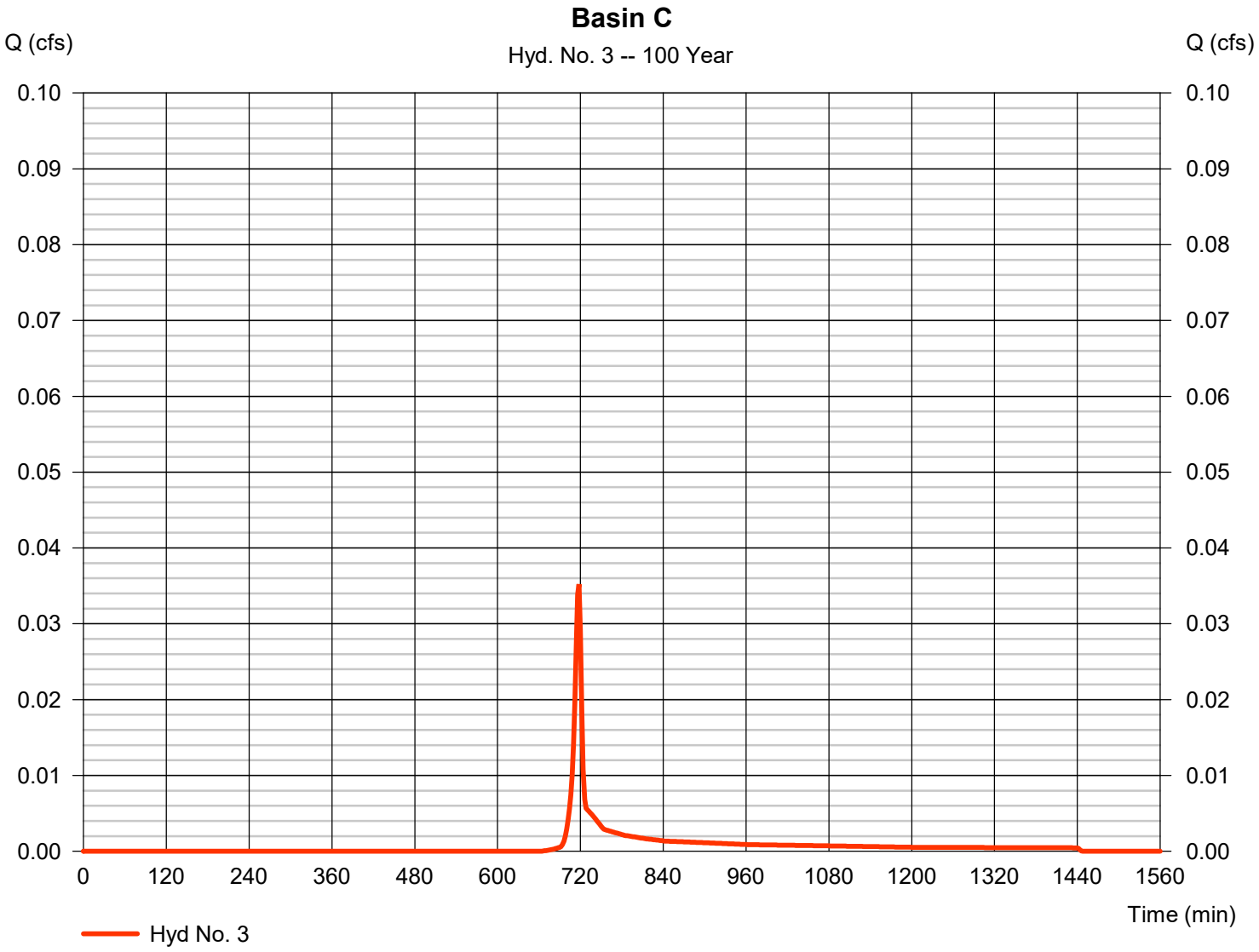
Hydrograph Report

Hyd. No. 3

Basin C

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.035 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	71 cuft
Drainage area	=	0.030 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.030 x 79)] / 0.030

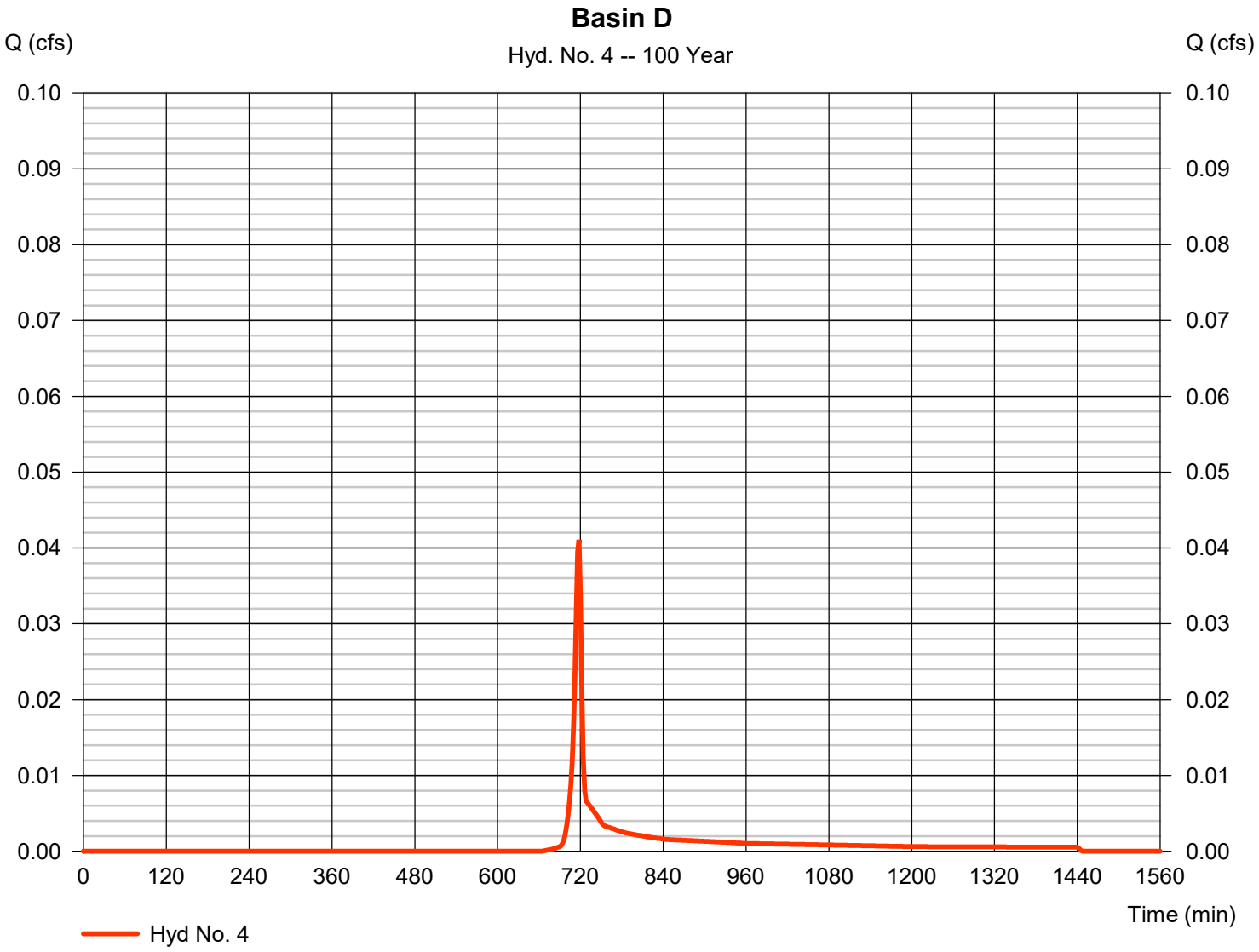


Hydrograph Report

Hyd. No. 4

Basin D

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.041 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	83 cuft
Drainage area	=	0.035 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



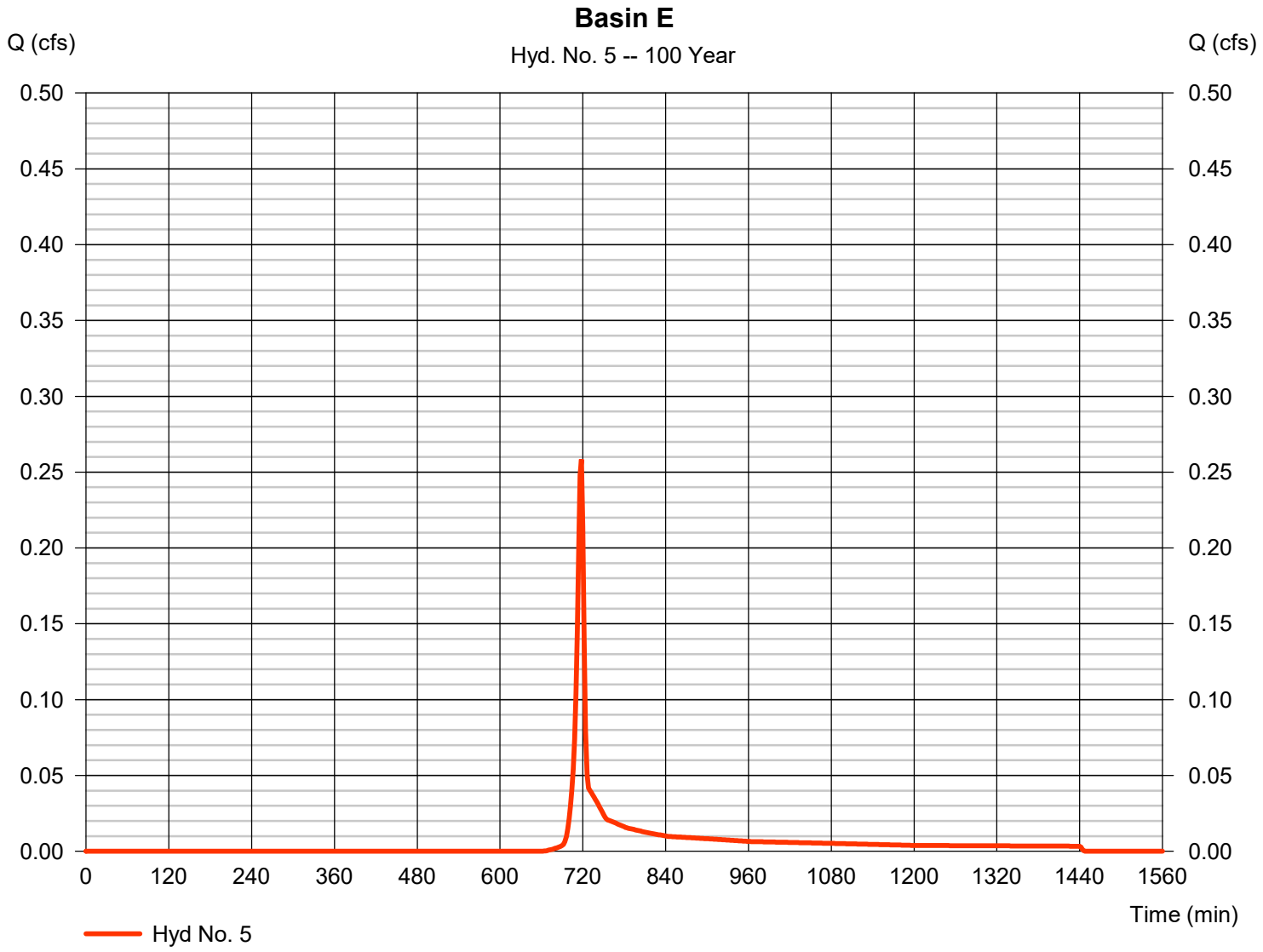
Hydrograph Report

Hyd. No. 5

Basin E

Hydrograph type	= SCS Runoff	Peak discharge	= 0.258 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 519 cuft
Drainage area	= 0.220 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.215 x 79)] / 0.220



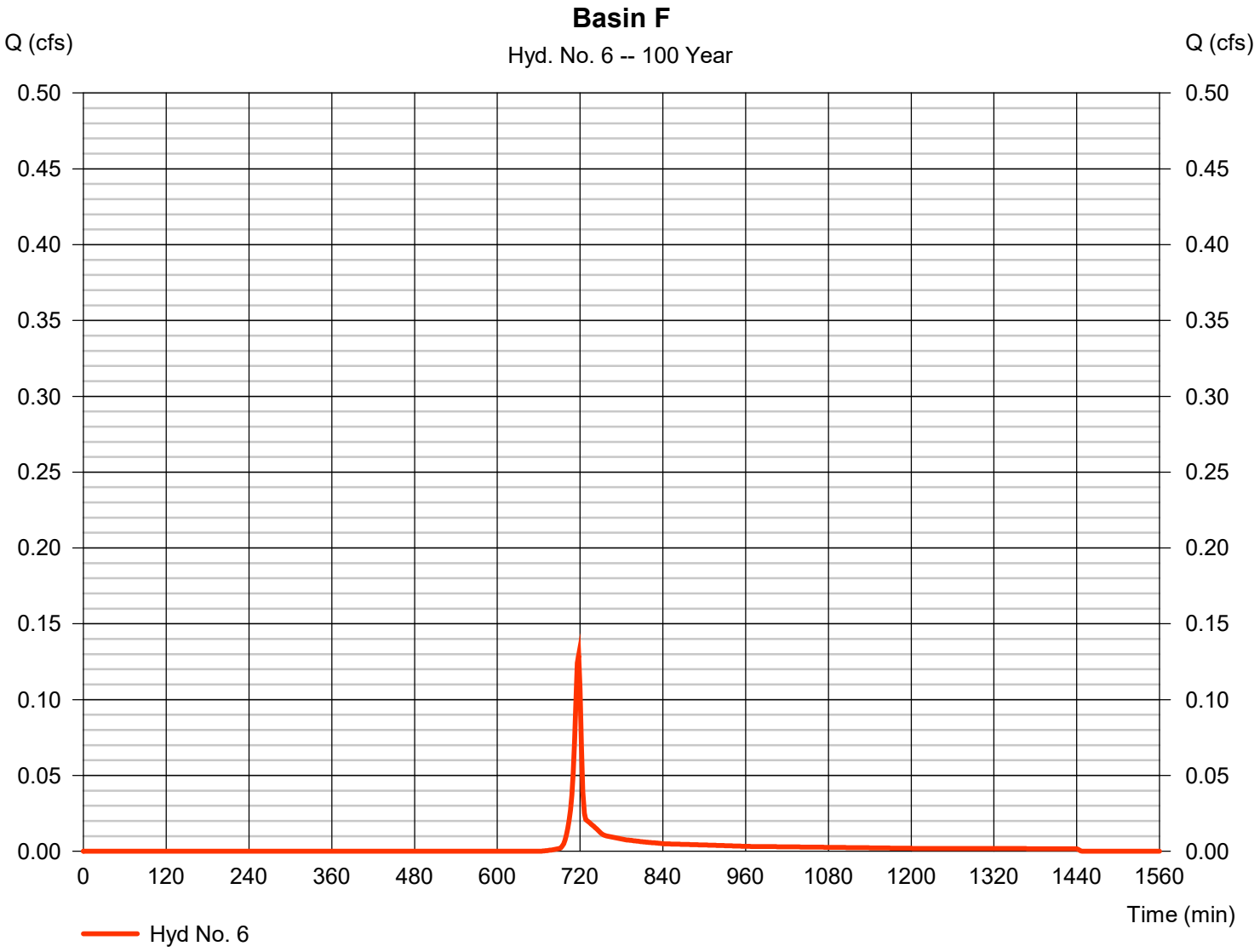
Hydrograph Report

Hyd. No. 6

Basin F

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.129 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	260 cuft
Drainage area	=	0.110 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.112 x 79)] / 0.110



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.320	2	716	659	------	------	------	Basin A
2	SCS Runoff	0.590	2	716	1,243	------	------	------	Basin B
3	SCS Runoff	0.067	2	716	136	------	------	------	Basin C
4	SCS Runoff	0.098	2	716	203	------	------	------	Basin D
5	SCS Runoff	0.566	2	716	1,178	------	------	------	Basin E
6	SCS Runoff	0.317	2	716	691	------	------	------	Basin F

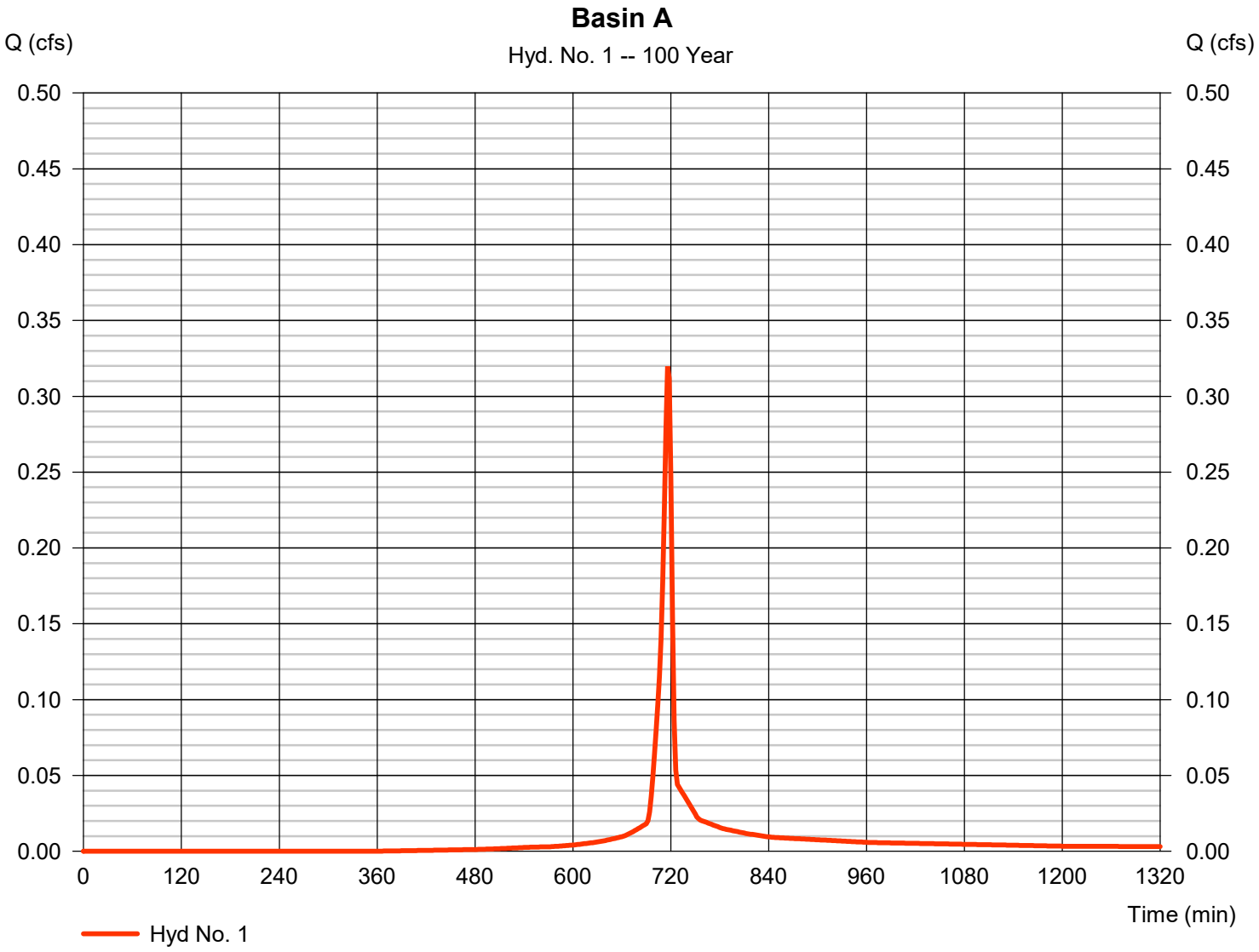
Hydrograph Report

Hyd. No. 1

Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.320 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 659 cuft
Drainage area	= 0.130 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 98) + (0.030 x 74)] / 0.130



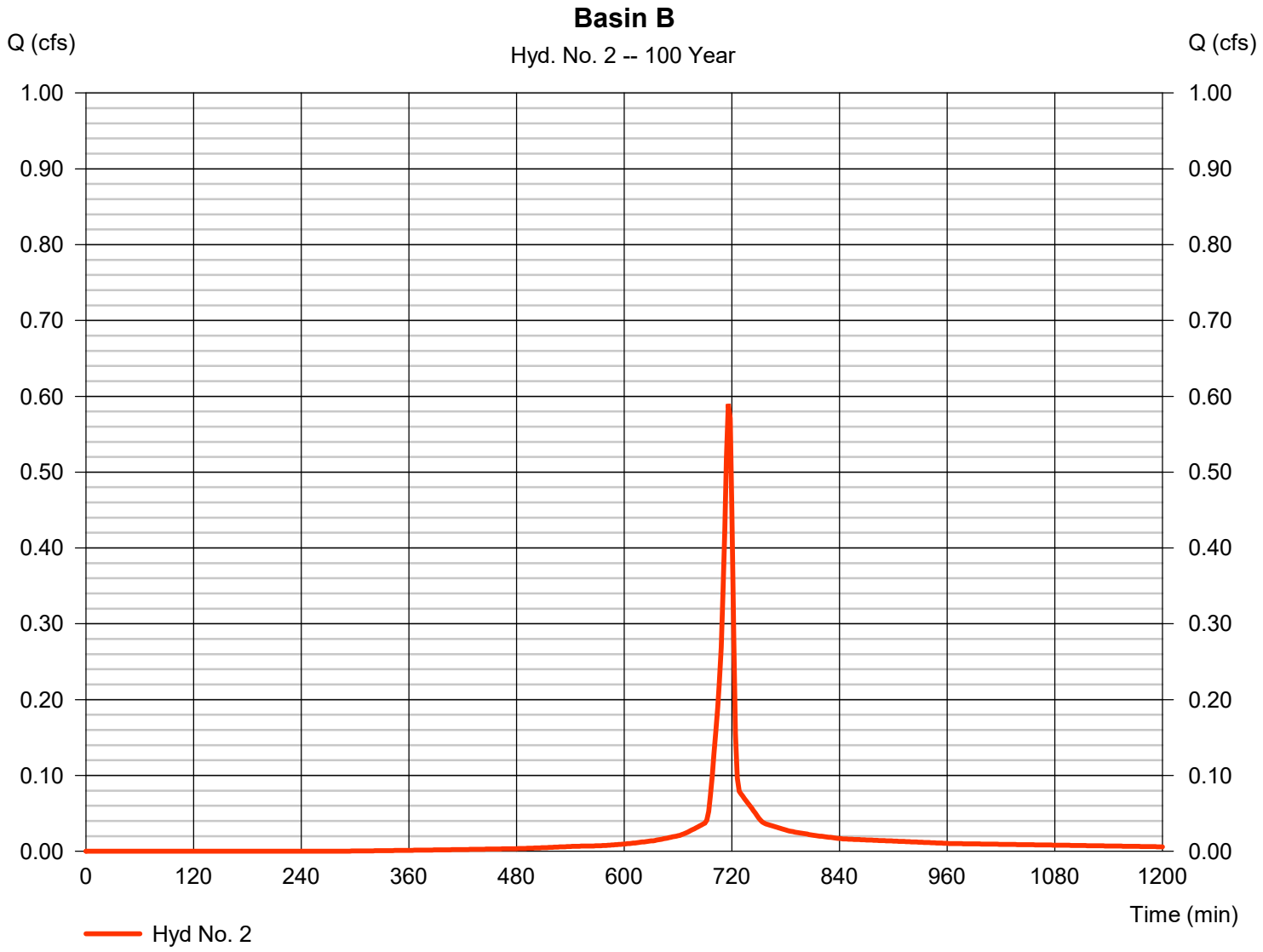
Hydrograph Report

Hyd. No. 2

Basin B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.590 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,243 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.180 x 98) + (0.040 x 74)] / 0.220



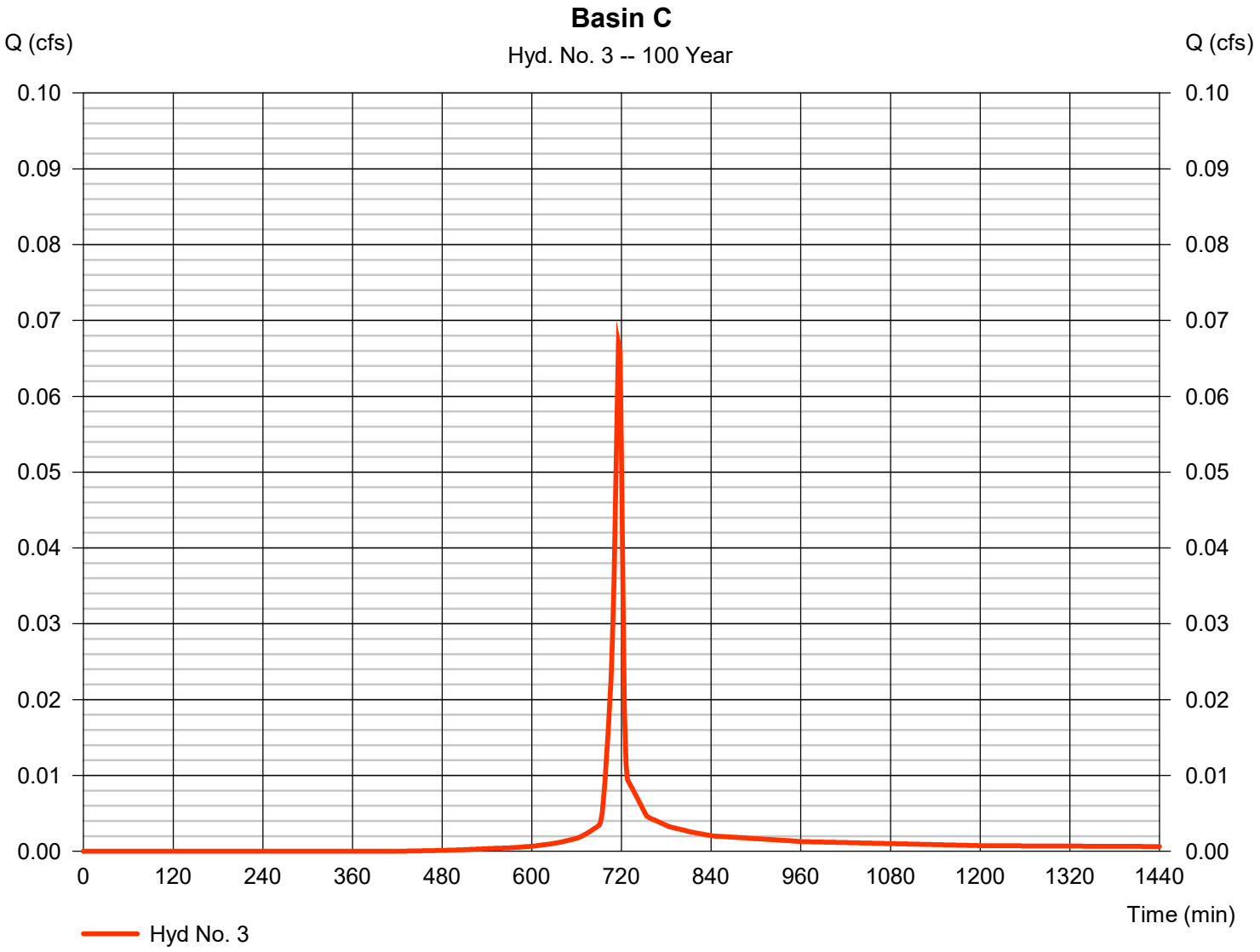
Hydrograph Report

Hyd. No. 3

Basin C

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.067 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	136 cuft
Drainage area	=	0.030 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.020 x 98) + (0.010 x 74)] / 0.030



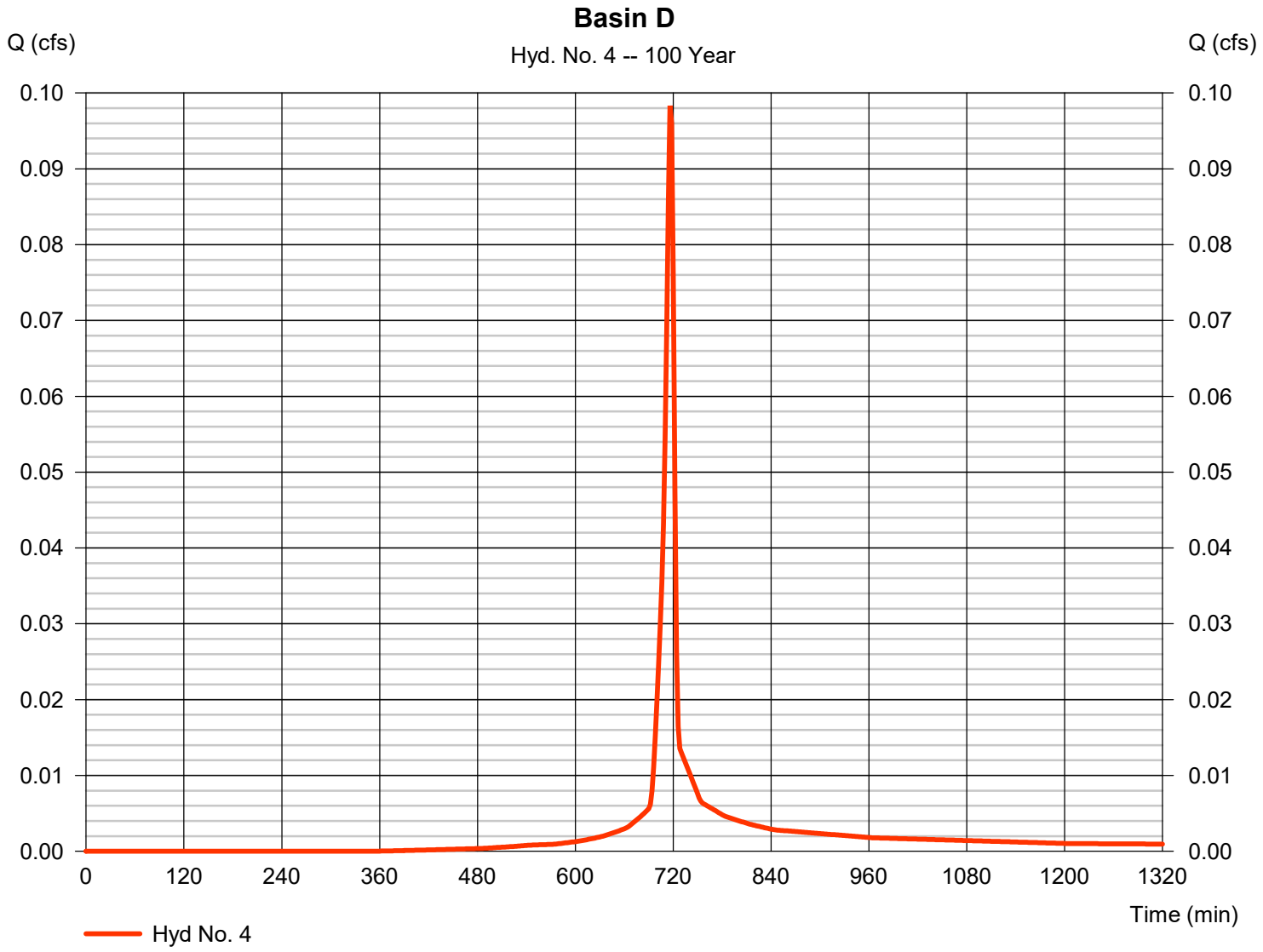
Hydrograph Report

Hyd. No. 4

Basin D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.098 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 203 cuft
Drainage area	= 0.040 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.030 x 98) + (0.010 x 74)] / 0.040



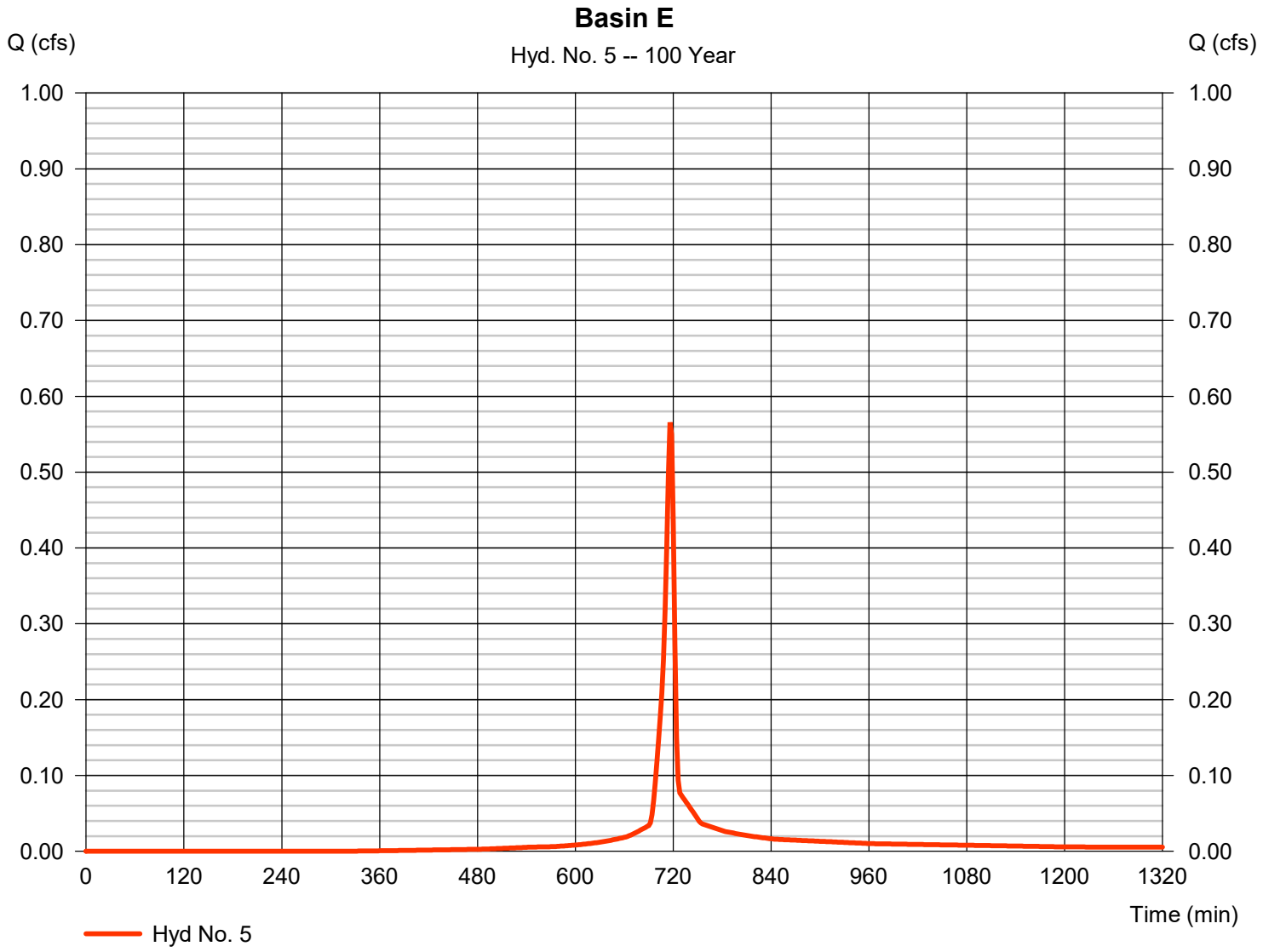
Hydrograph Report

Hyd. No. 5

Basin E

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.566 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	1,178 cuft
Drainage area	=	0.220 ac	Curve number	=	93*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.28 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.170 x 98) + (0.050 x 74)] / 0.220



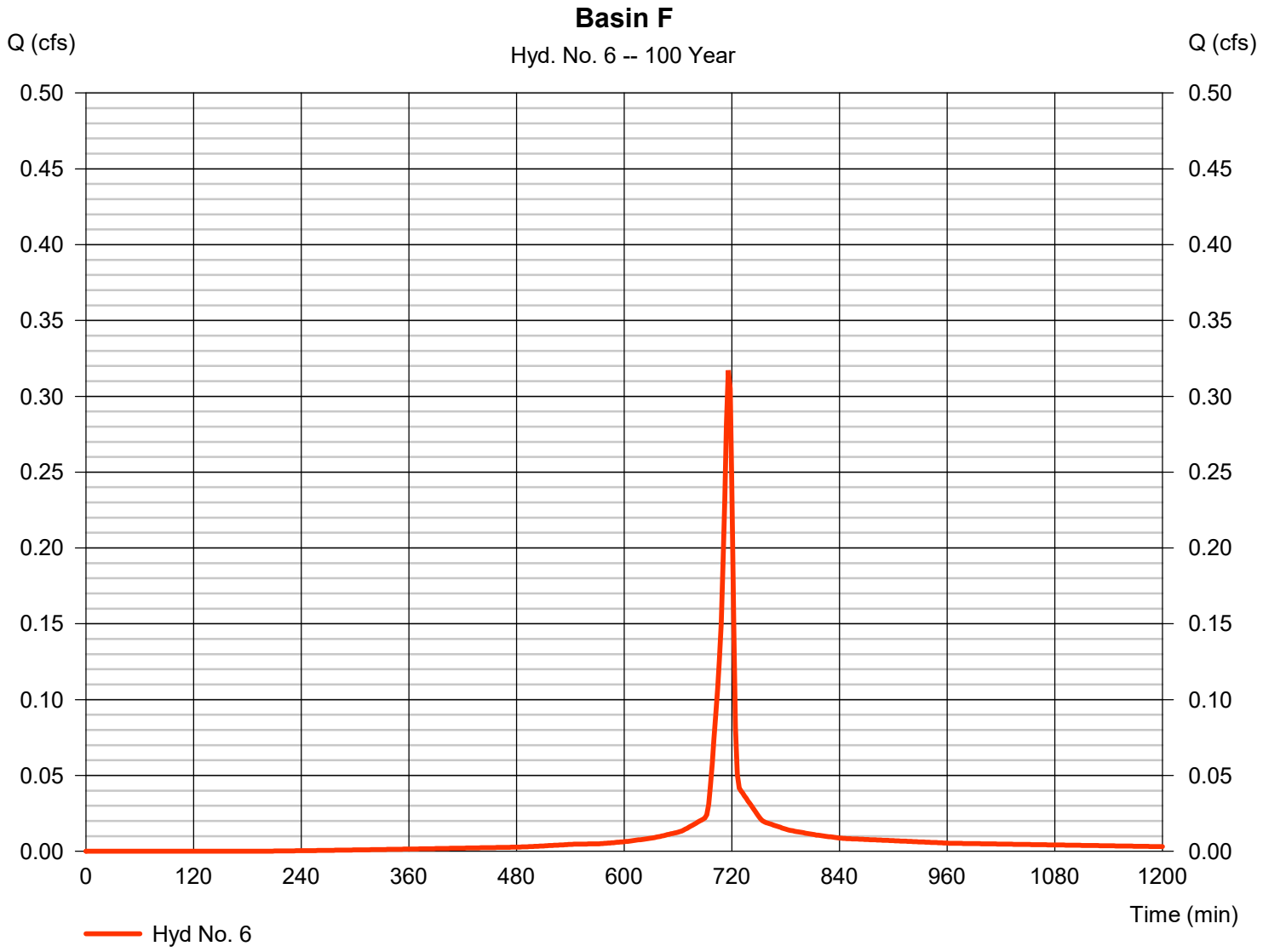
Hydrograph Report

Hyd. No. 6

Basin F

Hydrograph type	= SCS Runoff	Peak discharge	= 0.317 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 691 cuft
Drainage area	= 0.110 ac	Curve number	= 96*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.28 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 98) + (0.010 x 74)] / 0.110



Basin B Drywell Sump Stormwater Runoff Overflow Calculation

Time Intervals Where Runoff Exceeds Sump Infiltration		
Time (min)	Q (cfs)	Volume (cf)
702	0.157643	20.798892
704	0.189005	24.706194
706	0.222765	29.496336
708	0.268841	36.336324
710	0.336765	45.534546
712	0.422145	56.454978
714	0.518772	66.505524
716	0.589654	69.644364
718	0.571086	61.1775
720	0.448539	43.83297
722	0.28201	26.232666
724	0.155201	

Sump Infiltration Flow Rate	0.145	cfs
Peak Flow Rate	0.59	cfs
Typical Sump Storage Volume	155	cf
Total Excess Runoff Volume	481	cf
Total Sump Overflow Volume	**326**	cf

IMEG Corp.
(406) 721-0142

P.O. Box 3851
Missoula, MT 59806

Storage Capacity of a Typical Drywell Sump

Project Name: River View Sub
Project # : 21001296
Date: 7/28/2021

Drain Rock Void Ratio [R_{void}] 0.3 void ratio *(from DEQ-8)*

Calculate Volumes/Areas of Infiltration Drywell

Zone 3

$$V_3 = \frac{1}{3} * H_3 \left[\left(\pi * \left(\frac{B_2}{2} \right)^2 \right) + \left(\pi * \left(\frac{B_4}{2} \right)^2 \right) + \left(\sqrt{\left(\pi * \left(\frac{B_2}{2} \right)^2 \right) * \left(\pi * \left(\frac{B_4}{2} \right)^2 \right)} \right) \right]$$

V = 29.32153 cubic feet

Zone 2

$$V_2 = \left[\left(R_{void} * \pi * \left(\frac{B_{1+2+3}}{2} \right)^2 \right) - \left(R_{void} * \pi * \left(\frac{B_2}{2} \right)^2 \right) + \left(\pi * \left(\frac{B_2}{2} \right)^2 \right) \right] * H_2$$

V = 95.50442 cubic feet

Zone 1

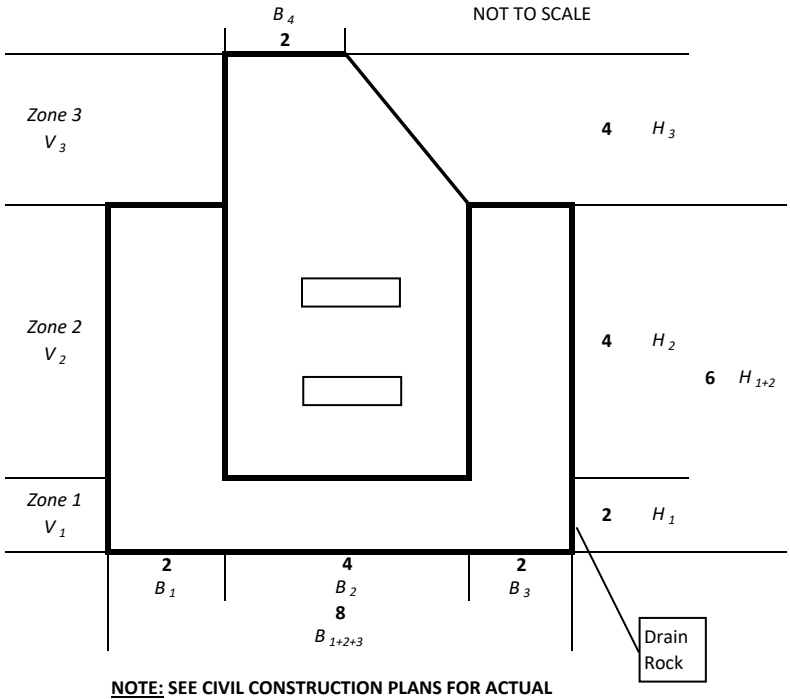
$$V_1 = \left[R_{void} * \pi * \left(\frac{B_{1+2+3}}{2} \right)^2 \right] * H_1$$

V = 30.15929 cubic feet

Total Volume

$V_{total\ per\ sump} = V_1 + V_2 + V_3$

$V_{total\ Per\ sump}$ = 155.0 cubic feet *(storage volume of 1 sump)*



NOTE: SEE CIVIL CONSTRUCTION PLANS FOR ACTUAL CONSTRUCTION DIMENSIONS FOR DRYWELL DETAIL BASED ON THESE CALCULATIONS

IMEG Corp.
(406) 721-0142

P.O. Box 3851
Missoula, MT 59806

Basin B Road Cross Section Storage Capacity

Project Name: River View Sub
Project # : 21001296
Date: 7/28/2021

D, Distance from Curb Face to Crown of Road (ft)	14	
H, Height of Curb (ft)	0.5	
L, Length of Ponding Water (ft)	60	
Total Runoff Overflow Volume	326	cf
Volume Contained Within Curb	**210**	cf

ROAD CONSTRUCTION PLANS

RIVER VIEW SUBDIVISION

LOCATED IN SECTION 20, T13N, R19W, P.M.M., MISSOULA COUNTY, MONTANA.

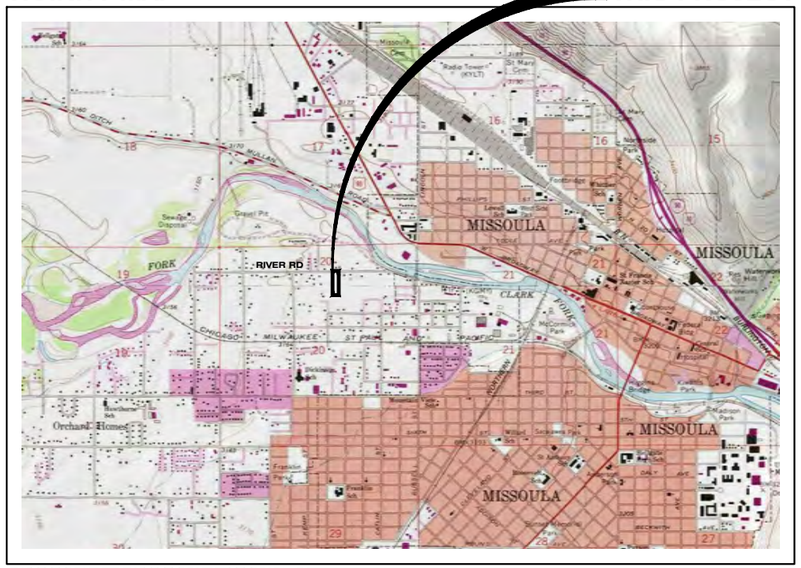
CALL UTILITY NOTIFICATION
CENTER OF MONTANA
1-800-424-5555
CALL FOR THE MARKING OF
UNDERGROUND UTILITIES
2 BUSINESS DAYS BEFORE
YOU DIG, GRADE, OR EXCAVATE

50 0 50 100
SCALE IN FEET

SHEET INDEX

DESCRIPTION	SHEET NO.
LEGEND & NOTES SHEET	SHEET 2 OF 9
PLAN & PROFILE SHEET	SHEET 3 OF 9
FRONTAGE IMPROVEMENTS PLAN	SHEET 4 OF 9
OVERALL UTILITY PLAN	SHEET 5 OF 9
SIGNAGE, STRIPING AND IRRIGATION PLAN	SHEET 6 OF 9
BOULEVARD PLANTING PLAN	SHEET 7 OF 9
EROSION CONTROL PLAN	SHEET 8 OF 9
CROSS SECTIONS	SHEET 9 OF 9
DETAIL SHEET	SHEET D1 OF D4
DETAIL SHEET	SHEET D2 OF D4
DETAIL SHEET	SHEET D3 OF D4
DETAIL SHEET	SHEET D4 OF D4

VICINITY MAP — **THIS PROJECT**



MISSOULA, MISSOULA COUNTY

0 2000

PROJECT STATUS

THESE PLANS REQUIRE, AT A MINIMUM, APPROVAL FROM THE AGENCIES LISTED BELOW. THEREFORE , THE OWNER & CONTRACTOR ARE ADVISED THAT BIDS & CONTRACTS SHOULD NOT BE FINALIZED UNTIL INDICATED BELOW.

AGENCIES REVIEW STATUS:	REFERENCE #	APPROVAL DATE
CITY OF MISSOULA		

PLAN SET IS READY FOR CONSTRUCTION __YES X NO

AS-BUILT DATE:_____

PROJECT HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE ABOVE APPROVALS, STATED SPECIFICATIONS, AND SHOWN HERE IN, UNLESS OTHERWISE SPECIFIED.

PROJECT NOTES:

CITY OF MISSOULA CHECKLIST DATA

STREET MILES ESTIMATED FOR CONSTRUCTION	
SQUARE FOOTAGE ESTIMATED FOR ALL PAVING	
SQUARE FOOTAGE CONCRETE ESTIMATED FOR SIDEWALKS AND DRIVEWAYS TO BE INSTALLED IN THE RIGHT-OF-WAY	
LINEAR FOOTAGE ESTIMATED FOR CURB AND GUTTER TO BE CONSTRUCTED IN THE RIGHT-OF-WAY	
LINEAR FOOTAGE OF SEWER GRAVITY MAINS ESTIMATED FOR CONSTRUCTION	
LINEAR FOOTAGE OF SEWER FORCE MAINS ESTIMATED FOR CONSTRUCTION	
NUMBER OF PROPOSED SEWER STUBS TO BE CONSTRUCTED	
NUMBER AND TYPES OF STREET SIGNS PROPOSED TO BE INSTALLED STOP SIGNS ROAD NAME	
LINEAR FOOTAGE OF STRIPING PROPOSED TO BE PAINTED	
LINEAR FOOTAGE ESTIMATED FOR WATER MAINS TO BE INSTALLED	
WATER STUBS TO BE CONSTRUCTED	
LINEAR FOOTAGE OF GAS MAIN ESTIMATED FOR CONSTRUCTION	
LINEAR FOOTAGE OF ELECTRICAL MAIN ESTIMATED FOR CONSTRUCTION	

IMEG
1817 SOUTH AVE W, STE. A
MISSOULA, MT
59801
PH: 406.721.0142
FAX: 406.721.5224
www.imegcorp.com

PLOT DATE: 10/6/2021 - 12:39 PM

REVISIONS | DATE

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG. 2021

LOCATION: SECTION 20, T. 13N., R. 19W., P.M.M. 1923 RIVER ROAD CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS COVER SHEET

PROJECT NO. 21001296

SHEET: 1 OF 9

PRELIMINARY

DWG LOCATION: J:\FILES\ACTIVE\PROJECTS\2021\21001296\DOCS\DESIGN\CIVIL\DRAFTING\1_DRAWINGS\AUTOCAD\PLAN SET\ROADCVR2-21001296.DWG

LEGEND

NOTE: ALL FEATURES SHOWN IN LEGEND MIGHT NOT BE PRESENT ON PLANS
ALL FEATURES SHOWN ON PLANS MIGHT NOT BE PRESENT IN LEGEND

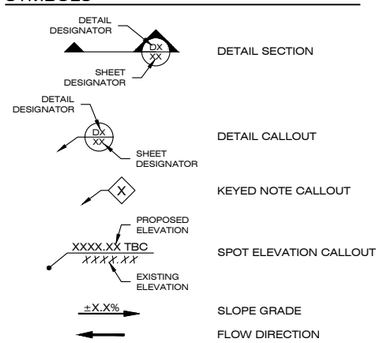
EXISTING

- (E) PROPERTY BOUNDARY
- (E) ADJACENT PROPERTY BOUNDARY
- (E) LOT LINE
- (E) EASEMENT
- (E) WATER LINE
- (E) WATER SERVICE
- (E) SEWER LINE
- (E) SEWER SERVICE
- (E) SEWER FORCE MAIN
- (E) SEWER FORCE MAIN SERVICE
- (E) STORM DRAIN PIPE
- (E) OVERHEAD UTILITY
- (E) BURIED POWER
- (E) GAS LINE
- (E) TELEPHONE LINE
- (E) TELEVISION LINE
- (E) FIBER OPTIC LINE
- (E) ROAD CENTERLINE
- (E) FENCE LINE
- (E) DITCH
- (E) SWALE
- (E) IRRIGATION DITCH
- (E) IRRIGATION FORCE MAIN
- (E) STREAM
- (E) MAJOR CONTOUR
- (E) MINOR CONTOUR
- (E) ASPHALT
- (E) GRAVEL
- (E) CONCRETE
- (E) SEWER MANHOLE
- (E) SEWER CLEANOUT
- (E) SOIL PROFILE
- (E) PERCOLATION TEST
- (E) GROUNDWATER MONITORING
- (E) SEPTIC TANK
- (E) DRAINFIELD
- (E) WELL
- (E) FIRE HYDRANT
- (E) WATER METER
- (E) WATER VALVE
- (E) WATER BLOW-OFF
- (E) STORM DRAIN MANHOLE
- (E) CULVERT
- (E) CURB INLET
- (E) CATCH BASIN
- (E) SUMP
- (E) UTILITY MANHOLE
- (E) TELEPHONE JUNCTION BOX
- (E) POWER VAULT
- (E) TELEVISION JUNCTION BOX
- (E) ELECTRICAL TRANSFORMER
- (E) POWER METER
- (E) GAS METER
- (E) POWER POLE
- (E) GUY WIRE
- (E) LIGHT POLE
- (E) SIGN
- (E) MAILBOX
- (E) DECIDUOUS TREE
- (E) CONIFEROUS TREE
- (E) BUSH/ SHRUB

PROPOSED

- (P) EASEMENT
- (P) WATER LINE
- (P) WATER SERVICE
- (P) SEWER LINE
- (P) SEWER SERVICE
- (P) SEWER FORCE MAIN
- (P) SEWER FORCE MAIN SERVICE
- (P) STORM DRAIN PIPE
- (P) OVERHEAD UTILITY
- (P) BURIED POWER
- (P) GAS LINE
- (P) TELEPHONE LINE
- (P) TELEVISION LINE
- (P) FIBER OPTIC LINE
- (P) ROAD CENTERLINE
- (P) FENCE LINE
- (P) DITCH
- (P) SWALE
- (P) IRRIGATION FORCE MAIN
- (P) MAJOR CONTOUR
- (P) MINOR CONTOUR
- (P) ASPHALT
- (P) GRAVEL
- (P) CONCRETE
- (P) SEWER MANHOLE
- (P) SEWER CLEANOUT
- (P) SEPTIC TANK
- (P) DRAINFIELD
- (P) WELL
- (P) FIRE HYDRANT
- (P) WATER METER
- (P) WATER VALVE
- (P) REDUCER
- (P) THRUST BLOCK
- (P) WATER BLOW-OFF
- (P) STORM DRAIN MANHOLE
- (P) CULVERT
- (P) CURB INLET
- (P) CATCH BASIN
- (P) SUMP
- (P) UTILITY MANHOLE
- (P) LIGHT POLE
- (P) SIGN
- (P) MAILBOX
- (P) DECIDUOUS TREE
- (P) CONIFEROUS TREE
- (P) BUSH/ SHRUB

SYMBOLS



DETAIL SECTION

GENERAL CONDITIONS OF CONSTRUCTION:

1. The Standard General Conditions of the Contract prepared by the Engineers Joint Contract Documents Committee (Copyright 2007), as included in Montana Public Works Standard Specifications, are herein referred to as the General Conditions within these Drawings. Copies of the General Conditions will be provided to Contractor upon written request to Engineer.
2. Wherever used in these Drawings, the terms, whether printed with initial capital letters or not, as listed in the Standard General Conditions of the Construction Contract (General Conditions), Article 1 - Definitions and Terminology, prepared by the Engineers Joint Contract Documents Committee (Copyright 2007) will have the meanings indicated, which are applicable to both the singular and plural thereof, except as follows:
   a. The Contract Documents shall mean the Drawings as shown in these plans and any applicable referenced standards, specifications, or laws.
   b. The Contract Price shall mean the moneys payable by Owner to Contractor for completion of the Work in accordance with the Agreement.
   c. The Contract Times shall mean the number of days or the dates stated in the Agreement to complete the Work so that it is ready for final payment. If no such dates are established, the Contract Time shall be 120 days to complete the Work.
   d. Effective Date of the Agreement shall have the meaning as listed in the General Conditions, Article 1. If no such Agreement exists, the Effective Date of the Agreement shall be the day the Contractor proceeds with the Work.
3. By proceeding with the Work as shown on these Drawings, the Contractor makes the following representations:
   a. Contractor has examined and carefully studied the Drawings and other related data.
   b. Contractor is familiar with and is satisfied as to all federal, state and local laws and Regulations that may affect cost, progress, performance and furnishing of the Work.
   c. Contractor has visited the site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance or furnishing of the Work.
   d. Contractor acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Drawings with respect to Underground Facilities at or contiguous to the site.
   e. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise, which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor including applying the specific means, methods, techniques, sequences and procedures of construction, if any, expressly required by the Drawings to be employed by the Contractor, and safety precautions and programs incident thereto.
   f. Contractor is aware of the general nature of work to be performed by Owner and others at the site that relates to the Work.
   g. Contractor has given Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Drawings and the written resolution thereof by Engineer is acceptable to Contractor.
   h. The Drawings are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
4. In resolving disputes resulting from conflicts, errors or discrepancies, the order of precedence shall be as follows, as applicable to this project: Written agreement between owner and contractor, specifications, Drawings. Within the Specifications, the order of precedence is as follows, as applicable to this project: Addenda/Change Orders, Contractor's Bid, Special Provisions, Instructions to Bidders, Supplemental General Conditions, Notice Inviting Bids, General Conditions, Technical Specifications, Referenced Standard Specifications. With reference to the Drawings, the order of precedence is as follows, as applicable to this project: Figures govern over scaled dimensions, Detail drawings govern over general drawings, Addenda/Change Order drawings govern over contract drawings, contract drawings govern over standard drawings, contract drawings govern over shop drawings.
5. If Contractor believes that any subsurface or physical condition at or contiguous to the Site that
   a. is uncovered or revealed either is of such a nature as to require a change in the Drawings; or
   b. differs materially from that shown or indicated in the Drawings; or
   c. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided in the drawings;

   then Contractor shall promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.
6. Section 2.06 of the General Conditions is hereby incorporated into these Drawings.
7. Section 3.03.A.2 of the General Conditions is hereby incorporated into these Drawings.
8. Section 3.05 of the General Conditions is hereby incorporated into these Drawings.
9. Section 3.06 of the General Conditions is hereby incorporated into these Drawings.
10. Section 4.05 of the General Conditions is hereby incorporated into these Drawings.
11. Section 6.01, 6.02.A, and 6.03 of the General Conditions are hereby incorporated into these Drawings.
12. Substitutes and "Or-Equals" items are subject to the provisions of the General Conditions, Section 6.05.
13. Section 6.13 of the General Conditions is hereby incorporated into these Drawings, except that Section 6.13.D shall be replaced with the following sentence.

    Contractor's duties and responsibility for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer and Owner, as applicable to the Work, have accepted that the work is complete.
14. Section 6.11, 6.14, 6.15, 6.16, 6.18, 6.19, 6.20, and 6.21 of the General Conditions are hereby incorporated into these Drawings.
15. Article 9 - Engineer's Status During Construction of the General Conditions is hereby incorporated into these Drawings, except as follows:
    a. Delete the last sentence of Section 9.05.A.
    b. Delete Section 9.06, 9.07, 9.08.B, 9.08.C, and 9.09.D.
16. Section 10.02 of the General Conditions is hereby incorporated into these Drawings.
17. Article 13 - Tests and Inspections, Correction, Removal or Acceptance of Defective Work of the General Conditions is hereby incorporated into these Drawings.

STANDARD SPECIAL PROVISIONS:

1. The Contractor shall be responsible for all permits, licenses and fees required for completion of this project unless specifically noted otherwise.
2. The Contractor shall provide the Owner with a 24 hour phone number of a party responsible and capable of immediate local response to emergency maintenance for the duration of the Work. Contractor shall provide the name of the responsible party and phone number in writing prior to proceeding with the Work.
3. Unless noted otherwise, the contractor shall be responsible for any necessary traffic control on and off-site including obtaining any applicable permits.
4. Material stockpiled along the project route shall be done so in a manner that does not affect public safety and is in a neat and orderly fashion.
5. The Contractor shall be responsible for disposing of all waste and excess materials such as, but not limited to: vegetation, trees, brush, asphalt, concrete, sub-grade soils, etc., offsite in accordance with local, state and federal laws. The Owner reserves the right to request certain waste materials to be stockpiled at a location on-site.
6. The contractor will be responsible to adhere to the MDEQ or EPA approved Storm Water Pollution Prevention Plan (SWPPP), if applicable to the project. The contractor is responsible for repairing any damage made to BMPs identified in the SWPPP. The approved Storm Water Pollution Prevention Plan will be provided by Owner to Contractor upon written request. If a SWPPP has not been prepared for the project, but is required by regulation, the Contractor is responsible for preparing and submitting a Notice of Intent and SWPPP.
7. The Contractor will be required to make every effort to immediately restore the construction area once the construction task is completed. All seeding shall be completed in accordance with MPWSS 02910. This includes such required activities as finish grading, spreading of topsoil, restoring irrigation, replacing traffic and street signs, etc. The contractor will have 48 hours to begin restoration once the construction task in the immediate area is complete. Once restoration is begun, it must be completed without interruption to the extent possible.
8. After all work on this project is completed and before final acceptance of the project, the entire project shall be neatly finished to the lines, grades, and cross sections shown on the plans and as hereinafter specified.
   a. Drainage facilities, such as inlets, catch basins, storm pipe, culverts, and curb and gutter shall be cleaned of all debris, gravel, silts or other foreign material.
   b. The Contractor shall remove and dispose of all construction stakes.
   c. All areas disturbed by the construction shall be shaped to present a uniform appearance blending into the contour of adjacent properties. All surface replacement and landscaping shall be completed.
   d. Except as otherwise permitted, all excess excavated materials shall be disposed of away from the site of the work.
   e. Broken concrete and other debris resulting from pavement or sidewalk removal, excavated rock in excess of the amount permitted, and other waste and debris encountered in excavated work, and other similar waste materials shall be disposed of away from the site.

   There will be no separate measurement or payment for cleanup, and all costs for such work shall be included in the Contract Price.
9. No on-site burning of waste materials will be allowed.
10. If a street has not been surfaced and cleaned, the Contractor shall be responsible for dust control and maintenance of the street. Also, if detours are made on a gravel road, the Contractor is responsible for dust control and maintenance on the detours. See "Air Quality" below also.
11. Daily street sweeping shall be completed on both ends of each street during construction. Unpaved detours or any other fugitive dust emission sources from construction and demolition should be watered and/or chemically stabilized so emissions are less than 20% opacity.

UTILITY NOTES:

1. The Contractor shall notify appropriate personnel for utility locations and notice of construction commencement at least two business days prior to proceeding with the Work. Before Contractor proceeds with the Work, a common locate service (One Call) is available at 1-800-424-5555. All Underground Facilities may not be located by the One Call service including but not limited to such Underground Facilities as irrigation systems, public and private water and sewer systems, etc.
2. The information and data shown or indicated in the Drawings with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise noted:
   a. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or date; and
   b. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
   i. Reviewing and checking all such information and data,
   ii. Locating all Underground Facilities shown or indicated in the Drawings,
   iii. Coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
   iv. The safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
   c. At least 2 business days before beginning any excavation, the Contractor shall, according to MCA 69-4-501, notify all owners of underground facilities and coordinate the Work with the owners of such underground facilities. The information shown or indicated in the Drawings with respect to existing underground facilities is based on information and data obtained from the owners of the facilities without field exploration, and as such, Owner and Engineer are not responsible for the accuracy or completeness of such information or data.
3. The Contractor shall support and protect all exposed utilities in conformance with the utility owner's standards.
4. All utility services shall be constructed per the International Plumbing Code, Local Jurisdictional policy, and the service provider standards and specifications.
5. All utility work shall be completed before paving.

SUBMITTALS, QUALITY CONTROL & ASSURANCE, INSPECTIONS, AND TESTING

1. Contractor shall comply with Summary of Work, Section 01010, MPWSS.
2. Contractor shall comply with Project Coordination, Section 01041, MPWSS.
3. Contractor shall comply with Field Engineering, Section 01050, MPWSS. Replace Part 1.1.A with "Notify Engineer of required survey work at least 5 days before starting work.
4. Contractor shall comply with Submittals, Section 01300, MPWSS.
5. Contractor shall comply with the Contractor Quality Control and Owner Quality Assurance, Section 01400 MPWSS.
6. Contractor shall comply with Contract Closeout, Section 01700, MPWSS.
7. Contractor shall comply with all Density Control Testing, Part 1.3, for Sub Base Course, Section 02234 MPWSS. This does not exclude any other requirements of Section 02234 MPWSS.
8. Contractor shall comply with all Density Control Testing, Part 1.3, and Materials Submittals, Part 1.4, for Crushed Base Course, Section 02235 MPWSS. This does not exclude any other requirements of Section 02235 MPWSS.
9. Contractor shall comply with Pavement and Material Testing Requirements, Part 3.29, for Asphalt Concrete Pavement, Section 02510 MPWSS. This does not exclude any other requirements of Section 02510 MPWSS.
10. Contractor shall complete trench excavation and backfill in accordance with Section 02221 MPWSS. This includes backfill for storm drainage infrastructure.
11. The Contractor shall coordinate with Engineer to obtain samples of trench backfill material to be used on-site. This includes backfill for storm drainage infrastructure.
12. Contractor will be responsible for coordination with a material testing company of the Owner's selection to complete compaction testing of trench backfill. Coordination includes updating appropriate personnel employed by the material testing company every work day as to progress of work so adequate testing can be completed.
13. The Contractor will be required to prepare a set of detailed as-built drawings to be presented to the Engineer at the completion of the project. The as-built drawings shall be updated daily and reviewed weekly by the Project Engineer. As-built drawings shall include, but not limited to location/depths of existing utilities encountered during completing the Work and location/depths of installed infrastructure completed as part of the Work. Installed infrastructure includes culverts, ponds, storm drainage systems, catch basins, dry-well sumps, storm manholes, swales, ditches, dry utilities (gas, power, phone, etc.), and road and pedestrian features such as handicap ramps, sidewalks, roads, curb and gutter, etc.

CONSTRUCTION NOTES:

1. All Work shall be in accordance with the Montana Public Works Standard Specifications (MPWSS), Sixth Edition, dated April 2010, Local Jurisdictional Standards, Special Provisions, and Contract Documents.
2. Contractor shall comply with Construction and Temporary Facilities, Section 01500, MPWSS.
3. Contractor shall comply with Construction Traffic Control, Section 01570, MPWSS.
4. For road plan and profile sheets, the stationing and elevations provided are for finished grade at centerline of road, unless noted otherwise.
5. For proposed pipe installations (culverts, storm drains, irrigation, etc.), the stationing is from centerline of pipe and elevations are from invert of pipe, unless noted otherwise.
6. Elevations shown on the Drawings are to finished surface grade unless otherwise indicated.
7. Elevations for curb and gutter are for top back of curb, unless otherwise indicated. Elevations provided at curb lay downs are for the "projected" top back of curb, as though the specified curb was being installed through the lay down. This allows the contractor to set his curb string line or forms based on the elevations shown on the plans, and then cut out the extra concrete for the lay down.
8. All material furnished on or for this project shall meet the minimum requirements of the approving agencies or as set forth herein, whichever is more restrictive.
9. If more than one acre will be disturbed during construction the contractor is responsible to notify DEQ or submit Storm Water Pollution Prevention Permit (SWPPP) to DEQ prior to construction.

CONSTRUCTION STAKING:

1. The owner will provide construction staking one time. Additional staking will be the responsibility of the contractor for scheduling and payment.
2. Contractor is responsible to coordinate and request staking at least two days in advance, unless otherwise agreed upon in writing by Engineer.
3. Staking will be provided as indicated in the Contract Documents, or as requested by contractor.
4. Cut sheets will be provided to the contractor with elevation from hub to finished grade, unless noted otherwise. Cut sheets for pipe installation provide the elevation from the hub to the invert of the pipe, unless noted otherwise.
5. Engineer does not consider staking to be complete and ready for use until cut sheets have been delivered to Contractor. Contractor's uses of construction staking prior to receipt of cut sheets is at contractor's risk. Any work incorrectly installed due to contractor's use of preliminary construction staking will be removed and replaced at contractor's expense.

GRADING NOTES:

1. All ramps shall be sloped @ 12:1 max (8.33%) with a cross slope less than 2%.
2. Square cut all asphalt.
3. Contractor shall protect all adjacent improvements (buildings, roadways, fences, ditches, parking lots, utilities, sidewalks, curbs, gutter, park recreation improvements, trees, etc.) from damage and erosion. All disturbed areas shall be restored to their original condition.
4. Compact subgrade and gravel cushion to 95% proctor density or per geotechnical engineering report, whichever provides a greater level of compaction.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

1. SWPPP Administrator shall turn in SWPPP reports generated from the beginning of construction to date that As-Builts are turned into Engineer. Engineer in turn submits SWPPP reports to City Engineering as part of As-Built documentation.
2. SWPPP Administrator is required to renew City SWPPP permit annually unless the site has been stabilized. SWPPP Administrator will submit any remaining SWPPP reports to City Engineering when filing for Notice of Termination.

ABBREVIATIONS:

BC	BACK OF CURB	MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
BP	BEGINNING POINT	MWC	MOUNTAIN WATER COMPANY
BSW	BACK OF SIDEWALK	NWE	NORTHWESTERN ENERGY
CBU	CLUSTER BOX UNIT	(P)	PROPOSED
CMP	CORRUGATED METAL PIPE	P.A.E	PEDESTRIAN ACCESS EASEMENT
ELEV	ELEVATION	PRC	POINT OF REVERSE CURVATURE
EP	ENDING POINT	PC	POINT OF CURVATURE
(E)	EXISTING	PT	POINT OF TANGENT
FFEL	FINISHED FLOOR ELEVATION	PVI	POINT OF VERTICAL INTERSECTION
FG	FINISHED GRADE	R	RADIUS
FL	FLOWLINE	ROW	RIGHT OF WAY
HP	HIGH POINT	SF	SQUARE FOOT
I.E.	INVERT ELEVATION	SIM	SIMILAR
INV	INVERT	STA	STATION
LD	LAYDOWN	STD	CITY OF MISSOULA STANDARD DRAWING
LF	LINEAR FOOT	SW	SIDEWALK
MAX	MAXIMUM	TBC	TOP BACK OF CURB
MIN	MINIMUM	TOA	TOP OF ASPHALT
ME	MATCH EXISTING	TOC	TOP OF CONCRETE
M.E.P.	MECHANICAL, ELECTRICAL, & PLUMBING	TYP	TYPICAL
MPOC	MID POINT OF CURVE	U.E.	UTILITY EASEMENT

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PLOT DATE: 10/6/2021 - 12:40 PM

REVISIONS	DATE

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG. 2021

LOCATION: SECTION 20, T. 13N., R. 19W., P.M.M., CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS LEGEND AND NOTES SHEET

PROJECT NO. 21001296

SHEET: 2 OF 9

PRELIMINARY

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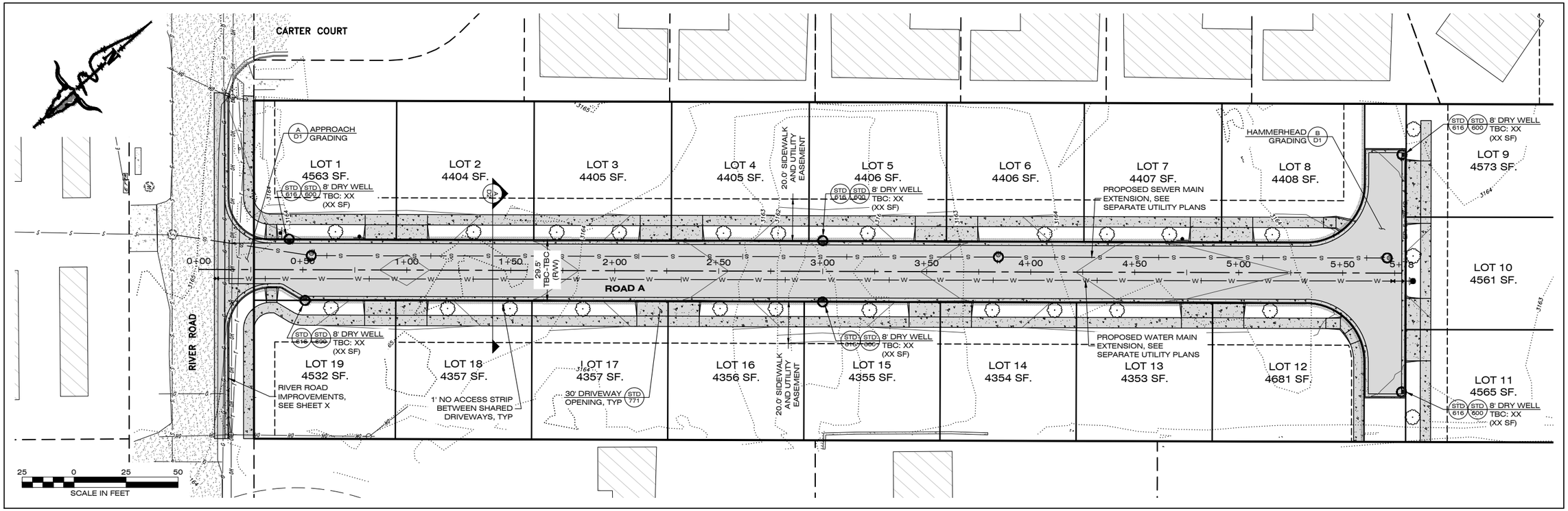

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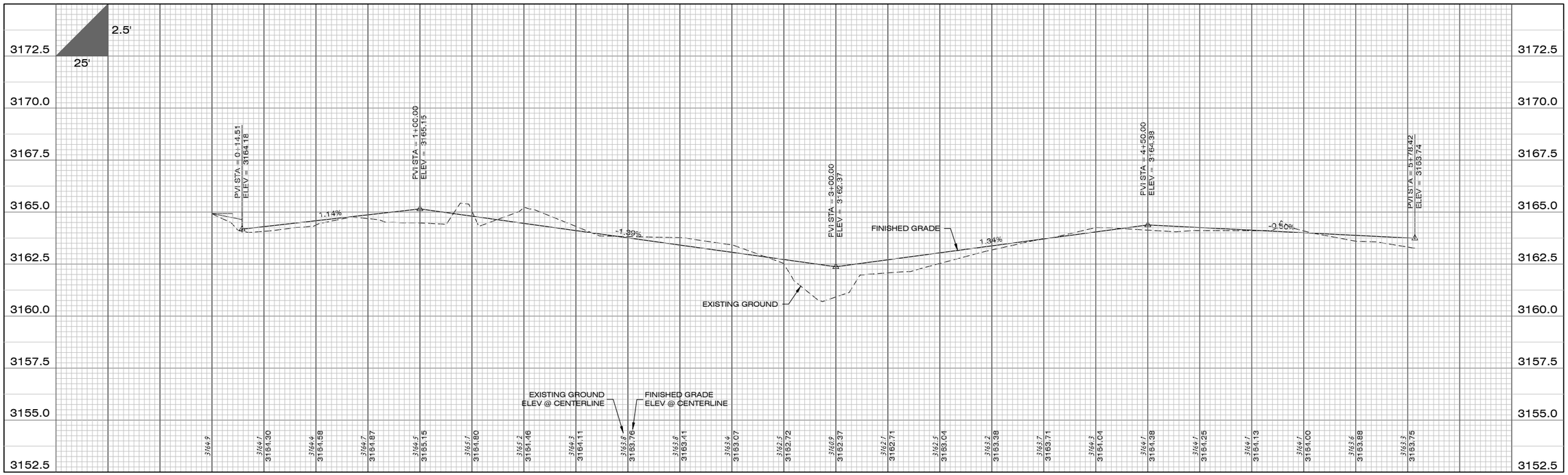

PROFILE VIEW

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CHECKED: CD
DATE: AUG, 2021

LOCATION: 1923 RIVER ROAD
SECTION 20, T. 13N., R. 19W., P.M.M.
CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS
PLAN AND PROFILE SHEET

PROJECT NO. 21001296

SHEET: 3 OF 9

PRELIMINARY

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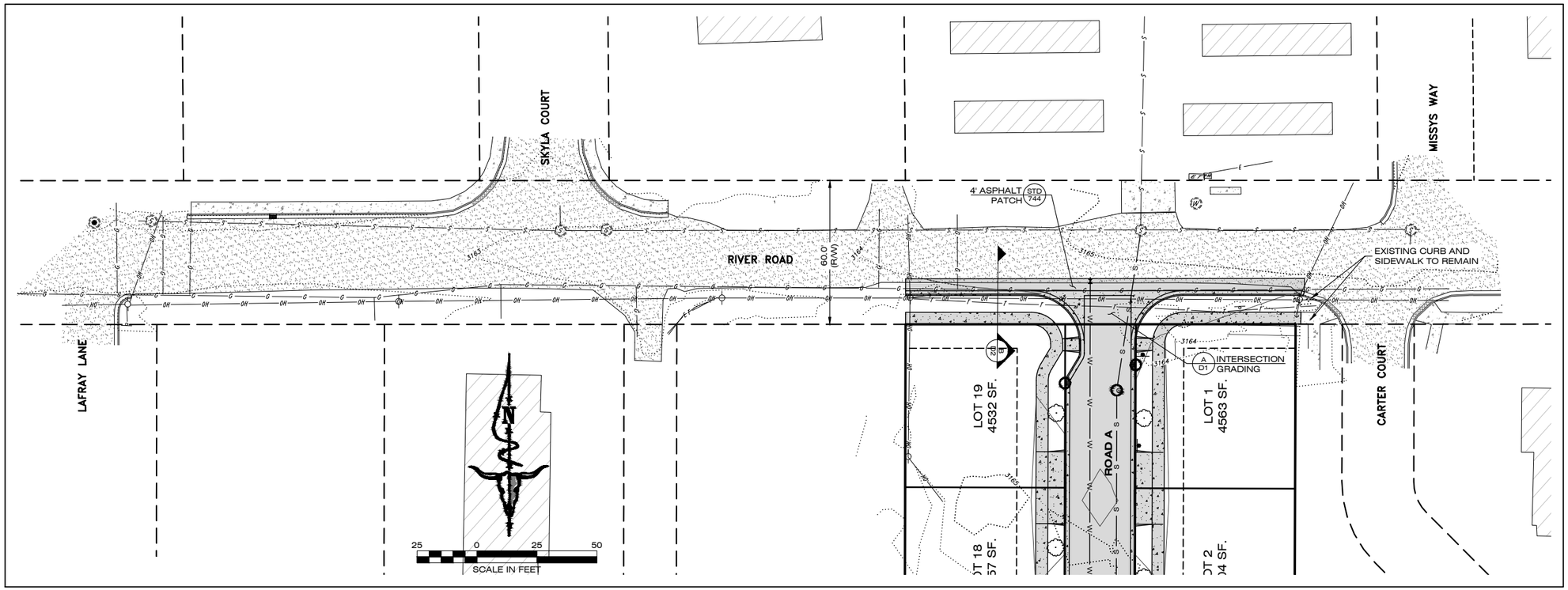

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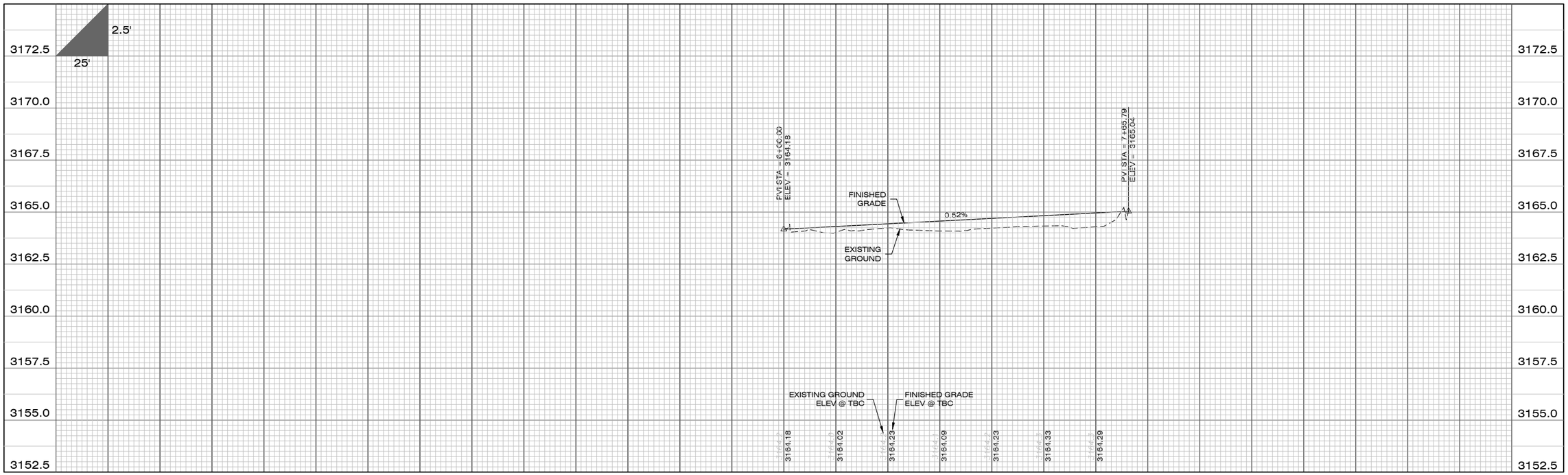

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CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS
FRONTAGE IMPROVEMENTS SHEET

PROJECT NO.: 21001296

SHEET: 4 OF 9

PRELIMINARY

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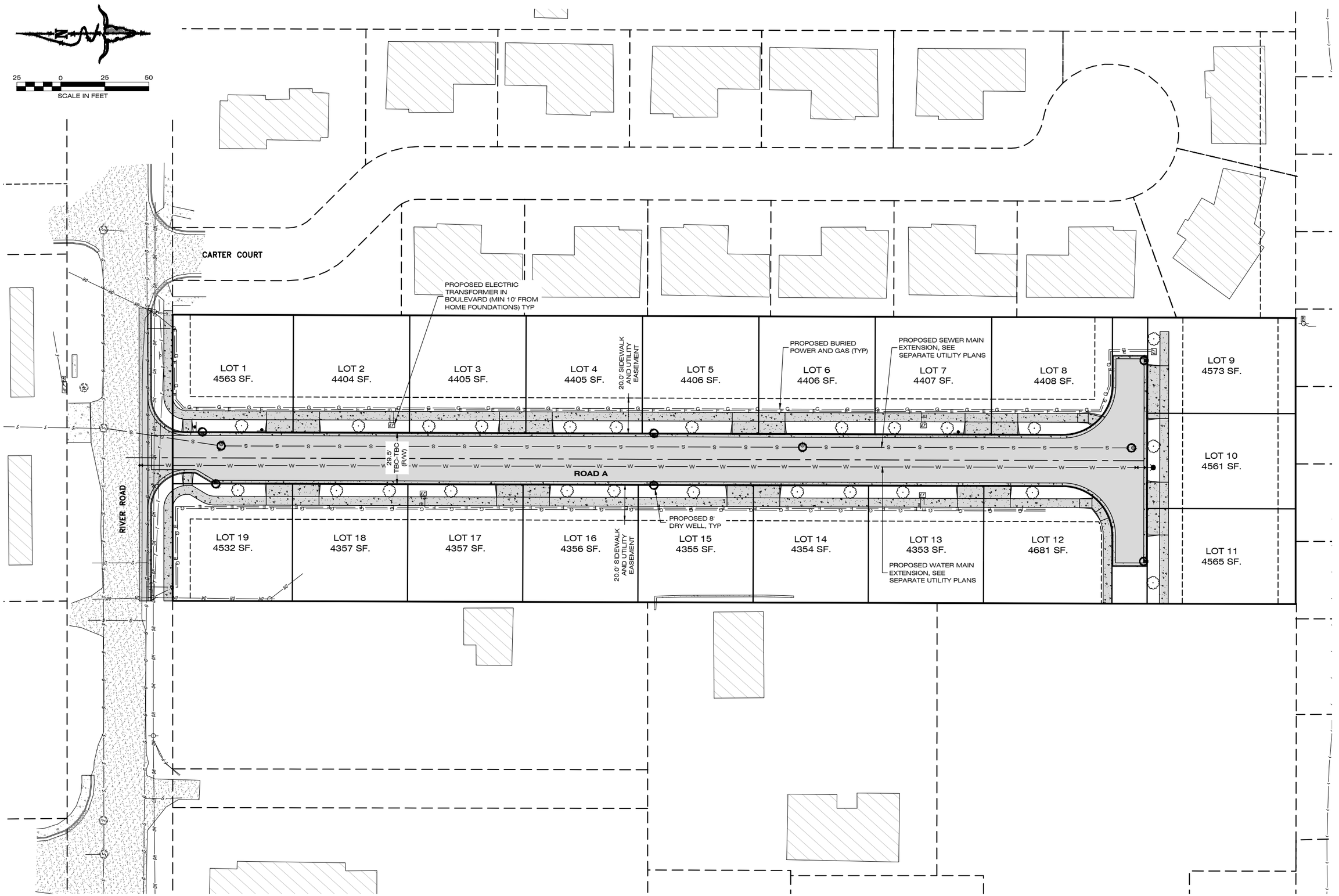

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SECTION 20, T. 13N., R. 19W., P.M.M.
CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS OVERALL UTILITY PLAN

PROJECT NO. 21001296

SHEET: 5 OF 9

PRELIMINARY

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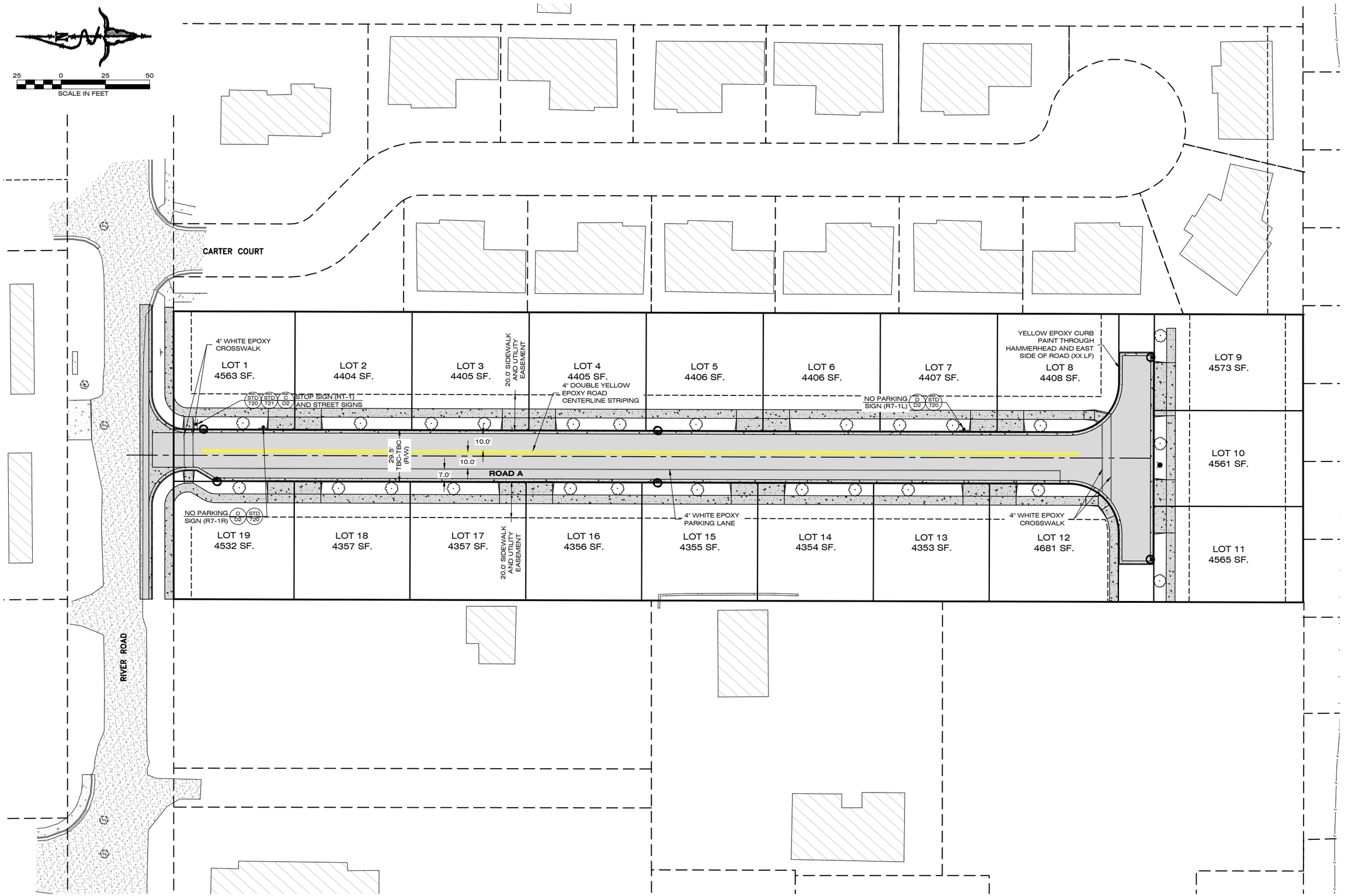

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CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS
SIGNAGE, STRIPING, AND IRRIGATION PLAN

PROJECT NO. 21001296

SHEET: 6 OF 9

PRELIMINARY

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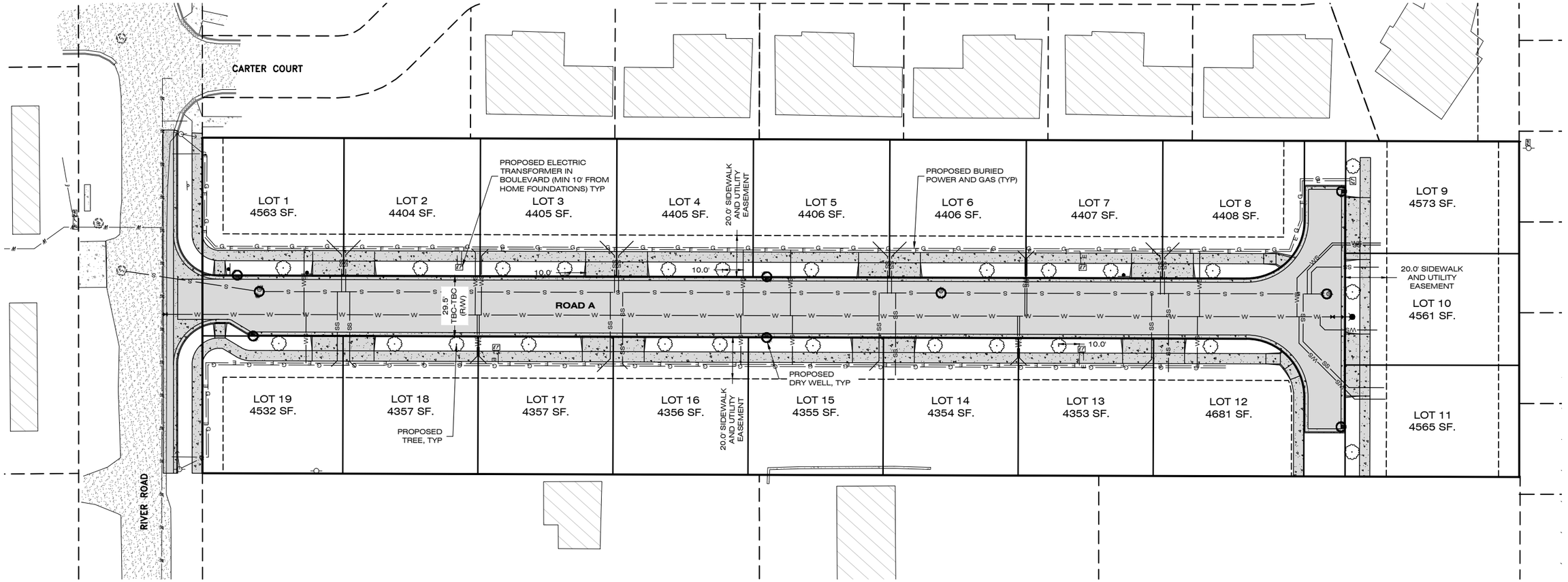


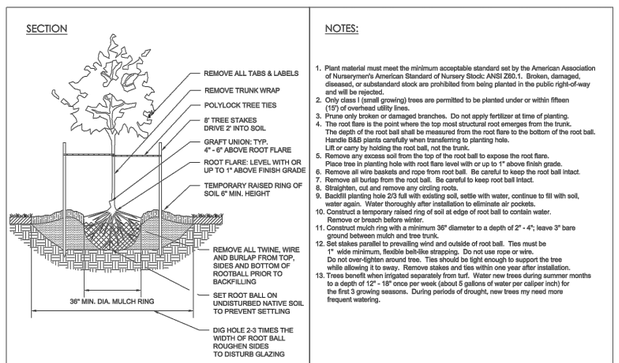
GENERAL NOTES:

1. LOCATE UTILITIES BEFORE PLANTING TREES. NOTIFY MONTANA UTILITY NOTIFICATION CENTER (PHONE #811) PRIOR TO ANY EXCAVATION.
2. TREES SHALL BE CENTERED BETWEEN BACK OF CURB AND FACE OF SIDEWALK.
3. OPTIMAL TREE SPACING MAY BE MODIFIED TO ACCOMMODATE FUTURE DRIVEWAYS AND EXACT LOCATION OF UTILITIES.
4. STREET TREES SHALL BE PLANTED WITHIN SIX (6) MONTHS OF COMPLETION OR OCCUPANCY OF PRIMARY STRUCTURE ERECTED ON ANY LOT, WHICHEVER OCCURS FIRST.
5. BUILDER OR DEVELOPER IS RESPONSIBLE FOR INSTALLATION OF TOPSOIL AND IRRIGATION IN BOULEVARD AREA FRONTING LOTS.
6. CITY OF MISSOULA REQUIRES A PERMIT FOR INSTALLATION OF BOULEVARD TREES. SEE CITY OF MISSOULA STREET TREE ORDINANCE CITY MUNICIPAL CODE 12.32.

PLANT SCHEDULE

TREE KEY	QTY	BOTANICAL/ COMMON NAME	SIZE	CONTAINER
	X EA	ACER RUBRUM RED MAPLE SPACING 30' O.C. OR AS SHOWN	2" CAL.	B&B
	X EA	ACER X FREEMANII FREEMAN MAPLE 'AUTUMN FANTASY' SPACING 30' O.C. OR AS SHOWN	2" CAL.	B&B
	X EA	TILIA AMERICANA AMERCAN LINDEN "REDMOND" SPACING 30' O.C. OR AS SHOWN	2" CAL.	B&B
	X EA	ULMUS 'FRONTIER' FRONTIER ELM SPACING 30' O.C. OR AS SHOWN	2" CAL.	B&B

CLASS II TREE CLEARANCE REQUIREMENTS	
LOCATION	MINIMUM CLEARANCE
ADJACENT TO SIDEWALK OR CURB	3' FROM CURB FACE OR SIDEWALK
ADJACENT TO ANY BUILDING OR STRUCTURE	10' FROM BUILDING OR STRUCTURE
ADJACENT TO METER BOXES AND PAD TRANSFORMERS	10' FROM METER VAULT BOX OR TRANSFORMER PAD
RESIDENTIAL DRIVEWAYS	10' FROM RESIDENTIAL DRIVEWAY
ALLEYWAYS	10' FROM ALLEYWAY
FIRE HYDRANTS AND UTILITY POLES	10' FROM A HYDRANT OR UTILITY POLE
SANITARY SEWER LATERAL	10' FROM SANITARY SEWER LATERALS
STREET LIGHTS	20' FROM STREET LIGHTS
TRAFFIC CONTROL SIGNS	25' IN FRONT OF TRAFFIC CONTROL SIGNS
CORNER SIGHT TRIANGLE	30' FROM INTERSECTION RETURN
DRAINAGE SUMP	10' FROM SUMP



BALL AND BURLAP TREE PLANTING DETAIL — Approved by Parks & Rec. Design Mgr. Nell Minter [Accepted] — Drawn by: GLH — Checked by: CB — PR-101

NOTES:

1. Plant material must meet the minimum acceptable standard set by the American Association of Nurserymen's American Standard of Nursery Stock: ANSI Z60.1. Broken, damaged, diseased, or substandard stock are prohibited from being planted in the public right-of-way and will be rejected.
2. Only class I (small growing) trees are permitted to be planted under or within fifteen (15') of overhead utility lines.
3. Prune only broken or damaged branches. Do not apply fertilizer at time of planting.
4. The root flare is the point where the top most structural root emerges from the trunk. The depth of the root ball shall be measured from the root flare to the bottom of the root ball. Handle B&B plants carefully when transferring to planting hole. Lift or carry by holding the root ball, not the trunk.
5. Remove any excess soil from the top of the root ball to expose the root flare. Place tree in planting hole with root flare level with or up to 1" above finish grade.
6. Remove all wire baskets and rope from root ball. Be careful to keep the root ball intact.
7. Remove all burlap from the root ball. Be careful to keep root ball intact.
8. Straighten, cut and remove any circling roots.
9. Backfill planting hole 2/3 full with existing soil, settle with water, continue to fill with soil, water again. Water thoroughly after installation to eliminate air pockets.
10. Construct a temporary raised ring of soil at edge of root ball to contain water. Remove or breach before winter.
11. Construct mulch ring with a minimum 36" diameter to a depth of 2" - 4"; leave 3" bare ground between mulch and tree trunk.
12. Set stakes parallel to prevailing wind and outside of root ball. Ties must be 1" wide minimum, flexible belt-like strapping. Do not use rope or wire. Do not over-tighten around tree. Ties should be tight enough to support the tree while allowing it to sway. Remove stakes and ties within one year after installation.
13. Trees benefit when irrigated separately from turf. Water new trees during summer months to a depth of 12" - 18" once per week (about 5 gallons of water per caliper inch) for the first 3 growing seasons. During periods of drought, new trees my need more frequent watering.

BALL AND BURLAP TREE PLANTING NOTES — Approved by Parks & Rec. Design Mgr. Nell Minter [Accepted] — Drawn by: GLH — Checked by: CB — PR-101

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DESIGNED: CD
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LOCATION: SECTION 20, T. 13N., R. 19W., P.M.M. CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS BOULEVARD TREE PLAN

PROJECT NO. 21001296

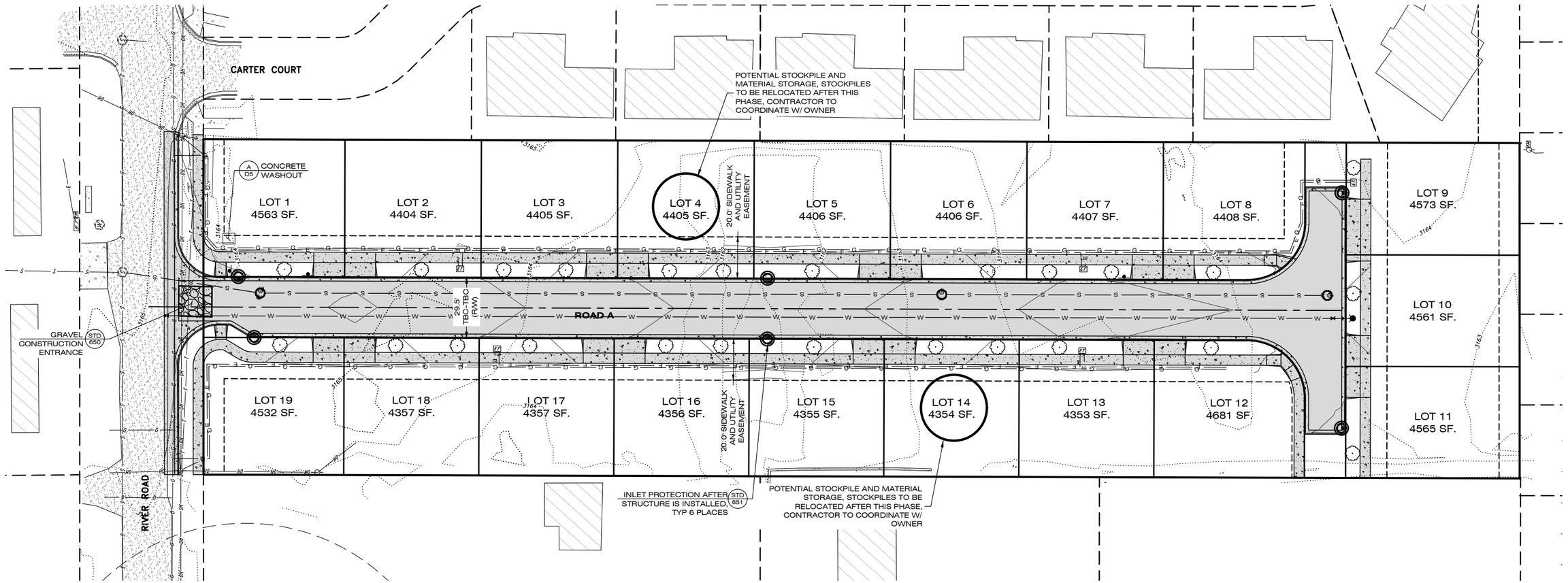
SHEET: 7 OF 9

DWG LOCATION: S:\FILES\ACTIVE\PROJECTS\2021\21001296.000\DESIGN\CIVIL\DRAFTING_DRAWINGS\AUTOCAD\PLAN SETS\ROADS\PR-210012960.DWG

STORM WATER POLLUTION PREVENTION PLAN (SWPPP) NOTES

1. CONTRACTOR IS TO BE FAMILIAR WITH THE REQUIREMENTS OF SECTION 402(P) OF THE FEDERAL CLEAN WATER ACT AND REGULATIONS ADOPTED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA). (AMENDMENTS TO TITLE 40 OF THE CODE OF FEDERAL REGULATIONS, PART 122, PUBLISHED IN THE FEDERAL REGISTER ON NOVEMBER 16, 1990 AND ON APRIL 2, 1992.) ALSO, DEQ 1200-C PERMIT FOR THE CONTROL OF STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
2. CONTRACTOR IS TO BE FAMILIAR WITH ALL REQUIREMENTS OF THE SWPPP.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH LOCAL JURISDICTION AND MONTANA DEQ FOR EROSION AND SEDIMENT CONTROL.
4. THE TEMPORARY POLLUTION CONTROL SYSTEM SHALL BE INSTALLED PRIOR TO ALL OTHER CONSTRUCTION.
5. ALL EQUIPMENT MAINTENANCE AND RE-FUELING SHALL BE CONDUCTED IN A SAFE MANNER AND SPILL KITS SHALL BE MAINTAINED ON-SITE TO CLEAN ANY SPILLS THAT MAY OCCUR.
6. ALL EXPOSED AND UNWORKED SOILS SHALL BE STABILIZED BY SUITABLE APPLICATION OF BEST MANAGEMENT PRACTICES (BMP'S), SUCH AS VEGETATIVE COVER, MULCHING, PLASTIC COVERING OR APPLICATION OF GRAVEL SURFACES IN AREAS TO BE GRAVELED. NO EXPOSED AND UNWORKED SOILS SHALL REMAIN UNSTABILIZED. ONCE CONSTRUCTION ACTIVITY IS COMPLETED IN AN AREA BETWEEN THE MONTHS OF OCTOBER 1 AND APRIL 30, PERMANENT SEEDING SHALL BE INSTALLED.
7. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL AT ALL TIMES DURING CONSTRUCTION.
8. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING PROPER TRASH RECEPTACLES AND PORTABLE TOILETS ON-SITE AS WELL AS THE REGULAR MAINTENANCE OF THESE FACILITIES.
9. ALL CLEARING LIMITS AND/OR EASEMENT SETBACKS, SENSITIVE/CRITICAL AREAS AND THEIR BUFFERS, SIGNIFICANT TREES AND DRAINAGE COURSES SHALL BE CLEARLY STAKED AND MARKED AS SHOWN ON PLANS.
10. PROPERTIES ADJACENT TO THE PROJECT SITE THAT ARE SUBJECT TO POTENTIAL EROSION CAUSED BY CONSTRUCTION ACTIVITIES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION THROUGH THE USE OF SILT FENCE, HAY BALES OR OTHER BMP SELECTED BY THE CONTRACTOR.
11. ALL FACILITIES INTENDED TO TRAP SEDIMENT ON-SITE SHALL BE CONSTRUCTED AS A FIRST STEP IN GRADING. THESE FACILITIES SHALL BE FUNCTIONAL BEFORE ANY LAND DISTURBING ACTIVITIES TAKE PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS SHALL BE SEEDED AND MULCHED ACCORDING TO THE TIME PERIOD STATED IN #6 ABOVE.
12. ALL CUT AND FILL SLOPES SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. ALL SLOPES SHALL BE STABILIZED WITHIN THE TIME PERIOD STATED IN #6 ABOVE.
13. ALL STORM DRAINAGE INLETS MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED WITH A GRAVEL INTAKE FILTER TO PREVENT SEDIMENT FROM ENTERING THE SYSTEM. THE FILTER MUST BE INSPECTED REGULARLY AND CLEANED WHEN NECESSARY.
14. THE FOLLOWING SHALL APPLY TO CONSTRUCTION OF UTILITY LINES:
    A. WHERE FEASIBLE, NO MORE THAN 500' OF TRENCH SHALL BE OPEN AT ONE TIME.
    B. WHERE CONSISTENT WITH SAFETY AND SPACE CONSIDERATIONS, EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
    C. TRENCH DEWATERING DEVICES SHALL DISCHARGE AND SHALL REMAIN ON-SITE AND IN NO WAY ENTER PUBLIC PROPERTY OR WATERWAY.
15. WHEREVER CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED ROADS, A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED (SEE DETAIL SHEET) TO MINIMIZE THE TRANSPORT OF SEDIMENT (MUD) ONTO THE PAVED ROAD. IF SEDIMENT IS TRANSPORTED ONTO A ROAD SURFACE, THE ROADS SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR SWEEPING AND BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA. STREET WASHING SHALL ONLY BE ALLOWED AFTER SEDIMENT IS REMOVED IN THIS MANNER. A MINIMUM OF ONE (1) ON-SITE STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED.
16. CONCRETE TRUCKS SHALL NOT BE ALLOWED TO WASH OUT ON-SITE UNLESS A PROPERLY CONSTRUCTED CONCRETE TRUCK WASHOUT AREA IS CONSTRUCTED AND MAINTAINED.
17. ALL TRUCKS USED TO HAUL EXCAVATED SOILS FROM THE SITE SHALL BE INSPECTED AND SWEPT CLEAN OF LOOSE SOIL PRIOR TO LEAVING THE SITE.
18. FUEL, LUBRICANTS AND OTHER FLUIDS REQUIRED FOR THE MAINTENANCE OF THE EQUIPMENT SHALL NOT BE STORED ON-SITE.
19. ALL TEMPORARY SEDIMENT AND EROSION CONTROL SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON-SITE. DISTURBED SOIL AREAS RESULTING FROM REMOVAL SHALL BE PERMANENTLY STABILIZED.
20. ALL POLLUTANTS OTHER THAN SEDIMENT THAT OCCUR ON-SITE DURING CONSTRUCTION SHALL BE HANDLED AND DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORM WATER OR THE SITE.
21. ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL FACILITIES SHALL BE INSPECTED, MAINTAINED AND REPAIRED BY THE CONTRACTOR AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED USE. ALL ON-SITE EROSION AND CONTROL MEASURES SHALL BE INSPECTED BY THE CONTRACTOR AT LEAST ONCE EVERY SEVEN (7) DAYS AND WITHIN 24 HOURS OF ANY STORM EVENT EQUAL TO OR GREATER THAN 0.25" OF RAIN PER 24 HOUR PERIOD. AN INSPECTION REPORT FILE SHALL BE MAINTAINED BY THE CONTRACTOR AND KEPT ON-SITE.
22. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ADDITIONAL TEMPORARY SEDIMENT PONDS/TRAPS AS SITE CONDITIONS REQUIRE. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER.
23. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ADDITIONAL EROSION CONTROL MEASURES, INCLUDING BUT NOT LIMITED TO SILT FENCING, SEDIMENT PONDS/TRAPS, DIVERSION SWALES, CHECK DAMS, SEDIMENT BARRIERS, FILTER FABRIC MULCH AND SEEDING, AS CONDITIONS REQUIRE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER.
24. BMP'S TO LIMIT DISTURBANCE AND VEGETATIVE BUFFER AROUND LIMITS OF DISTURBANCE WHERE PRACTICAL.
25. CONTRACTOR TO PROVIDE SWPPP PACKET AND DEQ NOI CONFIRMATION LETTER TO CITY OF MISSOULA AND ACQUIRE CITY OF MISSOULA SWPPP PERMIT PRIOR TO ANY EARTH DISTURBING ACTIVITIES.
26. SWPPP INSPECTION RECORDS , NOT, AND NOT CONFIRMATION LETTER SHALL BE PROVIDED TO THE CITY OF MISSOULA AFTER THE PROJECT HAS REACHED FINAL STABILIZATION TO CLOSE OUT CITY PERMIT.
27. PUBLIC SIGNAGE IS REQUIRED PER SECTION 1.2.3 OF GENERAL PERMIT.

NOTE:
CONTRACTOR IS RESPONSIBLE FOR OBTAINING A CITY OF MISSOULA SWPPP PERMIT & DEQ PERMIT.



IMEG
1817 SOUTH AVE W, STE A MISSOULA, MT 59801
PH: 406.721.0142
FAX: 406.721.5224
www.imegcorp.com

PLOT DATE: 10/6/2021 - 12:40 PM

REVISIONS | DATE

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD SECTION 20, T. 13N., R. 19W., P.M.M. CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS EROSION CONTROL PLAN

PROJECT NO.: 21001296

SHEET: 8 OF 9

PRELIMINARY

DWG LOCATION: I:\FILES\ACTIVE\PROJECTS\2021\21001296.00\DESIGN\CAD\CIVIL_DRAWINGS\ROADPLAN_SHTS\ROADGRD-EROSION.DWG

TBD

PRELIMINARY

PROJECT NO.: 21001296	PROJECT NAME: RIVER VIEW SUBDIVISION	LOCATION: 1923 RIVER ROAD SECTION 20, T. 13N., R. 19W., P.M.M. CITY OF MISSOULA, MISSOULA COUNTY	DESIGNED: CD DRAFTED: JW CHECKED: CD DATE: AUG. 2021
SHEET: 9 OF 9	SHEET TITLE: ROAD CONSTRUCTION PLANS CROSS SECTIONS	PREPARED FOR: HOMES FOR MISSOULA, LLC	

REVISIONS	DATE

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MISSOULA, MT
59801
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FAX: 406.721.5224
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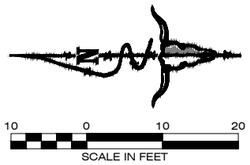

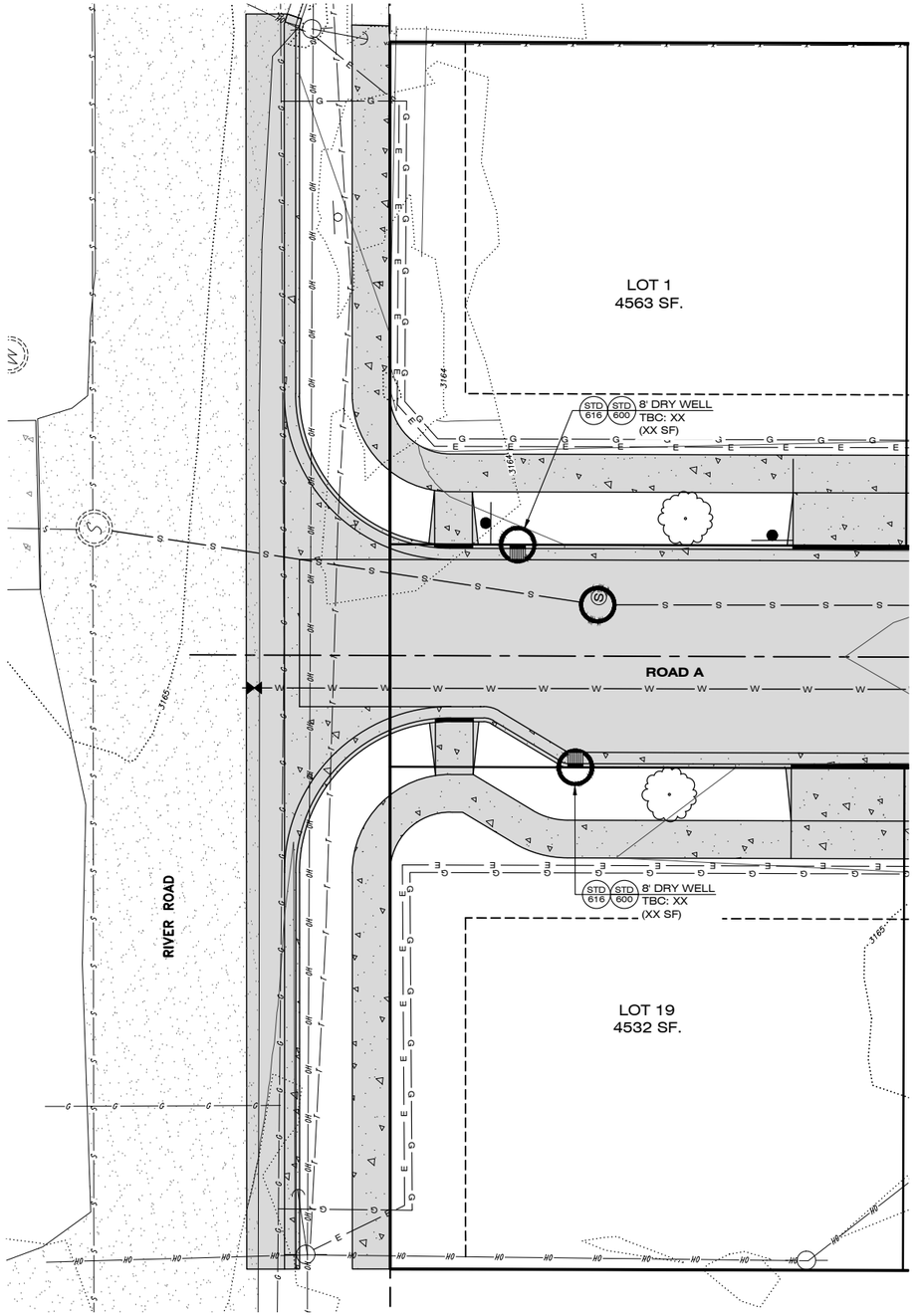

A
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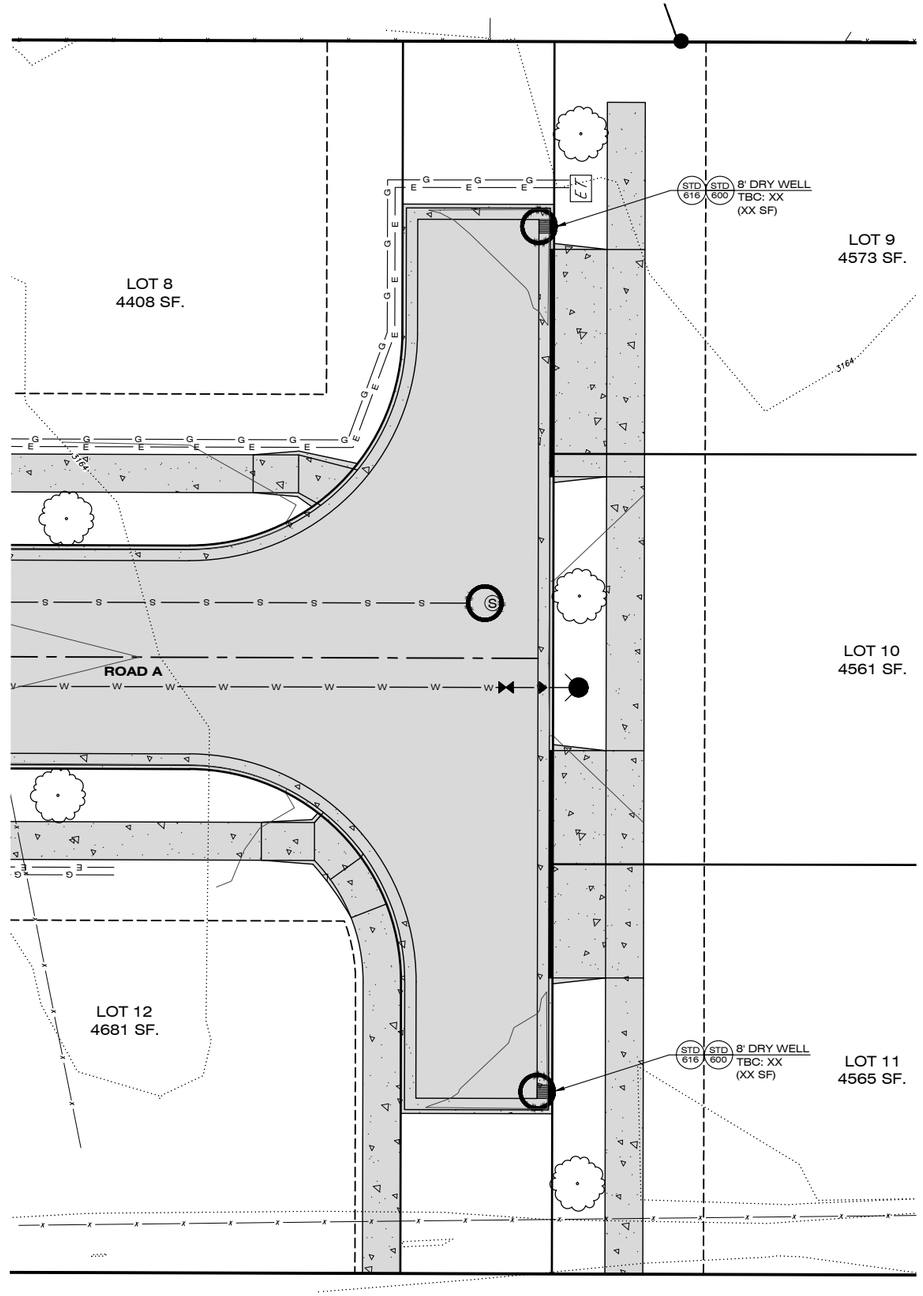
INTERSECTION PLAN/ GRADING



B
-
HAMMERHEAD PLAN/ GRADING

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MISSOULA, MT
59801
PH: 406.721.0142
FAX: 406.721.5224
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PLOT DATE: 10/6/2021 - 12:41 PM

REVISIONS
DATE

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG. 2021

LOCATION:
1923 RIVER ROAD
SECTION 20, T. 13N., R. 19W., P.M.M.
CITY OF MISSOULA, MISSOULA COUNTY

PREPARED FOR:
HOMES FOR MISSOULA, LLC

PROJECT NAME
RIVER VIEW SUBDIVISION

SHEET TITLE:
ROAD CONSTRUCTION PLANS
DETAIL SHEET

PROJECT NO.
21001296

SHEET:
D1 OF D4

PRELIMINARY

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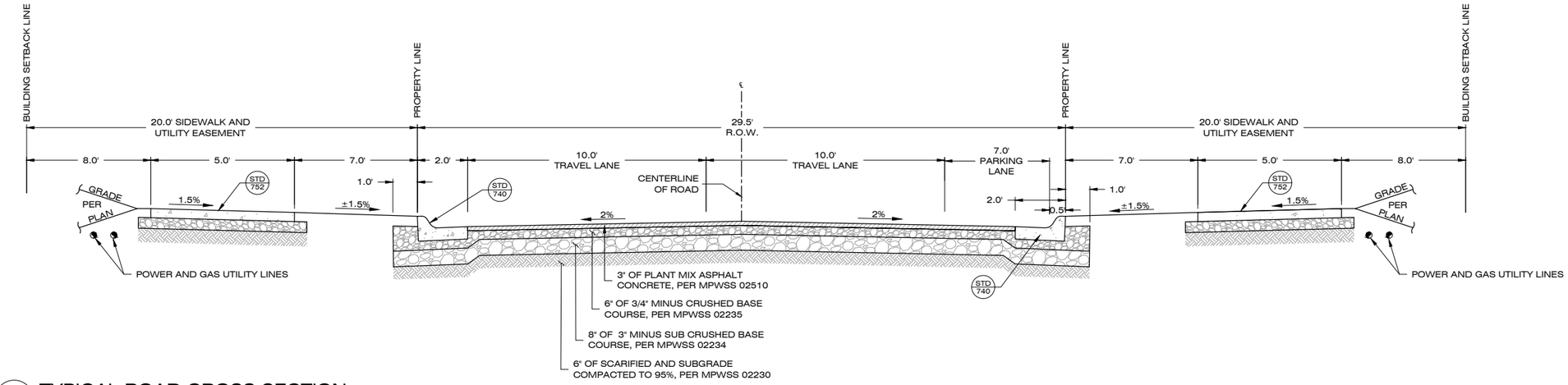

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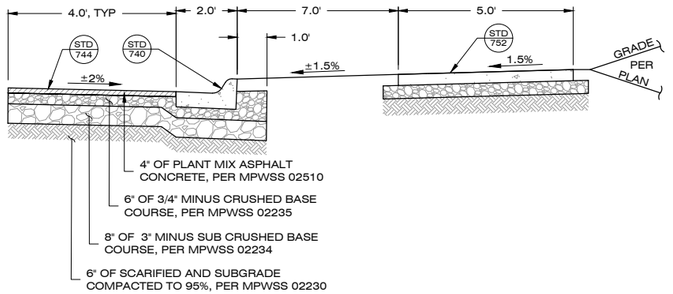
TYPICAL ROAD CROSS SECTION

NOT TO SCALE



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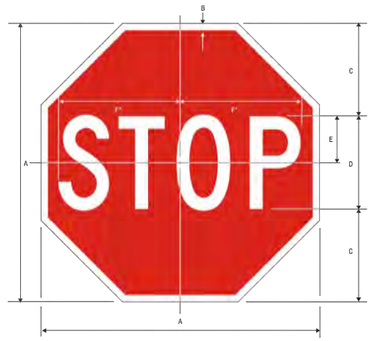
TYPICAL RIVER ROAD SECTION

NOT TO SCALE



R1-1
STOP

*Reduce spacing 40%

	A	B	C	D	E	F
C	18	.375	6	6 C	3	7.75
	24	.625	8	8 C	4	10
	30	.75	10	10 C	5	12.5
	36	.875	12	12 C	6	15
	48	1.25	16	16 C	8	20

COLORS: LEGEND — WHITE (RETROREFLECTIVE)
BACKGROUND — RED (RETROREFLECTIVE)

1-1

C
-
STOP SIGN

NOT TO SCALE

R7-1 NO PARKING

COLORS: LEGEND — RED
BACKGROUND — WHITE (RETROREFLECTIVE)

*See page 6-2 for arrow design

D
-
NO PARKING SIGN

NOT TO SCALE

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FAX: 406.721.5224
www.imegcorp.com

PLOT DATE: 10/6/2021 12:41 PM

DATE
REVISIONS

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG, 2021

LOCATION: 1923 RIVER ROAD
SECTION 20,T. 13N., R. 19W., P.M.M.
CITY OF MISSOULA, MISSOULA COUNTY
MISSOULA COUNTY, MONTANA

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

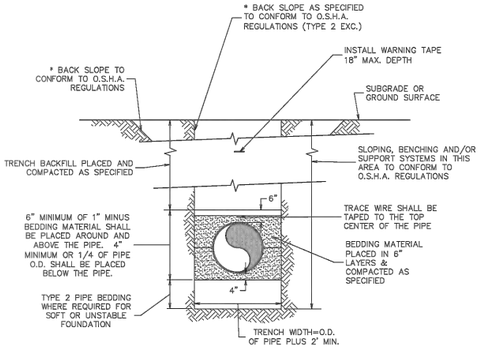
SHEET TITLE: ROAD CONSTRUCTION PLANS
DETAIL SHEET

PROJECT NO.: 21001296

SHEET: D2 OF D4

PRELIMINARY

DWG LOCATION: J:\FILES\ACTIVE\PROJECTS\2021\21001296.00\DESIGN\CIVIL\3_DRAFTING\3_DRAWINGS\AUTOCAD\PLANS SETS\ROAD\SHEET-210012296.DWG

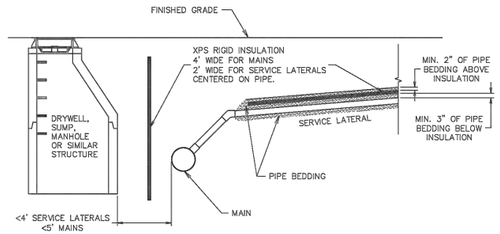


* SEE O.S.H.A. CONSTRUCTION STANDARDS FOR EXCAVATIONS, SECTION 1926, SUBPART P.

NOTE:

CASING PIPE (IF ANY) INSTALLED BY TRENCH CONSTRUCTION METHODS SHALL BE BEDDED AS SHOWN IN THIS DETAIL.

Engineering Division | Typical Utility Trench Detail | Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 401

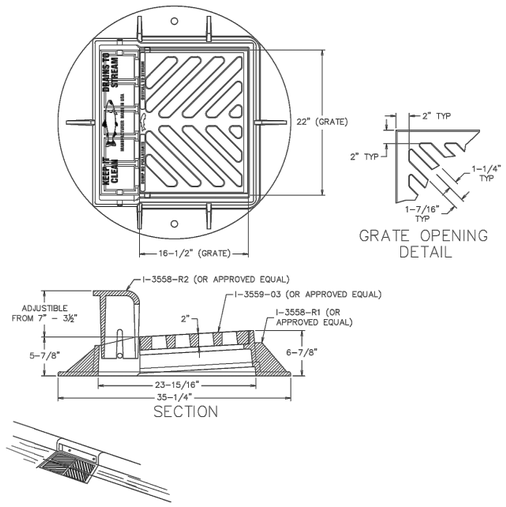


GENERAL NOTES:

1. INSULATION IS REQUIRED WHEN A SANITARY SEWER PIPE IS LESS THAN 4 FEET FOR A SERVICE LATERAL, AND LESS THAN 5 FEET FOR A SEWER MAIN, FROM FINISHED GRADE, A DRYWELL SUMP, IRRIGATION PIPE OR ANY STRUCTURE THAT HAS THE POTENTIAL TO TRANSFER COLD OR PROMOTE FREEZING.
2. PROVIDE TWO INCHES OF INSULATION THICKNESS, EQUIVALENT TO AN R-VALUE OF 10, PER FOOT OF MISSING COVER OR VOID SPACE LESS THAN FIVE FEET.
3. USE A HIGH DENSITY, RIGID INSULATION (PINK BOARD) WITH 35 PSI OR GREATER RATING IN TRAFFIC AREAS.

Engineering Division | Sanitary Sewer Service and Main Insulation Requirements | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 500

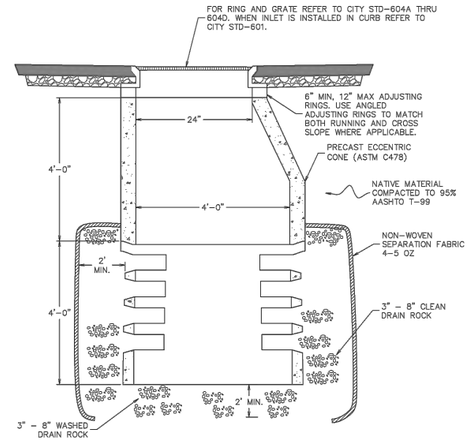
D&L 3558/EJIW 7222
OR APPROVED EQUIVALENT



GENERAL NOTES:

1. COMBINATION CURB INLET FRAME AND GRATE SHALL BE USED WHERE INLET OR DRY WELL IS LOCATED IN TYPICAL "L" TYPE CURB & GUTTER (STD-740).
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. VANED GRATE (D&L I-3559-04 OR APPROVED EQUAL) SHALL BE USED WHEN SLOPE EXCEEDS 5%.
4. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
5. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD.
6. GRATE SHALL MATCH RUNNING SLOPE OF STREET.
7. GROUT BOLT SLOTS LOCATED IN THE CURB LINE.

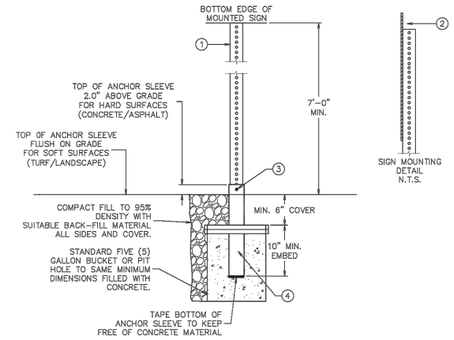
Engineering Division | 24" COMBINATION CURB INLET FRAME & GRATE | Approved By Utility Engineer Andy Schultz, PE | Revised: 09/28/2020 | STD - 601



GENERAL NOTES:

1. OVER-EXCAVATE WHERE REQUIRED TO ENSURE BOTTOM OF EXCAVATION IS A MIN. 2-FT INTO GRAVELLY SOIL.
2. CATCH BASINS (STD-614) PIPED TO DRY WELLS ARE ENCOURAGED AS A PRE-TREATMENT METHOD OR TO AVOID UTILITY CONFLICTS.
3. NO GRADE RING TO BE OFFSET MORE THAN 2" AND TOTAL OFFSET NOT TO EXCEED WALL THICKNESS OF CONE.
4. GRADE RINGS SHALL BE 2" THICKNESS MINIMUM.
5. NO WEDGES ALLOWED BETWEEN GRADE RINGS AND FRAME MUST BE SET FLUSH WITH TOP GRADE RING.

Engineering Division | Standard 8' Precast Dry Well | Approved By Utility Engineer Andy Schultz, PE | Revised: 09/28/2020 | STD - 616



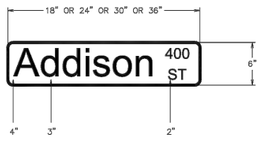
KEYED NOTES:

1. 2" 12 GAUGE TELESPAR ® PERFORATED STEEL SQUARE TUBING SIGN POST, OR CITY ENGINEER APPROVED EQUIVALENT, SHALL BE USED FOR ALL SIGN INSTALLATIONS UPON/WITHIN THE PUBLIC RIGHT-OF-WAY (UNLESS SIGN AREA (SQ- FT) EXCEEDS YIELD ACCORDING TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS). TELESPAR ®OR EQUAL MATERIAL SPECIFICATIONS: STEEL CONFORMING TO ASTM A-1011 GRADE 50 AND GALVANIZING CONFORMING TO ASTM A-653.
2. SET SIGN FLUSH WITH OR ABOVE TOP OF POST. TOP OF SIGN SHALL NOT BE PLACED BELOW TOP OF POST. SIGN SHOULD BE FULLY SUPPORTED BY POST.
3. FASTEN SIGN POST TO THROUGH-DRILLED ANCHOR SLEEVE WITH 5/16" X 3" GRADE 2 BOLT WITH FLAT WASHERS AND NYLON-INSERT LOCK NUT. PLACE BOLT 1" BELOW THE TOP OF ANCHOR SLEEVE.
4. GALVANIZED 2-1/2" X 2-1/2" X 18" LONG (MIN.), 7 GAUGE NON-PERFORATED STEEL SQUARE TUBING ANCHOR SLEEVE.

GENERAL NOTES:

1. ALL SIGNS SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), MOST CURRENT VERSION, REVISION AND / OR SUPPLEMENT, FOR SIGN MATERIAL(S), SIZE, THICKNESS, SHAPE, COLOR(S), MESSAGE, SYMBOLOGY AND RETROREFLECTIVITY.
2. ALL SIGNS LOCATED UPON/WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE SLEEVE-MOUNTED FOR BREAKAWAY AND REPLACEABILITY.
3. FINAL SIGN LOCATION AND / OR PLACEMENT SHALL BE IN ACCORDANCE WITH THE MUTCD AND AS DETERMINED AND APPROVED BY THE CITY ENGINEER OR SIGN SHOP SUPERVISOR.
4. 2-1/2" 12 GAUGE SHALL BE USED FOR LARGER SIGN AREA INSTALLATIONS. THE CITY ENGINEER MAY REQUIRE ALTERNATE SIZES, GAUGES, ETC, BASED ON SIGN SURFACE AREA.

Engineering Division | Typical Boulevard Sign Base Public Right-of-Way | Approved By City Engineer Kevin J. Slovarp | Adopted:01/27/1999 Revised: 01/10/2017 | STD - 720



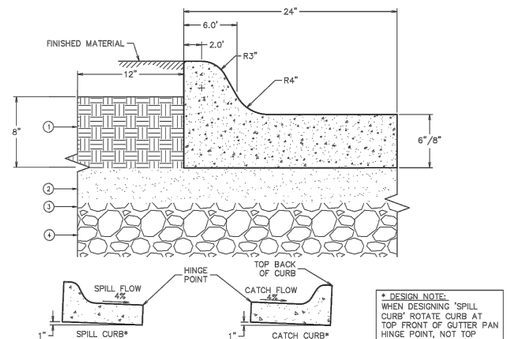
STREET NAME SIGN MATERIAL SPECIFICATIONS:

1. ALUMINUM BLANKS
   6" X 18", 24", 30", 36" X .08"
2. MARKINGS SHALL BE PLACED ON ONE SIDE OF SIGN ONLY.
3. TEXT SIZE SPECIFICATION:
   3.1. 4" INITIAL UPPERCASE.
   3.2. 3" NOMINAL LOOP LOWERCASE – NOT INCLUDING ASCENDING AND/OR DESCENDING TAIL.
   3.3. 2" BLOCK NUMBER.
   3.4. 2" ROUTE DESIGNATION – ALL CAPS – CENTER WITH BLOCK NUMBER.
4. TWO SIGNS SHALL BE MOUNTED BACK TO BACK ON EITHER SIDE OF THE SIGN POST. 2 SIGNS ARE REQUIRED.
5. GREEN BACKGROUND WITH WHITE TEXT FOR PUBLIC STREETS.
6. WHITE BACKGROUND WITH GREEN TEXT FOR PRIVATE STREETS.
7. PROVIDE "T2000 HWYC" FONT.

STREET NAME SIGN MATERIAL AND SPACING SPECIFICATIONS:

1. ALL STREET NAME SIGNS SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), MOST CURRENT VERSION, REVISION AND/OR SUPPLEMENT, FOR SIGN MATERIAL(S), SIZE, THICKNESS, SHAPE, COLOR(S), MESSAGE, SYMBOLOGY AND RETROREFLECTIVITY.
2. FINAL STREET NAME SIGN LOCATION AND/OR PLACEMENT SHALL BE IN ACCORDANCE WITH THE MUTCD AND AS DETERMINED AND APPROVED BY THE CITY ENGINEER OR SIGN SHOP SUPERVISOR.
3. SPACING BETWEEN EACH SIGN ON A SINGLE POLE SHALL BE NO GREATER THAN 1" AND MUST NOT OVERLAP.
4. ALL OTHER SIGNS SHALL DEFAULT TO MUTCD STANDARDS AND SPECIFICATIONS.

Engineering Division | Typical Street Name Sign Standard | Approved By City Engineer Kevin J. Slovarp | Adopted:03/15/2006 Revised: 01/13/2017 | STD - 721



* DESIGN NOTE:
WHEN DESIGNING 'SPILL CURB' ROTATE CURB AT TOP FRONT OF GUTTER PAN HINGE POINT, NOT TOP BACK OF CURB.

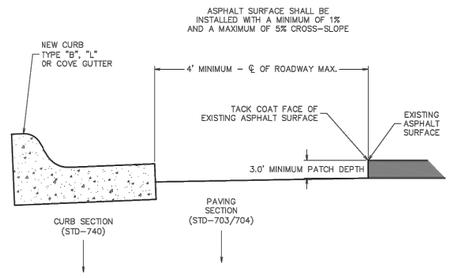
KEYED NOTES:

1. FILL MATERIAL: MINIMUM OF EIGHT (8") INCHES OF FILL MATERIAL COMPACTED TO 95% PROCTOR DENSITY BEHIND CURB. SEE STD-141 FOR SIDEWALK SECTION IF APPLICABLE.
2. BASE: MINIMUM OF FOUR (4") INCHES OF BASE SHALL BE COMPACTED TO 95% PROCTOR DENSITY. EXTEND 1' FOOT BEHIND CURB.
3. BASE: CITY ENGINEER MAY REQUIRE ADDITIONAL BASE, DEPENDING ON ADEQUACY OF SUB GRADE MATERIAL BASED ON A CBR.
4. SUB GRADE: MINIMUM OF SIX (6") INCHES OF SUB GRADE SHALL BE COMPACTED TO 95% PROCTOR DENSITY. EXTEND 1' FOOT BEHIND CURB.

GENERAL NOTES:

1. CONTRACTION JOINTS SHALL BE PLACED EVERY TEN (10') FEET AND SHALL BE ONE-FOURTH (1/4) THE CONCRETE THICKNESS OR A MINIMUM OF ONE (1") INCH DEEP.
2. EXPANSION JOINTS OF ONE-HALF (1/2") INCH MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS:
   2.1 P.C.S AND P.T.S OF CURVES WHERE RADII ARE THIRTY (30') FEET OR LESS.
   2.2 GRADE BREAKS.
   2.3 NO CLOSER THAN FOUR (4') FEET ON EITHER SIDE OF A DRAINAGE STRUCTURE.
   2.4 AT OTHER LOCATIONS AS SPECIFIED BY CITY ENGINEER.
3. MINIMUM GUTTER FLOW LINE SHALL BE FOUR-TENTHS (0.4%) PERCENT SLOPE.
4. NO CURB OR SIDEWALK SHALL BE POURED WITHOUT AN INSPECTION AND APPROVAL OF FORM PLACEMENT BY CITY ENGINEERING DIVISION.
5. "L" TYPE CURB IS SUITABLE FOR USE AS LANDSCAPE RETAINING CURB AND MAY BE POURED WITH SIDEWALK UPON APPROVAL.
6. CONSTRUCTION MATERIALS AND PROCEDURES SHALL CONFORM TO EXISTING CITY SPECIFICATIONS FOR M-4000 CEMENT CONCRETE AND MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS SECTIONS 02528 AND 03310.
7. THE CITY OF MISSOULA REQUIRES 564 LBS OF PORTLAND CEMENT PER CY OF CONCRETE.
8. NOT FOR USE IN NEW ROAD CONSTRUCTION.

Engineering Division | Typical "L" Type Curb/Gutter Section | Approved By City Engineer Kevin J. Slovarp | Adopted:01/30/1980 Revised: 03/15/2017 | STD - 740



GENERAL NOTES:

1. ASPHALT SURFACE SHALL BE SQUARE CUT BY A METHOD APPROVED BY THE CITY ENGINEER.
2. ASPHALT SHALL BE CUT, REMOVED AND REPLACED A MINIMUM FOUR (4') FEET FROM THE FACE OF THE CURB / GUTTER PAN.
3. ASPHALT CUT, REMOVAL AND REPLACEMENT MAY REQUIRE HALF STREET (UP TO CENTERLINE) IMPROVEMENTS, AS REQUIRED BY THE CITY ENGINEER.
4. FOR CURB REPLACEMENT ONLY, EXISTING ASPHALT EDGE MAY BE USED AS A FRONT FORM IF EXISTING ASPHALT IS SOUND AND SQUARE FACED, AND ONLY UPON PRIOR APPROVAL OF THE CITY ENGINEER.
5. ANY OVER EXCAVATION SHALL BE BACK-FILLED WITH THE PROPER ROAD SECTION (STD-703/704)
6. A MINIMUM OF 6" OF BASE SHALL BE PLACED UNDER THE ASPHALT REPAIR AND COMPACTED TO 95% PROCTOR DENSITY.
7. FOR TEMPORARY PATCH, CONTRACTOR SHALL BE RESPONSIBLE FOR FILLING IN FRONT OF THE CURB WITH EITHER 3/4" MINUS OR COLD MIX AND MAINTAINING THE OPENING IN A SAFE CONDITION UNTIL THE ASPHALT REPAIR CAN BE COMPLETED.
8. EXISTING ASPHALT FACE SHALL BE TACK COATED PRIOR TO PLACING ASPHALT PATCH.
9. ASPHALT DEPTH VARIES FROM 3" TO 6" – REFER TO ASPHALT PAVING SECTION STANDARD DRAWINGS STD-703/704.

Engineering Division | Asphalt Cutting, Removal and Replacement Adjacent to Curb and Gutter | Approved By City Engineer Kevin J. Slovarp | Adopted:02/06/1986 Revised: 03/20/2017 | STD - 744

IMEG
1817 SOUTH AVE W, STE A PH: 406.721.0142
MISSOULA, MT FAX: 406.721.5224
59801 www.imegcorp.com

PLOT DATE: 10/6/2021 - 12:41 PM

DATE
REVISIONS

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG. 2021

LOCATION: SECTION 20, T. 13N., R. 19W., P.M.M. CITY OF MISSOULA, MISSOULA COUNTY MISSOULA COUNTY, MONTANA

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

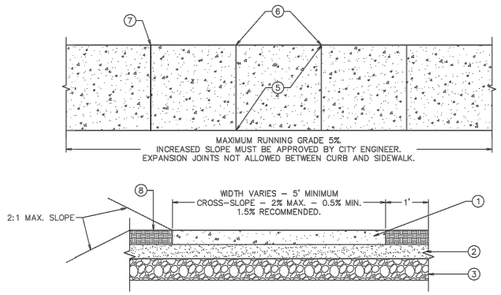
SHEET TITLE: ROAD CONSTRUCTION PLANS DETAIL SHEET

PROJECT NO. 21001296

SHEET: D3 OF D4

PRELIMINARY

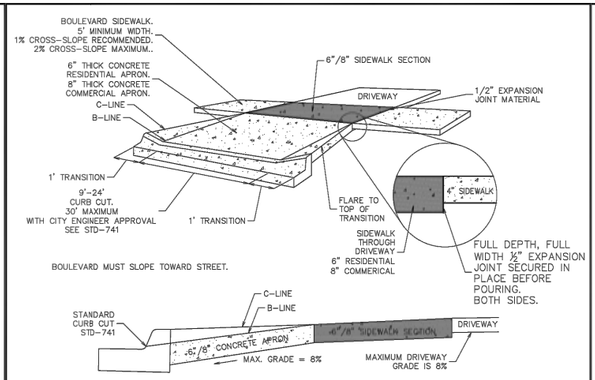
DWG LOCATION: P:\PROJECTS\PROJECTS 2021\21001296\DESIGN\CIVIL\DRAFTING\1_DRAWINGS\AUTOCAD\PLAN SETS\ACADSTD-210012296.DWG



KEYED NOTES:

1. MINIMUM OF FOUR (4") INCHES OF CONCRETE SIDEWALK (TYPICAL), MINIMUM SIX (6") INCHES CONCRETE SIDEWALK THROUGH RESIDENTIAL DRIVEWAY OR MINIMUM EIGHT (8") INCHES CONCRETE SIDEWALK THROUGH COMMERCIAL DRIVEWAY OR ON ADA RAMPS PER STD DWGS.
2. MINIMUM OF FOUR (4") INCHES OF BASE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
3. MINIMUM OF SIX (6") INCHES OF SUB GRADE SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
4. CITY ENGINEER MAY REQUIRE ADDITIONAL BASE, DEPENDING ON SUB GRADE MATERIAL.
5. CONTRACTION JOINTS SHALL FORM AS NEAR A SQUARE PANEL AS POSSIBLE, NO SINGLE PANEL SHALL EXCEED TEN (10') FEET ON ANY SIDE. LONGITUDINAL JOINTS REQUIRED IF SIDEWALK WIDTH EXCEEDS TEN (10') FEET.
6. CONTRACTION JOINTS SHALL BE ONE-FOURTH (1/4) THE CONCRETE THICKNESS OR A MINIMUM OF ONE (1") INCH DEEP.
7. EXPANSION JOINTS OF ONE-HALF (1/2") INCH THICK MASTIC MATERIAL SHALL BE PLACED AT THE FOLLOWING LOCATIONS:
   - 7.1. EVERY FIFTY (50') FEET OF UNINTERRUPTED SIDEWALK.
   - 7.2. P.C.S AND P.T.S OF CURVES.
   - 7.3. GRADE BREAKS.
   - 7.4. RESIDENTIAL DRIVEWAYS SIX (6") INCH DEEP MASTIC SHALL BE INSTALLED AT THE TOP OF THE TRANSITION ON BOTH SIDES AND SHALL BE PINNED IN PLACE BEFORE POURING.
   - 7.5. COMMERCIAL DRIVEWAYS EIGHT (8") INCH DEEP MASTIC SHALL BE INSTALLED AT THE TOP OF THE TRANSITION ON BOTH SIDES AND SHALL BE PINNED IN PLACE BEFORE POURING.
   - 7.6. AT OTHER LOCATIONS AS SPECIFIED BY CITY ENGINEERING DIVISION.
   - 7.7. ALL EXPANSION JOINTS SHALL BE PLACED FLUSH OR JUST BELOW TOP FINISHED SURFACE OF SIDEWALK.
   - 7.8. ALL EXPANSION JOINTS SHALL BE FULL DEPTH, FULL WIDTH AND SECURED IN PLACE BEFORE THE FORMS WILL BE APPROVED.
8. FINISHED SURFACE – 12" MINIMUM SHOULDER UNLESS OTHERWISE APPROVED BY CITY ENGINEER.
9. FINISHED SIDEWALK SURFACE SHALL HAVE MEDIUM-TO-HEAVY BROOM TEXTURE.
10. NO SIDEWALK SHALL BE POURED WITHOUT AN INSPECTION AND APPROVAL OF FORM PLACEMENT BY CITY ENGINEERING DIVISION.
11. CONSTRUCTION MATERIALS AND PROCEDURES SHALL CONFORM TO EXISTING CITY STANDARD SPECIFICATIONS FOR M-4000 CEMENT CONCRETE AND MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS SECTIONS 02528 AND 03310.
12. CITY OF MISSOULA REQUIRES 564 LBS OF PORTLAND CEMENT PER CY OF CONCRETE.

Engineering Division | **Typical Sidewalk Section** | Approved By City Engineer Kevin J. Slovarp | Adopted: 02/29/1996 Revised: 03/22/2017 | **STD - 752**



CROSS-SECTION

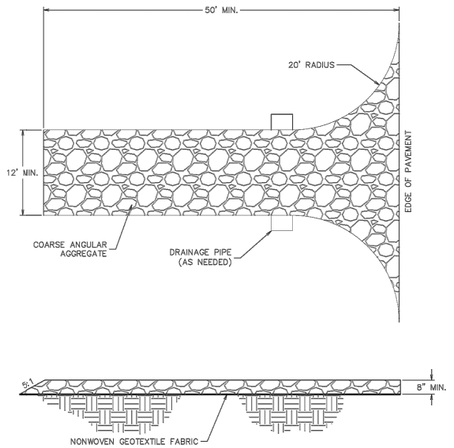
GENERAL NOTES:

1. RESIDENTIAL CURB CUT IS 9' TO 12' WIDE FOR SINGLE GARAGE.
2. MAXIMUM RESIDENTIAL CURB CUT IS 24' WIDE FOR DOUBLE GARAGE..
3. COMMERCIAL CURB CAN NOT BE SAW CUT, MUST BE REMOVED AND RE-POURED..
4. APRON AND SIDEWALK MUST BE POURED SEPARATELY.
5. SIDEWALK AND APRON THROUGH RESIDENTIAL (SINGLE FAMILY AND DUPLEX) DRIVEWAY MUST BE SIX (6") INCHES MINIMUM THICKNESS.
6. SIDEWALK AND APRON THROUGH MULTI-FAMILY (TRI-PLEX AND LARGER), COMMERCIAL OR INDUSTRIAL DRIVEWAYS MUST BE EIGHT (8") INCHES MINIMUM THICKNESS.
7. SEE STANDARD DRAWING STD-772 FOR ALTERNATIVE SIDEWALK/DRIVEWAY ADA REQUIREMENTS THROUGH DRIVEWAY.
8. ADDITIONAL EXPANSION JOINT MATERIAL MAY BE REQUIRED BY CITY ENGINEER.

BEDDING UNDER APRON MUST MEET SPECIFICATIONS FOR CONCRETE SIDEWALK PER STD-752

9. FOR EXISTING BOULEVARD RETROFIT, NEW SIDEWALK REPLACEMENT SECTION SHALL EXTEND TO NEAREST FULL SIDEWALK PANELS.

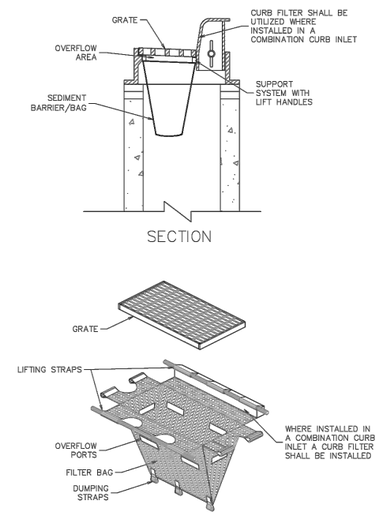
Engineering Division | **Standard Driveway Opening for Boulevard Sidewalk 25 Parking Spaces or Less** | Approved By City Engineer Kevin J. Slovarp | Adopted: 04/09/1973 Revised: 04/04/2017 | **STD - 771**



GENERAL NOTES:

1. A TEMPORARY GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT POINTS OF VEHICULAR EGRESS ON A CONSTRUCTION SITE TO LIMIT THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PUBLIC ROADS BY VEHICLES.
2. REMOVE AND REPLACE AGGREGATE WHEN VOIDS BECOME FILLED.
3. SWEEP AND REMOVE SEDIMENT TRACKED ONTO PAVED SURFACES.
4. PROPERLY GRADE INGRESS/EGRESS POINTS TO PREVENT RUNOFF FROM LEAVING THE SITE.
5. CONSIDER THE USE OF RUMBLE PADS, FODs, OR CATTLE GUARDS IN COMBINATION WITH THE GRAVEL CONSTRUCTION ENTRANCE TO IMPROVE EFFECTIVENESS

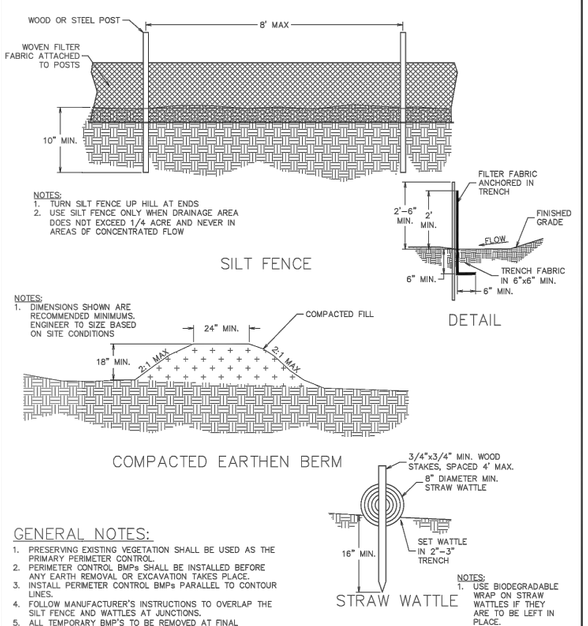
Engineering Division | **Temporary Gravel Construction Entrance** | Approved By Utility Engineer Andy Schultz, PE | Revised: 09/28/2020 | **STD - 650**



GENERAL NOTES:

1. INLET PROTECTION SHALL BE USED AS A "LAST RESORT" BMP. CARE SHALL BE TAKEN TO MINIMIZE SEDIMENT LADEN STORM WATER FROM REACHING INLETS/DRY WELLS
2. INLET PROTECTION SHALL BE INSPECTED REGULARLY AND AFTER STORM EVENTS. IF UNIT IS MORE THAN 1/3 FULL OF ACCUMULATED SEDIMENT, THE UNIT MUST BE EMPTIED.
5. ALL TEMPORARY BMP'S TO BE REMOVED AT FINAL STABILIZATION.

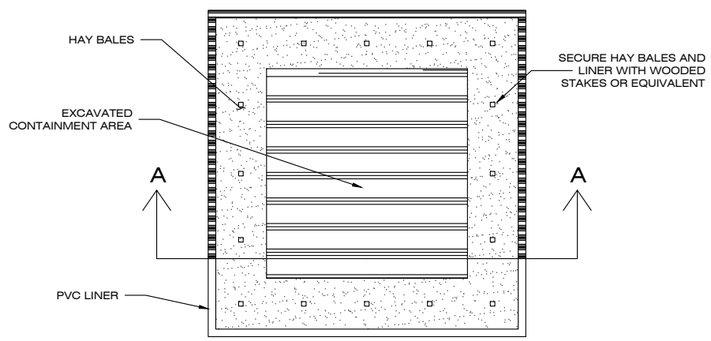
Engineering Division | **Inlet Protection** | Approved By Utility Engineer Andy Schultz, PE | Revised: 09/28/2020 | **STD - 651**



GENERAL NOTES:

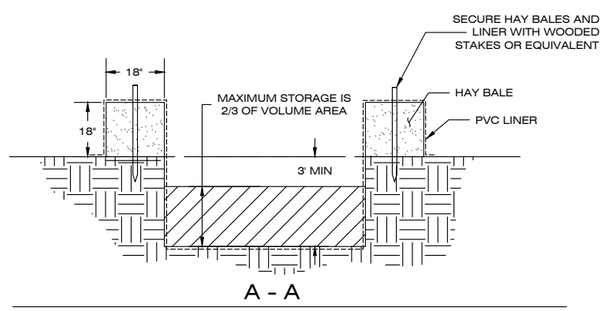
1. PRESERVING EXISTING VEGETATION SHALL BE USED AS THE PRIMARY PERIMETER CONTROL.
2. PERIMETER CONTROL BMPs SHALL BE INSTALLED BEFORE ANY EARTH REMOVAL OR EXCAVATION TAKES PLACE.
3. INSTALL PERIMETER CONTROL BMPs PARALLEL TO CONTOUR LINES.
4. FOLLOW MANUFACTURER'S INSTRUCTIONS TO OVERLAP THE SILT FENCE AND WATTLES AT JUNCTIONS.
5. ALL TEMPORARY BMP'S TO BE REMOVED AT FINAL STABILIZATION.

Engineering Division | **Perimeter Control** | Approved By Utility Engineer Andy Schultz, PE | Revised: 09/28/2020 | **STD - 652**



A - CONCRETE WASHOUT AREA DETAIL

NOT TO SCALE



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PH: 406.721.0142
FAX: 406.721.5224
www.imegcorp.com

PLOT DATE: 10/6/2021 - 12:41 PM

REVISIONS	DATE

DESIGNED: CD
DRAFTED: JW
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD
SECTION 20, T. 13N., R. 19W., P.M.M.
CITY OF MISSOULA, MISSOULA COUNTY
MISSOULA COUNTY, MONTANA

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: ROAD CONSTRUCTION PLANS
DETAIL SHEET

PROJECT NO. 21001296

SHEET: D4 OF D4

PRELIMINARY

BMG LOCATION: I:\FILES\ACTIVE\PROJECTS\2021\21001296\DESIGN\CIVIL\DRAFTING\01_DRAWINGS\AUTOCAD\PLAN SETS\ROADS\RD-STD01296.DWG

UTILITY CONSTRUCTION PLANS

RIVER VIEW SUBDIVISION
LOCATED IN SECTION 20, T13N, R19W, P.M.M., MISSOULA COUNTY, MONTANA.

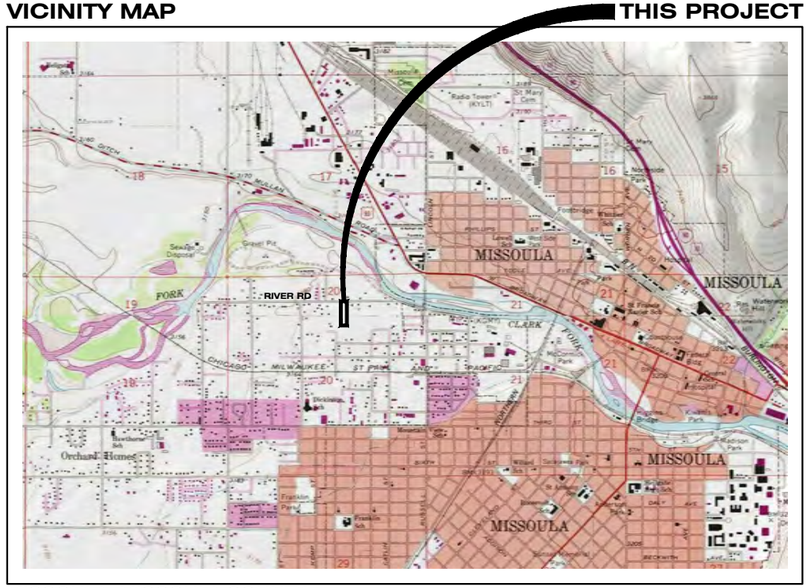
CALL UTILITY NOTIFICATION
CENTER OF MONTANA
1-800-424-5555
CALL FOR THE MARKING OF
UNDERGROUND UTILITIES
2 BUSINESS DAYS BEFORE
YOU DIG, GRADE, OR EXCAVATE

80 0 80 160
SCALE IN FEET

SHEET INDEX

DESCRIPTION	SHEET NO.
LEGEND & NOTES SHEET	SHEET 2 OF 4
PLAN & PROFILE - SEWER	SHEET 3 OF 4
PLAN & PROFILE - WATER	SHEET 4 OF 4
DETAIL SHEET	SHEET D1 OF D2
DETAIL SHEET	SHEET D2 OF D2

VICINITY MAP **THIS PROJECT**



MISSOULA, MISSOULA COUNTY

0 2000

PROJECT STATUS

THESE PLANS REQUIRE, AT A MINIMUM, APPROVAL FROM THE AGENCIES LISTED BELOW. THEREFORE , THE OWNER & CONTRACTOR ARE ADVISED THAT BIDS & CONTRACTS SHOULD NOT BE FINALIZED UNTIL INDICATED BELOW.

AGENCIES REVIEW STATUS:	REFERENCE #	APPROVAL DATE
MONTANA DEPT. OF ENV. QUALITY	EQ#:	
CITY OF MISSOULA	XX	

PLAN SET IS READY FOR CONSTRUCTION __YES X NO

AS-BUILT DATE:_____

PROJECT HAS BEEN CONSTRUCTED IN GENERAL CONFORMANCE WITH THE ABOVE APPROVALS, STATED SPECIFICATIONS, AS SHOWN HERE IN, UNLESS OTHERWISE SPECIFIED.

PROJECT NOTES:

CITY OF MISSOULA CHECKLIST DATA

LINEAR FOOTAGE OF SEWER GRAVITY MAINS ESTIMATED FOR CONSTRUCTION	XXX LF
LINEAR FOOTAGE OF SEWER FORCE MAINS ESTIMATED FOR CONSTRUCTION	0 LF
NUMBER OF PROPOSED SEWER STUBS TO BE CONSTRUCTED	XX
LINEAR FOOTAGE ESTIMATED FOR WATER MAINS TO BE INSTALLED	XXX LF
WATER STUBS TO BE CONSTRUCTED	XX

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1817 SOUTH AVE. W. STE. A
MISSOULA, MT
59801
PH: 406.721.0142
FAX: 406.721.5224
www.imegcorp.com

PLOT DATE: 1/06/2021 12:43 PM

REVISIONS | DATE

DESIGNED: AM
DRAFTED: AM
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD
SECTION 20, T13N, R19W, P.M.M.
MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: UTILITY CONSTRUCTION PLANS COVER SHEET

PROJECT NO. 21001296

SHEET: 1 OF 4

PRELIMINARY

DWG LOCATION: I:\FILES\ACTIVE\PROJECTS\2021\21001296.00\DESIGN\CIVIL\3_DRAFTING\1_DRAWINGS\AUTOCAD\PLAN SETS\UTILITY_WATER & SEWER\WTR_SWR-21001296.DWG

LEGEND

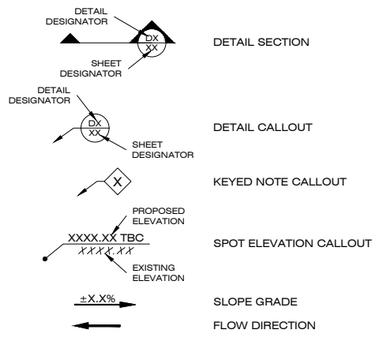
NOTE: ALL FEATURES SHOWN IN LEGEND MIGHT NOT BE PRESENT ON PLANS
ALL FEATURES SHOWN ON PLANS MIGHT NOT BE PRESENT IN LEGEND

EXISTING	PROPOSED
	(P) EASEMENT
W	(P) WATER LINE
WS	(P) WATER SERVICE
S	(P) SEWER LINE
SS	(P) SEWER SERVICE
FM	(P) SEWER FORCE MAIN
FMS	(P) SEWER FORCE MAIN SERVICE
ST	(P) STORM DRAIN PIPE
OH	(P) OVERHEAD UTILITY
E	(P) BURIED POWER
G	(P) GAS LINE
T	(P) TELEPHONE LINE
TV	(P) TELEVISION LINE
FO	(P) FIBER OPTIC LINE
	(P) ROAD CENTERLINE
X	(P) FENCE LINE
	(P) DITCH
	(P) SWALE
IFM	(P) IRRIGATION FORCE MAIN
3250	(P) MAJOR CONTOUR
	(P) MINOR CONTOUR
	(P) ASPHALT
	(P) GRAVEL
	(P) CONCRETE
	(P) SEWER MANHOLE
	(P) SEWER CLEANOUT
	(P) SEPTIC TANK
	(P) DRAINFIELD
	(P) WELL
	(P) FIRE HYDRANT
	(P) WATER METER
	(P) WATER VALVE
	(P) REDUCER
	(P) THRUST BLOCK
	(P) WATER BLOW-OFF
	(P) STORM DRAIN MANHOLE
	(P) CULVERT
	(P) CURB INLET
	(P) CATCH BASIN
	(P) SUMP
	(P) UTILITY MANHOLE
	(P) LIGHT POLE
	(P) SIGN
	(P) MAILBOX
	(P) DECIDUOUS TREE
	(P) CONIFEROUS TREE
	(P) BUSH/ SHRUB

ABBREVIATIONS

(E)	EXISTING
ELEV	ELEVATION
EOA	EDGE OF ASPHALT
FG	FINISHED GRADE
FL	FLOWLINE
INV	INVERT
LF	LINEAR FOOT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
(P)	PROPOSED
PC	POINT OF CURVATURE
PT	POINT OF TANGENT
SIM	SIMILAR
STA	STATION
TBC	TOP BACK OF CURB
TOC	TOP OF CONCRETE
TYP	TYPICAL

SYMBOLS



GENERAL CONDITIONS OF CONSTRUCTION:

1. The Standard General Conditions of the Contract prepared by the Engineers Joint Contract Documents Committee (Copyright 2007), as included in Montana Public Works Standard Specifications, are herein referred to as the General Conditions within these Drawings. Copies of the General Conditions will be provided to Contractor upon written request to Engineer.
2. Wherever used in these Drawings, the terms, whether printed with initial capital letters or not, as listed in the Standard General Conditions of the Construction Contract (General Conditions), Article 1 - Definitions and Terminology, prepared by the Engineers Joint Contract Documents Committee (Copyright 2007) will have the meanings indicated, which are applicable to both the singular and plural thereof, except as follows:
   a. The Contract Documents shall mean the Drawings as shown in these plans and any applicable referenced standards, specifications, or laws.
   b. The Contract Price shall mean the moneys payable by Owner to Contractor for completion of the Work in accordance with the Agreement.
   c. The Contract Times shall mean the number of days or the dates stated in the Agreement to complete the Work so that it is ready for final payment. If no such dates are established, the Contract Time shall be 120 days to complete the Work.
   d. Effective Date of the Agreement shall have the meaning as listed in the General Conditions, Article 1. If no such Agreement exists, the Effective Date of the Agreement shall be the day the Contractor proceeds with the Work.
3. By proceeding with the Work as shown on these Drawings, the Contractor makes the following representations:
   a. Contractor has examined and carefully studied the Drawings and other related data.
   b. Contractor is familiar with and is satisfied as to all federal, state and local laws and Regulations that may affect cost, progress, performance and furnishing of the Work.
   c. Contractor has visited the site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance or furnishing of the Work.
   d. Contractor acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Drawings with respect to Underground Facilities at or contiguous to the site.
   e. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise, which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor including applying the specific means, methods, techniques, sequences and procedures of construction, if any, expressly required by the Drawings to be employed by the Contractor, and safety precautions and programs incident thereto.
   f. Contractor is aware of the general nature of work to be performed by Owner and others at the site that relates to the Work.
   g. Contractor has given Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Drawings and the written resolution thereof by Engineer is acceptable to Contractor.
   h. The Drawings are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
4. In resolving disputes resulting from conflicts, errors or discrepancies, the order of precedence shall be as follows, as applicable to this project: Written agreement between owner and contractor, specifications, Drawings. Within the Specifications, the order of precedence is as follows, as applicable to this project: Addenda/Change Orders, Contractor's Bid, Special Provisions, Instructions to Bidders, Supplemental General Conditions, Notice Inviting Bids, General Conditions, Technical Specifications, Referenced Standard Specifications. With reference to the Drawings, the order of precedence is as follows, as applicable to this project: Figures govern over scaled dimensions, Detail drawings govern over general drawings, Addenda/Change Order drawings govern over contract drawings, contract drawings govern over standard drawings, contract drawings govern over shop drawings.
5. If Contractor believes that any subsurface or physical condition at or contiguous to the Site that
   a. is uncovered or revealed either is of such a nature as to require a change in the Drawings; or
   b. differs materially from that shown or indicated in the Drawings; or
   c. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided in the drawings;

   then Contractor shall promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.
6. Section 2.06 of the General Conditions is hereby incorporated into these Drawings.
7. Section 3.03.A.2 of the General Conditions is hereby incorporated into these Drawings.
8. Section 3.05 of the General Conditions is hereby incorporated into these Drawings.
9. Section 3.06 of the General Conditions is hereby incorporated into these Drawings.
10. Section 4.05 of the General Conditions is hereby incorporated into these Drawings.
11. Section 6.01, 6.02.A, and 6.03 of the General Conditions are hereby incorporated into these Drawings.
12. Substitutes and "Or-Equals" items are subject to the provisions of the General Conditions, Section 6.05.
13. Section 6.13 of the General Conditions is hereby incorporated into these Drawings, except that Section 6.13.D shall be replaced with the following sentence.
    Contractor's duties and responsibility for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer and Owner, as applicable to the Work, have accepted that the work is complete.
14. Section 6.11, 6.14, 6.15, 6.16, 6.18, 6.19, 6.20, and 6.21 of the General Conditions are hereby incorporated into these Drawings.
15. Article 9 - Engineer's Status During Construction of the General Conditions is hereby incorporated into these Drawings, except as follows:
    a. Delete the last sentence of Section 9.05.A.
    b. Delete Section 9.06, 9.07, 9.08.B, 9.08.C, and 9.09.D.
16. Section 10.02 of the General Conditions is hereby incorporated into these Drawings.
17. Article 13 - Tests and Inspections, Correction, Removal or Acceptance of Defective Work of the General Conditions is hereby incorporated into these Drawings.

STANDARD SPECIAL PROVISIONS:

1. The Contractor shall be responsible for all permits, licenses and fees required for completion of this project unless specifically noted otherwise.
2. The Contractor shall provide the Owner with a 24 hour phone number of a party responsible and capable of immediate local response to emergency maintenance for the duration of the Work. Contractor shall provide the name of the responsible party and phone number in writing prior to proceeding with the Work.
3. Unless noted otherwise, the contractor shall be responsible for any necessary traffic control on and off-site including obtaining any applicable permits.
4. Material stockpiled along the project route shall be done so in a manner that does not affect public safety and is in a neat and orderly fashion.
5. The Contractor shall be responsible for disposing of all waste and excess materials such as, but not limited to: vegetation, trees, brush, asphalt, concrete, sub-grade soils, etc., offsite in accordance with local, state and federal laws. The Owner reserves the right to request certain waste materials to be stockpiled at a location on-site.
6. The contractor will be responsible to adhere to the MDEQ or EPA approved Storm Water Pollution Prevention Plan (SWPPP), if applicable to the project. The contractor is responsible for repairing any damage made to BMPs identified in the SWPPP. The approved Storm Water Pollution Prevention Plan will be provided by Owner to Contractor upon written request. If a SWPPP has not been prepared for the project, but is required by regulation, the Contractor is responsible for preparing and submitting a Notice of Intent and SWPPP.
7. The Contractor will be required to make every effort to immediately restore the construction area once the construction task is completed. All seeding shall be completed in accordance with MPWSS 02910. This includes such required activities as finish grading, spreading of topsoil, restoring irrigation, replacing traffic and street signs, etc. The contractor will have 48 hours to begin restoration once the construction task in the immediate area is complete. Once restoration is begun, it must be completed without interruption to the extent possible.
8. After all work on this project is completed and before final acceptance of the project, the entire project shall be neatly finished to the lines, grades, and cross sections shown on the plans and as hereinafter specified.
   a. Drainage facilities, such as inlets, catch basins, storm pipe, culverts, and curb and gutter shall be cleaned of all debris, gravel, silts or other foreign material.
   b. The Contractor shall remove and dispose of all construction stakes.
   c. All areas disturbed by the construction shall be shaped to present a uniform appearance blending into the contour of adjacent properties. All surface replacement and landscaping shall be completed.
   d. Except as otherwise permitted, all excess excavated materials shall be disposed of away from the site of the work.
   e. Broken concrete and other debris resulting from pavement or sidewalk removal, excavated rock in excess of the amount permitted, and other waste and debris encountered in excavated work, and other similar waste materials shall be disposed of away from the site.

   There will be no separate measurement or payment for cleanup, and all costs for such work shall be included in the Contract Price.
9. No on-site burning of waste materials will be allowed.
10. If a street has not been surfaced and cleaned, the Contractor shall be responsible for dust control and maintenance of the street. Also, if detours are made on a gravel road, the Contractor is responsible for dust control and maintenance on the detours. See "Air Quality" below also.
11. Daily street sweeping shall be completed on both ends of each street during construction. Unpaved detours or any other fugitive dust emission sources from construction and demolition should be watered and/or chemically stabilized so emissions are less than 20% opacity.

UTILITY NOTES:

1. The Contractor shall notify appropriate personnel for utility locations and notice of construction commencement at least two business days prior to proceeding with the Work. Before Contractor proceeds with the Work, a commnon locate service (One Call) is available at 1-800-424-5555. All Underground Facilities may not be located by the One Call service including but not limited to such Underground Facilities as irrigation systems, public and private water and sewer systems, etc.
2. The Contractor shall support and protect all exposed utilities in conformance with the utility owner's standards.
3. The information and data shown or indicated in the Drawings with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise noted:
   a. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or date; and
   b. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
      i. Reviewing and checking all such information and data,
      ii. Locating all Underground Facilities shown or indicated in the Drawings,
      iii. Coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
      iv. The safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
   c. At least 2 business days before beginning any excavation, the Contractor shall, according to MCA 69-4-501, notify all owners of underground facilities and coordinate the Work with the owners of such underground facilities. The information shown or indicated in the Drawings with respect to existing underground facilities is based on information and data obtained from the owners of the facilities without field exploration, and as such, Owner and Engineer are not responsible for the accuracy or completeness of such information or data.

SUBMITTALS, QUALITY CONTROL & ASSURANCE, INSPECTIONS, AND TESTING

1. Contractor is responsible to comply with the Contractor Quality Control and Owner Quality Assurance, Section 01400 MPWSS.
2. Contractor shall complete trench excavation and backfill in accordance with Section 02221 MPWSS.
3. The Contractor shall coordinate with Engineer to obtain samples of trench backfill material to be used on-site.
4. Contractor will be responsible for coordination with a material testing company of the Engineer's selection to complete compaction testing of trench backfill. Coordination includes updating appropriate personnel of the material testing company every day as to progress of work so adequate testing can be completed.
5. The Contractor will be required to prepare a set of detailed as-built drawings to be presented to the Engineer at the completion of the project. The as-built drawings shall be updated daily and reviewed weekly by the Project Engineer. As-built drawings shall include, but not limited to location/depths of water mains and services, sewer mains and services, utilities, culverts, drainage structures, etc.
6. Contractor will be responsible for completing water service ditch cards for all water services. Information on the ditch cards must be provided as directed by Engineer including lot number or building address served; as-built service connection location on the water main relative to stationing on the Drawings; Contractor who made tap; date tap was made; distance from main to curb stop; size of tap; size and material of service; size and material of water main; depth of main at tap; and depth of service at curb stop. Engineer will provide Contractor with example ditch card upon written request. One water ditch card shall be completed for each water service.
7. Testing, cleaning, and disinfection of water mains, valves, and fittings shall be completed in accordance with MPWSS Section 02660, Part 3.4. Water testing procedure shall be as follows:
   a. Chlorination
   b. Flushing to reduce Chlorine residual to 0.5 ppm or less, or as otherwise approved by the engineer
   c. Bacteriological Test
   d. Hydrostatic and leakage testing
8. Water testing shall be completed in the presence of the Engineer. The Contractor is responsible for coordinating with the Engineer to be present for water testing.

SEWER CONSTRUCTION NOTES:

1. All Work shall be in accordance with the Montana Public Works Standard Specifications (MPWSS) (Sixth Edition, dated April 2010) and City of Missoula Public Works Standards and Specifications Manual (dated November 18, 2020). Sanitary Sewer Work shall conform to Section 02730 and any referenced specifications.
2. Invert elevations are provided from center of manhole, unless noted otherwise.
3. Manhole stations are provided from center of manhole, unless noted otherwise.
4. Sewer services shall be constructed and inspected per International Plumbing Code, City of Missoula, Missoula City-County Environmental Health Department, and Montana Department of Environmental Quality (MDEQ) regulations and standards.

WATER CONSTRUCTION NOTES

1. All Work shall be in accordance with the Montana Public Works Standard Specifications (MPWSS), Sixth Edition, dated April 2010, City of Missoula Specifications, and Missoula Water Standards and Specifications. Water Work shall conform to Section 02600 and any referenced specifications.
2. Stations are provided from center of bend, tee, or connection, unless noted otherwise.
3. Water services shall be constructed and inspected per Uniform Plumbing Code, City of Missoula Public Works, and Missoula Water.
4. Water services (new or swaps/replacements) shall only be completed after water main has been installed, completed, tested and certified by Missoula Water, City of Missoula, and the Engineer of record.

CONSTRUCTION STAKING

1. The owner will provide construction staking one time. Additional staking will be the responsibility of the contractor for scheduling and payment.
2. Contractor is responsible to coordinate and request staking at least two days in advance, unless otherwise agreed upon in writing by Engineer.
3. Staking will be provided as follows:
   a. Bends, Tees/Connections, and Hydrants: Center of structure and two offset stakes.
   b. Water Main: Hub offset set at 25' stations. Offset distance and side of trench as requested by Contractor in writing to engineer.
4. Cut sheets will be provided to the contractor with elevation from hub to top of pipe elevation.
5. Engineer does not consider staking to be complete and ready for use until cut sheets have been delivered to Contractor.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

1. SWPPP Administrator shall turn in SWPPP reports generated from the beginning of construction to date that As-Builts are turned into Engineer. Engineer in turn submits SWPPP reports to City Engineering as part of As-Built documentation.
2. SWPPP Administrator is required to renew City SWPPP permit annually unless the site has been stabilized. SWPPP Administrator will submit any remaining SWPPP reports to City Engineering when filing for Notice of Termination.

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www.imegcorp.com

PLOT DATE: 10/6/2021 - 12:43 PM

REVISIONS	DATE

DESIGNED: AM
DRAFTED: AM
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD
SECTION 20, T13N, R19W, P.M.M.
MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

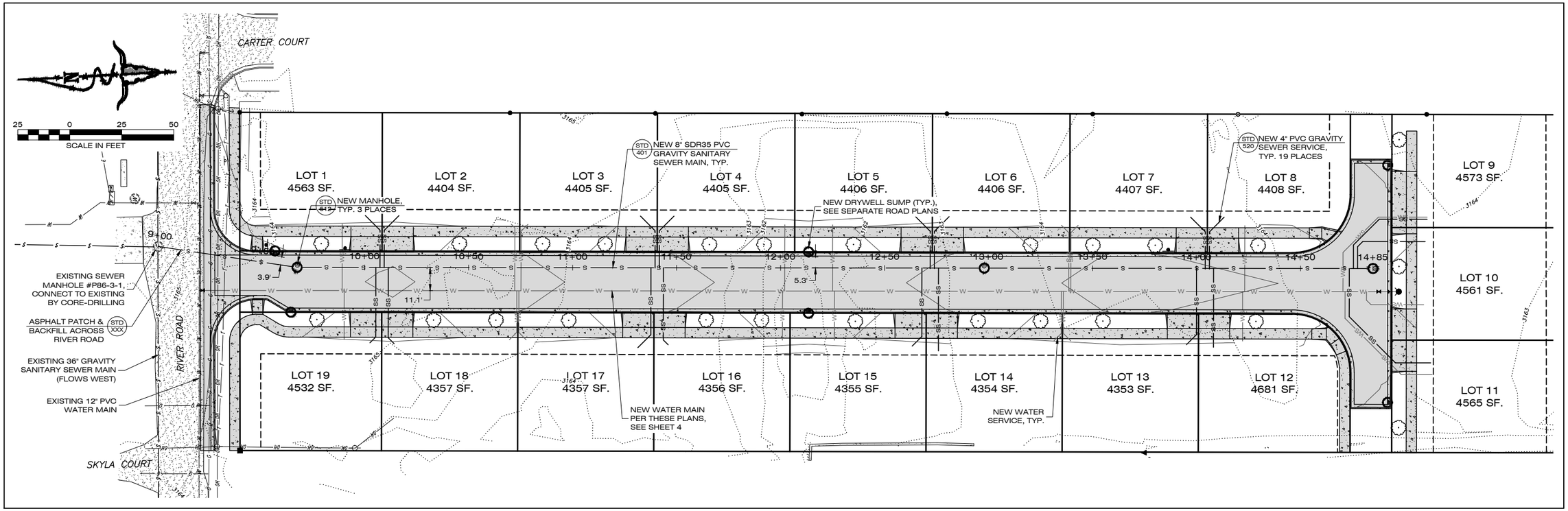
SHEET TITLE: UTILITY CONSTRUCTION PLANS
LEGEND AND NOTES SHEET

PROJECT NO. 21001296

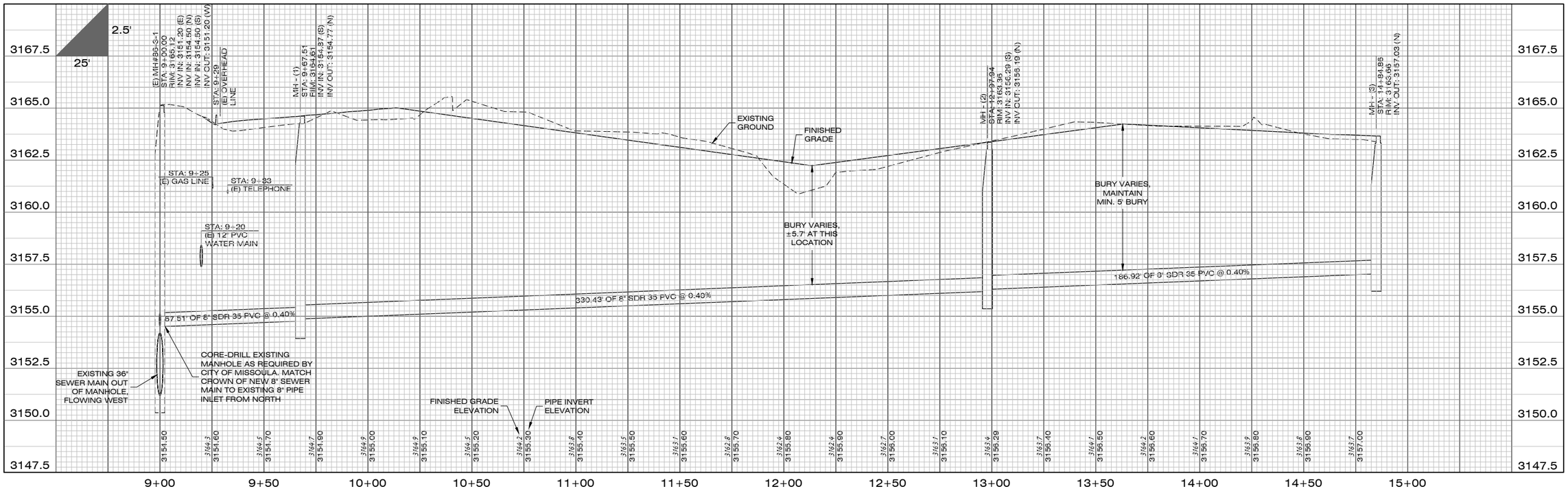
SHEET: 2 OF 4

PRELIMINARY

DWG LOCATION: J:\FILES\ACTIVE\PROJECTS\2021\21001296.10\DESIGN\CIVIL_DRAWINGS\AUTOCAD\PLAN SET\UTILITY\WATER & SEWER\WTR_SWR-210012961.DWG



PLAN VIEW



PROFILE VIEW

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PLOT DATE: 10/6/2021 12:43 PM

REVISIONS | DATE

DESIGNED: AM
DRAFTED: AM
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD SECTION 20, T13N, R19W, P.M.M. MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR MISSOULA, LLC

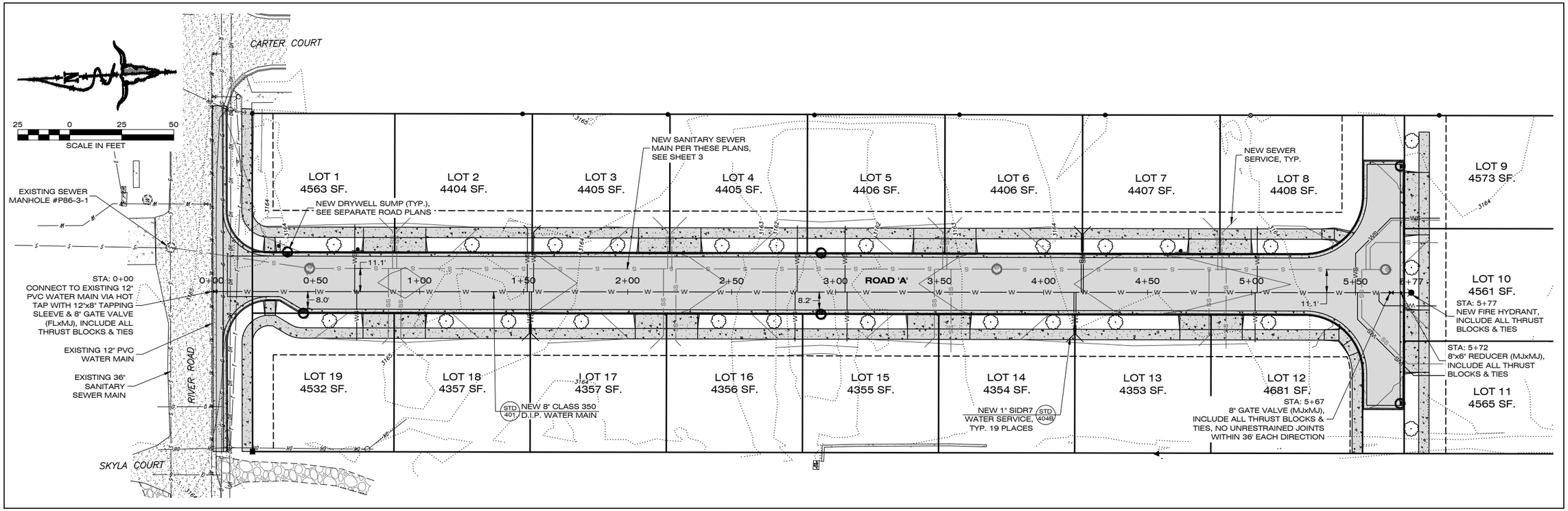
PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: UTILITY CONSTRUCTION PLANS SEWER PLAN AND PROFILE SHEET

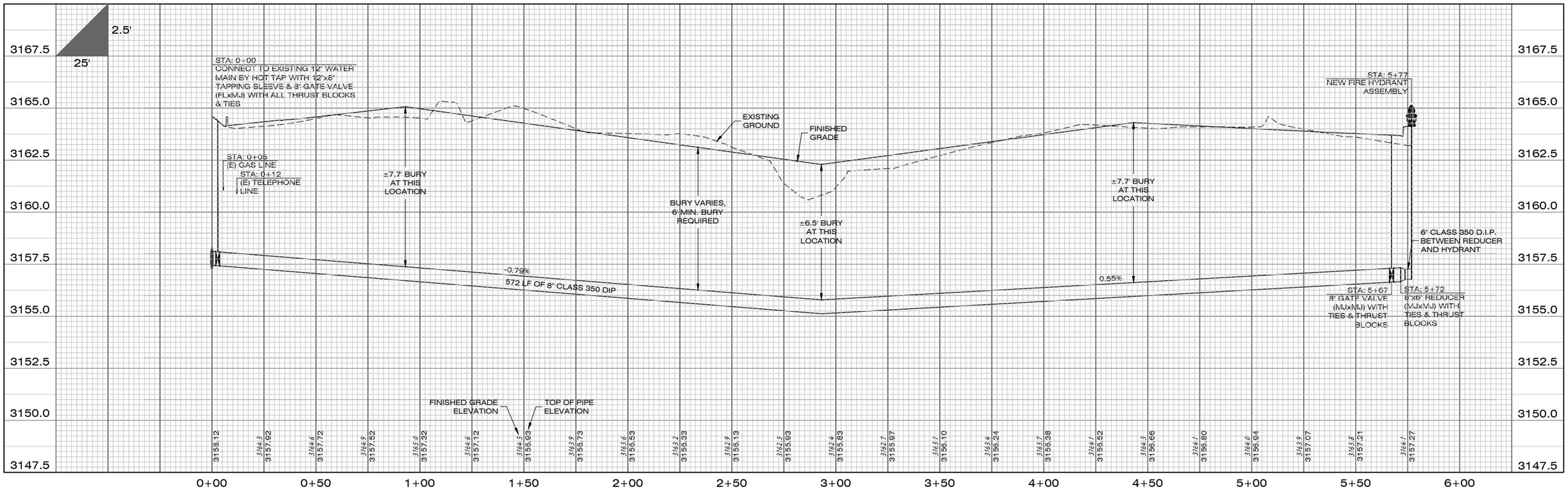
PROJECT NO. 21001296

SHEET: 3 OF 4

PRELIMINARY



PLAN VIEW



PROFILE VIEW

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PLOT DATE: 10/6/2021 12:43 PM

REVISIONS	DATE

DESIGNED:	AM
DRAFTED:	AM
CHECKED:	CD
DATE:	AUG. 2021

LOCATION: 1923 RIVER ROAD SECTION 20, T13N, R19W, P.M.M., MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

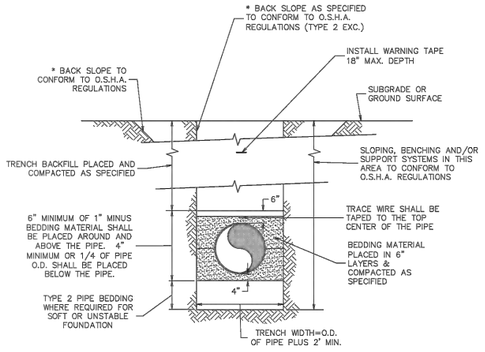
SHEET TITLE: UTILITY CONSTRUCTION PLANS WATER PLAN AND PROFILE SHEET

PROJECT NO. 21001296

SHEET: 4 OF 4

PRELIMINARY

DWG LOCATION: P:\JOBS\ACTIVE\PROJECTS\2021\21001296\ADDESIGN\CIVIL\DRAFTING_DRAWINGS\AUTOCAD\PLAN SET\UTILITY\WATER & SEWER\WTR_SWR-21001296.DWG

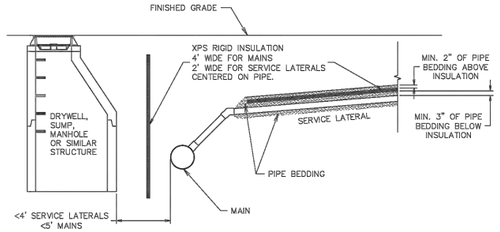


* SEE O.S.H.A. CONSTRUCTION STANDARDS FOR EXCAVATIONS, SECTION 1926, SUBPART P.

NOTE:

CASING PIPE (IF ANY) INSTALLED BY TRENCH CONSTRUCTION METHODS SHALL BE BEDDED AS SHOWN IN THIS DETAIL.

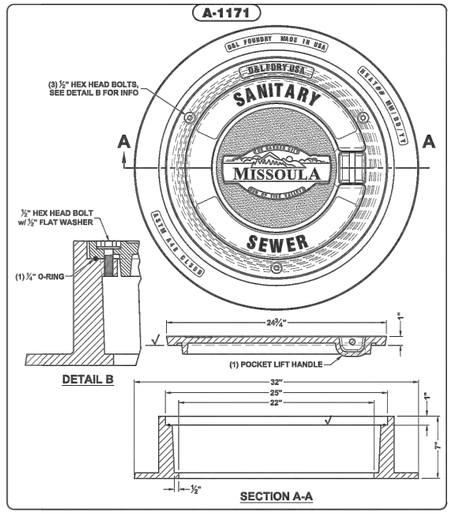
Engineering Division | Typical Utility Trench Detail | Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 401



GENERAL NOTES:

1. INSULATION IS REQUIRED WHEN A SANITARY SEWER PIPE IS LESS THAN 4 FEET FOR A SERVICE LATERAL, AND LESS THAN 5 FEET FOR A SEWER MAIN, FROM FINISHED GRADE, A DRYWELL SUMP, IRRIGATION PIPE OR ANY STRUCTURE THAT HAS THE POTENTIAL TO TRANSFER COLD OR PROMOTE FREEZING.
2. PROVIDE TWO INCHES OF INSULATION THICKNESS, EQUIVALENT TO AN R-VALUE OF 10, PER FOOT OF MISSING COVER OR VOID SPACE LESS THAN FIVE FEET.
3. USE A HIGH DENSITY, RIGID INSULATION (PINK BOARD) WITH 35 PSI OR GREATER RATING IN TRAFFIC AREAS.

Engineering Division | Sanitary Sewer Service and Main Insulation Requirements | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 500

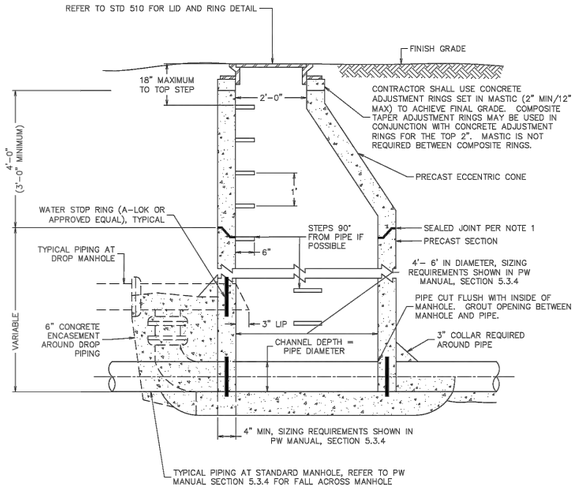


PRODUCT NUMBER:	MATERIAL TYPE:
COVER: A-1171	GRAY IRON: ASTM A-48 CL 35B
RING: A-1171-R1	GRAY IRON: ASTM A-48 CL 35B

GENERAL NOTES:

1. D&L FOUNDRY A-1171 BOLT DOWN, WATER TIGHT LIDS ARE REQUIRED FOR ALL CITY-OWNED AND PRIVATELY-OWNED MANHOLES. PRIVATELY OWNED MANHOLES SHALL BE LABELLED WITH THE WORDS "SANITARY SEWER", BUT SHALL NOT USE THE CITY OF MISSOULA LOGO.
2. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 HS20 LOADING RATING OR HIGHER.
3. A 4-INCH MANHOLE RING MAY BE USED IN LIEU OF A 7-INCH RING ONLY WITH PRIOR APPROVAL FROM CITY ENGINEERING.

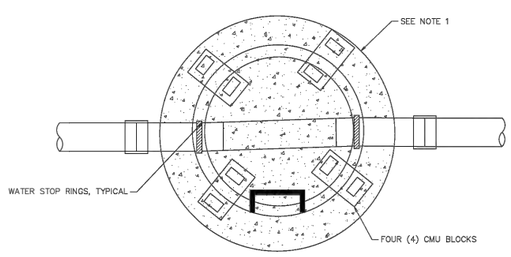
Engineering Division | Sanitary Sewer Lid | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 510



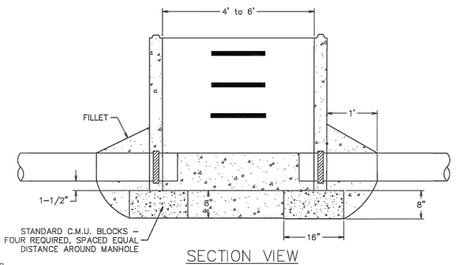
GENERAL NOTES:

1. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK®" OR EQUAL.
2. CONCRETE FOR DROP STRUCTURES SHALL BE FORMED.
3. BOLT-DOWN LIDS WILL BE REQUIRED AS PER STD 510. DUSTPANS ARE NOT REQUIRED WITH BOLT-DOWN LIDS.

Engineering Division | Sanitary Sewer Manhole (Sheet 1 of 3) | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 512-1



PLAN VIEW

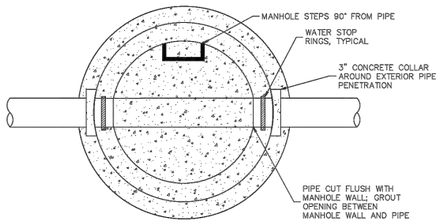


SECTION VIEW

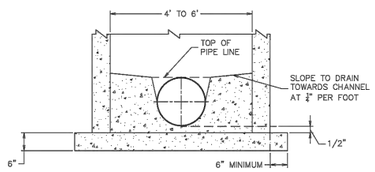
NOTES

1. BASE AND FILL CONCRETE MAY BE POURED MONOLITHICALLY.
2. ONE-HALF (1/2") INCH SPACING MAY BE OMITTED WHEN BASE AND FILL CONCRETE ARE POURED MONOLITHICALLY.

Engineering Division | Sanitary Sewer Manhole - Dog House Base (Sheet 2 of 3) | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 512-2

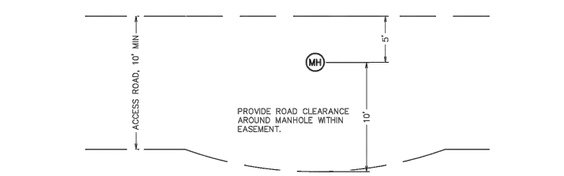


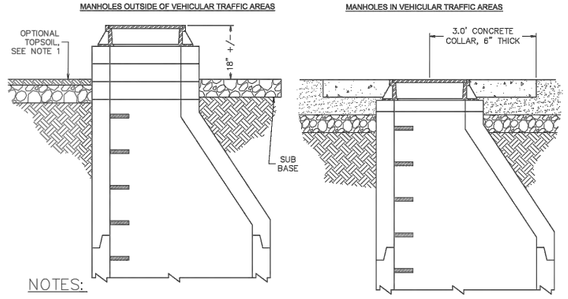
PLAN VIEW



SECTION VIEW

Engineering Division | Sanitary Sewer Manhole - Precast Base (Sheet 3 of 3) | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 512-3

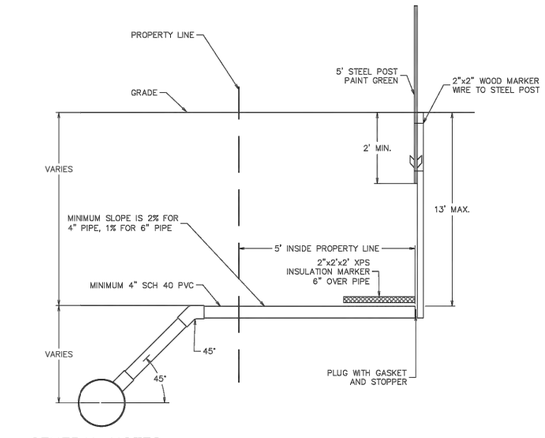




NOTES:

1. TWO (2") INCHES OF TOPSOIL MAY BE ALLOWED UPON OWNER REQUEST
2. CONCRETE COLLARS ARE REQUIRED FOR MANHOLES INSTALLED IN AREAS SUBJECT TO VEHICULAR TRAFFIC IF FINAL PAVING AROUND THE MANHOLE WILL OCCUR MORE THAN 3 MONTHS AFTER THE INSTALLATION OF THE MANHOLE. CONCRETE COLLAR SHALL BE FLUSH WITH EDGE OF MANHOLE AND SURROUNDING SURFACE.
3. CARSONITE MARKER SHALL BE SET ADJACENT TO MANHOLE AT EDGE OF UTILITY ACCESS ROAD.
4. CARSONITE MARKER SHALL CONTAIN THE APPROPRIATE UTILITY SPECIFIC LABEL AND COLOR AS PER CITY ENGINEER.
5. MINIMUM OF SIX (6") INCHES OF BASE COMPACTED TO 95% PROCTOR DENSITY FOR ASPHALT AND CONCRETE SURFACES.
   a) MINIMUM OF SIX (6") INCHES OF SUB BASE COMPACTED TO 95% PROCTOR DENSITY
6. MINIMUM OF SIX (6") INCHES OF SUB BASE COMPACTED TO 95% PROCTOR DENSITY FOR OTHER SURFACE TREATMENTS.
   a) EXTEND ROAD BASE OUT TO EDGES OF EASEMENT AROUND MANHOLES.

Engineering Division | Utility Access Road | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/20 | STD - 514



GENERAL NOTES:

1. MAXIMUM LINE DEPTH IS 13'. DEVIATIONS MAY BE ALLOWED BY CITY ENGINEERING.
2. CONNECTIONS TO EXISTING SEWER MAINS SHALL BE TAPPED AT THE CONTRACTORS EXPENSE, AND PREDCO FAST FIT SADDLES OR APPROVED EQUAL SHALL BE USED. WHEN THE SEWER MAIN AND SEWER SERVICE LATERALS ARE INSTALLED UNDER ONE CONTRACT, IN-LINE TEES ONLY SHALL SHALL BE PROVIDED FOR THE SERVICE LATERALS. TEES SHALL BE ROLLED TO A 45 DEGREE ANGLE.
3. AN EXCAVATION PERMIT IS REQUIRED FOR EACH STUB.
4. SEWER SERVICE STUBS SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED BY CITY ENGINEERING.
5. IN ORDER TO KEEP SERVICE LINES DEEP ENOUGH TO SERVE EACH HOME AND PASS UNDER WATER MAINS, A 22 DEGREE FITTING MAY BE ALLOWED BY THE CITY ENGINEER AT THE SEWER MAIN TAP.
6. ALL COMMERCIAL SERVICE STUBS SHALL BE 6" MINIMUM DIAMETER.
7. ALL SINGLE DWELLING UNIT SERVICE STUBS SHALL BE 4" MINIMUM DIAMETER.

Engineering Division | Standard Sewer Service Stub | Approved By Utility Project Manager – Ross Mollenhauer, PE | Revised: 09/28/2020 | STD - 520

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PLOT DATE: 10/6/2021 - 12:43 PM

REVISIONS | DATE

DESIGNED: AM
DRAFTED: AM
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD
SECTION 20, T13N, R19W, P.M.M.
MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR

PROJECT NAME: RIVER VIEW SUBDIVISION

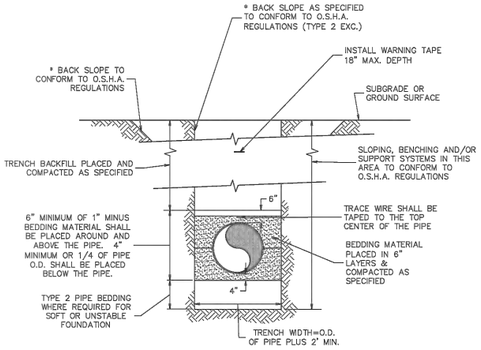
SHEET TITLE: UTILITY CONSTRUCTION PLANS
DETAIL SHEET

PROJECT NO. 21001296

SHEET: D1 OF D2

PRELIMINARY

BASE LOCATION: P:\PROJECTS\PROJECTS 2021\21001296\DESIGN\CAD\CIVIL\DRAFTING_DRAWINGS\AUTOCAD\PLAN SETS\UTILITY\MASTER & SEWER\MSTR_SWR-21001296.DWG



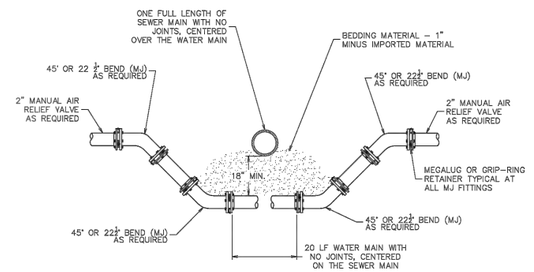
* SEE O.S.H.A. CONSTRUCTION STANDARDS FOR EXCAVATIONS, SECTION 1926, SUBPART P.

NOTE:

CASING PIPE (IF ANY) INSTALLED BY TRENCH CONSTRUCTION METHODS SHALL BE BEDDED AS SHOWN IN THIS DETAIL.

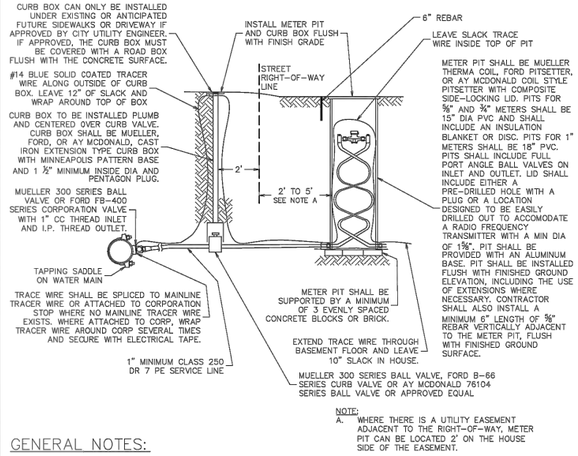
Typical Utility Trench Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 401



Typical Water Line Crossing @ Sewer Mains

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 402



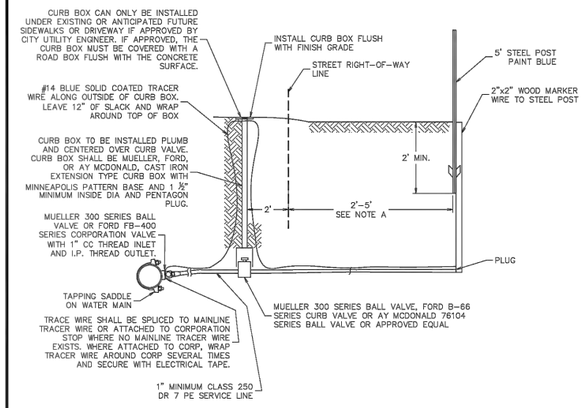
NOTE:
A. WHERE THERE IS A UTILITY EASEMENT ADJACENT TO THE RIGHT-OF-WAY, METER PIT CAN BE LOCATED 2' ON THE HOUSE SIDE OF THE EASEMENT.

GENERAL NOTES:

1. WATER SERVICES SHALL BE BURIED A MINIMUM OF 6' DEEP.
2. THIS DETAIL APPROPRIATE FOR 5/8", 3/4" OR 1" METERS. CONTRACT CITY UTILITY ENGINEER FOR RESIDENTIAL METERS LARGER THAN 1". IRRIGATION METERS LARGER THAN 1" MUST BE INSTALLED IN A CONCRETE PIT PER STD-412 OR OTHER APPROVED DRAWING.
3. PLASTIC METER PITS ARE NOT TRAFFIC RATED. METER PITS ARE NOT ALLOWED IN SIDEWALKS OR IN A TRAFFIC AREA UNLESS APPROVED BY THE CITY UTILITY ENGINEER. IF APPROVED BY THE CITY UTILITY ENGINEER. INSTALLATION SHALL HAVE A FLUSH MOUNTED, TRAFFIC RATED CASTING INSTALLED OVER THE PIT. THE CASTING DIA SHALL BE AT LEAST 3" LARGER THAN THE METER PIT. THE METER TRANSMITTER SHALL BE INSTALLED ON THE BUILDING WALL WITH A 1/2" CONDUIT BETWEEN THE PIT AND THE WALL.
4. NO OBSTRUCTIONS SHALL BE PLACED WITHIN A MIN 4' RADIUS AROUND THE METER PIT TO ENSURE ACCESS TO THE PIT.
5. NO PRV'S, CHECK VALVES, OR BACKFLOW DEVICES ALLOWED IN METER PIT.
6. THIS DIAGRAM IS NOT PROJECT SPECIFIC AND IS NOT INTENDED TO BE A DESIGN DRAWING. THE OWNER IS RESPONSIBLE TO COMPLY WITH ALL APPLICABLE BUILDING CODES. THIS DETAIL MAY CHANGE AT ANY TIME AND IT IS THE OWNER'S RESPONSIBILITY TO OBTAIN THE MOST CURRENT VERSION OF THIS AND OTHER CITY REQUIREMENTS.
7. IF PROPERTY DOES NOT FRONT A STREET WITH A WATER MAIN, CONTACT CITY FOR SPECIFIC REQUIREMENTS RELATED TO EASEMENTS AND METER PIT LOCATIONS.
8. WHERE NEW WATER SERVICE LINE TRANSITIONS TO EXISTING GALVANIZED SERVICE LINE, THE NEW TRACER WIRE SHOULD BE ATTACHED TO THE GALVANIZED PIPE USING A CHRISTY'S OR APPROVED EQUAL UL APPROVED BRONZE GROUNDING CLAMP SUITABLE FOR DIRECT BURIAL.
9. IF METER PIT IS INSTALLED TOO LOW THE CONTRACTOR/DEVELOPER SHALL BE RESPONSIBLE FOR THE PURCHASE AND INSTALLATION OF A METER RESETTER TO BRING TO FINISHED GRADE.

Typical Residential Water Service Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 404A



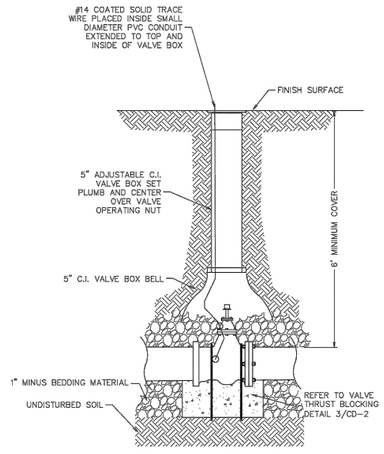
NOTE:
A. WHERE THERE IS A UTILITY EASEMENT ADJACENT TO THE RIGHT-OF-WAY, METER PIT CAN BE LOCATED 2' ON THE HOUSE SIDE OF THE EASEMENT.

GENERAL NOTES:

1. WATER SERVICES SHALL BE BURIED A MINIMUM OF 6' DEEP.
2. FOR WATER SERVICES STUBS LARGER THAN 2" SEE CITY STANDARD DETAIL STD-413.
3. IF PROPERTY DOES NOT FRONT A STREET WITH A WATER MAIN, CONTACT CITY FOR SPECIFIC REQUIREMENTS RELATED TO EASEMENTS.
4. SERVICE LINE SHALL END AT WOOD POST. NO ABOVE GROUND WHIPS ALLOWED. IT IS THE INSTALLER'S RESPONSIBILITY TO REMOVE AIR FROM THE SERVICE LINES AS NECESSARY.
5. WATER SERVICE STUBS SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED BY CITY ENGINEERING.

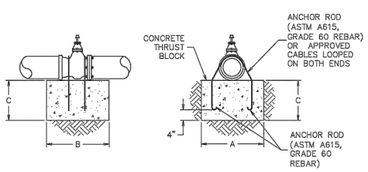
Typical Residential Water Service Stub Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 404B



Valve Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 405



NOTES:

1. DIAGRAM DEPICTS GATE VALVES ONLY, VALVES 12 INCH AND LARGER TO BE BUTTERFLY, AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS WITH BLOCKS CENTERED UNDER LOAD BEARING PORTION OF VALVE.
2. STEEL CABLE (3/4" MINIMUM DIA. OR AS APPROVED BY THE ENGINEER) W/ANCHOR BOLTS MAY BE SUBSTITUTED FOR ANCHOR ROD.

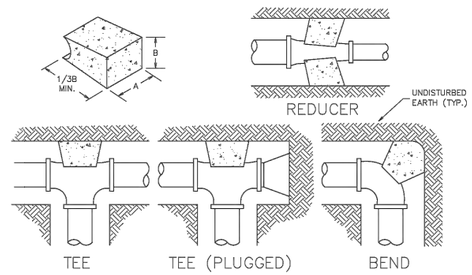
STANDARD THRUST BLOCK DIMENSIONS

ANCHOR ROD SIZE	VALVE SIZE	100 PSI			150 PSI			200 PSI			250 PSI			300 PSI	
		"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"
3/4"	6" & 8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
3/4"	10"	2'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-0"	2'-9"	2'-6"	2'-6"	3'-0"	3'-0"	3'-0"	3'-7"	3'-0"
3/4"	12"	2'-3"	2'-0"	2'-0"	3'-0"	3'-0"	2'-8"	3'-5"	3'-0"	3'-0"	4'-3"	3'-0"	3'-0"	5'-1"	3'-0"
1"	14"	2'-3"	2'-0"	2'-4"	3'-5"	3'-0"	3'-0"	4'-6"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-9"	4'-0"
1 1/8"	16"	3'-0"	3'-0"	2'-11"	4'-4"	3'-0"	3'-0"	4'-1"	4'-0"	4'-0"	5'-1"	4'-0"	4'-0"	6'-1"	4'-0"
1 1/4"	18"	3'-8"	3'-0"	3'-0"	5'-5"	3'-0"	3'-0"	5'-1"	4'-0"	4'-0"	6'-4"	4'-0"	4'-0"	5'-9"	5'-0"
1 3/8"	24"	4'-4"	4'-0"	4'-0"	6'-5"	4'-0"	4'-0"	6'-6"	5'-0"	5'-0"	6'-5"	6'-0"	6'-0"	7'-8"	6'-0"

NOTE: PRESSURES SHOWN ABOVE ARE MAXIMUM WORKING PRESSURE IN SYSTEM.

Valve Thrust Blocking Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 406



DIMENSIONS FOR THRUST BLOCKING

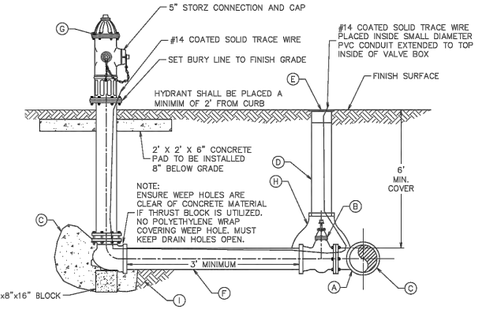
FITTING SIZES	TEES & PLUGS		90° BEND		45° BEND & WYES		REDUCERS & 22 1/2° BEND	
	A	B	A	B	A	B	A	B
4" & 6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"
10"	4'-0"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"
12"	4'-0"	3'-10"	4'-8"	4'-8"	3'-8"	3'-3"	2'-7"	2'-3"
16"	4'-6"	4'-0"	5'-0"	4'-8"	4'-0"	3'-0"	3'-0"	2'-6"
20"	5'-0"	5'-0"	7'-0"	5'-0"	4'-6"	4'-0"	3'-0"	3'-0"
24"	6'-10"	5'-0"	10'-0"	5'-0"	5'-8"	4'-6"	3'-8"	3'-8"

NOTES:

1. THIS TABLE IS BASED ON 2000 PSF SOIL BEARING PRESSURE AND 150 PSI MAIN PRESSURE.
2. WRAP ALL FITTINGS WITH POLYETHLENE PRIOR TO PLACING CONCRETE.

Thrust Block Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 407



NOTES:

1. IF USED, DUCTILE IRON PIPE SHALL BE WRAPPED WITH 8 MIL POLYETHYLENE
2. IF MAIN IS BELOW OR ABOVE STANDARD DEPTH, USE BENDS AS REQUIRED TO INSURE THAT HYDRANT IS PLACED ABOVE GRADE AS SHOWN. PLACE BENDS BETWEEN HYDRANT VALVE & MAIN TO RAISE VALVE TO NORMAL DEPTH WHEN MAIN IS BELOW DEPTH SHOWN.
3. IF THRUST BLOCK IS NOT USED, PLACE VALVE & HYDRANT ON 4"MINIMUM OF WASHED ROCK.
4. ALL JOINTS ON HYDRANT LEADS SHALL BE RESTRAINED.

(A)	APPROPRIATE SIZE X 6" FLG. OR MJ TEE AS REQUIRED.
(B)	6" FLG. OR MJ (OR COMBINATION) GATE VALVE--MUELLER OR APPROVED EQUAL
(C)	CONCRETE THRUST BLOCK IN PLACE OF MEGALUG OR TIE-BOLT RESTRAINTS.
(D)	5" ADJUSTABLE C.I. VALVE BOX
(E)	5" VALVE BOX LID
(F)	6" DUCTILE IRON PIPE WITH #14 COATED SOLID TRACE WIRE
(G)	6" MUELLER CENTURION HYDRANT ASSEMBLY--MJ OR FLANGED (AS REQUIRED)
(H)	5" C.I. VALVE BOX BELL
(I)	PROVIDE IN ALL SOILS 1/2YD MIN. OF 3/4" CRUSHED ROCK. IN CLAY SOILS, PROVIDE 1 YD MIN.

Hydrant Detail

Approved By Utilities Engineer Logan McInnis, PE | Revised: 09/28/2020 | STD - 408

IMEG
1817 SOUTH AVE W, STE A PH: 406.721.0142
MISSOULA, MT FAX: 406.721.5224
59801 www.imegcorp.com

PLOT DATE: 10/6/2021 - 12:43 PM

REVISIONS	DATE

DESIGNED: AM
DRAFTED: AM
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD SECTION 20, T13N, R19W, P.M.M. MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR

PROJECT NAME: RIVER VIEW SUBDIVISION

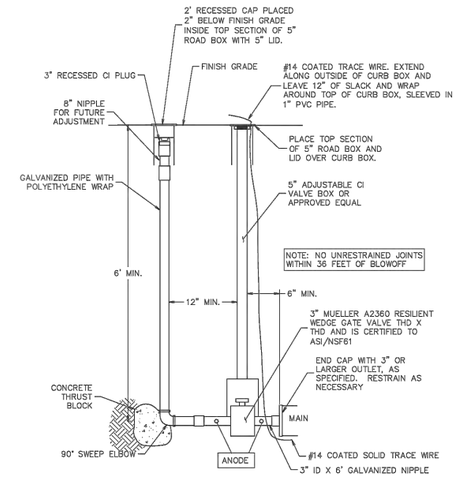
SHEET TITLE: UTILITY CONSTRUCTION PLANS DETAIL SHEET

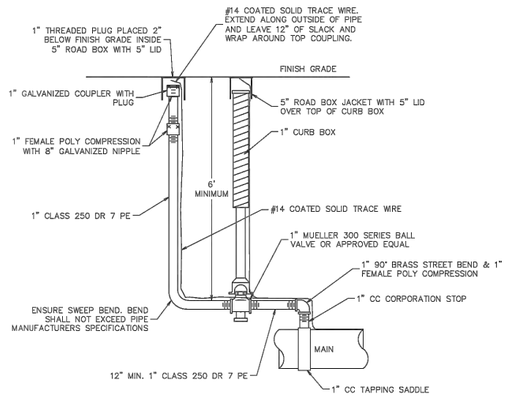
PROJECT NO. 21001296

SHEET: D2 OF D2

PRELIMINARY

SAVE LOCATION: P:\PROJECTS\PROJECTS\2021\21001296\DESIGN\CIVIL\DRAFTING_DRAWINGS\AUTOCAD PLAN SETS\UTILITY\MASTER & SEWER\PDF_EXHIBIT\21001296.DWG

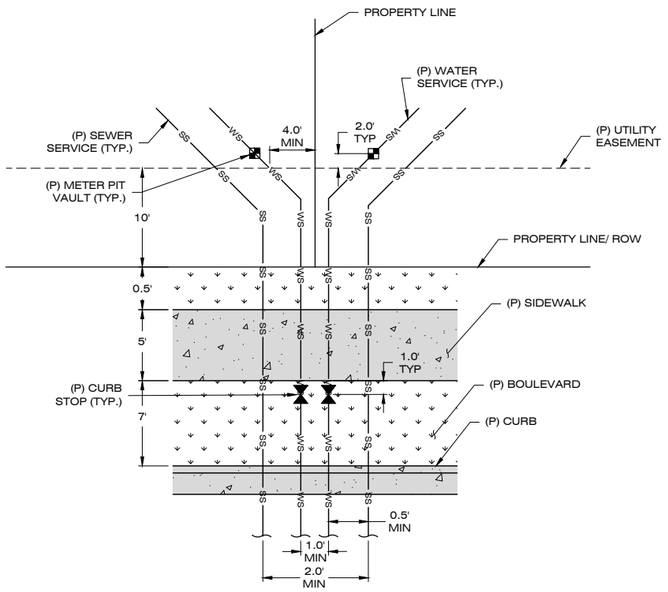




NOTES:

1. WHERE AIR RELIEF VALVES (ARVs) ARE IDENTIFIED ON THE PLANS AS TEMPORARY, TRACER WIRE IS NOT REQUIRED AND ALL MATERIALS CAN BE SALVAGED AFTER THE CORP IS CLOSED, THE LINE IS CAPPED WITH A BRASS CAP AND FITTINGS ARE WRAPPED IN 10-MIL TAPE..

MISSOULA Engineering Division	Typical Blow-Off Assembly	Approved By Utilities Engineer Logan McInnis, PE	Revised: 09/28/2020	STD - 409
MISSOULA Engineering Division	Manual Air Relief Detail	Approved By Utilities Engineer Logan McInnis, PE	Revised: 09/28/2020	STD - 410



A - WATER/SEWER SERVICES SHARED LOT LINE DETAIL

NOT TO SCALE

IMEG
1817 SOUTH AVE. W. STE. A
MISSOULA, MT
59801
PH: 406.721.0142
FAX: 406.721.5224
www.imegcorp.com

PLOT DATE: 10/6/2021 12:43 PM

REVISIONS	DATE

DESIGNED: AM
DRAFTED: AM
CHECKED: CD
DATE: AUG. 2021

LOCATION: 1923 RIVER ROAD SECTION 20, T13N, R19W, P.M.M. MISSOULA, MISSOULA COUNTY, MT

PREPARED FOR: HOMES FOR MISSOULA, LLC

PROJECT NAME: RIVER VIEW SUBDIVISION

SHEET TITLE: UTILITY CONSTRUCTION PLANS DETAIL SHEET

PROJECT NO. 21001296

SHEET: D3 OF D2

PRELIMINARY

DWG LOCATION: I:\FILES\ACTIVE\PROJECTS\2021\21001296.00\DESIGN\CIVIL\3_DRAFTING\1_DRAWINGS\AUTOCAD\PLAN SETS\UTILITY_WATER & SEWER\WTR_SWR-21001296.DWG

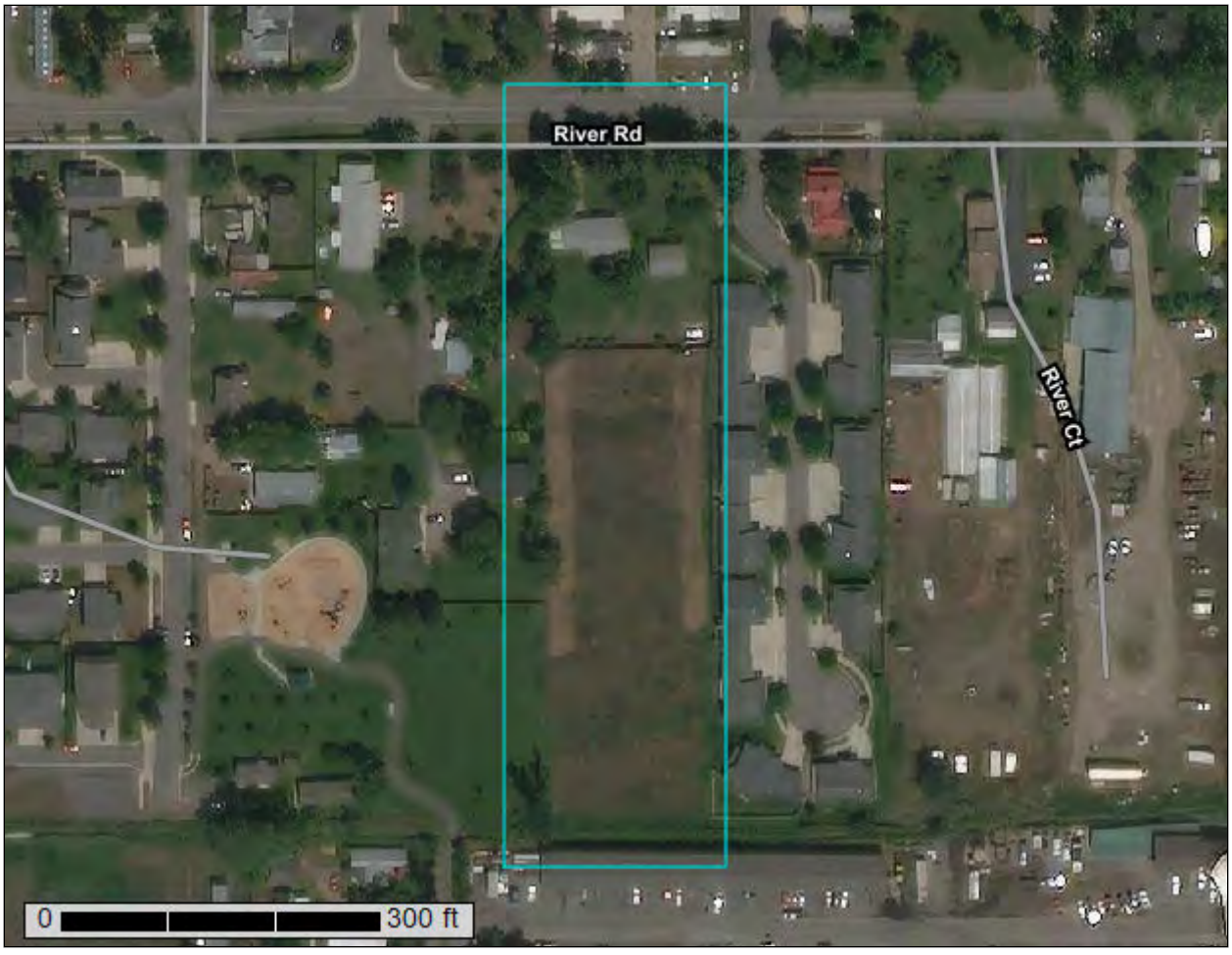
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Missoula County Area, Montana



May 27, 2021

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

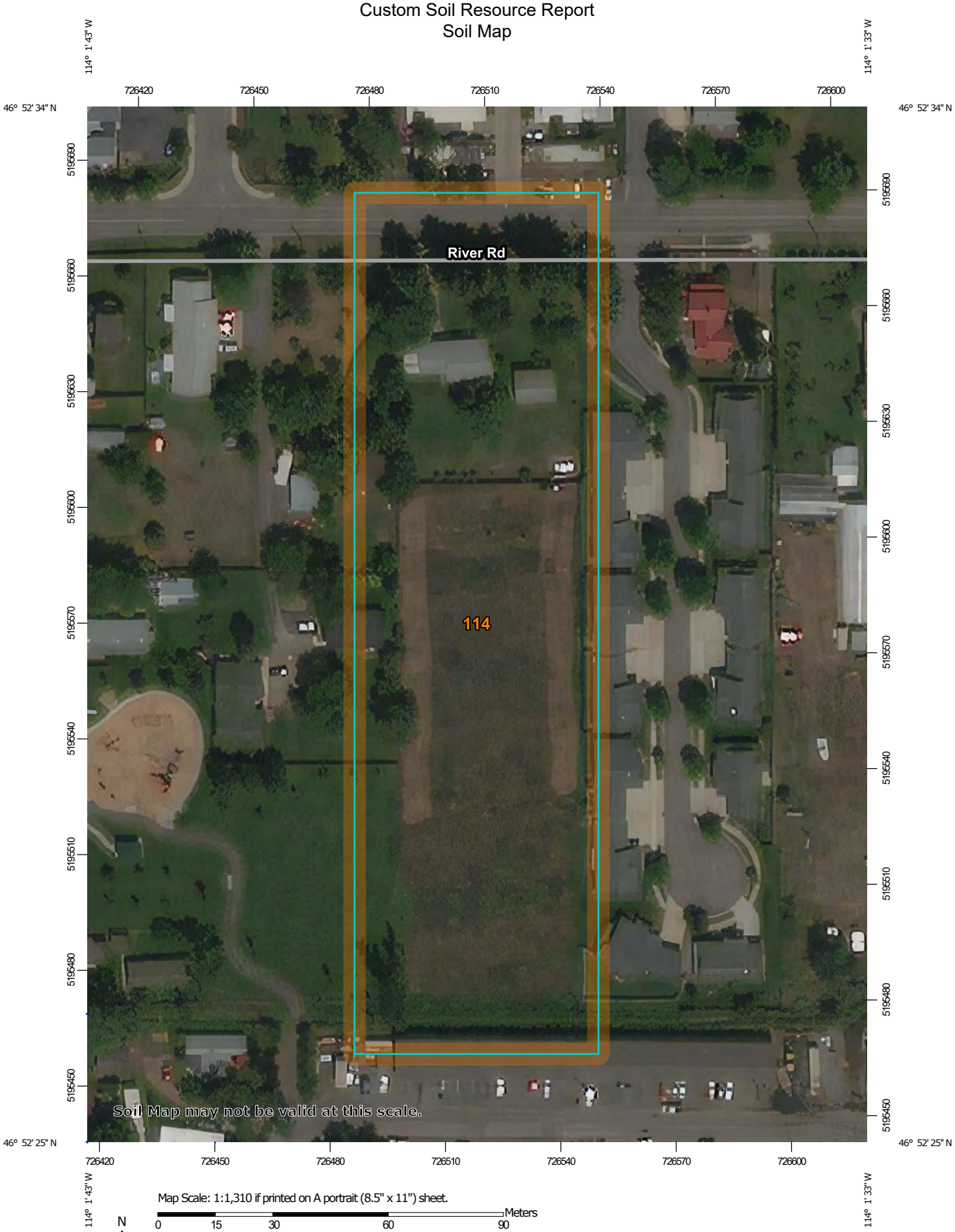
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,310 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: Missoula County Area, Montana
Survey Area Data: Version 18, Jun 4, 2020

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

Date(s) aerial images were photographed: Aug 6, 2014—Nov 2, 2016

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
114	Urban land	3.5	100.0%
Totals for Area of Interest		**3.5**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

Missoula County Area, Montana

114—Urban land

Map Unit Setting

National map unit symbol: 4w9f
Elevation: 2,600 to 5,500 feet
Mean annual precipitation: 11 to 19 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Orthents

Percent of map unit: 3 percent
Hydric soil rating: No

Bigarm

Percent of map unit: 3 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044XW184MT - Silty (Si) 15-19" p.z.
Hydric soil rating: No

Argiborolls

Percent of map unit: 3 percent
Hydric soil rating: No

Grassvalley

Percent of map unit: 2 percent
Landform: Lake plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044XW125MT - Silty (Si) 10-14" p.z.
Hydric soil rating: No

Desmet

Percent of map unit: 2 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044XW125MT - Silty (Si) 10-14" p.z.
Hydric soil rating: No

Grantsdale

Percent of map unit: 2 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear

Ecological site: R044XW184MT - Silty (Si) 15-19" p.z.
Hydric soil rating: No

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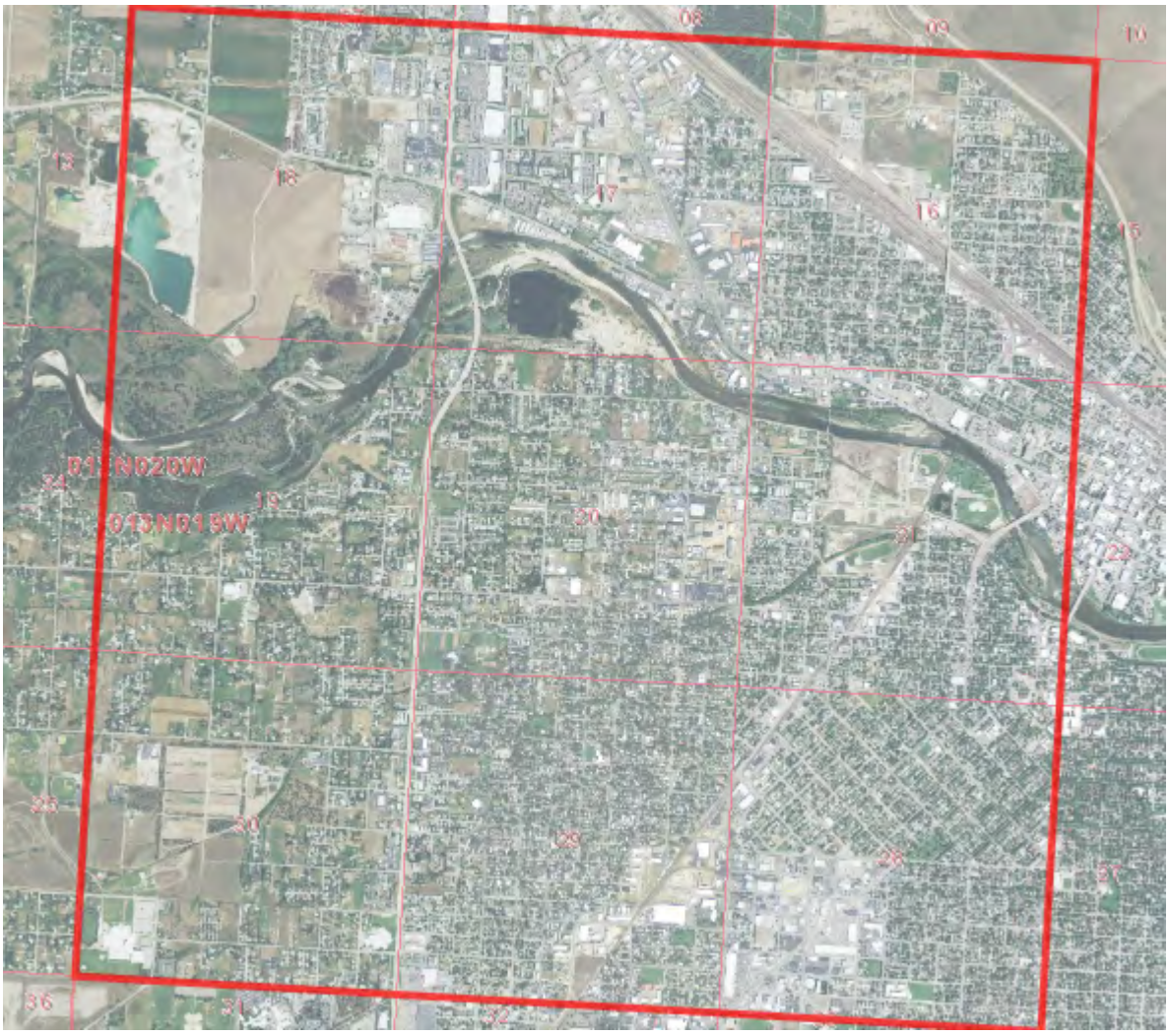
Environmental Summary

MONTANA
Natural Heritage Program
1515 East 6th Avenue
Helena, MT 59620
(406) 444-5363
mtnhp.org

Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Summarized by:
013N019W020
(Buffered PLSS Section)



Suggested Citation
Montana Natural Heritage Program. Environmental Summary Report.
for Latitude 46.84630 to 46.89484 and Longitude -113.99764 to -114.06045. Retrieved on 9/10/2021.

The Montana Natural Heritage Program is a program of the Montana State Library's Natural Resource Information System. It is operated as a special program under the Office of the Vice President for Research and Creative Scholarship at the University of Montana, Missoula.

The Montana Natural Heritage Program is part of NatureServe – a network of over 80 similar programs in states, provinces and nations throughout the Western Hemisphere, working to provide comprehensive status and distribution information for species and ecosystems.

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- Species Report
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- Data Use Terms and Conditions
- Suggested Contacts for Natural Resource Agencies
- Introduction to Native Species
- Introduction to Land Cover
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Introduction to Environmental Summary Report

The Environmental Summary report for your area of interest consists of introductory and related materials in this PDF and an Excel workbook with worksheets summarizing information managed in the Montana Natural Heritage Program's (MTNHP) databases for: (1) species occurrences; (2) other observed species without Species Occurrences; (3) other species potentially present based on their range, presence of associated habitats, or predictive distribution model output if available; (4) structured surveys (organized efforts following a protocol capable of detecting one or more species); (5) land cover mapped as ecological systems; (6) wetland and riparian mapping; (7) land management categories; and (8) biological reports associated with plant and animal observations. In order to do this in a consistent manner across Montana and allow for rapid delivery of summaries, we have intersected this information with a uniform grid of hexagons that have been used for planning efforts across the western United States (e.g. Western Association of Fish and Wildlife Agencies - Crucial Habitat Assessment Tool). Each hexagon is one square mile in area and approximately one kilometer in length on each side. Summary information for each data layer is then stored with each hexagon and those summaries are added up to an overall summary for the report area you have requested. Users should be aware that summaries do not correspond to the exact boundaries of the polygon they have specified, but instead are a summary across all hexagons intersected by the polygon they specified.

In presenting this information, MTNHP is working towards assisting the user with rapidly assessing the known or potential species and biological communities, land management categories, and biological reports associated with the report area. We remind users that this information is likely incomplete and may be inaccurate as surveys to document species are lacking in many areas of the state, species' range polygons often include regions of unsuitable habitat, methods of predicting the presence of species or communities are constantly improving, and information is constantly being added and updated in our databases. **Field verification by professional biologists of the absence or presence of species and biological communities in a report area will always be an important obligation of users of our data. Users are encouraged to only use this environmental summary report as a starting point for more in depth analyses and are encouraged to contact state, federal, and tribal resource management agencies for additional data or management guidelines relevant to your efforts. Please see the Appendix for introductory materials to each section of the report, additional information resources, and a list of relevant agency contacts.**

MONTANA Natural Heritage Program

A program of the **Montana State Library's Natural Resource Information System** operated by the **University of Montana**.

Legend

Model Icons	Habitat Icons	Range Icons	Num Obs
N Suitable (native range)	C Common	I Introduced	Count of obs with 'good precision' (<=1000m)
O Optimal Suitability	O Occasional	Y Year-round	+ indicates additional 'poor precision' obs (1001m-10,000m)
M Moderate Suitability		S Summer	
L Low Suitability		W Winter	
I Suitable (introduced range)		M Migratory	
		H Historic	

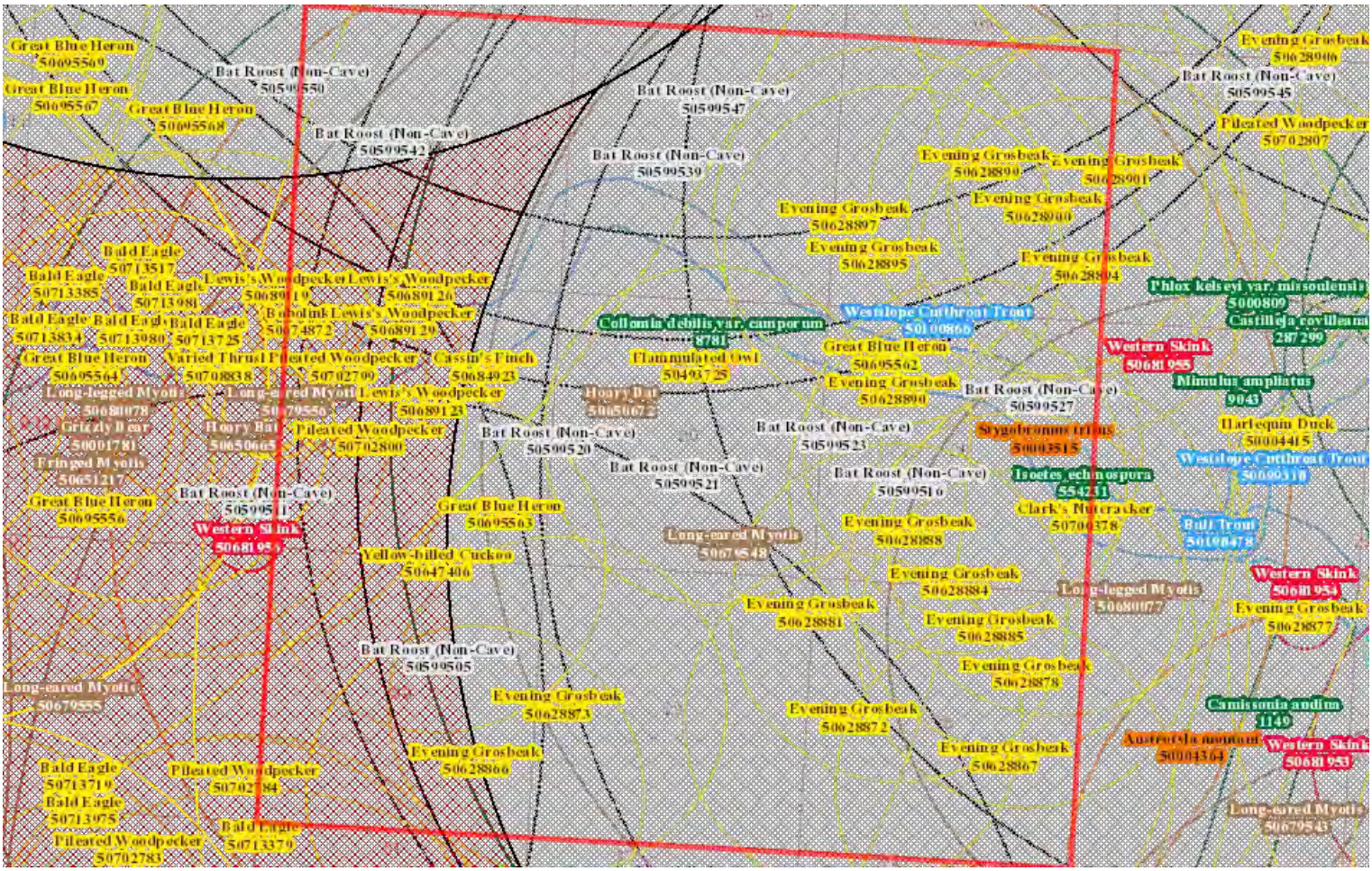
Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Native Species

Summarized by: **013N019W020** *(Buffered PLSS Section)*

Filtered by:

MT_Status='Species of Concern', 'Special Status', 'Important Animal Habitat', 'Potential SOC'



Species Occurrences

	USFWS Sec7	# SO	# Obs	Predictive Model	Associated Habitat	Range
V - Collomia debilis var. camporum *(Alpine Collomia)* SOC		1				Y

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5T2** State: **S1S2**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Apr 26, 2018)

Predictive Models: N 95% Suitable (native range) (deductive) **Associated Habitats:** C 1% Common

F - Westslope Cutthroat Trout *(Oncorhynchus clarkii lewisi)* SOC		1			Not Assigned	Y

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5T4** State: **S2**

USFS: **Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN2**

Delineation Criteria Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Sep 15, 2020)

Predictive Models: N 63% Suitable (native range) (deductive)

F - Bull Trout *(Salvelinus confluentus)* SOC	7	1			Not Assigned	Y

View in Field Guide View Predicted Models View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2** USFWS: **LT; CH**
USFS: **Threatened, Critical Habitat on Forests (BD, BRT, HLC, KOOT, LOLO)** BLM: **THREATENED** FWP SWAP: **SGCN2**

Delineation Criteria Stream reaches and standing water bodies where the species is believed to be present based on the professional judgement of a fisheries biologist, potentially supported by habitat assessment, direct capture, or confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 30, 2018)

Predictive Models: N 60% Suitable (native range) (deductive)

B - Lewis's Woodpecker *(Melanerpes lewis)* **SOC** 9 7 S M

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G4** State: **S2B** USFWS: **MBTA; BCC10; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN2** PIF: **2**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 300 meters in order to encompass the likely foraging area used by breeding adults around the nest tree and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jul 07, 2021)

Predictive Models: O 53% Optimal (inductive), M 33% Moderate (inductive), L 14% Low (inductive) **Associated Habitats:** C 4% Common

M - Long-legged Myotis *(Myotis volans)* **SOC** 2 Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G4G5** State: **S3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 2,000 meters in order to encompass the average distances traveled from capture locations to roosts in Washington, Oregon, and in the Black Hills of South Dakota and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 2,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Apr 08, 2021)

Predictive Models: O 18% Optimal (inductive), M 82% Moderate (inductive) **Associated Habitats:** C 12% Common, O 61% Occasional

B - Great Blue Heron *(Ardea herodias)* **SOC** 4 11 Y S M

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed nesting area buffered by a minimum distance of 6,500 meters in order to be conservative about encompassing the areas commonly used for foraging near the breeding colony and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Aug 03, 2021)

Predictive Models: O 11% Optimal (inductive), M 82% Moderate (inductive), L 7% Low (inductive) **Associated Habitats:** C 5% Common

M - Long-eared Myotis *(Myotis evotis)* **SOC** 2 Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 1,000 meters in order to encompass the average distances traveled from capture locations to roosts and between roosts in western Montana, Alberta, and Oregon and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 1,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Apr 08, 2021)

Predictive Models: M 77% Moderate (inductive), L 23% Low (inductive) **Associated Habitats:** C 12% Common, O 61% Occasional

M - Fringed Myotis *(Myotis thysanodes)* **SOC** 1 Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 2,000 meters in order to encompass the range of distances traveled from capture locations to roosts in the Black Hills of South Dakota and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 2,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Dec 18, 2020)

Predictive Models: M 67% Moderate (inductive), L 33% Low (inductive) **Associated Habitats:** C 12% Common, O 61% Occasional

B - Bald Eagle *(Haliaeetus leucocephalus)* **SSS** 1 9 Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Special Status Species - Native Species Global: **G5** State: **S4** USFWS: **DM; BGEPA; MBTA**
USFS: **Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** PIF: **2**

Delineation Criteria Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to be conservative about encompassing the breeding territory and area commonly used for renesting and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Aug 13, 2021)

Predictive Models: M 60% Moderate (inductive), L 37% Low (inductive) **Associated Habitats:** C 9% Common, O 3% Occasional

B - Yellow-billed Cuckoo *(Coccyzus americanus)* **SOC** 7 1 2 S M

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **PS: LT; MBTA** USFS: **Threatened on Forests (BRT, LOLO)** BLM: **THREATENED** FWP SWAP: **SGCN3, SGIN** PIF: **2**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to encompass the maximum foraging area size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 18, 2020)

Predictive Models: M 43% Moderate (inductive), L 57% Low (inductive) **Associated Habitats:** C 4% Common

R - Western Skink *(Plestiodon skiltonianus)* SOC — 2 — Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** FWP SWAP: **SGCN3, SGIN**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 200 meters in order to encompass habitats supporting other individuals in adjacent territories. Otherwise the point observation is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Apr 09, 2021)

Predictive Models: M 38% Moderate (inductive), L 48% Low (inductive) **Associated Habitats:** C 7% Common, O 1% Occasional

M - Hoary Bat *(Lasiurus cinereus)* SOC — 2 — S M

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G3G4** State: **S3** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles during the active season. Point observation location is buffered by a minimum distance of 3,500 meters in order to be conservative about encompassing the maximum reported foraging distance for the congeneric Lasiurus borealis and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 18, 2020)

Predictive Models: M 24% Moderate (inductive), L 76% Low (inductive) **Associated Habitats:** C 12% Common, O 65% Occasional

B - Bobolink *(Dolichonyx oryzivorus)* SOC — 1 — S M

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 150 meters in order to conservatively encompass male territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 24, 2020)

Predictive Models: M 20% Moderate (inductive), L 80% Low (inductive) **Associated Habitats:** C 40% Common, O 1% Occasional

B - Evening Grosbeak *(Coccothraustes vespertinus)* SOC — 16 — 23 — Y WM

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA; BCC10** FWP SWAP: **SGCN3**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 1,000 meters in order to encompass the maximum foraging distance from nests reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jan 03, 2020)

Predictive Models: M 1% Moderate (inductive), L 84% Low (inductive) **Associated Habitats:** C 41% Common

V - Isoetes echinospora *(Spiny-spore Quillwort)* SOC — 1 — Not Assigned — Y

View in Field Guide View Predicted Models View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3**

Predictive Models: L 94% Low (inductive)

B - Clark's Nutcracker *(Nucifraga columbiana)* SOC — 1 — 2 — Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** USFS: **Species of Conservation Concern on Forests (FLAT)** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Observations with direct evidence of breeding activity or indirect evidence of breeding activity between early March and mid-July within forested habitats containing Whitebark Pine (Pinus albicaulis), Limber Pine (Pinus flexilis), or Ponderosa Pine (Pinus ponderosa). Observations are buffered by a minimum distance of 1,000 meters in order to encompass the spring/summer breeding territory size reported for the species or the locational uncertainy of the observation to a maximum distance of 10,000 meters. (Last Updated: Aug 04, 2021)

Predictive Models: L 86% Low (inductive) **Associated Habitats:** C 5% Common

B - Pileated Woodpecker *(Dryocopus pileatus)* SOC — 4 — 6 — Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 1,500 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Aug 05, 2021)

Predictive Models: L 53% Low (inductive) **Associated Habitats:** C 4% Common

B - Cassin's Finch *(Haemorhous cassinii)* SOC — 1 — 3 — Y

View in Field Guide View Predicted Models View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA; BCC10** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing the courtship and foraging distance from nesting areas and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Apr 09, 2021)

Predictive Models: L 42% Low (inductive) **Associated Habitats:** C 4% Common

V - Mimulus ampliatus *(Stalk-leaved Monkeyflower)* SOC — 1 — Not Assigned — Y

View in Field Guide View Predicted Models View Range Maps

Species of Concern - Native Species Global: **G3** State: **S3** USFS: **Sensitive - Known on Forests (KOOT)**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Jan 29, 2021)

Predictive Models: L 1% Low (inductive)

M - Grizzly Bear *(Ursus arctos)* SOC | 7 | 1 | Not Available | Y

View in Field Guide View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G4** State: **S2S3** USFWS: **PS: LT; XN** USFS: **Threatened on Forests (BD, CG, HLC, KOOT, LOLO)** BLM: **THREATENED** FWP SWAP: **SGCN2-3**

Delineation Criteria Species Occurrence polygons represent areas delineated by the U.S. Fish and Wildlife Service (USFWS) that encompass both home ranges and potential transitory movements based on verified sightings. Within these areas, the USFWS wants project proponents to consider whether the species â€œmay be presentâ€ when evaluating the potential impacts of a project and to work with the USFWS to develop and implement best management practices to minimize or eliminate project effects on the species. (Last Updated: Dec 29, 2020)

Associated Habitats: C 8% Common

B - Varied Thrush *(Ixoreus naevius)* SOC | 1 | 1 | Not Available | S M

View in Field Guide View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 225 meters in order to encompass the reported minimum stand size occupied by breeding pairs and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Aug 05, 2021)

Associated Habitats: C 4% Common

B - Flammulated Owl *(Psiloscops flammeolus)* SOC | 1 | 1 | Not Available | S M

View in Field Guide View Associated Habitat View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA; BCC10**
USFS: **Sensitive - Known on Forests (BD, BRT, HLC, KOOT, LOLO)**
Sensitive - Suspected on Forests (CG)
Species of Conservation Concern on Forests (FLAT) BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **1**

Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 300 meters in order to encompass the maximum breeding territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: May 02, 2019)

Associated Habitats: C 1% Common, O 4% Occasional

I - Stygobromus tritus *(A Subterranean Amphipod)* SOC | 1 | Not Available | Not Assigned | Y

View in Field Guide View Range Maps

Species of Concern - Native Species Global: **G1G2** State: **S1S2**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 300 meters in order to encompass the cave system the species is dependent on. (Last Updated: Jan 17, 2008)

I - Austrotyla montani *(A Millipede)* SOC | 1 | Not Available | Not Assigned

View in Field Guide

Species of Concern - Native Species Global: **G1G3** State: **S1S3**

Delineation Criteria Confirmed breeding area based on the presence of a resident animal of any age. Point observation location is buffered by a minimum distance of 100 meters in order to encompass the home range of the individual as well as adjacent habitat likely to support other individuals and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Feb 05, 2008)

O - Bat Roost (Non-Cave) *(Bat Roost (Non-Cave))* IAH | 12 | Not Available | Not Assigned

View in Field Guide

Important Animal Habitat - Native Species Global: **GNR** State: **SNR**

Delineation Criteria Confirmed area of occupancy based on the documented presence of adults or juveniles of any bat species at non-cave natural roost sites (e.g. rock outcrops, trees), below ground human created roost sites (e.g. mines), and above ground human created roost sites (e.g., bridges, buildings). Point observation locations are buffered by a distance of 4,500 meters in order to encompass the 95% confidence interval for nightly foraging distance reported for Townsendâ€™s Big-eared Bat (a resident Montana bat Species of Concern) and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Oct 22, 2019)

MONTANA Natural Heritage Program

A program of the **Montana State Library's Natural Resource Information System** operated by the **University of Montana**.

Legend

Model Icons	Habitat Icons	Range Icons	Num Obs
N Suitable (native range)	C Common	I Introduced	Count of obs with 'good precision' (<=1000m)
O Optimal Suitability	O Occasional	Y Year-round	+ indicates additional 'poor precision' obs (1001m-10,000m)
M Moderate Suitability		S Summer	
L Low Suitability		W Winter	
I Suitable (introduced range)		M Migratory	
		H Historic	

Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Native Species

Summarized by: **013N019W020** *(Buffered PLSS Section)*
Filtered by:
MT_Status='Species of Concern', 'Special Status', 'Important Animal Habitat', 'Potential SOC'

Other Observed Species

	USFWS Sec7	# Obs	Predictive Model	Associated Habitat	Range
B - Harlequin Duck *(Histrionicus histrionicus)* SOC		2			S M
B - Hooded Merganser *(Lophodytes cucullatus)* PSOC		1			Y M
B - Western Screech-Owl *(Megascops kennicottii)* PSOC		1			Y
B - Rufous Hummingbird *(Selasphorus rufus)* PSOC		1			S M
M - Silver-haired Bat *(Lasionycteris noctivagans)* PSOC		3			Y
B - Barrow's Goldeneye *(Bucephala islandica)* PSOC		2			Y W M
B - Golden Eagle *(Aquila chrysaetos)* SOC		1			Y
B - Great Gray Owl *(Strix nebulosa)* SOC		1			Y
R - Snapping Turtle *(Chelydra serpentina)* SOC		2			I
B - Burrowing Owl *(Athene cunicularia)* SOC		3	Not Available		
B - Franklin's Gull *(Leucophaeus pipixcan)* SOC		1	Not Available		M

B - Harlequin Duck *(Histrionicus histrionicus)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S2B** USFWS: **MBTA** USFS: **Sensitive - Known on Forests (BD, CG, HLC, KOOT, LOLO)** FWP SWAP: **SGCN2** PIF: **1**

Predictive Models: N 2% Suitable (native range) (deductive) **Associated Habitats:** C 4% Common, O 4% Occasional

B - Hooded Merganser *(Lophodytes cucullatus)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **2**

Predictive Models: M 96% Moderate (inductive), L 4% Low (inductive) **Associated Habitats:** C 9% Common

B - Western Screech-Owl *(Megascops kennicottii)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G4G5** State: **S3S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **3**

Predictive Models: M 95% Moderate (inductive), L 5% Low (inductive) **Associated Habitats:** C 8% Common

B - Rufous Hummingbird *(Selasphorus rufus)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G4** State: **S4B** USFWS: **MBTA; BCC10** PIF: **3**

Predictive Models: M 85% Moderate (inductive), L 15% Low (inductive) **Associated Habitats:** C 46% Common

M - Silver-haired Bat *(Lasionycteris noctivagans)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G3G4** State: **S4**

Predictive Models: M 77% Moderate (inductive), L 23% Low (inductive) **Associated Habitats:** C 12% Common, O 57% Occasional

B - Barrow's Goldeneye *(Bucephala islandica)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **2**

Predictive Models: M 45% Moderate (inductive), L 55% Low (inductive) **Associated Habitats:** C 9% Common

B - Golden Eagle *(Aquila chrysaetos)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **BGEPA; MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Predictive Models: L 85% Low (inductive) **Associated Habitats:** C 7% Common, O 4% Occasional

B - Great Gray Owl *(Strix nebulosa)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3, SGIN** PIF: **3**

Predictive Models: L 20% Low (inductive) **Associated Habitats:** C 5% Common, O 1% Occasional

R - Snapping Turtle *(Chelydra serpentina)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5** State: **S3** BLM: **SENSITIVE** FWP SWAP: **SGCN3, SGIN**

Predictive Models: I 60% Suitable (introduced range) (deductive) **Associated Habitats:** C 4% Common

B - Burrowing Owl *(Athene cunicularia)* SOC

View in Field Guide | View Associated Habitat

Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA; BCC17** USFS: **Sensitive - Known on Forests (CG) Sensitive - Suspected on Forests (HLC)** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **1**

Associated Habitats: O 10% Occasional

B - Franklin's Gull *(Leucophaeus pipixcan)* SOC

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 5% Common, O 7% Occasional

B - Ferruginous Hawk *(Buteo regalis)* **SOC** 1 Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 4% Common, O 1% Occasional

B - Brown Creeper *(Certhia americana)* **SOC** 8 Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **1**
Associated Habitats: C 4% Common

B - Tennessee Warbler *(Leiothlypis peregrina)* **PSOC** 1 Not Available M

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S4B** USFWS: **MBTA**
Associated Habitats: C 4% Common

B - Northern Goshawk *(Accipiter gentilis)* **SOC** 1 Not Available Y WM

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 1% Common, O 4% Occasional

B - Sagebrush Sparrow *(Artemisiospiza nevadensis)* **SOC** 2 Not Available Not Assigned

View in Field Guide
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

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Legend

Model Icons	Habitat Icons	Range Icons	Num Obs
N Suitable (native range)	C Common	I Introduced	Count of obs with 'good precision' (<=1000m)
O Optimal Suitability	O Occasional	Y Year-round	+ indicates additional 'poor precision' obs (1001m-10,000m)
M Moderate Suitability		S Summer	
L Low Suitability		W Winter	
I Suitable (introduced range)		M Migratory	
		H Historic	

Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Native Species

Summarized by: **013N019W020** *(Buffered PLSS Section)*
Filtered by:
MT_Status='Species of Concern', 'Special Status', 'Important Animal Habitat', 'Potential SOC'

Other Potential Species

	USFWS Sec7	Predictive Model	Associated Habitat	Range
V - Rotala ramosior *(Toothcup)* SOC				Y
V - Dichanthelium acuminatum *(Panic Grass)* SOC			Not Assigned	Y
V - Impatiens aurella *(Pale-yellow Jewel-weed)* SOC			Not Assigned	Y
V - Carex scoparia *(Pointed Broom Sedge)* SOC			Not Assigned	Y
V - Wolffia columbiana *(Columbia Water-meal)* SOC				Y
M - Western Spotted Skunk *(Spilogale gracilis)* PSOC				Y
V - Cypripedium parviflorum *(Small Yellow Lady's-slipper)* PSOC			Not Assigned	Y
B - Long-billed Curlew *(Numenius americanus)* SOC				S M
M - Little Brown Myotis *(Myotis lucifugus)* SOC				Y
B - Short-eared Owl *(Asio flammeus)* PSOC				Y
V - Utricularia intermedia *(Flatleaf Bladderwort)* SOC			Not Assigned	Y

V - Rotala ramosior *(Toothcup)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S1S2** MNPS: **4**

Predictive Models: N 1% Suitable (native range) (deductive) **Associated Habitats:** C 4% Common

V - Dichanthelium acuminatum *(Panic Grass)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2S3**

Predictive Models: O 67% Optimal (inductive), M 33% Moderate (inductive)

V - Impatiens aurella *(Pale-yellow Jewel-weed)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3**

Predictive Models: O 59% Optimal (inductive), M 41% Moderate (inductive)

V - Carex scoparia *(Pointed Broom Sedge)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S1S2**

Predictive Models: O 54% Optimal (inductive), M 46% Moderate (inductive)

V - Wolffia columbiana *(Columbia Water-meal)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2S3**

Predictive Models: O 42% Optimal (inductive), M 58% Moderate (inductive) **Associated Habitats:** C 4% Common

M - Western Spotted Skunk *(Spilogale gracilis)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **SNR** FWP SWAP: **SGIN**

Predictive Models: O 10% Optimal (inductive), M 90% Moderate (inductive) **Associated Habitats:** C 7% Common, O 32% Occasional

V - Cypripedium parviflorum *(Small Yellow Lady's-slipper)* PSOC

View in Field Guide | View Predicted Models | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S3S4** USFS: **Sensitive - Known on Forests (CG, HLC, KOOT, LOLO)** **Sensitive - Suspected on Forests (BRT)** MNPS: **2**

Predictive Models: O 1% Optimal (inductive), M 35% Moderate (inductive), L 64% Low (inductive)

B - Long-billed Curlew *(Numenius americanus)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA; BCC11** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Predictive Models: M 98% Moderate (inductive), L 2% Low (inductive) **Associated Habitats:** C 3% Common, O 1% Occasional

M - Little Brown Myotis *(Myotis lucifugus)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G3** State: **S3** FWP SWAP: **SGCN3**

Predictive Models: M 96% Moderate (inductive), L 4% Low (inductive) **Associated Habitats:** C 44% Common, O 56% Occasional

B - Short-eared Owl *(Asio flammeus)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S4** USFWS: **MBTA; BCC11; BCC17** PIF: **3**

Predictive Models: M 96% Moderate (inductive), L 4% Low (inductive) **Associated Habitats:** C 11% Common, O 7% Occasional

V - Utricularia intermedia *(Flatleaf Bladderwort)* SOC

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known on Forests (KOOT)** MNPS: **3**

Predictive Models: M 96% Moderate (inductive), L 4% Low (inductive)

M - North American Porcupine *(Erethizon dorsatum)* **PSOC**

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S3S4** FWP SWAP: **SGIN**

Predictive Models: M 83% Moderate (inductive), L 17% Low (inductive) **Associated Habitats:** C 39% Common

M - Townsend's Big-eared Bat *(Corynorhinus townsendii)* **SOC**

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S3** USFS: **Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Predictive Models: M 76% Moderate (inductive), L 24% Low (inductive) **Associated Habitats:** C 11% Common, O 33% Occasional

M - North American Water Vole *(Microtus richardsoni)* **PSOC**

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S4**

Predictive Models: M 74% Moderate (inductive), L 22% Low (inductive) **Associated Habitats:** C 5% Common

V - Juncus covillei *(Coville's Rush)* **SOC**

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2S3**

Predictive Models: M 72% Moderate (inductive), L 28% Low (inductive) **Associated Habitats:** C 1% Common

B - Common Poorwill *(Phalaenoptilus nuttallii)* **PSOC** S M

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S4B** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **3**

Predictive Models: M 66% Moderate (inductive), L 31% Low (inductive) **Associated Habitats:** C 3% Common, O 35% Occasional

V - Botrychium lineare *(Linearleaf Moonwort)* **SOC** Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G3** State: **S1S2** MNPS: **4**

Predictive Models: M 64% Moderate (inductive), L 5% Low (inductive)

V - Eleocharis rostellata *(Beaked Spikerush)* **SOC** Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

USFS: **Sensitive - Known on Forests (BD, CG, HLC)**

Species of Concern - Native Species Global: **G5** State: **S3** **Species of Conservation Concern on Forests (FLAT)** MNPS: **3**

Predictive Models: M 33% Moderate (inductive), L 13% Low (inductive)

B - Black-necked Stilt *(Himantopus mexicanus)* **SOC** S M

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**

Predictive Models: M 31% Moderate (inductive), L 69% Low (inductive) **Associated Habitats:** C 4% Common, O 5% Occasional

A - Western Toad *(Anaxyrus boreas)* **SOC**

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S2** USFS: **Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN2**

Predictive Models: M 30% Moderate (inductive), L 70% Low (inductive) **Associated Habitats:** C 9% Common, O 35% Occasional

V - Ligusticum verticillatum *(Idaho Lovage)* **SOC** Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4G5** State: **S3**

Predictive Models: M 25% Moderate (inductive), L 23% Low (inductive)

V - Draba densifolia *(Dense-leaf Draba)* **SOC** Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2** MNPS: **2**

Predictive Models: M 20% Moderate (inductive), L 39% Low (inductive)

B - Veery *(Catharus fuscescens)* **SOC** S M

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Predictive Models: M 13% Moderate (inductive), L 84% Low (inductive) **Associated Habitats:** C 4% Common, O 1% Occasional

B - American Bittern *(Botaurus lentiginosus)* **SOC** S M

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **3**

Predictive Models: M 13% Moderate (inductive), L 82% Low (inductive) **Associated Habitats:** C 5% Common

B - Meesia triquetra *(Meesia Moss)* **SOC** Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

USFS: **Sensitive - Known on Forests (BRT, CG, KOOT)**
Sensitive - Suspected on Forests (LOLO)

Species of Concern - Native Species Global: **G5** State: **S2** **Species of Conservation Concern on Forests (FLAT)**

Predictive Models: M 13% Moderate (inductive), L 82% Low (inductive)

V - Carex crawei *(Crawe's Sedge)* SOC — Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2S3** MNPS: **2**

Predictive Models: M 13% Moderate (inductive), L 41% Low (inductive)

V - Centunculus minimus *(Chaffweed)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2**

Predictive Models: M 13% Moderate (inductive), L 21% Low (inductive) **Associated Habitats:** C 1% Common

B - Black Tern *(Chlidonias niger)* SOC — S M

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G4G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Predictive Models: M 3% Moderate (inductive), L 97% Low (inductive) **Associated Habitats:** C 4% Common, O 1% Occasional

V - Elodea bifoliata *(Long-sheath Waterweed)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G4G5** State: **S2?** MNPS: **3**

Predictive Models: M 3% Moderate (inductive), L 93% Low (inductive) **Associated Habitats:** C 4% Common

V - Psilocarphus brevissimus *(Dwarf woolly-heads)* SOC — Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G4** State: **S2S3** USFS: **Sensitive - Known on Forests (KOOT)** MNPS: **3**

Predictive Models: M 3% Moderate (inductive), L 72% Low (inductive)

V - Stipa lettermanii *(Letterman's Needlegrass)* SOC — Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S1S3**

Predictive Models: M 1% Moderate (inductive), L 11% Low (inductive)

V - Drosera rotundifolia *(Roundleaf Sundew)* PSOC — Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S3S4**

Predictive Models: M 1% Moderate (inductive), L 3% Low (inductive)

V - Stellaria crassifolia *(Fleshy Stitchwort)* SOC — Not Assigned

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S2**

Predictive Models: L 100% Low (inductive)

B - Brewer's Sparrow *(Spizella breweri)* SOC — Not Assigned S M

View in Field Guide | View Predicted Models | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Predictive Models: L 100% Low (inductive)

A - Northern Leopard Frog *(Lithobates pipiens)* SOC — H

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S1,S4** USFS: **Sensitive - Known on Forests (CG, HLC, KOOT)** **Sensitive - Suspected on Forests (BRT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN1**

Predictive Models: L 94% Low (inductive) **Associated Habitats:** C 4% Common, O 5% Occasional

M - Yuma Myotis *(Myotis yumanensis)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** FWP SWAP: **SGIN**

Predictive Models: L 86% Low (inductive) **Associated Habitats:** C 19% Common, O 26% Occasional

B - Black-backed Woodpecker *(Picoides arcticus)* SOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** USFS: **Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **1**

Predictive Models: L 84% Low (inductive) **Associated Habitats:** C 4% Common

V - Ranunculus hyperboreus *(High Northern Buttercup)* PSOC

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species Global: **G5** State: **S3S4**

Predictive Models: L 74% Low (inductive) **Associated Habitats:** C 1% Common

B - Horned Grebe *(Podiceps auritus)* SOC — S M

View in Field Guide | View Predicted Models | View Associated Habitat | View Range Maps

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Predictive Models: L 49% Low (inductive) **Associated Habitats:** C 4% Common

M - Hoary Marmot *(Marmota caligata)* PSOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S4** FWP SWAP: **SGIN**
Predictive Models: L 44% Low (inductive) **Associated Habitats:** C 1% Common

B - Peregrine Falcon *(Falco peregrinus)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3** USFWS: **DM; MBTA**
USFS: **Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Predictive Models: L 37% Low (inductive) **Associated Habitats:** C 12% Common

V - Phlox kelseyi var. missoulensis *(Missoula Phlox)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
USFS: **Sensitive - Known on Forests (BD, HLC)**
Species of Concern - Native Species Global: **G3** State: **S3** **Sensitive - Suspected on Forests (LOLO)** MNPS: **2**
Predictive Models: L 35% Low (inductive) **Associated Habitats:** C 3% Common

V - Erigeron linearis *(Linear-leaf Fleabane)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2** MNPS: **2**
Predictive Models: L 31% Low (inductive) **Associated Habitats:** C 3% Common

R - Northern Alligator Lizard *(Elgaria coerulea)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** FWP SWAP: **SGCN3, SGIN**
Predictive Models: L 24% Low (inductive) **Associated Habitats:** C 4% Common, O 35% Occasional

M - Canada Lynx *(Lynx canadensis)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
USFS: **Threatened on Forests (BD, BRT)**
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **LT; CH** **Threatened, Critical Habitat on Forests (CG, HLC, KOOT, LOLO)**
BLM: **THREATENED** FWP SWAP: **SGCN3**
Predictive Models: L 21% Low (inductive) **Associated Habitats:** C 4% Common, O 1% Occasional

V - Botrychium pallidum *(Pale Moonwort)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G3** State: **S1S2** MNPS: **2**
Predictive Models: L 21% Low (inductive) **Associated Habitats:** C 3% Common

V - Trichophorum cespitosum *(Tufted Club-rush)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
USFS: **Sensitive - Known on Forests (BD, HLC, KOOT)**
Species of Concern - Native Species Global: **G5** State: **S2** **Species of Conservation Concern on Forests (FLAT)** MNPS: **3**
Predictive Models: L 13% Low (inductive) **Associated Habitats:** C 1% Common

V - Botrychium hesperium *(Western Moonwort)* SOC

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3** USFS: **Sensitive - Known on Forests (BD, KOOT)** MNPS: **2**
Predictive Models: L 13% Low (inductive)

B - Black Swift *(Cypseloides niger)* SOC

View in Field Guide View Predicted Models View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G4** State: **S1B** USFWS: **MBTA; BCC10** USFS: **Species of Conservation Concern on Forests (FLAT)**
FWP SWAP: **SGCN1, SGIN** PIF: **2**
Predictive Models: L 11% Low (inductive) **Associated Habitats:** C 4% Common

V - Musineon vaginatum *(Rydberg's Parsley)* PSOC

View in Field Guide View Predicted Models View Range Maps
Potential Species of Concern - Native Species Global: **G3G4** State: **S3S4**
Predictive Models: L 4% Low (inductive)

V - Botrychium simplex *(Least Moonwort)* SOC

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2**
Predictive Models: L 3% Low (inductive)

V - Eriophorum gracile *(Slender Cottongrass)* SOC

View in Field Guide View Predicted Models View Range Maps
USFS: **Sensitive - Known on Forests (CG, KOOT)**
Species of Concern - Native Species Global: **G5** State: **S3** **Species of Conservation Concern on Forests (FLAT)** MNPS: **2**
Predictive Models: L 3% Low (inductive)

V - Dryopteris cristata *(Crested Shieldfern)* SOC

View in Field Guide View Predicted Models View Range Maps
USFS: **Sensitive - Known on Forests (BRT, KOOT, LOLO)**
Species of Concern - Native Species Global: **G5** State: **S3** **Species of Conservation Concern on Forests (FLAT)** MNPS: **3**
Predictive Models: L 1% Low (inductive)

F - Lake Trout *(Salvelinus namaycush)* **SOC** Not Assigned I

View in Field Guide View Predicted Models View Range Maps
Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: **G5** State: **S2** FWP SWAP: **SGCN2**
Predictive Models: I 55% Suitable (introduced range) (deductive)

B - Loggerhead Shrike *(Lanius ludovicianus)* **SOC** Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 35% Common, O 9% Occasional

B - Black-crowned Night-Heron *(Nycticorax nycticorax)* **SOC** Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**
Associated Habitats: C 9% Common

B - Trumpeter Swan *(Cygnus buccinator)* **SOC** Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3** USFWS: **MBTA** USFS: **Sensitive - Known on Forests (BD, CG)** BLM: **SENSITIVE**
FWP SWAP: **SGCN3** PIF: **1**
Associated Habitats: C 9% Common

B - White-faced Ibis *(Plegadis chihi)* **SOC** Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 9% Common

M - Western Pygmy Shrew *(Sorex eximius)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **GNR** State: **S3** FWP SWAP: **SGCN3**
Associated Habitats: C 8% Common

I - Argia alberta *(Paiute Dancer)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G4** State: **S2S3**
Associated Habitats: O 8% Occasional

I - Ophiogomphus occidentis *(Sinuous Snaketail)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S4**
Associated Habitats: C 8% Common

B - Common Tern *(Sterna hirundo)* **SOC** Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 8% Common

I - Euphydryas gillettii *(Gillette's Checkerspot)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G3** State: **S2**
Associated Habitats: C 5% Common, O 3% Occasional

M - Northern Bog Lemming *(Synaptomys borealis)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2** USFS: **Sensitive - Known on Forests (BD, BRT, HLC, KOOT, LOLO)**
FWP SWAP: **SGCN2, SGIN**
Associated Habitats: C 5% Common

I - Aeshna constricta *(Lance-tipped Darner)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S1S3**
Associated Habitats: C 5% Common

I - Aeshna eremita *(Lake Darner)* **PSOC** Not Available Y S W

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S4**
Associated Habitats: C 5% Common

I - Limenitis arthemis *(Red-spotted Admiral)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S3**
Associated Habitats: C 5% Common

I - Somatochlora albicincta *(Ringed Emerald)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S1S3**
Associated Habitats: C 4% Common, O 5% Occasional

I - Somatochlora minor *(Ocellated Emerald)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S4**
Associated Habitats: C 4% Common, O 5% Occasional

I - Libellula saturata *(Flame Skimmer)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S4**
Associated Habitats: C 4% Common, O 4% Occasional

B - Forster's Tern *(Sterna forsteri)* **SOC** Not Available S M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 4% Common, O 4% Occasional

B - Caspian Tern *(Hydroprogne caspia)* **SOC** Not Available M

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN2** PIF: **2**
Associated Habitats: C 4% Common, O 4% Occasional

M - Fisher *(Pekania pennanti)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFS: **Sensitive - Known on Forests (BD, BRT, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**
Associated Habitats: C 4% Common, O 1% Occasional

I - Epitheca spinigera *(Spiny Baskettail)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S5**
Associated Habitats: C 4% Common, O 1% Occasional

B - Boreal Chickadee *(Poecile hudsonicus)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3**
Associated Habitats: C 4% Common

B - Pacific Wren *(Troglodytes pacificus)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**
Associated Habitats: C 4% Common

I - Argia emma *(Emma's Dancer)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S5**
Associated Habitats: C 4% Common

I - Ladona julia *(Chalk-fronted Corporal)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S4**
Associated Habitats: C 4% Common

I - Polygonia progne *(Gray Comma)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2**
Associated Habitats: C 4% Common

I - Rhionaeschna multicolor *(Blue-eyed Darner)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S4**
Associated Habitats: C 4% Common

V - Senecio eremophilus *(Desert Groundsel)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S1S2**
Associated Habitats: C 4% Common

B - Northern Hawk Owl *(Surnia ulula)* **SOC** — Not Available — WM

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3, SGIN**

Associated Habitats: C 4% Common

B - American White Pelican *(Pelecanus erythrorhynchos)* **SOC** — Not Available — M

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G4** State: **S3B** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **3**

Associated Habitats: C 4% Common

B - Clark's Grebe *(Aechmophorus clarkii)* **SOC** — Not Available — M

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11** FWP SWAP: **SGCN3** PIF: **3**

Associated Habitats: C 4% Common

B - Common Loon *(Gavia immer)* **SOC** — Not Available — M

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G5** State: **S3B** USFWS: **MBTA** USFS: **Sensitive - Known on Forests (KOOT, LOLO)** FWP SWAP: **SGCN3** PIF: **1**

Associated Habitats: C 4% Common

B - Sharp-tailed Grouse *(Tympanuchus phasianellus)* **SOC** — Not Available — H

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G5** State: **SX,S4** FWP SWAP: **SGCN1** PIF: **2**

Associated Habitats: C 3% Common, O 7% Occasional

M - Bison *(Bos bison)* **SOC** — Not Available — H

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G4** State: **S2** FWP SWAP: **SGCN2**

Associated Habitats: C 3% Common, O 1% Occasional

V - Castilleja covilleana *(Coville Indian Paintbrush)* **SOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G3G4** State: **S3** USFS: **Sensitive - Known on Forests (BRT)** **Sensitive - Suspected on Forests (BD)** MNPS: **2**

Associated Habitats: C 3% Common

V - Polygonum austiniae *(Austin's Knotweed)* **PSOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species — Global: **G5T4** State: **S3S4** USFS: **Sensitive - Known on Forests (BD, HLC)** **Sensitive - Suspected on Forests (CG)** MNPS: **2**

Associated Habitats: C 3% Common

V - Trifolium gymnocarpon *(Hollyleaf Clover)* **SOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G5** State: **S2** USFS: **Sensitive - Known on Forests (BRT, LOLO)** **Sensitive - Suspected on Forests (BD)** MNPS: **2**

Associated Habitats: C 3% Common

I - Aeshna tuberculifera *(Black-tipped Darner)* **PSOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species — Global: **G5** State: **S2S4**

Associated Habitats: C 1% Common, O 8% Occasional

I - Argia vivida *(Vivid Dancer)* **PSOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species — Global: **G5** State: **S3S5**

Associated Habitats: C 1% Common, O 8% Occasional

I - Leucorrhinia glacialis *(Crimson-ringed Whiteface)* **PSOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species — Global: **G5** State: **S3**

Associated Habitats: C 1% Common, O 8% Occasional

I - Aeshna subarctica *(Subarctic Darner)* **SOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Species of Concern - Native Species — Global: **G5** State: **S1S2**

Associated Habitats: C 1% Common, O 5% Occasional

I - Somatochlora hudsonica *(Hudsonian Emerald)* **PSOC** — Not Available — Y

View in Field Guide | View Associated Habitat | View Range Maps

Potential Species of Concern - Native Species — Global: **G5** State: **S2S4**

Associated Habitats: C 1% Common, O 5% Occasional

M - Wolverine *(Gulo gulo)* **SOC** — 7 — Not Available — Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G4** State: **S3** USFS: **Proposed on Forests (BD, BRT, CG, HLC, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**
Associated Habitats: C 1% Common, O 4% Occasional

B - Boreal Owl *(Aegolius funereus)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S4** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **3**
Associated Habitats: C 1% Common, O 4% Occasional

I - Aeshna juncea *(Sedge Darner)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S5**
Associated Habitats: C 1% Common, O 4% Occasional

I - Colias gigantea *(Giant Sulphur)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3**
Associated Habitats: C 1% Common, O 4% Occasional

I - Enallagma clausum *(Alkali Bluet)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S4**
Associated Habitats: C 1% Common, O 4% Occasional

I - Leucorrhinia borealis *(Boreal Whiteface)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S1**
Associated Habitats: C 1% Common, O 4% Occasional

I - Rhionaeschna californica *(California Darner)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S5**
Associated Habitats: C 1% Common, O 4% Occasional

I - Sympetrum madidum *(Red-veined Meadowhawk)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S3**
Associated Habitats: C 1% Common, O 4% Occasional

B - Gray-crowned Rosy-Finch *(Leucosticte tephrocotis)* **SOC** Not Available Y WM

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2** USFWS: **MBTA** FWP SWAP: **SGCN2, SGIN**
Associated Habitats: C 1% Common

I - Aeshna sitchensis *(Zigzag Darner)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S2S3**
Associated Habitats: C 1% Common

I - Somatochlora semicircularis *(Mountain Emerald)* **PSOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Potential Species of Concern - Native Species Global: **G5** State: **S3S5**
Associated Habitats: C 1% Common

V - Braya humilis *(Low Braya)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S2** MNPS: **2**
Associated Habitats: C 1% Common

V - Calamagrostis tweedyi *(Cascade reedgrass)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G3** State: **S3**
Associated Habitats: C 1% Common

V - Clarkia rhomboidea *(Diamond Clarkia)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S3** USFS: **Sensitive - Known on Forests (BRT, KOOT, LOLO)** MNPS: **2**
Associated Habitats: C 1% Common

V - Cyperus bipartitus *(Shining Flatsedge)* **SOC** Not Available Y

View in Field Guide View Associated Habitat View Range Maps
Species of Concern - Native Species Global: **G5** State: **S1**
Associated Habitats: C 1% Common

V - Cypripedium fasciculatum *(Clustered Lady's-slipper)* **SOC** Not Available Y

View in Field Guide **View Associated Habitat** **View Range Maps**

USFS: **Sensitive - Known on Forests (KOOT, LOLO)**

Species of Concern - Native Species Global: **G4** State: **S3** **Species of Conservation Concern on Forests (FLAT)** MNPS: **1**

Associated Habitats: C 1% Common

V - Hornungia procumbens *(Hutchinsia)* **SOC** Not Available Y

View in Field Guide **View Associated Habitat** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S2** MNPS: **3**

Associated Habitats: C 1% Common

V - Ranunculus orthorhynchus *(Straightbeak Buttercup)* **SOC** Not Available Y

View in Field Guide **View Associated Habitat** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S1S2** MNPS: **1**

Associated Habitats: C 1% Common

V - Ranunculus pedatifidus *(Northern Buttercup)* **SOC** Not Available Y

View in Field Guide **View Associated Habitat** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3** MNPS: **2**

Associated Habitats: C 1% Common

V - Satureja douglasii *(Yerba Buena)* **SOC** Not Available Y

View in Field Guide **View Associated Habitat** **View Range Maps**

Species of Concern - Native Species Global: **G5** State: **S3**

Associated Habitats: C 1% Common

B - Black Rosy-Finch *(Leucosticte atrata)* **SOC** Not Available S M

View in Field Guide **View Associated Habitat** **View Range Maps**

Species of Concern - Native Species Global: **G4** State: **S2** USFWS: **MBTA; BCC10** FWP SWAP: **SGCN2, SGIN** PIF: **2**

Associated Habitats: C 1% Common

Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Structured Surveys

Summarized by: **013N019W020** *(Buffered PLSS Section)*

The Montana Natural Heritage Program (MTNHP) records information on the locations where more than 80 different types of well-defined repeatable survey protocols capable of detecting an animal species or suite of animal species have been conducted by state, federal, tribal, university, or private consulting biologists. Examples of structured survey protocols tracked by MTNHP include: visual encounter and dip net surveys for pond breeding amphibians, point counts for birds, call playback surveys for selected bird species, visual surveys of migrating raptors, kick net stream reach surveys for macroinvertebrates, visual encounter cover object surveys for terrestrial mollusks, bat acoustic or mist net surveys, pitfall and/or snap trap surveys for small terrestrial mammals, track or camera trap surveys for large mammals, and trap surveys for turtles. Whenever possible, photographs of survey locations are stored in MTNHP databases.

MTNHP does not typically manage information on structured surveys for plants; surveys for invasive species may be a future exception.

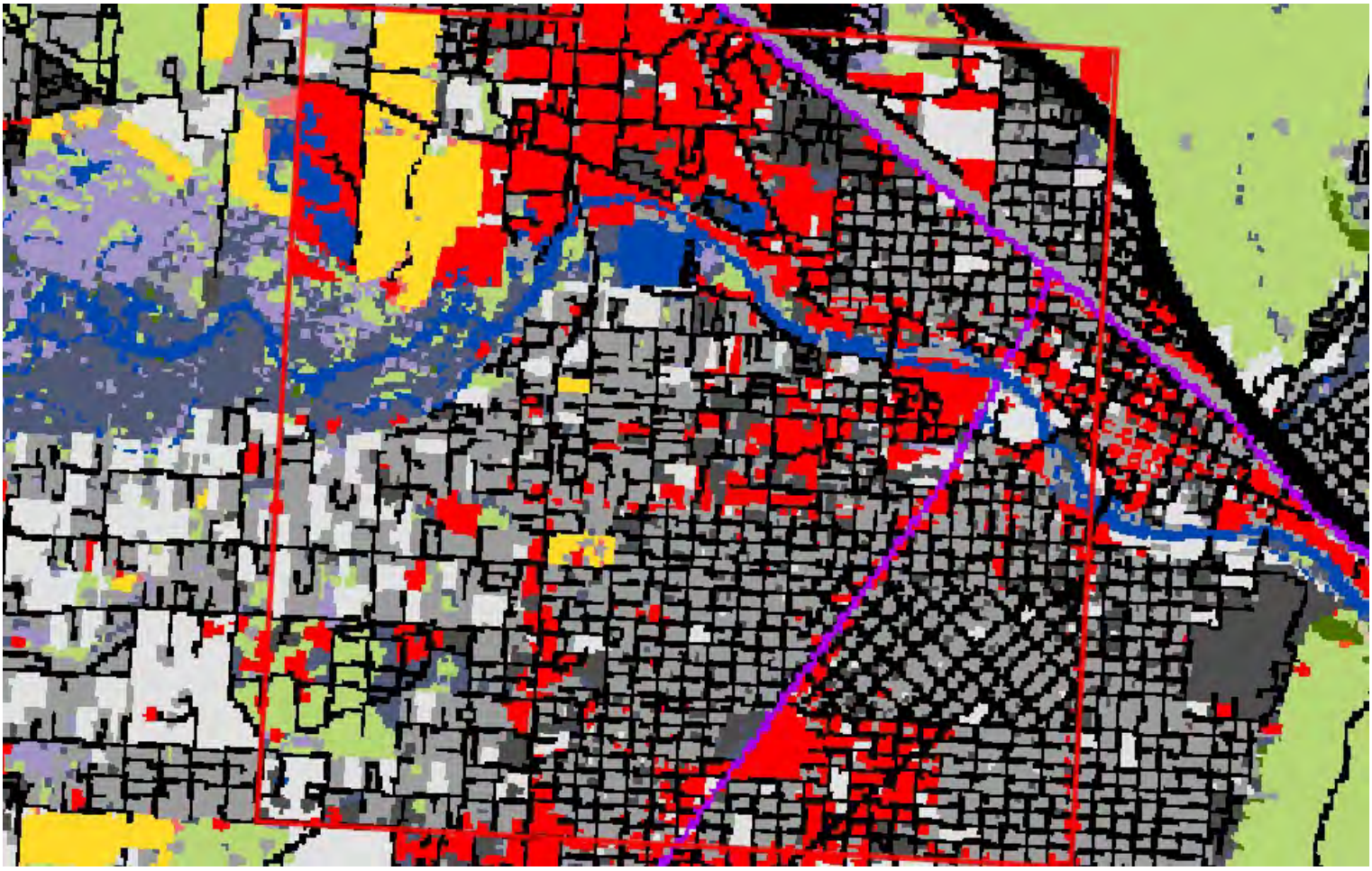
Within the report area you have requested, structured surveys are summarized by the number of each type of structured survey protocol that has been conducted, the number of species detections/observations resulting from these surveys, and the most recent year a survey has been conducted.

B-Colonial-nesting Waterbirds *(Colonial-nesting Waterbird Surveys)*	**Survey Count**: 2	**Obs Count**:	**Recent Survey**: 2011
B-Point Count *(Bird Point Count)*	**Survey Count**: 42	**Obs Count**: 339	**Recent Survey**: 1994
B-Raptor nest *(Raptor Nest Survey)*	**Survey Count**: 2	**Obs Count**: 2	**Recent Survey**: 2009
E-Eastern Heath Snail *(Eastern Heath Snail Survey)*	**Survey Count**: 3	**Obs Count**:	**Recent Survey**: 2012
E-Eurasian Water-milfoil Rake *(Rake tows/pulls for Eurasian Water-milfoil)*	**Survey Count**: 6	**Obs Count**:	**Recent Survey**: 2012
E-Kicknet *(Kicknet Collection Survey for Invasive Mussels and Snails)*	**Survey Count**: 1	**Obs Count**:	**Recent Survey**: 2021
E-Noxious Weed, Road-based *(Noxious Weed Road-based Visual Surveys)*	**Survey Count**: 23	**Obs Count**: 14	**Recent Survey**: 2003
E-Visual Aquatic Invasives *(Visual Encounter Surveys for Aquatic Invasives on Shorelines or Underwater)*	**Survey Count**: 2	**Obs Count**:	**Recent Survey**: 2021
M-Bat Roost (Active Season) *(Bat Roost (Active Season) Survey)*	**Survey Count**: 2	**Obs Count**: 1	**Recent Survey**: 2014

Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Land Cover

Summarized by: **013N019W020** *(Buffered PLSS Section)*



No Image

29% (*1,644 Acres*)

Human Land Use
Developed
Other Roads
County, city and or rural roads generally open to motor vehicles.

25% (*1,442 Acres*)

Human Land Use
Developed
Low Intensity Residential
Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units in rural and suburban areas. Paved roadways may be classified into this category.

No Image

16% (*899 Acres*)

Human Land Use
Developed
Commercial / Industrial
Businesses, industrial parks, hospitals, airports; utilities in commercial/industrial areas.

7% (*379 Acres*)

Human Land Use
Developed
Developed, Open Space

Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. This category often includes highway and railway rights of way and graveled rural roads.

6% (*333 Acres*)

Human Land Use
Developed
High Intensity Residential

Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-80% of the total cover. These areas most commonly include single-family housing units in urban areas. Paved roadways, parking lots, and other large impervious surfaces may be classified into this category.

4% (*223 Acres*)

Wetland and Riparian Systems
Floodplain and Riparian
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland

This ecological system is found throughout the Rocky Mountain and Colorado Plateau regions. In Montana, sites occur at elevations of 609-1,219 meters (2,000-4,000 feet) west of the Continental Divide. East of the Continental Divide, this system ranges up to 1,676 meters (5,500 feet). It generally comprises a mosaic of multiple communities that are tree-dominated with a diverse shrub component. It is dependent on a natural hydrologic regime with annual to episodic flooding, so it is usually found within the flood zone of rivers, on islands, sand or cobble bars, and along streambanks. It can form large, wide occurrences on mid-channel islands in larger rivers, or narrow bands on small, rocky canyon tributaries and well-drained benches. It is also typically found in backwater channels and other perennially wet but less scoured sites, such as floodplains, swales and irrigation ditches. In some locations, occurrences extend into moderately high intermountain basins where the adjacent vegetation is sage steppe. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) is the key indicator species. Other dominant trees may include boxelder maple (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), eastern cottonwood (*Populus deltoides*), Douglas-fir (*Pseudotsuga menziesii*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include Rocky Mountain maple (*Acer glabrum*), thinleaf alder (*Alnus incana*), river birch (*Betula occidentalis*), redoiser dogwood (*Cornus sericea*), hawthorne (*Crataegus* species), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), willows (*Salix* species), rose (*Rosa* species), silver buffaloberry (*Shepherdia argentea*), or snowberry (*Symphoricarpos* species).

4% (*215 Acres*)

Wetland and Riparian Systems
Open Water
Open Water

All areas of open water, generally with less than 25% cover of vegetation or soil

3% (*200 Acres*)

Human Land Use
Agriculture
Cultivated Crops

These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.

3% (*196 Acres*)

Grassland Systems
Montane Grassland
Rocky Mountain Lower Montane, Foothill, and Valley Grassland

This grassland system of the northern Rocky Mountains is found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are floristically similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. They are found at elevations from 548 - 1,650 meters (1,800-5,413 feet). In the lower montane zone, they range from small meadows to large open parks surrounded by conifers; below the lower treeline, they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. Microphytic crust may be present in high-quality occurrences. This system is typified by cool-season perennial bunch grasses and forbs (>25%) cover, with a sparse shrub cover (<10%). Rough fescue (*Festuca campestris*) is dominant in the northwestern portion of the state and Idaho fescue (*Festuca idahoensis*) is dominant or co-dominant throughout the range of the system. Bluebunch wheatgrass (*Pseudoroegneria spicata*) occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present, often with appreciable coverage (>10%) in lower elevation occurrences in western Montana and virtually always present, with relatively high coverages (>25%), on the edge of the Northwestern Great Plains region. Species diversity ranges from a high of more than 50 per 400 square meter plot on mesic sites to 15 (or fewer) on xeric and disturbed sites. Most occurrences have at least 25 vascular species present. Farmland conversion, noxious species invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.

Additional Limited Land Cover

1% (*69 Acres*) Railroad

1% (*64 Acres*) Major Roads

1% (*61 Acres*) Alpine-Montane Wet Meadow

<1% (*28 Acres*) Interstate

<1% (*9 Acres*) Introduced Upland Vegetation - Annual and Biennial Forbland

<1% (*2 Acres*) Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest

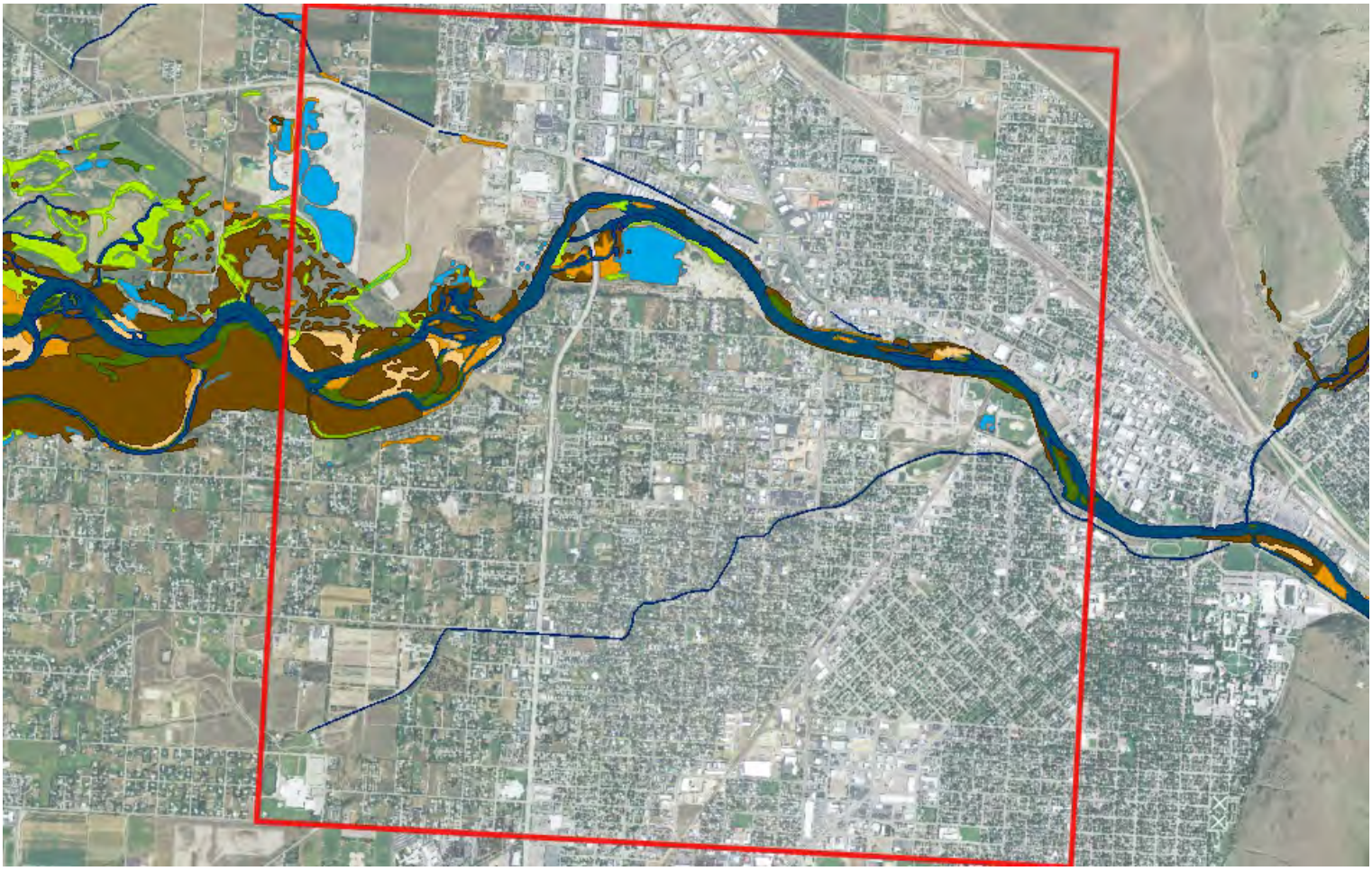
<1% (*1 Acres*) Rocky Mountain Ponderosa Pine Woodland and Savanna

<1% (*0 Acres*) Emergent Marsh

Latitude Longitude
46.84630 -113.99764
46.89484 -114.06045

Wetland and Riparian

Summarized by: **013N019W020** *(Buffered PLSS Section)*



Wetland and Riparian Mapping

Explain

P - Palustrine

UB - Unconsolidated Bottom

F - Semipermanently Flooded	<1 Acres	
x - Excavated	**<1 Acres**	**PUBFx**

P - Palustrine, UB - Unconsolidated Bottom
Wetlands where mud, silt or similar fine particles cover at least 25% of the bottom, and where vegetation cover is less than 30%.

AB - Aquatic Bed

F - Semipermanently Flooded	59 Acres	
(no modifier)	**2 Acres**	**PABF**
h - Diked/Impounded	**3 Acres**	**PABFh**
x - Excavated	**54 Acres**	**PABFx**
G - Intermittently Exposed	5 Acres	
x - Excavated	**5 Acres**	**PABGx**
K - Artificially Flooded	1 Acres	
x - Excavated	**1 Acres**	**PABKx**

P - Palustrine, AB - Aquatic Bed
Wetlands with vegetation growing on or below the water surface for most of the growing season.

US - Unconsolidated Shore

A - Temporarily Flooded	<1 Acres	
x - Excavated	**<1 Acres**	**PUSAx**

P - Palustrine, US - Unconsolidated Shore
Wetlands with less than 75% areal cover of stones, boulders, or bedrock. AND with less than 30% vegetative cover AND the wetland is irregularly exposed due to seasonal or irregular flooding and subsequent drying.

EM - Emergent

P - Palustrine, EM - Emergent
Wetlands with erect, rooted herbaceous vegetation present

A - Temporarily Flooded 16 Acres
(no modifier) **16 Acres** **PEMA**

C - Seasonally Flooded 4 Acres
(no modifier) **4 Acres** **PEMC**

F - Semipermanently Flooded 1 Acres
(no modifier) **1 Acres** **PEMF**

during most of the growing season.

SS - Scrub-Shrub

A - Temporarily Flooded 18 Acres
(no modifier) **18 Acres** **PSSA**

C - Seasonally Flooded <1 Acres
(no modifier) **<1 Acres** **PSSC**

P - Palustrine, SS - Scrub-Shrub
Wetlands dominated by woody vegetation less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

R - Riverine (Rivers)

2 - Lower Perennial

UB - Unconsolidated Bottom

H - Permanently Flooded 45 Acres
(no modifier) **45 Acres** **R2UBH**

R - Riverine (Rivers), 2 - Lower Perennial, UB - Unconsolidated Bottom
Stream channels where the substrate is at least 25% mud, silt or other fine particles.

US - Unconsolidated Shore

A - Temporarily Flooded 3 Acres
(no modifier) **3 Acres** **R2USA**

R - Riverine (Rivers), 2 - Lower Perennial, US - Unconsolidated Shore
Shorelines with less than 75% areal cover of stones, boulders, or bedrock and less than 30% vegetation cover. The area is also irregularly exposed due to seasonal or irregular flooding and subsequent drying.

3 - Upper Perennial

UB - Unconsolidated Bottom

G - Intermittently Exposed 81 Acres
(no modifier) **81 Acres** **R3UBG**

R - Riverine (Rivers), 3 - Upper Perennial, UB - Unconsolidated Bottom
Stream channels where the substrate is at least 25% mud, silt or other fine particles.

US - Unconsolidated Shore

A - Temporarily Flooded 17 Acres
(no modifier) **17 Acres** **R3USA**

C - Seasonally Flooded 1 Acres
(no modifier) **1 Acres** **R3USC**

R - Riverine (Rivers), 3 - Upper Perennial, US - Unconsolidated Shore
Shorelines with less than 75% areal cover of stones, boulders, or bedrock and less than 30% vegetation cover. The area is also irregularly exposed due to seasonal or irregular flooding and subsequent drying.

4 - Intermittent

SB - Stream Bed

C - Seasonally Flooded 11 Acres
x - Excavated **11 Acres** **R4SBCx**

R - Riverine (Rivers), 4 - Intermittent, SB - Stream Bed
Active channel that contains periodic water flow.

Rp - Riparian

1 - Lotic

SS - Scrub-Shrub
(no modifier) **24 Acres** **Rp1SS**

Rp - Riparian, 1 - Lotic, SS - Scrub-Shrub
This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

FO - Forested
(no modifier) **132 Acres** **Rp1FO**

Rp - Riparian, 1 - Lotic, FO - Forested
This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.

EM - Emergent
(no modifier) **25 Acres** **Rp1EM**

Rp - Riparian, 1 - Lotic, EM - Emergent
Riparian areas that have erect, rooted herbaceous vegetation during most of the growing season.

2 - Lentic

SS - Scrub-Shrub
(no modifier) **1 Acres** **Rp2SS**

Rp - Riparian, 2 - Lentic, SS - Scrub-Shrub
This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

FO - Forested
(no modifier) **<1 Acres** **Rp2FO**

Rp - Riparian, 2 - Lentic, FO - Forested
This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.

MONTANA Natural Heritage Program

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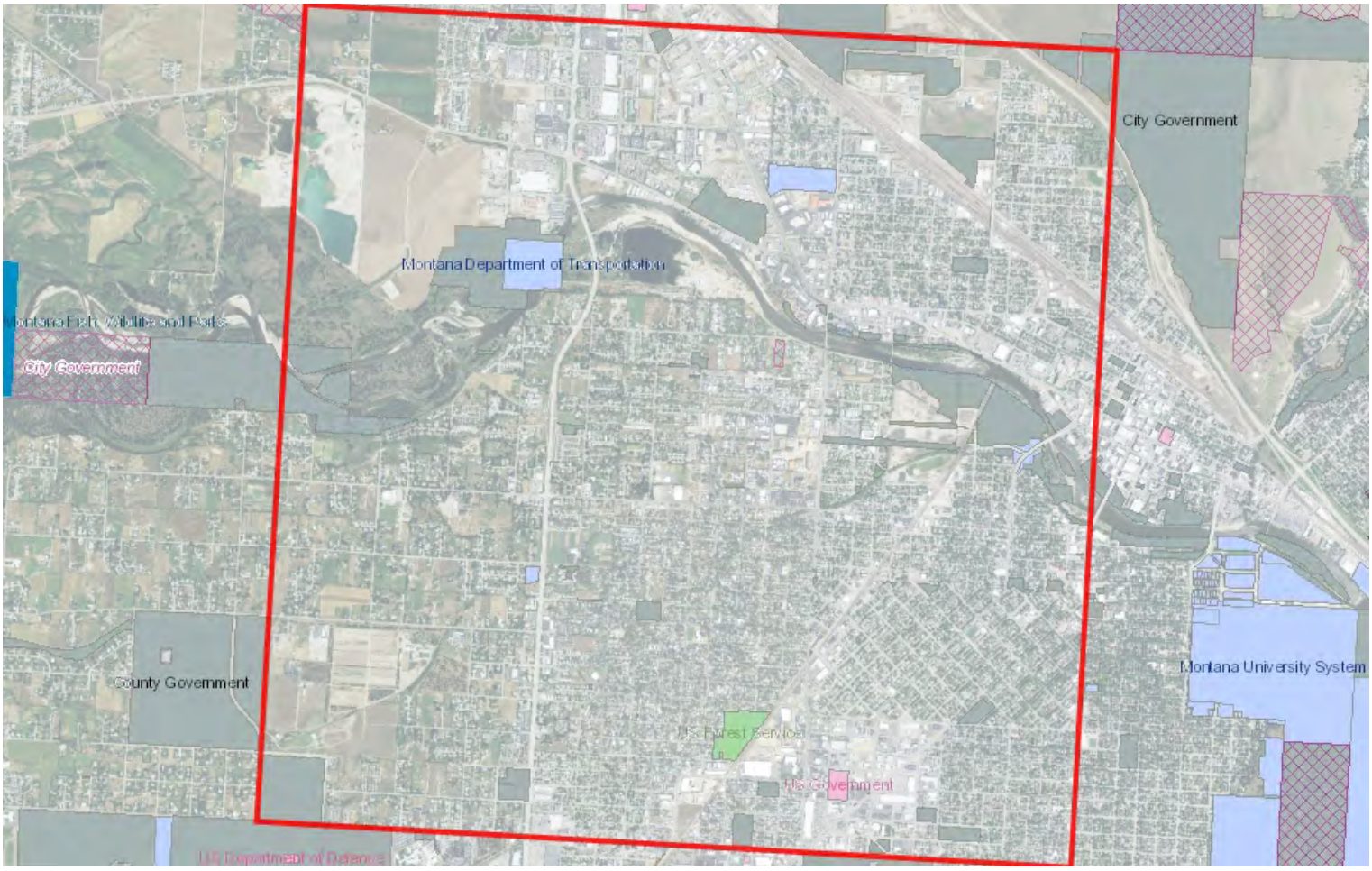
Latitude	Longitude
46.84630	-113.99764
46.89484	-114.06045

Land Management

Summarized by: **013N019W020** *(Buffered PLSS Section)*



Land Management Summary *Explain*

	Ownership	Tribal	Easements	Other Boundaries (possible overlap)
Public Lands	424 Acres (7%)			
Federal	19 Acres (<1%)			
US Forest Service	14 Acres (<1%)			
USFS Owned	14 Acres (<1%)			
US Government	5 Acres (<1%)			
US Government Owned	5 Acres (<1%)			
State	44 Acres (1%)			
Montana Department of Transportation	44 Acres (1%)			
MTDOT Owned	44 Acres (1%)			
Local	361 Acres (6%)			
Local Government	361 Acres (6%)			
Local Government Owned	361 Acres (6%)			
Conservation Easements			2 Acres (<1%)	
State & Local			2 Acres (<1%)	
City Government			2 Acres (<1%)	
Private Lands or Unknown Ownership	5,338 Acres (93%)			

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46.84630	-113.99764
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Biological Reports

Summarized by: **013N019W020** *(Buffered PLSS Section)*

Within the report area you have requested, citations for all reports and publications associated with plant or animal observations in Montana Natural Heritage Program (MTNHP) databases are listed and, where possible, links to the documents are included.

The MTNHP plans to include reports associated with terrestrial and aquatic communities in the future as allowed for by staff resources. If you know of reports or publications associated with species or biological communities within the report area that are not shown in this report, please let us know: mtnhp@mt.gov

- Burleigh, T. D. 1951. ***Spring migration***. Audubon Field Notes 5:266-268.
- Hand, R. L. 1969. ***A distributional checklist of the birds of western Montana***. Unpublished. Available at Mansfield Library, University of Montana, Missoula.
- Hansen, R. M. 1962. Movements and survival of (thomomys talpoides) in a mima-mound habitat. Ecology 43(1):151-154.
- Kinsella, J. M. 1966. ***Helminths of Microtinae in western Montana.*** M.A. thesis. University of Montana, Missoula. 61 pp.
- Missoula County Weed District. ***Geodatabases with sample site location data related to AIS surveys beginning in 2011 on waterbodies in western Montana***

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Legend

Model Icons
- N Suitable (native range)
- O Optimal Suitability
- M Moderate Suitability
- L Low Suitability
- I Suitable (introduced range)

Habitat Icons
- C Common
- O Occasional

Range Icons
- T Suspect (invasive / pest)
- D Documented (invasive / pest)
- R Released (biocontrol)
- E Established (biocontrol)

Num Obs
Count of obs with 'good precision' (<=1000m)
+ indicates additional 'poor precision' obs (1001m-10,000m)

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Invasive and Pest Species

Summarized by: **013N019W020** *(Buffered PLSS Section)*

	# Obs	Predictive Model	Associated Habitat	Range
Aquatic Invasive Species				
V - Iris pseudacorus *(Yellowflag Iris)* N2A/AIS	28		Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species — Global: **GNR** State: **SNA**				
Predictive Models: O 100% Optimal (inductive)				
V - Butomus umbellatus *(Flowering-rush)* N2A/AIS			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species — Global: **G5** State: **SNA**				
Predictive Models: O 11% Optimal (inductive), M 23% Moderate (inductive), L 26% Low (inductive)				
V - Potamogeton crispus *(Curly-leaf Pondweed)* N2B/AIS	1		Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 2B - Aquatic Invasive Species - Non-native Species — Global: **G5** State: **SNA**				
Predictive Models: O 2% Optimal (inductive), M 38% Moderate (inductive), L 27% Low (inductive)				
A - American Bullfrog *(Lithobates catesbeianus)* AIS				D
View in Field Guide · View Predicted Models · View Associated Habitat · View Range Maps				
Aquatic Invasive Species - Non-native Species — Global: **G5** State: **SNA**				
Predictive Models: M 11% Moderate (inductive), L 89% Low (inductive) **Associated Habitats:** C 8% Common, O 1% Occasional				
V - Myriophyllum spicatum *(Eurasian Water-milfoil)* N2A/AIS			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species — Global: **GNR** State: **SNA**				
Predictive Models: L 26% Low (inductive)				
V - Nymphaea odorata *(American Water-lily)* AIS			Not Available	D
View in Field Guide · View Associated Habitat · View Range Maps				
Aquatic Invasive Species - Non-native Species — Global: **G5** State: **SNA**				
Associated Habitats: C 4% Common				
Noxious Weeds: Priority 1A				
V - Centaurea solstitialis *(Yellow Starthistle)* N1A			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 1A - Non-native Species — Global: **GNR** State: **SNA**				
Predictive Models: O 100% Optimal (inductive)				
V - Isatis tinctoria *(Dyer's Woad)* N1A			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 1A - Non-native Species — Global: **GNR** State: **SNA**				
Predictive Models: O 93% Optimal (inductive), M 7% Moderate (inductive)				
V - Phragmites australis ssp. australis *(European Common Reed)* N1A			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 1A - Non-native Species — Global: **G5T5** State: **SNA**				
Predictive Models: O 11% Optimal (inductive), M 79% Moderate (inductive), L 10% Low (inductive)				
V - Taeniatherum caput-medusae *(Medusahead)* N1A			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 1A - Non-native Species — Global: **G4G5** State: **SNA**				
Predictive Models: M 60% Moderate (inductive), L 40% Low (inductive)				
Noxious Weeds: Priority 1B				
V - Lythrum salicaria *(Purple Loosestrife)* N1B			Not Assigned	D
View in Field Guide · View Predicted Models · View Range Maps				
Noxious Weed: Priority 1B - Non-native Species — Global: **G5** State: **SNA**				
Predictive Models: O 100% Optimal (inductive)				
V - Polygonum cuspidatum *(Japanese Knotweed)* N1B	106		Not Assigned	D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 1B - Non-native Species Global: **GNRTNR** State: **SNA**
Predictive Models: O 97% Optimal (inductive), M 3% Moderate (inductive)

V - Cytisus scoparius *(Scotch Broom)* N1B — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 1B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 68% Optimal (inductive), M 32% Moderate (inductive), L 0% Low (inductive)

V - Echium vulgare *(Blueweed)* N1B — 1 — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 1B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 3% Optimal (inductive), M 97% Moderate (inductive)

V - Chondrilla juncea *(Rush Skeletonweed)* N1B — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 1B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 40% Moderate (inductive), L 60% Low (inductive)

Noxious Weeds: Priority 2A

V - Iris pseudacorus *(Yellowflag Iris)* N2A/AIS — 28 — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 100% Optimal (inductive)

V - Rhamnus cathartica *(Common Buckthorn)* N2A — 192 — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 100% Optimal (inductive)

V - Lepidium latifolium *(Perennial Pepperweed)* N2A — 190 — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 26% Optimal (inductive), M 34% Moderate (inductive), L 34% Low (inductive)

V - Ventenata dubia *(Ventenata)* N2A — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 15% Optimal (inductive), M 25% Moderate (inductive), L 46% Low (inductive)

V - Hieracium praealtum *(Kingdevil Hawkweed)* N2A — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 14% Optimal (inductive), M 80% Moderate (inductive), L 6% Low (inductive)

V - Butomus umbellatus *(Flowering-rush)* N2A/AIS — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: **G5** State: **SNA**
Predictive Models: O 11% Optimal (inductive), M 23% Moderate (inductive), L 26% Low (inductive)

V - Ranunculus acris *(Tall Buttercup)* N2A — 1 — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **G5** State: **SNA**
Predictive Models: M 38% Moderate (inductive), L 62% Low (inductive)

V - Hieracium aurantiacum *(Orange Hawkweed)* N2A — 11 — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 12% Moderate (inductive), L 88% Low (inductive)

V - Senecio jacobaea *(Tansy Ragwort)* N2A — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 85% Low (inductive)

V - Myriophyllum spicatum *(Eurasian Water-milfoil)* N2A/AIS — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 26% Low (inductive)

V - Hieracium caespitosum *(Meadow Hawkweed)* N2A — Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2A - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 7% Low (inductive)

Noxious Weeds: Priority 2B

V - Tanacetum vulgare *(Common Tansy)* **N2B** — 1086 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 100% Optimal (inductive)

V - Linaria dalmatica *(Dalmatian Toadflax)* **N2B** — 315 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **G5** State: **SNA**
Predictive Models: O 33% Optimal (inductive), M 67% Moderate (inductive)

V - Centaurea diffusa *(Diffuse Knapweed)* **N2B** — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 14% Optimal (inductive), M 66% Moderate (inductive), L 20% Low (inductive)

V - Linaria vulgaris *(Yellow Toadflax)* **N2B** — 2 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 3% Optimal (inductive), M 34% Moderate (inductive), L 49% Low (inductive)

V - Potamogeton crispus *(Curly-leaf Pondweed)* **N2B/AIS** — 1 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Aquatic Invasive Species - Non-native Species Global: **G5** State: **SNA**
Predictive Models: O 2% Optimal (inductive), M 38% Moderate (inductive), L 27% Low (inductive)

V - Leucanthemum vulgare *(Oxeye Daisy)* **N2B** — 21 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 85% Moderate (inductive), L 15% Low (inductive)

V - Hypericum perforatum *(Common St. John's-wort)* **N2B** — 2 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 74% Moderate (inductive), L 26% Low (inductive)

V - Cynoglossum officinale *(Common Hound's-tongue)* **N2B** — 73 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 70% Moderate (inductive), L 30% Low (inductive)

V - Potentilla recta *(Sulphur Cinquefoil)* **N2B** — 66 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 56% Moderate (inductive), L 44% Low (inductive)

V - Acroptilon repens *(Russian Knapweed)* **N2B** — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 25% Moderate (inductive), L 61% Low (inductive)

V - Centaurea stoebe *(Spotted Knapweed)* **N2B** — 550 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 22% Moderate (inductive), L 63% Low (inductive)

V - Lepidium draba *(Whitetop)* **N2B** — 9 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 9% Moderate (inductive), L 91% Low (inductive)

V - Euphorbia virgata *(Leafy Spurge)* **N2B** — 635 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **GNRTNR** State: **SNA**
Predictive Models: M 3% Moderate (inductive), L 97% Low (inductive)

V - Cirsium arvense *(Canada Thistle)* **N2B** — 209 — Not Assigned — D

View in Field Guide **View Predicted Models** **View Range Maps**
Noxious Weed: Priority 2B - Non-native Species Global: **G5** State: **SNA**
Predictive Models: M 3% Moderate (inductive), L 80% Low (inductive)

V - Convolvulus arvensis *(Field Bindweed)* **N2B** — 111 — Not Assigned — D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 88% Low (inductive)

V - Berteroa incana *(Hoary False-alyssum)* N2B 3 Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 67% Low (inductive)

V - Tamarix ramosissima *(Salt Cedar)* N2B 36 Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Noxious Weed: Priority 2B - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 25% Low (inductive)

Regulated Weeds: Priority 3

V - Bromus tectorum *(Cheatgrass)* R3 62 Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Regulated Weed: Priority 3 - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 69% Moderate (inductive), L 31% Low (inductive)

V - Elaeagnus angustifolia *(Russian Olive)* R3 6 Not Assigned D

View in Field Guide View Predicted Models View Range Maps
Regulated Weed: Priority 3 - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: L 52% Low (inductive)

Biocontrol Species

I - Cyphocleonus achates *(Knapweed Root Weevil)* BIOCNTRL Not Assigned R

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 100% Optimal (inductive)

I - Oberea erythrocephala *(Red-headed Leafy Spurge Stem Borer)* BIOCNTRL Not Assigned R

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 100% Optimal (inductive)

I - Mecinus janthiniformis *(Dalmatian Toadflax Stem-boring Weevil)* BIOCNTRL Not Assigned R

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 54% Optimal (inductive), M 46% Moderate (inductive)

I - Mecinus janthinus *(Yellow Toadflax Stem-boring Weevil)* BIOCNTRL Not Assigned R

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: O 21% Optimal (inductive), M 75% Moderate (inductive), L 4% Low (inductive)

I - Aphthona lacertosa *(Brown-legged Leafy Spurge Flea Beetle)* BIOCNTRL Not Assigned R

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 100% Moderate (inductive)

I - Aphthona nigriscutis *(Black Dot Leafy Spurge Flea Beetle)* BIOCNTRL Not Assigned R

View in Field Guide View Predicted Models View Range Maps
Biocontrol Species - Non-native Species Global: **GNR** State: **SNA**
Predictive Models: M 77% Moderate (inductive), L 23% Low (inductive)

Introduction to Montana Natural Heritage Program

P.O. Box 201800 • 1515 East Sixth Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • tel 406.444.0241 • mtnhp.org

Introduction

The Montana Natural Heritage Program (MTNHP) is Montana's source for reliable and objective information on Montana's native species and habitats, emphasizing those of conservation concern. MTNHP was created by the Montana legislature in 1983 as part of the Natural Resource Information System (NRIS) at the Montana State Library (MSL). MTNHP is "a program of information acquisition, storage, and retrieval for data relating to the flora, fauna, and biological community types of Montana" (MCA 90-15-102). MTNHP's activities are guided by statute (MCA 90-15) as well as through ongoing interaction with, and feedback from, principal data source agencies such as Montana Fish, Wildlife, and Parks, the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation, the Montana University System, the US Forest Service, and the US Bureau of Land Management. The enabling legislation for MTNHP provides the State Library with the option to contract the operation of the Program. Since 2006, MTNHP has been operated as a program under the Office of the Vice President for Research and Creative Scholarship at the University of Montana (UM) through a renewable 2-year contract with the MSL. Since the first staff was hired in 1985, the Program has logged a long record of success, and developed into a highly respected, service-oriented program. MTNHP is widely recognized as one of the most advanced and effective of over 80 natural heritage programs throughout the Western Hemisphere.

Vision

Our vision is that public agencies, the private sector, the education sector, and the general public will trust and rely upon MTNHP as the source for information and expertise on Montana's species and habitats, especially those of conservation concern. We strive to provide easy access to our information in order for users to save time and money, speed environmental reviews, and inform decision making.

Core Values

- We endeavor to be a single statewide source of accurate and up-to-date information on Montana's plants, animals, and aquatic and terrestrial biological communities.
- We actively listen to our data users and work responsively to meet their information and training needs.
- We strive to provide neutral, trusted, timely, and equitable service to all of our information users.
- We make every effort to be transparent to our data users in setting work priorities and providing data products.

Confidentiality

All information requests made to the Montana Natural Heritage Program are considered library records and are protected from disclosure by the Montana Library Records Confidentiality Act (MCA 22-1-11).

Information Managed

Information managed at the Montana Natural Heritage Program includes: (1) lists of, and basic information on, plant and animal species and biological communities; (2) plant and animal surveys, observations, species occurrences, predictive distribution models, range polygons, and conservation status ranks; and (3) land cover and wetland and riparian mapping and the conservation status of these and other biological communities.

Data Use Terms and Conditions

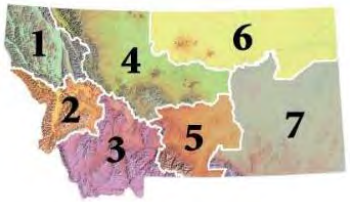
- Montana Natural Heritage Program (MTNHP) products and services are based on biological data and the objective interpretation of those data by professional scientists. MTNHP does not advocate any particular philosophy of natural resource protection, management, development, or public policy.
- MTNHP has no natural resource management or regulatory authority. Products, statements, and services from MTNHP are intended to inform parties as to the state of scientific knowledge about certain natural resources, and to further develop that knowledge. The information is not intended as natural resource management guidelines or prescriptions or a determination of environmental impacts. MTNHP recommends consultation with appropriate state, federal, and tribal resource management agencies and authorities in the area where your project is located.
- Information on the status and spatial distribution of biological resources produced by MTNHP are intended to inform parties of the state-wide status, known occurrence, or the likelihood of the presence of those resources. **These products are not intended to substitute for field-collected data, nor are they intended to be the sole basis for natural resource management decisions.**
- MTNHP does not portray its data as exhaustive or comprehensive inventories of rare species or biological communities. **Field verification of the absence or presence of sensitive species and biological communities will always be an important obligation of users of our data.**
- MTNHP responds equally to all requests for products and services, regardless of the purpose or identity of the requester.
- Because MTNHP constantly updates and revises its databases with new data and information, products will become outdated over time. Interested parties are encouraged to obtain the most current information possible from MTNHP, rather than using older products. We add, review, update, and delete records on a daily basis. Consequently, we strongly advise that you update your MTNHP data sets at a minimum of every three months for most applications of our information.
- MTNHP data require a certain degree of biological expertise for proper analysis, interpretation, and application. Our staff is available to advise you on questions regarding the interpretation or appropriate use of the data that we provide. Contact information for MTNHP staff is posted at: http://mtnhp.org/contact.asp
- The information provided to you by MTNHP may include sensitive data that if publicly released might jeopardize the welfare of threatened, endangered, or sensitive species or biological communities. This information is intended for distribution or use only within your department, agency, or business. Subcontractors may have access to the data during the course of any given project, but should not be given a copy for their use on subsequent, unrelated work.
- MTNHP data are made freely available. Duplication of hard-copy or digital MTNHP products with the intent to sell is prohibited without written consent by MTNHP. Should you be asked by individuals outside your organization for the type of data that we provide, please refer them to MTNHP.
- MTNHP and appropriate staff members should be appropriately acknowledged as an information source in any third-party product involving MTNHP data, reports, papers, publications, or in maps that incorporate MTNHP graphic elements.
- Sources of our data include museum specimens, published and unpublished scientific literature, field surveys by state and federal agencies and private contractors, and reports from knowledgeable individuals. MTNHP actively solicits and encourages additions, corrections and updates, new observations or collections, and comments on any of the data we provide.
- MTNHP staff and contractors do not cross or survey privately-owned lands without express permission from the landowner. However, the program cannot guarantee that information provided to us by others was obtained under adherence to this policy.

Suggested Contacts for Natural Resource Agencies

As required by Montana statute (MCA 90-15), the Montana Natural Heritage Program works with state, federal, tribal, nongovernmental organizations, and private partners to ensure that the latest animal and plant distribution and status information is incorporated into our databases so that it can be used to inform a variety of planning processes and management decisions. In addition to the information you receive from us, we encourage you to contact state, federal, and tribal resource management agencies in the area where your project is located. They may have additional data or management guidelines relevant to your efforts. In particular, we encourage you to contact the Montana Department of Fish, Wildlife, and Parks for the latest data and management information regarding hunted and high-profile management species and to use the U.S. Fish and Wildlife Service's Information Planning and Conservation (IPAC) website http://ecos.fws.gov/ipac/ regarding U.S. Endangered Species Act listed Threatened, Endangered, or Candidate species.

For your convenience, we have compiled a list of relevant agency contacts and links below:

Montana Fish, Wildlife, and Parks

Fish Species	Zachary Shattuck zshattuck@mt.gov (406) 444-1231 or Eric Roberts eroberts@mt.gov (406) 444-5334
American Bison Black-footed Ferret Black-tailed Prairie Dog Bald Eagle Golden Eagle Common Loon Least Tern Piping Plover Whooping Crane	Lauri Hanauska-Brown LHanauska-Brown@mt.gov (406) 444-5209
Grizzly Bear Greater Sage Grouse Trumpeter Swan Big Game Upland Game Birds Furbearers	John Vore jvore@mt.gov (406) 444-3940
Managed Terrestrial Game and Nongame Animal Data	Smith Wells – MFWP Data Analyst smith.wells@mt.gov (406) 444-3759
Fisheries Data	Ryan Alger – MFWP Data Analyst ryan.alger@mt.gov (406) 444-5365
Wildlife and Fisheries Scientific Collector's Permits	http://fwp.mt.gov/doingBusiness/licenses/scientificWildlife/ Kammi McClain for Wildlife Kammi.McClain@mt.gov (406) 444-2612 Kim Wedde for Fisheries kim.wedde@mt.gov (406) 444-5594
Fish and Wildlife Recommendations for Subdivision Development	Renee Lemon RLemon@mt.gov (406) 444-3738 and see http://fwp.mt.gov/fishAndWildlife/livingWithWildlife/buildingWithWildlife/subdivisionRecommendations/
Regional Contacts  	Region 1 (Kalispell) (406) 752-5501 Region 2 (Missoula) (406) 542-5500 Region 3 (Bozeman) (406) 994-4042 Region 4 (Great Falls) (406) 454-5840 Region 5 (Billings) (406) 247-2940 Region 6 (Glasgow) (406) 228-3700 Region 7 (Miles City) (406) 234-0900

United States Fish and Wildlife Service:

Information Planning and Conservation (IPAC) website: http://ecos.fws.gov/ipac/

Montana Ecological Services Field Office: http://www.fws.gov/montanafieldoffice/ (406) 449-5225

Bureau of Land Management

Montana Field Office Contacts:

Billings	(406) 896-5013
Butte	(406) 533-7600
Dillon	(406) 683-8000
Glasgow	(406) 228-3750
Havre	(406) 262-2820
Lewistown	(406) 538-1900
Malta	(406) 654-5100
Miles City	(406) 233-2800
Missoula	(406) 329-3914

United States Forest Service

Regional Office – Missoula, Montana Contacts			
Wildlife Program Leader	Tammy Fletcher	tammyfletcher@fs.fed.us	(406) 329-3588
Wildlife Ecologist	Cara Staab	cstaab@fs.fed.us	(406) 329-3677
Fish Program Leader	Scott Spaulding	scottspaulding@fs.fed.us	(406) 329-3287
Fish Ecologist	Cameron Thomas	cathomas@fs.fed.us	(406) 329-3087
TES Program	Lydia Allen	lrallen@fs.fed.us	(406) 329-3558
Interagency Grizzly Bear Coordinator	Scott Jackson	sjackson03@fs.fed.us	(406) 329-3664
Regional Botanist	Steve Shelly	sshelly@fs.fed.us	(406) 329-3041
Invasive Species Program Manager	Michelle Cox	michelle.cox2@usda.gov	(406) 329-3669

Tribal Nations

Assiniboine & Gros Ventre Tribes – Fort Belknap Reservation

Assiniboine & Sioux Tribes – Fort Peck Reservation

Blackfeet Tribe - Blackfeet Reservation

Chippewa Creek Tribe - Rocky Boy's Reservation

Crow Tribe – Crow Reservation

Little Shell Chippewa Tribe

Northern Cheyenne Tribe – Northern Cheyenne Reservation

Salish & Kootenai Tribes - Flathead Reservation

Natural Heritage Programs and Conservation Data Centers in Surrounding States and Provinces

Alberta Conservation Information Management System

British Columbia Conservation Data Centre

Idaho Natural Heritage Program

North Dakota Natural Heritage Program

Saskatchewan Conservation Data Centre

South Dakota Natural Heritage Program

Wyoming Natural Diversity Database

Invasive Species Management Contacts and Information

Aquatic Invasive Species

Montana Fish, Wildlife, and Parks Aquatic Invasive Species staff
Montana Department of Natural Resources and Conservation's Aquatic Invasive Species Grant Program
Montana Invasive Species Council (MISC)
Upper Columbia Conservation Commission (UC3)

Noxious Weeds

Montana Weed Control Association Contacts Webpage
Montana Biological Weed Control Coordination Project
Montana Department of Agriculture - Noxious Weeds
Montana Weed Control Association
Montana Fish, Wildlife, and Parks - Noxious Weeds
Montana State University Integrated Pest Management Extension
Integrated Noxious Weed Management after Wildfires

Introduction to Native Species

Within the report area you have requested, separate summaries are provided for: (1) Species Occurrences (SO) for plant and animal Species of Concern, Special Status Species (SSS), Important Animal Habitat (IAH) and some Potential Plant Species of Concern; (2) other observed non Species of Concern or Species of Concern without suitable documentation to create Species Occurrence polygons; and (3) other non-documented species that are potentially present based on their range, predicted suitable habitat model output, or presence of associated habitats. Each of these summaries provides the following information when present for a species: (1) the number of Species Occurrences and associated delineation criteria for construction of these polygons that have long been used for considerations of documented Species of Concern in environmental reviews; (2) the number of observations of each species; (3) the geographic range polygons for each species that the report area overlaps; (4) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (5) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the Montana Field Guide; and (6) a variety of conservation status ranks and links to species accounts in the Montana Field Guide. Details on each of these information categories are included under relevant section headers below or are defined on our Species Status Codes page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document native and introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are restricted by declining budgets, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species and biological communities will always be an important obligation of users of our data.**

If you are aware of observation datasets that the MTNHP is missing, please report them to the Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov. If you have observations that you would like to contribute, you can submit animal observations using our online data entry system at http://mtnhp.org/AddObs/, plant and animal observations via Excel spreadsheets posted at http://mtnhp.org/observations.asp , or to the Program Botanist or Senior Zoologist.

Observations

The MTNHP manages information on more than 1.8 million animal and plant observations that have been reported by professional biologists and private citizens from across Montana. The majority of these observations are submitted in digital format from standardized databases associated with research or monitoring efforts and spreadsheets of incidental observations submitted by professional biologists and amateur naturalists. At a minimum, accepted observation records must contain a credible species identification (i.e. appropriate geographic range, date, and habitat and, if species are difficult to identify, a photograph and notes on key identifying features), a date or date range, observer name, locational information (ideally with latitude and longitude in decimal degrees), notes on numbers observed, and species behavior or habitat use (e.g., is the observation likely associated with reproduction). Bird records are also required to have information associated with date-appropriate breeding or overwintering status of the species observed. MTNHP reviews observation records to ensure that they are mapped correctly, occur within date ranges when the species is known to be present or detectable, occur within the known seasonal geographic range of the species, and occur in appropriate habitats. MTNHP also assigns each record a locational uncertainty value in meters to indicate the spatial precision associated with the record's mapped coordinates. Only records with locational uncertainty values of 10,000 meters or less are included in environmental summary reports and number summaries are only provided for records with locational uncertainty values of 1,000 meters or less.

Species Occurrences

The MTNHP evaluates plant and animal observation records for species of higher conservation concern to determine whether they are worthy of inclusion in the Species Occurrence (SO) layer for use in environmental reviews; observations not worthy of inclusion in this layer include long distance dispersal events, migrants observed away from key migratory stopover habitats, and winter observations. An SO is a polygon depicting what is known about a species occupancy from direct observation with a defined level of locational uncertainty and any inference that can be made about adjacent habitat use from the latest peer-reviewed science. If an observation can be associated with a map feature that can be tracked (e.g., a wetland boundary for a wetland associated plant) then this polygon feature is used to represent the SO. Areas that can be inferred as probable occupied habitat based on direct observation of a species location and what is known about the foraging area or home range size of the species may be incorporated into the SO. Species Occurrences generally belong to one of the following categories:

Plant Species Occurrences

A documented location of a specimen collection or observed plant population. In some instances, adjacent, spatially separated clusters are considered subpopulations and are grouped as one occurrence (e.g., the subpopulations occur in ecologically similar habitats, and their spatial proximity likely allows them to interbreed). Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Plant SO's are only created for Species of Concern and Potential Species of Concern.

Animal Species Occurrences

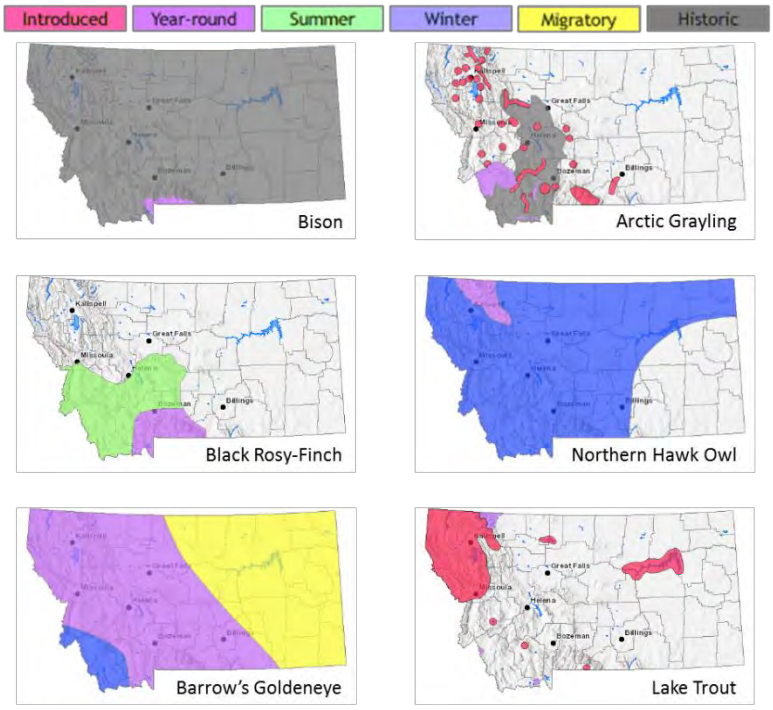
The location of a verified observation or specimen record typically known or assumed to represent a breeding population or a portion of a breeding population. Animal SO's are generally: (1) buffers of terrestrial point observations based on documented species' home range sizes; (2) buffers of stream segments to encompass occupied streams and immediate adjacent riparian habitats; (3) polygonal features encompassing known or likely breeding populations (e.g., a wetland for some amphibians or a forested portion of a mountain range for some wide ranging carnivores); or (4) combinations of the above. Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Species Occurrence polygons may encompass some unsuitable habitat in some instances in order to avoid heavy data processing associated with clipping out habitats that are readily assessed as unsuitable by the data user (e.g., a point buffer of a terrestrial species may overlap into a portion of a lake that is obviously inappropriate habitat for the species). Animal SO's are only created for Species of Concern and Special Status Species (e.g., Bald Eagle).

Other Occurrence Polygons

These include significant biological features not included in the above categories, such as Important Animal Habitats like bird rookeries and bat roosts, and peatlands or other wetland and riparian communities that support diverse plant and animal communities.

Geographic Range Polygons

Geographic range polygons have not yet been defined for most plant species. Native year-round, summer, winter, migratory and historic geographic range polygons as well as polygons for introduced populations have been defined for most animal species for which there are enough observations, surveys, and knowledge of appropriate seasonal habitat use to define them (see examples to left). These native or introduced range polygons bound the extent of known or likely occupied habitats for non-migratory and relative sedentary species and the regular extent of known or likely occupied habitats for migratory and long-distance dispersing species; polygons may include unsuitable intervening habitats. For most species, a single polygon can represent the year-round or seasonal range, but breeding ranges of some colonial nesting water birds and some introduced species are represented more patchily when supported by data. Some ranges are mapped more broadly than actual distributions in order to be visible on statewide maps (e.g., fish).



Predicted Suitable Habitat Models

Recent predicted suitable habitat suitability models have not yet been created for most plant species. For animal species for which models have been completed, the environmental summary report includes simple, rule-based, associations with streams for fish and other aquatic species and mathematically complex Maximum Entropy models (Phillips et al. 2006, Ecological Modeling 190:231-259) constructed from a variety of statewide biotic and abiotic layers and presence only data for individual species contributed to Montana Natural Heritage Program databases for most terrestrial species. For the Maximum Entropy models, we reclassified 90 x 90-meter continuous model output into suitability classes (unsuitable, low, moderate, and optimal) then aggregated that into the one square mile hexagons used in the environmental summary report; this is the finest spatial scale we suggest using this information in management decisions and survey planning. Full model write ups for individual species that discuss model goals, inputs, outputs, and evaluation in much greater detail are posted on the MTNHP's Predicted Suitable Habitat Models page. Evaluations of predictive accuracy and specific limitations are included with the metadata for models of individual species. **Model outputs should not be used in place of on-the-ground surveys for species. Instead model outputs should be used in conjunction with habitat evaluations to determine the need for on-the-ground surveys for species.** We suggest that the percentage of predicted optimal and moderate suitable habitat within the report area be used in conjunction with geographic range polygons and the percentage of commonly associated habitats to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning.

Associated Habitats

Within the boundary of the intersected hexagons, we provide the approximate percentage of commonly or occasionally associated habitat for vertebrate animal species that regularly breed, overwinter, or migrate through the state; a detailed list of commonly and occasionally associated habitats is provided in individual species accounts in the Montana Field Guide. We assigned common or occasional use of each of the 82 ecological systems mapped in Montana by: (1) using personal knowledge and reviewing literature that

summarizes the breeding, overwintering, or migratory habitat requirements of each species; (2) evaluating structural characteristics and distribution of each ecological system relative to the species' range and habitat requirements; (3) examining the observation records for each species in the state-wide point observation database associated with each ecological system; and (4) calculating the percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system to get a measure of numbers of observations versus availability of habitat. Species that breed in Montana were only evaluated for breeding habitat use, species that only overwinter in Montana were only evaluated for overwintering habitat use, and species that only migrate through Montana were only evaluated for migratory habitat use. In general, species were listed as associated with an ecological system if structural characteristics of used habitat documented in the literature were present in the ecological system or large numbers of point observations were associated with the ecological system. However, species were not listed as associated with an ecological system if there was no support in the literature for use of structural characteristics in an ecological system, even if point observations were associated with that system. Common versus occasional association with an ecological system was assigned based on the degree to which the structural characteristics of an ecological system matched the preferred structural habitat characteristics for each species as represented in the scientific literature. The percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system was also used to guide assignment of common versus occasional association.

We suggest that the percentage of commonly associated habitat within the report area be used in conjunction with geographic range polygons and the percentage of predicted optimal and moderate suitable habitat from predictive models to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning. Users of this information should be aware that land cover mapping accuracy is particularly problematic when the systems occur as small patches or where the land cover types have been altered over the past decade. Thus, particular caution should be used when using the associations in assessments of smaller areas (e.g., evaluations of public land survey sections).

Introduction to Land Cover

Land Use/Land Cover is one of 15 Montana Spatial Data Infrastructure framework layers considered vital for making statewide maps of Montana and understanding its geography. The layer records all Montana natural vegetation, land cover and land use, classified from satellite and aerial imagery, mapped at a scale of 1:100000, and interpreted with supporting ground-level data. The baseline map is adapted from the Northwest ReGAP (NWGAP) project land cover classification, which used 30m resolution multi-spectral Landsat imagery acquired between 1999 and 2001. Vegetation classes were drawn from the Ecological System Classification developed by NatureServe (Comer et al. 2003). The land cover classes were developed by Anderson et al. (1976). The NWGAP effort encompasses 12 map zones. Montana overlaps seven of these zones. The two NWGAP teams responsible for the initial land cover mapping effort in Montana were Sanborn and NWGAP at the University of Idaho. Both Sanborn and NWGAP employed a similar modeling approach in which Classification and Regression Tree (CART) models were applied to Landsat ETM+ scenes. The Spatial Analysis Lab within the Montana Natural Heritage Program was responsible for developing a seamless Montana land cover map with a consistent statewide legend from these two separate products. Additionally, the Montana land cover layer incorporates several other land cover and land use products (e.g., MSDI Structures and Transportation themes and the Montana Department of Revenue Final Land Unit classification) and reclassifications based on plot-level data and the latest NAIP imagery to improve accuracy and enhance the usability of the theme. Updates are done as partner support and funding allow, or when other MSDI datasets can be incorporated. Recent updates include fire perimeters and agricultural land use (annually), energy developments such as wind, oil and gas installations (2014), roads, structures and other impervious surfaces (various years): and local updates/improvements to specific ecological systems (e.g., central Montana grassland and sagebrush ecosystems). Current and previous versions of the Land Use/Land Cover layer with full metadata are available for download at the Montana State Library's Geographic Information Clearinghouse.

Within the report area you have requested, land cover is summarized by acres of Level 1, Level 2, and Level 3 Ecological Systems.

Literature Cited

Anderson, J.R. E.E. Hardy, J.T. Roach, and R.E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data. U.S. Geological Survey Professional Paper 964.

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological systems of the United States: A working classification of U.S. terrestrial systems. NatureServe, Arlington, VA.

Introduction to Wetland and Riparian

Within the report area you have requested, wetland and riparian mapping is summarized by acres of each classification present. Summaries are only provided for modern MTNHP wetland and riparian mapping and not for outdated (NWI Legacy) or incomplete (NWI Scalable) mapping efforts; described here. MTNHP has made all three of these datasets and associated metadata available for separate download on the Montana Wetland and Riparian Framework MSDI download page.

Wetland and Riparian mapping is one of 15 Montana Spatial Data Infrastructure framework layers considered vital for making statewide maps of Montana and understanding its geography. The wetland and riparian framework layer consists of spatial data representing the extent, type, and approximate location of wetlands, riparian areas, and deepwater habitats in Montana.

Wetland and riparian mapping is completed through photointerpretation of 1-m resolution color infrared aerial imagery acquired from 2005 or later. A coding convention using letters and numbers is assigned to each mapped wetland. These letters and numbers describe the broad landscape context of the wetland, its vegetation type, its water regime, and the kind of alterations that may have occurred. Ancillary data layers such as topographic maps, digital elevation models, soils data, and other aerial imagery sources are also used to improve mapping accuracy. Wetland mapping follows the federal Wetland Mapping Standard and classifies wetlands according to the Cowardin classification system of the National Wetlands Inventory (NWI) (Cowardin et al. 1979, FGDC Wetlands Subcommittee 2013). Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands differently than the NWI. Similar coding, based on U.S. Fish and Wildlife Service conventions, is applied to riparian areas (U.S. Fish and Wildlife Service 2009). These are mapped areas where vegetation composition and growth is influenced by nearby water bodies, but where soils, plant communities, and hydrology do not display true wetland characteristics. **These data are intended for use in publications at a scale of 1:12,000 or smaller. Mapped wetland and riparian areas do not represent precise boundaries and digital wetland data cannot substitute for an on-site determination of jurisdictional wetlands.**

A detailed overview, with examples, of both wetland and riparian classification systems and associated codes can be found at: http://mtnhp.org/help/MapViewer/WetRip_Classification.asp

Literature Cited

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79/31. Washington, D.C. 103pp.

Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, D.C.

U.S. Fish and Wildlife Services. 2009. A system for mapping riparian areas in the western United States. Division of Habitat and Resource Conservation, Branch of Resource and Mapping Support, Arlington, Virginia.

Introduction to Land Management

Within the report area you have requested, land management information is summarized by acres of federal, state, and local government lands, tribal reservation boundaries, private conservation lands, and federal, state, local, and private conservation easements. Acreage for "Owned", "Tribal", or "Easement" categories represents non-overlapping areas that may be totaled. However, "Other Boundaries" represents managed areas such as National Forest boundaries containing private inholdings and other mixed ownership which may cause boundaries to overlap (e.g. a wilderness area within a forest). Therefore, acreages may not total in a straight-forward manner.

Because information on land stewardship is critical to effective land management, the Montana Natural Heritage Program (MTNHP) began compiling ownership and management data in 1997. The goal of the Montana Land Management Database is to manage a single, statewide digital data set that incorporates information from both public and private entities. The database assembles information on public lands, private conservation lands, and conservation easements held by state and federal agencies and land trusts and is updated on a regular basis. Since 2011, the Information Management group in the Montana State Library's Digital Library Division has taken an increasingly active role in managing layers of the Montana Land Management Database in partnership with the MTNHP.

Public and private conservation land polygons are attributed with the name of the entity that owns it. The data are derived from the statewide Montana Cadastral Parcel layer. Conservation easement data shows land parcels on which a public agency or qualified land trust has placed a conservation easement in cooperation with the land owner. The dataset contains no information about ownership or status of the mineral estate. For questions about the dataset or to report errors, please contact the Montana Natural Heritage Program at (406) 444-5363 or mtnhp@mt.gov. You can download various components of the Land Management Database and view associated metadata at the Montana State Library's GIS Data List at the following links:

Public Lands
Conservation Easements
Private Conservation Lands
Managed Areas

Map features in the Montana Land Management Database or summaries provided in this report are not intended as a legal depiction of public or private surface land ownership boundaries and should not be used in place of a survey conducted by a licensed land surveyor. Similarly, map features do not imply public access to any lands. The Montana Natural Heritage Program makes no representations or warranties whatsoever with respect to the accuracy or completeness of this data and assumes no responsibility for the suitability of the data for a particular purpose. The Montana Natural Heritage Program will not be liable for any damages incurred as a result of errors displayed here. Consumers of this information should review or consult the primary data and information sources to ascertain the viability of the information for their purposes.

Introduction to Invasive and Pest Species

Within the report area you have requested, separate summaries are provided for: Aquatic Invasive Species, Noxious Weeds, Agricultural Pests, and Forest Pests that have been documented or potentially occur there based on their known distribution in the state. Definitions for each of these invasive and pest species categories can be found on our Species Status Codes page.

Each of these summaries provides the following information when present for a species: (1) the number of observations of each species; (2) the geographic range polygons for each species, if developed, that the report area overlaps; (3) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (4) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the Montana Field Guide; and (5) and links to species accounts in the Montana Field Guide. Details on each of these information categories are included under relevant section headers under the Introduction to Native Species above or are defined on our Species Status Codes page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what invasive and pest species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are restricted by declining budgets, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species will always be an important obligation of users of our data.**

If you are aware of observation or survey datasets for invasive or pest species that the MTNHP is missing, please report them to the Program Coordinator bmaxell@mt.gov Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov. If you have observations that you would like to contribute, you can submit animal observations using our online data entry system at http://mtnhp.org/AddObs/, plant and animal observations via Excel spreadsheets posted at http://mtnhp.org/observations.asp , or to the Program Botanist or Senior Zoologist.

Additional Information Resources

Home Page for Montana Natural Heritage Program (MTNHP)

MTNHP Staff Contact Information

Montana Field Guide

MTNHP Species of Concern Report - Animals and Plants

MTNHP Species Status Codes - Explanation

MTNHP Predicted Suitable Habitat Models (for select Animals and Plants)

MTNHP Request Information page

Montana Cadastral

Montana Code Annotated

Montana Department of Environmental Quality

Montana Fisheries Information System

Montana Fish, Wildlife, and Parks Subdivision Recommendations

Montana GIS Data Layers

Montana GIS Data Bundler

Montana Greater Sage-Grouse Project Submittal Site

Montana Ground Water Information Center

Montana Legislative Environmental Policy Office Publications
(Including Index of Environmental Permits required in Montana and Guide to the Montana Environmental Policy Act)

Montana Environmental Policy Act (MEPA)

MEPA Analysis Resource List

Laws, Treaties, Regulations, and Permits on Animals and Plants

Montana Spatial Data Infrastructure Layers

Montana State Historic Preservation Office Review and Compliance

Montana Water Information System

Montana Web Map Services

National Environmental Policy Act

Penalties for Misuse of Fish and Wildlife Location Data (MCA 87-6-222)

U.S. Fish and Wildlife Service Information for Planning and Conservation (Section 7 Consultation)

Web Soil Survey Tool

1:36112

Legend/Tool

Streams

Original data layers

Streams

MBMG Stations - MBMG Surface Water

USGS Stations - USGS Gaging Stations

Production DNRC - DNRC Surface Sites

IsLiveSite

Real time gage

Stream gage

Clark Fork River

Ypn

Qgr

Ymu

Bitterroot River

SUBJECT PROPERTY

0.6 km

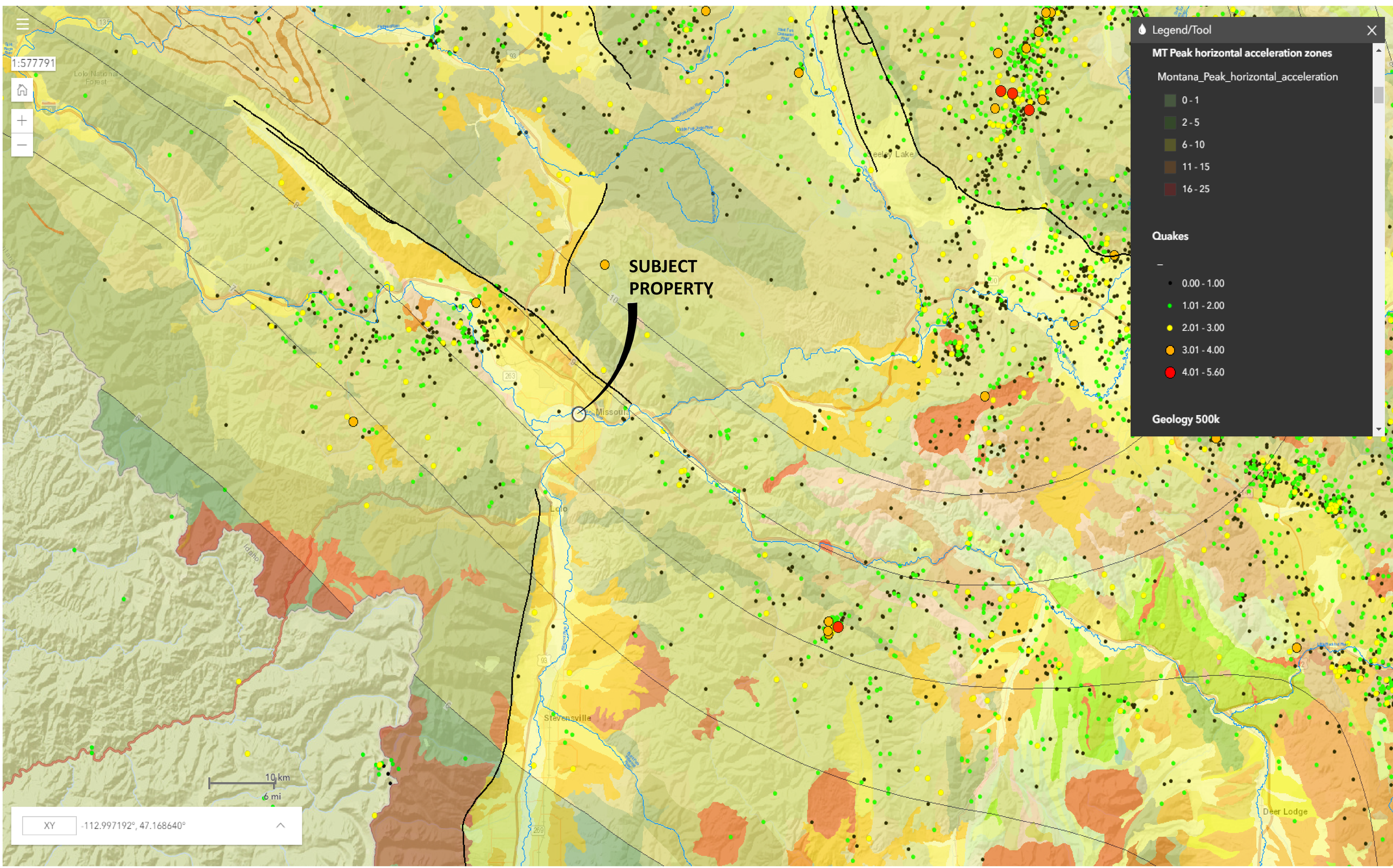
0.4 mi

XY -113.938186°, 46.864104°

MBMG Montana Bureau of Mines and Geology Science & Service

Montana Bureau of Mines and Geology Science

River View Subdivision Geological Exhibit



MBMG Montana Bureau of Mines and Geology Science & Service | Montana Bureau of Mines and Geology Science

River View Subdivision Geological Exhibit

Potentiometric Surface of the Basin-Fill and Bedrock Aquifers, Mineral and Missoula Counties, Western Montana

By

John I. LaFave

Author's Note: This map is part of the Montana Bureau of Mines and Geology (MBMG) GroundWater Assessment Atlas for the Lolo-Bitterroot Area. It is intended to stand alone and describe a single hydrogeologic aspect of the study area, although many of the area's hydrogeologic features are interrelated. For an integrated view of the hydrogeology of the Lolo-Bitterroot Area the reader is referred to Part A (descriptive overview) and Part B (maps) of Montana Ground-Water Assessment Atlas 4.

INTRODUCTION

As part of the Montana Ground-Water Assessment Program, water levels were measured in bedrock and basin-fill aquifers in Mineral and Missoula Counties in western Montana to assess directions of regional ground-water flow. This plate presents a potentiometric surface map of the basin-fill and bedrock aquifers constructed from water-level measurements made mostly between 1998 and 2000. The map also shows the distribution of wells in the mapped area.

The potentiometric surface represents the altitudes to which water will rise in wells penetrating the aquifer. Ground water moves down the slope of the potentiometric surface, from higher altitude to lower altitude, perpendicular to the contours. Water levels for the southern part of the Lolo-Bitterroot Ravalli County (Ravalli County, the Bitterroot Valley) are presented on a separate plate (LaFave, 2006).

The mapped area is drained by the Clark Fork River and its tributaries. The area consists of bedrock-cored mountains, intermontane valleys, and canyons that host major streams. Most of the area is mountainous and part of the Lolo National Forest. Valley bottoms and canyons are the primary areas of habitation and ground-water development. Basin-fill aquifers within the valleys and bedrock aquifers along the valley margins supply water to all the municipalities and most residences.

GEOLOGIC SETTING

The bedrock exposed in the mountains also underlies the valleys. Bedrock, as defined here, consists of well-cemented or indurated rock that is commonly fractured. Most of the bedrock is made up of metacarbonates, argillites, and quartzites of the Proterozoic Belt Supergroup; there are localized occurrences of Paleozoic rocks in the northwest part of the Missoula Valley and along the Clark Fork Valley downstream from Missoula (Smith, 2006a).

The basin-fill deposits consist of Tertiary and Quaternary sediments. Tertiary sediments range from unconsolidated to strongly consolidated and include claystone, shale, siltstone, sandstone, locally thick conglomerate, coal, and volcaniclastic rocks (McMurtrey and others, 1965; Smith 2006a).

Tertiary sedimentary rocks fill most of the valleys to thicknesses up to 2,500 ft. These sediments typically have low permeability and where they underlie Quaternary alluvium form a basal confining unit. Prominent Tertiary benches flank the northeast and southeast sides of the Missoula Valley; exposures are also found in the Potomac and Ninemile Valleys. Locally, permeable Tertiary sandstones and conglomerates are aquifers however, there are relatively few wells completed in Tertiary sediments.

Quaternary basin-fill deposits (up to 300 ft thick) include older Pleistocene alluvium and lacustrine deposits associated with glaciation, and recent Holocene sand and gravel deposits in the floodplains of the major river valleys. Glaciers deposited till, which is mostly clayey and silty gravel. Bedded silt and clay were deposited in the valleys during stands of Glacial Lake Missoula and form confining layers within the basin-fill deposits. Sand and gravel interbedded with, and overlain by, bedded silt and clay deposits were deposited before glaciation and during flood events when Glacial Lake Missoula drained. The uppermost sand and gravel deposits in stream valleys are less than 80 ft thick in most areas and represent stream deposition during and after waning phases of glaciation (Smith, 2006b).

HYDROGEOLOGIC SETTING

Exploitable ground-water resources within the valley regions occur primarily in the Quaternary basin-fill deposits and to a lesser extent in the Tertiary basin fill and fractured bedrock. There are records of about 9,400 wells in the map area; approximately 1,200 are completed in bedrock aquifers and the remainder are in basin-fill deposits. The basin fill contains unconfined aquifers and sequences of confined aquifers with numerous discontinuous confining layers. In places the confining layers hydraulically separate the aquifers; however, in most valleys water-level data from different depths suggest that the basin-fill aquifers are well-connected on a valley-wide scale. The basin-fill aquifers are the most utilized sources of municipal and domestic water (Kendy and Tresch, 1996). The median reported well yields from the basin-fill aquifers are about three times greater than median well yields from bedrock aquifers (fig. 1).

For the purposes of this map, aquifers were generalized into three units based on the properties of the aquifer material (primary porosity vs. secondary porosity in fractured rock), ground-water conditions (confined vs. unconfined), and position within the geologic framework. The three hydrogeologic units recognized are: 1) shallow basin fill, 2) deep basin fill, and 3) bedrock (fig. 2). Lithologic and static water-level data from well logs, in addition to well construction information, were used to distinguish between wells completed in the shallow and deep units.

The uppermost or shallow hydrologic unit is developed in surficial alluvial sediments generally within 80 ft of the land surface. Ground water in the shallow hydrologic unit is under unconfined, or water table, conditions. Most wells classified as being in the shallow unit (yellow circles on the map) are less than 80 ft deep or have perforations within 80 ft of the land surface.

The deep unit consists of confined to semi-confined aquifers in the valleys that are generally deeper than 80 ft and underlie the shallow unit. Accordingly, wells that produce from aquifers greater than 80 ft deep are classified as being in the deep unit (orange circles).

Bedrock aquifers occur around the valley margins. The occurrence of ground water in the bedrock is primarily controlled by fractures. Where it is sufficiently fractured (permeable) and saturated, bedrock can yield water to wells (green squares). However, the number, size, and orientation of the openings are unpredictable and can change abruptly over short distances, resulting in large variations in well yields and depths. The lower permeability inherent to fractured-rock aquifers is reflected in lower well yields—the median reported yield is 10 gpm (fig. 2). Additionally, lower storage capacities inherent to fractured-rock aquifers make them more sensitive to climatic changes and development stresses than basin-fill aquifers.

POTENTIOMETRIC SURFACE

This map depicts the regional ground-water flow system in the bedrock and basin-fill aquifers. The potentiometric surface represents the altitudes to which water will rise in wells. Ground water moves down the slope of the potentiometric surface, from higher altitude to lower altitude, perpendicular to the contour lines. Ground-water flow paths are generally away from the mountains toward the center of the valleys.

Ground water generally originates as precipitation in the mountains and valleys where it infiltrates through the soil and rock. Leakage of water from streams and irrigation canals is also an important source of ground-water recharge. Mountain-front recharge can be a significant source of water to basin-fill aquifers because the mountains receive much more precipitation than valleys. Where fractured-bedrock aquifers are hydraulically connected to the basin-fill aquifers, water is transferred from the fractured bedrock to the adjacent and lower-lying basin-fill aquifers.

MAP USE

The map is useful for estimating the general direction of ground-water flow, identifying areas where flowing artesian wells might occur, and estimating the water-level altitude in non-flowing wells. If the approximate land-surface altitude at a location is known (for example, determined from a topographic map), the corresponding point on the potentiometric surface map can be found and the altitude of the potentiometric surface estimated. Subtracting the potentiometric surface altitude from the land surface altitude yields the approximate level at which water will stand in a well.

METHODS

The maps were constructed by hand contouring measured water-level altitudes. The primary data were obtained from 362 wells mostly visited between 1998 and 2000 (Carstarphen and others, 2003). Visited wells were selected on the basis of availability, information on well logs, access, geographic location, and geologic setting. Well locations were determined using a Global Positioning System (GPS) receiver and plotted on U.S. Geological Survey (USGS) 1:24,000 topographic maps. Land-surface altitudes were determined from the 1:24,000-scale maps and are generally accurate to +/- 5 to 10 ft (based on 10- and 20-ft contour intervals).

Additionally, reported water levels from driller's logs were used to estimate ground-water elevations. The supplemental data were used in areas where the primary data were sparse, and also helped confirm the shape of the potentiometric surface(s) in areas of dense primary data coverage. Map accuracy is affected by data distribution, field measurement errors, accuracy of well locations, and errors in interpretation. Points at which water levels have been measured are distributed unevenly across the map, and map accuracy is greater near points of measurement.

ACKNOWLEDGMENTS

Well owners who allowed collection of the data necessary for the map and the people who collected the data are all gratefully acknowledged. Reviews of this report by Tom Patton and John Metesh improved its clarity.

DATA SOURCES

Population centers and roads are from 1:100,000-scale USGS Digital Line Graph files available from the Natural Resources Information System (NRIS) at the Montana State Library, Helena, Montana. Hydrography has been simplified from the 1:100,000 Digital Line Graph files. Township boundaries are from the U.S. Forest Service. The hillshade base was compiled from USGS digital elevation models (DEMs) for 1:24,000 quadrangle maps available from NRIS. Differences in the quality of the DEMs may result in artifacts such as mottled surfaces and horizontal striping in the hillshade base. Geological data were simplified from the Hydrogeologic Framework Map compiled by Smith (2006a).

Point Data

Well location and water-level altitude data were obtained by Ground-Water Characterization Program personnel. Altitudes of the points were determined from USGS 1:24,000 topographic maps. Water-well logs and inventory data are available from the Montana Ground-Water Information Center (GWIC, online at http://mbmggwic.mtech.edu) at the Montana Bureau of Mines and Geology, Montana Tech of The University of Montana, Butte, Montana.

REFERENCES

Carstarphen, C.A., Mason, D.M., Smith, L.N., LaFave, J.I., and Richter, M.G., 2003, Data for water wells visited during the Lolo-Bitterroot Area Ground-Water Characterization Study: Montana Bureau of Mines and Geology Ground-Water Assessment Atlas 4, Part B, Map 1, scale 1:250,000.

Kendy, E., and Tresch, R.E., 1996, Geographic, geologic, and hydrologic summaries of intermontane basins of the northern Rocky Mountains, Montana: U.S. Geologic Survey Water Resources Investigations Report 96-4025, 233 p.

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McMurtrey, R.G., Konizeski, R.L., and Brietkrietz, A., 1965, Geology and ground-water resources of the Missoula Basin, Montana: Montana Bureau of Mines and Geology Bulletin 47, 35 p.

Miller, R.D., 1991, A numerical flow model of the Missoula Aquifer–Interpretation of aquifer properties and river interaction: Missoula, University of Montana , M.S. thesis, 275 p.

Smith, L.N., 2006a, Hydrogeologic framework of the Lolo-Bitterroot Area, Mineral, Missoula, and Ravalli Counties, Montana: Montana Bureau of Mines and Geology Ground-Water Assessment Atlas 4, Part B, Map 2, scale 1:250,000.

Smith, L.N., 2006b, Thickness of Quaternary unconsolidated deposits in the Lolo-Bitterroot Area, Mineral, Missoula, and Ravalli Counties, Montana: Montana Bureau of Mines and Geology Ground-Water Assessment Atlas 4, Part B, Map 3, scale 1:125,000.

Woessner, W.W., 1988, Missoula valley aquifer study—Hydrogeology of the eastern portion of the Missoula aquifer, Missoula County, Montana: Prepared for the Water Development Bureau, Montana Department of Natural Resources and Conservation, Helena, Montana, Volume 1, 127 p.

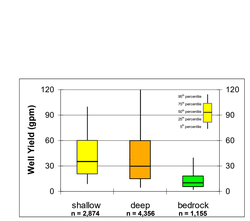


Figure 1. Aquifers in the shallow and deep basin-fill aquifers are generally productive; median and average yields are greater than 30 gallons per minute. However, in the Missoula Valley yields greater than 1,000 gallons per minute are reported for more than 75 wells in the shallow and deep basin fill. Yields from wells in the fractured bedrock are much less, with a median of 10 and an average of 14 gallons per minute.

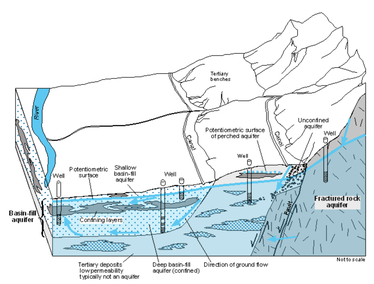
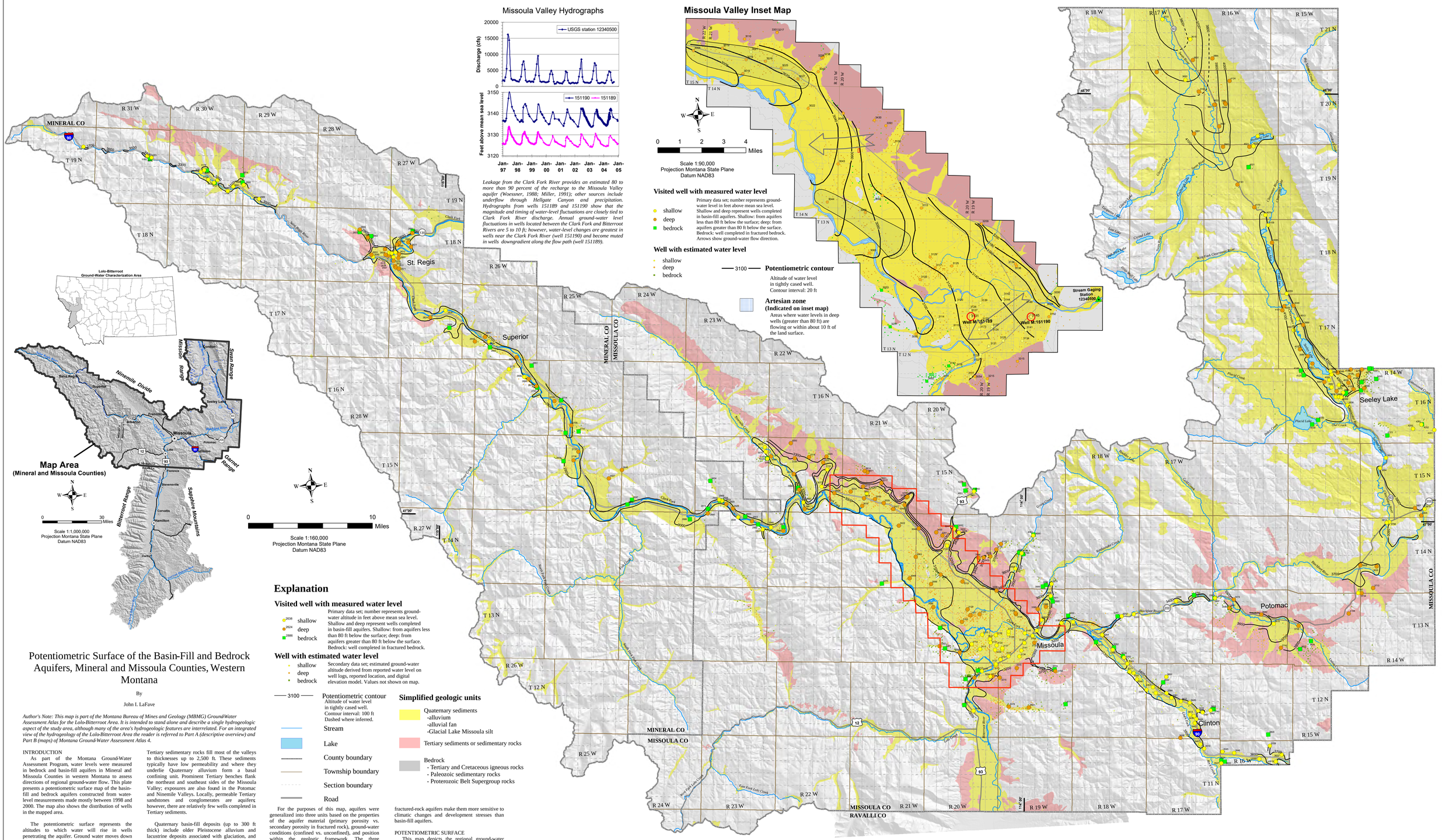


Figure 2. Schematic block diagram showing the relationship between shallow and deep basin-fill aquifers and fractured-bedrock aquifers in the intermontane basins of Mineral and Missoula Counties.



STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 76M 48416-00 GROUND WATER CERTIFICATE
Version: 1 -- ORIGINAL RIGHT
Version Status: ACTIVE

Owners:
ASHLEY JONES
1931 RIVER RD
MISSOULA, MT 59801

MATTHEW JONES
1931 RIVER RD
UNIT B
MISSOULA, MT 59801

Priority Date: APRIL 23, 1982 at 02:17 P.M.
Enforceable Priority Date: APRIL 23, 1982 at 02:17 P.M.

Purpose (use): DOMESTIC
LAWN AND GARDEN

Maximum Flow Rate: 15.00 GPM

Maximum Volume: 2.25 AC-FT

Maximum Acres: 0.13

Source Name: GROUNDWATER
Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		SWNWNE	20	13N	19W	MISSOULA

Period of Diversion: JANUARY 1 TO DECEMBER 31
Diversion Means: WELL
Subdivision: COBBAN DINSMORE HOMES NO 2 TRACT/LOT: 2 BLOCK: 8

Purpose (Use): DOMESTIC
Households: 2
Volume: 2.00 AC-FT
Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SWNWNE	20	13N	19W	MISSOULA

Subdivision: COBBAN DINSMORE HOMES NO 2 TRACT/LOT 2 BLOCK: 8

Purpose (Use): LAWN AND GARDEN
Volume: 0.25 AC-FT
Period of Use: JUNE 1 to SEPTEMBER 15

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1	0.13		SWNWNE	20	13N	19W	MISSOULA

Subdivision: COBBAN DINSMORE HOMES NO 2 TRACT/LOT 2 BLOCK: 8
Total: 0.13

Geocodes/Valid: 04-2200-20-1-19-15-0000 - Y

Remarks:

OWNERSHIP UPDATE RECEIVED
OWNERSHIP UPDATE TYPE DOR # 142675 RECEIVED 05/19/2016.