HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

November 4, 2016

Madison County Planning Board
P.O. Box 278
Virginia City, Montana 59755

RE: The Corral PUD Subdivision Application

Dear Planning Office:

Please find enclosed the Preliminary Plat Application for the Corral PUD Subdivision within the Yellowstone Mountain Club. This subdivision represents clustered development near Big Springs Village at the base of Pioneer Mountain and Andesite Mountain. The proposed development has 2 lots; one being an open space lot and one containing a mixture of duplexes and triplexes making up a total of 26 condominium units.

The Pre-Application packet for this subdivision was discussed and approved at the April 25th Planning Board meeting.

Accompanied with this application is an application to the Montana Department of Environmental Quality for the review of the water, sewer, storm water and solid waste.

Items contained in this document are presented in generally the same order as listed in the Preliminary Plat Checklist of the new subdivision regulations. A Table of Contents has also been provided to aid in the layout of this document.

If you have any questions, or would like to discuss this project further, please call me at 406-548-7820.

Sincerely;
HOUSER ENGINEERING P.C.

_____
Justin L. Houser, P.E.

Enclosures

Cc: Madison County Planning Office
Mike DuCuennois (Yellowstone Club)
File

THE CORRAL PUD SUBDIVISION
YELLOWSTONE MOUNTAIN CLUB

TABLE OF CONTENTS

1. Subdivision Application Cover Sheet and Form (MCSR Appendix 11)
2. Subdivision Review Fees (MCSR Appendix 4)
3. Montana Subdivision Joint Application Form (MCSR Appendix 12)
4. Preliminary Plat Checklist (MCSR Appendix 9)
5. PUD Narrative and Supplementary Documents
6. Preliminary Plat Application Narrative
    a. Part I. Introduction
    b. Part II. Community Services and Facilities
    c. Part III. Environmental Assessment
    d. Part IV. Additional Madison County Subdivision Requirements
    e. Part V. Supporting Exhibits
7. Road Variance Application

Appendices

A. Draft Covenants, Articles of Incorporation, and Bylaws
B. NRCS Soils Data
C. Water and Sewer Authorization to Connect, and Certificates of Approval
D. Weed Plan
E. Wildlife Monitoring Updates & Wildlife Brochure
F. Agency & Neighboring Property Owner Letters and Corresponding Responses
G. Right to Farm
H. Cultural Resource Study Correspondence
I. Geotechnical Study
J. Access and Utility Easements
K. Seismic Calculations
L. Road Design Report
M. Employee Housing Mitigation
N. Water Rights Summary
O. Preliminary Plat
P. Construction Plans
Q. Fire Protection Plan and Standard Operating Procedures
R. Hydrology and Floodplain Survey

Appendix 1

APPENDIX 11 SUBDIVISION APPLICATION COVER SHEET & FORM

Name of Proposed Subdivision. The Corral PUD Subdivision, Yellowstone Mountain Club

Date of Pre-Application Meeting(s).
August 25, 2015

Date of Overall Development Plan Approval by the Board of Madison County Commissioners *(If applicable)***.** _____

Contents of Subdivision Application Package.

_____	*[If applicable]* Overall Development Plan Information.
X	Preliminary Plat (or Plan).
X	PART I of the Subdivision Joint Application Form (See Appendix 12).
X	PART II materials of the Subdivision Joint Application Form (See Appendix 12).
X	*[If applicable]* Environmental Assessment Materials (See PART III of Appendix 12 and Appendix 10).
X	Additional Supplementary Materials.
X	Additional Supplementary Materials if proposed subdivision is a planned unit development (PUD).
X	Preliminary Plat Checklist (See Appendix 9).
X	Subdivision review fee (See Appendix 4).
_____	Any request for variance, along with variance review fee (See Appendix 30).

Note:

Pursuant to the Madison County Subdivision Regulations, the Board of Madison County Commissioners may revoke a subdivision approval if it determines that information provided by the subdivider, and upon which such decision was based, is inaccurate. Therefore, please complete the application package accurately and provide all information requested.

Appendix 2

Subdivision Size Information	# units/lots
Single-family/multi-family lots	1
Commercial lots	
Industrial lots	
Condo Units	26
Townhouse Units	
RV Spaces	
Mobile Home Spaces	
Open space/road/park/common area lots	1
TOTAL LOTS	28
LOTS SUBJECT TO FEES (Total - Open space)	**27**

Subdivision Type	
Major	y

Overall Development Plan or Amendment	
ODP or amendment accompanied by plat (if not, leave blank)	
ODP or amendment only (if not leave blank)	
Is there an ODP approved after April 2009 for which no preliminary plat has been submitted (Y/N)?	N

Certified Mailing	# Notifications	Cost per mailing
Domestic Mailing	41	$ 6.49
International Mailing	0	$ 18.55
TOTAL	**41**	**$ 266.09**

Variances		Variance Cost
# with Preliminary Plat application	2	$ 500.00
# after Preliminary Plat approval	0	$ 2,000.00

Planning/Public Safety Review Fee Calculator

Type of Application	Planning	Certified Mailing	Public Safety	GRAND TOTAL	NOTES
Pre-application	$ 100.00		$ 350.00	**$ 450.00**	
Preliminary Plat	$ 5,400.00	$ -	$ 330.00	**$ 5,730.00**	Credit $1000
Final Plat	$ 2,200.00		$ 340.00	**$ 2,540.00**	
Overall Development Plan or ODP Amendment	Credit	$ -	$ -	**$ -**	
SUBDIVSION TOTAL (No Variance)	**$ 7,700.00**	**$ 266.09**	**$ 1,020.00**	**$ 8,986.09**	Requires Certified Ma

Variance(s) included with preliminary plat	$ 1,000.00			
Variance(s) after preliminary plat approval	$ -			
VARIANCE TOTAL	$ 1,000.00			
TOTAL PLANNING & PUBLIC SAFETY	**$ 8,700.00**	**$ -**	**$ 1,020.00**	**$ 9,720.00**

Instructions **(All entries are in Yellow boxes)**:

1. Subdivision Size Information - fill in # of units or lots of each type.
2. Subdivision Type - If a minor subdivision, Y for a first minor, N if not a first minor
3. ODP or Amendment - Leave blank if it does not apply.
4. Certified Mailing - If # Notifications appears, fill in # of adjoining property owners in domestic and international as appropriate

5. Variances - Fill in the number of variances requested.

Yellowstone Development, LLC

17040

Madison County Planning Dept.

5-10-16 05102016	Paddock-Pre Plat Fe	5730.00	5730.00

5-10-16	17040	5730.00	5730.00

THIS DOCUMENT HAS A COLORED BACKGROUND AND MICROPRINTING. THE REVERSE SIDE INCLUDES AN ARTIFICIAL WATERMARK.

Yellowstone Development, LLC
1111 Research Drive Unit B
Bozeman, MT 59718
(406) 586-5522

First Republic Bank
Boston, MA 02110

17040

CHECK NO.

54-7500
2114

Pay: **********Five thousand seven hundred thirty dollars and no cents

PAY DOLLARS

DATE	AMOUNT
May 10, 2016	$******5,730.00

TO THE ORDER OF
Madison County Planning Dept.
PO Box 278
Virginia City, MT 59755

VALIDATED DNA SECURE™ CHECK
Verify at gValidate.com

Jennifer L. Miller

⑆211475000⑆ ⑈80001562595⑈ 17040

Appendix 3

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY/
LOCAL GOVERNMENT JOINT APPLICATION FORM

PART I. GENERAL DESCRIPTION AND INFORMATION

1. Name of proposed development The Corral Subdivision, Yellowstone Mountain Club

2. Location: City and County Madison County
   Legal description: NE 1/4 of Section 12, T7S, R2E and NW ¼ of Section 7, T7S R3E
   Geocode 25-0337-07-1-01-01-1000
   Latitude 45d14'36" Longitude 111d24'33"

3. Is concurrent review by local governing body and DEQ requested? Yes XX_ No _____

4. Type of water supply system

   _____ Individual well
   _____ Individual surface water supply or spring
   _____ Cistern
   _____ Shared well (2 connections)
   _____ Multiple-user water supply system (3-14 connections and fewer than 25 people)
   _____ Service connection to multiple-user system
   _____ Service connection to public system
   ___XX__ Extension of public main
   _____ New public system (15 or more connections or serving 25 or more people)

5. Type of wastewater treatment system
   _____ Individual wastewater treatment system
   _____ Number of bedrooms (3 bedrooms will be used if unknown)
   _____ Shared wastewater treatment system (2 connections)
   _____ Multiple-user system (3-14 connections and fewer than 25 people)
   _____ Service connection to multiple-user system
   _____ Extension of multiple-user main
   _____ Service connection to public system
   ___XX__ Extension of public main
   _____ New public system (15 or more connections or serving 25 or more people)

6. Name of solid waste (garbage) disposal site Logan Landfill

7. Nondegradation
   Yes_____ No XX_ Is information included which substantiates that there will be no degradation of state waters or that degradation will be nonsignificant?
   Yes_____ No XX_ If not, have you enclosed an Application to Degrade?

8. Descriptive Data
   26_____ Number of lots, condominiums, townhomes, or rental spaces
   1_____ Total acreage in lots being reviewed
   3.55____ Total acreage in streets or roads
   6.88___ Total acreage in parks, open space, and/or common facilities
   28.81__ Total gross acreage of subdivision
   28.81__ Minimum size of lots or spaces
   28.81__ Maximum size of lots or spaces

9. Indicate the proposed use(s) and number of lots or spaces in each
   _____ Residential, single family
   XX____ Residential, multiple family. Number of buildings 12 Number of living units 26
   XX____ Type of multiple family structure (e.g. duplex) ten duplex buildings, 2 triplex buildings
   _____ Planned unit development. Number of units _____ (buildings? Or living units?)
   XX____ Condominium/ townhomes. Number of buildings 12 Number of units 26
   _____ Mobile home park. Number of living units _____ (or spaces?)
   _____ Recreational vehicle park. Number of spaces _____
   _____ Commercial or industrial
   _____ Other (please describe)

10. Provide the following information regarding the development.

Current land use Vacant timber and horse pasture

Depth to ground water at the time of year when water table is nearest to the natural ground surface within the drainfield area >8 feet

Depth to bedrock or other impervious material in the drainfield area >8 feet

Existing zoning or other regulations No zoning, property falls under Yellowston Mountain Club Property Owners Association rules and regulations

11. Include the following attachments, if applicable.

Yes _____ NA XX__ An overall development plan indicating the intent for the development of the remainder of the tract, if a tract of land is to be subdivided in phases.

Yes XX__ NA _____ Drafts of any covenants and restrictions to be included in deeds or contracts for sale.

Yes XX___ NA _____ Drafts of homeowners' association bylaws and articles of incorporation, if applicable.

(Submitting a draft copy of a homeowners' association bylaws and articles of incorporation is adequate for DEQ to initiate and complete its review of sanitary facilities, but a copy of the fully executed documents must be submitted before DEQ can issue final approval.)

I understand that a person may not dispose of any lot within a subdivision, erect any facility for the supply of water or disposal of sewage or solid waste, erect any building or shelter in a subdivision that requires facilities for the supply of water or disposal of sewage or solid waste, or occupy any permanent buildings in a subdivision until the reviewing authority under the Sanitation in Subdivisions Act has issued a certificate of subdivision approval indicating that the subdivision is not subject to sanitary restriction, unless the subdivision is exempt from the Sanitation in Subdivisions Act under 76-4-125, MCA. I understand that a person may not construct or use a facility that deviates from the certificate of subdivision approval until the reviewing authority has approved the deviation.

Designated representative, if any (e.g., engineer, surveyor)

I designate Justin Houser of Houser Engineering PC
Print name Print Company Name
as my representative for purposes of this application.

Address: 626 South Ferguson Avenue, Suite #1, Bozeman, Montana 59718
Company, Street or P.O. Box, City, State, Zip Code

Email: justin@houserengineering.com_____ Phone: 406-548-7820

Owner

Name: _____ Michael P DuCuennois, Vice President of Development, Yellowstone Mountain Club
Signature of owner Print name of owner (s)

Address : P.O. Box 161097, Big Sky, Montana 59716
Street or P.O. Box, City, State, Zip Code

Email: mike.ducuennois@yellowstone club.com Phone: 406-995-7385

Date: 05/23/16

(This statement must be signed by all owners of the subdivision or the responsible officer of the corporation offering the same for sale.)

Notice: Upon receipt of a subdivision application, the department will have 55 days to approve, conditionally approve, or deny the subdivision application, unless an environmental impact statement is required, in which case action must be taken within 120 days.

PART II REQUIRED INFORMATION FOR APPROVAL OF SUBDIVISIONS UNDER SANITATION IN SUBDIVISIONS LAWS (e.g., parcels less than 20 acres, trailer courts, RV parks, condominiums)

All applications must include the information required in ARM 17.36.101-805 and the appropriate circulars. In order to facilitate review, the application should be organized in the same manner as this application form and follow closely the submittal requirements in the rules and circulars.

A. Physical Conditions

1. Provide the following attachments:

    1. A vicinity map showing the location of the proposed subdivision in relation to the nearest town, highway(s). **See enclosed Preliminary Plat**
    2. Soils survey map and most recent interpretations of soil suitability for the proposed land uses. **See enclosed soils survey**
    3. Topographic map of the development with contour intervals meeting the preliminary plat requirements of the local subdivision regulations. **See enclosed Preliminary Plat**
    4. On one or more copies of a preliminary plat* (a minor subdivision plat, if applicable) prepared in accordance with local subdivision regulations, or a final plat, show the location of:
        a. Any rock outcroppings.
        b. Any areas subject to flood hazard or, if available, 100-year floodplain studies. (The local floodplain administrator or the Floodplain Management Section of the Water Resources Division of the Department of Natural Resources and Conservation may be contracted for assistance in determining flood hazard locations.)
        c. Any natural water systems such as streams, rivers, intermittent streams, lakes or wetlands (also indicate the names and sizes of each).
        d. Any man-made water systems such as wells, ponds, canals, ditches, aqueducts, reservoirs and irrigation systems. (Also indicate the names, sizes and present use of each).
        e. Any existing or proposed utilities located within or adjacent to the subdivision, including electrical power, natural gas, telephone service, and water and sewer pipelines or facilities.

        See enclosed Preliminary Plat

*Submit a preliminary plat or certificate of survey with complete and accurate legal description adequate for DEQ to initiate and complete its review of the subdivision.

B. Water Supply

1. <u>Where an individual water supply system is proposed or existing for each parcel:</u> **N/A**

    a. For a proposed system, provide all information required in ARM 17.36.328 – 336, indicate the distance to the nearest public water system.
    b. If an existing system will be used, provide all information required in ARM 17.36.335.
    c. Attach four copies of the lot layout showing the proposed or existing location of each water supply source (spring, well or cistern) and indicating the distance to existing or proposed wastewater treatment systems.

2. <u>Where a multiple user water system is proposed or existing</u> **N/A**

    a. If an existing system will be used:
        1) Identify the system and the person, firm or agency responsible for its operation and maintenance.
        2) Indicate the system's capacity to handle additional use and its distance from the development.
        3) Provide evidence that permission to connect has been granted.
        4) Provide three copies of the following attachments:
            a) Map or plat showing location, sizes and depth of any existing water supply lines and facilities which may directly serve parcels within the proposed development.
            b) Provide plans and specifications for all proposed extensions and additional lines and facilities as required by ARM 17.36.335 and DEQ-3.
    b. If a new system will be used:

1) Indicate who will install the system, who will bear the costs, when it will be completed and who will own it.
2) Provide all information required in ARM 17.36.330-336 and DEQ-3.

3. Where a public water system is proposed or existing

a. If an existing system will be used
1) Identify the system and the person, firm, or agency responsible for its operation and maintenance. **Yellowstone Development, LLC is responsible for the operation and maintenance of the public water system**.
2) Provide evidence that the system is approved by DEQ and is in compliance with the regulations. **Please see enclosed Application to DEQ and Certificates of Approvals in Engineer's Report.**
3) Provide evidence that the managing entity has authorized the connections, the system has adequate capacity to meet the needs of the subdivision, the system is in compliance with department regulations, and the appropriate water rights exist or have been applied for the connections. **Please see enclosed Authorization to Connect letter in Engineer's Report.**
4) Provide three copies of the following as attachments:
a) A map or plat showing the location, sizes and depth of any existing water lines and facilities that will directly serve parcels within the proposed development. **See enclosed Preliminary Plat**
b) Plans and specifications for all proposed extensions and additional lines and facilities as required by ARM 17.36.328-330 and DEQ-1 or DEQ-3. **See enclosed plans and specifications**

b. If a new system will be used
1) Indicate who will install the system, who will bear the costs, when it will be completed, and who will own it. **Yellowstone Mountain Club, LLC will install the system and bear the costs of construction, operation and maintenance. Completion is expected by fall of 2017.**
2) Provide plans and specifications for all proposed extensions and additional lines and facilities as required by ARM 17.36.328-330 and DEQ-1 or DEQ-3. **Please see enclosed plans and specifications**

C. Wastewater Treatment

1. Where individual wastewater treatment systems are proposed for each parcel:

a. Indicate the distance to the nearest public wastewater treatment system.
b. Provide all information required in ARM 17.36.320-345 and in DEQ-4. **See enclosed Engineer's Report**

2. For a proposed multiple user wastewater treatment system: **N/A**

a. Where an existing system is to used
1) Identify the system and the person, firm, or agency responsible for its operation and maintenance.
2) Indicate the system's capacity to handle additional use and its distance from the development.
3) Provide evidence that permission to connect has been granted.
4) Provide two copies of the following attachments:
a) A map or plat showing the location, sizes and depth of any existing sewer lines and facilities that will directly serve parcels within the proposed development.
b) Provide plans and specifications for all proposed extensions and additional lines and facilities as required by ARM 17.36.320-345 and DEQ-4.

b. Where a new system is proposed
1) Indicate who will install the system, who will bear the costs, when it will be completed, and who will own it.
2) Provide all information required in ARM 17.36.320-326 and DEQ-4.

3. For a proposed public wastewater treatment system:

a. Where an existing system is to used
1) Identify the system and the person, firm, or agency responsible for its operation and maintenance. **Yellowstone Mountain Club, LLC is responsible for the operation and maintenance of the public water system.**
2) Provide evidence that the system is approved by DEQ and is in compliance with the

regulations. **Please see enclosed Certificates of Approvals in Engineer's Report.**

3) Provide evidence that the managing entity has authorized the connections, the system has adequate capacity to meet the needs of the subdivision, and the system is in compliance with department regulations. **Please see enclosed Authorization to Connect letter enclosed.**

4) Provide three copies of the following attachments

a) A map or plat showing the location, sizes, and depth of any existing sewer lines and facilities that will directly serve parcels within the proposed development. **See enclosed Preliminary Plat.**

b) Plans and specifications for all proposed extensions and additional lines and facilities as required by ARM 17.36.328 and DEQ-2 or DEQ-4. **See enclosed plans and specifications.**

b. Where a new system is proposed

1) Indicate who will install the system, who will bear the costs, when it will be completed, and who will own it. **Yellowstone Development, LLC will install the system and bear the costs of construction, operation and maintenance. Completion is expected by fall of 2017. Yellowstone Mountain Club, LLC will own the system upon completion of construction**

2) Provide plans and specifications for all proposed extensions and additional lines and facilities as required by ARM 17.36.320-326 and DEQ-2 or DEQ-4. (Also see ARM 17.38.101). **Please see enclosed plans and specifications**

D. Solid Waste

1. Describe the proposed method of collecting and disposing of solid waste. **Allied Waste, an independent solid waste contractor, will collect and dispose of solid waste.**

2. Indicate the name and location of the department-licensed or appropriate out-of-sate solid waste disposal site where solid waste will be disposed in accordance with ARM 17.36.309. **The Gallatin County Landfill in Logan Montana.**

E. Drainage

1. Streets, roads, and unvegetated areas.

a. Describe measures for disposing of storm run-off from streets, roads, parking lots, and other unvegetated areas within the subdivision or onto adjacent property. **See enclosed Storm Water Design Report**

b. Indicate type of road surface proposed. **Asphalt**

c. Describe facilities for stream or drainage crossing (e.g., culverts, bridges). **See enclosed Storm Water Design Report**

d. Describe how surface run-off will be drained or channeled from parcels. **See enclosed Storm Water Design Report**

e. Indicate if storm run-off will enter state waters and describe any proposed treatment measures. (A DEQ storm-water discharge permit may be required) **See enclosed Storm Water Design Report**

f. Describe any existing or proposed streambank or shoreline alteration, any proposed construction or modification of lakebeds or stream channels. Provide information on location, extent, type and purpose of alternation. **No alteration, construction or modification of any lakebeds or stream channels is proposed.**

g. Provide storm drainage plans and specifications as required by ARM 17.36.310 and DEQ-8. **See enclosed Storm Water Design Report**

Appendix 4

APPENDIX 9 PRELIMINARY PLAT CHECKLIST

Section A: Completed by Subdivider

Name of Proposed Subdivision: The Corral PUD Subdivision, Yellowstone Mountain Club

Location: Yellowstone Mountain Club, Big Sky, Montana

Property Owner: Yellowstone Development LLC

Legal Description: NW1/4 Section 7, T7S, R3E, Madison County
NE 1/4 Section 12, T7S, R2E, Madison County

Property Geocode/Parcel ID: 25-0337-07-1-01-01-1000

Subdivider Explanatory Comments: Proposed subdivison contains 24 residential condominiums

20 copies submitted to Planning Office *(AFTER sufficiency is met)*:

☒ Preliminary Plat or Plan
24" x 36" in size
(For one-or-two lot proposed subdivisions, 18 of the 20 copies may be 11" x 17" in size.)

☒ Preliminary Plat Supplements

Additional public review copies

☒ (Required) Placed in local library: Date_____
Library Ennis Library

☐(Big Sky only) Placed at Big Sky Fire Department and/or Yellowstone Club: Date_____

Section B: Completed by Planner			
PLANNER REVIEW	**Date:**	**By:**	**Comment:**
Received:			
Element Review			
Element Complete:			
Sufficiency Review:			
Meets sufficiency:			

Section C: Completed by Subdivider and Planner

Items and Information, Filled Out by: (Note if Not Applicable)	Subdivider	Planner			
		Element Review		Sufficiency Review	
		Missing	OK/NA	Missing	OK/NA
Documentation of Status as First Minor Subdivision	N/A				
Subdivision Application Form (Appendix 11)	see App. 1				
Subdivision Review Fee.	see App 2				
Preliminary Plat or Plan 24" x 36" in size Preliminary Plat Contents ***(Surveyor should be made aware of these requirements.)*** See Appendix O					
a. Title Block.					
1. Name and location of subdivision (Name does not duplicate another subdivision).	X				
2. Scale	X				
3. North arrow.	X				
4. Date of preparation.	X				
b. Vicinity map.	X				
c. Approximate exterior boundaries of the platted tract and location of all section corners or legal subdivision corners of sections pertinent to the subdivision boundary.	X				
d. All lots and blocks, designated by numbers, and the approximate dimensions and area of each lot.	X				
e. All roadways and right-of-way width/grades/curvature of each, with existing and proposed roadway names (New road names have been approved by Madison County).	X				
f. Proposed intersection locations or other access points for any subdivision requiring access to highways, arterials, and collectors.	X				
g. Approximate location, boundaries, dimensions, and areas of all parks, common grounds, or other grounds dedicated for public use.	X				

Items and Information, Filled Out by: (Note if Not Applicable)	Subdivider	Planner			
		Element Review		Sufficiency Review	
		Missing	OK/NA	Missing	OK/NA
h. Existing and proposed utilities located on or adjacent to the tract, including:	X				
1. Approximate location, size, and depth of sanitary and storm sewers, water mains, fire hydrants, dry hydrants, cisterns, and any other water	X				
2. Approximate location of gas, electric, and telephone lines, and street lights.	X				
3. Approximate location of the nearest water mains and sewer lines where none are located on or adjacent to the tract.	X				
4. Existing irrigation ditches and canals.	N/A				
i. Ground Elevations on the Tract. Contour intervals are provided at suggested vertical intervals of: two (2) feet where the average slope is 0-2%, five (5) feet where the average slope is 3-7%, and ten (10) feet where the average slope is over 7%. *Notes: (1) A cross section may be required to define drainage patterns. (2) United States Geological Survey data or other information may be used, if it presents an accurate and usable representation of ground features.*	X				
j. Approximate location of existing buildings, structures, and improvements.	X				
k. Approximate location and identity of existing and proposed public and private easements and rights-of-way, including description of their width and purpose. This includes conservation easements.	X N/A				
l. Approximate location of any water bodies.	X				
m. Floodway survey data, when required.	X				
n. Construction setback from any river running through or immediately adjacent to the proposed subdivision.	X				

Items and Information, Filled Out by: (Note if Not Applicable)	Subdivider	Planner			
		Element Review		Sufficiency Review	
		Missing	OK/NA	Missing	OK/NA
o. Proposed building envelopes.	X				
p. Names of adjoining platted subdivisions and numbers of adjoining COSs previously recorded.	X				
q. Ownership of all lands adjacent to the subdivision and to the access road leading from a present public right-of-way to the boundary of the proposed subdivision.	X				
Preliminary Plat Supplements:					
a. A vicinity sketch or sketches showing conditions on subject land and adjacent land, including:	See App 6				
1. Clear indication of the proposed subdivision on an U.S. Geological Survey topographic map, aerial photograph, or location map.	See App 6				
2. Approximate direction and gradient of ground slope, including any embankments or retaining walls.	See App 6				
3. Current land uses.	See App 6				
4. Location of buildings, railroads, power lines, towers, and roads.	See App 6				
5. Location of any known potential man-made or natural hazards.	See App 6				
b. Any existing or proposed zoning (or other land use regulation) on the proposed subdivision tract and in the vicinity.	N/A				
c. Overall development plan or notice of plan approval by governing body.	X				

Items and Information, Filled Out by: (Note if Not Applicable)	Subdivider	Planner			
		Element Review		Sufficiency Review	
		Missing	OK/NA	Missing	OK/NA
d. Where land will be dedicated to public use, either: 1. A dedication certificate of a licensed title abstractor showing the written consent of the dedication by the owners of the land and any lien holders or claimants of record against the land; or, 2. Title insurance guaranteeing the dedication, in a reasonable amount (to be determined by the governing body).	N/A				
e. Drafts of any covenants and restrictions to be included in deeds or contracts for sale.	See App A				
f. Draft of any owners' association covenants.	See App A				
g. Draft of any plat approval covenants.	N/A				
h. Names and addresses of adjoining landowners, and documentation that they have received at least 30 days' advanced notification of the proposed subdivision. Include any comments received.	See App F				
i. Names and addresses of all lien holders, easement holders, potentially affected water users (if any, and if known), and any property owners association potentially affected by the project as determined by the planner. Documentation that they have received at least 30 days' advanced notification of the proposed subdivision. Include any comments received.	See App F				

Items and Information, Filled Out by: (Note if Not Applicable)	Subdivider	Planner			
		Element Review		Sufficiency Review	
		Missing	OK/NA	Missing	OK/NA
j. Names and addresses of public agencies and municipalities located within two (2) miles of the proposed subdivision (including any agencies who manage a road that would provide access to the development), and documentation that they have received at least 30 days' advanced notification of the proposed subdivision. Include any comments received.	See App F				
k. Verification that other review agencies, as required (See Appendix 1), have received at least 30 days' advanced notification of the proposed subdivision. Include any comments received.	See App F				
l. Verification that local library has received a copy of the subdivision application package.					
m. Copies of easements, proposed easements, or other documents verifying legal access to the subdivision.	See App J				
n. Calculations, documentation pertaining to parkland dedication or cash-in-lieu.	N/A				
o. Water and sanitation information, as outlined in Appendix 13 or 14. Approval from DEQ or County Sanitarian, if available.	See enclosed DEQ binder				
p. Environmental assessment (Appendix 10) 1. Select one ☒ Full. ☐ Partial. ☐ Exemption statement from Planning Board.					

Items and Information, Filled Out by: (Note if Not Applicable)	Subdivider	Planner			
		Element Review		Sufficiency Review	
		Missing	OK/NA	Missing	OK/NA
2. Required special studies, such as: ☒ Geological assessment ☒ Hydrology study ☐ Wetlands delineation ☒ Floodplain survey ☒ Traffic impact analysis ☒ Fire protection plan ☒ Cultural resources survey ☐ Other (list)	 See App I See App R N/A See App R See App L See App Q See App H none				
q. Floodplain development permit, if required (Appendix 31).	N/A				
r. Receipt for noxious weed management plan and review fee (Appendix 18).	See plan in App D, payment to be calculated				
s. Explanation of water rights/mineral rights.	See App N				
t. Land stewardship plan (Appendix 15).	See App 6				
u. Statement of how the proposed subdivision meets the ten (10) public interest review criteria and the goals and objectives of the Madison County Growth Policy (Guidelines are included in Appendices 10 and 16).	See App 6				
v. Other public comments received.	See App F				
Special information for:					
a. Mobile home parks. b. Recreational vehicle parks. c. Condominiums or townhouses. d. Planned unit developments.	N/A N/A See Part 4E of App 6 See App 5				
Preliminary Plat Checklist (one copy only).	See App 4				

Appendix 5

PLANNED UNIT DEVELOPMENT NARRATIVE
THE CORRAL PUD SUBDIVISION
YELLOWSTONE MOUNTAIN CLUB

June 2016

Prepared for:
Yellowstone Development, LLC
P.O. Box 161097
Big Sky, Montana 59716

Prepared by:

HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

The Corral Planned Unit Development Subdivision

The Corral Planned Unit Development Subdivision (the Corral) is a residential subdivision within the heart of the Yellowstone Mountain Club. Located at the southern slope of Andesite Mountain just north of the South Fork of the West Fork of the Gallatin River, this subdivision proposes clustered development in the form of duplex and triplex residential condominiums. These properties will have access to the nearby recreational and commercial amenities that currently exist and that are proposed within the Yellowstone Mountain Club's base area. All of the condominiums are within Lot 1, while Open Space 1 is an open space tract dedicated to members of the Yellowstone Mountain Club. The proposed development proposes high density, clustered development near the core of the development.

Below is a narrative addressing each of the requirements of a PUD as outlined on pages 105-106 of the Madison County Subdivision Regulations (2015). For ease of review, each of the special requirements has been included below in bold italics text, with the narrative addressing each special requirement following in standard text.

Item 7. b. (1) A description of proposed open space and recreational facilities, roads and any other public improvement;

The Corral consists of approximately 28.81 acres, with 6.88 acres dedicated to open space. It should be noted that 1.99 acres of Lot 1 will be removed from Open Space created with the Phase 4 subdivision, therefore the net open space created with this development is 4.89 acres or 18%. Many of the areas outside of the structures and roadways will be common space per the condominium declarations, providing additional green space for owners of property within the subdivision.

Roads within the proposed development will be kept to a minimum or concealed to the greatest extent possible. The goal of this subdivision is to provide an atmosphere of recreational abundances within a seemingly pristine and natural environment. With this as a goal, the roads and driveways proposed throughout the development are minimized. Walking trails are proposed within and near the subdivision to encourage walking, and to create a cozy atmosphere indicative of a close-knit community.

Utilities servicing the proposed structures will primarily follow the access and utility easements that currently exist or that are proposed as part of this subdivision. Utilities will consist of those typically found in any subdivision, those being electricity, telephone, fiber optic, and public water and sewer system extensions. Propane will likely provide heat for the structures.

It should be noted that while the above stated amenities will serve the owners of the Corral, they will be owned by the Yellowstone Mountain Club and will not be public.

Item 7. b. (2) A description of plans for the long-term management of open space, whether commonly owned or not;

Currently, the Yellowstone Mountain Club has hundreds of acres of open space that has been dedicated over the past 20 years during the platting of subdivisions. These open spaces are currently maintained by the Yellowstone Mountain Club Property Owners Association. The additional open space that will be created as part of the development of the Corral will be included with this open space inventory. Yellowstone Mountain Club Property Owners dues are collected from the owners on an annual basis, which provide the funding for maintenance of these areas. Primarily, these areas remain largely untouched, with the exception of weed management, ski trail grooming and forest management activities. As is illustrated in the other sections of this Preliminary Plat application, the Yellowstone Mountain Club has taken a proactive approach to the management of weeds, ski terrain, forests and wildlife within the Yellowstone Mountain Club.

Item 7. b. (3) A description of plans for the long-term management of common facilities or property;

Common facilities and property created during the development of the Corral will be maintained by the Yellowstone Mountain Club and/or by the Corral Property Owners Association. Similar to the management of open space described above, these facilities and properties will be rolled into the current inventory of facilities and properties to be maintained within the Yellowstone Mountain Club. Currently, this maintenance is subsidized by the developer, however as property is purchased, membership dues and property owners dues will absorb all of the maintenance costs.

Item 7. b. (4) A schedule for installing proposed road and utility improvements;

The developer, Yellowstone Development, LLC, has estimated construction to start in the spring of 2017. Road and utility construction is anticipated to be completed in the fall of 2017, while construction of the structures is estimated to be completed in the fall of 2019.

Item 7. b. (5) A description of any proposed modifications from the design and development standards outlined in this Chapter;

The design and development standards have been adhered to completely, with two exceptions; Roads within The Corral generally meet the standards set forth in the Madison County Subdivision Regulations for low density mountainous roads, however Roads A and C are narrower than specified in the Madison County Subdivision Regulations, and the length of the equivalent cul-de-sac for Road C is longer than specified in the same reference. Roads A and C have been classified as low density, even though there are more than 5 residences being served, which requires a 26 foot wide road. A 22 foot wide road is proposed. The reason for the reduction in road width and extended cul-de-sac length is explained below.

The nature of the homes within the Corral is recreational, part time residences. This use is suggested by the Institute of Traffic Engineers to have a lower traffic volume than a typical residence. Typical residences in a non-resort setting assume an ADT of 8-10, while recreational homes have an ADT of 3.6. The lower than usual traffic volume supports a narrower road and a cul-de-sac of longer length.

Item 7. b. (6) A statement of how the proposed PUD would accomplish any or all of the following purposes:

a. Preserve to the maximum extent possible, the natural characteristics of the land including topography, vegetation, streams, and other bodies of water.

The development of the Corral will commit a minimum of 23% of the property to open space, which will remain untouched. The remaining 78% will be included into a developed tract, however not necessarily disturbed. Topography and vegetation will be altered around each structure, however extensive landscaping is proposed for disturbed areas using vegetation native to the area. No surface waters will be disturbed as a result of this development. Wetlands will be avoided and not disturbed. Buildings will have "walk-out" basements to best fit to the land.

b. Provide economies in the provision of roads and other public improvements.

Roadways will be kept to a minimum to reduce the visual impact on the site. Utilities will be routed so as to minimize the amount of utility corridors and disturbance. The clustering concept used with the development of the property allows for high density development, conducive to efficient road and utility corridors.

c. Preserve productive agricultural lands, wildlife habitat, or other significant open space.

A minimum of 23% of this property will be dedicated to open space, preserving wildlife habitat and adding to the extensive open space inventory that exists within the Yellowstone Mountain Club. Structures will be clustered so as to reduce the footprint of the development and allow for greater separation between wildlife corridors and structures. The property that the Corral sits upon is not historically productive agricultural land. It has in the past been used for a horse corral, which will be moved off-site to better grazing lands.

d. Protect important historic sites or structures.

The Montana State Historical Preservation Office surveyed the site and found no historically significant sites or structures within this property; therefore there are no sites or structures to be protected.

e. ***Provide development facilities for recreational purposes.***

As stated above, the common space and open space created, in conjunction with the existing amenities nearby, will be developed to provide additional recreational amenities within the Corral, primarily with the addition of walking trails.

As required in the Madison County Subdivision Regulations, at least three of the five purposes outlined in Item 8, B. (6) are required to be advanced. This proposed development seemingly advances each of these five purposes.

Appendix 6

PRELIMINARY PLAT APPLICATION FOR THE CORRAL PLANNED UNIT DEVELOPMENT SUBDIVISION

YELLOWSTONE MOUNTAIN CLUB

October 2016

1. INTRODUCTION

1A Executive Summary

The Corral Planned Unit Development (The Corral) is a subdivision located near the base area of the Yellowstone Mountain Club near Big Sky, Montana. This subdivision is located in the area labeled "River Homestead/Paddock" on the 2015 Second Revised Master Plan for the Yellowstone Mountain Club, a copy of which is provided at the end of this section. The subdivision encompasses approximately 28.81 acres located within the northeast quarter of section 12, Township 7 South, Range 2 East, and the northwest quarter of Section 7, Township 7 South, Range 3 East, Madison County, Montana. The Corral proposes 26 residential condominiums located in ten duplex buildings and two triplex buildings. All of the condominiums are located on Lot 1, which is 21.93 acres. In addition to this Lot, an open space tract, Open Space 1, is proposed that dedicates 6.88 acres of open space. A portion of Lot 1 encroaches upon an open space tract dedicated during the platting of Phase 4 of the Yellowstone Mountain Club. This open space, consisting of 1.99 acres, has been included as part of the 6.88 acres of open space found in Open Space 1. A copy of the Preliminary Plat is provided in Appendix O.

1B Document Organization

As an overall format for the presentation of environmental and community impact information relevant to this subdivision application, the "Joint Subdivision Application Form" provided by the Montana Department of Environmental Quality (MDEQ) will be used. The form is titled "Montana Department of Environmental Quality, Local Government Joint Application Form, (referred to herein as the "Joint Application Form"). In addition, the Madison County Subdivision regulations require additional information as part of the application process. These will be addressed separately from the requirements of the Joint Application Form.

The **Preliminary Plat Application** for the Corral Planned Unit Development within the Yellowstone Mountain Club will consist of the following sections:

- **Part 1** is an introductory section, containing a general description of the project area and the Plans for development. It addresses Part 1 of the Joint Application Form.

- **Part 2** is a description of existing and proposed community services and facilities. This section addresses the items in Part II of the Joint Application Form.

- **Part 3** describes existing site conditions and anticipated environmental/community impacts with respect to geology, vegetation, wildlife, cultural and historical features, roads, utilities, emergency services and schools. Part 3 also discusses permitted and planned land uses. This section addresses the items in Part III of the Joint Application Form.

- **Part 4** provides comments regarding the additional preliminary plat application requirements of the Madison County Subdivision Regulations, including the Land Stewardship outline and this subdivision applications compliance with the Madison County Growth Policy.

- **Part 5** provides a series of exhibits that aid in the understanding of the text described in the previous four parts.

- **Appendices**: The last major component of the application is a set of Appendices, providing supporting documentation.

1C General Site Description

As noted above, the Corral is a 28.81 acre parcel consisting of an open space tract and a condominium tract containing 26 residential condominiums within ten duplex buildings and two triplex buildings. This subdivision is to be added to, and part of the approximately 13,774-acre Yellowstone Mountain Club. The Yellowstone Mountain Club lies adjacent to and south of Lone Mountain and the Big Sky Ski and Summer Resort. The vast majority of YMC will be open space. The Corral is generally located just north of the area commonly referred to as the "Base Area" of Yellowstone Club. Located at the base of Andesite Mountain and very near the base of Pioneer Mountain (the primary ski hill of the Yellowstone Club), the Corral will provide clustered dwellings near the core of the Yellowstone Club development. Properties within the Corral will consist of multi-level residential condominiums.

The Corral is located at a mean elevation of approximately 7,200 feet. The site drains to the South Fork of the West Fork of the Gallatin River (South Fork), which is located along the south boundary of the property. The proposed buildings are located a minimum 100 feet horizontally and 13 feet vertically from the South Fork.

Primary access to the subdivision is via Yellowstone Mountain Club Trail and Seven Bears Trail. A Vicinity Map is enclosed, which illustrates the ingress and egress to and from the site. From the primary access gate (found on Yellowstone Mountain Club Trail), access consists of traveling westerly along Yellowstone Mountain Club Trail just north of the South Fork until the

road “switches back”, which is the location of the intersection with the northern most road within the subdivision. Access to the southerly roads within the subdivision requires following Yellowstone Mountain Club Trail until it intersects with Seven Bears Trail.

Primary access to the Yellowstone Mountain Club consists of rural collector roads (Ousel Falls Road) that intersect with Montana Highway 64 (Spur Road) approximately 5 miles east of the Yellowstone Mountain Club boundary.

Figure 1 is a vicinity map showing the relationship of the Corral to the broader Big Sky area. Figure 2 illustrates the location of the Corral in relation to the overall Yellowstone Mountain Club.

1D General Project Description

The Corral Subdivision is designed as a residential subdivision consisting of 26 condominium units to be housed in ten duplex buildings and two triplex buildings. The preliminary plat in Appendix O shows the proposed relationship of the lot, roads and open spaces.

The existing Yellowstone Mountain Club Trail will be utilized for primary access to the subdivision. Within the subdivision, four local access roads are proposed. Each condominium will be provided with driveway approaches onto these local roads.

Water for domestic consumption and fire protection will be provided by an extension of the Encampment Trail Public Water Supply System. Individual wells are not proposed. Wastewater treatment will be provided by onsite septic and dosing tanks that pump effluent to existing and proposed sanitary sewer mains located throughout the property. Wastewater effluent is pumped to the existing effluent treatment plant, and ultimately stored and disposed of on the Yellowstone Mountain Club’s Golf Course.

There is 6.88 acres of open space proposed for dedication with this subdivision. It should be noted however that 1.99 acres of open space previously dedicated as part of the Phase 4 Yellowstone Mountain Club Plat is being absorbed into Lot 1. The net gain of open space is therefore 4.89 acres, or approximately 18% of the net subdivision area. There are no lands dedicated to the public or to parkland, nor is there any cash-in-lieu of parkland proposed.

The overall theme of the Yellowstone Mountain Club, and in particular the Corral, is to provide vacation homes in a mountainous setting that features year-round recreational opportunities. Summer opportunities will include fishing, golfing, hiking, and horseback riding along a network of multi-use recreational trails. Winter recreation opportunities include alpine and Nordic skiing, snow coach tours, and ice-skating.

A goal of the Yellowstone Club is to create a self-contained residential/recreational community that will require minimal reliance on the public sector for provision of services. Annual association fees and original purchase prices for the home sites will offset operating expenses for

the private services and infrastructure. Long-term management and maintenance of the Yellowstone Mountain Club is intended to be by a single management entity whose objective will be to create a trouble-free setting for Yellowstone Mountain Club members (owners) and their guests.

II. COMMUNITY SERVICES AND FACILITIES

2A Physical Conditions

The following Figures provide required information regarding physical site conditions and the application requirements for Part II of the Joint Application Form:

- Figure 7 is a map of the existing water supply and distribution systems and proposed modifications.
- Figure 8 is a map of the existing wastewater treatment system and proposed modifications.

There are no anticipated flooding threats within the Corral. No 100-year flood plain studies or delineations are available for the South Fork or any other streams in the proximity of the subdivision. The homes are proposed to be over 100 horizontal feet and 13 vertical feet above average flow depth. There are several wetland sites on the south border of the property along the South Fork. All building envelopes have been placed so that the wetlands and surface waters are protected. The proposed development will not impact jurisdictional wetlands, wetland restoration sites, or wetland mitigation sites. The lot to be created as part of this subdivision is situated just north of the South Fork. There are no man-made water features within the Corral.

Water mains will be extended from the existing water mains within The Settlement Subdivision, which are located east of the Corral. This water main extension will include the installation of five service extensions, one for each condominium unit and one irrigation service.

Underground electrical power has been installed along the west side of the subdivision and on the east side if Yellowstone Mountain Club Trail. Expansion of the electrical services will be included as part of the infrastructure improvements and included in either proposed or existing easements. "Blanket" easements for placement of future utilities are provided in the covenants.

2B Central Water Supply

As noted above, water supply for this subdivision will be through a new water main extension within either proposed or existing utility easements proposed as part of this subdivision. All structures within the Corral will be equipped with sprinkler systems for fire protection as per the Yellowstone Mountain Club Master Association covenants.

2B-1 Water Supply and Storage

The wells supplying water to the Water Supply System are capable of supplying up to 70 and 185 gpm each to the Settlement Water Reservoir. The volume of the reservoir allows for 2 days of "max day" water demand and 2 hours of maximum demand fire flow (assumed flow rate of 1500 gallons per minute). A study of the Yellowstone Mountain Club’s water systems is

included with the Montana DEQ subdivision application (under separate cover) which states the findings of the water system demands.

2B-2 Water Distribution

Due to site topography and the elevation difference between the reservoir site and building locations, pressure reducing valves (PRV's) are needed within each building. The PRV's ensure that pressures for the buildings will range from 35 to 65 psi during normal operating conditions (consistent with the Uniform Plumbing Code). The design of the existing water distribution system will be reviewed and approved by the Montana Department of Environmental Quality prior to submittal of the Final Plat. Yellowstone Development, LLC will finance and construct the proposed improvements, while Yellowstone Mountain Club LLC will maintain the proposed infrastructure.

2C Wastewater Collection, Treatment and Disposal

Each building will be serviced by a common septic and dosing tank that will treat the sewage and pump the effluent to effluent collection mains. Wastewater collection will be via a main extension (including services) that will be tied into the existing wastewater mains located south and west of the subdivision. Figure 8 provides a schematic view of the major components of the wastewater system. Wastewater from this subdivision will be conveyed to the public wastewater collection system to a central wastewater treatment facility. This facility is currently being upgraded in order to facilitate additional wastewater flow. From the treatment facility, the effluent will be pumped to an effluent reservoir and disposed of by spray irrigation onto the Yellowstone Mountain Club Golf Course.

In an agreement with the Big Sky County Water & Sewer District No. 363, the Yellowstone Mountain Club has agreed to dispose of treated wastewater (via spray irrigation onto the Yellowstone Mountain Club Golf Course) from the Big Sky area as well as from within the Yellowstone Mountain Club.

Yellowstone Mountain Club LLC maintains the existing and proposed infrastructure. The Yellowstone Mountain Club's covenants provide the framework for the management of the water and wastewater systems.

2D Solid Waste

Solid waste disposal is at the Gallatin County Landfill (Logan Landfill) or other approved public landfills. Bear-proof containers are used throughout the Yellowstone Mountain Club, and open burning of refuse is not allowed. Enforcement of these requirements is through protective covenants. Coordination of solid waste collection and disposal will be by the Yellowstone Mountain Club Property Owners Association or the individual property owners. No on-site disposal is proposed.

2E Drainage

The site currently drains south to the South Fork. The proposed buildings within the subdivision are a minimum of 100 horizontal feet and 13 vertical feet from the water bodies. Storm water improvements proposed within the Corral include swales and detention ponds that will detain and release storm water to pre-development levels. Best Management Practices (BMP's) will be incorporated into the site design for erosion and sediment control during and after construction. The post-development drainage will not exceed pre-development drainage, and will closely mimic existing drainage patterns.

There are no agricultural water user facilities on the site.

2E-1 Runoff Conveyance

Surface water conveyance, after project completion, will primarily be along roadside ditches and between the structures within the subdivision. This will be accomplished by creating ditches and swales throughout the property that route runoff towards the detention ponds located on the southern border of the subdivision. The post-development drainage from the detention ponds will be released at the approximate rate and location as the pre-development discharge. Design for the detention ponds use the two-year, one-hour storm as recommended in Circular DEQ-8. No stream bank alterations, buildings or other construction activities will encroach upon the 100 foot setback from the South Fork.

2E-2 Storm Water Treatment

Construction will comply with all state and local storm water permitting requirements. These include permanent, structural and temporary Best Management Practices, which will be installed prior to and during construction. The most appropriate temporary storm water controls for this site include seeding, fertilization, swales, slope roughening, preservation of vegetation (as much as possible), culverts with inlet/outlet protection, detention ponds, and erosion control blankets or mulches. Appropriate seed mixes are to be used for vegetating disturbed slopes to provide sediment retention and weed control. All structural, temporary and permanent Best Management Practices will be closely monitored by the contractor and the owner throughout the construction of this subdivision's improvements. A copy of the Weed Management Plan is included in Appendix D, while a copy of the Construction Plans are included in Appendix P. The construction storm water permit will be obtained prior to construction.

Storm drainage controls combined with Best Management Practices will minimize the potential for degradation of receiving state waters. Furthermore, prior to reaching the South Fork, much of the runoff from impervious areas will flow through forested or grassy open space areas, thus promoting infiltration and sediment capture.

2E-3 Stream Corridors

There are no stream corridors impacted by development within the Corral; therefore there are no stream bank modification requirements.

III. ENVIRONMENTAL ASSESSMENT

The following Appendices and Figures provide the required information regarding physical site conditions and the application requirements for Part III of the Joint Application Form:

- Appendix B contains soils information from the NRCS.
- Figure 4 is an aerial photo map showing the general distribution of existing vegetation within the site.
- Topographic map contours of the site, at 2-foot contour intervals, are shown on the Topographical Map (Figure 5) and the Slope Map (Figure 6).
- Appendix I contains a geotechnical report addressing the surficial geology of the site.
- Appendix J illustrates the primary accesses and general circulation of the site including emergency accesses.

3A Geology

A geotechnical reconnaissance was completed on May 13, 2016 by Terracon Inc, for this subdivision. This report is provided in Appendix I. The following summarizes that report.

3A-1 Geologic Hazards

The Yellowstone Club property, in general, has widespread unconsolidated landslide deposits derived from the underlying Cretaceous shales during the retreat of the Pleistocene-aged alpine glaciers about 10-11,000 years ago. Evidence of this is found in the hummocky terrain and the deeply incised streams which have cut through former slide masses. Reasonable care must be taken to maintain slope stability during design and construction of road cuts and other construction activity. Common engineering and construction practices, exercised in conjunction with geotechnical assessments for future home site construction, can maintain land stability. There is no evidence of recent, large-scale landslides within the area of the Corral site boundary. Site specific Geotechnical reports are required prior to construction of each of the structures.

There are no known avalanche chute run-outs within the subdivision. Rock-fall hazards are minimal due to moderate slopes and tree cover extending throughout the project area and upslope area. The inherent characteristic of the underlying rock is to shed small rock sizes onto talus slopes rather than large and potentially dangerous blocks.

The proposed subdivision is classified as site class C per the International Building Code (IBC). Common design and construction practices, with additional direction from site-specific geotechnical studies can mitigate this concern.

3A-2 Soils

Appendix B shows the boundaries of the soil types within the overall PUD, as provided in the *NRCS Soi1 Survey of Madison County Area, Montana*. Soils information has been incorporated into a number of the engineering analyses for the project. It has been used to estimate storm water runoff rates and as correlating information source on estimates of rock exposure, groundwater depths and slope stability. The NRCS descriptions of the soil types can also be found in Appendix B.

3A-3 Groundwater

Groundwater is generally deeper than 10 feet throughout the site. This is verified by the geotechnical report. Proper foundation sub-drainage and site drainage away from residences will ensure that groundwater will not present a problem for construction or long-term stability of buildings and other constructed facilities as indicated in Appendix I.

The availability and distribution of groundwater in the Yellowstone Mountain Club property is controlled by the characteristics and structure of the geologic deposits. Large springs drain the old landslide deposits on the north and south sides of the South Fork, just downstream from the confluence of Muddy Creek with the South Fork. The presence of the deep valley cut created by the South Fork through the underlying strata permits groundwater to drain out of the strata.

Availability of groundwater for individual wells will not be a concern because water for this subdivision will be supplied by two public wells located within the Settlement Subdivision (Wells #1 and #2 of the Encampment Trail Water System).

3A-4 Slopes

Slopes within the Corral range from 0 to 50 percent. The area to be developed features slopes ranging from 0 to 25 percent. General topography is shown on the Preliminary Plat. Figure 6 is a slope analysis map showing the slopes within the subdivision.

3B Vegetation

3B-1 Existing Vegetation

A large portion of the Corral has been used in the past as a corral for horses. Horses historically have been staged in this area for trail rides and pack trips. Upon platting of the subdivision, the horses will be kept off site and brought in for special events only. These areas are generally vegetated, with signs of grazing (grasses cut very low with sage brush being undisturbed). A portion of the site is covered with trees (predominately Lodgepole pine), while the vast majority of the site consists of sage brush and native grasses. Figure 4 is an aerial photograph of the site that shows the general distribution of trees and meadows.

Streams are not located in proximity to any proposed building footprints, however the South Fork are as close as 100 feet horizontally and 13 feet vertically from the proposed buildings. Wetlands do exist immediately near the river, however they do not encroach upon the proposed building sites.

3B-2 Protection

Covenants and the Design Guidelines for the Yellowstone Mountain Club require existing vegetation be preserved wherever possible. Fire management, such as removal of deadfall timber and reduction of flammable materials within specified distances from homes, will drive modifications to existing vegetation. Structures within the Corral will only be constructed within the identified designated building areas. In order to minimize disturbance, the covenants will limit the extent of grading that may be performed surrounding these areas. Vegetation removal will be limited to that which is considered necessary to provide defensible space within the designated building areas.

Mature vegetation in undisturbed areas will be preserved for its wildlife habitat and visual screening benefits. All disturbed areas will be re-seeded and stabilized to minimize soil erosion.

3B-3 Weed Management Plan

The protective covenants for this subdivision (Appendix A) require the control of noxious weeds in accordance with the Madison County Weed Program recommendations and an approved Weed Management and Re-Vegetation Plan. The protective covenants also require that the Property Owners Association is to enforce the weed management plan and maintain the commonly owned open spaces and landscaping. Grass seed types will be appropriately selected. A copy of the Weed Management Plan is included in Appendix D.

3C Wildlife

Wildlife preservation is a key component in the Yellowstone Mountain Club's planning philosophy. Wildlife is one of the area’s major assets and increases the project’s long-term appeal and value. A 1993 Wildlife Assessment by Robert Eng, PhD and Harold Picton, PhD presented the findings of their wildlife studies and mitigation recommendations for wildlife in the South Fork and Beaver Creek drainages, including the Yellowstone Mountain Club area. A 1998 update to the assessment, by the original authors, provides information and recommendations more specific to the Yellowstone Mountain Club area. The 1993 Wildlife Assessment presented nine recommendations to mitigate development impacts on wildlife. The 1998 update added four more. Part 3C-2 discusses these recommendations in greater detail. These recommendations have been integrated into the Master Plan for the Yellowstone Mountain Club and, by extension, the Corral. The 1993 study and the 1998 updates have been previously submitted to Madison County for review.

One of the conditions of approval for the Yellowstone Mountain Club by Madison County in 1999 was to embark on a wildlife monitoring program. The 1993 study and 1998 update provided a datum for subsequent monitoring efforts. Since January 1, 2000, continuous monitoring of the Yellowstone Mountain Club property has been ongoing, with monitoring reports provided at a fairly consistent interval. The latest report, covering 2015, has been included in Appendix E.

The Crucial Areas Planning System was used to determine the Overall Crucial Habitat Rank for this development. Each of the parameters within the CAPS was examined. The results of each parameter was listed in Appendix E. While many of the results were unranked or of relatively low importance, Crucial Habitat and Watershed Integrity were critical. Given this recommendation, additional effort has been put towards preserving native vegetation, re-establishing disturbed areas with native vegetation, and protection of the surface waters from runoff from the site.

As noted throughout this document, the Corral is located in a portion of the Yellowstone Mountain Club that includes a more densely clustered development pattern. The objective of this philosophy is to create a more pedestrian oriented concentration of residential development within the larger Yellowstone Mountain Club site. As a result, the vast majority of the Yellowstone Mountain Club will remain undeveloped, therefore preserving much of the wildlife habitat and migratory corridors.

3C-1 Existing Fish and Wildlife

The findings within this section are derived from the Annual Wildlife Report and CAPS data found in Appendix E.

The South Fork of the West Fork of the Gallatin River is adjacent to this subdivisions south border. This river does not contain a significant amount of game fish, and is ranked as a level 4 (the lowest ranking) with respect to game fish quality streams. Aquatic connectivity is not ranked, however it is assumed that given these waters represent the headwaters of the Gallatin River, a high quality game fish stream, the aquatic connectivity is significant, and protection of the water quality should be of primary concern. Fish Native Species Richness has been ranked as a class 4, which is relatively low when compared to the Madison and Gallatin Rivers. The size and temperature of this river limits the fish species to primarily trout.

Wildlife species that can be anticipated include large ungulates, deer, elk, mountain goats and moose along with black bear and transitory grizzlies. Since the 1993 report, the area is now regarded as grizzly bear habitat. Females with cubs are known to reside in the general area southeast of the Corral. Five (5) grizzly bear/human incidents occurred in the general area during 1997; two at Huntley Lodge at Big Sky Mountain Village. No incidents are known to have occurred on site. The site is not known to be critical habitat for any species. The small mammals and birds' species noted in the earlier Picton and Eng wildlife studies may be anticipated to be

found in the Corral. Approximately one-half of the birds the studies identified inhabit open meadows or logged areas.

Wolf sightings from Yellowstone National Park's expanding population are also occurring in the general area. None have been reported in the Yellowstone Mountain Club development, but known denning sites are as close as 10 miles to the south. Wolf sightings, however, are expected to increase as their range continues to expand.

3C-2 Mitigation of Wildlife Impacts

In their 1993 study, Dr. Picton and Dr. Eng offer nine recommendations to mitigate potential wildlife impacts of future development. These recommendations subsequently influenced the *Gallatin Canyon/Big Sky Zoning Regulation* on the land east of the Yellowstone Club. Dr. Picton and Dr. Eng added 3 recommendations in 1998. Both sets of recommendations are an integral part of the design philosophy for the site as well as the covenants and the overall Yellowstone Club development. Below is a summary of the 12 recommendations in the Picton-Eng assessment and a comment regarding their incorporation into the Yellowstone Club Master Plan and this development.

1. Cluster development in limited areas. The Yellowstone Club plan incorporates cluster development and leaves large blocks of land undeveloped. The Corral clusters 26 dwelling units within 21.93 acres in an area identified in the Master Plan for the Yellowstone Club as a clustered development area.

2. Leave large blocks of land undeveloped. The Yellowstone Club Master Plan provides that approximately 90 percent of the area on the Madison County side of the wildlife study area will be left undeveloped. As part of this development, 6.88-acres of open space are identified. It should be noted however that of the 6.88 acres, 1.99 acres of open space was removed from the proposed development area, resulting in a net open space dedication of 4.89 acres.

3. Provide cover corridors along streams and crossing points along roads. The South Fork of the West Fork of the Gallatin River is adjacent to the developments south boundary. A 100 foot wide no build corridor exists on the north side of the river within the subdivision's boundaries. Existing vegetation, and in particular trees, will remain undisturbed so as to maintain cover to the river. An existing bridge exists as part of Road B that will remain undisturbed.

4. Through covenants, or other mechanisms, restrict or prohibit: free roaming pets, planting of exotic wildlife attracting plants, feeding of large mammals and control garbage disposal. The covenants, design guidelines and management guidelines for the Yellowstone Club implement all of these recommendations, and furthermore restrict fencing, require the use of bear-proof trash containers and provide private garbage collection and disposal to a public landfill.

5. Establish a wildlife education program for residents. Management of the Yellowstone Club has implemented a wildlife education program for its residents as per recommendations from Biologists Picton and Eng and the Montana Department of Fish, Wildlife, and Parks. A wildlife brochure has been designed specifically for the Yellowstone Mountain Club. A copy of this brochure, along with the wildlife report is provided in Appendix E.

6. Conserve aspen stands, review logging and grazing practices. There are no existing aspen stands within the Corral boundary. Much of the landscaping used within and around homes within Yellowstone Mountain Club incorporates aspen trees. Future logging of the area will be limited to that which is necessary for wildfire management, home site clearing, road corridors, and wildlife habitat enhancement. The same will be true for grazing practices.

7. The use of selected food plants, including clovers, for re-vegetation of ski runs could reduce wildlife impacts and enhance viewing opportunities. Wildlife specialists and governing agencies have been consulted as to appropriate re-vegetation plant species. Subsequent to the 1993 wildlife studies, clovers have been removed from the list of re-vegetation species because they are a bear attractant. A grass-forb seed mixture developed specifically for the Yellowstone Mountain Club has replaced early re-vegetation strategies.

8. Protect the mountain goat wintering areas along the south and west slopes of Pioneer Mountain, leave a vegetative screen between ski runs and these areas. There is no known mountain goat habitat within the Corral boundary. The current Pioneer Mountain ski run configuration and current development concept complies with this recommendation.

9. Provide sanitary waste disposal for all occupied structures on Pioneer Mountain to avoid salt attraction conflicts with mountain goats. All occupied facilities within the Corral will be connected to wastewater conveyance pipelines that will transport wastewater to the treatment disposal facilities.

10. Maintain a wildlife buffer zone between Forest Service lands to the south, especially in those areas likely to harbor grizzlies in the future, by minimizing development in Sections 19, 20, 23 and 24 on the south margin of Yellowstone Club property. This subdivision is outside of the referenced sections.

11. If hunting is allowed within the project boundary, great care should be taken in timber removal for fire management so as to preserve cover areas for big game in Sections 3 and 23, north and south of Pioneer Mountain, respectively. Hunting is not allowed. If timber is removed for fire management purposes, small, naturally shaped blocks that maintain wildlife corridors and cover will be left in place.

12. Development of lands near the Lee Metcalf Wilderness boundary, especially Sections 9 and 15 should remain at a very low density or of a recreational nature. This recommendation is not applicable to the Corral; however, there are Forest Service "use" restrictions as a consequence of the Land Consolidation Act of 1998 on portions of all sections of

land bordering the Lee Metcalf Wilderness. Recreation is the only authorized use adjacent to the wilderness boundary.

In addition to the recommendations by Picton and Eng, concern for mitigation of wildlife impacts was further considered in the approval of the Yellowstone Mountain Club Master Plan by the Madison County Planning Board and County Commission, which added three conditions of approval pertaining to wildlife.

1. Avoid the use of bear-attractant vegetation, such as clover, to re-vegetate the ski runs. Clover species are not being used to re-vegetate the ski runs or any reclaimed areas.

2. Follow the recommendations of the Picton-Eng assessments. Compliance with these recommendations is discussed above.

3. The Yellowstone Club shall implement a wildlife-monitoring program. The monitoring program began in the spring of 1999. The most recent reports have been provided in Appendix E of this report. Previous copies of the monitoring results have been forwarded to the Madison County Planning Department.

A general mitigation measure suggested by the 1998 Picton and Eng Report was that wildlife personnel work in concert with the wildfire management interests in designing fuel breaks within designated open space areas, and especially in undeveloped drainages so as to maintain wildlife corridors. Roads are proposed within this subdivision as shown on the preliminary plat. These roads will create fuel breaks that are irregular in shape.

In addition to the recommendations discussed above, the 2004 Picton and Eng Report suggested that the area under decks or porches be enclosed if there is less than four feet of clearance from the ground in order to prevent bears from using these areas to den. The Yellowstone Mountain Club's Architectural Review Committee (ARC) guidelines ensure that this suggestion is implemented.

3D Historical and Cultural Resources

A Cultural Resource File Search of the Corral Subdivision has been completed by the Montana State Historical Preservation Office. There were no historic or cultural resources found within the subdivision boundaries, as indicated by the report provided in Appendix H.

3E Roads and Traffic

Primary access to the Yellowstone Mountain Club is off of Highway 64 in Meadow Village of Big Sky. At Highway 64, the primary access route starts as Ousel Falls Road, changes to South Fork Road in the Spanish Peaks project within Gallatin County and then is named Yellowstone Mountain Club Trail after it enters the Yellowstone Mountain Club (and Madison County). Primary access to the Corral will be off of Yellowstone Mountain Club Trail American Spirit

Road. Please note that road names for the internal roads will be placed on the final plat, however they have not been decided upon at this time. The existing and proposed road system provides year-round access to the Corral. All roads providing access to this subdivision are situated within a 60-foot access and utility easement. Covenants allow the Yellowstone Mountain Club Property Owners Association and Yellowstone Mountain Club, LLC to cooperatively pay all maintenance costs for on-site roadways.

Emergency access for the Yellowstone Mountain Club is provided by several alternatives within the Master Plan area. These alternatives include access to Ousel Falls Road via an existing road which travels through Spanish Peaks Subdivision located to the east of the Yellowstone Mountain Club, per Document No. 2018926 on file with the Gallatin County Clerk and Recorders Office. A summertime emergency access easement has been granted to the Yellowstone Mountain Club from the north border of Phase 3A to Mountain Village in Big Sky. A third emergency access easement has been provided to the Yellowstone Mountain Club from the eastern portion of Phase 3A to the northwestern portion of the Spanish Peaks subdivision. A fourth access road is situated south of the South Fork which accesses the east side of the golf course. This road is called Yellow Mule Trail. Local emergency access routes for the Corral subdivision will travel through the main access, which is Ousel Falls Trail/Yellowstone Mountain Club Trail.

The Yellowstone Mountain Club Property Owners Association and Yellowstone Mountain Club will provide year-round access to the subject property. Easements within the covenants guarantee road access to all future property owners and the Yellowstone Mountain Club. These two entities will provide snow removal from all roads within the project boundary as well as to and from the proposed subdivision. A mutual agreement between the Yellowstone Mountain Club and the property owners adjacent to the roadway is in place to provide for snow removal and year-round maintenance of the main Yellowstone Mountain Club's access roads from the property boundary to Highway 64.

3E-2 Traffic Generation

Traffic projections were submitted with the original Yellowstone Mountain Club Master Plan. Since this subdivision will not add additional dwelling units, the original projections will remain the same. At full build out, Yellowstone Mountain Club traffic estimates range between 2,000 and 4,000 Average Daily Trips (ADT), with seasonal variations in traffic. For the Corral, peak hour trip estimates have been calculated at 5.04 trips per hour on Road B. Average traffic generation estimates range from 11.72 ADT on the weekends to 50.4 ADT during the week. A detailed Road Design Report has been included in Appendix L which details the design of the roads and the anticipated traffic volumes.

3E-3 Traffic Impacts

The main access road into the Yellowstone Mountain Club is adequate to handle the traffic from the Corral Subdivision. Yellowstone Mountain Club Trail and American Spirit Road will accommodate all of the traffic from this Subdivision. Impacts to the intersection of Ousel Falls Road and Highway 64 at Big Sky Meadow Village were the subject of a Rural Improvement District (RID) created by separate resolutions in Gallatin County on June 17, 2009 and Madison County on August 11, 2009. The improvements associated with this RID include the addition of dedicated turn lanes at the intersection of Ousel Falls Road and Highway 64 as recommended by the Montana Department of Transportation along with paving improvements from the Ousel Falls/Highway 64 intersection to the Yellowstone Mountain Club gate on Yellowstone Mountain Club Trail. These improvements have been completed.

The Big Sky Transportation District provides a bussing system for anyone, regardless of employer or purpose of travel. Yellowstone Mountain Club is the largest contributor to the Big Sky Transportation District with an annual contribution of $200,000. Additionally, there is a Yellowstone Mountain Club employee van pool. This van pool provides transportation directly from Meadow Village to Yellowstone Mountain Club and from Bozeman to Yellowstone Mountain Club on an as needed basis. This service is modified depending on the seasons. The cost of this service is approximately $250,000 per year. As a result, the Yellowstone Mountain Club is the largest supporter of public transportation in Big Sky.

One of the primary goals of this development is to create a pedestrian and multi-model oriented development pattern within the subdivision and the nearby Big Springs Village. As a consequence, impacts associated with vehicle traffic are primarily limited to those generated by arrivals and departures. Proximity to a range of essential services and the ease of access to multi-modal facilities within the development further establish this principle.

3F Utilities

All utilities will be underground (with the exception of transformers, telephone pedestals and control panels) and located within existing or proposed utility easements. Electrical power lines are currently installed along Yellowstone Mountain Club Trail. Proposed utility easements will be provided during the final platting process.

Electrical service is currently available to the Corral Subdivision by extension of existing facilities currently servicing areas adjacent to The Settlement boundary. Natural gas is not currently available to the project. The preliminary plat will be provided to local utility companies for utility planning.

Comments were solicited from the utility companies; Copies of these letters are in Appendix F.

3G Emergency Services

Public Safety and Privacy, Incorporated (hereafter referred to as "PSPI"), has been established to provide private fire protection, medical, and security services to the Yellowstone Mountain Club

and its members/guests. This includes maintaining a full-time professional staff and necessary equipment and facilities including ambulances and firefighting equipment. The professional staff operates in cooperation with local public law enforcement, fire protection and medical services. Currently, there are three captains that maintain operations at the Fire Department. The Yellowstone Mountain Club Fire Department is actively and aggressively looking for a fire chief.

PSPI employs a private security force to handle day-to-day emergency issues. Space is provided for security personnel in the existing entryway gatehouse. This provides a physical location for coordination of security services.

3G-1 Fire Protection Services

As mentioned above, PSPI provides fire protection services to the Yellowstone Mountain Club. The fire station is located on the north side of the Warren Miller lodge, which is fully operational. Response time to the Corral Subdivision is estimated to be 7 to 10 minutes.

In the event of a large wildfire occurring under extreme weather and fuel bed conditions, additional resources from Gallatin County, and southwest Montana in general, can be called upon. Response times of over 2 hours should be anticipated for these types of fires. Under normal fire conditions, the Big Sky Fire Department and Custer Gallatin National Forest (CGNF) can, through mutual aid, adequately protect this development. The CGNF helicopter may be the first resource on the scene.

In addition to Big Sky Fire Department services, the Custer Gallatin National Forest provides wild land fire protection in the area. The Custer Gallatin National Forest keeps a varying number of wild land fire engines in the Big Sky area from mid-May through mid-October.

3G-2 Wildfire Risk Assessment and Mitigation Measures

Bruce Suenram of Fire Logistics, Inc. has provided previous risk assessments and mitigation plans for the Yellowstone Mountain Club, including an overall assessment for the development. Previously-conducted risk assessments and mitigation plans noted that the most significant risk to the overall Yellowstone Mountain Club was wind-driven fires coming from the southwest off site and threatening the Muddy Creek drainage and the upper South Fork drainage. The off-site risk from the southwest to the Corral Subdivision will be mitigated by implementation of fire prevention measures, which include the installation of fire breaks, improvement of vehicular access, installation of fire hydrants and the use of sprinklers in all structures.

The previous fire assessments and fire protection plans have been provided to Madison County. The covenants incorporate recommendations from the assessments and plans to mitigate fire risk. Overall, the Yellowstone Mountain Club Property Owners Association and the Yellowstone Mountain Club provide an organizational structure to implement fire management measures.

3G-3 Law Enforcement

PSPI provides a private security force to serve the Yellowstone Mountain Club that works in cooperation with local law enforcement. The Gallatin County Sheriff‘s Department, by way of an inter-local agreement with Madison County, will provide police protection. A letter requesting comment concerning the Corral Subdivision from the Madison County Sheriff’s Department was sent, however comments were not received. Approximate response times to the Corral is estimated at 30-35 minutes. As part of a larger, privately secured development with sporadic occupancy, the likelihood of frequent demand for law enforcement services, beyond those provided through PSPI, is relatively low.

3G-4 Ambulance and Medical Services

PSPI will provide emergency services for members and guests in cooperation with the Big Sky Fire Department. Two fully-operational ambulances are stationed in the fire station at the Warren Miller Lodge. Ambulance response time is estimated at 7-10 minutes to the Corral Subdivision. Hospital facilities are available in Big Sky at the Bozeman Health-Big Sky Medical Center located in Meadow Village.

3H Schools

The tax base created by the Corral Subdivision will support local schools. Although any students residing on the site will reside in Madison County, they will likely attend Gallatin County schools. The schools likely serving this development are Ophir Elementary School and Lone Peak High School. Both are approximately 15 miles from the site. State legislation authorizes the district of residence (Madison) to pay tuition to another school district (Gallatin/Bozeman) for schooling costs.

The Corral will consist primarily of recreational and seasonally occupied homes. As a consequence, estimating school age children is difficult. Due to the relatively small number of units within the subdivision and the seasonal occupancy, it is doubtful that the development will generate an appreciable number of school age children. However, as a base of reference, the *Gallatin Canyon/Big Sky CIP* (Pg. 6) estimates that 29% of dwellings in the Big Sky area are permanently occupied. This percentage will be used as a basis for calculating the number of permanently occupied dwellings in the subdivision. Due to the nature of this development, these estimates will be very conservative.

Using the *Gallatin Canyon/Big Sky CIP*, and an estimated permanent occupancy of 29%, roughly 7.54 of the 26 dwellings will be permanently occupied. Permanent residences generate 0.41 children per household (Pg. 19). Therefore, 7.54 permanent residences would generate roughly 3.09 school age residents. The ratio of students is approximately two-thirds elementary and one-third high school.

Copies of letters sent to the school districts are provided in Appendix F. No responses were received from the impacted districts as of the date of drafting this application.

3I Land Use

The *Yellowstone Mountain Club Master Plan* defines the overall plan for the Yellowstone Mountain Club. The Master Plan is the county-approved guidance document for land uses on the site. Development pods are located as sensitively as possible to protect the natural amenities of the area and to provide for public safety and convenience.

The primary land uses historically are logging and dispersed recreation. Re-growth from past timber harvests consists of Lodgepole Pine/Subalpine Fir forests of various ages. Several logging roads exist throughout the area. More recently, the site has been used for pasture land for the horses within the Yellowstone Mountain Club's equestrian activities. The current use of the land is classified as vacant un-platted land, however 1.99 acres of the subdivision are currently open space that will be moved as part of this subdivision.

3I-1 Adjacent Land Uses

The Corral is located west of The Settlement Subdivision, and approximately 500 feet north of the fire department/Warren Miller Lodge. Nearby facilities include fishing access, ski runs, ski lifts, ropes course, zip line, tennis courts, pool, sauna, spa, sports courts and fields, paint ball course, hiking and biking trails, golf course, and the commercial facilities housed in the Warren Miller Lodge and Big Springs Village area. The site is near single and multi-family residential uses that are similar in use and form, and commercial uses that are part of the Big Springs Village Phase 1b subdivision. The uses proposed with this subdivision are consistent with those residential uses adjacent to the subject property. Adherence to the Yellowstone Mountain Club Design Guidelines will prevent the likelihood of any potential conflicts.

3I-2 Permitted Land Uses

There is no zoning on the Corral Subdivision site. The *Madison County Growth Policy* provides general county-wide land use policies and goals. These policies and goals generally strive to protect natural resources and agricultural lands, avoid burdening county and local services, enhance the county's economy, and respect private property rights.

The *Yellowstone Mountain Club Master Plan* meets the intent of Madison County's Growth Policy. The Master Plan for the Yellowstone Mountain Club is approved by Madison County and is now the primary guidance document of the Yellowstone Club properties. This application is in compliance with the approved Yellowstone Club Master Plan.

3I-3 Access to Public Lands

Development of the Corral will have no effect on public access. It will not result in closure of public access to hunting or fishing areas, or to public lands. There are no public lands adjacent to the site.

3I-4 Hazards

Hazards on the site are typical of the Big Sky Area. Natural hazards such as landslides, earthquakes, lightning strikes and wildfires are the most common area-wide hazards. Geologic hazards (landslides and seismic activity) are discussed in Part 3A-1.

The most pronounced hazard on the site is the risk of wildfires. Fire management assessments for the Yellowstone Mountain Club project were discussed previously. The most dramatic finding of the fire risk assessments is the threat from wildfires originating outside the project boundaries. The risk from on-site wild fires is relatively minor at present; however, as re-growth in harvested areas occurs, the fire risk could increase. Mitigation measures for on-site and off-site wildfire risks are detailed in Part 3G-2 and in the previous fire assessments and fire protection plans furnished to Madison County.

The site is in close proximity to the South Fork River, which could be a hazard during high water. The homes have been placed a minimum of 13 vertical feet from the drainages.

There are underground utilities within the site. These utilities have been researched and have been placed on the construction plans. No other man-made hazards are known to exist on the site. There are no mining activities, high-pressure gas lines, dilapidated structures that will remain(there is a lean-to horse shelter that will be removed), or irrigation ditches on the site.

3J Parks and Recreation Facilities

There is no parkland dedication proposed with the Corral, however there will be a 6.88 acre tract of open space that will be created as part of this subdivision, 4.89 acres of which is newly created open space. Maintenance of the open space will be by the Yellowstone Mountain Club Property Owners Association.

The recreational needs of the future residents will be met by the overall project. Open space and recreational facilities are a major component of the Yellowstone Mountain Club in general and will be available for use by residents of the Corral Subdivision. Recreational opportunities will exist throughout the entire project, and will include the Pioneer Mountain Ski Area, an extensive multi-use trail system for hiking, biking, horseback riding, and cross country skiing, an 18-hole golf course, and resort type facilities in the Village Area including fishing access and other amenities.

IV. ADDITIONAL MADISON COUNTY PRELIMINARY PLAT APPLICATION REQUIREMENTS

4A Introduction

In addition to the application information required by the State of Montana Joint Application, Madison County requires information be provided relating to four other topics. These are: 1) a discussion regarding the seven areas of public interest criteria noted in state law and three additional criteria noted in the Madison County Subdivision Regulations; 2) a discussion regarding the provision of a "Land Stewardship Plan"; 3) a discussion as to the application's compliance with the Madison County Plan; and 4) a discussion as to how this application meets the Specific Standards for condominiums as outlined in the Madison County Subdivision Regulations, Part IV-B.6. b and e.

4B Public Interest Criteria

Criteria #1 Effect on Agriculture

None of the proposed subdivision site or surrounding area has been cultivated in the past. Previous land uses of adjacent properties in this portion of Yellowstone Mountain Club were limited to logging activities and limited horse grazing. There will be no effect on agriculture.

Criteria #2 Effect on Agricultural Water User Facilities

There are no agricultural water user facilities, such as impoundment structures or irrigation ditches on or near this site that serve on-site or downstream water users. There will be no effect on agricultural water user facilities.

There will be no water rights conveyed with ownership of this subdivision.

Criteria #3 Effect on the Natural Environment

Overall effect on the natural environment will be minimal.

Neither surface water nor ground water degradation is likely. Ground water depths are such that contamination is not likely. All surface runoff measures will be compliant with applicable State and Federal regulations. While surface runoff from rainfall can make any soil type vulnerable to erosion, appropriate erosion control measures and Best Management Practices will prevent erosion into adjacent surface waters.

Groundwater and surface water will be protected due to the use of central water and sewer systems, which is currently undergoing review by the Montana Department of Environmental Quality.

The grizzly bear is the only animal Species of Concern (through the Montana Fish and Wildlife database) within the township that the Corral is located within. Whitebark Pine is the only species of concern or potential species of concern within the township, however this tree does not exist within the site. Given the high density of development and reservation of open space over the vast majority of the Yellowstone Mountain Club property, coupled with the lack presence for both plant and animal species of concern, both the Grizzly Bear and the White Bark Pine is unlikely to be negatively impacted by this development.

The Yellowstone Club's overall weed management plan addresses weed management and re-vegetation issues. The covenants assure that the management plan will be implemented on an annual basis.

Air quality will not be affected.

A 100 foot construction setback is proposed along the South Fork, therefore riparian areas, floodplains and wetlands will not be affected.

The proposed access roads and driveways have been placed to minimize site grading requirements as much as possible. Covenants will minimize disturbance by relegating site grading to a pre-determined distance outside of each building envelope. Erosion potential from construction activities will be controlled as noted above.

The subject property is well suited for the project proposed. The site is located near the existing Big Springs Village area and will contribute to the concentration of development activities in a centralized area with a range of services accessible by means other than an automobile. Because no increase is proposed in the overall number of housing units approved in the 1999 YMC Master Plan, the concept of clustering development within development pods ensures that the vast majority of the Yellowstone Mountain Club will remain as undeveloped land.

Criteria #4 and #5 Effect on Wildlife and Wildlife Habitat

There are no known critical habitats on site or in the immediate proximity. The subdivision is not in an area of winter range for elk, an elk calving area or in an elk migration corridor. The site is not known to be a breeding area for wildlife.

Grizzly Bears are the only listed Species of Concern to be observed in the general area, but they are not known to inhabit this particular site. Recommended mitigation measures from the Montana Fish Wildlife and Parks and Department of Interior have been in place for several years as part of the Yellowstone Mountain Clubs operations. It is likely that wolves from neighboring packs occasionally pass through the area. For additional information regarding wildlife, please see the Annual Wildlife Report in Appendix E.

Consideration of wildlife was an integral part of the overall design of Yellowstone Mountain Club. As part of the approved Master Plan, there is an on-going wildlife monitoring program. As stated above, a summary of the most recent wildlife monitoring efforts (from 2015) is provided in Appendix E. A summary of the wildlife impact mitigation measures is provided in Part III of this document. These mitigation measures are based on recommendations from recognized wildlife conservation experts. This subdivision fits within these recommendations and mitigation measures. There are no known un-mitigated impacts to wildlife as a consequence of this subdivision.

The covenants and Architectural Design Guidelines require that future land owners adhere to a series of wildlife protection measures in order to help mitigate wildlife impacts. Examples include a requirement to provide bear-proof garbage and a prohibition on the feeding of large wildlife. It is unlikely that development of this subdivision will displace wildlife that would, in-turn, create problems for adjacent land owners.

Criteria #6 Effect on Local Services

Water & Sewer

The water for this subdivision will be provided by a central public water supply system. Wastewater from the subdivision will be conveyed to a central wastewater treatment facility. The sewer system is currently undergoing upgrades and expansions to accommodate future development. The Yellowstone Mountain Club Property Owners Association is responsible for maintenance of these systems.

Traffic

Traffic to be generated by this subdivision was accounted for in the original traffic estimates within the Master Plan. Traffic generated by this particular subdivision phase will range from 14.4 to 50.4 vehicle trips per day (see supporting documentation in Appendix L).

Traffic impacts from this subdivision are not anticipated to create any problems that were not anticipated by the Yellowstone Club Master Plan nor create the need for additional infrastructure improvements.

Impacts to the intersection of Yellowstone Club Trail and Highway 64 at Big Sky Meadow Village were the subject of a Rural Improvement District (RID) created by separate resolutions in Gallatin County on June 17, 2009 and Madison County on August 11, 2009. The improvements associated with this RID include the addition of dedicated turn lanes at the intersection of Ousel Falls Road and Highway 64 as recommended by the Montana Department of Transportation along with paving improvements from the Ousel Falls/Highway 64 intersection to the Yellowstone Mountain Club gate on Yellowstone Mountain Club Trail. These improvements have been completed.

Capacity of Local Services

Public Safety & Privacy, Inc. (PSPI) has been established to provide security, fire protection, and medical services to the Yellowstone Mountain Club. A full-time staff of emergency personnel located in the Yellowstone Mountain Club Village Area is available for emergency response scenarios. A fleet of emergency service vehicles, including ambulances and firefighting equipment, is also available. Security will be provided by PSPI and police protection will be provided by the Gallatin County Sheriff's Department through a cooperative agreement with the Madison County Sheriff's Department. Because of the overall recreational nature of the development, the burden on local services, per dwelling unit, is expected to be less than existing developed areas outside of the Yellowstone Mountain Club. Property tax increases will offset the cost of services. There has been no correspondence from local service providers requesting special impact assessments or mitigation fees beyond what the increased tax base should provide.

Affordable Housing

Provision of employee housing has been part of the overall development plan for the Yellowstone Mountain Club. While plans for permanent, employer provided housing is not currently planned, mitigation measures have been enacted to assist others in affordable housing. These measures include the provision of public transportation intended to offset the lack of affordable housing throughout the greater Big Sky area. An Employee Housing Mitigation update and discussion on current proposals to address employee housing are included in Appendix M.

Utilities

All utilities will be underground and located as shown on the preliminary plat. Utility easements located outside of the subdivision boundary will be provided during the final platting process.

Arrangements have been made with utility providers for service to all areas planned for development within Yellowstone Mountain Club. Electrical power and fiber optic cable will be installed as part of the development. As of this writing, none of the service suppliers has indicated a problem with providing utilities to the site.

Criteria #7 Effect on Public Health and Safety

Water will be supplied to the Corral through extensions and service connections to the Encampment Trail Water System. The well testing program (part of the Public Water Supply operation) indicates that a clean and adequate water supply exists and can be expanded for use by the Corral Subdivision. This water system has adequate capacity to meet the additional demands of this subdivision.

There are several man-made hazards on the property; however none pose an increased significant hazard to the public. Steep slopes, underground utilities, stands of trees, traffic, and retaining walls are the major hazards that can be expected within the subdivision, however these are not considered to be significant. Human-wildlife incidents have not been identified as a significant hazard. They have been addressed through the wildlife mitigation efforts in the design of the overall development and the covenants on the property.

Potential natural hazards include risk of wildfire, earthquakes and the presence of open water. Wildfire risks have been mitigated and discussed previously. Homes within the Yellowstone Mountain Club are required to be designed based on the increased seismic hazards found within this area. Owners will be cautioned during times of high water through the Yellowstone Mountain Club Fire Department.

Criteria #8 Effect on Other Resources in the County

Access to Public Lands

There are no public lands adjacent to or in the vicinity of the subdivision site. Open space will be created with this subdivision. Access to public lands will not be affected as a result of this subdivision. The site is within the overall Big Sky/Yellowstone Mountain Club community, which is a year-round recreational destination resort.

Mineral Resources

Mineral deposits in the area are not known to exist. The approved master plan for the area does not include exploration or mining of any of mineral resources. There are no mineral rights attached to this property, nor will mineral rights be conveyed with the property.

Outdoor Recreation, Tourism, Scenic and Cultural Resources

This particular subdivision will contribute to the implementation of the Yellowstone Mountain Club Master Plan, which, when developed, will contribute to the overall recreation and tourism economy of Madison County (cumulative impact). The master plan emphasizes the year round recreational activities that will be offered, including alpine and Nordic skiing, hiking, fishing, golfing, biking and rafting in a scenic setting that is ideal for all of these activities. The subdivision will not contribute to resource user conflicts.

The Second Yellow Mule Creek Forest Service Trail #42 is located within sections 8, 17, 18 and 19 of Township 7 South, Range 3 East, which is a public access trail bisecting a portion of the Yellowstone Mountain Club property. This trail is located approximately 3.5 miles (at its closest point) to the east of this subdivision.

Criteria #9 Effect of Proposed Subdivision on the County's Economy

This proposed subdivision phase, and the other developed components of Yellowstone Mountain Club, will strengthen the local economy in Madison County. In addition to expansion of the tax base and increase in tourism, the year round recreational nature of the resort will create permanent, year round jobs within the resort and elsewhere in the community.

Construction is already a major asset of the local economy and much construction is necessary to achieve full build-out of the Yellowstone Mountain Club. Residential/recreational home construction and commercial facility construction will generate significant revenue in the local economy. In addition to construction, the development and long term presence of this subdivision will create opportunities for a variety of other local businesses and employment sectors.

The increase in annual revenue that Madison County and the State of Montana will receive from the Yellowstone Mountain Club residential properties will increase overall tax revenues and decrease reliance on existing revenue sources, including agricultural land tax levies. In terms of estimated tax revenue increases, the Corral Subdivision is located on Madison County tax parcel number 28003600. The proposed parcel is 28.81 acres (including open space) of an existing 619.14 acre parcel of land (4.65% of the parent parcel). Current (2015) property taxes on this parcel totals $60,307.44. Assuming the tax value is proportionately distributed across the parent parcel, the tax revenue currently received from the *proposed* parcel is calculated as 4.65% x $60,307.44 = $2806.24.

The total estimated property taxes on the proposed parcel are assumed based on the anticipated property value (based on prior sales) and an Average Effective Property Tax Rate for Madison County of 0.55%. Assuming the property values are $6,000,000 per unit with 26 total units, the assumed property value upon development is calculated below:

$6,000,000/ unit x 26 units = $156,000,000

$156,000,000 x 0.55% = $858,000

The net increase in property taxes is therefore $855,193.75 (a factor of 305.75 times more tax revenue).

This subdivision will not have an impact on the economic viability of agriculture.

Criteria #10 Effect of proposed subdivision on public services provided by other entities

The proposed subdivision will have no known negative impact on services or cost of these services provided by any other local entities.

Part 4C Land Stewardship Plan

The issues addressed in the Stewardship Plan Outline of the Madison County Subdivision Regulations are generally addressed by the Corral Master Covenants, Property Owners Association, weed management plan and by the individual storm water permits required by the Montana DEQ when state approvals are sought.

Vegetative Health

The proposed weed management plan will be the primary instrument to insure vegetative health of the subdivision. The Madison County Weed Board has been involved with subdivision/landowner noxious weed control management plans at Yellowstone Club since 1999. The weed management plan for the Corral has been submitted to the County Weed Manager. The covenants require implementation of the weed management plan and restrict the removal of native vegetation. Agricultural Best Management Practices such as grazing will not be applicable to this subdivision. Disturbed areas will be revegetated immediately upon construction. Revegetation will primarily consist of native trees and grasses.

Public Access

There are no public lands to which public access could be provided by this subdivision.

Wildlife

The proposed subdivision is in addition to the approved Yellowstone Mountain Club Master Plan, which has made very significant provisions to mitigate impacts on wildlife. Covenants on the property will assure that development and occupation of the lots will be consistent with the mitigation measures recommended by Dr. Picton and Dr. Eng in their wildlife studies of the area. As an example, garbage containers will be of a "bear-proof" type approved by the Yellowstone Mountain Club Owners Association, hunting will not be allowed within Yellowstone Mountain Club.

Livestock Grazing / Other Agricultural Uses

There are no grazing or other agricultural activities within the Corral Subdivision boundaries and none are proposed. It should be noted that the subject property did previously contain an equestrian center that contained horses from time to time, however this program has been moved off site.

Recycling

Several recycling programs exist within the Yellowstone Mountain Club. Some of the key programs are as follows:

- Members, contractors and employees of the Yellowstone Mountain Club are encouraged to utilize onsite recycling containers. Receptacles for aluminum, plastics, paper and cardboard are placed at the entry gate and at the Warren Miller Lodge.

- Water dispensers and re-useable water bottles are being used at the Camps in order to replace hundreds of plastic water bottles, and re-useable water bottles are being sold at the Warren Miller Lodge.
- The housekeeping crews have converted to non-toxic cleaning products and laundry detergent.
- Styrofoam peanuts and other packaging materials from shipments arriving at Yellowstone Mountain Club are delivered to a local shipping company in Big Sky for re-use.
- The Yellowstone Mountain Club has also created the YC Green Team in April of 2010, in which many employees volunteer to clean the trails and assist in increasing recycling awareness.
- The Yellowstone Mountain Club Architectural Review Committee now requires a "Dark Sky" ordinance to lessen the impact of exterior or stray light pollution. Additionally, design criteria now include every new home to have a room to the garage with exterior access for trash and recycling services.
- Restaurants within Yellowstone Mountain Club have replaced disposable utensils and plates with ware-wash utensils and plates.

Protection of Water Resources

Surface and groundwater resources will be protected by the implementation of designated building sites, which dictate the location of the future dwelling units. Central sewer and water systems, and adherence to local, state and federal regulations will further protect water resources. To assure reliability and conformance to state and local regulations, management of the central water supply and sewage disposal systems are the responsibility of the Yellowstone Mountain Club. There are no surface water bodies within the proposed building sites.

4D Compliance with the 2012 Madison County Growth Policy

Compliance with the Guiding Principles

The 2012 Madison County Growth Policy adopted, the general Guiding Principles, Goals and Objectives from the 1999 Comprehensive Plan Update and the 2006 Growth Policy. The proposed subdivision is in compliance with the guiding principles from the 2012 Madison County Growth Policy. It meets or exceeds the 5 guiding principles noted in the Plan. Specifically:

Principle #1: Locate new development close to existing services and communities.

This principle is met because the Corral is located near the existing Big Springs Village area, which represents high density, clustered development. The proposed development is in proximity to existing ski runs within the Pioneer Mountain Ski Area and will be part of the greater Big Sky recreational area.

Principle #2: Protect our river corridors.

This principle is met. This subdivision, at its closes point, is over 100 feet horizontally from State surface waters. Structures within this subdivision are a minimum 100 horizontally and 13 feet vertically from State surface waters. The area separating this subdivision from State surface waters generally consists of heavily forested terrain. Storm water management policies combined with best management practices will minimize the potential for degradation of receiving waters.

Principle #3: Preserve our most productive agricultural lands.

This principle is met. The site has not been used for agriculture nor does it have significant agricultural value. Providing recreational housing in appropriate locations provides a housing supply that may help offset demands that might otherwise be met on productive agricultural lands.

Principle #4: New development should pay its own way.

This principle will be met. The proposed subdivision is located near other recreational home sites and near the Big Springs Village area, which will reduce response times. Community services such as private security and fire protection are provided by PSPI, based in the Yellowstone Mountain Club's Village Area. The tax base to be created by this subdivision will offset the cost of services. No public expenses will be incurred to provide water supply, sanitary waste disposal or any other improvements.

Principle #5: Respect private property rights.

This principle is directed to the County at large, rather than individual applications, however, creation of the proposed development would be consistent with the principle.

Compliance with the Growth Policy's goals and objectives:

The proposed subdivision meets the applicable goals and objectives. It is located in an area that adds to the value of the recreation and tourism economy of Madison County. The area is appropriate for recreational development and is proposed as part of a county-approved master planned area. The site is not useful for mineral extraction or for agriculture. Environmental protection is part of the overall Master Plan for the Yellowstone Mountain Club, including protection of water, visual, open space and wildlife resources. Provision of community services is accounted for in the Master Plan for the Yellowstone Mountain Club and the BSV PUD. Publicly provided services will be augmented by privately provided services within the Yellowstone Mountain Club and supported by the increased tax base. Overall, creation of the proposed subdivision will be consistent with the County Growth Policy. The Corral will not add any acreage to the overall Yellowstone Mountain Club, and the original number of housing units approved in the original 1999 YMC Master Plan will be maintained.

4E Compliance with Madison County Subdivision Regulations, Part IV-B.6. b and e

MCSR, Part IV-B.6.b (1): Special provisions for condominium developments exist due to the high density of the development. Storage facilities are commonly needed for high density developments due to the relatively small living spaces and restricted outdoor or common spaces. This development would seemingly fall into this category. Understanding this, the developer has proposed large condominium units with significant storage areas within each unit.

MCSR, Part IV-B.6.b (2): In addition to storage, parking can also become congested in high density developments similar to this. In contrast however, owners within the Yellowstone Club typically use their residences as secondary homes (not primary dwellings), which relieves parking congestion. On average, each owner has only one vehicle, and in many cases, this vehicle is a rental vehicle. There are some cases where Owners have more than one vehicle, but that is not the norm. Recreational vehicles, boats and trailers are not allowed to be stored on-site or near the residences per the Covenants. Should the owner desire to have such additional vehicles, they will be required to be stored off-site or store it within their garage. Understanding this, the Design Guidelines and Owners have allowed fewer parking spaces for newer homes than originally required by the Yellowstone Club Architectural Design Guidelines. This development proposes each unit contains its own two car garage with two exterior parking spaces provided. On street parking is not encouraged, however parking areas along the roads have been provided for overflow parking. It is believed that this parking scenario will adequately serve the owners and their guests.

MCSR, Part IV-B.6.b (3): Landscaping within the subdivision is proposed and under development by Design 5, an established and respected landscape architecture firm in Bozeman. This master plan intends to mesh the landscaping within each development into one large, attractive landscape that is consistent with Big Springs Village, Phase 5, and Camp YC.

MCSR, Part IV-B.6.b (4): Mail delivery to each unit will be delivered to a central mail room for all owners within the Yellowstone Mountain Club. This form of mail delivery currently exists and works well for the owners.

MCSR, Part IV-B.6.b (5): Street lighting is not proposed within this project. Lighting is proposed on each home, which will be the limits of exterior lighting. It is the intent of the Yellowstone Mountain Club to maintain night sky compliance (per the Architectural Review Board) and to minimize the light pollution resulting from excessive lighting.

MCSR, Part IV-B.6.e (1): While construction of this project is likely to begin shortly after receiving approval from the Montana Department of Environmental Quality, it is unlikely to be completed prior to filing this final plat. For this reason, a Subdivision Improvements Agreement will likely be entered into upon platting of this subdivision.

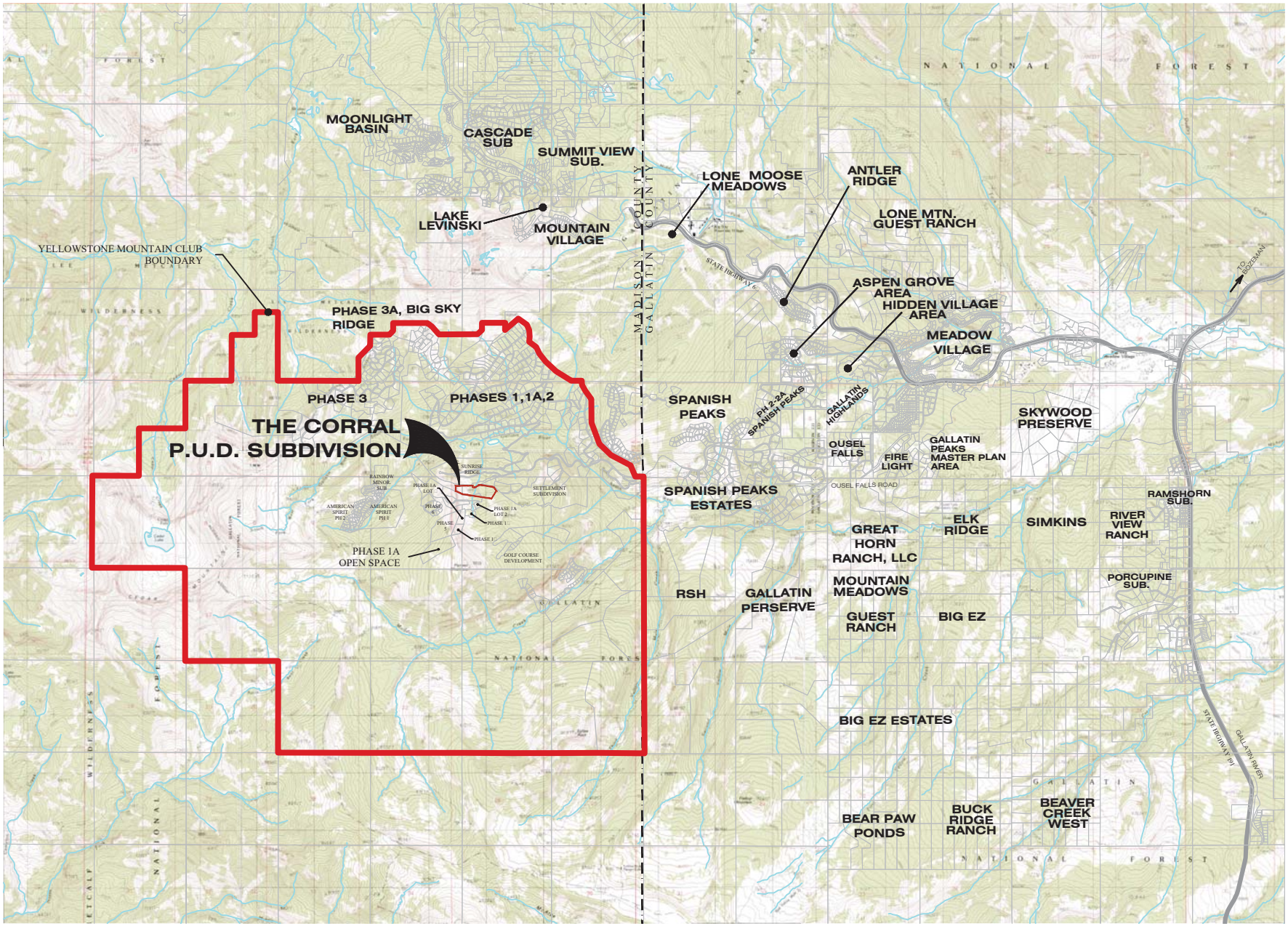
MCSR, Part IV-B.6.e.(2)(a): As discussed above, on-site parking of boats, trailers, or other recreational vehicles is not allowed per the covenants. If additional storage is needed, owners will need to store these items off-site, per the covenants. It is not anticipated that this will become an issue however, given the nature of the residences being secondary homes and the recreational "draw" is skiing.

MCSR, Part IV-B.6.e.(2)(b): No on-site storage areas are proposed.

MCSR, Part IV-B.6.e.(2)(c): Adjoining land uses are similar (with the exception of open space), therefore no landscaping or fencing separation measures are proposed.

MCSR, Part IV-B.6.e.(2)(d): Visitor parking is provided via outdoor parking at each dwelling. As mentioned above, each dwelling will have a two car garage with two exterior parking spaces located outside of the dwelling. On street parking, while not encouraged, is also available.

THE CORRAL P.U.D. SUBDIVISION
VICINITY MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

VICINITY MAP

PROJECT NO. 0001.061

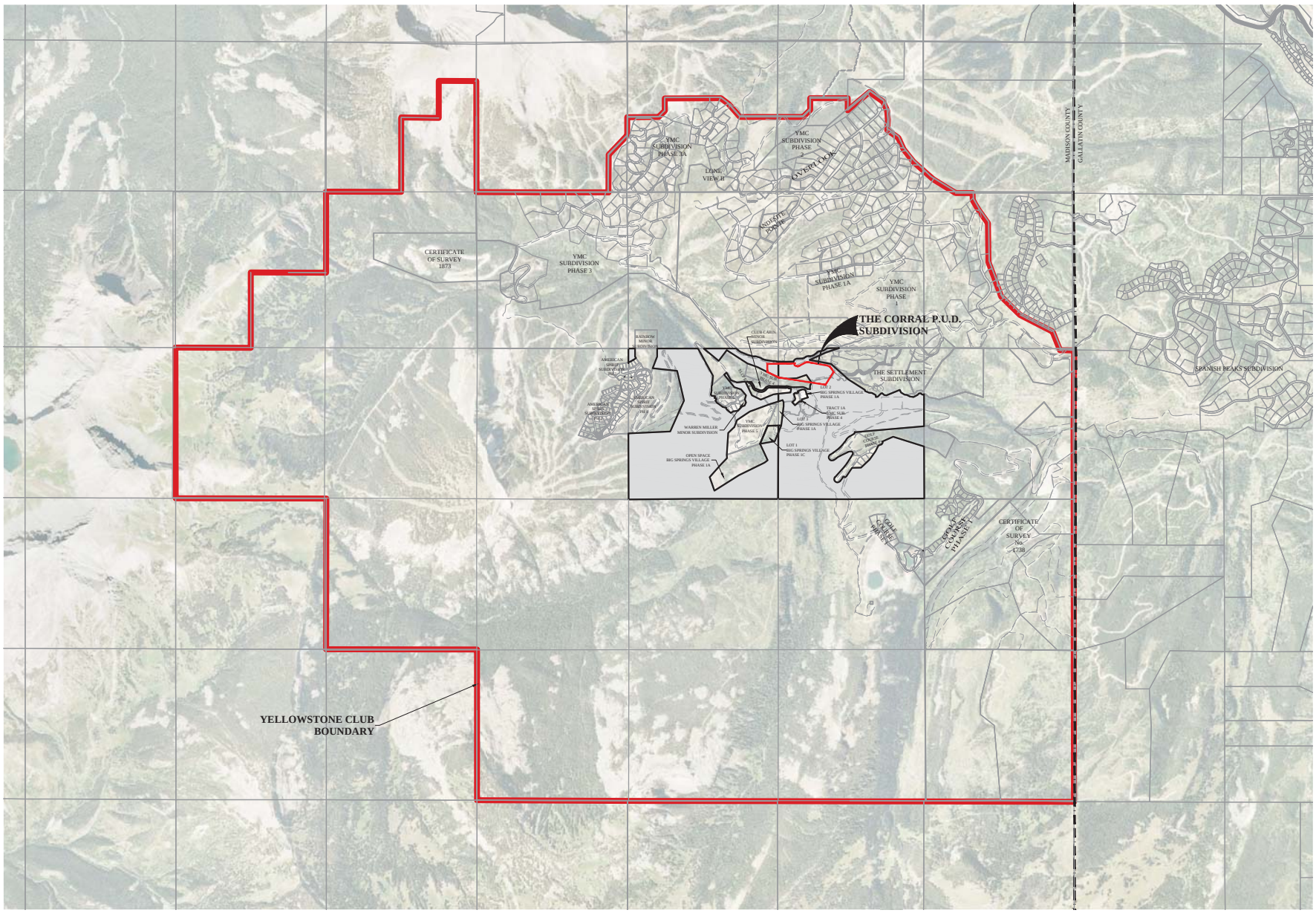
FIGURE NUMBER 1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 1 - BIG SKY MAP.dwg Plotted on J□n/2□/2016

VICINITY MAP of

THE CORRAL P.U.D. SUBDIVISION

AN UPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E,
AND THE NW1/4 SECTION 7, T7S, R3E, P.M., MADISON COUNTY, MONTANA



0 5000

(IN FEET)

LEGEND

- YELLOWSTONE CLUB BOUNDARY
- COUNTY LINE
- PARENT PARCEL

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION

BIG SKY MONTANA

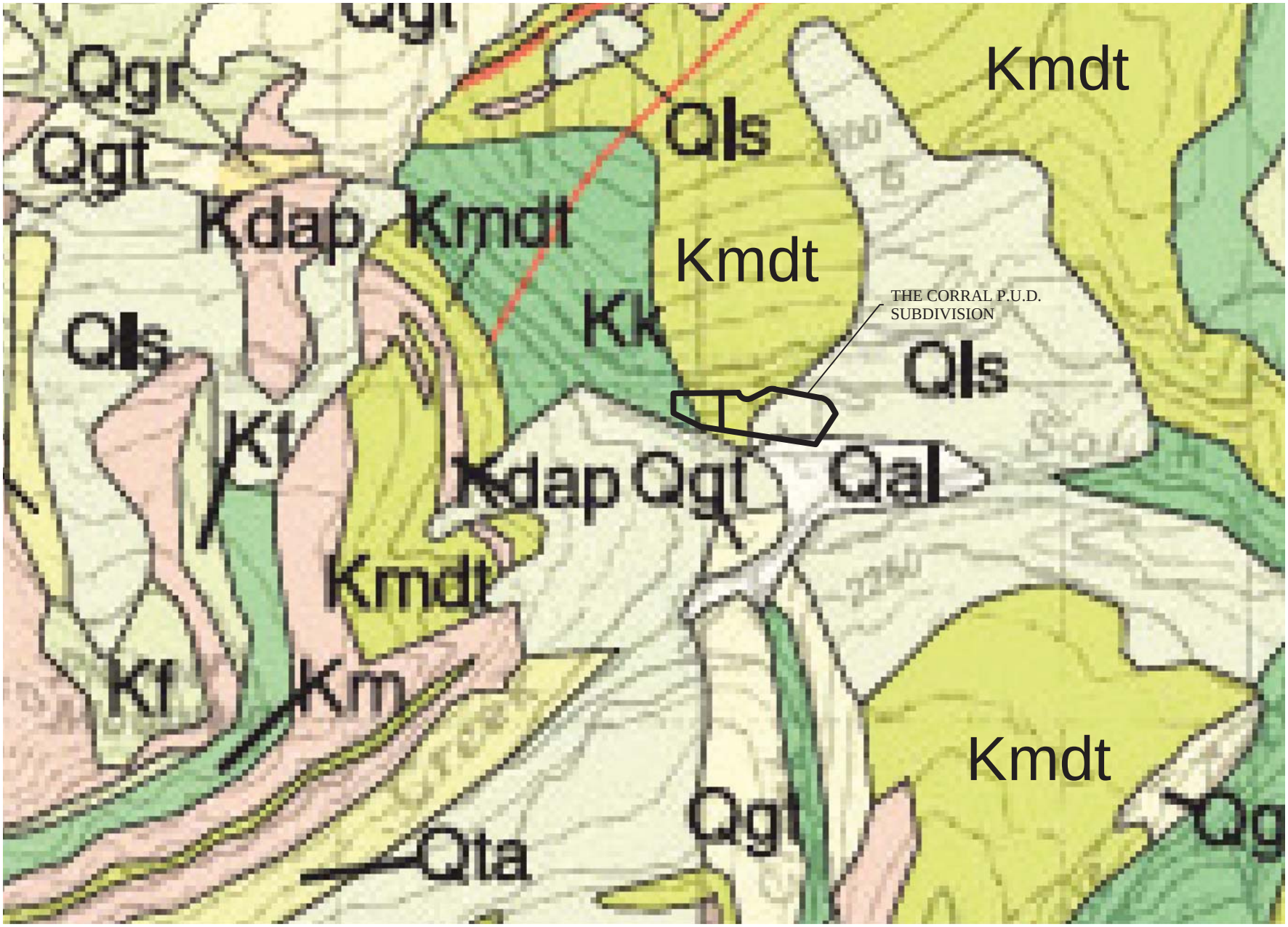
VICINITY MAP

PROJECT NO. 0001.061

FIGURE NUMBER 2

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 2-VIC MAP YC.dwg Plotted on Jun/28/2016

THE CORRAL P.U.D. SUBDIVISION
SURFACE GEOLOGY MAP



0 2000

(IN FEET)

LEGEND

Kk	Kootenai Formation
Kmdt	Muddy Sandstone and Thermopolis Formation, undivided
Qls	Landslide Deposit
Qal	Alluvium of Modern Channels and Flood Plains

Montana Bureau of Mines and Geology
Open File 529

Geologic Map of the Ennis 30'x60' Quadrangle, Madison and Gallatin Counties, Montana and Park County, Wyoming

Karl S. Kellogg and Van S. Williams, U.S. Geological Survey, Denver, CO

2006

HOUSER
ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MT

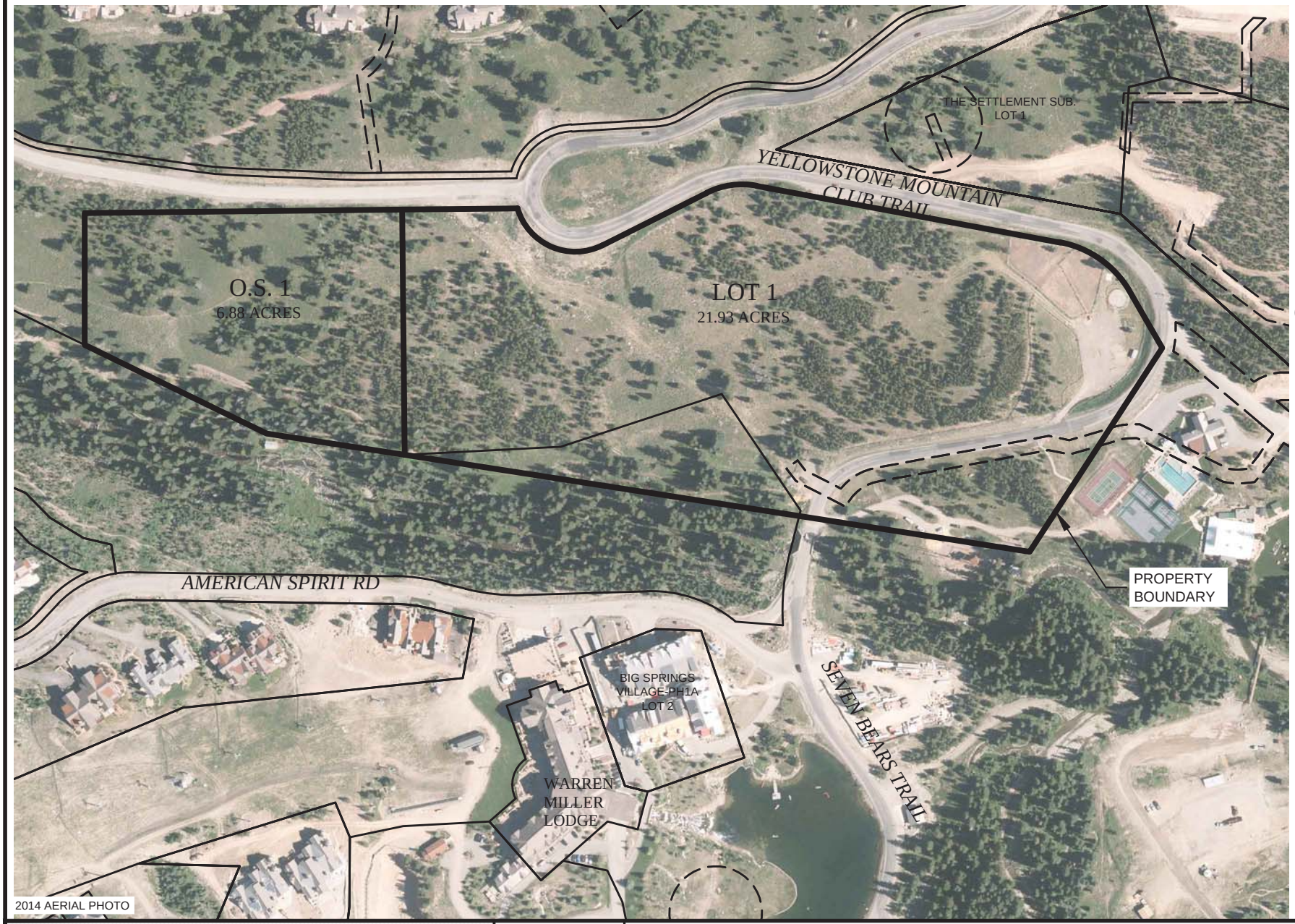
SURFACE GEOLOGY MAP

PROJECT NO. 0001.061

FIGURE NUMBER 3

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 3 - GEOLOGICAL MAP.dwg Plotted on Jun/28/2016

THE CORRAL P.U.D. SUBDIVISION
AERIAL MAP



0 300

(IN FEET)

HOUSER
ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MT

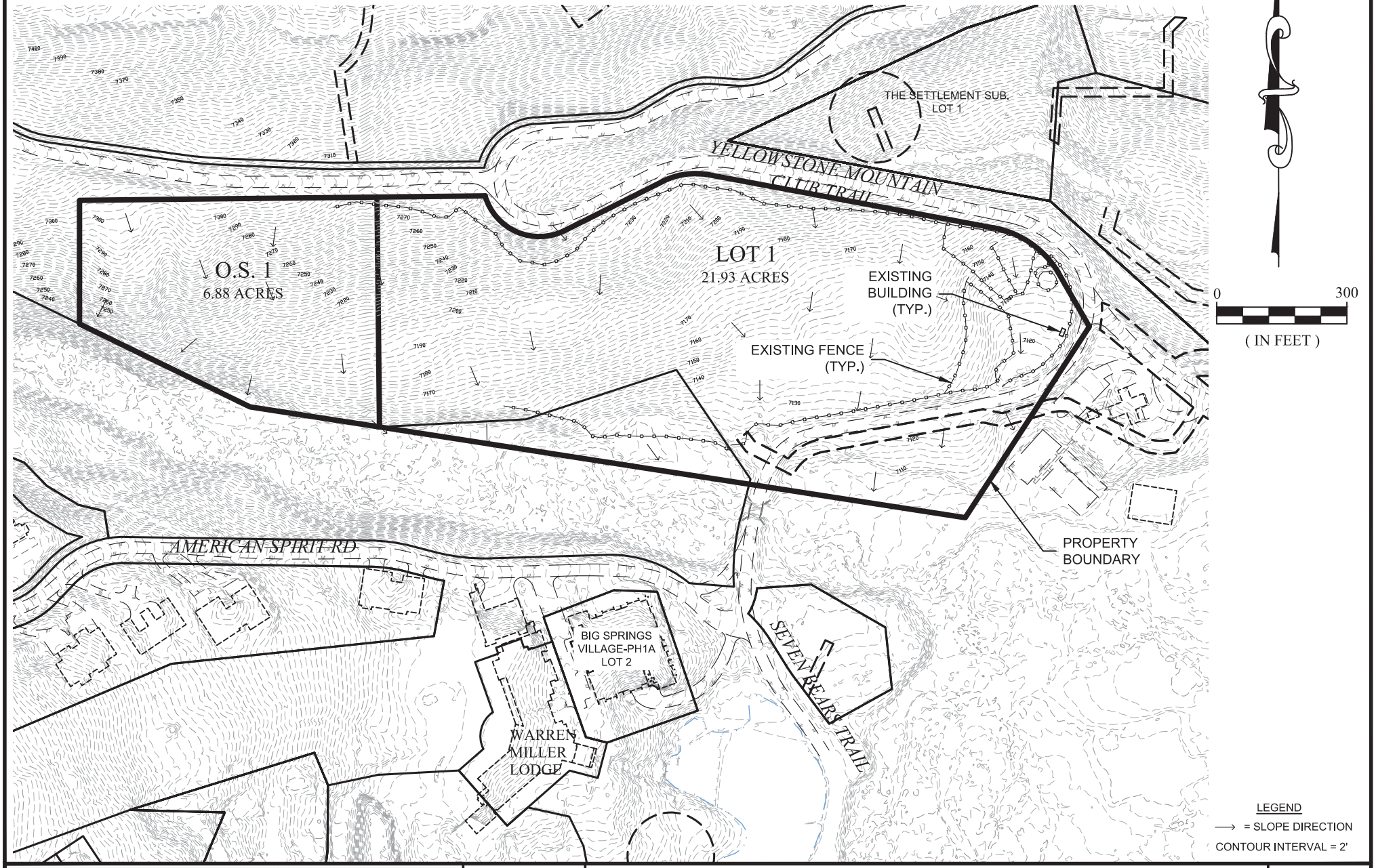
PROJECT NO. 0001.061

AERIALMAP

FIGURE NUMBER 4

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 4 - AERIAL MAP.dwg Plotted on Jun/28/2016

THE CORRAL P.U.D. SUBDIVISION
TOPOGRAPHIC CONTOUR MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 08/2016

BIG_SKY

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION

MT

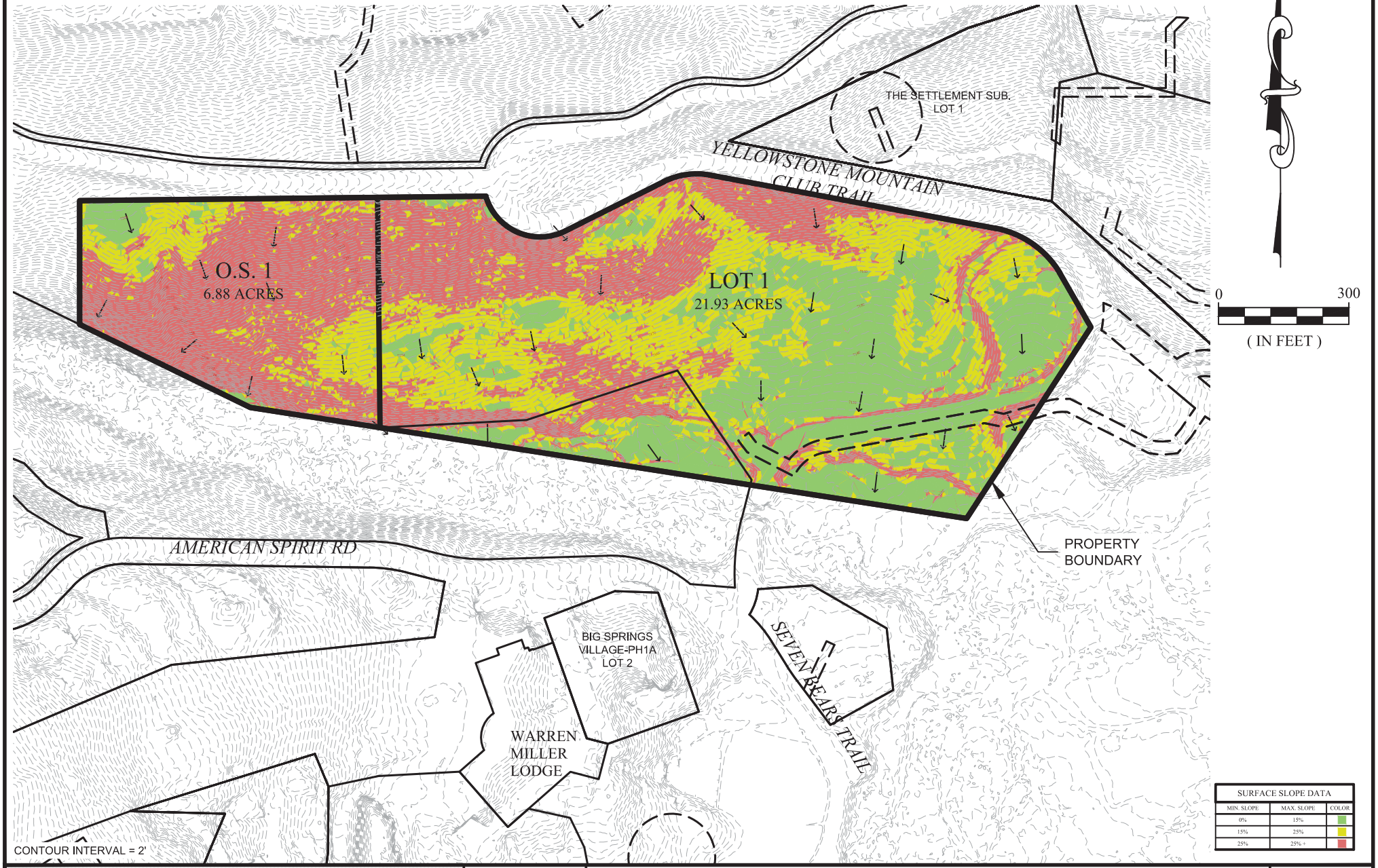
PROJECT NO. 0001.061

TOPOGRAPHIC CONTOUR MAP

FIGURE NUMBER 5

G:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 5 - TOPOGRAPHICAL MAP.dwg Plotted on Aug/23/2016

THE CORRAL P.U.D. SUBDIVISION



SURFACE SLOPE DATA		
MIN. SLOPE	MAX. SLOPE	COLOR
0%	15%	
15%	25%	
25%	25% +	

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 10/2016

BIG_SKY

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION

MT

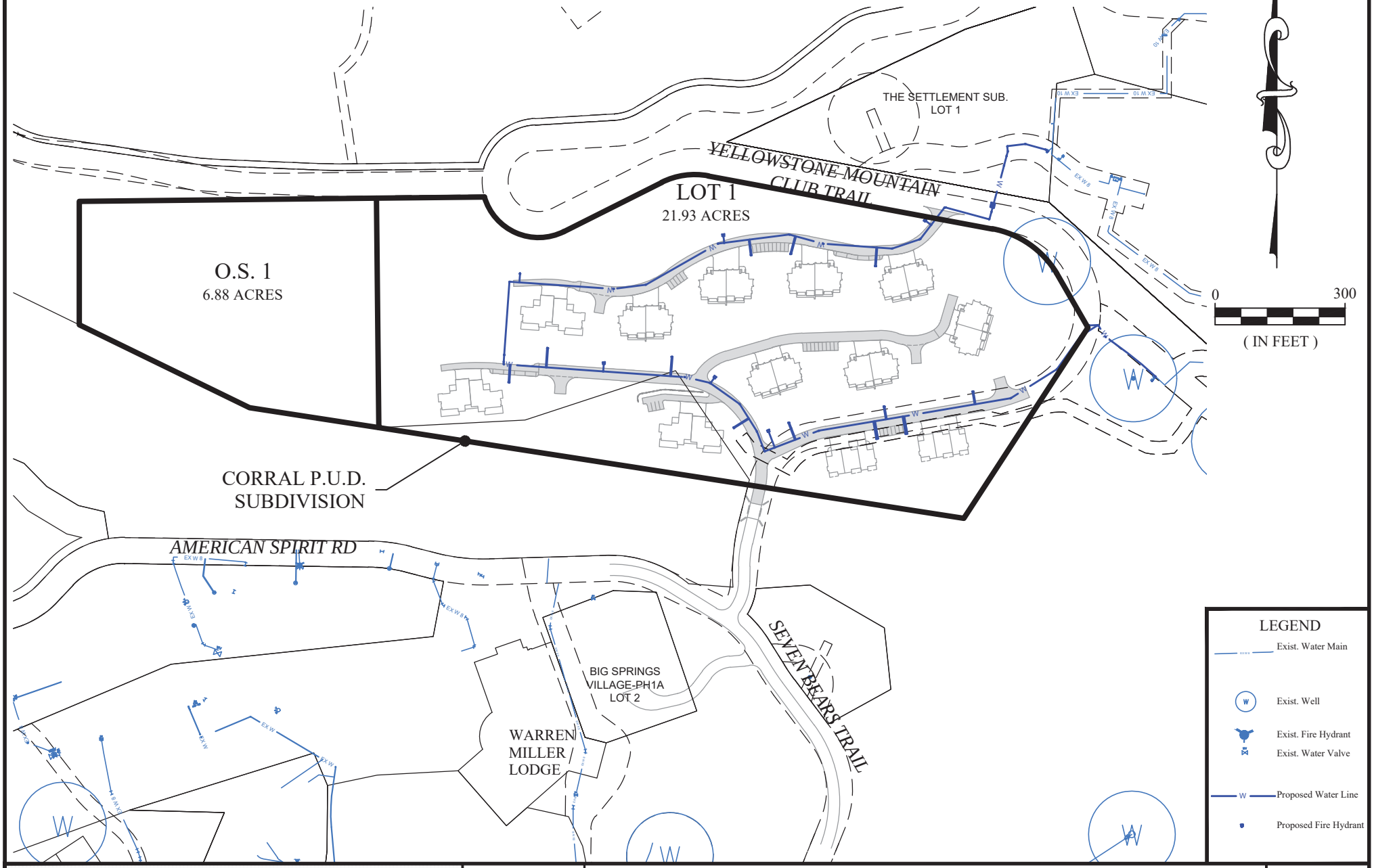
PROJECT NO. 0001.061

SLOPE MAP

FIGURE NUMBER 6

K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 6 - SLOPE MAP.dwg Plotted on Oct/11/2016

THE CORRAL P.U.D. SUBDIVISION
WATER SYSTEM MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 09/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MT

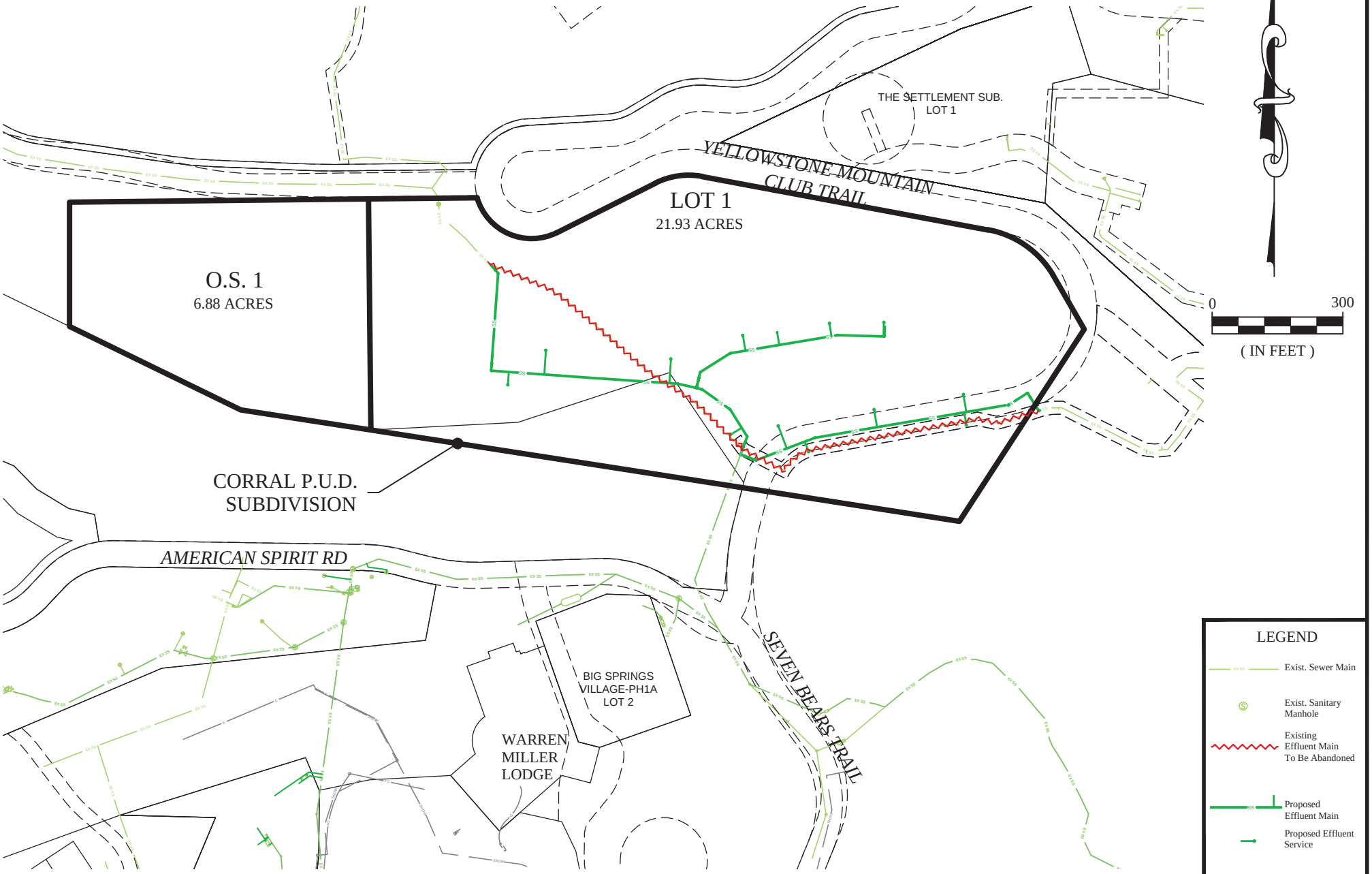
WATER SYSTEM MAP

PROJECT NO. 0001.061

FIGURE NUMBER 7

K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 7 - WATER SYSTEM.dwg Plotted on Sep/26/2016

THE CORRAL P.U.D. SUBDIVISION
SEWER SYSTEM MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MT

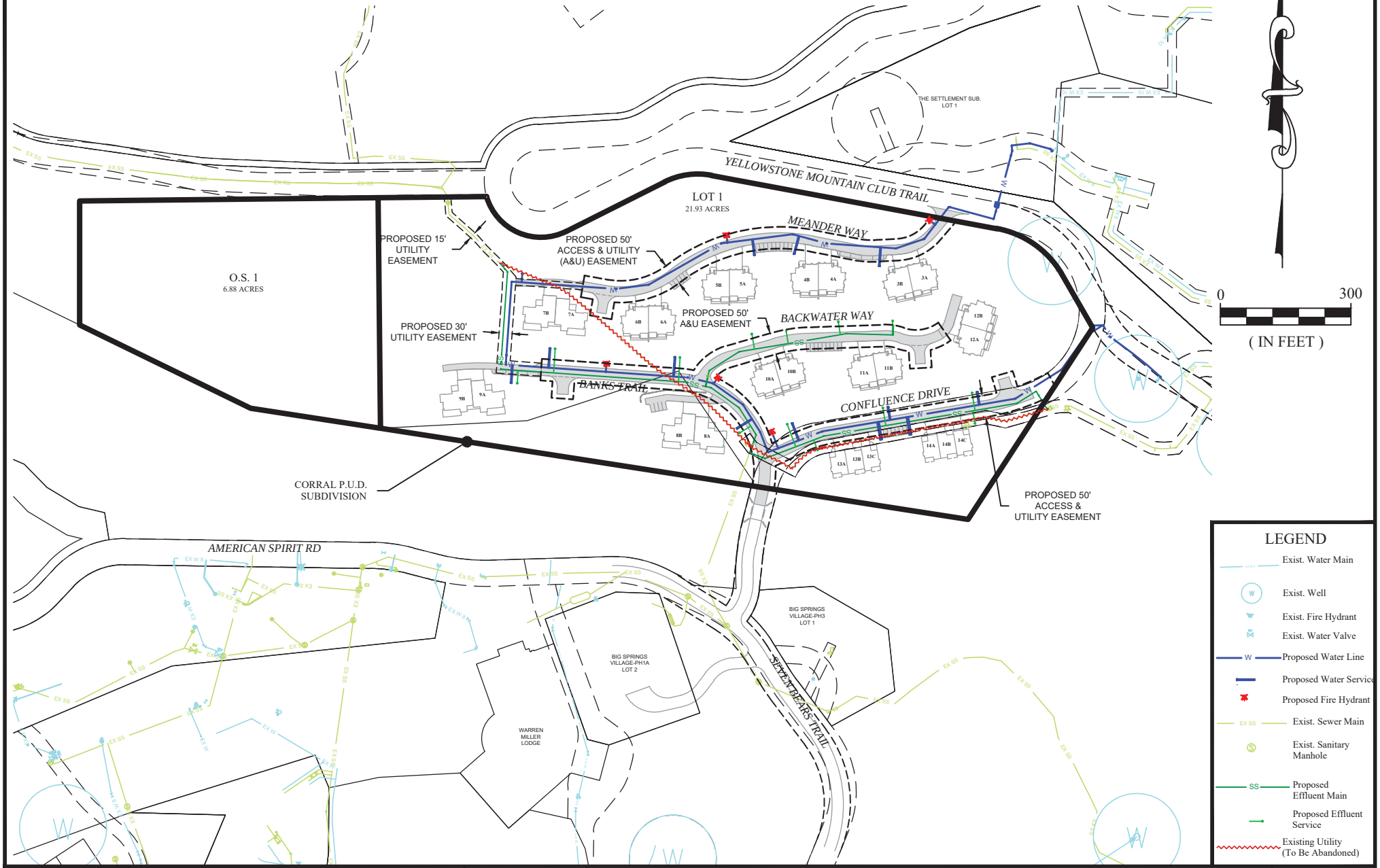
SEWER SYSTEM MAP

PROJECT NO. 0001.061

FIGURE NUMBER 8

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 8 - SEWER SYSTEM.dwg Plotted on Jun/28/2016

THE CORRAL P.U.D. SUBDIVISION
FIRE PROTECTION PLAN



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 09/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

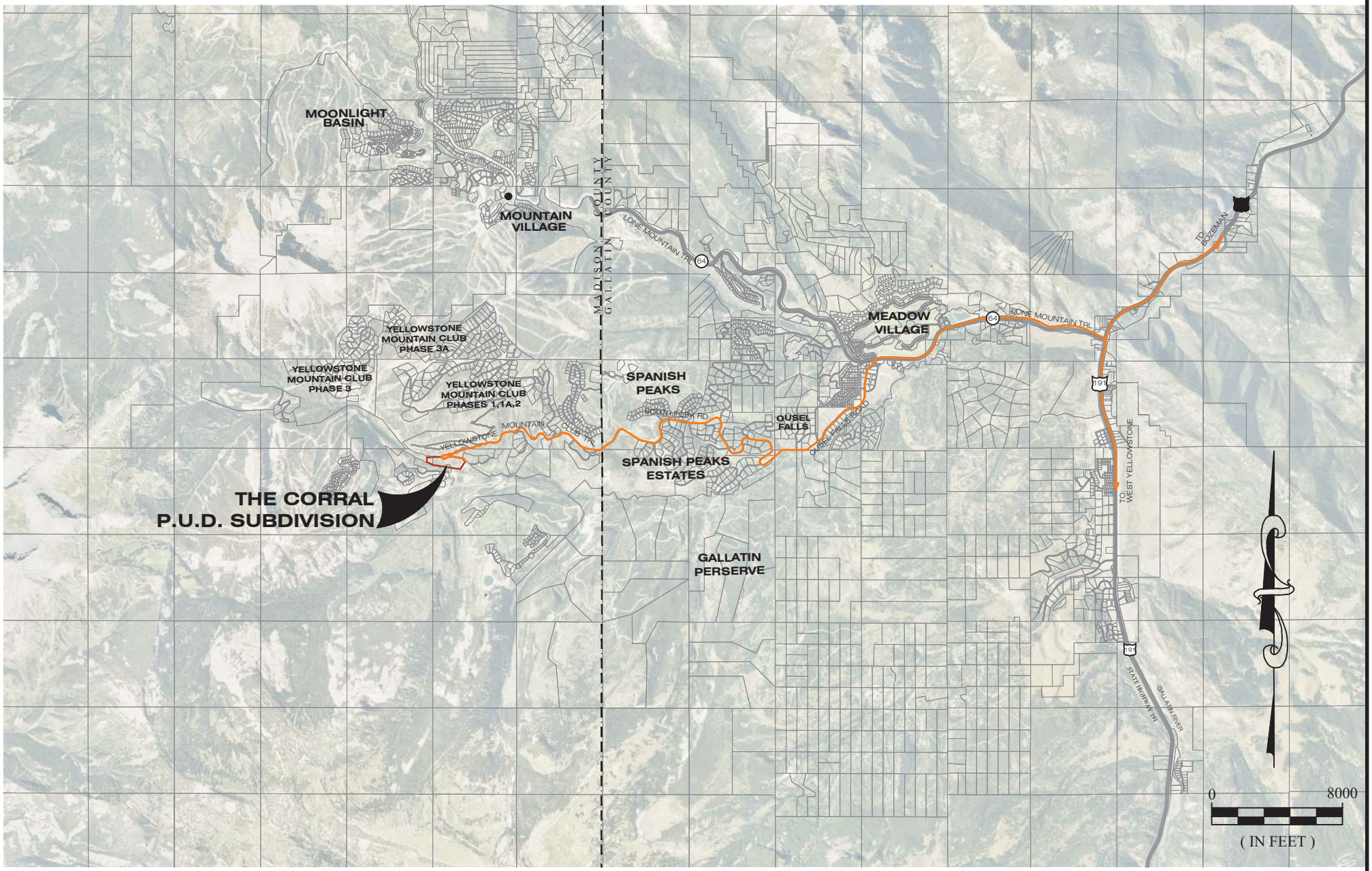
FIRE PROTECTION PLAN

PROJECT NO. 0001.061

FIGURE NUMBER 9

K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 9 - FIRE PLAN.dwg Plotted on Sep/26/2016

THE CORRAL P.U.D. SUBDIVISION
ACCESS MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 09/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

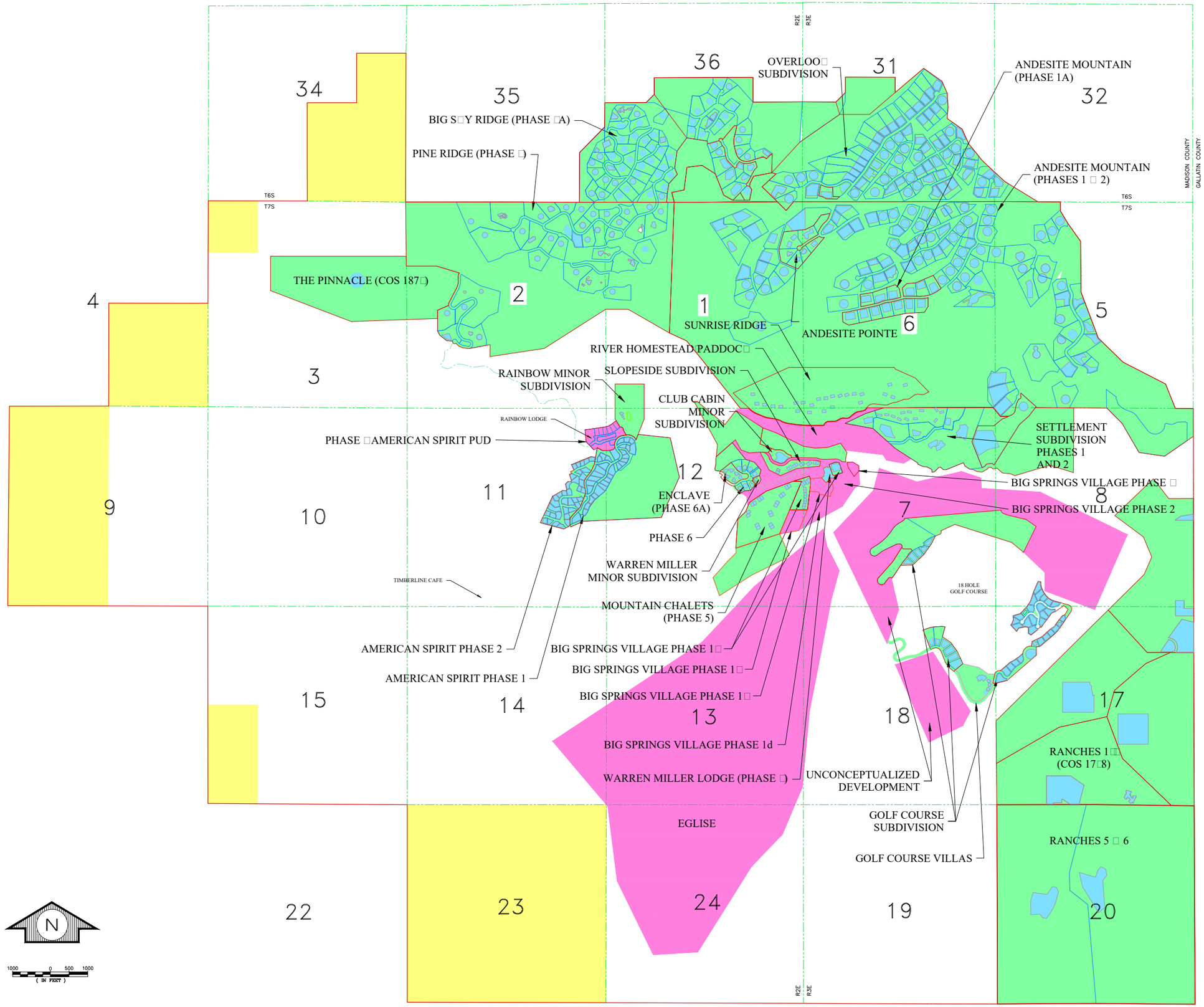
ACCESS MAP

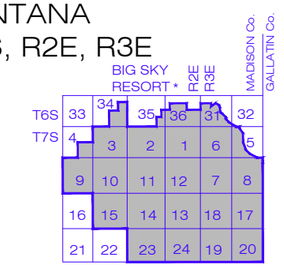
PROJECT NO. 0001.061

FIGURE NUMBER 10

K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 10 - ACCESS MAP.dwg Plotted on Sep/14/2016

YELLOWSTONE MTN CLUB
MADISON COUNTY, MONTANA
T6S, T7S, R2E, R3E





PERMANENT RESIDENCE PLATTED DENSITY SUMMARY

(BY SUBDIVISION)

RESIDENTIAL LOTS	NUMBER OF UNITS
ANDESITE MOUNTAIN (PHASES 1–2)	159
ANDESITE MOUNTAIN (PHASE 1A)	14
PINE RIDGE (PHASE 3)	37
BIG SKY RIDGE (PHASE 3A)	64
PHASE 6	7
ANDESITE POINTE	7
OVERLOOK	5
GOLF COURSE	42
RAINBOW MINOR	1
CLUB CABIN MINOR	1
WARREN MILLER MINOR	1
AMERICAN SPIRIT PHASE 1	32
AMERICAN SPIRIT PHASE 2	36
THE SETTLEMENT PHASE 1	1
THE SETTLEMENT PHASE 2	4
CONDOMINIUM UNITS	
WARREN MILLER LODGE (PHASE 4)	21
MOUNTAIN CHALETS (PHASE 5)	18
ENCLAVE (PHASE 6A)	12
SUNRISE RIDGE	58
SLOPESIDE SUBDIVISION	12
THE SETTLEMENT PHASE 2	36
BIG SPRINGS VILLAGE PH1a	34
CERTIFICATES OF SURVEY	
RANCHES 1–4 (COS 1738)	4
RANCHES 5–6 (COS 2184)	2
PINNACLE (COS 1873)	1
TOTAL PERMANENT RESIDENCE PLATTED DENSITY:	609

APPROXIMATE PERMANENT RESIDENCE UNPLATTED DENSITY SUMMARY

(BY SUBDIVISION)

LOTS OR CONDOS	NUMBER OF UNITS
BIG SPRINGS PHASES 1B, 1C, 1D, 2 & 3	123
AMERICAN SPIRIT PH 3	6
RIVER HOMESTEAD/PADDOCK	22
EGLISE	104
TOTAL PERMANENT RESIDENCE UNPLATTED DENSITY:	255

TOTAL PERMANENT RESIDENCE DENSITY PER MASTER PLAN: 864

GUEST ACCOMMODATION SUMMARY

(BY SUBDIVISION)

SUBDIVISION	NUMBER OF UNITS
GOLF COURSE VILLAS	22
AMERICAN SPIRIT PH 3	16
UNCONCEPTUALIZED	62
TOTAL GUEST ACCOMMODATIONS	100

TOTAL GUEST ACCOMMODATIONS PER MASTER PLAN: 100

LEGEND

- HOMESITE/BUILDING ENVELOPE
- PLATTED ACREAGE OUTSIDE OF BUILDING ENVELOPE
- FUTURE DEVELOPMENT
- CONSERVATION EASEMENT

2015 SECOND UPDATED YELLOWSTONE MTN CLUB MASTER PLAN

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2015

Appendix 7

APPENDIX 30 VARIANCE APPLICATION FORM

1. Project Name The Corral Subdivision, Yellowstone Mountain Club

2. Landowner Information

Name: Yellowstone Development LLC and Yellowstone Mountain Club LLC

Address: PO Box 161097, Big Sky, Montana 59716

Telephone: 406-995-7385

Signature: _____ Date June 27, 2016

3. Describe the requested variance. The proposed roads within the subdivision exceed the 750 feet standard listed in Table IV-1 of the MCSR. A 1350 foot cul-de-sac length is requested for all roads within the subdivision.

4. Describe how the requested variance meets each of the following criteria (Attach additional pages as needed): see attachment

a. The variance will not be detrimental to the public health, safety, or general welfare, or injurious to other adjoining properties.
b. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of these regulations is enforced.
c. The variance will not cause a substantial increase in public costs.
d. The variance will not in any manner place the proposed subdivision in non-conformance with any adopted zoning regulations or in substantial non-compliance with the Madison County Growth Policy.

5. As appropriate, discuss whether or not the variance is a part of an innovative development proposal which does not circumvent the purpose of the Madison County Subdivision Regulations. see attachment

6. Provide names and addresses of all adjoining property owners. Provide documentation that written notification of the variance request has been provided to them, plus any existing property owners association potentially affected by the project as determined by the planner. see attachment

The following is intended to address Items #4 through 6 of the Variance Application Form of the Madison County Subdivision Regulations for the proposed Corral Subdivision Application. The requested items are listed in bold italics font, while the responses to each are in standard font directly thereafter.

4. Describe how the requested variance meets each of the following criteria

a. The variance will not be detrimental to the public health, safety, or general welfare, or injurious to other adjoining properties. This variance will not be detrimental to the public health or general welfare, nor will it be injurious to other adjoining properties. With regards to safety of access via motor vehicles and emergency vehicles, this has been addressed in the following paragraphs.

The length of the cul-de-sac roads within the Corral Subdivision range in length from 928 to 1330 feet in length. These roads service greater than 5 dwellings, therefore they are considered high density mountainous roads per the Madison County Subdivision Regulations (MCSR). Using this classification, the maximum cul-de-sac length is 750 feet.

The road lengths have been extended in length to access the building sites that are most suitable for the development. "Looped" access roads are feasible within this subdivision, however if the roads are "looped", then access to the village core from non-residents will likely occur. The intent it so encourage motorists to use the new access road that is currently under construction. This new road (which is a continuation of Yellowstone Mountain Club Trail) has been designed to handle much higher traffic loads.

The nature of the dwelling being proposed within the Corral are recreational, part time residences that suggest a lower traffic volume than a standard residence. The Institute for Traffic Engineers assumes a recreational home consists of 3.6 ADT (which is still seemingly high for this development), while a single family residence in a non-resort setting has between 8 and 10 ADT (10 being the accepted value throughout many counties in Montana). These reduced traffic volumes support the request for additional cul-de-sac length.

b. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of these regulations is enforced. The proposed subdivision is designed such that the road accesses the property with minimal disturbance to the property. As mentioned above, access to the village core through Yellowstone Mountain Club Trail would encourage motorists to travel through the subdivision. The intent of the new access road is to relieve the traffic congestion within residential areas and encourage primary access to the village core through arterial roads, rather than roads accessing subdivisions.

c. The variance will not cause a substantial increase in public costs. The increase in the cul-de-sac length will not impact *public* costs whatsoever.

d. The variance will not in any manner place the proposed subdivision in non-conformance with any adopted zoning regulations or in substantial non-compliance with the Madison County Growth Policy. The increase in length will not place the proposed subdivision in non-conformance with any adopted zoning regulation or with the Growth Policy.

5. As appropriate, discuss whether or not the variance is a part of an innovative development proposal which does not circumvent the purposed of the Madison County Subdivision Regulations. This development proposes placing high density housing within a relatively small

footprint with the least amount of disturbance as possible. The intent of this is to increase efficiencies in design, utilities, roads, and amenities. As part of this goal, minimizing roads and vehicular traffic within residential areas is central to this vision. The intent of this design is not intended to circumvent the Madison County Subdivision Regulations.

6. ***Provide names and addresses of all adjoining property owners. Provide documentation that written notification of the variance request has been provided to them, plus any existing property owners association potentially affected by the project as determined by the planner.*** All adjacent property owners, service providers and reviewing agencies were notified on April 1, 2016. A copy of the notification package can be found in Appendix F of the Subdivision Application.

APPENDIX 30 VARIANCE APPLICATION FORM

1. Project Name The Corral Subdivision, Yellowstone Mountain Club

2. Landowner Information

Name: Yellowstone Development LLC and Yellowstone Mountain Club LLC

Address: PO Box 161097, Big Sky, Montana 59716

Telephone: 406-995-7385

Signature: _____ Date June 27, 2016

3. Describe the requested variance. The proposed roads within the subdivision are designed with a width of 22 feet, consisting of 20 feet of asphalt with 1 foot shoulders on either side of the road. This is a reduction from the 26 foot wide road width per MCSR.

4. Describe how the requested variance meets each of the following criteria (Attach additional pages as needed): see attachment

a. The variance will not be detrimental to the public health, safety, or general welfare, or injurious to other adjoining properties.
b. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of these regulations is enforced.
c. The variance will not cause a substantial increase in public costs.
d. The variance will not in any manner place the proposed subdivision in non-conformance with any adopted zoning regulations or in substantial non-compliance with the Madison County Growth Policy.

5. As appropriate, discuss whether or not the variance is a part of an innovative development proposal which does not circumvent the purpose of the Madison County Subdivision Regulations. see attachment

6. Provide names and addresses of all adjoining property owners. Provide documentation that written notification of the variance request has been provided to them, plus any existing property owners association potentially affected by the project as determined by the planner. see attachment

The following is intended to address Items #4 through 6 of the Variance Application Form of the Madison County Subdivision Regulations for the proposed Corral Subdivision Application. The requested items are listed in bold italics font, while the responses to each are in standard font directly thereafter.

4. Describe how the requested variance meets each of the following criteria

a. The variance will not be detrimental to the public health, safety, or general welfare, or injurious to other adjoining properties. This variance will not be detrimental to the public health or general welfare, nor will it be injurious to other adjoining properties. With regards to safety of access via motor vehicles and emergency vehicles, this has been addressed in the following paragraphs.

The width of the roads within the Corral Subdivision are proposed as 22 feet in width, with 20 feet being asphalt with 1 foot gravel shoulders on either side of the road. These roads service greater than 5 dwellings, therefore they are considered high density mountainous roads per the Madison County Subdivision Regulations (MCSR). Using this classification, the minimum road width is 26 feet.

The road widths have been reduced to minimize the disturbance to the landscape to the greatest extent possible while maintaining a safe roadway. The nature of the dwellings being proposed within the Corral are recreational, part time residences that suggest a lower traffic volume than a standard residence. The Institute for Traffic Engineers assumes a recreational home consists of 3.6 ADT (which is still seemingly high for this development), while a single family residence in a non-resort setting has between 8 and 10 ADT (10 being the accepted value throughout many counties in Montana). MCSR differentiates between high building density and low building density as those roads servicing 5 or less dwellings or 6 or more dwellings, respectively.

Assuming the traffic loading criteria listed above, the delineation between a low density road and a high density road would be 50 ADT (5 dwellings at 10 ADT each). In other words, roads servicing low building densities would have an ADT of less than (or equal to) 50 ADT, while roads servicing high building densities would have an ADT of greater than 50 ADT.

As outlined in the Road Design Report found in Appendix L, the ADT on Roads A-D are as follows:

Road A = 36 ADT
Road B = 50.4 ADT
Road C = 14.4 ADT
Road D = 21.6 ADT

Given the ADT of these roads are 50.4 ADT and less, it seems reasonable to assume that while there are more than 5 dwellings being serviced, classifying the roads as low density roads is justifiable from the aspect of traffic loading.

b. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of these regulations is enforced. The proposed subdivision is designed such that the road access to the properties minimize disturbance to the landscape. Wider roads will cause significantly more disturbance given the relatively steep cross slope.

c. The variance will not cause a substantial increase in public costs. The reduction in the road width will not impact *public* costs whatsoever.

d. The variance will not in any manner place the proposed subdivision in non-conformance with any adopted zoning regulations or in substantial non-compliance with the Madison County Growth Policy. The reduction in road width will not place the proposed subdivision in non-conformance with any adopted zoning regulation or with the Growth Policy.

5. As appropriate, discuss whether or not the variance is a part of an innovative development proposal which does not circumvent the purposed of the Madison County Subdivision Regulations. This development proposes placing high density housing (relative to surrounding subdivisions within the Yellowstone Club) within a relatively small footprint with the least amount of disturbance as possible. The intent of this is to increase efficiencies in design, utilities, roads, construction and amenities. The intent of this design is not intended to circumvent the Madison County Subdivision Regulations.

6. Provide names and addresses of all adjoining property owners. Provide documentation that written notification of the variance request has been provided to them, plus any existing property owners association potentially affected by the project as determined by the planner. All adjacent property owners, service providers and reviewing agencies were notified on April 1, 2016. A copy of the notification package can be found in Appendix F of the Subdivision Application.

Appendix A

NOTICE TO REVIEWER:

This subdivision will be annexed into the RP Condominium Owners Association within the Big Springs Village Phase 3 subdivision. The Bylaws and Declarations for RP Condominium Owners Association will be amended to include the condominiums created as part of the Corral subdivision. The original subdivision binder contains the proposed amendments to the Bylaws and the Declarations of the RP Condominiums.

After recording return to:
Crowley Fleck PLLP
Attn: Gina Sherman
PO Box 10969
Bozeman, MT 59715

FIRST AMENDMENT TO BYLAWS OF RP CONDOMINIUMS ASSOCIATION

This First Amendment ("Amendment") is made effective upon recording with the Madison County, Montana Clerk and Recorder.

RECITALS

A. The Association is governed by those certain Bylaws of RP Condominiums Association recorded as Document No. _____, on _____, 2016 with the Madison County, Montana Clerk and Recorder ("Bylaws").

B. Pursuant to Article XI of the Bylaws, the Bylaws may be amended by Declarant so long as Declarant owns a Unit and Declarant currently owns all of the Units.

C. Declarant desires to amend the Bylaws to annex additional land and Units into the RP Condominiums.

AMENDMENT

1. Exhibit A to the Bylaws is deleted in its entirety and replaced with Exhibit A attached hereto.

2. This Amendment amends the Bylaws and shall be incorporated into and a part of the Bylaws. Except as specifically amended or supplemented herein, all terms of the Bylaws shall remain in full force and effect. In the event the terms of this Amendment and the Bylaws conflict or are inconsistent, the terms of this Amendment shall control. Unless specifically defined herein, all capitalized terms shall have the definition given in the Bylaws.

IN WITNESS WHEREOF, Declarant has executed this First Amendment to the Bylaws.

YELLOWSTONE DEVELOPMENT, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By: _____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016 before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Development, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

EXHIBIT A

The following described property located in Madison County, Montana:

Lot 1 of Final Plat of Big Springs Village Phase 3, in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County, Montana);

AND

_____, in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County, Montana);

NOTICE TO REVIEWER:

This subdivision will be annexed into the RP Condominium Owners Association within the Big Springs Village Phase 3 subdivision. The Bylaws and Declarations for RP Condominium Owners Association will be amended to include the condominiums created as part of the Corral subdivision. The original subdivision binder contains the proposed amendments to the Bylaws and the Declarations of the RP Condominiums.

After recording, return to:
Crowley Fleck PLLP
Gina Sherman
P.O. Box 10969
Bozeman, MT 59719-0969

FIFTH SUPPLEMENT TO SECOND RESTATED AND REVISED DECLARATION OF PROTECTIVE COVENANTS, CONDITIONS AND RESTRICTIONS FOR THE YELLOWSTONE CLUB PROPERTY

Pursuant to Section 9.1 of the Second Restated and Revised Declaration of Protective Covenants, Conditions and Restrictions for The Yellowstone Club Property, recorded August 19, 2010, as Document No. 137084, records of Madison County, Montana ("Declaration"), Yellowstone Development, LLC and Yellowstone Mountain Club, LLC (collectively, "Declarant") hereby annexes the following described real property ("Annexed Property") into Exhibit A of the Declaration:

> _____, in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County, Montana)

As a result, the Annexed Property shall be subject to the provisions of the Declaration and any amendments and supplements thereto.

IN WITNESS WHEREOF, the parties have executed this Fifth Supplement to the Declaration.

YELLOWSTONE DEVELOPMENT, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By:_____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

YELLOWSTONE MOUNTAIN CLUB, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By:_____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Development, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Mountain Club, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

After recording return to:
Crowley Fleck PLLP
Attn: Gina Sherman
PO Box 10969
Bozeman, MT 59715

FIRST AMENDMENT TO DECLARATION FOR RP CONDOMINIUMS

This FIRST AMENDMENT TO DECLARATION FOR RP CONDOMINIUMS ("First Amendment") is hereby made and entered into by Yellowstone Development, LLC, as Declarant. This document amends the Declaration for RP Condominiums recorded _____, 2016 as Document No. _____, records of Madison County ("Declaration").

The Declaration is hereby amended as follows:

1. Section 2.1 of the Declaration is hereby deleted in its entirety and replaced with the following language:

> The purpose of this Declaration is to divide the Property into ___ Units by submitting the following real property in Madison County, Montana (the "Property") and the improvements existing and to be constructed on the Property to the condominium form of ownership and use in the manner provided by Chapter 23, Title 70, Montana Code Annotated, (the "Unit Ownership Act"):
>
> > Lot 1 of Final Plat of Big Springs Village Phase 3, in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County, Montana);
> >
> > AND
> >
> > in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County,

Montana);

2. Exhibit A to the Declaration is hereby deleted in its entirety and replaced with the Exhibit A attached hereto.

3. Exhibit C to the Declaration is hereby deleted in its entirety and replaced with the Exhibit C attached hereto.

4. Exhibit D to the Declaration is hereby deleted in its entirety and replaced with the Exhibit C attached hereto.

5. Exhibit E to the Declaration is hereby deleted in its entirety and replaced with the Exhibit E attached hereto.

6. Exhibit F to the Declaration is hereby supplemented with Exhibit F attached hereto.

Except as modified in this First Amendment, all terms and conditions of the Declaration remain in full force and effect. The undersigned Declarant hereby certifies that this First Amendment has amended the Declaration in accordance with Section 10.1 in that Declarant currently owns a Unit in the Project and this amendment has no material adverse effect on the right of any Owner.

DATED: _____ 2016.

IN WITNESS WHEREOF, the Declarant has caused this Declaration to be made and executed according to the provisions of the Montana Unit Ownership Act, Section 70-23-101, *et seq.*, MCA (2015).

DECLARANT: **YELLOWSTONE DEVELOPMENT, LLC,**
a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By:_____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Development, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

CONSENT
OF
YELLOWSTONE MOUNTAIN CLUB, LLC

Pursuant to Section 10.1 of the Declaration for RP Condominiums, Yellowstone Mountain Club, LLC must consent to any amendment to the Declaration of RP Condominiums. The undersigned hereby consents to the First Amendment to Declaration for RP Condominiums.

YELLOWSTONE MOUNTAIN CLUB, LLC,
a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By:_____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Mountain Club, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

Approval by Yellowstone Club Property Owners Association, Inc.

Pursuant to paragraph 9.6 of the Second Restated and Revised Declaration of Protective Covenants, Conditions and Restrictions for the Yellowstone Club Property, recorded as Document No. 137084, of the Official Records of Madison County, Montana, this First Amendment to the Declaration is hereby approved by the Yellowstone Club Property Owners Association, Inc.

YELLOWSTONE CLUB PROPERTY OWNERS ASSOCIATION, INC., a Montana non-profit corporation

By: _____
J. Kevin Hinkle, Secretary/Treasurer

STATE OF MONTANA)
: ss.
County of Madison)

This instrument was acknowledged before me this _____ day of _____, 2016, by J. Kevin Hinkle, as the Secretary/Treasurer of the Yellowstone Club Property Owners Association.

_____
Print Name: _____
Notary Public for the State of _____
[SEAL] Residing at _____,_____ [city/state]
My Commission expires _____

EXHIBIT A

The following described property located in Madison County, Montana:

Lot 1 of Final Plat of Big Springs Village Phase 3, in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County, Montana);

AND

_____, in Madison County, Montana, according to the official plat thereof on file and of record in the office of the Clerk and Recorder, Madison County, Montana. (Plat Reference in Book 4 of Plats, Page ____, records of Madison County, Montana);

EXHIBIT C

Site Plan (see attached)

EXHIBIT D

(see attached floor plans)

EXHIBIT E

EXHIBIT F

The Condominium Units listed in the Declaration, as amended by this First Amendment to Declaration for RP Condominiums, have been approved following review under Montana Code Annotated Title 76, chapter 3, parts 5 and 6.

_____
_____, Commissioner

STATE OF MONTANA)
: ss.
County of Madison)

This instrument was acknowledged before me this ___ day of _____, 2016, by _____, as a Commissioner of Madison County, Montana.

_____
Print Name: _____
Notary Public for the State of _____
[SEAL] Residing at _____, _____
My Commission expires _____, 20____

Appendix B

United States Department of Agriculture

NRCS

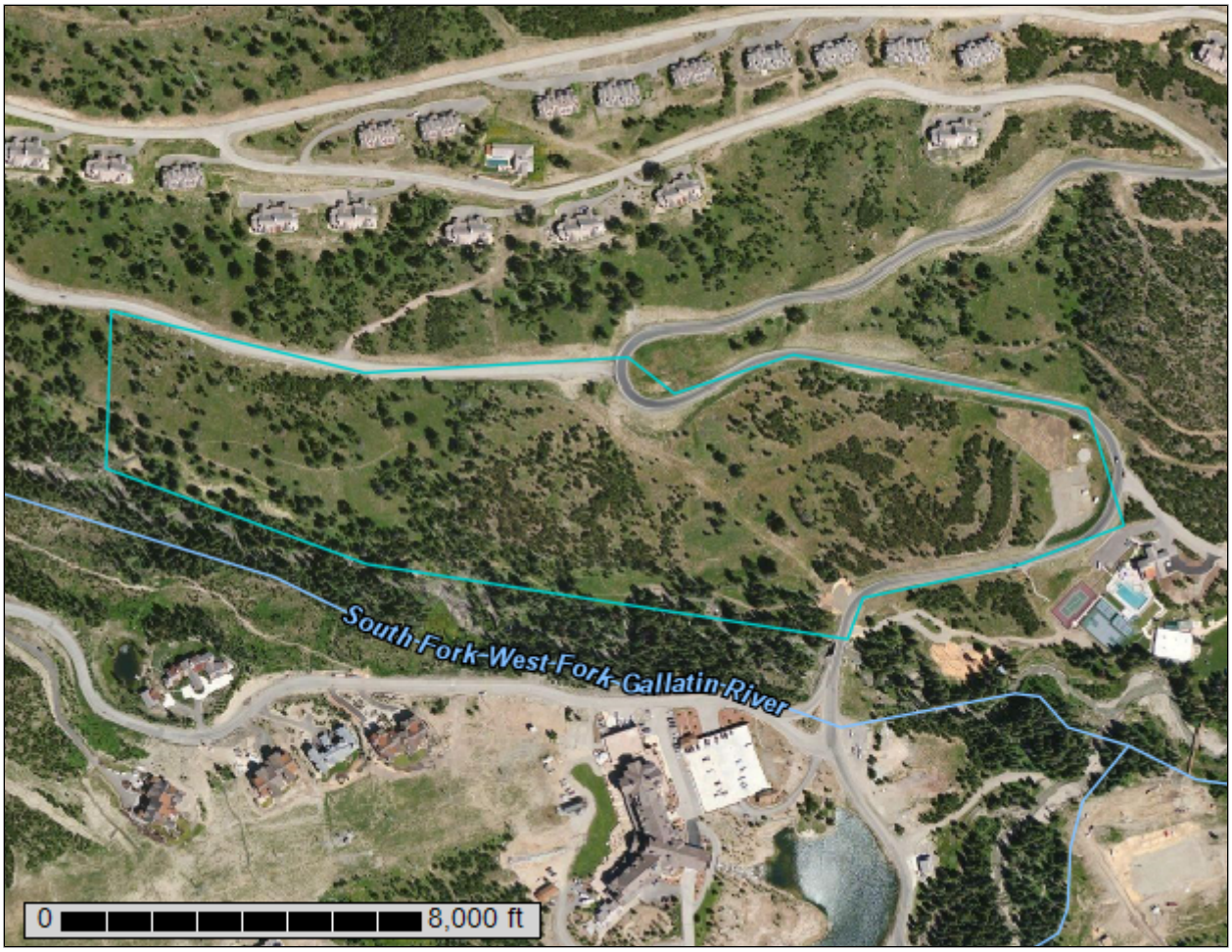
Natural Resources Conservation Service

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

Madison County Area, Montana

The Corral PUD Subdivision



March 28, 2016

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 (http://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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....7
Soil Map.....8
Legend.....9
Map Unit Legend.....10
Map Unit Descriptions.....10
Madison County Area, Montana.....12
80—Mikesell clay loam, 15 to 45 percent slopes.....12
121—Shadow very channery loam, 15 to 45 percent slopes.....13
128—Shedhorn-Rock outcrop complex, 15 to 45 percent slopes.....14
References.....17

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 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: http://websoilsurvey.nrcs.usda.gov
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: Madison County Area, Montana
Survey Area Data: Version 18, Sep 25, 2015

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

Date(s) aerial images were photographed: Jul 28, 2011—Aug 10, 2011

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

Madison County Area, Montana (MT636)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
80	Mikesell clay loam, 15 to 45 percent slopes	18.4	53.0%
121	Shadow very channery loam, 15 to 45 percent slopes	4.9	14.2%
128	Shedhorn-Rock outcrop complex, 15 to 45 percent slopes	11.4	32.8%
Totals for Area of Interest		**34.8**	**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.

Madison County Area, Montana

80—Mikesell clay loam, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 4xg2
Elevation: 6,000 to 8,070 feet
Mean annual precipitation: 22 to 32 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 40 to 60 days
Farmland classification: Not prime farmland

Map Unit Composition

Mikesell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mikesell

Setting

Landform: Mountainsides, mountains
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey residuum weathered from shale

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 8 inches: clay loam
Bt - 8 to 60 inches: gravelly clay

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Other vegetative classification: subalpine fir/grouse whortleberry-pinegrass phase (PK731)

Minor Components

Loberg

Percent of map unit: 7 percent
Landform: Moraines, mountainsides
Down-slope shape: Linear
Across-slope shape: Linear

Soils with shale at 40-60 in.
Percent of map unit: 6 percent

Poorly drained soils
Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Linear

121—Shadow very channery loam, 15 to 45 percent slopes

Map Unit Setting
National map unit symbol: 4xbd
Elevation: 6,000 to 8,600 feet
Mean annual precipitation: 15 to 32 inches
Mean annual air temperature: 36 to 43 degrees F
Frost-free period: 30 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition
Shadow and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shadow

Setting
Landform: Moraines, mountain slopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium and/or colluvium and/or till

Typical profile
A - 0 to 10 inches: very channery loam
Bw - 10 to 30 inches: very channery sandy loam
C - 30 to 60 inches: extremely channery sandy loam

Properties and qualities
Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A

Other vegetative classification: subalpine fir/grouse whortleberry (PK730)

Minor Components

Mikesell
Percent of map unit: 3 percent
Landform: Mountains, mountain slopes
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear

Shallow soils over shale
Percent of map unit: 3 percent
Ecological site: Shallow Droughty (SwDr) LRU 43B-E (R043BE138MT)

Shadow, very stony
Percent of map unit: 3 percent
Landform: Mountain slopes, moraines
Down-slope shape: Linear
Across-slope shape: Linear

Poorly drained soils
Percent of map unit: 2 percent
Landform: Swales
Down-slope shape: Linear
Across-slope shape: Linear

Slopes greater than 45 percent
Percent of map unit: 2 percent

Soils with douglas-fir trees
Percent of map unit: 2 percent

128—Shedhorn-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting
National map unit symbol: 4xbm
Elevation: 4,500 to 9,500 feet
Mean annual precipitation: 15 to 50 inches
Mean annual air temperature: 34 to 39 degrees F
Frost-free period: 30 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition
Shedhorn and similar soils: 70 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shedhorn

Setting

Landform: Mountainsides, moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey colluvium derived from sandstone and shale and/or till

Typical profile

A - 0 to 12 inches: clay loam
Bw - 12 to 40 inches: clay
BC - 40 to 60 inches: channery clay

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: Loamy Steep (LoStp) LRU 43B-E (R043BE040MT)

Minor Components

Mikesell, forested

Percent of map unit: 4 percent
Landform: Mountainsides, mountains
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Linear

Whitore, forested

Percent of map unit: 3 percent
Landform: Mountainsides, moraines
Down-slope shape: Linear
Across-slope shape: Linear

Shallow soils over shale

Percent of map unit: 3 percent
Ecological site: Shallow Droughty (SwDr) LRU 43B-E (R043BE138MT)

Rubble land

Percent of map unit: 3 percent

Poorly drained soils

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

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix C

YELLOWSTONE CLUB

April 27, 2016

Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Madison County Planning Office
P.O. Box 287
Virginia City, Montana 59755

RE: Authorization to connect to the Encampment Trail Public Water Supply System, and Yellowstone Club Wastewater System

To Whom It May Concern:

Extension of the proposed water mains for the Corral Subdivision of the Yellowstone Mountain Club is hereby authorized, as designed by Houser Engineering. The water mains will be an extension of the existing water mains of the Encampment Trail Public water supply/distribution system. This existing water supply system has adequate capacity to facilitate this connection, has been approved by the Montana Department of Environmental Quality (see E.Q.#12-1826), and is in compliance with ARM Title 17, Chapter 38 and all applicable department regulations. Adequate water rights exist for this subdivision (see enclosed water abstract).

Extension of the proposed sewer mains for the Corral Subdivision of the Yellowstone Mountain Club is hereby authorized, as designed by Houser Engineering. The sewer mains will be an extension of the existing sewer mains of the Yellowstone Mountain Club wastewater collection and treatment system. The effluent mains will be an extension of the existing effluent mains of the Yellowstone Mountain Club Phase 3 sewer collection system. This system has adequate capacity to facilitate this connection, has been approved by the Montana Department of Environmental Quality, and is in compliance with ARM Title 17, Chapter 38 and all applicable department regulations.

Respectfully,

Mike DuCuennois, Vice President, Development
Yellowstone Development, LLC

One Yellowstone Club Trail
P.O. Box 161097, Big Sky, Montana 59716 Tel (888)700-7748 (406)995-4900 Fax (406) 995-7393
www.yellowstoneclub.com

YELLOWSTONE CLUB

April 27, 2016

Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Madison County Planning Office
P.O. Box 287
Virginia City, Montana 59755

RE: Retainage of Professional Engineer for the Corral Subdivision, Yellowstone Mountain Club Infrastructure.

To Whom It May Concern:

In accordance with ARM 17.36.314(2), the Developer, Yellowstone Development, LLC, hereby commits to retaining a professional engineer to provide certification that the systems proposed within the construction plans for the Corral subdivision within the Yellowstone Mountain Club are built in conformance with the plans and specifications approved by the reviewing authority.

Respectfully,

Mike DuCuennois
Director of Development
Yellowstone Development, LLC

One Yellowstone Club Trail
P.O. Box 161097, Big Sky, Montana 59716 Tel (888)700-7748 (406)995-4900 Fax (406) 995-7393
www.yellowstoneclub.com

DEQ
Montana Department
of Environmental Quality

December 28, 2015

Justin Houser
Houser Engineering
626 Ferguson Road Suite 1
Bozeman MT 59718-7820

RE: Big Springs Village Phase 1b
Yellowstone Mountain Club
Madison County
E.Q. #16-1268

Dear Mr Houser:

The plans and supplemental information relating to the water supply, sewage, solid waste disposal, and storm drainage (if any) for the above referenced division of land have been reviewed as required by ARM Title 17 Chapter 36(101-805) and have been found to be in compliance with those rules.

Two copies of the Certificate of Subdivision Plat Approval are enclosed. The original is to be filed at the office of the county clerk and recorder. The duplicate is for your personal records.

Development of the approved subdivision may require coverage under the Department's General Permit for Storm Water Discharges Associated with Construction Activity, if your development has construction-related disturbance of one or more acre. If so, please contact the Storm Water Program at (406) 444-3080 for more information or visit the Department's storm water construction website at http://www.deq.state.mt.us/wqinfo/MPDES/StormwaterConstruction.asp. Failure to obtain this permit (if required) prior to development can result in significant penalties.

In addition, your project may be subject to Federal regulations relating to Class V injection wells. Please contact the United States Environmental Protection Agency regarding specific rules that may apply.

Your copy is to inform you of the conditions of the approval. Please note that you have specific responsibilities according to the plat approval statement primarily with regard to informing any new owner as to any conditions that have been imposed.

If you wish to challenge the conditions of this Certificate of Subdivision Plat Approval, you may request a hearing before the Board of Environmental Review or the Department, pursuant to Section 76-4-126, MCA and the Montana Administrative Procedures Act.

If you have any questions, please contact this office.

Sincerely,

Acata English For

Barb Kingery, Supervisor
Subdivision Review Section

BK/le

cc: County Sanitarian
County Planning Board (e-mail)

STATE OF MONTANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
CERTIFICATE OF SUBDIVISION PLAT APPROVAL
(Section 76-4-101 et seq., MCA)

TO: County Clerk and Recorder
Madison County
Virginia City, Montana

E.Q. #16-1268
16-20mad

THIS IS TO CERTIFY THAT the plans and supplemental information relating to the subdivision known as: **Big Springs Village, Phase 1b, Yellowstone Mountain Club:**

a parcel of land located in the NW1/4 of Section 7, Township 7 South, Range 3 East, PMM, Madison County, Montana,

consisting of one (1) lot which has been reviewed by personnel of the Permitting and Compliance Division, and,

THAT the documents and data required by ARM Chapter 17 Section 36 have been submitted and found to be in compliance therewith, and,

THAT the approval of the Plat is made with the understanding that the following conditions shall be met:

THAT the lot sizes as indicated on the Plat to be filed with the county clerk and recorder will not be further altered without approval, and,

THAT Lot 1A shall be used for forty-eight (48) residential condominium units and seven(7) commercial condominium units in one(1) building, and,

THAT the public water supply for these lots shall be provided through existing and proposed extensions and service connections to the Lower Pioneer Mountain Public Water Supply System, PWSID # MT0004462, and,

THAT the water supply extension to the public water system will consist of approximately 1,229 lineal feet of 8-inch CL200 AWWA C-900 PVC Water Main; 2 new fire hydrant; 3 valves and appurtenances, and shall be constructed in accordance with the approved plans and specifications prepared by Justin L Houser PE #37372PE of Houser Engineering of Bozeman, dated 9/2015 and received by the Department on 9/25/2015, and,

THAT the public wastewater treatment system serving these lots shall be provided through service connections to the **Yellowstone Mountain Club Sewage Treatment, Conveyance and Storage Facility**, and,

THAT the extensions to the public sewer system will consist of approximately 2,252 lineal feet of 8-inch SDR 35 PVC Sewer Main; approximately 51 lineal feet of 10-inch SDR 35 PVC Sewer Main; 15 new manholes; a pump stations; approximately 123 lineal feet of 6-inch Sewer Force Main and appurtenances, and shall be constructed in accordance with the approved plans and specifications prepared by Justin L Houser PE #37372PE of Houser Engineering of Bozeman, dated 9/2015 and received by the Department on 9/25/2015, and, Eric L. Blanksma #14850PE of Morrison-Maierle, Inc., of Bozeman, dated 12/2014 and received by the Department on 1/22/2015, and,

THAT stormwater conveyance and catchments structures shall be constructed in accordance with the approved plans and specifications prepared by Justin L Houser PE #37372PE of Houser Engineering of Bozeman, dated 9/2015 and received by the Department on 9/25/2015, and,

THAT construction will be completed within three years of the date of this approval. If more than three years pass before beginning construction, it shall be necessary to resubmit the plans and specifications. This expiration period does not extend any compliance schedule requirements pursuant to enforcement action against a public water/sewage system, and,

THAT within 90 days after construction is completed upon a public water system, wastewater system, or storm drainage system, or upon an extension of or addition to such a system, the professional engineer shall certify to the Department that the construction, alteration or extension was completed in accordance with the plans and specifications approved by the Department, and,

THAT project certification shall be accompanied by a complete set of "as-built" drawings bearing the signature and seal of the professional engineer, and,

THAT water supply systems, sewage treatment systems and storm drainage systems will be located as shown on the approved plans, and,

THAT plans and specifications for any proposed sewage treatment systems will be reviewed and approved by the county health department and will comply with local regulations and ARM Title 17 Chapter 36 subchapters 3 and 9 before construction is started, and,

THAT all sanitary facilities must be located as shown on the attached lot layout, and,

THAT the developer and/or owner of record shall provide each purchaser of property with a copy of the Plat, approved location of water supply and sewage treatment system as shown on the attached lot layout, and a copy of this document, and,

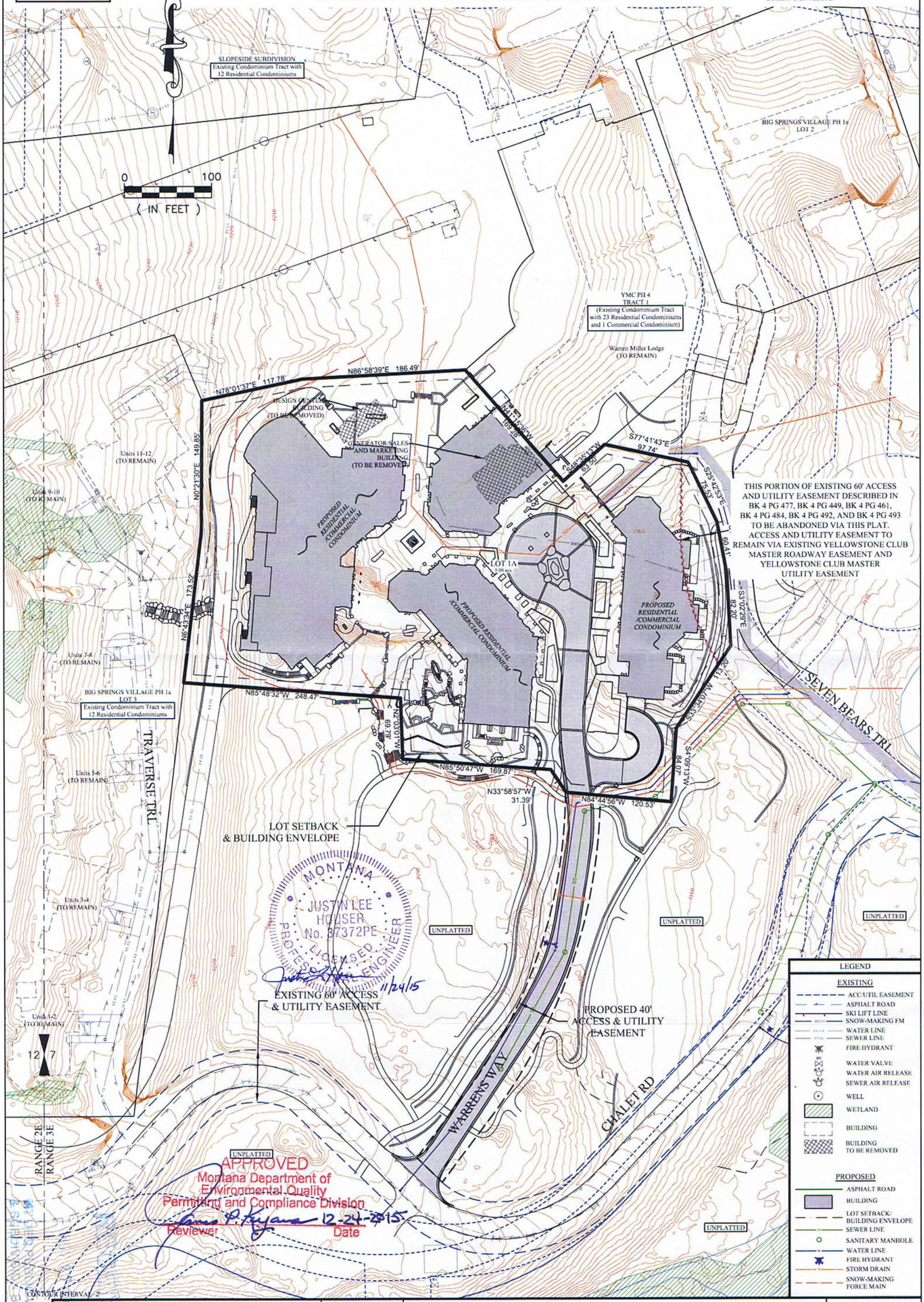
THAT instruments of transfer for this property shall contain reference to these conditions, and,

THAT departure from any criteria set forth in the approved plans and specifications and Title 17, Chapter 36, Sub-Chapters 1, 3, and 6 ARM when erecting a structure and appurtenant facilities in said subdivision without Department approval, is grounds for injunction by the Department of Environmental Quality.

SETBACKS
10' FRONT
10' SIDE & REAR

LOT LAYOUT of
BIG SPRINGS VILLAGE PHASE 1b
SITUATED IN THE NW 1/4 SECTION 7, T7S, R3E

NOTE: COMMON AREAS INCLUDE ALL AREAS WITHIN THE LOT AND OUTSIDE OF THE BUILDING ENVELOPE.



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 11/2015

BIG SKY — BIG SPRINGS VILLAGE PHASE 1b — MT

EQ#16-1268

LOT LAYOUT

PROJECT NO. 0001.038

FIGURE NUMBER 1

COPYRIGHT © HOUSER ENGINEERING P.C., 2015

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15026\ACAD\PREPLAT\BSV-1b LOT LAYOUT.dwg Plotted on Nov/24/2015

RECEIVED FEB 19 2008

Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

February 14, 2008

Justin L. Houser, PE
Morrison-Maierle, Inc.
901 Technology Boulevard
PO Box 1113
Bozeman, MT 59771

RE: EQ#07-2588; Yellowstone Mountain Club Timber Line Café; Lower Pioneer Mountain Public Water System; Water Main Extension and 298,472-Gallon American Spirit Water Reservoir; Madison County; MT0004462

Dear Mr. Houser:

I reviewed the plans and specifications you submitted on March 15 and November 28, 2007 and January 28, 2008 for the above-mentioned project in accordance with Department design standards Circular DEQ 1. Approval of these plans is hereby given. A copy of the plans bearing the approval stamp of the Department of Environmental Quality is enclosed. The second set will be retained as Department record.

Approval is based on final plans and specifications received under the engineering seal of Justin L. Houser, No.13894PE. The proposed project shall consist of approximately 5,700 lineal feet of 6-inch Zaplok steel water main; approximately 629 lineal feet of 10-inch Certa-Lok PVC; approximately 2,479 lineal feet of 4-inch Zaplok steel; one 298,472-gallon poured-in-place concrete water storage tank; the American Spirit pump station with two Goulds 8RAHC, 75 hp, 3600 rpm (150 gpm @1265 feet TDH) vertical turbine VFD pumps; and the Timberline pump station with two Grundfos CR5-24, 10 hp, 3500 rpm (25 gpm @ 565 feet TDH).

Approval is also given with the understanding that any deviation from the approved plans and specifications must be submitted to the Department for reappraisal and approval. Within 90 days following completion of the project a complete set of "as-built" record drawings must be signed, stamped, certified to be constructed in accordance with approved plans and specifications, and submitted to the Department by the project engineer. The project may not be put into use until the record drawings and specifications have been received by DEQ or the project engineer certifies by letter to the Department that the activated portion of the project was inspected and found to be constructed in accordance with the plans and specifications approved by the Department.

Construction of this project must be completed within three years of this date. If more than three years elapse before completing construction, plans and specifications must be resubmitted and approved before construction begins.

The applicant is responsible for compliance with all applicable federal, state, local, and tribal law, regulations, and ordinances. Approval in this document is limited solely to the matters therein specifically contained and does not constitute approval, implied or otherwise, for the purposes of any other law, regulation, or ordinance.

If there is anything I can do to answer questions or assist, please do not hesitate to call me at 444-5881.

Sincerely,

Michele Marsh

Michele Marsh, PE
Environmental Engineer
DEQ Public Water Supply and Subdivisions

cc: Madison County Health Department
Yellowstone Development, LLC, PO Box 161097, Big Sky, MT 59716
Plan Review File
File MT0004462

Enclosure: One set of approved plans and specifications

Montana Department of
ENVIRONMENTAL QUALITY

Steve Bullock, Governor
Tracy Stone-Manning, Director

P. O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • Website: www.deq.mt.gov

June 30, 2014

RECEIVED
JUL 02 2014

Eric Blanksma, PE
Morrison Maierle
P.O. Box 1113
Bozeman, MT 59771

RE: Yellowstone Mountain Club Wastewater Treatment Plant; EQ 14-1891

I have reviewed the engineering report, plans and specifications you submitted on April 10, 2014 and the additional information submitted on June 16, 2014 for the above-mentioned project in accordance with Department Design Standard DEQ-2. The request construct a new wastewater treatment system to serve the Yellowstone Mountain Club is hereby approved. A copy of the plan bearing the approval stamp of the Department of Environmental Quality is enclosed. A second set will be retained as Department record.

The general project concept consists of installing successive Sequencing Batch Reactors to meet projected daily flows at the following levels:

WWTP Improvements Phasing Plan			
Phase	Design Trigger Value (gpd)	Construction Trigger Value (gpd)	Treatment Capacity (gpd)
1	NA	NA	50,000
2	40,000	45,000	100,000
3	90,000	95,000	150,000
4	140,000	145,000	200,000
5	190,000	195,000	250,000

This approval is for construction of Phase 1 only. Plans and specifications for additional Phases will need to be submitted for Department review and approval prior to construction when the maximum daily flows reach the trigger values listed above. Phase 1 consists of new influent headworks, two Sequencing Batch Reactors basins, and an aerobic sludge reactor designed to handle up to 50,000 gallons of wastewater per day.

USEPA promulgated Part 503, Standards for the Use or Disposal of Sewage Sludge, on February 19, 1993 (58 FR 9248), with amendments on February 19, 1994 (59 FR 9095), and October 25, 1995 (60 FR 54764). These regulations address four sludge use and disposal practices: land application, surface disposal, incineration, and disposal in a municipal solid waste landfill. Part 503 imposes requirements on four groups:

- Persons who prepare sewage sludge or material derived from sewage sludge;
- Land appliers of sewage sludge;
- Owners/operators of sewage sludge surface disposal sites; and
- Owners/operators of sewage sludge incinerators.

USEPA Region 8 is responsible for implementing the 40 CFR Part 503 Standards for the Use or Disposal of Sewage Sludge in permits issued to treatment works treating domestic sewage (TWTDS) in Montana. USEPA has issued a general permit for facilities in the State of Montana that generate, treat, or use or dispose of sewage sludge by means of land application, landfill, or surface disposal (NPDES Permit No. MTG650000). TWTDS must file a notice of intent with USEPA and the Department in accordance with the timeframes and procedures identified in the applicable permit.

Department approval of this project covers only those portions of the plans and specifications that are subject to the Department's review authority under the Public Water Supply Laws (MCA 75-6) and the Administrative Rules promulgated thereunder (ARM 17.38). This approval does not cover items found within the plans and specifications that are outside of the Department's review authority, including but not limited to, electrical work, architecture, site grading or water and sewer service connections.

Please note that any deviations from the approved plans and specifications must be submitted to the Department prior to modification. Within 90 days following completion of the project a complete set of "as-built" record drawings must be signed, stamped, certified to be constructed in accordance with approved plans and specifications, and submitted to the Department by the project engineer. The project may not be placed into service until the project engineer certifies by letter to the Department that the activated portion of the project was inspected and found to be constructed in accordance with the plans and specifications approved by the Department.

Construction of this project must be completed within three years of this date. If more than three years elapse before completing construction, plans and specifications must be resubmitted and approved before construction begins. Thank you for your efforts to meet our requirements. If I can offer any further information or assistance, please feel free to contact me at (406) 444-6722.

Thank you,

Rachel C

Rachel Clark, PE
Public Water and Subdivisions Bureau

cc: Madison County EH Office

DEQ
Montana Department
of Environmental Quality

December 30, 2015

Justin Houser PE
Houser Engineering PC
626 South Ferguson Avenue, Suite 1
Bozeman, MT 59718

RE: YMC – SETTLEMENT SUBDIVISION
As-Built Review
Madison County
EQ #12-1826

Dear Justin:

The plans for the Settlement Subdivision were originally approved with water and sewer extensions and connections to the Settlement Subdivision's Public Water Supply System as approved by the Public Water Supply Section under EQ#12-1829 and the Yellowstone Mountain Club Sewage Treatment, Conveyance and Storage Facility, on 29th day of March, 2013. The plans for the extensions were submitted under the seal of Camille Alison Dooley PE #15709PE of Morrison-Maierle, Inc., of Bozeman.

Two sets of as-built plans and two letters of certification were received on September 28, 2015 and November 23, 2015 from Justin L Houser PE #37372PE of Houser Engineering PC., of Bozeman. The as-built plans were the same except that the second set had all the detail sheets and individual lot connections detail attached, which are not required for as-builts.

The as-builts submitted show that there were changes made to the water mains on Page W-3, from the Water Tank to Winter Cache Trail, that were contrary to the requirements of 76-4-130MCA, which states that a person may not construct or use a facility that deviates from the certificate of subdivision approval (COSA) until the reviewing authority has approved the deviation. However, in reviewing the as-builts, Page W-3A, the changes made still conform to the requirements of DEQ-1; thus, the as-builts are accepted and no additional comments are required. Note that this as-built does not apply to any PWS as-built submittal requirements under EQ#12-1829.

Sincerely,

James P. Kujawa

James P Kujawa PE
Public Water and Subdivisions Bureau
Permitting and Compliance Division

cc: file; Madison County Sanitarian

Appendix D

Madison County Weed Board

PO Box 278*Virginia City, MT 59755*Physical Address: 2296 Hwy 287, Alder, MT 59710
Ph# Margie (406) 842-5595 * Janie (406) 842-5596 * Fax (406) 842-5589
E-mail – Margie – madweed@3rivers.net Janie – amadweed@3rivers

June 10, 2016

Yellowstone Mountain Club
PO Box 161097
Big Sky, MT. 59716

Re: ***The Corral***

Dear Gentlemen,

The Madison County Weed Board thanks you for filing an updated Noxious Weed Management Plan for ***The Corral*** *which is located in the* ***NW 1/4 Section 7, Township 7S, Range 3E.***

The Management Plan has been approved and we request that any future owners must be made aware of this plan pertaining to weed management and meet the requirements of the Montana County Noxious Weed Control ***Act. 7-22-2116****, Unlawful to Permit Noxious Weeds to Propagate (go to seed).*

Thank you for your concerns about noxious weeds and if you have any other questions feel free to call our office at (406) 842-5595

Sincerely,

Margie N. Edsall

Margie N. Edsall, Coordinator
Madison County Weed Board

cc. Board of Madison County Commissioner
cc. Clerk & Recorders Office
cc. Madison County Planning Board

Madison County Weed Board

PO Box 278*Virginia City, MT 59755*Physical Address: 2296 Hwy 287, Alder, MT 59710
Ph# Margie (406) 842-5595 * Janie (406) 842-5596 * Fax (406) 842-5596
E-mail – Margie – madweed@3rivers.net
Janie – amadweed@3rivers.net

Noxious Weed Control Management Plan

Plan# 1 Date 4/26/16

I. Ownership and Location:

A. Name: Yellowstone Mountain Club

Address: PO Box 161097
Big Sky MT 59716

Phone# 406. 995-7385

B. Location:

a. Legal Description: NW 1/4 ____ 1/4 ____ 1/4

Section 7 Township 7S Range 3E

C. How many Lots? 28 units

D. A Map identifying or locating the Ownership must be included

E. Name of Subdivision The Corral

II. Noxious Weed Data:

A. Types of Noxious Weeds: Canada thistle, Houndstongue, Hoary Alyssum

B. Acres of infestation by weed species and land use. (use data key-2nd pg.)

Location	Weed Species	Acres	Land Uses	Environmental & Safety Factors
Example:	S. knapweed	4	Residential	Trees/Garden/Creek
1.	C. Thistle	.25	Pasture ~~Ranch~~	NONE
2.	H. Alyssum	.10	Pasture	NONE
3.	Houndstongue	.25	Pasture	NONE
4.				
5.				

(If possible, please locate above infestations on map)

Note: All Noxious Weed Management Plans must be signed, dated, and notarized .

(For office use only)

VI. Approval / Non-Approval:

***Before the Board will accept this Weed Management Plan for Approval, the Applicant must have his/her Notarized signature in place on this document. The Weed Board Chairperson will sign after Board Review and Approval.**

A. Approval- ✓ Date: 7/9/19
B. Approval with modifications- _____ Date: _____
C. Non - Approval- _____ Date: _____

D. Board Recommendations & Reasons: Should the Board have any recommendations to assist the landowner, or if this Plan is not approved, a letter of explanation will be sent to the landowner.

Madison County Weed Board

Betty Sykes
(Chairperson Signature)

7/9/16
(Date)

Applicant/Landowner

(Signature)

4/26/16
(Date)

STATE OF MONTANA)
) **ss.**
COUNTY OF MADISON)

On this 26 day of April, 2016, before me, the undersigned Notary Public in and for the State of Montana, personally appeared Mike DuCuennois, known to me to be the person whose name is subscribed this instrument was signed and sworn to before me as the same.

IN WITNESS WHEREOF, I have here unto set my hand and affixed my notarial seal the day and year first above written.

Sharon D Wampler
Notary Public of the State of Montana

Residing at Big Sky, MT
My Commission Expires April 01, 2019

SHARON D WAMPLER NOTARIAL SEAL STATE OF MONTANA

SHARON D WAMPLER
Notary Public
for the State of Montana
Residing at:
Big Sky, Montana
My Commission Expires:
April 01, 2019

Appendix E

Yellowstone Club
Annual Wildlife Report
2015

The Yellowstone Club
Big Sky, MT
59716

WILDLIFE MONITORING REPORT
YELLOWSTONE CLUB

January 1, 2015 –December 31, 2015

Prepared by:
Rich Chandler
Environmental Manager
Yellowstone Club

INTRODUCTION

History of Ownership

Prior to 1864, the land was owned by the United States. In the years following 1864, alternating sections of land in the Pioneer Mountain area were granted to the Northern Pacific Railroad. The remaining sections became part of the Gallatin National Forest in 1899. Private checkerboard ownership transferred from Northern Pacific Railroad to Burlington Northern (1890) to Plum Creek Timber (circa 1980). Following land consolidations authorized by Gallatin I (1993) and Gallatin II (1998), the 26 full/partial sections comprising the Yellowstone Club were owned by Big Sky Lumber. An investment partnership led by Cross Harbor Capital Partners, LLC acquired the Yellowstone Club in July 2009.

Property Summary

The property presently consists of 13,584 acres utilized as a low density resort. A main lodge, member gathering facilities, single home and townhouse residences, ski area, golf course and support services are located amid a largely forested habitat of varied species and characteristics. The Yellowstone Club has been, and will continue to be, developed in phases. The property's master plan restricts the total number of memberships to 864. As of December 2015, approximately 55 percent of the 864 membership have been sold.

MAMMALS

Methods

The Yellowstone Club employs 1 full time Environmental Manager to conduct the monitoring efforts of wildlife on property. This monitoring is carried out through a variety of techniques including but not limited to; 100+ days of on ground assessments, recording of staff and member observations, 2 trail cameras with over 1000 hours of recording time, staff outreach programs relating to bear awareness, species identification, conservation efforts, species on the ESA and reporting procedures, and lastly, analyzing past historical records. All of these methods seem to be effective, as it allows for continual monitoring and the establishment of a teamwork philosophy regarding the management of living, working and recreating with wildlife.

General Summary of Results

The most common mammal species found at The Yellowstone Club in 2015 were Elk and Mule Deer. All of which have been sighted on all of the sections of property. The most common predators found on property are Black Bear and Coyote. This year's weather brought below average moisture and above average temperatures throughout the year with the exception of July, September and December which produced higher than average precipitation (See Appendix A) while snowpack totals hovered around 80% of normal. A total of 31 species of mammals have been recorded on property to date (Picton, Eng 1999-2008 & Barstad et. al. 2007-2011). It is likely that several more species exist, but are currently unconfirmed (See Appendix B).

Awareness Training

An environmental awareness presentation was conducted in the spring for all new YC employees. Topics covered included; sediment control, wetlands, trash disposal, wildlife encounters & confrontations, species on the ESA, and proper means of reporting wildlife sightings and incidents. This training was presented to over 200 employees and many more contractors in 2015 and seems to be a very effective means of communicating proper land stewardship on many levels. The Forest Service also brought their bear education team to YC for a long day, which targeted the YC staff that works outdoors. This was presented to nearly 125 employees.

The Yellowstone Club revised the previous version of the wildlife and backcountry safety guide for its members, guests and employees (See Appendix C) in 2013. This brochure covers several topics while working, living and recreating in a mountain environment, such as food storage and disposal, wildlife encounters and reacting to wildlife encounters. These outreach programs have educated the residents and employees of The Yellowstone Club to safely coincide with the eco-system and its surroundings.

Construction Practices

The Yellowstone Club has strict design guidelines in place and regulated by an architectural review committee essentially overseeing the CC&R's. The guidelines cover an array of issues pertaining to mountain developments; from design, excavation practices, building requirements, contractor regulations, landscape standards, forestry management and limiting impacts to wildlife. Below are a few of the wildlife specific regulations discussed in the 130+ page design guideline document.

- *Buildings shall be located to minimize disturbance to existing topography, vegetation and wildlife.*

- *Numerous wildlife migration corridors bisect the Yellowstone Club. Many plants that grow in the Yellowstone Club and surrounding areas are palatable to the existing wildlife. Care should be taken when designing and installing landscapes by choosing plant materials that work with and enhance the native surroundings of the site. Minimize encounters with wildlife by carefully planning the landscape design to avoid plant placement that draw wildlife close to the building.*

- *Under no circumstances shall fences interfere with wildlife corridors or winter range areas.*

- *Balconies or decks that are four feet or less measured from the bottom of the deck to top of finished grade are to be enclosed with an appropriate solid material to prohibit access by wildlife.*

- *Trash containers shall be ARC approved and prevent access by wildlife and domestic animals and shall not be left outside overnight.*

- *Food waste and other trash whose scent may attract wildlife must be appropriately contained to minimize the smell.*

Non-Predator Species

Rocky Mountain Elk

Elk have been observed on all sections of property. No elk were seen on property through the winter months and the majority of elk moved onto property in late April as snowpack levels resided. Observations have concluded that populations are most dense in Sections 5/6 along the South Fork corridor and Sections 17/20 along the southern boundary with Buck Ridge and Sections 9/15 along the SW property boundary. Elk were observed throughout late spring through fall months in sections 5/6 and estimates indicate approximately 30-40 elk reside in these two sections. A herd was frequently reported on the east slope of Pioneer Mountain, Sections 11/12. No survey was conducted; however reports and evidence suggest over 10-15 elk were part of this herd. Bull to cow ratio varies annually, but there is strong evidence to believe the ratio averages 1:10 throughout property. There is a tendency for the general YC elk population to relocate to their wintering grounds when the base area snowpack becomes greater than 18" in depth and the general hunting season is completed. There is an annual migration documented through the greater South Fork drainage through much of the open space within Yellowstone Club property when the snowpack becomes too deep for elk to forage. These populations are likely from herds near the head waters of Muddy Creek and the South Fork of the West Fork of the Gallatin drainage. It is assumed these elk are migrating to their wintering grounds in and near the Porcupine/Buffalo Horn WMA. Traditionally this occurs around the first of the year; however this year's migration occurred in early December due to the early snowfall. In summary, with the increased wolf observations on YC property from 2012 through 2014 it appears the elk numbers are generally down from previous reporting's. There were no reported predator kills in 2015.

Shiras Moose

Moose were seen primarily along the riparian corridors on property and areas that have an abundance of wetland. The South Fork Corridor (Section 7), along with the Golf Course (Section 8), and Eglise Mountain (Sections 12/13) and near the South Fork Gate House (Section 5) continue to show the strongest populations. Overall observed Moose populations on property were slightly stronger than last year, between 12-18. Moose have been observed throughout the winter months on property, typically in areas with above snow food sources and settled snow depths of less than 2 feet, such as the South Fork corridor.

Rocky Mountain Mule Deer

Mule Deer are found on all sections of property. Deer movement seems to primarily be driven by food source and seasons. Typically, deer come onto property in early May, are seen below 7500' into late May and migrate to the higher elevations as the summer season progresses. The densest populations of Mule Deer reside on sections 6, 7 and 8 with estimates around 15 to 20 in each section. Their migration to wintering areas seems to begin upon the establishment of snowpack which is typically mid-October.

Mountain Goat

Mountain Goats have been sighted on Eglise (section 24), Pioneer Mountain (section 14) and Cedar Mountain (section 9). The Pioneer Mountain herd was frequently observed several times through the year and is estimated between 25-30 head. This particular herd resides year round on or near the Southerly slopes at elevations above 8000'. Sign of goats have been reported on all sections of property that are above 8500'.

Big Horn Sheep

No Big Horn Sheep were observed on property in 2015.

Predator Species

North American Grey Wolf

There was no reported Wolf sign or sightings documented in 2015, which is interesting when compared to 2014.

2014:
Wolf, their tracks and/or scat were seen in sections 6, 8, 10 and 17 while howling was heard in most all sections at some point throughout the year. Confirmed wolf sightings this fall were in sections 1 & 6. A wolf kill was discovered in January near the Waste Water Treatment Facility (sect. 7) as well as Lower Cedar View Drive (sect. 2). There is a known wolf pack south of The YC property boundary near Buck Ridge. It seemed predator kills were more prevalent this year in areas that are more heavily populated by human traffic.

Yellowstone Grizzly Bear

Portions of the southern side of the Yellowstone Club occur on the border or just inside the northwestern corner of the primary conservation area for grizzly bears designated by the USFWS. Within the Yellowstone Club, grizzly bears have been documented in sections 3, 7, 8, 13, 15, 17, 18 and 19 however no grizzly bears were documented in YC in 2012, 2014, or 2015. Wildlife cameras recorded over 1000 hours in sections 13 & 24 with the goal of documenting a Grizzly and were unsuccessful. Grizzlies were confirmed in sections 3 and 15 in the fall of 2013, which was the last confirmed sighting in YC. No resident grizzlies occur on the Yellowstone Club, but they can pass through the area in the spring/early summer, presumably in search of newly born elk calves, as well as in the fall following ungulate migrations. Though grizzlies do pass through the area, since its inception in 1999 there have been no documented human-grizzly bear conflicts within Yellowstone Club. All Yellowstone Club staff are required to undergo a bear aware training that focuses on safety as well as conflict prevention training by limiting the availability of bear attractants, such as food and trash. This program is strictly enforced by Yellowstone Club. In addition, all residents and contractors are provided educational material about grizzly bears and are required to adhere to a strictly enforced trash management program. The YC Architectural Review Committee also has several regulations in place for new home construction that address the permanent storage and management of bear attractants.

American Black Bear

Black Bear sightings were significantly less than in 2014; which contradicted the general reporting throughout the Big Sky community. Black Bears have historically been sighted on most sections of property with the majority of activity concentrated in sections 7, 8 and 12. The YC employee outreach and education program has demonstrated proven success over the last 6 years. However, continued outreach & education to new staff is still recommended.

Coyote

Coyote sign has been observed in all sections of property. There is an abundance of small mammals such as the Yellow Bellied Marmot that serve as prey. Track surveys suggest that populations are strong and widespread throughout property with no specific concentrations.

Red Fox

A few fox were observed in 2015 in the early summer months when rodent populations were highest. Reports and trail cameras have continued to confirm their presence in sections 1, 2, 6, 5, 11 and 12.

Wolverine

No wolverine sign was observed in 2015.

Mountain Lion

No Mountain Lion signs or sightings were reported in 2015.

Canada Lynx

No signs or sightings were reported in 2015. Trail cameras were put in Lynx specific habitat throughout 2015 but no lynx were photographed. The Greater Yellowstone Area supports a small, persistent population of lynx. The Greater Yellowstone Area is considered to be naturally marginal lynx habitat that contains highly fragmented foraging habitat. Because of this, lynx home ranges are thought to generally be larger than in other portions of their range, and consist of a matrix of foraging and non-foraging areas. As snowshoe hares are the primary prey of lynx, it is not surprising that the majority of documented lynx observations in the state are also below an elevation of 7500 feet. Because of the low densities of snowshoe hares at YC it is unlikely that the area would ever support a resident population of lynx, though lynx may occasionally travel through the area.

Bobcat

Several bobcats were observed in 2015 primarily in sections 6, 7 & 12, which is similar to 2013 and 2014 findings.

POTENTIAL THREATENED AND ENDANGERED SPECIES Within The Yellowstone Club

According to the U.S. Fish and Wildlife Service (USFWS) four species listed as threatened under the Endangered Species Act, and two candidate species for listing, potentially occur in Madison County (Table 2; USFWS 2015). The Yellowstone Grizzly Bear is the only threatened species to have been observed at the Yellowstone Club. Sightings of this species have generally been on the southern portions of the property, sections 3, 7, 8,13,17,18 and 19. It is likely this animal migrates from the Yellow Mule headwaters south of our property as it is a prime wildlife corridor. Lynx are known to be present in the Madison Range; however no sightings have been documented on YC property to date.

Scientific Name	Common Name	Federal Status*	Likelihood to Occur in Project Area	Notes
Spiranthes diluvialis	Ute Ladies' Tresses	T	Not likely	No suitable habitat.
Lynx canadensis	Canada Lynx	T	Potentially occurs as a transient	Potential habitat has been documented in the vicinity as a transient.
Ursus arctos horribilis	Grizzly Bear	T	Potentially occurs as a transient	Potential habitat has been documented in the vicinity as a transient.
Calidris canutus rufa	Red Knot	T	Not Likely	No suitable habitat.
Centrocercus urophasianus	Greater Sage-Grouse	C	Not Likely	No suitable habitat.
Anthus spragueii	Sprague's Pipit	C	Not Likely	No suitable habitat.

*T= threatened; C=candidate

BIRDS

Methods

Bird monitoring is accomplished through a variety of techniques similar to mammal monitoring which includes; 50+ days of on ground assessments, confirmation of reports from employees and members, staff outreach programs relating to species identification, species on the ESA and reporting procedures, analyzing known nesting areas and lastly, comparing findings against past historical records. These techniques seem to be effective, as it allows for continual monitoring throughout the entire year.

General Summary of Results

Ninety nine bird species have been observed on the Yellowstone Club property, of which approximately 40% are cavity nesters (See Attachment B). The Yellowstone Club has installed over forty bird houses on the golf course where the population of standing dead trees (snags) is low. This practice along with preserving existing snags appears to work well, as the overall amount of bird species seen on property continues to increase (Picton & Eng 2001-2008).

Species of Concern

Five species have been sighted which are currently listed as Species of Concern; Bald Eagle, Black-Backed Woodpecker, Cassin's Finch, Clark's Nutcraker and the Greater Grey Owl. Of these species the Clark's Nutcraker is the only bird to be seen on a year round basis. This is thought to be because of the White Bark Pine population on property, which is a significant food source for the Clark's Nutcracker.

Endangered or Threatened Species

No birds currently listed on the ESA are found on Yellowstone Club property.

FISH

Methods

The only fish species found on Yellowstone Club property is the West Slope Cutthroat (*Oncorhynchus clarki lewisi*). Testing conducted in 1994 and 1999 found the genetics of the West Slope Cutthroat on the YC property to be essentially pure. In September 2010, the Gallatin National Forest in conjunction with the Montana Fish, Wildlife and Parks conducted sampling to validate previous findings. Six sites were tested and tissue samples were taken from 10 fish per site within the YC property boundary. Testing confirmed the previous results and the population of WS Cutthroat Trout are nearly 97% essentially pure whereas further downstream the purity decreased to 93%.

General Summary

The West Slope Cutthroat Trout is listed as a Species of Concern in Montana, and there are only a handful of streams in SW Montana that produce 100 percent pure species of West Slope Cutthroat Trout. The water system above Ousel Falls (South Fork of the West Fork of the Gallatin) has an essentially pure strain of this species. It is believed that Ousel Falls has disconnected this species from hybridization with other trout species and the current population is aboriginal. The Yellowstone Club makes every effort to ensure this species purity is protected.

The Yellowstone Club is drained by four tertiary streams – Muddy Creek, Third Yellow Mule Creek, Second Yellow Mule Creek and the South Fork of the West Fork of the Gallatin River. Together these form the upper headwaters of the South Fork of the West Fork of the Gallatin River. These streams total just over 15 river miles within the property boundary and are principle assets of the Yellowstone Club, both esthetically and environmentally. Efforts have been made by the Yellowstone Club to improve bank stability, in stream habitat, and preservation of the riparian zones.

Recreational Use

Fishing is one of several opportunities offered at the Yellowstone Club for its members and guests. This takes place either in the four above mentioned streams or in the artificial pond located in the base area. The Yellowstone Club guides fishing in-house to ensure a consistent, sustainable and environmentally friendly approach to species and land management is implemented. All fishing is catch and release, barbless hooks are required and no bait is allowed. The artificial pond is 3.2 acres with an average depth of 13'. This pond is stocked with West Slope Cutthroat from a certified hatchery (MT FWP license # 3-030044). Stocking has occurred five times, 2003, 2007, 2013, 2014 and 2015. The first two times 1500 100% pure native West Slope Cutthroat Trout were introduced and nearly 1000 in 2013 and another 125 larger stock in 2014 and again in 2015.

A Westslope Cutthroat Trout fishery enhancement plan was drafted in winter 2011. This plan outlined a course moving forward that protects the genealogy and population of this fish species on property. The first phase of this plan was implemented in summer 2011. This phase consisted of the creation of an education/outreach pamphlet and mandatory barbless hooks along with the development of several access points to the waterways. It was accepted openly by all YC staff and members and has shown positive results so far with the initial goals that were established.

APPENDIX A

2015 Weather Data

January 2015 through December 2015
Yellowstone Club Weather Station
Data

Temperature (7200')	January	February	March	April	May	June	July	August	September	October	November	December	Annual Avg.
Avg. Temp *(f)*	25.37	26.48	33.65	35.42	43.58	57.25	57.68	57.94	52.34	43.86	22.75	18.28	39.55
Avg. High *(f)*	35.97	37.89	45.74	47.50	53.77	73.20	71.48	72.65	66.90	55.84	33.83	27.45	51.85
Avg. Low *(f)*	14.77	15.07	21.55	23.33	33.38	41.30	43.87	43.23	37.77	31.87	11.67	9.10	27.24

Precipitation	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total
Precip @ 7200' *(Inches)*	1.47	1.02	1.23	1.97	3.33	0.81	4.36	1.52	2.46	1.37	2.25	2.84	24.63
Precip @ 9375' *(Inches)*	3.2	2.12	2.14	3.03	4.79	0.64	4.2	1.53	2.98	2.89	2.57	3.96	34.05
***Long Term Precip Avg.**	2.86	2.39	2.52	3.22	3.61	4.11	2.85	2.01	1.76	1.38	2.75	2.77	29.46

* Long term information taken from NRCS SnoTel Site Located on Lone Mountain (8880') from 1992 through 2009.

APPENDIX B

MAMMAL LIST FOR THE YELLOWSTONE CLUB
1999-2015

1) Rocky Mountain Elk *(Cervus elaphus nelson)*
2) Rocky Mountain Mule Deer *(Odocoileus Hemionus)*
3) Mountain Goat *(Oreamnos Americana)*
4) Big Horn Sheep *(Ovis canadensis)*
5) Shiras Moose *(Alces alses shirasi)*
6) Black Bear *(Ursus Americana)*
7) Grizzly Bear *(Ursus arctos horribilis)*
8) Grey Wolf *(Canis lupus)*
9) Coyote *(Canis latrans)*
10) Red Fox *(Vulpes fulva)*
11) Mountain Lion *(Puma concolor)*
12) Bobcat *(Lynx rufus)*
13) Wolverine *(Gulo gulo)*
14) Showshoe Hare *(Lepus americanus)*
15) Pika *(Ochotona princeps)*
16) Montane Vole *(Microtus montanus)*
17) Red-Backed Vole *(Clethrionomys gapperi)*
18) Deer Mouse *(Peromyscus maniculatus)*
19) Red Squirrel *(Tamiasciuris hudsonicus)*
20) Least Chipmunk *(Tamais minimus)*
21) Yellow-Pine Chipmunk *(Tamias amoenus)*
22) Uinta Ground Squirrel *(Spermophilus armatus)*
23) Gold Mantled Ground Squirrel *(Callospermophilus lateralis)*
24) Northern Pocket Gopher *(Thomomys talpoides)*
25) Yellow Bellied Marmot *(Marmota flavivenris)*
26) Porcupine *(Erethizon dorsatum)*
27) Pine Marten *(Martes americana)*
28) Long-Tailed Weasel *(Mustela frenata)*
29) Ermine *(Mustela erminea)*
30) Least Weasel *(Mustela nivalis)*
31) Northern River Otter *(Lontra Canadensis)*

(Picton, Eng 1999-2008 & Barstad et. al. 2007-2013)

BIRD LIST FOR THE YELLOWSTONE CLUB
1999-2015

Species	Spring	Summer	Fall	Winter
1. Dusky Flycatcher *(Empidonax oberholseri)*			X	
2. Olive-sided Flycatcher *(Contopus borealis)*		X	X	
3. Western Wood Pewee *(Contopus sordidulus)*			X	
4. Say's Phoebe *(Sayornis saya)*			X	
5. Warbling Vireo *(Verio gilvus)*			X	
6. Gray Jay *(Perisoreus Canadensis)*	X	X	X	X
7. Steller's Jay *(Cyanocitta stelleri)*	X	X	X	X
8. Clark's Nutcracker *(Nucifraga Columbiana)*	X	X	X	X
9. Black-billed Magpie *(Pica hudsonia)*	X		X	
10. American Crow *(Corvus brachyrhynchos)*		X	X	
11. Common Raven *(Corvus corax)*	X	X	X	X
12. Horned Lark *(Eremophila alpestris)*			X	
13. Barn Swallow *(Hirundo rustica)*			X	
14. Cliff Swallow *(Petrochelidon pyrrhonota)*		X		
15. Tree Swallow *(Tachycineta bicolor)*	X	X	X	
16. Violet-green Swallow *(Tachycineta thalassina)*	X	X	X	
17. Black-capped Chickadee *(Parus atricapillus)*		X	X	
18. Mountain Chickadee *(Parus gambeli)*	X	X	X	X
19. Red-breasted Nuthatch *(Sitta canadensis)*		X	X	
20. White-breasted Nuthatch *(Sitta carolinensis)*	X	X		
21. Brown Creeper *(Certhia americana)*			X	
22. House Wren *(Troglodytes aedon)*		X	X	
23. Rock Wren *(Salpinctes obsoletus)*		X		
24. Winter Wren *(Troglodytes hiemalis)*			X	
25. American Dipper *(Cinclus mexicanus)*	X	X	X	
26. Ruby-crowned Kinglet *(Regulus calendula)*			X	
27. Mountain Bluebird *(Sialia currucoides)*	X	X	X	
28. Townsend's Solitaire *(Myadestes townsendi)*			X	
29. Veery *(Catharus fuscescens)*			X	
30. Hermit Thrush *(Catharus guttatus)*			X	
31. Swainson's Thrush *(Catharus istulatus)*			X	
32. American Robin *(Turdus migratorius)*	X	X	X	

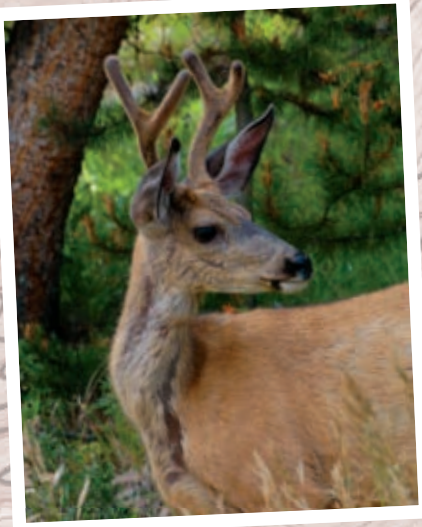
Species	Spring	Summer	Fall	Winter
33. European Starling *(Sturnus vulgaris)*			X	
34. Cedar Waxwing *(Bombycilla cedrorum)*			X	
35. MacGillivray's Warbler *(Opurornis tolmiei)*			X	
36. Orange-crowned Warbler *(Vermivora celata)*			X	
37. Townsend's Warbler *(Dendroica townsendi)*		X		
38. Wilson's Warbler *(Wilsonia pusilla)*		X	X	
39. Yellow-rumped Warbler *(Dendroica coronate)*	X	X	X	
40. Yellow Warbler *(Dendoica petachia)*			X	
41. Northern Waterthrush *(Parkesia noveboracensis)*			X	
42. Common Yellowthoat *(Geothypis trichas)*			X	
43. Western Tanager *(Piranga ludoviciana)*			X	
44. Green-tailed Towhee (*Pipilo chlorurus)*			X	
45. Chipping Sparrow *(Spizella passerine)*		X	X	
46. Fox Sparrow (*Passerella iliaca)*		X		
47. Lincoln's Sparrow *(Melospiza lincolnii)*			X	
48. Savannah Sparrow *(Passerculus sandwichensis)*			X	
49. Song Sparrow *(Melospiza melodia)*		X	X	
50. White-crowned Sparrow *(Zonotrichia leucophrys)*	X	X	X	
51. Dark-eyed Junco *(Junco hyemalis)*	X	X	X	
52. Snow Bunting *(Plectrophenax nivalis)*				X
53. Lazuli Bunting *(Passernia amoena)*			X	
54. Brewer's Blackbird *(Euphagus cyanocephalus)*		X		
55. Brown-headed Cowbird *(Molothrus ater)*	X	X	X	
56. American Goldfinch *(Spinus tristis)*			X	
57. Cassin's Finch *(Carpodacus cassinii)*	X	X	X	
58. Gray-crowned Rosy Finch *(Leucosticte tephrocotis)*	X		X	X
59. Red Crossbill *(Loxia curvirostra)*	X		X	
60. Pine Siskin *(Cardvelis pinus)*		X	X	
61. Evening Grosbeak *(Coccothraustes vespertinus)*			X	
62. Pine Grosbeak *(Carduelis pinus)*	X	X	X	
63. Western Grebe *(Aechmophorus occidentalis)*			X	
64. Barrows Goldeneye *(Bucephala islandica)*		X		
65. Blue-winged Teal *(Anas discors)*		X		
66. Bufflehead *(Bucephala albeola)*			X	

Species	Spring	Summer	Fall	Winter
67. Lesser Scaup *(Aythya affinis)*			X	
68. Mallard *(Anas platyrhynchos)*	X	X	X	
69. Northern Shoveler *(Anas clypeata)*		X		
70. Ring-necked Duck *(Aythya collaris)*			X	
71. American Coot *(Fulica americana)*			X	
72. Canada Goose *(Branta canadensis)*	X			
73. Bald Eagle *(Haliaeetus leucocephalus)*	X	X	X	
74. Golden Eagle *(Aquila chrysaetos)*		X		
75. Osprey *(Panion haliaetus)*	X	X	X	
76. American Kestrel *(Falco sparverius)*	X	X	X	
77. Cooper's Hawk *(Accipiter cooperii)*			X	
78. Northern Goshawk *(Accipiter gentiles)*		X	X	
79. Red-tailed Hawk *(Buteo jamaicensis)*	X	X	X	
80. Dusky (Blue) Grouse *(Dendragapus obscures)*	X	X	X	
81. Ruffed Grouse *(Bonasa umbellus)*	X	X	X	X
82. Killdeer *(Charadrius vociferous)*	X	X		
83. American Avocet *(Recurvirostra americana)*		X		
84. Spotted Sandpiper *(Bartramia longicauda)*	X	X	X	
85. Wilson's Snipe *(Gallinago delicate)*	X			
86. Mourning Dove *(Zenaida macraura)*	X	X		
87. Great Gray Owl *(Strix nebulosa)*			X	
88. Great Horned Owl *(Bubo virginianus)*			X	
89. Northern Saw-whet Owl *(Aegolius acadicus)*			X	
90. Calliope Hummingbird *(Stellula calliope)*			X	
91. Rufous Hummingbird *(Selasphorus rufus)*		X		
92. Belted Kingfisher *(Megaceryle alcyon)*			X	
93. Red-naped Sapsucker *(Sphyrapicus nuchalis)*		X	X	
94. Williamson's Sapsucker *(Sphyrapicus thyroideus)*			X	
95. American Three-toed Woodpecker *(Picoides dorsalis)*		X		
96. Black-backed Woodpecker *(Picoides arcticus)*			X	
97. Downy Woodpecker *(Picoides pubescens)*		X	X	
98. Hairy Woodpecker *(Picoides villosus)*	X	X	X	X
99. Norther Flicker *(Colaptes auratus)*	X	X	X	

(Picton, Eng 1999-2008 & Barstad et. al. 2007-2014)

APPENDIX C

WILDLIFE AND BACKCOUNTRY SAFETY GUIDE



YELLOWSTONE CLUB

Whether you are hiking, biking, horseback riding, fishing, or just out for a stroll, your safety at Yellowstone Club is a top priority. The wilderness in and around YC is prime wildlife habitat which includes everything from bear, moose and wolves to deer, elk and other game species. The environment is also very dynamic – from thunderstorms and high altitudes to forest fires and rugged terrain. It is important to familiarize yourself with the following safety guidelines and utilize these safety tips when spending time out - doors. In an emergency call Yellowstone Club Security at {406} 993-2002.

SAFETY IN THE BACKCOUNTRY

- Carry bear spray. know your hiking abilities. Do not attempt a hike that is too advanced for your level of fitness.
- Contact Concierge for information on trail conditions and weather forecast.
- Make sure someone knows where you are going and an estimated return time.
- Try to avoid hiking at dusk and dawn when wildlife is most active.
- Take a jacket, rain coat or poncho, a warm hat, insect repellent, sun screen, matches, high energy food, and a map.
- Carry adequate drinking water as stream and lake water may not be safe to drink untreated.
- Always hike with another person. There is safety in numbers!

WATCHING THE WEATHER

Be alert to changing weather conditions. In mountainous terrain, storms develop quickly, especially in the summer. Summer lightning can be very dangerous. If you are caught in a lightning storm remember to:

- Avoid high ridges, tall trees, and peaks.
- Stay in the open, try to remain in low lying areas.
- Stay away from single trees or other targets – especially metal towers.
- Shed backpacks with metal supports.

HIKING BY THE RULES - THINGS NOT TO DO

- Do not take shortcuts across switchbacks. This causes harmful erosion.
- Do not take motorized equipment or wheeled vehicles into the wilderness.
- Do not leave any trash or garbage. If you pack it in, PACK IT OUT!
- Do not build fires in the backcountry unless prior permission is granted by security.
- Do not smoke. We are in a highly dangerous fire area.
- Do not make any significant impact in stream crossings.

ENCOUNTERING WILDLIFE

Although attacks are rare, ALL wildlife is unpredictable and may attack without warning. Even animals that appear 'tame' or docile can react suddenly and unexpectedly to a perceived threat – it's impossible to predict what will threaten the animal.

- Keep a safe distance from all wildlife – at least 100 yards (91m) from wildlife.
- Make noise when hiking by talking loudly, singing, or wearing bear bells; this will alert wildlife –especially bears – that you are in the area.
- Avoid eye contact and back away slowly during animal encounters.

IF A BEAR ATTACKS

- Stand your ground. Never run.
- The most effective weapon against a charging bear is bear spray. If an aggressive bear comes within 40 feet, release a 2-3 second blast of bear spray to create a fog between you and it.
- If the bear charges, fire 4 second blasts towards its' face until empty.
- Do not climb a tree.
- As a last resort, play dead. Lie flat on your stomach, legs spread and with your hands clasped over the back of your neck. Keep your backpack on, as it may act as a shield.
- Do not move until you are sure the bear has left the area.

BEAR FACTS

Yellowstone Club and the surrounding area is bear country. Bear attacks are rare and usually occur only when a bear is taken by surprise. Bears will react defensively to protect their space, cubs or food caches. It is important to know the difference between a black bear and a grizzly bear and how each one might react.

WILDLIFE RESPONSIBILITY CODE

Respect their space. Wildlife viewing is exciting and the temptation to get close is strong. However, getting too close poses a number of risks:

- Serious or fatal injury to you, your children or another onlooker.
- Injury to the animal due to 'flight' response.
- Long-term effects on the health and longevity of the population due to stress, including young being separated from their mother.
- Disturbing wildlife is considered harassment and is subject to hefty fines in State/National Forests, Wilderness Areas and Yellowstone Club.

DO NOT FEED WILDLIFE

Feeding wildlife seems harmless and may even appear helpful when food sources are scarce; however, feeding wildlife can be harmful to the animal and dangerous to you.

- Feeding wildlife is illegal in Montana.
- Once wild animals associate people with food, the animals lose their fear of humans and may become aggressive.
- Animals populate areas where food is most easily obtained. Feeding prey animals—birds, rabbits, and deer— will also attract predators—bears, mountain lions, and wolves.

STORE FOOD PROPERLY

- Bears are attracted to food smells, including human and pet food. BBQ grills and garbage are especially high attractants to bears. Once a bear eats human food, it will become very aggressive in order to get more. The saying is: "A fed bear is a dead bear."
- Use outside garbage cans for non-food items only.
- Garbage should be stored where bears can neither smell nor gain access to it— either in a bear-proof container or inside a building that bears cannot enter.
- Thoroughly wash or store any outdoor items – such as barbeque grills, portable smokers, ice chests, and coolers – after each use.

There are many other forms of wildlife you may encounter in the backcountry including: Moose, Elk, Deer, Mountain Lions and Wolves. Though, these sightings may seem insignificant, always take caution and do not approach the animals. Treat all wildlife with respect by giving them their space.

YELLOWSTONE CLUB

www.yellowstoneclub.com

For more information, please contact Yellowstone Club's Wildlife Specialist, Shane Barstad at:
w: {406} 995-3475, c: {406} 539-1296,
e: shane.barstad@yellowstoneclub.com

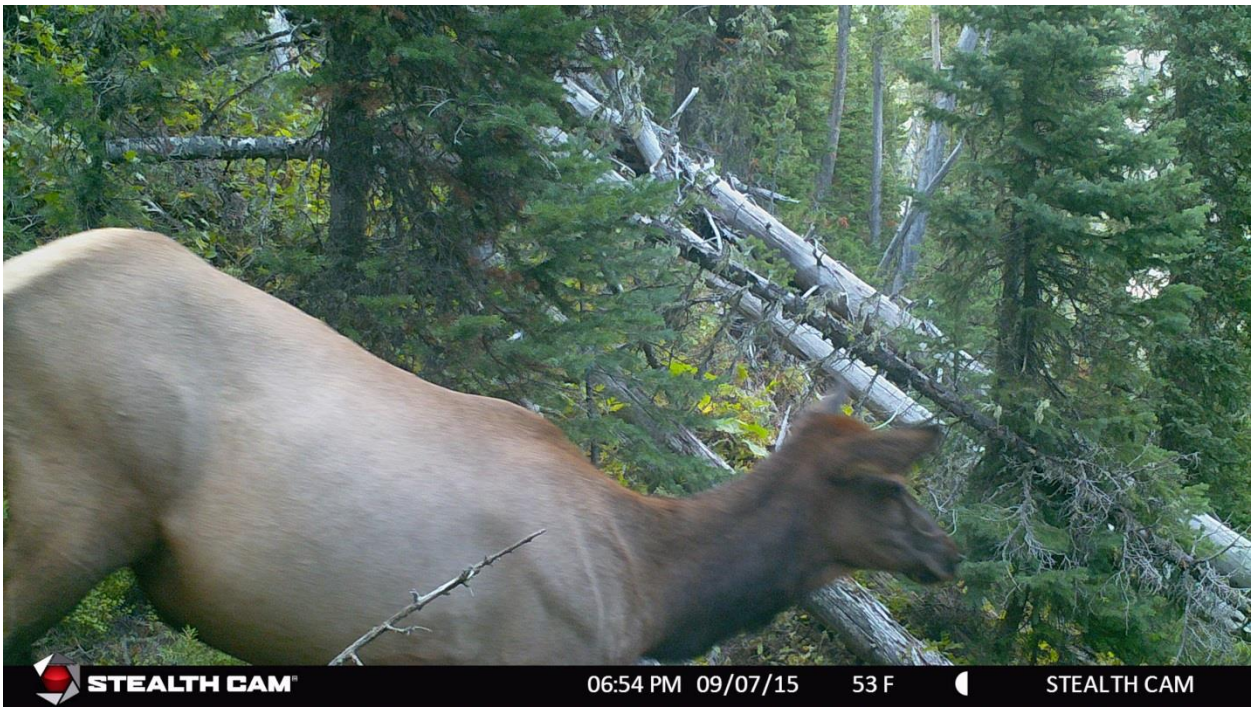
APPENDIX D

Black bear cub photo taken in section 8, October 2015.

Bobcat photo taken in section 1, November 2015.

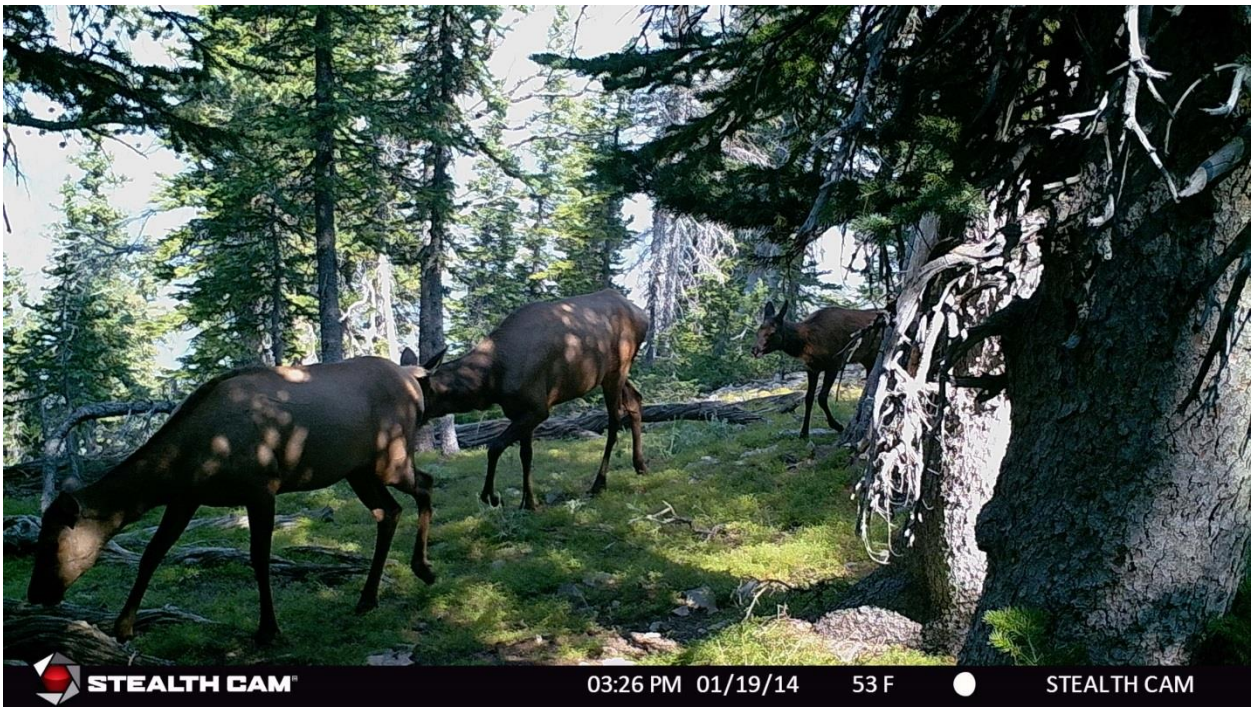
Black Bear cub photo taken in section 7, July 2015.

Bald Eagle photo taken in section 7, June 2015.

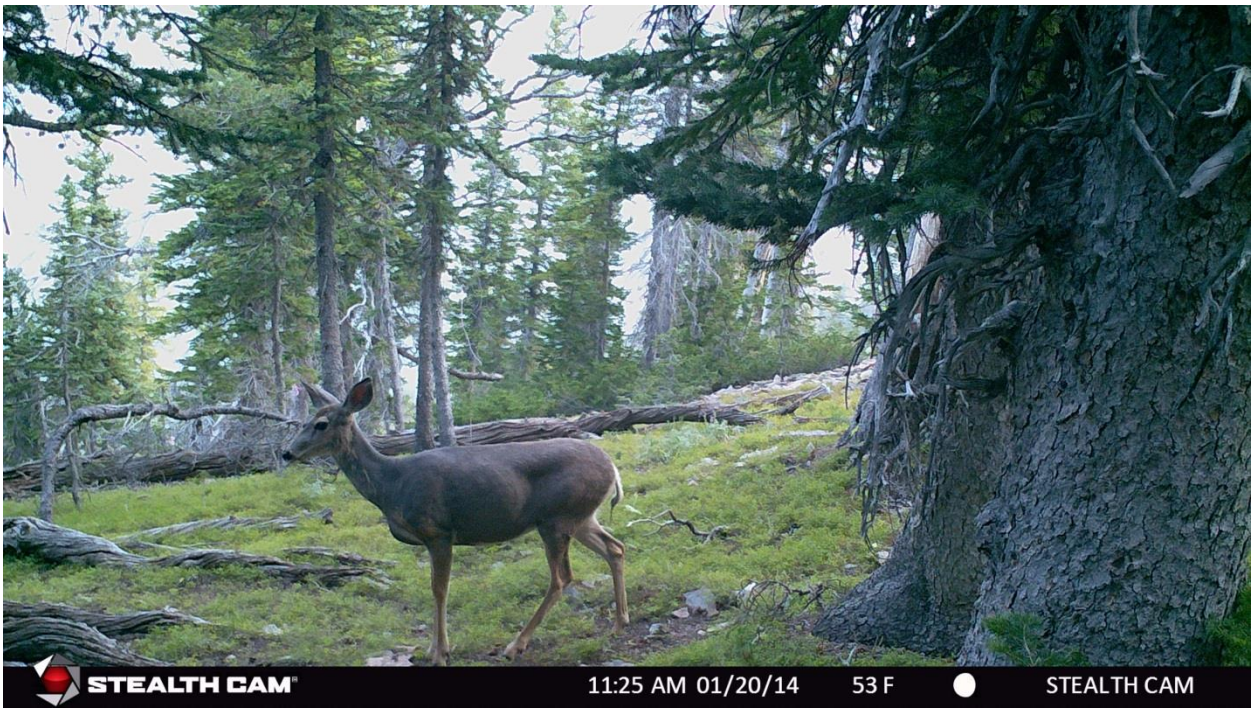


Cow elk photo taken in section 13, September 2015.

Black Bear photo taken in section 17, September 2015.



Cow elk photo taken in section 24, August 2015.



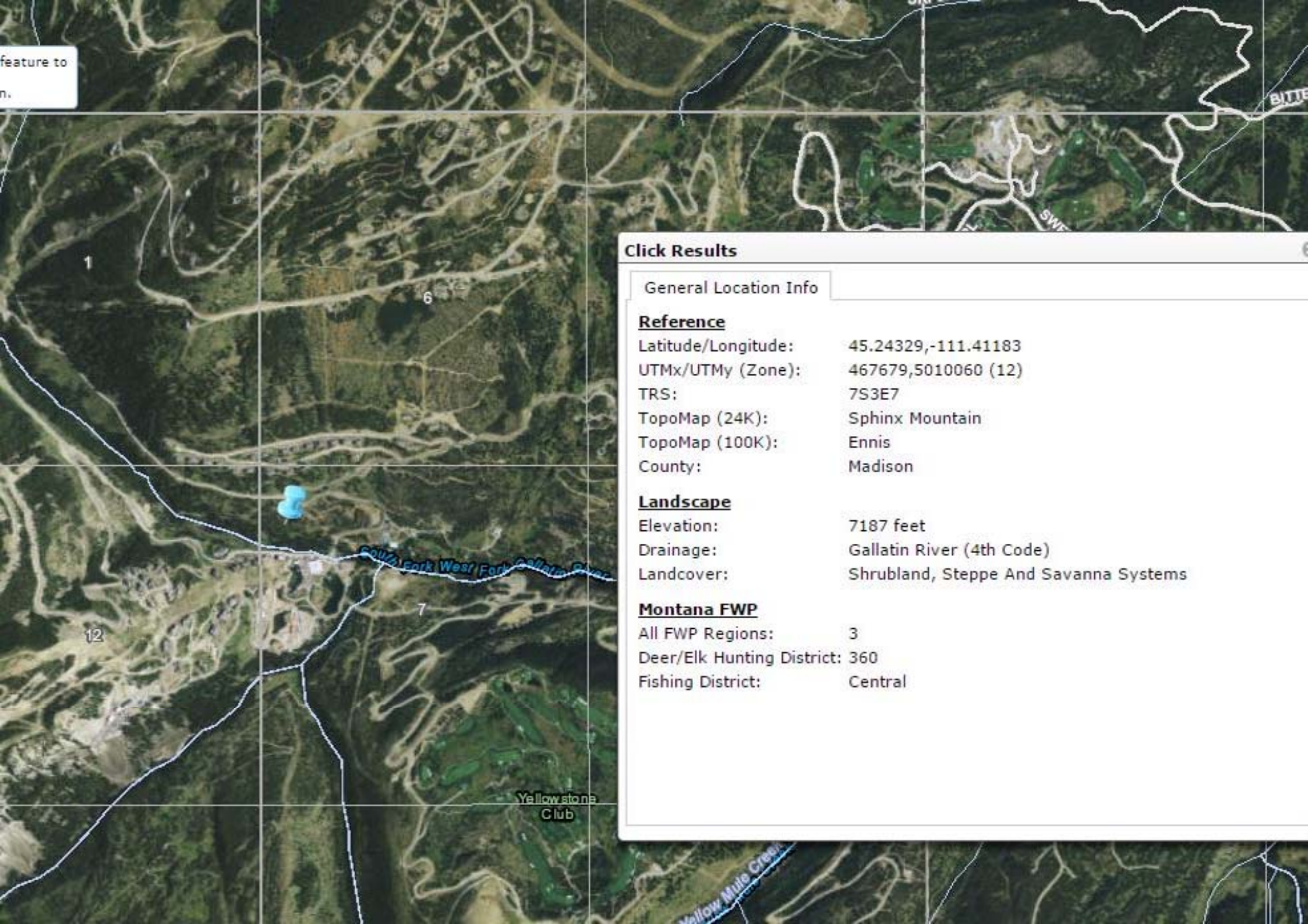
Mule Deer doe photo taken in section 24, August 2015.

Crucial Areas Planning System (CAPS)

Data Layer Documentation and Summary

Montana Fish, Wildlife and Parks

4/29/2015


feature to
n.
1
6
7
12
Yellowstone
Club
Click Results
General Location Info
Reference
Latitude/Longitude: 45.24329,-111.41183
UTMx/UTMy (Zone): 467679,5010060 (12)
TRS: 7S3E7
TopoMap (24K): Sphinx Mountain
TopoMap (100K): Ennis
County: Madison
Landscape
Elevation: 7187 feet
Drainage: Gallatin River (4th Code)
Landcover: Shrubland, Steppe And Savanna Systems
Montana FWP
All FWP Regions: 3
Deer/Elk Hunting District: 360
Fishing District: Central

Purpose:
To define the layers included in the Crucial Areas Planning System (CAPS), describe how they were constructed, and provide information about the data update process.

FWP Staff:

- Chief of Operations: Paul Sihler
- Fisheries Division Administrator: Bruce Rich
- Wildlife Division Administrator: Ken McDonald
- Data Services Bureau Chief: Dawn Anderson

List of acronyms and abbreviations used in this document:

Abbreviation	Full Text
AFWA	Association of Fish and Wildlife Agencies
CAPS	Crucial Areas Planning System
DS	Data Services Bureau
FIS	Fisheries Information System - Montana FWP
GAP	Gap Analysis Program (United States Geological Survey)
HUC	Hydrologic Unit Code
MFISH	Montana Fisheries Information System - Montana FWP
MFWP	Montana Fish, Wildlife & Parks
MRRE	Mandatory Reporting Response Entry
MTNHP	Montana Natural Heritage Program
MTNRIS	Montana Natural Resource Information Service
POD	Point Observation Database
SERI	Species of Economic or Recreational Importance
SGCN	Species of Greatest Conservation Need
SOC	Species of Concern
T/E	Threatened or Endangered
USGS	United States Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WGA	Western Governors Association
WGWC	Western Governors Wildlife Council
WIS	Wildlife Information System - Montana FWP

Contents

1. Introduction 4

2. Montana CAPS Data Layers 5

Crucial Habitat Rank 6

Tier 1 - Crucial Habitat Input Data Layers 7

Habitat for Species of Concern 7

Native and Unfragmented Habitat 8

Species of Economic and Recreational Importance (SERI) 10

Wetland and Riparian Areas 14

Montana Pilot Data – Non-Tier 1/Supporting Layers 15

Aquatic Connectivity 16

Fish Native Species Richness 17

Game Fish Life History 17

Large Landscape Blocks and Habitat Connectivity 18

Watershed Integrity 19

3. Data Sources 21

4. Data Extrapolation Techniques 22

5. Additional Data Layers 22

6. Data Layer Update Process and Staff Responsibilities 23

1. Introduction

With the adoption of its Wildlife Corridors Initiative Report in 2008, the Western Governors' Association (WGA) created the Western Governors' Wildlife Council (WGWC) and tasked its members with developing policies and tools to identify and conserve crucial wildlife habitat and corridors across the region. With the launch of the Western Governors' Crucial Habitat Assessment Tool (CHAT), the WGA and WGWC aim to bring greater certainty and predictability to planning efforts by establishing a common starting point for discussing the intersection of development and wildlife. CHAT is designed to reduce conflicts and surprises while ensuring wildlife values are better incorporated into land use planning, particularly for large-scale linear projects. It is a non-regulatory scoping tool that is not intended for project-level approval. CHAT is integrated with, and depicts, state specific information on priority species and habitats. In April 2015, the WGA transferred full responsibility for CHAT to the Western Association of Fish and Wildlife Agencies (WAFWA) and the Association of Fish and Wildlife Agencies (AFWA), and the tool was renamed the Western Association of Fish and Wildlife Agencies CHAT.

Montana Fish, Wildlife & Parks (MFWP) took the lead in conducting a statewide Crucial Areas Assessment for Montana in 2008. The Assessment evaluated the fish, wildlife and recreational resources of Montana in order to identify crucial areas and fish and wildlife corridors. This Assessment is part of the WAFWA CHAT, a larger conservation effort that recognizes the importance of landscape scale management of species and habitats by fish and wildlife agencies across the western United States. Within Montana, this effort resulted in a web-based Crucial Areas Planning System (CAPS)**,** a tool aimed at future planning for a variety of development and conservation purposes so fish, wildlife, and recreational resources can be considered early in the planning process.

The fish, wildlife, and recreational resources in Montana are represented by data layers available in CAPS. The overall Crucial Habitat Rank and Tier 1 layers are also available in the WAFWA CHAT along with other states' data. The remainder of this document outlines the process by which data layers for Montana were developed and how those data will be updated for MT CAPS and the WAFWA CHAT.

2. Montana CAPS Data Layers

Data layers are categorized as Final "roll up", Tier 1, Non-tier 1/Supporting data layers. WAFWA defines "Tier 1" as "the first tier being those data layers that are considered to be the foundation of any crucial habitat layers and which states commit to including, as a minimum, in their systems." The Crucial Habitat Rank and CAPS Tier 1 layers are the only CAPS layers that are shared with and shown on the WAFWA CHAT. CAPS non-tier 1 layers are specific to Montana and only shown in MT CAPS. Non-tier 1 layers are those from the original 2008 Crucial Areas Assessment which did not contribute to the Crucial Habitat Rank. A general overview of these datasets is discussed below.

Layers follow a hierarchy where supporting data and Tier 1 data contribute to an overall ranking or "score" for each hexagon displayed in the map. The hierarchy is outlined below.

1) Crucial Habitat Rank (Final "roll up" layer)
2) Crucial Habitat Tier 1 Inputs (Tier 1 layers):
    a. Habitat for Species of Concern
    b. Large Natural Areas
    c. Landscape Connectivity
    d. Species of Economic and Recreational Importance
    e. Wetland and Riparian Areas
3) Montana Pilot Data – Non-Tier 1 (Non-tier 1/Supporting data layers)
    a. Aquatic Connectivity
    b. Fish Native Species Richness
    c. Game Fish Life History
    d. Large Landscape Blocks and Habitat Connectivity
    e. Watershed Integrity

Crucial Habitat Rank

Summary: The Western Governors' Wildlife Council defines "crucial habitat" as places containing the resources (including food, water, cover, shelter and important wildlife corridors) that are necessary for the survival and reproduction of aquatic and terrestrial wildlife and to prevent unacceptable declines, or facilitate future recovery of, wildlife populations; or are important ecological systems with high biological diversity value. The compiled Crucial Habitat Rank layer can be used to determine areas containing high priority crucial habitats. This layer is a result of aggregating all crucial habitat input layers and can provide an initial overview of whether an area contains crucial habitat or important natural resources for fish and wildlife.

Aggregation Method: Categorical

Aggregation Details: Starts with the highest priority levels of the Habitat for Species of Concern (SOC) Tier 1 dataset and then in descending priority includes Species of Economic and/or Recreational Importance (SERI), Large Intact Blocks (LIB), Landscape Connectivity, and Wetland and Riparian Areas to generate the Crucial Habitat Rank priority levels.

Priority Level 1	SOC priority level 1 or 2.
Priority Level 2	SOC priority level 3 or Species of Economic and/or Recreational Importance (SERI) priority level 1 or Large Intact Block (LIB) priority level 1.
Priority Level 3	SOC priority level 4 or SERI priority level 2 or LIB priority level 2 or Landscape Connectivity priority level 1.
Priority Level 4	SOC priority level 5 or SERI priority level 3 or LIB priority level 3 or Landscape Connectivity priority level 2 or Wetland and Riparian Areas priority level 1.
Priority Level 5	SOC priority level 6 or Landscape Corridors priority level 3 OR Wetland and Riparian Areas priority level 2.
Priority Level 6	None of the above criteria apply.

Tier 1 - Crucial Habitat Input Data Layers

Habitat for Species of Concern

Summary: Species of state and/or national conservation importance, including those vulnerable to extinction or those undergoing regional decline or other species requiring special management attention.

Aggregation Method: Highest Priority Level

Aggregation Details:

Priority Level 1	Hexagons with at least one Federal Threatened, Federal Endangered, NatureServe G1 or NatureServe S1 species observation.
Priority Level 2	Hexagons with at least one NatureServe G2 or Natureserve S2 species observation.
Priority Level 3	Hexagons with at least one Federal Candidate, NatureServe G3 or NatureServe S3 species observation, or at least one Federal Threatened or Federal Endangered species modeled distribution.
Priority Level 4	Hexagons with a Federal Candidate species modeled distribution, or a cumulative modeled distribution count > 14 SGCN species.
Priority Level 5	Hexagons with a cumulative modeled distribution count > 11 SGCN species.
Priority Level 6	Hexagons with a cumulative modeled distribution count > 7 SGCN species.

Data Sources:

Name	Description	Type	Steward	URL
Fish Distributions	Predicted fish distributions based on the best professional judgment of local fisheries biologists.	Modeled	MFWP	Link
Fish Population Surveys	Fish census information collected by fisheries field biologists.	Observations	MFWP	Link
Montana's Point Observation Database	State-wide, documented, and confirmed element occurrences of wildlife.	Observations	Montana NHP	Link
GAP Distribution Models	Vertebrate distribution models for amphibians, birds, mammals, and reptiles occurring in the U.S.	Modeled	USGS GAP	Link

Native and Unfragmented Habitat

At the west-wide scale, the category of Native and Unfragmented Habitat was used to represent habitat value and condition metrics which could include landscape condition, large natural areas, natural vegetative communities, ecological systems of concern, landscape corridors, and/or freshwater integrity. In Montana, large natural areas and landscape connectivity were used for this category.

Large Natural Areas

Summary: Large Intact Blocks or other datasets depicting large areas of native habitat that are relatively intact or have low levels of anthropogenic impact.

Aggregation Method: Highest Priority Level

Aggregation Details: Selected the highest priority level of large natural areas within the boundary of a one square mile hexagon. Large natural areas depict those contiguous areas greater than 10,000 acres where >= 90% of native landcover remains after all anthropogenic features have been removed.

Priority Level 1	Hexagons with Large Natural Areas from the Montana evaluation occurring within the priority level 1 area of the west-wide Large Natural Areas layer.
Priority Level 2	Hexagons with Large Natural Areas from the Montana evaluation occurring within the priority level 2 area of the west-wide Large Natural Areas layer.
Priority Level 3	Hexagons with Large Natural Areas from the Montana evaluation occurring within the priority level 3 area of the west-wide Large Natural Areas layer.

this area is unranked by CAPS

Data Sources:

Name	Description	Type	Steward	URL
Ski Areas	Ski area location boundaries	Observations	MFWP	
Superfund areas	Superfund area location boundaries	Observations	EPA	Link
Surface Mines	Coal, gravel, hardrock surface mining boundaries	Observations	MFWP	
Wind Towers	Wind tower locations	Observations	MFWP	
Communication Towers	Tower point locations	Observations	Federal Communications Commission	Link
Transportation infrastructure	Roadway line locations	Observations	US Census Bureau	Link
Oil and Gas Pipelines	Oil and gas pipeline locations	Observations	MT Dept of Environmental Quality	Link
Oil and Gas Wells	Oil and gas well point locations	Observations	MT Board of Oil and Gas	Link
Electrical Transmission Lines	Electrical Transmission Line locations	Observations	MT Dept of Environmental Quality	Link
Montana Landcover	Ecological System landcover mapping	Modeled	MT Natural Heritage Program	Link

Landscape Connectivity

Summary: Landscape - scale permeability or connectivity.

Aggregation Method: Highest Priority Level

Aggregation Details: Selected the highest priority level of Landscape Connectivity within the boundary of a one square mile hexagon. Landscape Connectivity depicts those areas identified (on a relative ranking from most likely to be a corridor to least likely) between Large Natural Areas based on the selection for native habitats and the avoidance of anthropogenic features as determined by a least cost path analysis.

Priority Level 1	Hexagons with Landscape Connectivity area values 1 to 5 (top 5%).
Priority Level 2	Hexagons with Landscape Connectivity area values 6 to 10.
Priority Level 3	Hexagons with Landscape Connectivity area values 11 to 15.
Priority Level 4	Hexagons with Landscape Connectivity area values 16 to 25.
Priority Level 5	Hexagons with Landscape Connectivity area values 26 to 50.
Priority Level 6	Hexagons with Landscape Connectivity area values 51 to 100.

Data Sources:

Name	Description	Type	Steward	URL
Ski Areas	Ski area location boundaries	Observations	MFWP	
Superfund areas	Superfund area location boundaries	Observations	EPA	Link
Surface Mines	Coal, gravel, hardrock surface mining boundaries	Observations	MFWP	
Wind Towers	Wind Tower locations	Observations	MFWP	
Communication Towers	Tower point locations	Observations	Federal Communications Commission	Link
Transportation infrastructure	Roadway line locations	Observations	US Census Bureau	Link
Oil and Gas Pipelines	Oil and gas pipeline locations	Observations	MT Dept of Environmental Quality	Link
Oil and Gas Wells	Oil and gas well point locations	Observations	MT Board of Oil and Gas	Link
Electrical Transmission Lines	Electrical Transmission Line locations	Observations	MT Dept of Environmental Quality	Link
Montana Landcover	Ecological System landcover mapping	Modeled	MT Natural Heritage Program	Link

Species of Economic and Recreational Importance (SERI)

Summary: SERI data represent areas recognized as important for meeting the biological requirements and objectives of fish and wildlife species regulated by harvest such as important breeding areas or winter concentration areas.

Aggregation Method: Highest Priority Level

Aggregation Details: This layer represents the highest priority level from either the Terrestrial Game Quality or the Game Fish Quality layers that were developed for Montana's Crucial Areas Planning System (CAPS).

The Terrestrial Game Quality layer depicts the relative value of areas based on the specific habitat requirements of 12 native game species. These species were categorized into 4 functional groups: big game, bighorn sheep and mountain goat, prairie grouse, and forest carnivores. Area values were calculated by adding together the individual contribution of each species group, meaning that in areas of overlap values will generally be higher. However, it is important to realize that an area with a lower cumulative value can still contain high value habitat for just one species group.

The Game Fish Quality layer depicts the relative quality of 46 cold and warm water game fish populations available to anglers in Montana.

Priority Level 1	Hexagons with Terrestrial Game Quality values > 71% OR Game Fish Quality values in the top 3% of waterbodies with sport fish.
Priority Level 2	Hexagons with Terrestrial Game Quality values of 48-71% OR Game Fish Quality values in the 90-97th percentile of all waterbodies with sport fish.
Priority Level 3	Hexagons with Terrestrial Game Quality values of 26-48% OR Game Fish Quality values in the 75-90th percentile of all waterbodies with sport fish.
Priority Level 4	Hexagons with Terrestrial Game Quality values of <26% OR Game Fish Quality values in the lowest 75% of all waterbodies with sport fish.
Priority Level 5	N/A
Priority Level 6	N/A

Data Sources:

Name	Description	Type	Steward	URL
The first three layers below are inputs to Terrestrial Game Quality				
Montana Landcover 2010	Ecological System landcover mapping.	Modeled	MT Natural Heritage Program	Link
Species Distributions	Biologist reviewed models for species habitat value for forest carnivores and sharp-tailed grouse	Modeled	MFWP	
Species Distributions	Species locations and areas designated via expert knowledge as important for prairie grouse. Expert knowledge big game species distribution for general and winter ranges.	Observations	MFWP	Link
The following two layers are inputs to Game Fish Quality				
Fish Population Surveys	Fish census information collected by fisheries field biologists.	Observations	MFWP	Link
Fish Distributions	Predicted fish distribution and associated relative abundance based upon the best professional judgment of local fish biologists.	Modeled	MFWP	Link

Game Fish Quality

Summary: This layer depicts the relative quality of 46 cold and warm water game fish populations available to anglers in Montana.

Measurement Unit: River segments for flowing water and entire waterbodies for lakes/reservoirs. River segments are uniquely identified by river mile and latitude/longitude.

Data Source(s) / Quality: The Montana Fisheries Information System (MFISH) (http://fwp.mt.gov/fishing/mFish/) was the source of most data utilized in this assessment. Fish distribution, size, and relative abundance data were extrapolated from fisheries surveys conducted by Montana Fish, Wildlife & Parks (FWP) and collector permit holders from state and federal agencies and non-governmental organizations for the past 10 years. Distribution and abundance data were updated by FWP biologists using raw survey data. FWP biologists also used survey data and knowledge of game fish populations to delineate stream reaches with unique or exceptionally large game species present.

Methods: Each game fish species within a waterbody (stream or lake) received a score based on 1) fish size, 2) relative abundance and 3) a tier based on angler preference. Regulated species were assigned to a tier based on daily possession limit: Tier 1*, <= 5 fish/day and Tier 2**, > 5 fish/day. Unregulated species recognized as sport fish by the International Game Fish Association were assigned Tier 3. Tiers 1, 2, and 3 were assigned 4, 2, or 1 point(s), respectively.

*Exceptions: Redband trout and burbot were demoted to Tier 2 when not indicated as fishable in the Montana Fishing Regulations.
**Exceptions: Black and white crappie, yellow perch, and kokanee were promoted to Tier 1 based on expert knowledge of desirability.

Relative size was determined by species-specific length categories from literature to determine if species present were less than fishable size, of fishable size, or of trophy potential, with 1, 2, or 4 point(s) possible, respectively. The maximum size of a species captured in a survey determined size potential for each species. FWP biologists assigned relative abundance values of rare, common, or abundant to each species' distribution and scores of 1, 2, or 4 point(s) were assigned to each abundance value, respectively.

A score for each species was created by multiplying **Tier** x **Size** x **Abundance**, for a maximum score of 64 points possible per species. Species scores were then summed for each river reach or waterbody. Additional points were given for: presence of unique species (10 points), exceptional numbers (>2500/mi) of a single species (32pts), and presence of a trophy fishery (20 points), based on FWP expert knowledge.

Final Categorization: Four categories, representing a gradient of sport fish quality from high to low, were created based on breaks at the 97th, 90th, and 75th percentiles within each type of fishery, either cold or warm water. Cold or warm water designation was based on generalized species presence and composition at the 6th Code HUC scale. The final breaks used to classify fisheries from highest to lowest quality were reviewed with area biologists.

the South Fork of the West Fork of the Gallatin River is classified as a Class 4 (Lowest) Game Fish Quality Stream

Terrestrial Game Quality

Summary: This layer depicts the relative value of areas based on the specific habitat requirements of 12 native game species. These species were categorized into 4 functional groups: big game, bighorn sheep

and mountain goat, prairie grouse, and forest carnivores. Area values were calculated by adding together the individual contribution of each species group, meaning that in areas of overlap, values will generally be higher. However, it is important to realize that an area with a lower cumulative value can still contain high value habitat for a single species group. The 12 species were selected to represent the areas of highest value for native game in Montana.

Measurement Unit: One square mile hexagon.

Mapping Considerations: Indian Reservations and National Parks were not included in the evaluation due to lack of data.

Class 4 (Lowest)

Data Source(s) / Quality:
Big Game:
Metric evaluated: winter range habitat value
Species: pronghorn antelope, elk, moose, mule deer ,and white-tailed deer
Data layers: big game distribution - publicly available for individual species, maintained by FWP. Layers are updated using expert knowledge, including known habitat associations and extrapolation from survey data. Resolution is based on one square mile public land survey sections; Montana Land Cover Classification 2010 – layer maintained by the Montana Natural Heritage Program (NHP) Spatial Analysis Lab, University of Montana. Classification based on remote sensing. Resolution is 30 meters.

not ranked

Bighorn sheep and mountain goat:
Metric evaluated: general and winter distribution

not ranked

Data layer: big game distribution – see additional information in Big Game section above

Forest carnivores:
Metric evaluated: habitat suitability
Species: wolverine, fisher, marten

Score 3

Data layers: furbearer harvest locations – maintained by FWP Mandatory Reporting System. Reporting at public lands survey section level by trappers; furbearer observation records – Maintained in MT NHP Point Observation Database. Accuracy verified by MT NHP staff; wolverine primary habitat model – produced by the Wildlife Conservation Society; fisher and marten habitat suitability model developed using known locations and reviewed by FWP biologists. Resolution is 90 meters.

Prairie grouse:
Metric evaluated: core habitat areas, lek areas, and habitat suitability
Species: sage-grouse, sharp-tailed grouse

unranked

Data layers: sage-grouse and sharp-tailed grouse lek locations and observations collected via ground and aerial surveys by FWP and Bureau of Land Management (BLM) biologists – maintained in FWP sage-grouse database; sage-grouse core areas – developed and maintained by FWP with input from BLM. Publicly available layer based on expert knowledge review of sage-grouse habitat suitability model using lek locations and limited to areas of highest male density; sharp-tailed grouse habitat suitability model - developed using lek locations and reviewed by FWP biologists. Resolution is 90 meters.

Methods:
Big game values were determined based on the presence of winter range habitat. The score assigned to particular areas varied by FWP Region (R#). In the western mountains, areas identified as winter use

areas for any species' distribution layers received one point. In the northwest (R1), winter use by elk or white-tailed deer was given an additional point. In the southwest (R2-3), winter use by elk or mule deer was given an additional point. For the rest of the state, areas identified as winter use areas for any species, as well as areas containing >50% sagebrush grassland, received one point. Areas identified as winter use for more than one species, or containing >75% sagebrush grassland were given an additional point. The resulting scores ranged from 0 to 2. A score of 0 indicates the area was not identified as having winter range habitat. A score of 1 indicates important winter range habitats. A score of 2 indicates highly valued winter range habitats.

Bighorn sheep and mountain goat received 1 point for overall distribution and 2 points for winter use. In areas of species overlap, values were not cumulative, the highest value was chosen. The resulting scores ranged from 0 to 2.

Forest carnivore habitat values were 2 points for wolverine habitat; 2 points for highly suitable marten or fisher habitat; and 1 point for moderately suitable marten or fisher habitat. In areas of species overlap, values were cumulative. Values were only calculated in western forest habitats where forest carnivores were expected. The resulting scores ranged from 0 to 6.

Prairie grouse habitat was valued by assigning 3 points to sage-grouse core areas. Outside of sage-grouse core areas, 2 points were assigned to sage-grouse lek areas. For sharp-tailed grouse, 2 points were assigned to highly suitable habitat and 1 point to moderately suitable habitat. In areas of species overlap, values were cumulative. Values were only calculated in prairie areas where prairie grouse were expected. The resulting scores ranged from 0 to 5.

Overall: Within each species group, values were rescaled by dividing by the maximum number of points to give each category a value ranging from 0 to 1. In this way, each group received equal weight. In the final calculation, big game winter range habitat was given twice the weight of the other species categories based on its level of importance. These values were summed, and the result was again rescaled to 0 to 1 by dividing by the total possible score for that area. For example, in eastern prairie areas, the total possible score did not include forest carnivores.

Final Categorization: The resulting scores ranged from 0 to 1. The mean and the standard deviation of the final scores were calculated. Final categories were determined by assessing the deviation from the mean value. The highest category had values > 1.5 SD from the mean. The high category was 0.5 to 1.5 SD from the mean value. The moderate category ranged from -0.5 SD below the mean to 0.5 SD above the mean. The low category was < -0.5 SD from the mean.

<u>Wetland and Riparian Areas</u>

Summary: Areas that represent unique and/or sensitive environments and function to support animal and plant diversity with respect to wildlife objectives and connectivity.

Aggregation Method: Highest priority level.

Aggregation Details: This layer represents the highest priority level from either the Wetland or Riparian layers that were developed for Montana's Crucial Areas Planning System.
The Riparian layer depicts specific landcover classes present within a square-mile hexagon.
The Wetland layer depicts total area of wetlands present within a square-mile hexagon.

Priority Level 1	Hexagons with Riparian landcover class "Northwestern Great Plains Floodplain" - OR - Total Wetland Area >=10% of hexagon area.
Priority Level 2	Hexagons with Riparian landcover classes "Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland", "Northwestern Great Plains Riparian", or "Rocky Mountain Lower Montane Foothill Riparian Woodland and Shrubland" >=5% of hexagon area - OR - Total Wetland Area >=5% of hexagon area.
Priority Level 3	N/A
Priority Level 4	N/A
Priority Level 5	N/A
Priority Level 6	N/A

unranked

Data Sources:

Name	Description	Type	Steward	URL
Montana Landcover 2010	Ecological System landcover mapping	Modeled	MT Natural Heritage Program	Link
National Wetlands Inventory (NWI)	Wetland locations	Modeled	USFWS/ MT Natural Heritage Program	USFWS Link MT NHP Link

Montana Pilot Data – Non-Tier 1/Supporting Layers

Non-Tier 1 layers are those from the original 2008 Crucial Areas Assessment which did not contribute to the Crucial Habitat Rank. These data were considered pilot data as the different states conducting the original assessment efforts were exploring various techniques that would be presented as options for inputs to the identification of an overall crucial habitat rank. After a number of states completed these initial efforts, state representatives evaluated which data layers would be considered for Tier 1 status and contribute to the overall Crucial Habitat Rank in the west-wide CHAT. The layers in this non-Tier 1 list did not make the west-wide list, but are considered to have value in Montana.

class 4 (Lowest)

Aquatic Connectivity

Summary: The Aquatic Connectivity layer depicts important stream corridors for fish species that require connected habitats to complete all or a portion of their life history. Corridor importance was determined using an approach that considered corridor size as well as species utilization of known corridors for eight aquatic ecoregions in Montana. Corridor size was inferred from stream order. Corridor utilization by selected species was determined by selecting a species in each ecoregion that is most sensitive to loss of connected habitats for some or all of its life history needs. These 'focal species' serve as surrogates for preserving high priority corridors for many other important sport fish and species of concern. Preserve the corridors and connected habitats for this focal species, and many or most other species will likely benefit. unranked

Measurement Unit: River segments, uniquely identified by river mile and latitude/longitude.

Data Source(s) / Quality: The Montana Fisheries Information System (MFISH) (http://fwp.mt.gov/fishing/mFish) was the source of fish distribution data utilized in this layer. Data within MFISH include FWP data and collector permit holders from state and federal agencies and non-governmental organizations for the past 10 years. Distribution and abundance data were updated by FWP biologists using this raw survey data.

The most current Montana FWP Yellowstone cutthroat trout assessment was the source of cutthroat distribution data for streams in the upper Yellowstone aquatic ecoregion. Stream order methodology developed by the National Hydrography Dataset (NHD), 2009.

Methods: Aquatic corridors for species within and among eight different aquatic ecoregions in Montana were considered. The eight aquatic ecoregions were delineated based on major drainage area and species composition (warm vs cold water species). Focal species were selected for each aquatic ecoregion through a ranking process that considered species mobility characteristics (long distance migrations of greater than 10 miles or movement within and among metapopulations) and threat vulnerability (climate change, manmade infrastructure, and habitat alteration). Species selected for each ecoregion were: **sauger** (lower Missouri and lower Yellowstone), **burbot** (middle Missouri and middle Yellowstone), **Yellowstone cutthroat trout** (upper Yellowstone), **bull trout** (Hudson Bay and Columbia), and **Arctic grayling** (upper Missouri). Stream orders were delineated for all streams in Montana using a USGS National Hydrography Dataset (NHD) algorithm. Migratory Yellowstone cutthroat trout were assumed to be present upstream to natural or manmade barriers. Barrier information for Yellowstone streams was obtained from the Yellowstone cutthroat trout assessment. Stream order methodology developed by the NHD, 2009.

Final Categorization: Stream order (SO) and focal species information were integrated to create a corridor priority system. Four categories were created, representing a gradient, based on current knowledge and past research that suggests increasing corridor importance as SO increases. Highest priority corridors are those habitats where focal species exist, regardless of abundance or SO. High priority corridors are areas where large rivers occur (SO>4), but no focal species are present. Moderate

priority streams are moderate size (SO=4 or SO=3) with no focal species present. Undesignated waters are small streams (SO<3) with no focal species present. Small streams were not ranked because certain tributaries that connect to large river systems are important and would be undervalued using this rule-based approach for valuing aquatic connectivity.

Fish Native Species Richness

Summary: Ecologists have frequently proposed that habitats high in species richness are more functionally diverse, and this natural diversity produces an increase in ecological stability, resiliency, and maintenance of food web dynamics. To account for native biodiversity as an important aquatic resource value, a species richness layer was created using a count of native fishes present in waterbodies and stream reaches within eight aquatic ecoregions in Montana.

Measurement Unit: River segments for flowing water and entire waterbodies for lakes/reservoirs. River segments are uniquely identified by river mile and latitude/longitude.

Data Source(s) / Quality: The Montana Fisheries Information System (MFISH) (http://fwp.mt.gov/fishing/mFish) was the source of most data utilized in this assessment. Fish distribution data were extrapolated by local fisheries biologists from fisheries surveys conducted by FWP and collector permit holders from state and federal agencies and non-governmental organizations for the past 10 years.

Methods: A species richness layer based on a count of native fishes present in waterbody reaches within eight aquatic ecoregions in Montana was created. Ecoregions were based on the intersection of major watershed (4th Code HUC) boundaries and generalized species composition (warm vs cold water). Ecoregions were evaluated separately for their species richness because large differences in species richness are inherently associated with drainage patterns, geographical extents, and inherent differences in productivity.

Native fish species distributions were extrapolated by local biologists from fisheries surveys conducted by FWP and collector permit holders from state and federal agencies and non-governmental organizations for the past 10 years. The number of unique native fish species within a stream segment or waterbody was counted, regardless of rarity.

Final Categorization: Four categories, representing a gradient of diversity from high to low, were created based on breaks that differed between ecoregion. Categorical designations (n=4) were created using Jenks' natural breaks methodology for each of the eight aquatic ecoregions in Montana.

class 4

Game Fish Life History

Summary: This layer depicts habitats that support at least one of 43 recognized game fish species during essential and important life history stages, including habitats that support spawning, rearing, and are a source of thermal refuge during seasonal periods of stress.

Measurement Unit: River segments for flowing water and entire waterbodies for lakes/reservoirs. River segments are uniquely identified by river mile and latitude/longitude.

Data Source(s) / Quality: FWP biologists' expert knowledge, supported by survey data from MFISH (http://fwp.mt.gov/fishing/mFish) and telemetry, tagging, redd count, and creel data. Fisheries surveys conducted by FWP and collector permit holders from state and federal agencies and non-governmental 0rganizations for the past 10 years.

Methods: Habitats or locations where fish congregate to complete important, often limiting, life history strategies such as spawning, rearing, or seeking thermal refuge are considered life history support areas. These life history support areas can be classified by their level of importance to the associated sport fish population as either essential or important. Local FWP biologists delineated and designated life history support areas by interpreting a combination of survey, telemetry, tagging, redd count, or creel data. **Essential habitat** are defined as spawning, rearing, and thermal refuge habitats for migratory sport fish species that, if lost, would severely impact the associated sport fishery for that species. **Important habitats** are defined as spawning, rearing, and thermal refuge areas for migratory sport fish that cumulatively benefit the associated sport fishery. Impacts to these habitats would result in declines in abundance or distribution of the associated sport fishery for that species, however, the declines would not be as severe as losses to essential habitats.

unranked

Final Categorization: Life history support areas for maintaining an associated sport fishery were categorized as either essential or important. Essential habitats were chosen as the most important category of life history support areas. These areas, as defined above, often limit the production and maintenance of many sport fisheries and, if lost, would severely impact an associated sport fishery for many species. Important habitats, as defined above, are shown as highly important, however, they are somewhat less important than essential habitats in that loss of one of these habitats may not result in severe population level declines. Cumulatively, however, these areas are highly beneficial to the overall maintenance of sport fisheries across the state.

Large Landscape Blocks and Habitat Connectivity

Summary: A landscape integrity approach to identify large areas of native habitat that may serve as source and destination patches for a variety of game and non-game species and the most likely connections between them. Blocks represent areas with the lowest direct effects of the "human footprint". Connectivity represents the lowest likely cost of movement between blocks. Five categories of large landscapes were analyzed: All Native Habitat, Alpine Habitat, Forest Generalist Habitat, Forest Specialist Habitat, and Grass/Shrub Habitat.

Measurement Unit: One square mile hexagon.

Data Source(s) / Quality: Montana Landcover 2010 – layer maintained by the Montana Natural Heritage Program (NHP) Spatial Analysis Lab, University of Montana. Classification based on remote sensing. Resolution is 30 meters. Roadways, structures, incorporated areas – from Montana Spatial Data Infrastructure layers, available from the Montana State Library Data List; Coal and Pit mines, Gravel

Pit, Transmission lines, Wind Turbine locations, Superfund sites – from Montana Department of Environmental Quality; Oil and Gas Well locations – from Montana Board of Oil and Gas; Cell and Radio Towers – Federal Communications Commission; Ski Areas – digitized by FWP.

Methods: Page numbers and appendices reference the full Connectivity Project documentation available at http://fwp.mt.gov/fwpDoc.html?id=53366.

Methods were replicated for each of the 5 habitat categories. LARGE BLOCKS: Identified "native" land cover for each category (Appendix H Table 1 pg. 265) using the Montana Land Cover Classification layer at 90m raster cell resolution. Eliminated all cover types that are non-native cover types with the exception of open water (reservoirs) and the harvested forest classes if applicable. Identified features representing human influence buffering each feature by one cell at 100 meter resolution and then removed those areas from the native cover (Appendix H Table 2). After removal, if 90% of the surrounding 20 x 20 cells remained native cover, the cell was considered to be "intact". All intact cells were merged to create contiguous polygons of intact habitat. These constituted the blocks, which were then filtered to use only those large blocks of 5,000 acres or more. CONNECTIVITY: Assigned a cost of movement for each cell on the landscape ranging from 0-no cost to 100-high cost (pp 140-141). Cost was first calculated for moving across a cell containing a specific land cover value. These costs differed for each of the 5 categories depending on the cover types presumed to be more or less preferred within that category. Cost was also calculated for each cell containing a mapped human influence, as well as a descending cost value for areas out to 1,000 meters from each influence. The maximum score for a cell was used considering all cost inputs. Connectivity models were then calculated between each large landscape block. These models were run locally from each block, using all surrounding blocks within 10 km. In addition, regions were identified by combining all blocks within 5 km of one another and then running models between all regions within 70 km of one another. This local and regional approach alleviated problems whereby lower costs due to cores within close proximity did not overwhelm, or falsely represent, areas beyond the most likely area of connectivity for that pair of blocks. Model scores were relative and ranged from 0, with the lowest pair wise cost of movement, to 100, with the highest cost. Costs were considered 0 within landscape blocks.

Final Categorization: Landscape Blocks have a single metric (1/0) indicating if the area is a block or not. Connectivity scores are split into 6 categories covering the 0-100 score, with a score of 6 being most likely to represent an area of connectivity. Category scores were as follows: Category 6 (scores 0-5); 5 (scores 6-10); 4 (scores 11-15); 3 (scores 16-25); 2 (scores 26-50); 1 (scores 51-100).

many parameters are unranked, however the parameters that were ranked ranged from levels 1 through 4

Watershed Integrity

Summary: The level of human impact on streams and river basins was characterized by creating a score of watershed integrity for each river basin and sub-basin in Montana. Watershed integrity (WI) is a summation of human impacts that contribute to the impairment of streams and watersheds. The 13 variables are supported by literature as best predictors of watershed health in Pacific Northwest and Rocky Mountain streams and include impacts that are likely to affect water quality, water quantity, watershed connectivity, stream function, and the overall health of stream systems.

Measurement Unit: Upper and lower portions of watersheds (6th Code Hydrologic Unit).

Data Source(s) / Quality: Variables include: 1) % urban, 2) % riparian buffer as urban, 3) % cultivated cropland, 4) % riparian buffer as cultivated cropland from the Montana Department of Revenue Farm Land Use Type layer, 5) road density, and 6) road density in riparian buffer from the US Census Bureau, 7) # producing oil / gas wells from the Montana Board of Oil and Gas, 8) # unique points of irrigation diversion from the Montana Department of Natural Resources and Conservation, 9) # surface / placer mines, 10) # dams with storage >20 surface acres, 11) presence of large in-stream reservoirs from the Montana Natural Resource Information System, 12) presence of impaired streams (303d listed by the Montana Department of Environmental Quality), 13) # of Wetland Modification Project Permits (Army Corps of Engineer 404 permits).

Methods: Variables were summarized by 6th code HUC and each HUC was given a score based on density, frequency or presence of each variable. In HUCs west of the lower Yellowstone and Missouri basins, HUCs were split into valley and mountain portions to account for differences in land use management and stream gradient. Valley segments of watersheds are generally lower in gradient, have a different suite of native species present, and have different ownership characteristics than mountainous stream reaches that are generally high gradient and publicly owned.

Variables used to represent watershed integrity were selected from literature as best explaining the variability seen in watershed health throughout Pacific Northwest and high elevation prairie streams. The presence, density, or frequency variables were summarized by 6th code HUCs in prairie systems (lower Missouri and Yellowstone) and by sub-basin (upper and lower) for streams west of the lower Missouri and Yellowstone ecoregions. The elevation contour that best explained the division between valley and mountain topography was selected as the division between upper and lower portions of most western HUCs.

HUC scores for each variable ranged from 0 to 30 with five categories possible for most variables. Scoring breaks for each variable were made using the Natural Breaks (Jenks) Method of categorization. Variables shown by literature as being highly correlated to watershed health (% cultivated cropland, road density, % urban) received more weight than others. Calculations for riparian buffers are based on increasing buffer widths for stream orders 2 – 8, with buffers 5 to 246 meters, respectively. Each 6 th code HUC score was calculated by adding scores for each variable and dividing by the total possible points (e.g. WI Score = HUC total / total possible).

Final Categorization: Scores for watershed integrity were normally distributed. Four categories of watershed integrity were created based on quartiles that represented a gradient of integrity from highest to low. The highest score for a watershed was 1.00 and the lowest score for a watershed was 0.48.

class 1 (highest)

3. Data Sources

Summary of the data sources for each layer in the Montana CAPS application. The following table indicates the type or category of data used as inputs. Layers are listed in the order they appear in the CAPS application.

Layer Name	Survey data counts or estimates	Survey data categorical	Expert opinion based on observation	Extrapolated from existing GIS layers
Habitat for Species of Concern	x	x	x	
Large Natural Areas				x
Landscape Connectivity				x
Species of Economic and Recreational Importance (SERI)	x	x	x	
Game Fish Quality	x	x	x	
Terrestrial Game Quality	x	x	x	
Big Game Winter Range Habitat			x	
Bighorn Sheep and Mountain Goat Habitat			x	
Forest Carnivore Habitat		x		
Prairie Grouse Habitat	x	x	x	
Riparian Areas				x
Wetland Areas				x
Aquatic Connectivity	x	x	x	
Fish Native Species Richness	x	x	x	
Game Fish Life History	x	x	x	
Large Landscape Blocks				x
Habitat Connectivity				x
Watershed Integrity	x	x		

4. Data Extrapolation Techniques

In an effort to provide consistent information throughout each region of the state, biologists were often asked to provide interpretations of survey data for each of the data categories and layers presented in CAPS. Where survey data were not easily available, for either spatial or temporal reasons, some layers relied on one or more data extrapolation techniques to depict a value. Extrapolation is an estimation of a value based on extending a known sequence of values or facts beyond the area that is certainly known. Inductive modeling refers to the logic of making specific observations (facts) and drawing broad conclusions based on those observations. Deductive modeling, also called top-down logic, refers to the logic of using a specific set of rules to narrow the scope of possible conclusions. Layers are listed in the order they appear in the CAPS application.

Layer Name	Modeling of habitat associations - Deductive	Statistical Modeling (Inductive)	Extrapolation to habitat unit (e.g. stream section)	Extrapolation based on expert opinion	None
Habitat for Species of Concern		x	x	x	
Large Natural Areas	x				
Landscape Connectivity	x	x			
Species of Economic and Recreational Importance (SERI)	x	x	x	x	
Game Fish Quality			x	x	
Terrestrial Game Quality	x	x		x	
Big Game Winter Range Habitat	x			x	
Bighorn Sheep and Mountain Goat Habitat				x	
Forest Carnivore Habitat	x	x			
Prairie Grouse Habitat		x		x	
Riparian Areas			x		
Wetland Areas					x
Aquatic Connectivity		x	x	x	
Fish Native Species Richness			x	x	
Game Fish Life History			x	x	
Large Landscape Blocks	x				
Habitat Connectivity	x	x			
Watershed Integrity			x		

5. Additional Data Layers

Additional data layers have been added to CAPS to provide supplementary information for users. The layers include State Wildlife Action Plan (SWAP) layers, Development and Infrastructure layers (Energy, Residential, and Transportation) and Reference and Landscape layers. These data layers were not created for CAPS. These layers have description information and data source links in CAPS. Detailed information about these layers is not included in this document.

6. Data Layer Update Process and Staff Responsibilities

FWP's Data Services Bureau staff maintains the data layers represented in CAPS and the WAFWA CHAT as outlined in this document. FWP Fisheries and Wildlife staff direct the review of CAPS data layers and any data sources listed which are produced by FWP. The timing of updates to data layers not maintained by FWP may influence the CAPS layers.

New techniques for display, representation, and validation of natural resource data are constantly being developed, and it is therefore beneficial to occasionally review the procedures used to generate CAPS layers. The process to develop new methods and review resulting data can be resource intensive. Therefore, review of the data generation procedures, and the staff required, will be initiated by FWP staff when time and resources are most appropriately allocated toward that effort.

Appendix F

	Notify	Group	Agency	Area/Comments	Title	Contact	Address	Address 2	City, State	Telephone
1			**County**							
2	✓	Madison County	Madison County Planning Office		Director	Charity Fechter	P.O. Box 278		Virginia City, MT 59755	(406)843-5250
3	✓	Madison County	Madison County Road Supervisor - District 3	Madison Valley/Big Sky		Jim Hart	P.O. Box 278		Virginia City, MT 59755	(406)843-4277
4	✓	Madison County	Madison County Sanitarian & Solid Waste Manager		Sanitarian	Van Pucket	P.O. Box 278		Virginia City, MT 59755	(406)843-4275
5	✓	Madison County	Madison County Weed Coordinator			Margie Edsall	P.O. Box 278		Virginia City, MT 59755	(406)843-4275
6	✓	Madison County	Madison County Sheriff			Roger Thompson	P.O. Box 276		Virginia City, MT 59755	(406)843-5301
7	✓	Madison County	Madison County Sheriff	Big Sky			P.O. Box 160564		Big Sky, MT 59716	(406)995 –4880
8	✓	Madison County	Madison County Emergency Management		Director	Dustin Tetrault	P.O. Box 278		Virginia City, MT 59755	(406)843-4253
9			**Local Municipality**							
10		Municipality	Big Sky Owners Association		Executive Director	Suzan Scott	P.O. Box 160057		Big Sky, MT 59716	(406)995-4166
11	✓		**Fire District**							
12	✓	Fire District	Big Sky Rural Fire District		Fire Chief	William Farhat	P.O. Box 160382	650 Rainbow Trout Run	Big Sky, MT 59716	(406)995-2100
13	✓		**Ambulance**							
14			**Quick Response Unit**							
15			**Phone**							
16		Phone	Three Rivers Telephone Co-op.		Facilities Manager	Mike Henning	P.O. Box 429		Fairfield, MT 59436	(406)467-2535
17	✓		**Electricty, Natural Gas, Water/Sewer**							
18		Electricty, Natural Gas, Water/Sewer	Northwestern Energy	(east part of Madison County)	Director of Operations	Matt McIlwright	P.O. Box 490		Bozeman, MT 59771	1-800-586-1386
19	✓		**School District**							
20	✓	School District	Big Sky School District #72	Also contact Ennis Schools		Jerry House	45465 Gallatin Rd.		Gallatin Gateway, MT 58730	(406)995-4281
21	✓	School District	Ennis District #52 -	including Big Sky	Superintendent	Jon Wrzesinski	323 S. Charles St.		Ennis, MT 59729	(406)682-4258
22	✓		**Conservation District**							
23	✓	Conservation District	Madison Conservation District			Mel McKitrick	P.O. Box 606		Ennis, MT 59729	
24			**State of Montana**							
25	✓		**State - Fish Wildlife & Parks**							
26	✓	MTFWP	Montana Department of Fish, Wildlife, and Parks	Wildlife - Big Sky over to the west slope of Madison Range and Wall Creek	Wildlife Biologist	Julie Cunningham	1400 S. 19th Ave.		Bozeman, MT 59718	(406)994-6341
27	✓	MTFWP	Montana Department of Fish, Wildlife, and Parks	Fisheries - Madison	Fisheries	Mike Vaughn	1400 S. 19th Ave.		Bozeman, MT 59718	(406)570-2665
28	✓		**State - Transportation**							
29	✓	MDT	Montana Department of Transportation	Bozeman		Ray Stocks	Bozeman Office	P.O. Box 1110	Bozeman, MT 59771	(406) 556-4700
30			**State - Environmental Quality**							
31	✓	MDEQ	Montana Dept. of Environmental Quality (DEQ)			Barbara Kingery	P.O. Box 200901		Helena, MT 59620-0901	(406)444-3926
32		MDEQ	Montana Dept. of Environmental Quality (DEQ)		Sr. TMDL Planner -	Pete Schade	P.O. Box 200901		Helena, MT 59620-0901	(406) 995-2660
33	✓		**State - Other Agencies**							
34	✓	MDNRC	Montana Dept. of Natural Resources & Conservation (DNRC)		Central Land Office	Gavin Anderson	8001 N. Montana Ave.		Helena, MT 59602	(406)458-3502
35	✓	Other State Agencies	Montana State Historical Society, Historic Preservation Office		Cultural Records Manager	Damon Murdo	P.O. Box 201202		Helena, MT 59620-1202	(406)444-7767
36	✓	Other State Agencies	Montana Dept. of Revenue, Assessor's Office			Brandy Hilton	P.O. Box 307		Virginia City, MT 59755	(406)843-5632
37	✓	Other State Agencies	Montana Bureau of Mines and Geology			Edmond Deal	MT Tech of the University of MT	1300 West Park St.	Butte, MT 59701-8997	(406)496-4250
38	✓		**Federal Agencies**							
39	✓		**Federal - US Forest Service**							
40	✓	US Forest Service	Madison Ranger District	Beaverhead-Deerlodge National Forest	District Ranger		5 Forest Service Road		Ennis, MT 59729	(406)682-4253
41	✓	US Forest Service	Gallatin Custer National Forest		Supervisor	Mary Erickson	P.O. Box 130		Bozeman, MT 59771	(406)522-2520
42	✓		**Federal - Other**							
43	✓	USDI	Bureau of Land Management		Field Manager	Cornelia Hudson	1005 Selway Dr.		Dillon, MT 59725	(406)683-2337
44		USFWS	U.S. Fish and Wildlife Service				585 Shepard Way		Helena, MT 59601	
45	✓	USGS	U.S. Geological Survey			Wayne Berkis	3162 Bozeman Ave.		Helena, MT 59601	(406)457-5903
46	✓	USACOE	U.S. Army Corps of Engineers		State Program Manager	Alan Steinie	10 West 15th St., Suite 2200		Helena, MT 59626	(406)441-1375
47	✓		**Local - Other**							
48	✓	Local - other	Big Sky Trails, Recreation and Parks District		Director	Stephen Young	PO Box 161395		Big Sky, MT 59716	
49		Local - other	Madison Valley Ranchlands Group			Melissa Griffiths	PO Box 330		Ennis, MT 59729	(406)682-3731
50	✓		**Non-Agency Contacts**							
51	✓	Other Contacts	Lien holders							
52		Other Contacts	Easement holders							
53	✓	Other Contacts	Each adjoining property owner (including purchaser under contract for deed of adjoining property)		Yellowstone Development LL	(Owner, Lots 1 and 2, The Settlement Subdivision)	PO Box 161097		Big Sky, Montana 59716	
54	✓	Other Contacts	Potentially affected water users							
55	✓	Other Contacts	Property owners associations that may be affected							
56	✓				**Yellowstone Mountain Club**	**Charlie Callendar**	**PO Box 161097**		**Big Sky, Montana 59716**	**#N/A**
57	✓				**Sunrise Ridge Property Ow**	**Charlie Callendar**	**PO Box 161097**		**Big Sky, Montana 59716**	**#N/A**
58	✓				**LS Condo Owners Associa**	**Charlie Callendar**	**PO Box 161097**		**Big Sky, Montana 59716**	
59	✓				**WM Lodge Owners Associa**	**Charlie Callendar**	**PO Box 161097**		**Big Sky, Montana 59716**	

HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

April 7, 2016

TO: Adjacent Property Owners
Lien Holders
Easement Holders
Potentially Affected Water Users
Potentially Affected Property Owner Associations
Review Agencies
Nearby Municipality

FROM: Yellowstone Mountain Club LLC and Yellowstone Development, LLC
P.O. Box 161097
Big Sky, Montana 59716

Houser Engineering, P.C.
626 South Ferguson Avenue Suite #1
Bozeman, Montana 59718
406-548-7820

RE: The Corral PUD Subdivision, Yellowstone Mountain Club

To Whom It May Concern:

This is to notify you that we are preparing a subdivision application for review by Madison County. Enclosed for your information is a pre-application packet describing the proposed project.

Please contact Justin Houser at Houser Engineering P.C. at the address listed above with any questions, comments, or suggestions you may have, within the next 30 days.

Sincerely;

HOUSER ENGINEERING P.C.

Justin L. Houser

Enclosures

The Corral Planned Unit Development at Yellowstone Mountain Club
Pre-Application Narrative

The Corral Planned Unit Development (The Corral) consists of approximately 28.81 acres of land in the area commonly referred to as the corral within the Yellowstone Mountain Club. The parent tract consists of unplatted parcels located in the northeast ¼ of Section 12, Township 7 South, Range 2 East and in the northwest ¼ of Section 7, Township 7 South, Range 3 East. The Corral will provide clustered dwellings near the core of the Yellowstone Mountain Club. Properties within The Corral will consist of 9 duplex buildings and 2 triplex buildings (24 condominiums) within the platted area.

The Corral is located near the base area commonly known as Big Springs Village (BSV). BSV is the primary hub of the Yellowstone Mountain Club, and consists of a gondola lift terminal, general store, spa, ski shop/ski rental shop, ski locker rooms and restaurants. Camp Yellowstone Mountain Club, located just southeast of this subdivision, consists of a workout facility, tennis courts, sports courts, pool, spa, zip line, ropes course, and several other outdoor amenities.

The landowner and subdivider of this property is as follows:

Yellowstone Development LLC
1111 Research Drive
Bozeman, Montana 59718-6856
Phone: 406-995-7385

The landowner's representative of this property is as follows:

Justin Houser, Houser Engineering P.C.
626 South Ferguson Avenue, Suite #1
Bozeman, Montana 59718
Phone: 406-548-7820

The Corral is part of the existing Yellowstone Mountain Club Master Plan (2015 Update), and is consistent with the development goals outlined within that plan. As part of this application, a 2016 Master Plan update has been provided to illustrate the current conditions within Yellowstone Mountain Club. The Yellowstone Mountain Club is not within a zoning district.

As mentioned above, The Corral consists of 9 duplex condominiums and 2 triplex condominiums (24 residential condominiums units). These structures will be placed on a common tract of land consisting of approximately 21.93 acres. The Open Space tract created with this PUD is approximately 6.88 acres, or 31.4% of the overall development. A portion of this subdivision, 1.99 acres, consists of open space dedicated as part of the Phase 4 subdivision (Tract 2). The intent is to modify the boundary of Tract 2 and combine it with the open space to be dedicated with this subdivision. A map illustrating this open space modification has been included for your review.

Roads within The Corral generally meet the standards set forth in the Madison County Subdivision Regulations for low density mountainous roads. There are two design elements of the roads that are not consistent with the Madison County Subdivision Regulations, those are the width of Roads A and C, and the length of the equivalent cul-de-sac for Road C. Roads A and C have been classified as low density, even though there are more than 5 residences being served. The nature of the homes being recreational, part time residences suggests a lower traffic volume than a standard residence. AASHTO assumes a recreational home consists of 4.6 ADT, while a single family residence in a non-resort setting has between 8 and 10 ADT. In addition, Road C is approximately 1200 lineal feet long, which is longer than the allowable cul-de-sac length. Similar to the road width issue listed above, the lower than usual traffic volume supports a cul-de-sac of longer length.

Another road design modification proposes relocating the intersection of American Spirit Road and Yellowstone Mountain Club Trail. As part of the larger improvement goals within the Yellowstone Mountain Club's base area, Yellowstone Mountain Club Trail will be re-routed around Camp Yellowstone Mountain Club, through the meadows to the southeast, and connect with East Golf Course Road. The existing portion of Yellowstone Mountain Club Trail that goes through The Corral will be terminated, and the roads proposed herein will be constructed. This change to the roadways will result in the primary traffic loading traveling along American Spirit Road, while the proposed Road A will be the intersecting road due to its significantly lower traffic volumes. A detailed road design will be provided with the preliminary plat application.

The Corral PUD is located just north of the South Fork of the West Fork of the Gallatin River. All buildings will be placed at a minimum 100 horizontal and 20 vertical feet from the river.

Currently, no dwellings lie within the proposed boundary; however there is a "lean to" structure that has historically been used to provide shelter to horses. Adjacent to The Corral is the Warren Miller Lodge (containing retail stores and restaurants) and BSV providing several recreational facilities such as a lake, ski hills and open spaces.

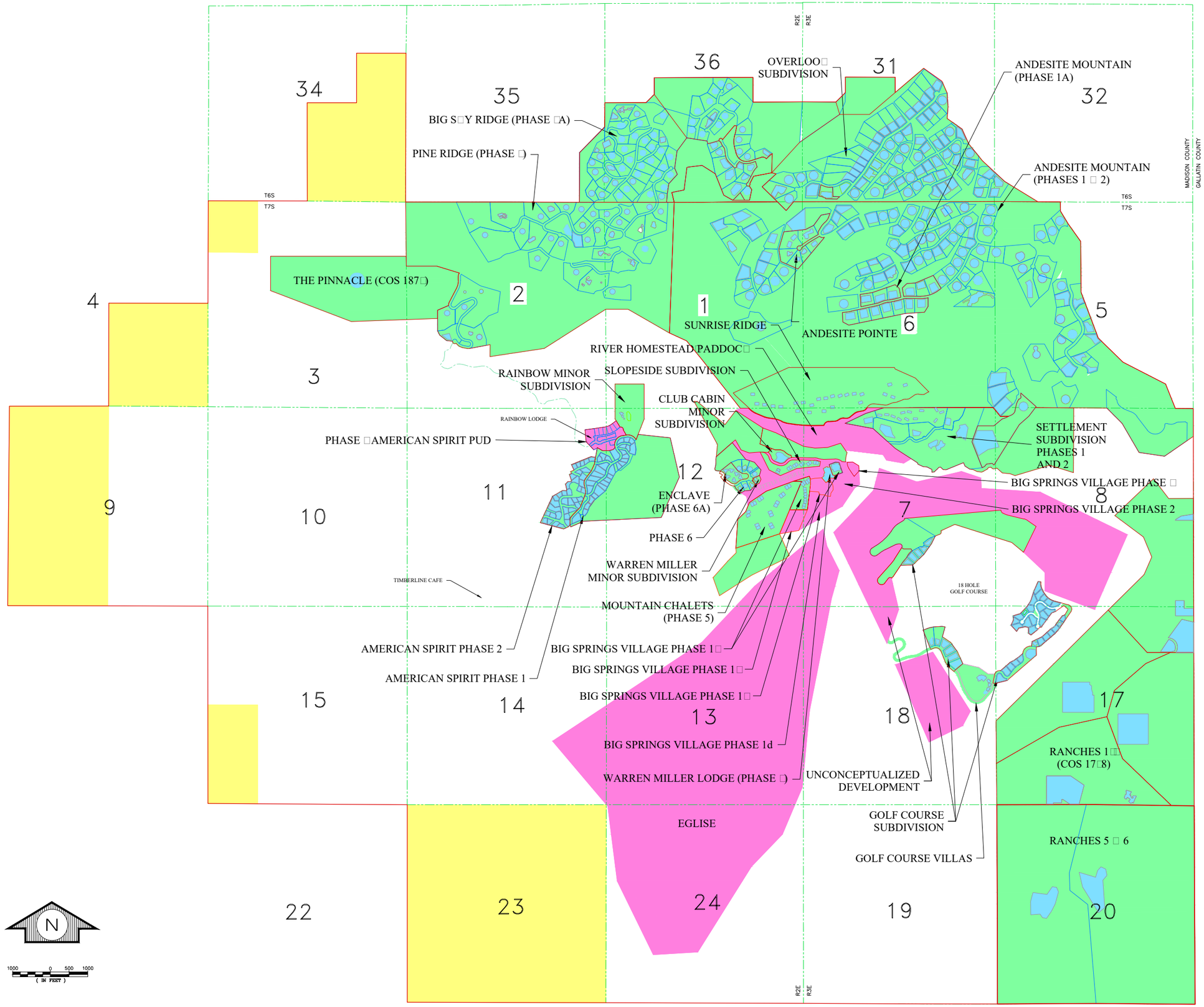
Terrain within The Corral consists of low to severe slopes. The locations of the proposed buildings are placed in areas with slopes less than 25%. Trees and native grasses dominate the landscape of the property. Water, sewer, electric and phone utilities are generally located on the south and east side of the property as shown on the enclosed maps.

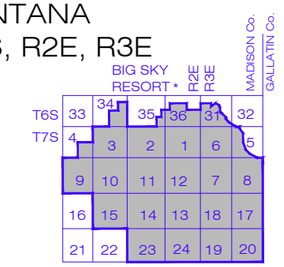
Covenants exist for the overall Yellowstone Mountain Club property, and are enclosed herein. Additionally, supplementary covenants will be drafted for this subdivision to address specific requirements pertaining to these residences. These supplementary covenants will be included with the preliminary plat application.

Adjacent properties consist of Lots 1 and 2 of The Settlement subdivision, un-platted land, and dedicated open space. While not directly adjacent to the property, the Owners Associations for the Phase 4, Big Springs Village Phase 1a, and Sunrise Ridge subdivisions will be notified of this proposed subdivision.

The Corral falls within Madison County Rural Improvement District No 2009-01, document No 136904 located within the records of Madison County.

YELLOWSTONE MTN CLUB
MADISON COUNTY, MONTANA
T6S, T7S, R2E, R3E





PERMANENT RESIDENCE PLATTED DENSITY SUMMARY

(BY SUBDIVISION)

RESIDENTIAL LOTS	NUMBER OF UNITS
ANDESITE MOUNTAIN (PHASES 1–2)	159
ANDESITE MOUNTAIN (PHASE 1A)	14
PINE RIDGE (PHASE 3)	37
BIG SKY RIDGE (PHASE 3A)	64
PHASE 6	7
ANDESITE POINTE	7
OVERLOOK	5
GOLF COURSE	42
RAINBOW MINOR	1
CLUB CABIN MINOR	1
WARREN MILLER MINOR	1
AMERICAN SPIRIT PHASE 1	32
AMERICAN SPIRIT PHASE 2	36
THE SETTLEMENT PHASE 1	1
THE SETTLEMENT PHASE 2	4
CONDOMINIUM UNITS	
WARREN MILLER LODGE (PHASE 4)	21
MOUNTAIN CHALETS (PHASE 5)	18
ENCLAVE (PHASE 6A)	12
SUNRISE RIDGE	58
SLOPESIDE SUBDIVISION	12
THE SETTLEMENT PHASE 2	36
BIG SPRINGS VILLAGE PH1a	34
CERTIFICATES OF SURVEY	
RANCHES 1–4 (COS 1738)	4
RANCHES 5–6 (COS 2184)	2
PINNACLE (COS 1873)	1
TOTAL PERMANENT RESIDENCE PLATTED DENSITY:	609

APPROXIMATE PERMANENT RESIDENCE UNPLATTED DENSITY SUMMARY

(BY SUBDIVISION)

LOTS OR CONDOS	NUMBER OF UNITS
BIG SPRINGS PHASES 1B, 1C, 1D, 2 & 3	123
AMERICAN SPIRIT PH 3	6
RIVER HOMESTEAD/PADDOCK	22
EGLISE	104
TOTAL PERMANENT RESIDENCE UNPLATTED DENSITY:	255

TOTAL PERMANENT RESIDENCE DENSITY PER MASTER PLAN: 864

GUEST ACCOMMODATION SUMMARY

(BY SUBDIVISION)

SUBDIVISION	NUMBER OF UNITS
GOLF COURSE VILLAS	22
AMERICAN SPIRIT PH 3	16
UNCONCEPTUALIZED	62
TOTAL GUEST ACCOMMODATIONS	100

TOTAL GUEST ACCOMMODATIONS PER MASTER PLAN: 100

LEGEND

- HOMESITE/BUILDING ENVELOPE
- PLATTED ACREAGE OUTSIDE OF BUILDING ENVELOPE
- FUTURE DEVELOPMENT
- CONSERVATION EASEMENT

2015 SECOND UPDATED YELLOWSTONE MTN CLUB MASTER PLAN

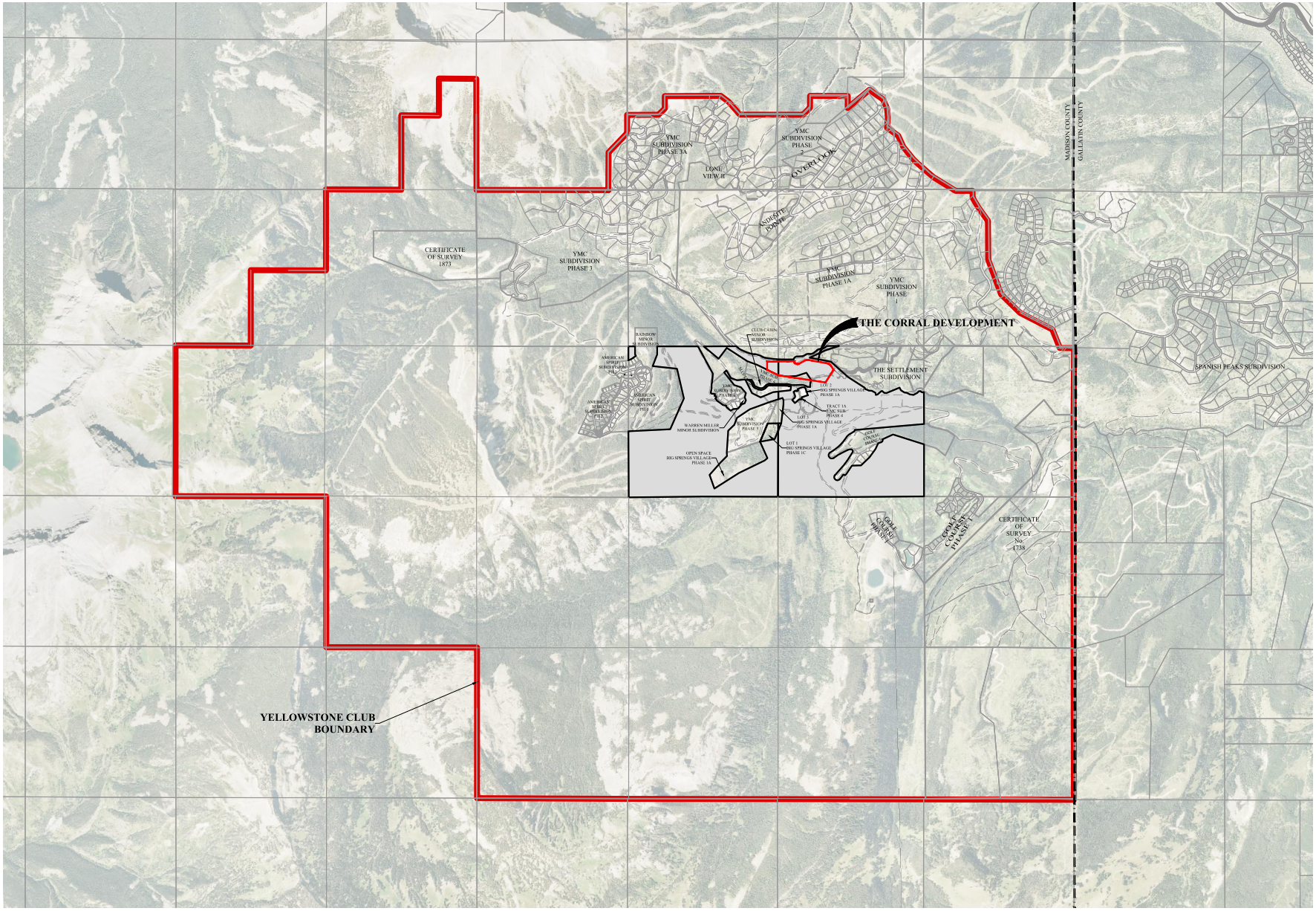
HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2015

VICINITY MAP of

THE CORRAL DEVELOPMENT

AN UPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E,
AND THE NW1/4 SECTION 7, T7S, R3E, P.M., MADISON COUNTY, MONTANA



0 5000

(IN FEET)

LEGEND

- YELLOWSTONE CLUB BOUNDARY
- COUNTY LINE
- PARENT PARCEL

HOUSER ENGINEERING P.C.

626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 03/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL DEVELOPMENT

BIG_SKY MONTANA

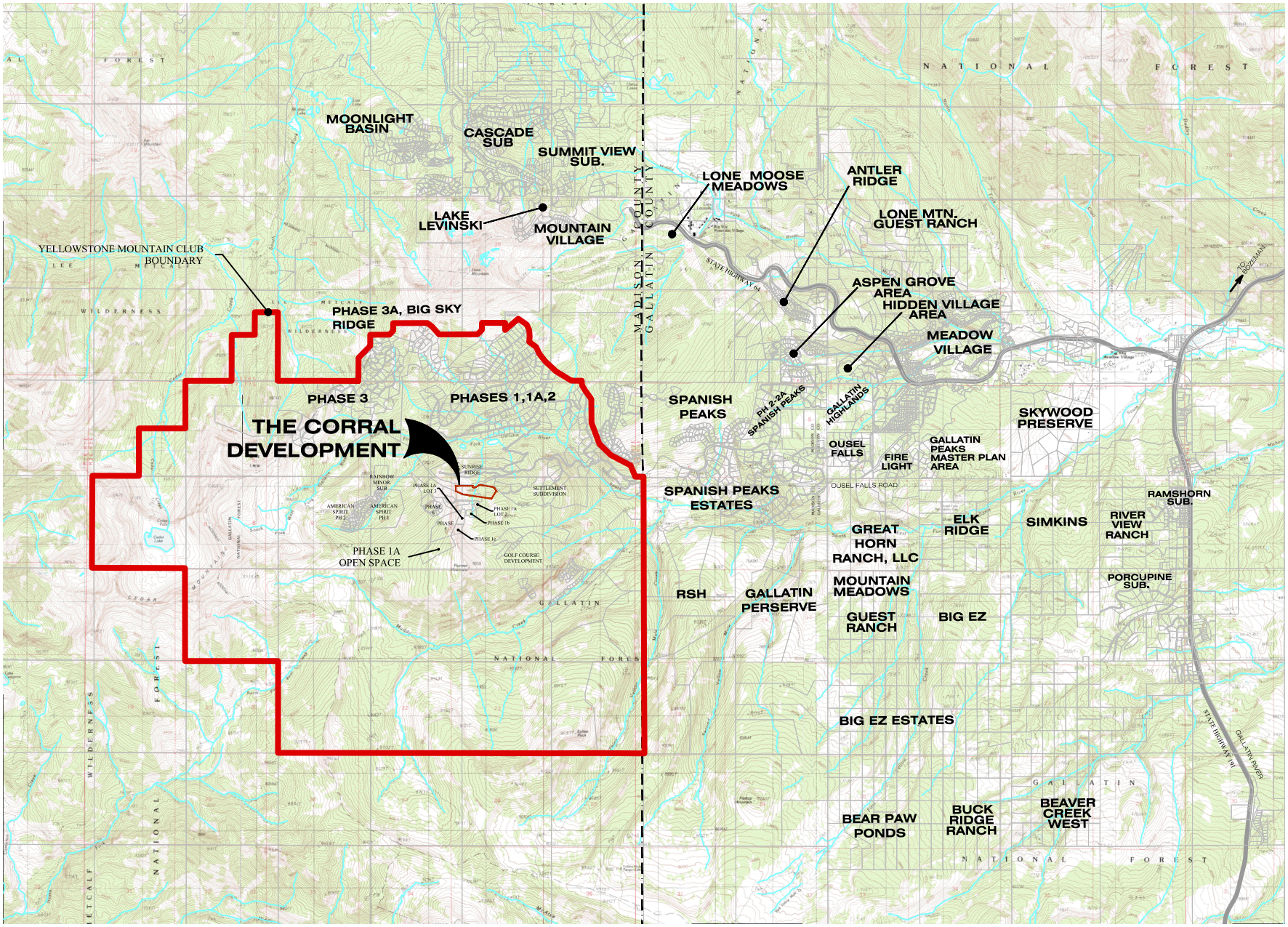
VICINITY MAP

PROJECT NO. .

FIGURE NUMBER 1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 2-VIC MAP YC.dwg Plotted on Mar/23/2016

THE CORRAL DEVELOPMENT
VICINITY MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 03/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL DEVELOPMENT

BIG_SKY MONTANA

VICINITY MAP

PROJECT NO. .

FIGURE NUMBER 1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 1 - BIG SKY MAP.dwg Plotted on Mar/23/2016

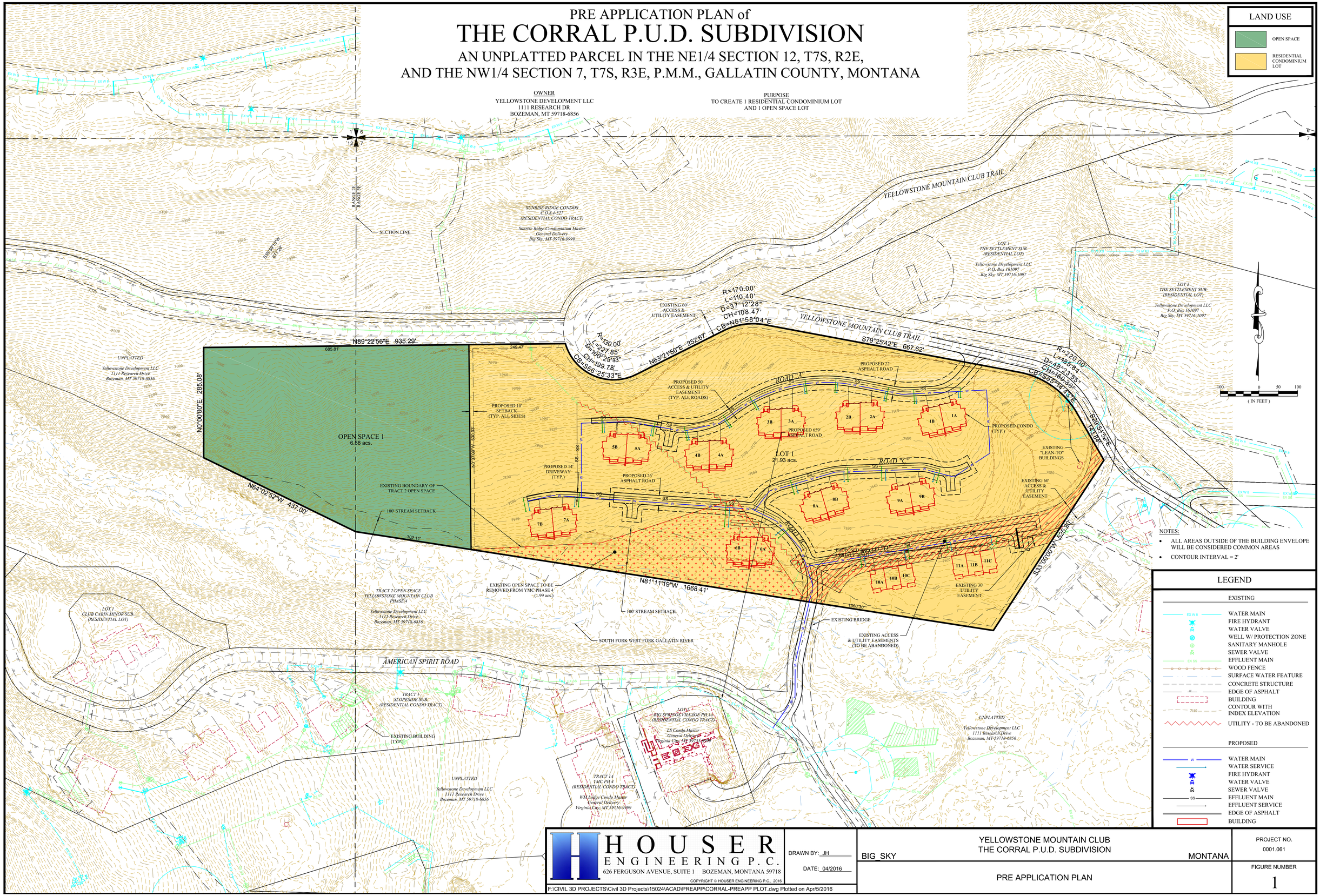
PRE APPLICATION PLAN of

THE CORRAL P.U.D. SUBDIVISION

AN UNPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E, AND THE NW1/4 SECTION 7, T7S, R3E, P.M.M., GALLATIN COUNTY, MONTANA

OWNER
YELLOWSTONE DEVELOPMENT LLC
1111 RESEARCH DR
BOZEMAN, MT 59718-6856

PURPOSE
TO CREATE 1 RESIDENTIAL CONDOMINIUM LOT
AND 1 OPEN SPACE LOT



NOTES:

- ALL AREAS OUTSIDE OF THE BUILDING ENVELOPE WILL BE CONSIDERED COMMON AREAS
- CONTOUR INTERVAL = 2'

LEGEND

EXISTING

- WATER MAIN
- FIRE HYDRANT
- WATER VALVE
- WELL W/ PROTECTION ZONE
- SANITARY MANHOLE
- SEWER VALVE
- EFFLUENT MAIN
- WOOD FENCE
- SURFACE WATER FEATURE
- CONCRETE STRUCTURE
- EDGE OF ASPHALT
- BUILDING
- CONTOUR WITH INDEX ELEVATION
- UTILITY - TO BE ABANDONED

PROPOSED

- WATER MAIN
- WATER SERVICE
- FIRE HYDRANT
- WATER VALVE
- SEWER VALVE
- EFFLUENT MAIN
- EFFLUENT SERVICE
- EDGE OF ASPHALT
- BUILDING

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JH
DATE: 04/2016

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\PREAPP\CORRAL-PREAPP PLOT.dwg Plotted on Apr/5/2016

BIG_SKY — YELLOWSTONE MOUNTAIN CLUB THE CORRAL P.U.D. SUBDIVISION — MONTANA

PRE APPLICATION PLAN

PROJECT NO. 0001.061

FIGURE NUMBER 1

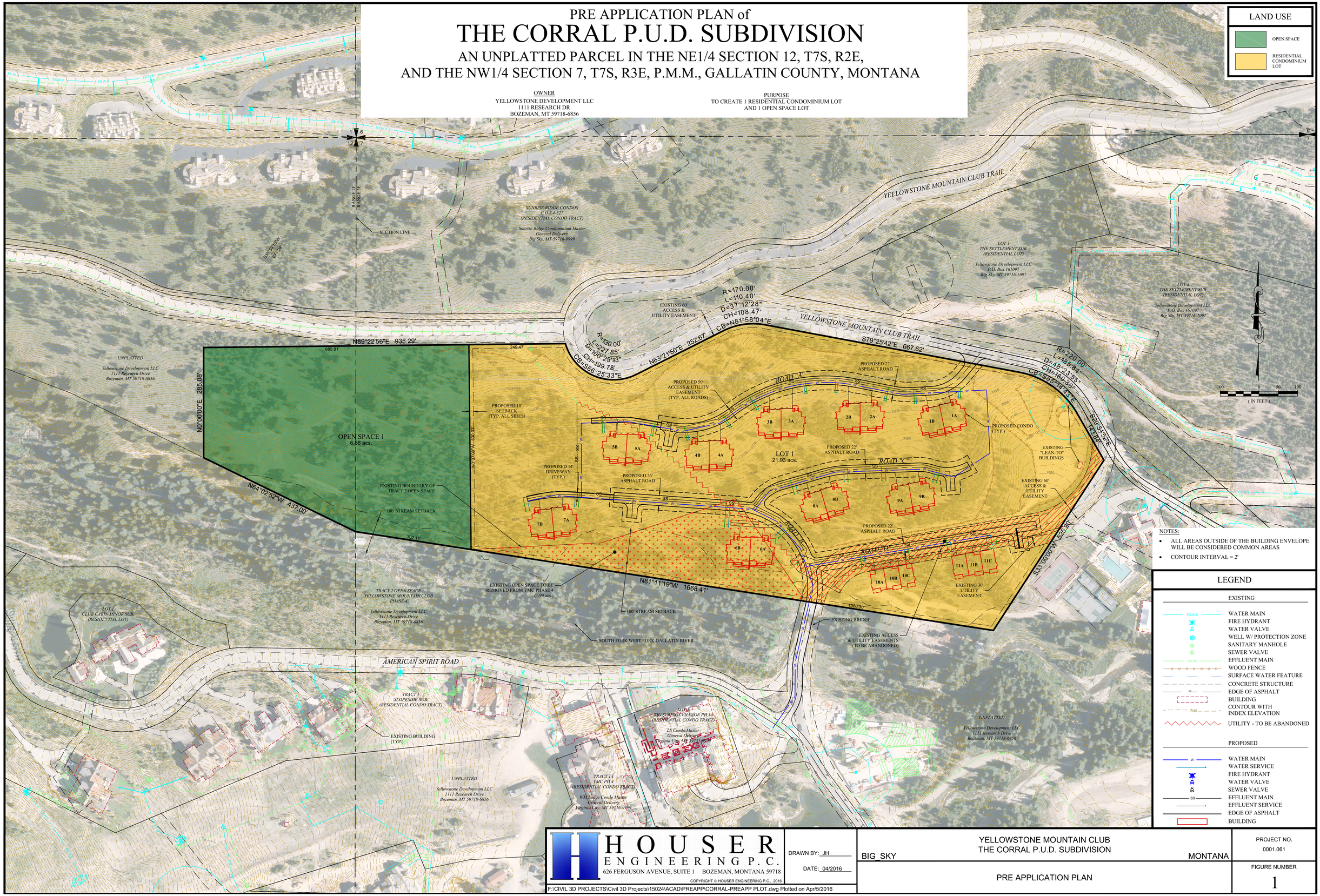
PRE APPLICATION PLAN of

THE CORRAL P.U.D. SUBDIVISION

AN UNPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E, AND THE NW1/4 SECTION 7, T7S, R3E, P.M.M., GALLATIN COUNTY, MONTANA

OWNER
YELLOWSTONE DEVELOPMENT LLC
1111 RESEARCH DR
BOZEMAN, MT 59718-6856

PURPOSE
TO CREATE 1 RESIDENTIAL CONDOMINIUM LOT
AND 1 OPEN SPACE LOT



NOTES:

- ALL AREAS OUTSIDE OF THE BUILDING ENVELOPE WILL BE CONSIDERED COMMON AREAS
- CONTOUR INTERVAL = 2'

LEGEND

EXISTING

- WATER MAIN
- FIRE HYDRANT
- WATER VALVE
- WELL W/ PROTECTION ZONE
- SANITARY MANHOLE
- SEWER VALVE
- EFFLUENT MAIN
- WOOD FENCE
- SURFACE WATER FEATURE
- CONCRETE STRUCTURE
- EDGE OF ASPHALT
- BUILDING
- CONTOUR WITH INDEX ELEVATION
- UTILITY - TO BE ABANDONED

PROPOSED

- WATER MAIN
- WATER SERVICE
- FIRE HYDRANT
- WATER VALVE
- SEWER VALVE
- EFFLUENT MAIN
- EFFLUENT SERVICE
- EDGE OF ASPHALT
- BUILDING

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JH
DATE: 04/2016

BIG_SKY — YELLOWSTONE MOUNTAIN CLUB THE CORRAL P.U.D. SUBDIVISION — MONTANA

PRE APPLICATION PLAN

PROJECT NO. 0001.061

FIGURE NUMBER 1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\PREAPP\CORRAL-PREAPP PLOT.dwg Plotted on Apr/5/2016

HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

April 28, 2016

TO: Adjacent Property Owners
Lien Holders
Easement Holders
Potentially Affected Water Users
Potentially Affected Property Owner Associations
Review Agencies
Nearby Municipality

FROM: Yellowstone Mountain Club LLC and Yellowstone Development, LLC
P.O. Box 161097
Big Sky, Montana 59716

Houser Engineering, P.C.
626 South Ferguson Avenue Suite #1
Bozeman, Montana 59718
406-548-7820

RE: Revisions to the The Corral PUD Subdivision, Yellowstone Mountain Club

To Whom It May Concern:

This is to notify you that we are preparing a subdivision application for review by Madison County. Enclosed for your information is a pre-application packet describing the proposed project. *The previous notification that was sent to you has been modified. An additional 2 condominiums have been added to the subdivision. The documents that require modification have been included.*

Please contact Justin Houser at Houser Engineering P.C. at the address listed above with any questions, comments, or suggestions you may have, within the next 30 days.

Sincerely;

HOUSER ENGINEERING P.C.

Justin L. Houser

Enclosures

The Corral Planned Unit Development at Yellowstone Mountain Club
Revised Pre-Application Narrative

The Corral Planned Unit Development (The Corral) consists of approximately 28.81 acres of land in the area commonly referred to as the corral within the Yellowstone Mountain Club. The parent tract consists of unplatted parcels located in the northeast ¼ of Section 12, Township 7 South, Range 2 East and in the northwest ¼ of Section 7, Township 7 South, Range 3 East. The Corral will provide clustered dwellings near the core of the Yellowstone Mountain Club. Properties within The Corral will consist of 10 duplex buildings and 2 triplex buildings (26 condominiums) within the platted area.

The Corral is located near the base area commonly known as Big Springs Village (BSV). BSV is the primary hub of the Yellowstone Mountain Club, and consists of a gondola lift terminal, general store, spa, ski shop/ski rental shop, ski locker rooms and restaurants. Camp Yellowstone Mountain Club, located just southeast of this subdivision, consists of a workout facility, tennis courts, sports courts, pool, spa, zip line, ropes course, and several other outdoor amenities.

The landowner and subdivider of this property is as follows:

Yellowstone Development LLC
1111 Research Drive
Bozeman, Montana 59718-6856
Phone: 406-995-7385

The landowner's representative of this property is as follows:

Justin Houser, Houser Engineering P.C.
626 South Ferguson Avenue, Suite #1
Bozeman, Montana 59718
Phone: 406-548-7820

The Corral is part of the existing Yellowstone Mountain Club Master Plan (2015 Update), and is consistent with the development goals outlined within that plan. As part of this application, a 2016 Master Plan update has been provided to illustrate the current conditions within Yellowstone Mountain Club. The Yellowstone Mountain Club is not within a zoning district.

As mentioned above, The Corral consists of 10 duplex condominiums and 2 triplex condominiums (26 residential condominiums units). These structures will be placed on a common tract of land consisting of approximately 21.93 acres. The Open Space tract created with this PUD is approximately 6.88 acres, or 31.4% of the overall development. A portion of this subdivision, 1.99 acres, consists of open space dedicated as part of the Phase 4 subdivision (Tract 2). The intent is to modify the boundary of Tract 2 and combine it with the open space to be dedicated with this subdivision. A map illustrating this open space modification has been included for your review.

Roads within The Corral generally meet the standards set forth in the Madison County Subdivision Regulations for low density mountainous roads. There are two design elements of the roads that are not consistent with the Madison County Subdivision Regulations, those are the width of Roads A and C, and the length of the equivalent cul-de-sac for Road C. Roads A and C have been classified as low density, even though there are more than 5 residences being served. The nature of the homes being recreational, part time residences suggests a lower traffic volume than a standard residence. AASHTO assumes a recreational home consists of 4.6 ADT, while a single family residence in a non-resort setting has between 8 and 10 ADT. In addition, Road C is approximately 1200 lineal feet long, which is longer than the allowable cul-de-sac length. Similar to the road width issue listed above, the lower than usual traffic volume supports a cul-de-sac of longer length.

Another road design modification proposes relocating the intersection of American Spirit Road and Yellowstone Mountain Club Trail. As part of the larger improvement goals within the Yellowstone Mountain Club's base area, Yellowstone Mountain Club Trail will be re-routed around Camp Yellowstone Mountain Club, through the meadows to the southeast, and connect with East Golf Course Road. The existing portion of Yellowstone Mountain Club Trail that goes through The Corral will be terminated, and the roads proposed herein will be constructed. This change to the roadways will result in the primary traffic loading traveling along American Spirit Road, while the proposed Road A will be the intersecting road due to its significantly lower traffic volumes. A detailed road design will be provided with the preliminary plat application.

The Corral PUD is located just north of the South Fork of the West Fork of the Gallatin River. All buildings will be placed at a minimum 100 horizontal and 20 vertical feet from the river.

Currently, no dwellings lie within the proposed boundary; however there is a "lean to" structure that has historically been used to provide shelter to horses. Adjacent to The Corral is the Warren Miller Lodge (containing retail stores and restaurants) and BSV providing several recreational facilities such as a lake, ski hills and open spaces.

Terrain within The Corral consists of low to severe slopes. The locations of the proposed buildings are placed in areas with slopes less than 25%. Trees and native grasses dominate the landscape of the property. Water, sewer, electric and phone utilities are generally located on the south and east side of the property as shown on the enclosed maps.

Covenants exist for the overall Yellowstone Mountain Club property, and are enclosed herein. Additionally, supplementary covenants will be drafted for this subdivision to address specific requirements pertaining to these residences. These supplementary covenants will be included with the preliminary plat application.

Adjacent properties consist of Lots 1 and 2 of The Settlement subdivision, un-platted land, and dedicated open space. While not directly adjacent to the property, the Owners Associations for the Phase 4, Big Springs Village Phase 1a, and Sunrise Ridge subdivisions will be notified of this proposed subdivision.

The Corral falls within Madison County Rural Improvement District No 2009-01, document No 136904 located within the records of Madison County.

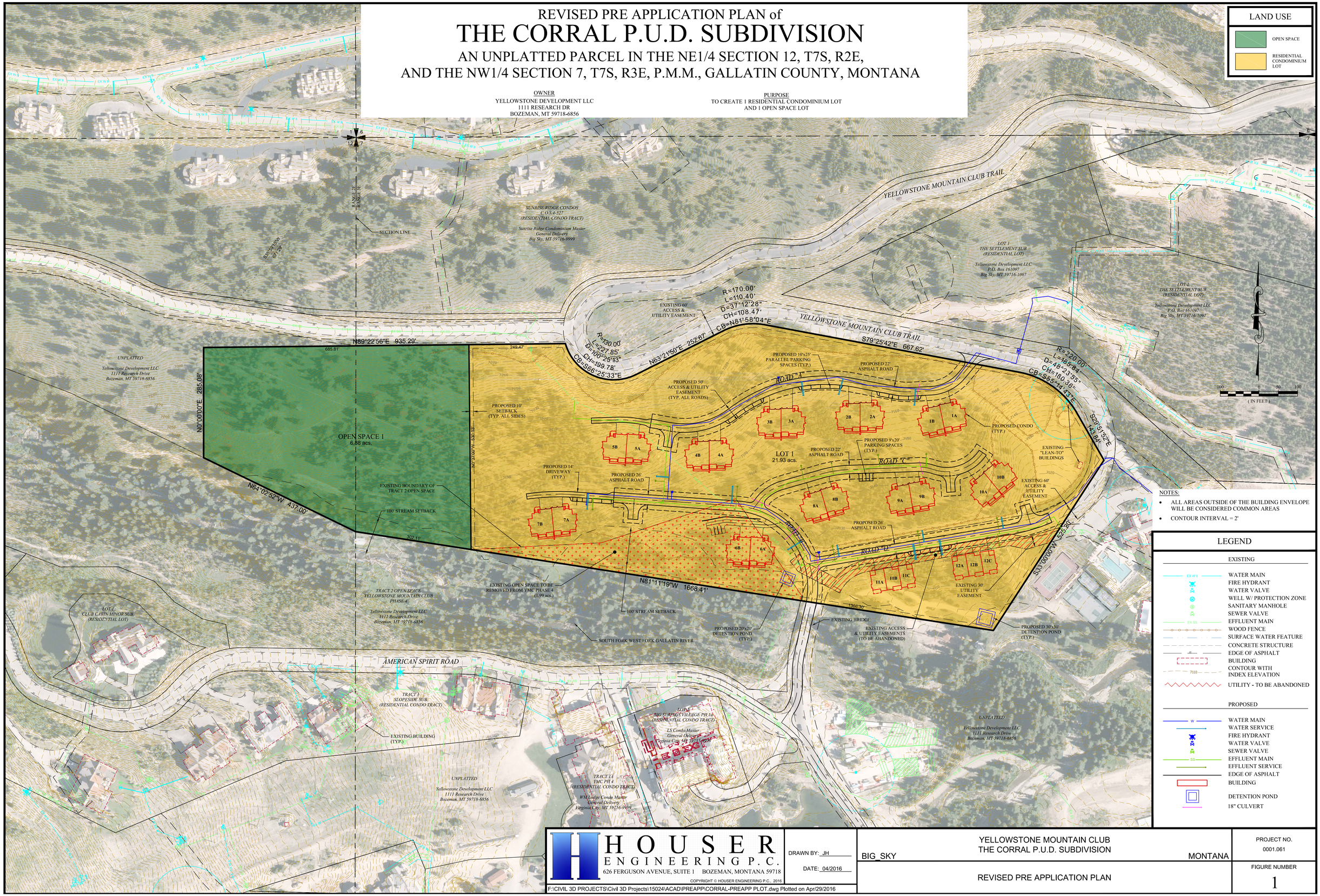
REVISED PRE APPLICATION PLAN of

THE CORRAL P.U.D. SUBDIVISION

AN UNPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E, AND THE NW1/4 SECTION 7, T7S, R3E, P.M.M., GALLATIN COUNTY, MONTANA

OWNER
YELLOWSTONE DEVELOPMENT LLC
1111 RESEARCH DR
BOZEMAN, MT 59718-6856

PURPOSE
TO CREATE 1 RESIDENTIAL CONDOMINIUM LOT
AND 1 OPEN SPACE LOT



NOTES:

- ALL AREAS OUTSIDE OF THE BUILDING ENVELOPE WILL BE CONSIDERED COMMON AREAS
- CONTOUR INTERVAL = 2'

LEGEND

EXISTING

- WATER MAIN
- FIRE HYDRANT
- WATER VALVE
- WELL W/ PROTECTION ZONE
- SANITARY MANHOLE
- SEWER VALVE
- EFFLUENT MAIN
- WOOD FENCE
- SURFACE WATER FEATURE
- CONCRETE STRUCTURE
- EDGE OF ASPHALT
- BUILDING
- CONTOUR WITH INDEX ELEVATION
- UTILITY - TO BE ABANDONED

PROPOSED

- WATER MAIN
- WATER SERVICE
- FIRE HYDRANT
- WATER VALVE
- SEWER VALVE
- EFFLUENT MAIN
- EFFLUENT SERVICE
- EDGE OF ASPHALT
- BUILDING
- DETENTION POND
- 18" CULVERT

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JH
DATE: 04/2016

BIG_SKY — YELLOWSTONE MOUNTAIN CLUB THE CORRAL P.U.D. SUBDIVISION — MONTANA

PROJECT NO. 0001.061

REVISED PRE APPLICATION PLAN

FIGURE NUMBER 1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\PREAPP\CORRAL-PREAPP PLOT.dwg Plotted on Apr/29/2016

MADISON COUNTY
FIRE RISK & HAZARD ASSESSMENT ANALYSIS
CORRAL PUD SUBDIVISION
YELLOWSTONE CLUB

A. Access

1. Ingress & egress
   - a. Two or more year-round roads in/out 0
   - b. One year-round road in/out 7
   - c. Other 0-7
2. Hard surface road width
   - a. >24 ft 0
   - b. 20 to 24 ft 2
   - c. < 20 ft. 4
3. All-season road condition
   - a. Hard surfaced road, grade <5% 0
   - b. Hard surfaced road, grade >5% 2
   - c. Non-surfaced road, grade < 5% 2
   - d. Non-surfaced road, grade > 5% 5
   - e. Additional for road greater than 10% grade 5
   - f. Other than all-season 7
   - g. Other 0-7
4. Access/Turnaround
   - a. < 300 ft with >50 ft radius turnaround 0
   - b. > 300 ft with >50 ft radius turnaround 2
   - c. <300 ft with no turnaround 4
   - d. >300 ft with no turnaround 5
   - e. Other 0-5
5. Street signs
   - a. Yes (4 in., viewable & reflectorized) 0
   - b. Not present or specified 5
   - c. Other 0-5

B Vegetation (Fuel Models)

1 Characteristics of predominant vegetation w/in 300 ft
- a. Light (grasses, forbs, sawgrasses & tundra) 5
- b. Medium (light brush & small trees) 10
- c. Heavy (dense brush, timber & hardwoods) 25
- d. Slash (timber harvesting residue) 25

2. Defensible Space
   - a. More than 100 ft of vegetation treatment from structure 1
   - b. 71 to 100 ft of vegetation treatment from structure 3
   - c. 30 to 70 ft of vegetation treatment from structure 10
   - d. <30 ft of vegetation treatment from structure 25
   - e. Other

C. Topography

1. Slope <9% 1
2. Slope 10% to 20% 4

3. Slope 21% to 30%	7
4 Slope 31% to 40%	8
5. Slope > 41%	10
D. Additional Rating Factors	
1. Topographical features that adversely affect wildland fire behavior	0-5 2
2. History of high fire occurrence	0-5
3. Areas of unusually severe fire weather and strong dry winds	0-5
4. Separation of adjacent structures	0-5
5. Vegetation Mgt./Defensible Space plan	0-5
6. Other	0-5
E. Roofing Assembly	
1. Class A roof	0
2. Class B roof	3
3. Class C roof	15
4. Nonrated	25
F. Building Construction	
1. Materials	
a. Noncombustible/fire resistant siding, eaves & deck	0
b. Noncombustible/fire-resistant siding and combustible deck	5
c. Combustible siding & deck	10
d. Other	0-10
2. Setback from slope	
a. >30 ft to slope	1
b. < 30 ft to slope	5
G. Available Fire Protection	
1. Year round water source	
a. Pressurized water source	
(1) 500 gpm hydrants < 1000 ft apart	0
(2) 250 gpm hydrants < 1000 ft apart	1
(3) Hydrants > 1000 ft. apart	5
b. Nonpressurized water source flow	
(1) > 250 gpm/structure for 2 hours	3
(2) < 250 gpm/structure for 2 hours	5
c. Nonpressurized water source distance	
(1) < 1 mile	3
(2) > 1 mile	5
d. Water unavailable	10
2. Organized response resources	
a. Station < 5 mi.	1
c. Station > 5 mi.	3
3. Fixed fire protection	
a. Approved sprinkler system	0
b. No sprinkler system	5
H. Utilities	
1. Gas & Electric underground	0
2. One underground, one above ground	3

3. Both aboveground 5

I. Risk Rating of Area (from Wildland Fire Plan) 2-10 7

J. Other (Max 10 points)

Largest factors effecting the score are the topography, slope , and egress.

0-10

Madison County Hazard Assessment

Low Hazard	<45	Total Score 51
Moderate Hazard	45-74	
High Hazard	75-117	
Extreme Hazard	>117	

Prepared by Dustin Tetrault on June 9th, 2016

Emergency Manager, Risk Mitigation Officer, Madison County

Montana Department of Transportation
2701 Prospect Avenue
PO Box 201001
Helena MT 59620-1001

Michael T. Tooley, Director
Steve Bullock, Governor

May 11, 2016

Justin Houser
Houser Engineering P.C.
626 South Ferguson Avenue Suite #1
Bozeman, MT 59718

Subject: The Corral PUC Subdivision, Yellowstone Mountain Club

Dear Mr. Houser,

The Montana Department of Transportation (MDT) Staff has reviewed the information supplied in your letter of April 7, 2016, received April 18, 2016 concerning the above referenced subdivision.

I cannot determine infrastructure encroachments onto MT 64 right-of-way will be required for this subdivision.

It does not appear that the subdivision will directly access MT 64. The Developer must determine if there are adverse impacts to the traffic on MT 64 at county road approaches as a result of this development. MDT will work with Madison County for impact review to determine if mitigation is required.

If you have any questions, concerning this letter, please contact me at (406)444-9456 or email at jriley@mt.gov.

Sincerely,

Jean A. Riley, P.E.
Transportation Planning Engineer
Policy, Program & Performance Analysis Bureau

Copies: Jeff Ebert – MDT Butte District Administrator
Kyle DeMars – MDT Bozeman Area Maintenance Chief
Mike Tierney – MDT Policy, Program & Performance Analysis Bureau
Madison County Planning Office
File

Madison County Weed Board

PO Box 278*Virginia City, MT 59755*Physical Address: 2296 Hwy 287, Alder, MT 59710
Ph# Margie (406) 842-5595 * Janie (406) 842-5596 * Fax (406) 842-5589
E-mail – Margie – madweed@3rivers.net Janie – amadweed@3rivers

June 10, 2016

Yellowstone Mountain Club
PO Box 161097
Big Sky, MT. 59716

Re: ***The Corral***

Dear Gentlemen,

The Madison County Weed Board thanks you for filing an updated Noxious Weed Management Plan for ***The Corral*** *which is located in the* ***NW 1/4 Section 7, Township 7S, Range 3E.***

The Management Plan has been approved and we request that any future owners must be made aware of this plan pertaining to weed management and meet the requirements of the Montana County Noxious Weed Control ***Act. 7-22-2116****, Unlawful to Permit Noxious Weeds to Propagate (go to seed).*

Thank you for your concerns about noxious weeds and if you have any other questions feel free to call our office at (406) 842-5595

Sincerely,

Margie N. Edsall

Margie N. Edsall, Coordinator
Madison County Weed Board

cc. Board of Madison County Commissioner
cc. Clerk & Recorders Office
cc. Madison County Planning Board

Madison County Weed Board

PO Box 278*Virginia City, MT 59755*Physical Address: 2296 Hwy 287, Alder, MT 59710
Ph# Margie (406) 842-5595 * Janie (406) 842-5596 * Fax (406) 842-5596
E-mail – Margie – madweed@3rivers.net
Janie – amadweed@3rivers.net

Noxious Weed Control Management Plan

Plan# 1 Date 4/26/16

I. Ownership and Location:

A. Name: Yellowstone Mountain Club

Address: PO Box 161097
Big Sky MT 59716

Phone# 406. 995-7385

B. Location:

a. Legal Description: NW 1/4 ____ 1/4 ____ 1/4

Section 7 Township 7S Range 3E

C. How many Lots? 28 units

D. A Map identifying or locating the Ownership must be included

E. Name of Subdivision The Corral

II. Noxious Weed Data:

A. Types of Noxious Weeds: Canada thistle, Houndstongue, Hoary Alyssum

B. Acres of infestation by weed species and land use. (use data key-2nd pg.)

Location	Weed Species	Acres	Land Uses	Environmental & Safety Factors
Example:	S. knapweed	4	Residential	Trees/Garden/Creek
1.	C. Thistle	.25	Pasture ~~Ranch~~	NONE
2.	H. Alyssum	.10	Pasture	NONE
3.	Houndstongue	.25	Pasture	NONE
4.				
5.				

(If possible, please locate above infestations on map)

Note: All Noxious Weed Management Plans must be signed, dated, and notarized .

(For office use only)

VI. Approval / Non-Approval:

***Before the Board will accept this Weed Management Plan for Approval, the Applicant must have his/her Notarized signature in place on this document. The Weed Board Chairperson will sign after Board Review and Approval.**

A. Approval- ✓ Date: 7/9/19
B. Approval with modifications- _____ Date: _____
C. Non - Approval- _____ Date: _____

D. Board Recommendations & Reasons: Should the Board have any recommendations to assist the landowner, or if this Plan is not approved, a letter of explanation will be sent to the landowner.

Madison County Weed Board

Betty Sykes
(Chairperson Signature)

7/9/16
(Date)

Applicant/Landowner

(Signature)

4/26/16
(Date)

STATE OF MONTANA)
) **ss.**
COUNTY OF MADISON)

On this 26 day of April, 2016, before me, the undersigned Notary Public in and for the State of Montana, personally appeared Mike DuCuennois, known to me to be the person whose name is subscribed this instrument was signed and sworn to before me as the same.

IN WITNESS WHEREOF, I have here unto set my hand and affixed my notarial seal the day and year first above written.

Sharon D Wampler
Notary Public of the State of Montana

Residing at Big Sky, MT
My Commission Expires April 01, 2019

SHARON D WAMPLER NOTARIAL SEAL STATE OF MONTANA

SHARON D WAMPLER
Notary Public
for the State of Montana
Residing at:
Big Sky, Montana
My Commission Expires:
April 01, 2019

Appendix G

APPENDIX 22 DECLARATION OF RIGHT TO FARM, DECLARATION OF EMERGENCY SERVICES INFORMATION

Yellowstone Mountain Club and Yellowstone Development LLC of
(Owner Names)
PO Box 161097, Big Sky, Montana 59716
(Address)

"Owners" are the owners of the property situated in Madison County, Montana, more particularly described as: The Corral PUD Subdivision, Yellowstone Mountain Club
(Name of subdivision)

RIGHT-TO-FARM

Owners hereby declare that this property shall be held, sold, and conveyed subject to the following acknowledgments, waivers, restrictions, and conditions:
This property is situated in an agricultural area and may be subject to conditions resulting from commercial agricultural operations on adjacent land. Such operations may include: cultivation, harvesting, and storage of crops; livestock raising; application of chemicals; operation of machinery; application of irrigation water; and other accepted and customary agricultural activities conducted in accordance with federal and state law.

Such activities ordinarily and necessarily produce noise, dust, smoke, odor, and other conditions that may conflict with residential purposes. Grantees shall have no common law rights to object to normal and necessary agricultural management activities legally conducted on adjacent land which may conflict with use of the property for residential purposes. Grantees are specifically subject to 27-30-101, MCA.

Adjacent property owners shall have no ingress or egress upon or across this property by virtue of this Declaration, and nothing herein shall prohibit or otherwise restrict the enforcement of statutes or regulations of governmental agencies for activities conducted on adjacent property.

These acknowledgments, waivers, restrictions, and conditions shall run with the real property and shall be binding on all parties having or acquiring any right, title, or interest in the described property or any part thereof, and shall inure to the benefit of and be binding upon each successor in interest of the owners thereof.

EMERGENCY SERVICES INFORMATION

At the time of final plat filing, emergency service providers and their estimated response times under good weather conditions are:

	AGENCY	RESPONSE TIME
Fire	PSPI	5-7 minutes
Ambulance	PSPI	5-7 minutes
Law Enforcement	Gallatin Sheriff	30-35 minutes

NOTE: In bad weather, access may be difficult or nonexistent.

In accordance with Madison County Ordinance 1-93, the road providing primary access to this subdivision is closed to vehicle traffic other than snowmobiles from December 1st of each year to April 15th of the following calendar year.

☐ Applicable ☐ Not Applicable

IN WITNESS WHEREOF, the Owners have caused this instrument to be made and executed this _____ day of _____, 20 ___.

_____ _____

Owner **Owner**

STATE OF MONTANA
County of Madison

On this ____ day of _____, 20 ___, before me personally appeared _____, known to me to be the persons whose names are subscribed to within this instrument and who acknowledge to me that they executed the same.

_____
Notary Public for State of Montana
Residing at _____
My Commission expires _____

Appendix H

Big Sky. Big Land. Big History.
Montana
Historical Society

April 20, 2016

Justin Houser
Houser Engineering
626 South Ferguson Ave, Suite 1
Bozeman MT 59718

RE: THE CORRAL PUD SUBDIVISION, YELLOWSTONE MOUNTAIN CLUB, MADISON CO. SHPO Project #: 2016041816

Dear Mr. Houser:

I have conducted a cultural resource file search for the above-cited project located in Section 12, T7S R2E, and Section 7, T7S R3E. According to our records there have been no previously recorded sites within the designated search locale. However, there have been a few previously conducted cultural resource inventories done in the areas.

It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old we would recommend that they be recorded and a determination of their eligibility be made.

As long as there will be no disturbance or alteration to structures over fifty years of age we feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should structures need to be altered or if cultural materials be inadvertently discovered during this project we would ask that our office be contacted and the site investigated.

If you have any further questions or comments you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

File: LOCAL/SUBDIVISIONS/2016

Appendix I

May 13, 2016

Yellowstone Club Development
P.O. Box 161097
Big Sky, MT 59716

Attention: Mr. Mike DuCuennois

Subject: Geotechnical and Geologic Hazard Reconnaissance
The Corral – YC Development
Madison County, Montana
Terracon Project No. C4165318

Dear Mr. DuCuennois:

Terracon Consultants, Inc. (Terracon) has completed the surficial geology and geologic hazard mapping for the above referenced project. This study was performed in accordance with our proposal dated April 29, 2016 and per your subsequent authorization. The purpose of this work was to describe the general geology throughout the development area and identify geotechnical hazards and potential geotechnical limitations in order that appropriate engineering planning and design can be initiated, or that the avoidance of problem areas can be affected.

The general geology was mapped by identifying surficial features across the slopes of the planned development and surrounding vicinity plus reviewing other geologic references, aerial photographs, and previous subsurface and reconnaissance investigations for several nearby projects. The information was then compiled into maps summarizing the surficial geology and potential hazards throughout the development area. These maps and related discussions of conditions are presented in the following report.

With all mountainside development there is an inherent risk of some downslope movements and the intent of this reconnaissance was to assign risk predominantly based on observations of surficial features. There is no guarantee that future movements will not occur, and some amount of risk must be accepted by both developers and perspective owners alike.

General Geologic Background

The Big Sky terrain has originated as a result of tectonic activity along several faults throughout the region which thrust a block of Precambrian basement rock upward, disturbing Cretaceous-aged formations predominantly of the Frontier (Kf), Mowry (Kmo), Thermopolis/Muddy Sandstone (Kmt), and the Kootenai Formations (Kk). Three prominent faults along which movement occurred, that are in the direct vicinity of the development, include the Hilgard System to the west, the Buck Creek Fault to the south, and the Spanish Peaks Fault to the north. Fault activity continues along the Hilgard and Buck Creek systems.

The emplacement of the up-thrust block severely distorted the sedimentary rock cover creating numerous, smaller, micro-fault splays and fold structures that have in essence fractured the soft rock formations and placed them on inclined planes. Two such fold features are the prominent Buck Creek Anticline and the Andesite Ridge Anticline. The Buck Creek Anticline has an axis of folding which

strikes in a northwesterly/southeasterly orientation, while the Andesite Ridge Anticline strikes with a general northeasterly/southwesterly orientation. About these axes of folding, the disturbed sedimentary beds dip downslope in perpendicular directions. The planned Corral Development is located on the easterly limb of the Andesite Ride Anticline where sedimentary beds then dip toward the southeast. Tertiary volcanic activity has also altered the bedrock formations with numerous dikes and sills of igneous rock being emplaced within fractures and laterally between formations.

Large-scale land movements are common within the Big Sky region, and are often due to the nature and orientation of the weak sedimentary beds. The shale members of the formations tend to be very susceptible to erosion and sliding, particularly those of the Mowry Formation (Kmo) which are rich in bentonite, as are the black shales of the Thermopolis (Kmt) and Frontier (Kf) which are poorly bonded and fractured. Where the formations have been folded or positioned on inclined planes, the more resistant sandstone and siltstone beds tend to form a ridge-type topography, while the more erosion prone shales weather more rapidly creating run-out type landslides in the trough portions of the terrain. The Corral Development is situated physically lower in the stratigraphic column near a more resistant sandstone formation exposed in a trough sequence along the lower flanks of the Andesite Ridge Anticline.

In the more recent geologic time of the Pleistocene Epoch (10,000 to 100,000 years ago) glaciation along with related environmental, seismic, and geologic factors, has had a pronounced effect on much of Big Sky. Glaciers advancing down from the higher elevations deposited till, rock debris, and glacio-fluvial soils along the valley walls and floors. Based on valley shape, glaciation at its maximum extent (nearer 100,000 years ago) filled the valleys with ice to an elevation extending well above the planned development. Although the most recent glacial period was much less extensive, each period significantly impacted the surficial geology of the area. Following the retreat of the glaciers, a loss of glacial buttressing and elevated moisture levels, coupled with beds of weak shale situated on inclined planes or exposed on hanging valley walls, left much of the region susceptible for episodes of mass slope movements. In the Corral Development area, lateral moraine and glacial till deposits left on over-steepened slopes of the Andesite Ridge Anticline, most certainly experienced some mass movements in response to the loss of buttressing when the glacial period ended (See attached Surficial Geology/Geotechnical Hazards Maps).

The Big Sky area has been and remains seismically active. Probabilistic estimates by the USGS indicate that Peak Ground Accelerations (PGA) with return intervals of 2500+ years will be on the order of 0.35g. Seismic events of this nature can impact slope stability and foundation performance.

Project Geology and Reconnaissance Observations

The proposed development area is located in T7S, R3E, NW1/4 of Section 7, along with an open space portion in T7S, R2E, NE1/4 of section 12. The development is expected to consist of 11 duplex and triplex units with 3-story height. Current conceptual location of the units is shown on the attached maps.

The site is situated along the lower southeast flank of the Andesite Ridge Anticline along the north bank and slightly above South Fork of the West Fork of the Gallatin and immediately west of the confluence with Muddy Creek. The mountainside terrain of the project area has been significantly impacted by glaciation. Glaciers advancing from the vicinity of Lone Mountain created the valley now occupied by the South Fork. In the immediate vicinity of the planned development, the glacier from Lone Mountain joined together with two other glacial lobes moving through the current Muddy Creek and Third Yellow Mule Creek drainages. The confluence of all three ice sheets in the immediate proximity of the Corral Development created a larger mass of ice that flowed to the east along the current South Fork Valley depositing andesite glacial till. Following glacial retreat, the till soils that were left clinging to the valley walls slumped randomly due to loss of buttressing, elevated moisture levels, and weak shale formations where present beneath the till. Post-glacial landsliding in and around the planned development does not appear to have had a significant role in the shaping of the surficial geology, and no areas of active sliding or instability were observed within the confines of the proposed development, nor in the immediate vicinity surrounding the site.

The till soils have matrix constituents indicative of their place of origin and rock types encountered as the glaciers advanced down from higher elevations. Numerous outcrops of andesite rock rim the valley walls along the glacial routes. The till is typically very rocky and comprised primarily of subangular to subround andesite rock fragments ranging in size from small gravel to large boulders in a silty to clayey matrix (See Photo 1).

Bedrock exposures are limited and mostly obscured by a relatively thin to moderately thick mantle of glacial till, colluvium, and alluvium at the lower elevations. Occasional outcrops of bedrock appear near the extreme western edge of the planned development in the “open space” area and in creek bed of the South Fork within the planned development. The development lies on the southeasterly limb of the prominent Andesite Anticline just east of axis of folding. The rock strata generally dip at relatively moderate angles in opposing directions away for the center of folding with trends in a northeasterly/southwesterly direction. Where exposed showing to the west of the planned residences, rock beds dip to the southeast at 17 to 23 degrees and strike northeast at approximately 49 to 61 degrees. It is anticipated that the depth to bedrock will vary significantly from relatively shallow to moderately deep depending upon location, and if encountered will be the lower member of the Thermopolis Formation (Kmt) and/or possibly the upper Kootenai Formation (Kk). The lower member of the Thermopolis Formation is a resilient sandstone layer (See Photos 2 & 3) known as the “Red Beds” that is overlain by black shale and capped again by sandstone higher in the stratum.

Tertiary igneous activity has also had a significant impact within the near vicinity. Intrusions of dacite porphyry (Kdap) (andesite for local clarification) and Gabbro (TKga) magma as dikes, sills and plugs pushed its way into beds, cracks, and fissures in the fractured bedrock where exposed, typically creates hard ledge/cliff like outcrops and talus slopes of angular rock. As noted previously, the presence of volcanic intrusions in the area is also evident from the glacial till composition.

Near the upper switchback of the Yellowstone Club Trail Road and the intersection of Moose Lake Road two areas of seepage exit the slope via culverts placed under the road and lower downslope. One area

of seepage is located between Units 1 and 2 and the other to the west of Unit 1. Small boggy areas have been created by both seeps, however the wetness disappears at similar elevations on-slope and do not reappear at an obvious location downslope. Methods to mitigate possible impacts of hydrostatic pressure and moisture accumulation against foundations should be included in the project planning and design. A second wet area occurs immediately west of planned Unit 7, and it appears that the bottom land along the South Fork of the West Fork of the Gallatin River could be seasonally marshy or possibly tied to the seepage upslope as previously identified (See Photo 4). Furthermore, several sag areas located between till ridges may experience seasonal high water and should be addressed during foundation design with practices incorporated to drain soils and mitigate excessive hydrostatic earth pressures on foundation walls.

The reconnaissance results are summarized on the Surficial Geology Map (See attached Figure Number 1). A photograph log is attached with representative site feature and Unit views as noted with location reference shown on the Geotechnical Hazard Map (See attached Figure 2).

Geologic Hazard Assessment

The hummocky till terrain appears stable overall, and based on initial field observation, the gravelly till soils should be generally suitable for support of residential foundations. However, some till deposits could include rocky and gap graded soils, or boulders that might result in non-uniform bearing or differential settling. Areas of active sliding were not observed during the field reconnaissance, nor were slopes that are indicative for the potential for sliding. Many slopes in the Big Sky area experience gradual downslope gravitational creep in the overburden soils and weak rock strata, but such movements were not evident in the planned development area.

The geologic hazard assessment and associated project risk have been evaluated based on the surficial geology and reconnaissance observations discussed previously. Since no areas of active or impending sliding were identified, risks for development appear to be primarily related to construction earthwork and potential areas of seepage and seasonally high groundwater. These items should be manageable with proper design and construction practices for the mountainside environment. This initial reconnaissance effort should be extended by continued geotechnical engineering involvement and selective subsurface investigations as development planning and design proceed.

Based on our surficial reconnaissance, a Geotechnical Hazard Map (See attached Figure Number 2) using a color coded rating system has been developed in which areas within the proposed development have been given a color designation ranging from green to red, with degree of hazard increasing accordingly. The color coding is based on observations encountered during the field reconnaissance and also based on our past experience with similar conditions in the direct vicinity of the development. Also taken into consideration were the likelihood of undesirable or difficult soils near footing depths, steepness of slopes, moisture levels, seepage, and other potentially destabilizing concerns. The color coding is further explained below and references the following geotechnical investigation key:

Geotechnical Investigation Key

GTF	Standard geotechnical investigation for foundation design and building location recommended.
GTSS	Geotechnical investigation for site mitigation of localized slope stability or slow, creep movement concerns required.

- **Red** – areas of extreme caution or that are to be avoided. Generally situated on active landslides with rates of movement that are characterized as fast and having significant potential for damaging effects on structures founded in these areas. No obvious surficial features of active (red) landsliding were found during the reconnaissance of the proposed development.

- **Orange** - areas of moderate concern generally situated on overly steep and irregular slopes, or areas that show possible signs of recent surficial adjusting. Unconventional foundation systems such as micropiles, mat, or other engineered foundations should be considered the norm and mandatory geotechnical investigations, including stability analysis for slopes, cuts, and fills, are recommended if development is to be considered. No areas of "orange" were identified within the planned development. (**GTSS/GTF**)

- **Yellow** – moderate to low concern, locations typically situated on moderately but uniform sloping terrains that may require some modest earthwork, and/or on uniform steeper, but visually stable slopes. For this reconnaissance seepage and water issues are primary concern for yellow designation and appropriate sub-drainage measures should be included in foundation design. Foundation conditions may also include gap-graded materials comprised of potentially voided and very angular, cobble to boulder-sized rock. Point loading and potential settlement issues may arise if safeguards are not properly taken to secure foundations. Foundations systems employing such techniques as grouting, micropiles, mat, and other engineered foundations slabs should be considered to ensure foundation integrity if geotechnical investigation indicates boulder foundation conditions as discussed above. Standard geotechnical investigation is recommended for foundation and site work in all yellow areas (**GTF**). If site construction dictates significant cuts or fills on over-steepened slopes, mandatory geotechnical investigation with slope stability is recommended (**GTSS**).

- **Green** – minimal apparent concerns. Locations where either no significant geologic limitations are identified or where anticipated grading requirements for residential development are not expected to cause major alteration to the landscape. Sites generally occupy flatter terrain where desirable gravelly till soils and little site grading are anticipated. Locations may show potential for seasonally high groundwater. Some locations and structures identified as green may require sight adjustments to best fit the terrain under the direction of a geotechnical engineer. Standard geotechnical investigation is recommended (**GTF**).

Based on the previous hazard recommendations the following table has been compiled with a color coding for each structure, hazard (if present) and the appropriate level of geotechnical investigation:

Structure I.D.	Geology	Hazard Risk	Hazard Rating
Unit 1; (Three Stories)	Glacial Till	Potential seepage, high groundwater, and uncertain hydrogeology. Possible boulder till.	**Yellow/green** (See Photo5), no stability issues, gentle topography, presence of infiltrating seepage in vicinity raises concern for high groundwater and hydrostatic conditions **GTF with observation wells**
Unit 2; (Three Stories)	Glacial Till	Potential seepage, high groundwater, and uncertain hydrogeology.	**Yellow/green** (See Photo 6), no stability issues, very gently sloping topography, presence of infiltrating seepage in vicinity raises concern for high groundwater and hydrostatic conditions **GTF with observation wells**
Unit 3; (Three Stories)	Glacial Till	No apparent hazard	**Green** (See Photo 7) gentle slope, **GTF**
Unit 4; (Three Stories)	Glacial Till	No apparent hazard	**Green** (See Photo 8) gentle slope, GTF
Unit 5; (Three Stories)	Glacial Till	No apparent hazard	**Green** (See Photo 9) gentle slope, gravelly till ridge, **GTF**
Unit 6; (Three Stories)	Glacial Till	No apparent hazard, SE corner extends over terrace edge and may impact earthwork and foundation design.	**Green** (See Photo 10&11) gentle slope, SE corner of unit extends over terrace edge, potentially shallow bedrock **GTF**
Unit 7; (Two Stories)	Glacial Till And Gravelly Alluvium	Possible high groundwater, unit extends to creek level, seepage area west of unit, Some potential for deep organic soils near creek bottom.	**Yellow/green** (See Photo 12) gentle slope, potentially shallow bedrock, possible location adjustment pending geotechnical investigation **GTF with observation wells**
Unit 8; (Two Stories)	Glacial Till	No apparent hazard	**Green** (See Photo 13) gentle topography, **GTF**
Unit 9; (Two Stories)	Glacial Till	No apparent hazard	**Green** (See Photo 14) gentle topography, , **GTF**
Unit 10; (Tri-Plex)	Glacial Till	No apparent geotechnical hazard, SE corner extends over terrace edge and may impact earthwork and foundation design.	**Green** (See Photo 15) gentle topography, **GTF**
Unit 11; (Tri-Plex)	Glacial Till	No apparent hazard	**Green** (See Photo 16) gentle topography, **GTF**

Closure and Recommendations

The foregoing hazard assessment is intended to be used as a reference provided by the Yellowstone Club to planners, regulators, and future lot owners as our professional opinion regarding geology, stability, and investigation recommendations for the overall development. When lot layout and building envelopes have been defined, our mapping and risk assessment can be further refined based on more detailed reconnaissance, or additional subsurface investigations. This reconnaissance effort has been

conducted consistent with the level of care standard for geotechnical practice in the area. **Under no circumstances is this report to be interpreted as replacing site-specific geotechnical investigations as discussed and recommended herein, nor does the report express or imply any warranty with regard to future performance or ground conditions.**

Based on our reconnaissance of the proposed development area, it appears that there are no obvious active stability issues or other critical geotechnical hazards evident from surficial observations. However, development planning and design must consider possible local instabilities due to construction and the potential effects of slow, hillside creep. Foundation and drainage (both surface and subsurface) designs must be conducted with proper appreciation for movement risks and associated cosmetic and structural damage which could develop due to slope adjustments or non-uniform/unsuitable bearing substrates.

As with entire Big Sky region, the appealing terrain and scenery which makes the location so desirable is the result of a dramatic geologic past whose forces are not exhausted, but continue to alter the landscape in irregular manners and unpredictable time frames. A certain level of risk must be accepted with all mountainside construction and should be conveyed to prospective buyers and contractors prior to development. Unpredictable events such as increased precipitation levels, seismic activity, and development itself, can promote instabilities even in the most geotechnically favorable locations.

The next course of action, if it is desired to extend from the reconnaissance level of study, is to conduct further geotechnical investigations to better characterize subsurface conditions. This level of investigation should include several borings drilled to determine depths to bedrock and supplemented with test pits excavated at select locations. Based on data acquired during the next level of investigation, models can be made to better analyze existing conditions and potential issues that may arise from development in certain locations. However, it should be stressed that this work would not constitute site specific geotechnical investigations, which for private residences, will need to be performed by entities other than Terracon.

We would like to thank you for the opportunity to work with Yellowstone Club LLC. If any questions arise regarding our reconnaissance, or as we can be of assistance in planning and implementing further investigations and monitoring, please feel for to contact us.

Sincerely,
Terracon Consultants, Inc.

MONTANA
GARY A. QUINN
6283E
LICENSED
PROFESSIONAL ENGINEER

Brian Evans
Senior Staff Geologist

Gary A. Quinn, P.E.
Senior Project Geotechnical Engineer

Photo 1: Glacial till composed of subangular to subround andesitic gravel in a silty clayey matrix exposed in road cut above Units 4 and 5.

Photo 2: Sandstone outcrop exposed west of units in open space area. Attitude of beds can be projected through the proposed development area.

Photo 3: Bedrock in stream bed southeast of Unit 6 (back edge of unit 6 located on slope in upper right of photo).

Photo 4: Seepage zone west of Unit 7; possibly be associated with infiltrating seepage upslope

Photo 5: **Unit 1**, pink stake is the back of the unit. Note boulder surficial soils. Seepage zone above terminates left of the photo.

Photo 6: **Unit 2**, looking northeast. Front of unit is pink stake in middle of photo. Note boulder soils. Upslope seepage terminates to left of upper left hand corner of photo.

Photo 7: Unit 3, looking east. Front of unit is left of tree in center of photo, back of unit is to the right.

Photo 8: Unit 4, looking east, pink stake is front of unit.

Photo 9: Unit 5, looking south. Located on ridge of till. Pink stake is front of unit. Slight sag to the right.

Photo 10: Unit 6, looking north. Pink stake is front of unit.

Photo 11: Unit 6, looking east. Pink stake is rear of unit. Bedrock outcrops along creek in right center of photo

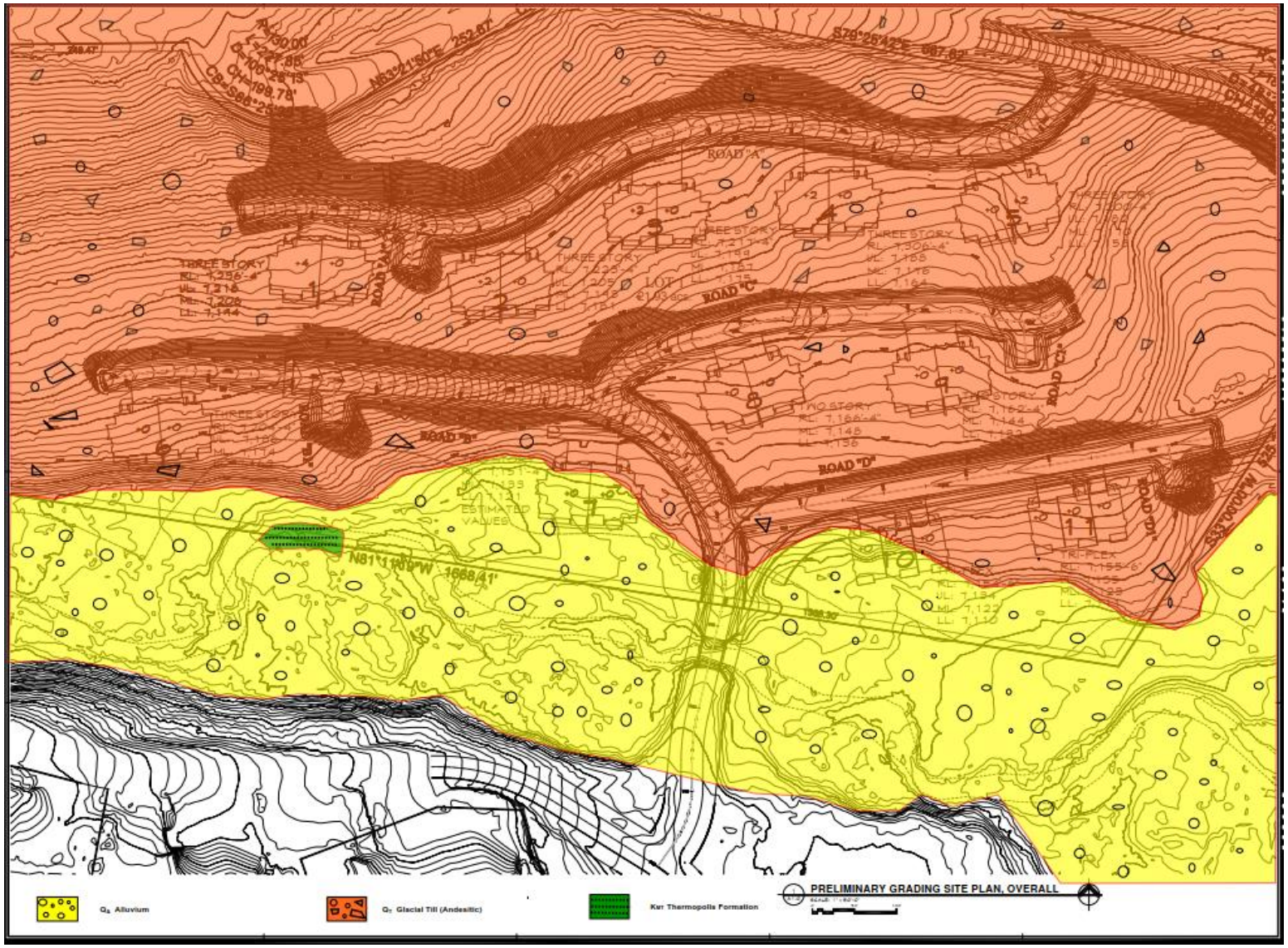
Photo 12: Unit 7, looking southwest. Front of unit is right center and rear extends across fence onto bottom land of stream. Seepage is located on other side of tree on right side of photo.

Photo 13: Unit 8, looking north. Pink stake is rear of unit. Very rocky soils.

Photo 14: Unit 9, looking northeast towards Unit 5. Pink stake is front of unit.

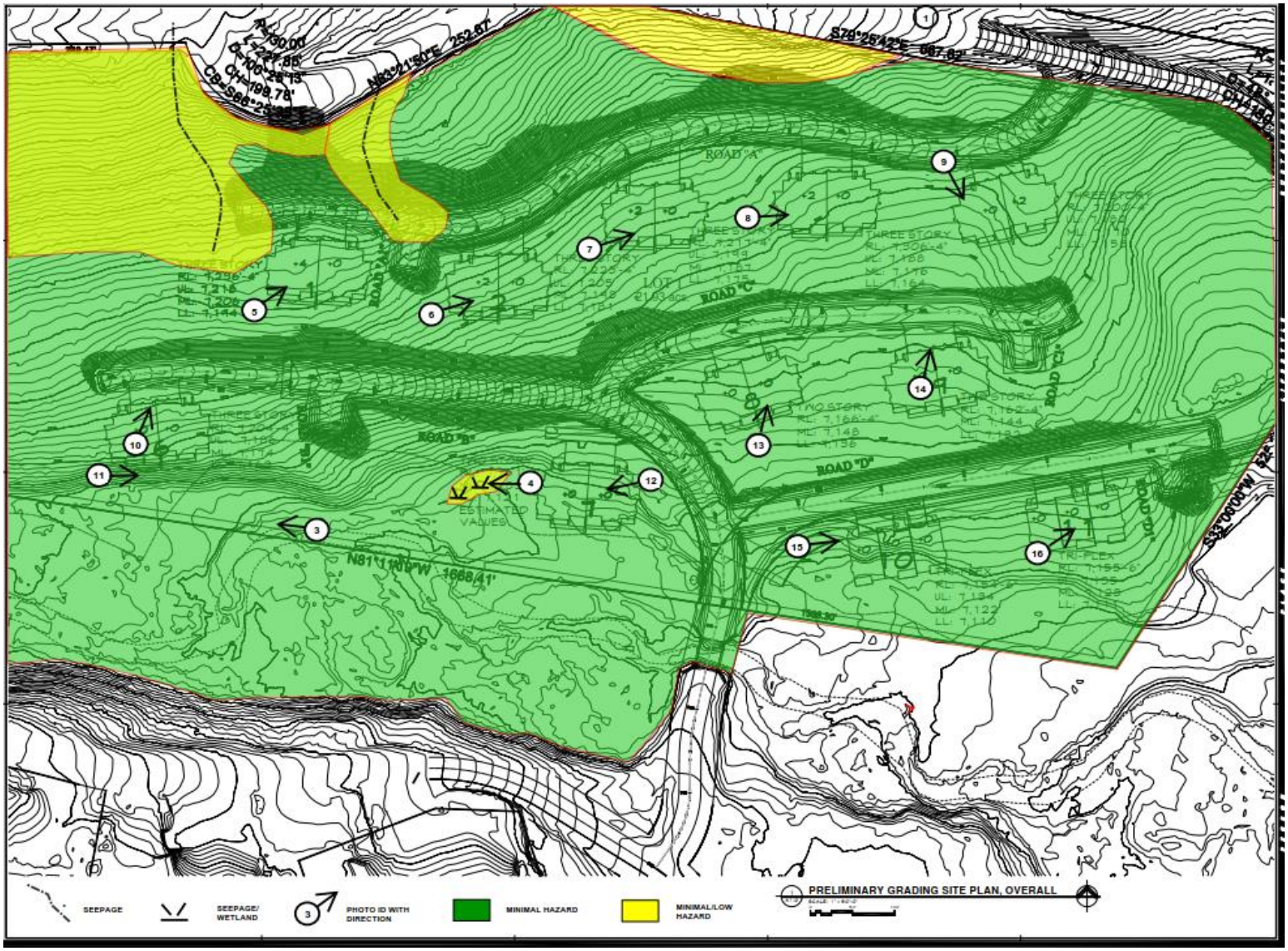
Photo 15: Unit 10, looking east. Front of unit is atop slope and rear is in the road.

Photo 16: Unit 11, looking east. Unit situated in flat area.



NO SCALE

Project Manager: GAQ	Project No. C4165018	Terracon	SURFICIAL GEOLOGY MAP
Drawn by: BWE	Scale: N.T.S.		THE CORRAL – YC DEVELOPMENT
Checked by: GAQ	File Name: --		BIG SKY, MONTANA
Approved by: GAQ	Date: 5/13/2016	1392 13th Ave. SW Great Falls, MT 59404 PH. (406) 453-5400 FAX. (406) 761-6655	Figure 1



NO SCALE

Project Manager: GAQ	Project No. C4165018	Terracon	GEOTECHNICAL HAZARD MAP
Drawn by: BWE	Scale: N.T.S.	1392 13th Ave. SW Great Falls, MT 59404	THE CORRAL – YC DEVELOPMENT
Checked by: GAQ	File Name: --	PH. (406) 453-5400 FAX. (406) 761-6655	BIG SKY, MONTANA
Approved by: GAQ	Date: 5/13/2016		Figure 2

Appendix J

After Recording Return To:

Crowley Fleck PLLP
Gina S. Sherman
P.O. Box 10969
Bozeman, MT 59719-0969

163298 RECORDS Pages: 16
STATE OF MONTANA MADISON COUNTY
RECORDED: 09/15/2015 10:30 KOI: EASEMENT
Peggy Kaatz Stemler CLERK AND RECORDER
FEE:$112.00 BY: Julia McKenzie, Deputy
TO: CROWLEY FLECK PO BOX 10969, BOZEMAN MT 59719

CC
pm

YELLOWSTONE MOUNTAIN CLUB SEVENTH RESTATED AND REVISED ROADWAY EASEMENT DECLARATION

Yellowstone Development, LLC and Yellowstone Mountain Club, LLC, each a Montana limited liability company, of P.O. Box 161097, Big Sky, MT, 59716, (collectively, "Declarant"), for the benefit of itself, its successors and assigns, and any successors in title to any real property described in this Yellowstone Mountain Club Seventh Restated and Revised Roadway Easement Declaration ("Seventh Easement"), declares, covenants and agrees as follows:

RECITALS

A. Declarant is the owner of real property known as the "Yellowstone Club" located in all or portions of Sections 31 and 32, Township 6 South, Range 3 East, Sections 35 and 36, Township 6 South, Range 2 East, Sections 5, 6, 7, 8, 17, 18 and 20, Township 7 South, Range 3 East, and Sections 1, 2, 3, 11 and 12, Township 7 South, Range 2 East, P.M.M., Madison County, Montana.

B. Access from public roads to various portions of the Yellowstone Club is by way of roadways (the "Primary Access Roads") that are private roads owned by Declarant as of the date of this Declaration. The Primary Access Roads are depicted on Exhibit A.

C. In addition to general access by use of the Primary Access Roads, certain other roads within the Yellowstone Club have been designated by Declarant as emergency access roads for use in the event of emergencies ("Emergency Access Roads"). The Emergency Access Roads are depicted on Exhibit B.

D. Declarant has created and intends to continue to create certain tracts of land or condominiums by subdivision pursuant to the provisions of the Montana Subdivision and Platting Act and the subdivision regulations of Madison County. These tracts of land or condominiums may be resold or otherwise conveyed to third parties.

E. Declarant desires to provide owners of tracts and condominiums created within Yellowstone Club with the use of the Primary Access Roads and Emergency Access Roads, subject to the terms and conditions of this Seventh Easement.

F. This Seventh Easement supersedes and replaces the Yellowstone Mountain Club Sixth Restated and Revised Roadway Easement Declaration recorded June 16, 2015 as Document No. 161720, records of Madison County, Montana.

TERMS AND CONDITIONS

1. **Grant of Easement.** Subject to the terms of this Seventh Easement, each owner of a tract of land or condominium within the Yellowstone Club ("Owner") shall have a perpetual non-exclusive easement, and except as specified below, will be a width of sixty (60) feet, to use the Primary Access Roads for general ingress and egress to and from the Owner's property by use of conventional motor vehicles. This right of access includes invitees of any Owner and all on-duty law enforcement, fire or other emergency personnel while performing their professional duties. Notwithstanding the foregoing, the road commonly known as Andesite Ridge Road shall have a width of seventy-five (75) feet, the roads commonly known as Preservation Way, Gatherers Way, Traverse Trail, South Cabin Road, North Cabin Road, and Backcountry Trail shall have a width of forty (40) feet, the road known as Union Drive shall have a width of fifty (50) feet.

2. **Use of Emergency Roads.** Subject to the terms of this Seventh Easement, each Owner shall have a perpetual non-exclusive easement, and except as specified on Exhibit B, will be a width of thirty (30) feet, to use the Emergency Access Roads for limited emergency ingress and egress to and from the Owner's property by use of conventional motor vehicles. This right of access includes invitees of any Owner and all on-duty law enforcement, fire or other emergency personnel while performing their professional duties. Use of the Emergency Access Roads shall be limited to those periods of time when the Primary Access Roads are inaccessible or unsafe due to fire, flooding, washout, traffic accident or other similar emergency, or during emergencies that might necessitate the use.

3. **Initiation of Easement Rights.** An Owner's easement rights under this Seventh Easement shall arise simultaneous with the vesting of title to a tract of land or condominium within the Yellowstone Club. The easement rights shall be an appurtenance that runs with the Owner's real property and any subsequent conveyance of real property shall include the easement rights regardless of whether such easement rights are specifically mentioned in an instrument of conveyance. Declarant further confirms that the easement rights contained in this Seventh Easement apply to each Owner of

property within the Yellowstone Club who acquired title to such property prior to the date of this Seventh Easement.

4. **Declarant's Retained Rights.** All easement rights granted by Declarant in this Seventh Easement shall be subservient to Declarant's rights as owner of the Primary Access Roads and Emergency Access Roads. Declarant retains the right to relocate, reconstruct, maintain, repair and grant additional easements over the Primary Access Roads and Emergency Access Roads so long as such activities do not materially interfere with an Owner's rights of access.

5. **Extent of Easement Rights.** Each Owner's easement rights are limited to the surface and do not include any subsurface rights or any other rights not associated with ingress and egress to a tract of real property or condominium unit owned by Owner within Yellowstone Club.

6. **Rules and Regulations.** Declarant reserves the right to promulgate and enforce any rules or regulations it deems necessary for the reasonable use of the Primary Access Roads and Emergency Access Roads by any and all Owners and invitees, including but not limited to traffic regulation, speed regulation, parking, height, size, and other vehicle regulation, and time use regulation as Declarant in its sole discretion deems appropriate. Such regulations may include the assessment of a prorated maintenance fee for the use, maintenance and repair of the Primary Access Roads and Emergency Access Roads. An Owner's use of the Primary Access Roads and Emergency Access Roads is further subject to any rights and restrictions set out in a declaration of covenants, conditions or restrictions or other rules or regulations pertaining to an Owner's ownership of property within the Yellowstone Club.

7. **Taxes and Maintenance.** Responsibility for the taxes, maintenance, repair and upkeep of the Primary Access Roads and Emergency Access Roads shall be governed by the Second Restated and Revised Declaration of Protective Covenants, Conditions and Restrictions for the Yellowstone Club Property recorded on August 19, 2010, as Document No. 137084, as amended by the First Amendment to Second Restated and Revised Declaration of Protective Covenants, Conditions and Restrictions for the Yellowstone Club Property recorded on April 10, 2013, as Document No. 150153, and as such may be amended or supplemented from time to time.

8. **Modifications.** Declarant reserves the right to amend, modify, or supplement this Seventh Easement, including but not limited to, the termination of road segments or designation of additional road segments, at any time by a written instrument recorded in Madison County or Gallatin County, Montana. Declarant further reserves the right to sell, donate, transfer or dedicate all or any portion of the Primary Access Roads and Emergency Access Roads to a private entity.

9. **Dedication.** In the event any portions of the Primary Access Roads or Emergency Access Roads are dedicated as public roads as a requirement by any

government entity, the terms of such dedication shall supersede this Seventh Easement to the extent they are inconsistent with this Seventh Easement.

10. **Binding Effect.** The burdens and benefits of this Declaration shall run with the land and inure to and be binding upon Declarant, each Owner, and their respective successors and assigns.

11. **Severance.** No Owner may sever the Owner's rights under this Declaration from the Owner's interest in a tract of land or condominium unit within the Yellowstone Club and, as to the Owner, the easement rights shall terminate at such time as the Owner no longer owns real property within the Yellowstone Club.

Dated: September 11, 2015

DECLARANT:

YELLOWSTONE DEVELOPMENT, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By: _____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

YELLOWSTONE MOUNTAIN CLUB, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By: _____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this 11th day of September, 2015, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Development, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: 8/10/18

MONICA L. COLLORONE
Notary Public
Massachusetts
Commission Expires Aug 10, 2018

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this 11th day of September, 2015, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Mountain Club, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: 8/10/18

MONICA L. COLLORONE
Notary Public
Massachusetts
Commission Expires Aug 10, 2018

EXHIBIT A

(attach Primary Access Road Map)

YELLOWSTONE MOUNTAIN CLUB

PRIMARY ACCESS EASEMENTS

LOCATED IN SECTIONS 35 AND 36, T6S, R2E, P.M.M, MADISON COUNTY, MONTANA

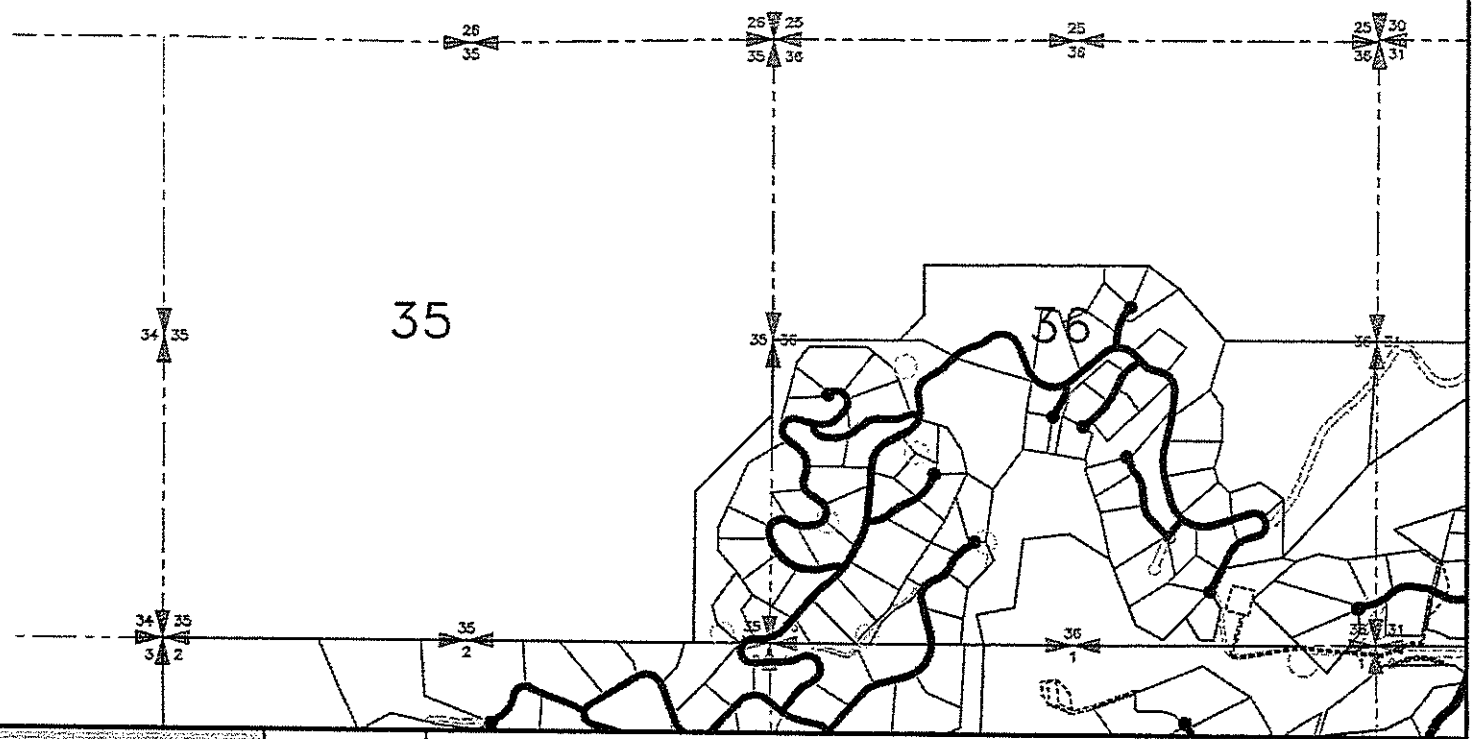
0 1500

(IN FEET)

MAGNETIC

LEGEND

PRIMARY ACCESS EASEMENTS



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE SUITE 1 BOZEMAN, MONTANA 59715

DRAWN BY: JLH
CHKD. BY: JLH
APPR. BY: JLH
DATE: 08/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB PRIMARY ACCESS EASEMENTS — MONTANA

PROJECT NO. 0001

EXHIBIT A

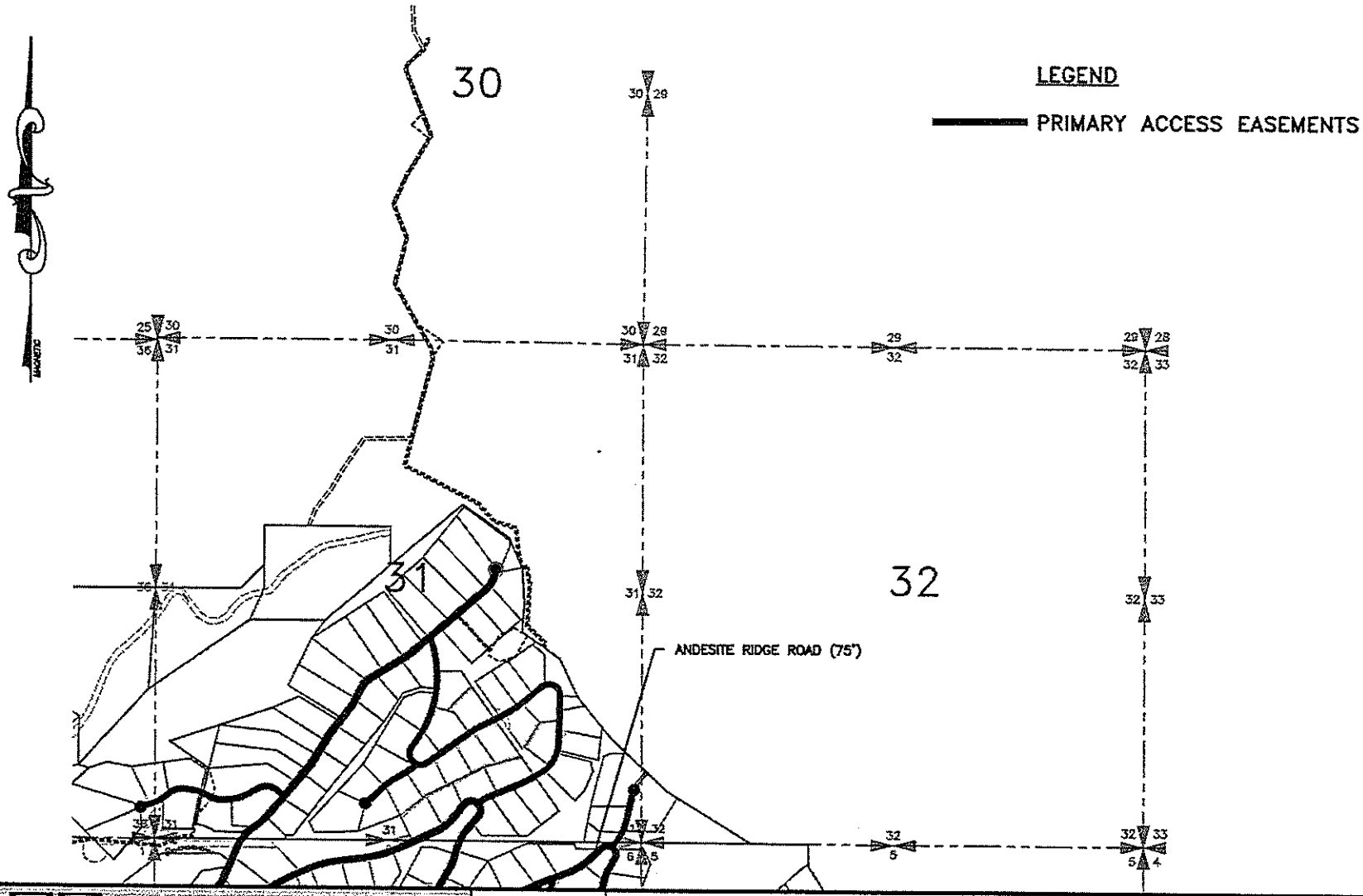
FIGURE NUMBER 1

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on Aug 21/2015

YELLOWSTONE MOUNTAIN CLUB

PRIMARY ACCESS EASEMENTS

LOCATED IN SECTIONS 31 AND 32, T6S, R3E, P.M.M, MADISON COUNTY, MONTANA



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C. 2015

DRAWN BY: JLH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 08/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB PRIMARY ACCESS EASEMENTS — MONTANA

EXHIBIT A

PROJECT NO. 0001

FIGURE NUMBER 2

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on Aug 21/2015

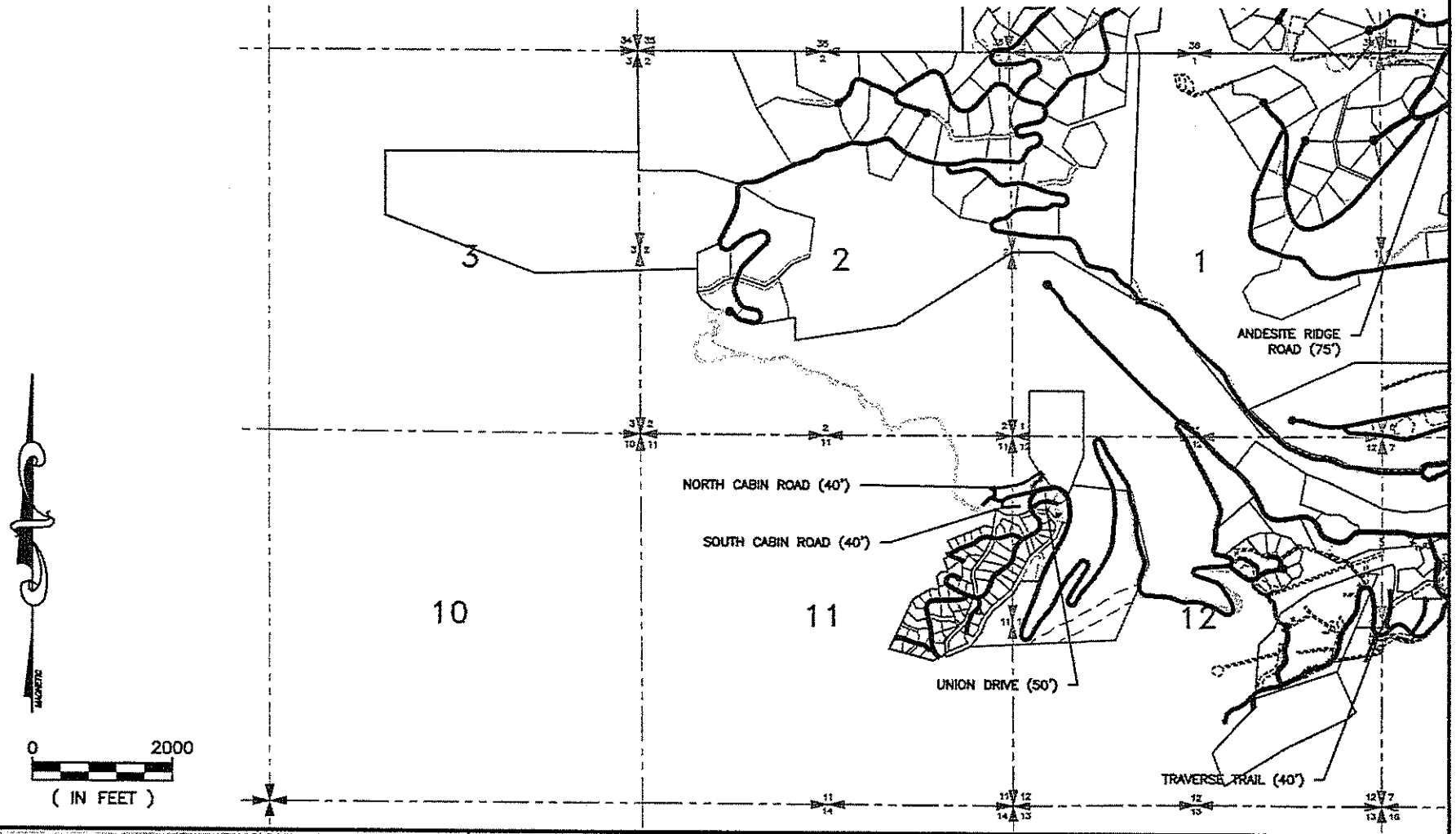
YELLOWSTONE MOUNTAIN CLUB

PRIMARY ACCESS EASEMENTS

LOCATED IN SECTIONS 1, 2, 3, 11, AND 12, T7S, R2E, P.M.M, MADISON COUNTY, MONTANA

LEGEND

PRIMARY ACCESS EASEMENTS



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2015

DRAWN BY: JLH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 08/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB PRIMARY ACCESS EASEMENTS — MONTANA

EXHIBIT A

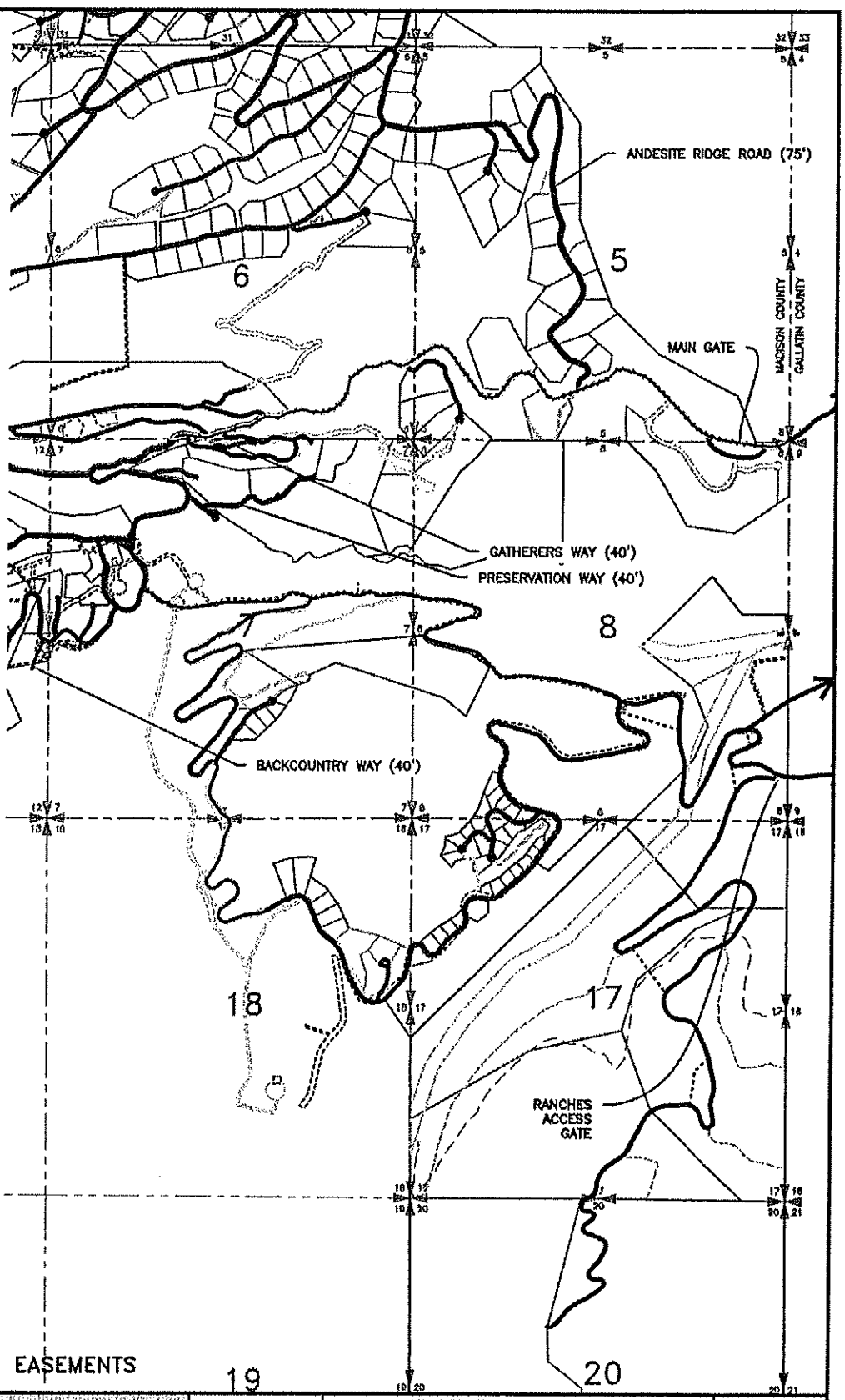
PROJECT NO. 0001

FIGURE NUMBER 3

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on Aug 21/2015

YELLOWSTONE MOUNTAIN CLUB

PRIMARY ACCESS EASEMENTS
LOCATED IN SECTIONS 5, 6, 7, 8, 17, 18 AND 20, T7S, R3E, P.M.M, MADISON COUNTY, MONTANA



0 2000
(IN FEET)

MAGNETIC

LEGEND

PRIMARY ACCESS EASEMENTS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 - BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2015

DRAWN BY: JLH
CHKD. BY: JLH
APPR. BY: JLH
DATE: 08/2015

YELLOWSTONE MOUNTAIN CLUB
PRIMARY ACCESS EASEMENTS
BIG SKY MONTANA

PROJECT NO. 0001

EXHIBIT A

FIGURE NUMBER 4

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on August 1/2015

EXHIBIT B

(attach Emergency Access Road Map)

YELLOWSTONE MOUNTAIN CLUB

EMERGENCY ACCESS EASEMENTS

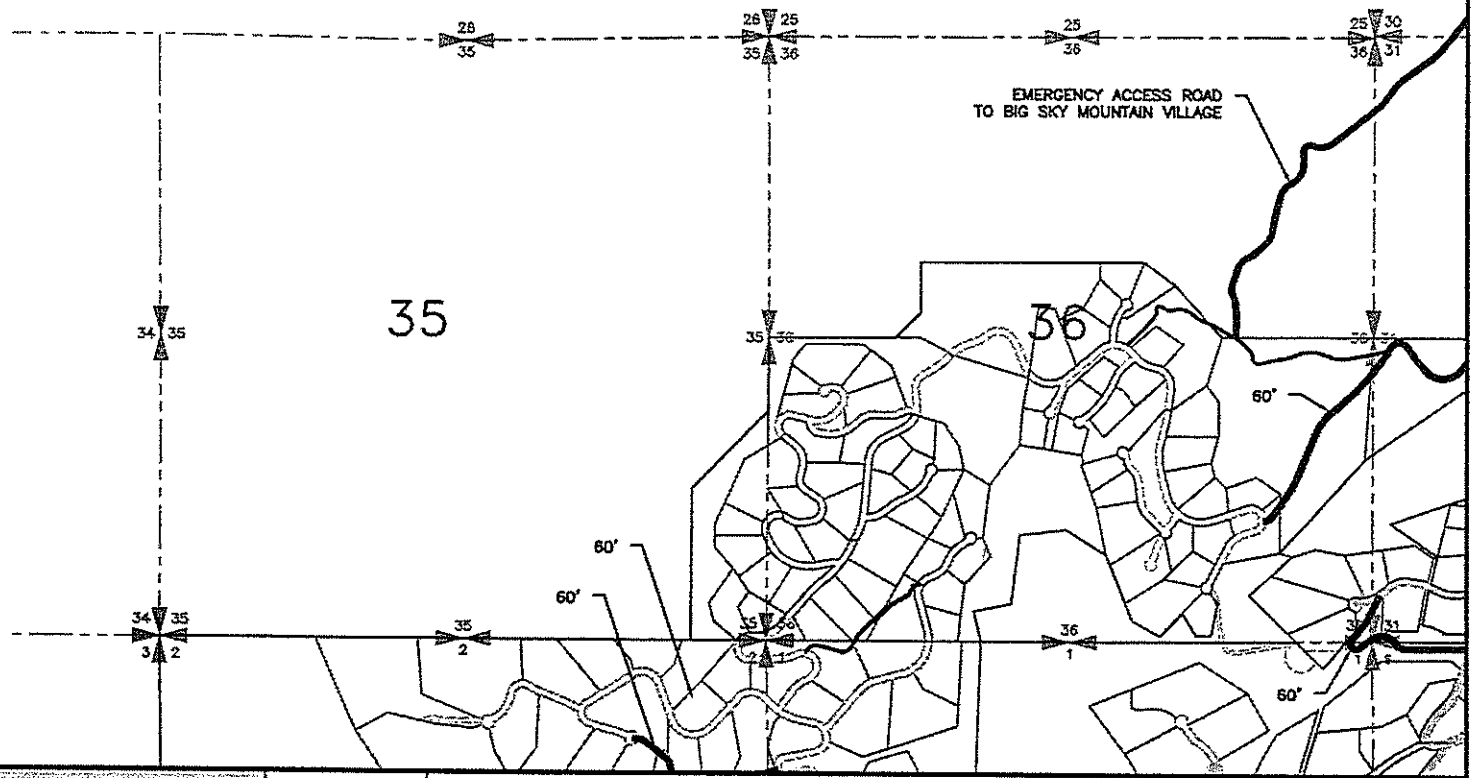
LOCATED IN SECTIONS SECTIONS 35 AND 36, T6S, R2E, P.M.M, MADISON COUNTY, MONTANA

0 1500

(IN FEET)

LEGEND

EMERGENCY ACCESS EASEMENTS



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C., 2015

DRAWN BY: JLH
CHKD. BY: JLH
APPR. BY: JLH
DATE: 08/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB EMERGENCY ACCESS EASEMENTS — MONTANA

EXHIBIT B

PROJECT NO. 0001

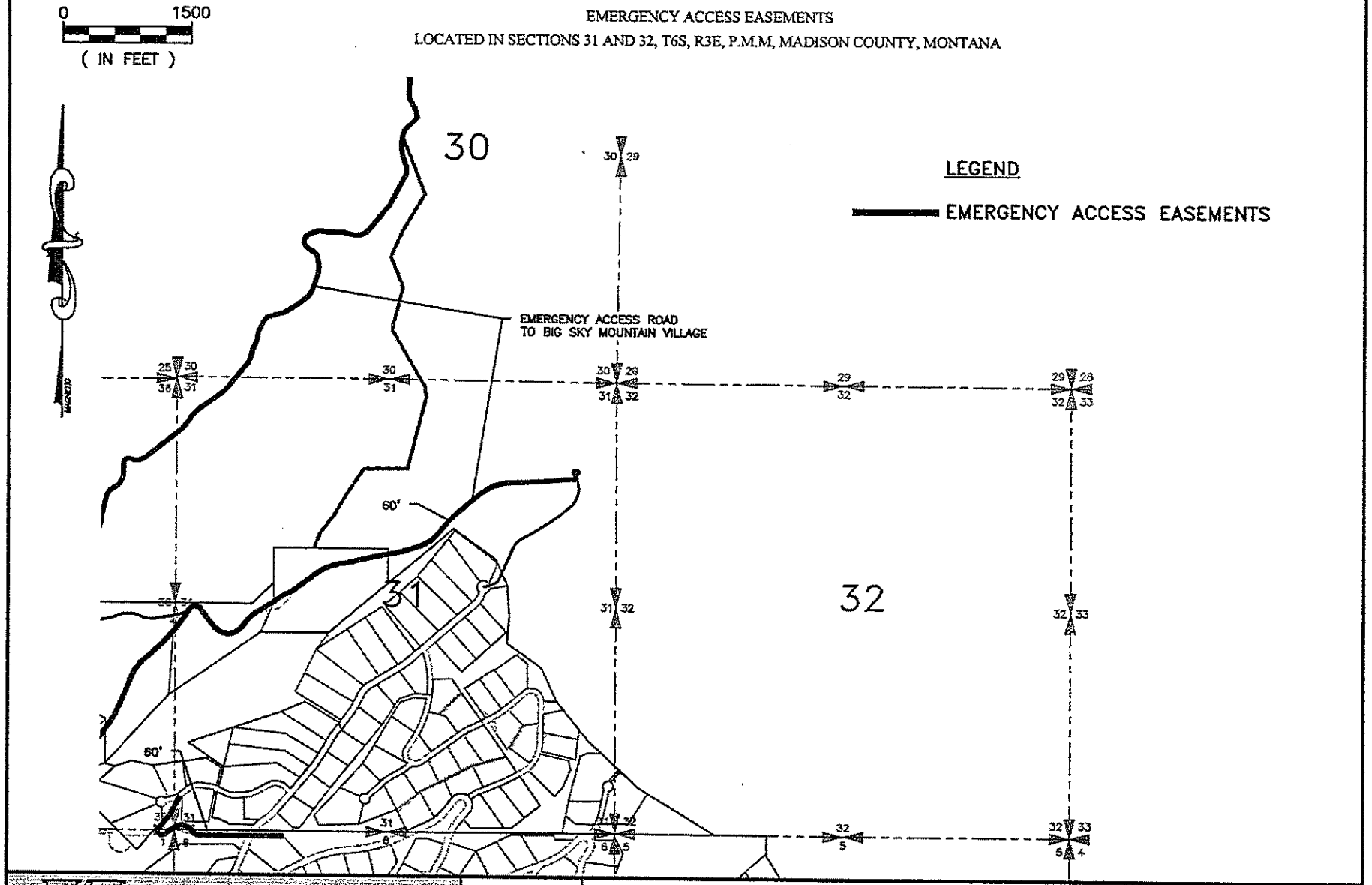
FIGURE NUMBER 1

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on August 21/2015

YELLOWSTONE MOUNTAIN CLUB

EMERGENCY ACCESS EASEMENTS

LOCATED IN SECTIONS 31 AND 32, T6S, R3E, P.M.M, MADISON COUNTY, MONTANA



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JLH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 08/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB EMERGENCY ACCESS EASEMENTS — MONTANA

EXHIBIT B

PROJECT NO. 0001

FIGURE NUMBER 2

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on Aug 21/2015

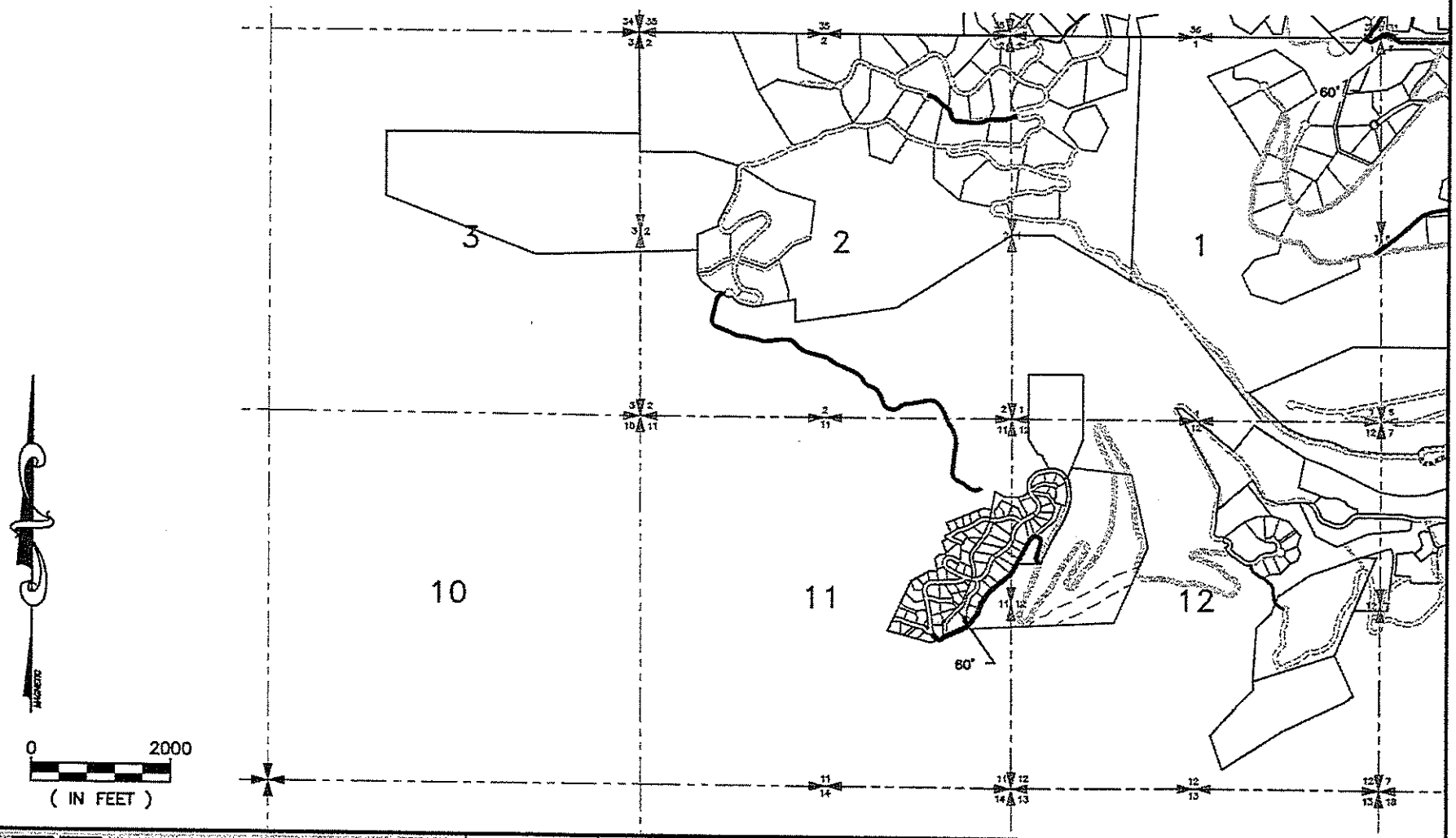
YELLOWSTONE MOUNTAIN CLUB

EMERGENCY ACCESS EASEMENTS

LOCATED IN SECTIONS 1, 2, 3, 11, AND 12 T7S, R2E P.M.M, MADISON COUNTY, MONTANA

LEGEND

EMERGENCY ACCESS EASEMENTS



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE SUITE 1 BOZEMAN MONTANA 59718

DRAWN BY: JLH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 08/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB EMERGENCY ACCESS EASEMENTS — MONTANA

EXHIBIT B

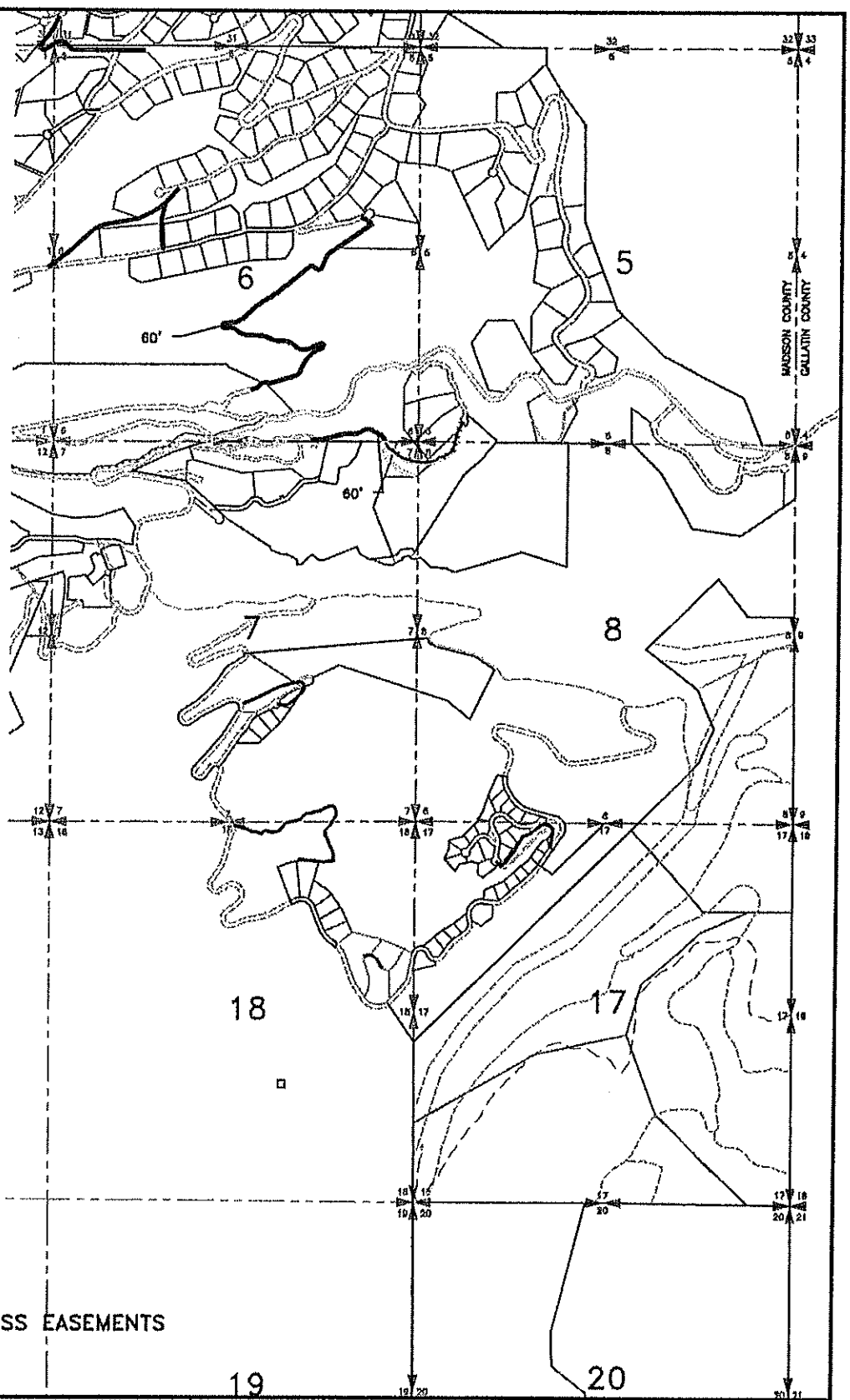
PROJECT NO. 0001

FIGURE NUMBER 3

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by justin on Aug 21/2015

YELLOWSTONE MOUNTAIN CLUB

EMERGENCY ACCESS EASEMENTS
LOCATED IN SECTIONS 5, 6, 7, 8, 17, 18 AND 20, T7S, R3E, P.M.M, MADISON COUNTY, MONTANA



0 2000
(IN FEET)

MAGNETIC

LEGEND

EMERGENCY ACCESS EASEMENTS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2015

DRAWN BY: JLH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 08/2015

YELLOWSTONE MOUNTAIN CLUB
EMERGENCY ACCESS EASEMENTS
BIG SKY MONTANA

PROJECT NO. 0001

EXHIBIT B

FIGURE NUMBER 4

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Access Road Easement Exhibits.dwg Plotted by Justin on Aug 21/2015

Return To:
Crowley Fleck PLLP
Gina Sherman
1915 South 19th Avenue
Bozeman, MT 59718

163299 RECORDS Pages: 9
STATE OF MONTANA MADISON COUNTY
RECORDED: 09/15/2015 10:30 KOI: EASEMENT
Peggy Kaatz Stemler CLERK AND RECORDER
FEE: $63.00 BY: Paula McKenzie, Deputy
TO: CROWLEY FLECK PO BOX 10969, BOZEMAN MT 59719

CC
pm

UTILITY EASEMENT
for
YELLOWSTONE CLUB

Yellowstone Development, LLC and Yellowstone Mountain Club, LLC, of P.O. Box 161097, Big Sky, MT, 59716 ("Declarant"), for the benefit of itself, its successors and assigns, and any successors in title to any real property described in this Utility Easement for Yellowstone Club ("Utility Easement") declares, covenants and agrees as follows:

RECITALS

A. Declarant is the owner of real property known as the "Yellowstone Club" located in all or portions of Sections 31 and 32, Township 6 South, Range 3 East, Sections 35 and 36, Township 6 South, Range 2 East, Sections 5, 6, 7, 8, 17, 18 and 20, Township 7 South, Range 3 East, and Sections 1, 2, 3, 11 and 12, Township 7 South, Range 2 East, P.M.M., Madison County, Montana ("Declarant Property").

B. The real property within the Declarant Property is served by utility easements located on the Declarant Property.

C. Declarant desires to document the utility easements located on the Declarant Property and serving subdivisions.

NOW, therefore, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties to this Utility Easement hereby agree as follows:

1. Grant of Easement. Subject to the terms of this Utility Easement, Declarant grants to each owner of a tract of land within the Declarant Property ("Owners"), and such Owners' successors and assigns, a non-exclusive, perpetual utility easement, which utility easement shall have the width and location shown on Exhibit A ("Utility Easement"). The Utility Easement is granted for the benefit of the Owners and is the dominant estate.

2. Purpose and Scope of Easement. The Utility Easement shall be for the benefit of the Owners. The Declarant will install the initial utilities within the Utility Easement and to

the extent Declarant does not maintain such utilities, the Owners shall have the right to enter upon the Utility Easement for the purpose of maintaining, repairing and replacing such utilities.

3. **Retained Rights.** Notwithstanding anything to the contrary herein, Declarant retains the right to relocate the Utility Easement, reconstruct, maintain, and repair utilities and grant additional easements on the Utility Easement, and connect to and extend any utilities installed within the Utility Easement.

4. **Indemnity.** The Owners shall indemnify and hold harmless Declarant from any and all liability arising out of or relating to the Owners' use of the Utility Easement or violation of any of the terms of the Utility Easement.

5. **Run with the Land.** The Utility Easement shall run with the land, shall be a perpetual easement, and shall be binding on the Declarant's and Owners' successors and assigns.

6. **No Public Access.** Nothing contained in this Utility Easement shall be construed to grant easement rights to the general public.

7. **Compliance with Laws.** While utilizing the Utility Easement, Owners shall fully comply with all laws, rules, regulations and ordinances, including but not limited to all environmental laws, rules, regulations and ordinances of all federal, state and local governments.

8. **Attorney Fees.** In the event of any breach of individual obligations set forth in this Utility Easement, or any litigation arising hereunder, the prevailing party shall be entitled to recover reasonable attorney fees and costs. If attorney's fees are so incurred, an action may be brought solely for the purposes of recovering the same.

9. **Miscellaneous.** This Utility Easement shall be governed by the Laws of the State of Montana and constitutes the entire agreement and understanding of the parties with respect to the matters contained herein. This Utility Easement may not be modified or amended except by written agreement of the parties, and shall be binding upon the successors or assigns of the parties hereto. No waiver shall be deemed to be a further or continuing waiver of any condition or breach. If any term of this Utility Easement is found to be void or invalid, such invalidity shall not affect the remaining terms of this Utility Easement, which shall continue in full force and effect. This Utility Easement may be executed in one or more counterparts, which taken together shall constitute one and the same document.

DECLARANT:

YELLOWSTONE DEVELOPMENT, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By: _____
Name: Matthew E. Kidd
Title: Principal

YELLOWSTONE MOUNTAIN CLUB, LLC, a Montana limited liability company

By: YC Holdings LLC, a Delaware limited liability company, its sole member

By: CH YC Manager LLC, a Delaware limited liability company, its sole manager

By: _____
Name: Matthew E. Kidd
Title: Principal

STATE OF MONTANA)
:ss
COUNTY OF Gallatin)

This instrument was acknowledged before me on September 14th, 2015, by Matthew E. Kidd, as Principal of CH YC Manager LLC, a Delaware limited liability company, sole manager of YC Holdings LLC, a Delaware limited liability company, sole member of Yellowstone Development, LLC, a Montana limited liability company.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal the day and year first above written.

GENEVIEVE S SHERMAN
Notary Public
for the State of Montana
Residing at:
Bozeman, Montana
My Commission Expires:
June 16, 2018

GENEVIEVE S SHERMAN NOTARIAL SEAL STATE OF MONTANA

Genevieve S. Sherman
_____ (printed name)
Notary Public for the State of Montana
Residing at _____, Montana
My commission expires: _____

STATE OF MONTANA)
:ss
COUNTY OF Gallatin)

This instrument was acknowledged before me on September 14th, 2015, by Matthew E. Kidd, as Principal of CH YC Manager LLC, a Delaware limited liability company, sole manager of YC Holdings LLC, a Delaware limited liability company, sole member of Yellowstone Mountain Club, LLC, a Montana limited liability company.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal the day and year first above written.

Genevieve S. Sherman
_____ (printed name)
Notary Public for the State of Montana
Residing at _____, Montana
My commission expires: _____

GENEVIEVE S SHERMAN
Notary Public
for the State of Montana
Residing at:
Bozeman, Montana
My Commission Expires:
June 16, 2018

GENEVIEVE S SHERMAN NOTARIAL SEAL STATE OF MONTANA

EXHIBIT A

(see attached)

YELLOWSTONE MOUNTAIN CLUB

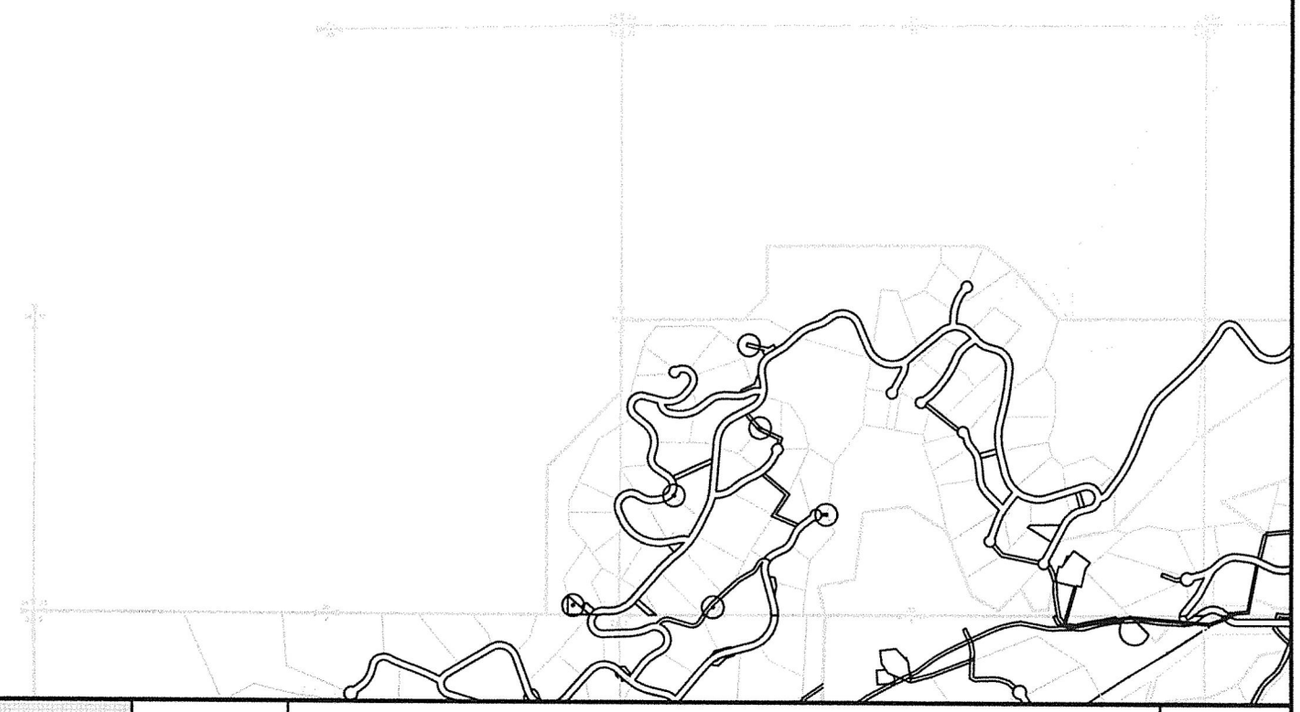
UTILITY EASEMENTS

LOCATED IN SECTIONS 35 AND 36, T6S, R2E, P.M.M, MADISON COUNTY, MONTANA

0 1500

(IN FEET)

MAGNETIC



HOUSER ENGINEERING P.C.

626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2015

DRAWN BY: JLH

CHK'D. BY: JLH

APPR. BY: JLH

DATE: 06/2015

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Utility Easement Exhibit.dwg Plotted by justin on Aug/21/2015

YELLOWSTONE MOUNTAIN CLUB
UTILITY EASEMENTS

BIG SKY MONTANA

EXHIBIT A

PROJECT NO. 0001

FIGURE NUMBER 1

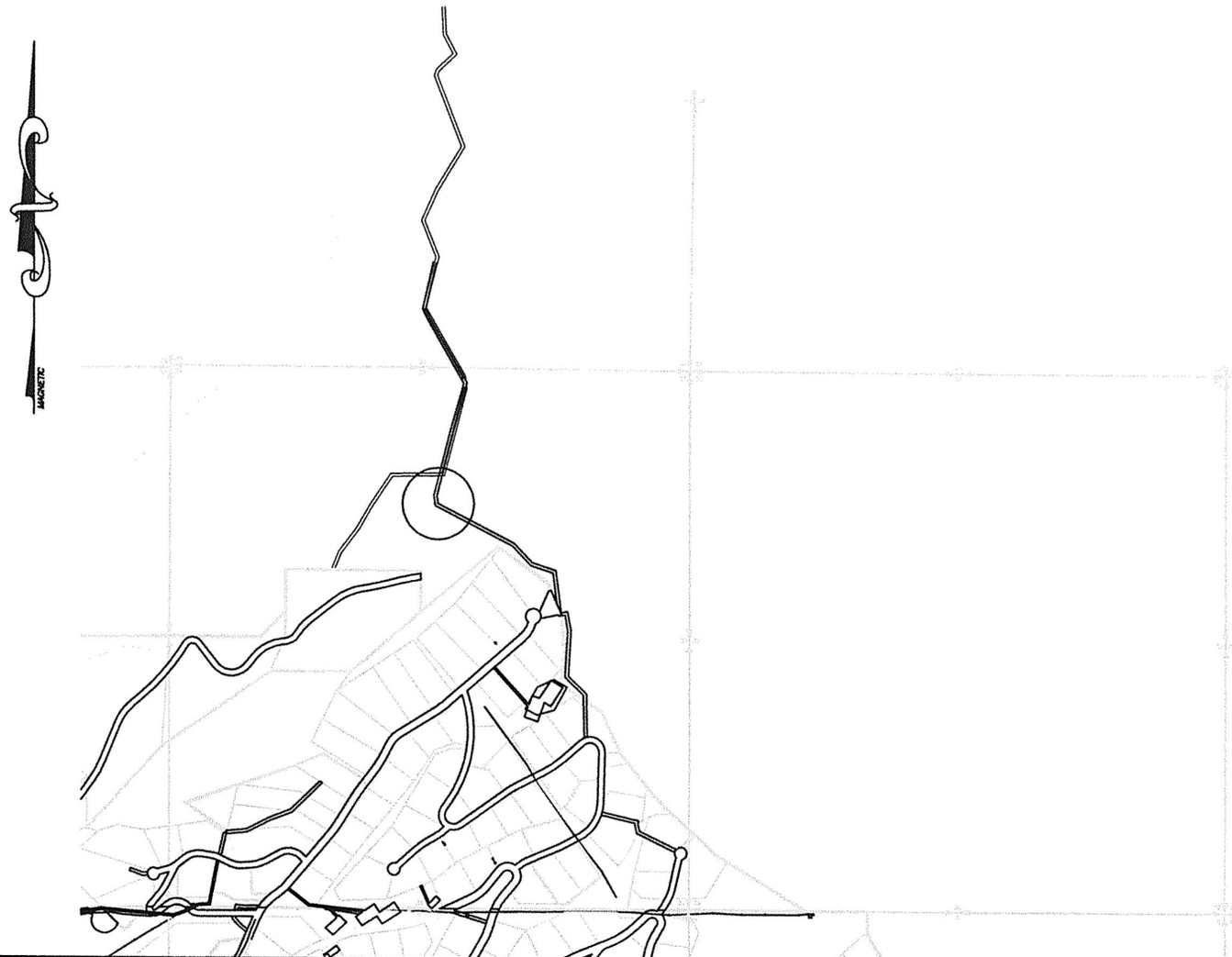
YELLOWSTONE MOUNTAIN CLUB

UTILITY EASEMENTS

LOCATED IN SECTIONS 31 AND 32, T6S, R3E, P.M.M, MADISON COUNTY, MONTANA

0 1500

(IN FEET)



HOUSER ENGINEERING P.C.

626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2015

DRAWN BY: JLH

CHK'D. BY: JLH

APPR. BY: JLH

DATE: 06/2015

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Utility Easement Exhibit.dwg Plotted by justin on Aug/21/2015

BIG SKY

YELLOWSTONE MOUNTAIN CLUB
UTILITY EASEMENTS

MONTANA

EXHIBIT A

PROJECT NO. 0001

FIGURE NUMBER 2

YELLOWSTONE MOUNTAIN CLUB

UTILITY EASEMENTS

LOCATED IN SECTIONS 1, 2, 3, 11, AND 12, T7S, R2E, P.M.M, MADISON COUNTY, MONTANA

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C., 2015

DRAWN BY: JLH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2015

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Utility Easement Exhibit.dwg Plotted by justin on Aug/21/2015

BIG SKY — YELLOWSTONE MOUNTAIN CLUB UTILITY EASEMENTS — MONTANA

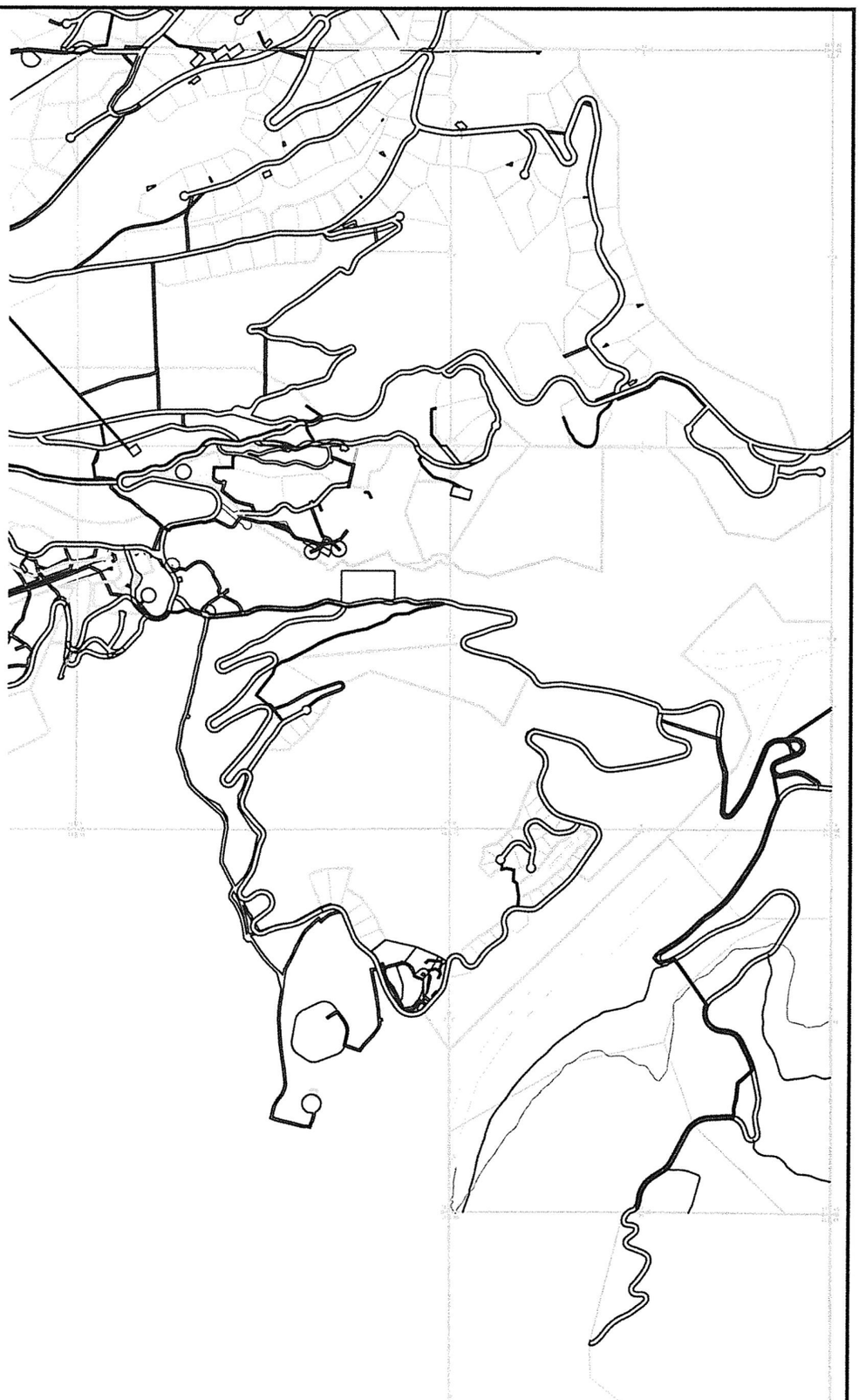
EXHIBIT A

PROJECT NO. 0001

FIGURE NUMBER 3

YELLOWSTONE MOUNTAIN CLUB

UTILITY EASEMENTS
LOCATED IN SECTIONS 5, 6, 7, 8, 17, 18 AND 20, T7S, R3E, P.M.M, MADISON COUNTY, MONTANA



0 2000
(IN FEET)

MAGNETIC

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2015

C:\Users\Justin\Documents\Dropbox\Server\0001\Master Files\Master Drawings\Utility Easement Exhibit.dwg Plotted by justin on Aug/21/2015

DRAWN BY: JLH CHK'D. BY: JLH APPR. BY: JLH DATE: 06/2015	YELLOWSTONE MOUNTAIN CLUB UTILITY EASEMENTS BIG SKY MONTANA	PROJECT NO. 0001	
	EXHIBIT A	FIGURE NUMBER 4	

Appendix K

SEISMIC DESIGN CATEGORIES
FOR YELLOWSTONE MOUNTAIN CLUB, MT
IBC 2006 / ASCE 7-05

OCCUPANCY CATEGORY = II (I,II,III,IV)

SOIL SITE CLASS	S_{MS}	S_{M1}	S_{DS}	S_{D1}	SEISMIC DESIGN CATEGORY[1] TABLE 1616.3(1)	SEISMIC DESIGN CATEGORY[1] TABLE 16.16.3(2)
A	0.804	0.259	0.536	0.173	D	C
B	1.005	0.323	0.670	0.215	D	D
C	1.005	0.478	0.670	0.319	D	D
D	1.103	0.567	0.735	0.378	D	D
E	0.904	0.875	0.603	0.583	D	D

1. Assign the most severe seismic design category.

2. Occupancy Category I, II, or III structures located where the mapped spectral reponse acceleration parameter at 1-second period, S_1, is equal to or greater than 0.75g shall be assigned to Seismic Design Category E, and Occupancy Category IV structures located on such sites shall be assigned to Seismic Design Category F.

Appendix L

ROAD DESIGN REPORT
FOR
THE CORRAL PUD
AT
YELLOWSTONE MOUNTAIN CLUB

November 2016

Prepared by:

HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

INTRODUCTION

The information presented in this report summarizes the basis of design for the proposed roadway improvements associated with the Corral Subdivision within the Yellowstone Mountain Club in Big Sky, Montana. The methodology and design criteria utilized in this report are based on the standards found in the following references:

1. American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets, 2004* and *Guidelines for Design of Very Low-Volume Local Roads (ADT<400), 2001*
2. Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition*
3. *Madison County Subdivision Regulations, April 2015*

Recommendations made in this report are based on these standards and the professional judgment of the author.

PROPOSED DEVELOPMENT

The Corral Subdivision is located on an un-platted tract of land within the northeast ¼ of Section 12, Township 7 South, Range 2 East and northwest ¼ of Section 7, Township 7 South, Range 3 East, in Madison County, Montana. It is approximately nine miles west of US Highway 191 (US 191) and 2.5 miles south of Lone Mountain. The proposed development consists of approximately 21.93 acres (developed), and contains 10 duplexes and 2 triplexes, for a total of 26 residential condominiums.

Access to the Corral Subdivision is provided by four proposed roads within the Yellowstone Mountain Club that eventually access Montana Highway 64 (MT 64). These roads, which have not yet been named but are referred to as Roads A through D, access Montana Highway 64 via Ousel Falls Road, Yellowstone Mountain Club Trail and American Spirit Road.

Roads within The Corral generally meet the standards set forth in the Madison County Subdivision Regulations for high density mountainous roads. There are two design elements of the roads that are not consistent with the Madison County Subdivision Regulations, those are the width of Roads A and C, and the length of the equivalent cul-de-sac for Roads A-D. Roads A and C have been classified as low density, even though there are more than 5 residences being served. The nature of the homes being recreational, part time residences suggests a lower traffic volume than a standard residence. AASHTO assumes a recreational home consists of 3.6 ADT, while a single family residence in a non-resort setting has between 8 and 10 ADT.

The equivalent length of these roads (as measured from a looped road, such as American Spirit Road and Yellowstone Mountain Club Trail) are between 928 and 1330 feet. Madison County Subdivision regulations state that for high density mountainous terrain, cul de sac lengths may not exceed 1,000 feet for roads servicing 5 or less dwellings, or 750 feet for roads servicing 6 dwellings or more. Similar to the argument above, the lower traffic volumes as a result of recreational homes (versus full time residences) supports the longer cul-de-sac length. A

Madison County Variance Application Form is enclosed in Appendix 7 of the subdivision application for each of these variances.

As part of the larger improvement goals within the Yellowstone Mountain Club's base area, Yellowstone Mountain Club Trail will be re-routed around Camp Yellowstone Mountain Club, through the meadows to the southeast, and connect with East Golf Course Road. The existing portion of Yellowstone Mountain Club Trail that goes through The Corral will be terminated, and the roads proposed herein will be constructed. This change to the roadways will result in the traffic from Roads B through D to be routed to American Spirit Road, while the proposed Road A will intersect to Yellowstone Mountain Club Trail.

DESIGN METHODOLOGY

Traffic Volumes

Trip Generation

In order to design the proposed roadways serving the subdivision, it is necessary to make an estimate of the volume of traffic that will be generated. Since the facilities within the subdivision do not currently exist, traffic counts would do little to estimate traffic. The Yellowstone Club is a private club that is very unique in nature. A traffic study is not prudent due to a lack of similar land uses that are representative of this development. Due to the lack of measured data and unique nature of this development, traffic volumes were assumed utilizing the ITE's *Trip Generation, 9th Edition* for Land Use Code 260 (Recreational Homes). Other land use codes were examined to determine applicability to this development; however this land use classification seems to be the most fitting and most encompassing of the future use of the roadways.

It should be noted that the traffic volumes found in the ITE reference assumed publically accessed facilities. This is not the case with this subdivision as it is limited to the Yellowstone Club members, their guests, and the employees only. While the data found in the ITE reference is assumed for the design of the roads, it should also be understood that the traffic volumes experienced will likely be much less than that provided in this report.

Estimated Volumes: Recreational Homes

Land Use Code 260-Recreational Homes has been assumed for the homes located within the Corral Subdivision. There are two methods of quantifying the traffic found within this reference; those being 1.) based on the number of dwelling units, and 2.) based on the number of acres. The sample set for the number of acres approach only included two data points ranging from 1800 acres to almost 3400 acres. This project consists of 26 dwellings within 12 structures found on 21.93 acres. For this reason, dwelling units was the preferred method of estimating traffic generation. It should be noted that this method also has a low sample size, but seemed to be a similar case to what is anticipated within this development. As stated earlier, properties within the Yellowstone Club are very unique and undergoing development currently, so traffic studies would not be a feasible method for estimating traffic generation. The values listed in above are expected to be conservative or higher than expected, therefore use of these values assumes a more conservative approach to traffic generation.

Regression equations were not provided for this Land Use. As a result, the weighted average has been used. There are 2 studies completed for daily traffic volumes, and 8 for peak hourly traffic volumes. The average traffic volumes have been provided in the spreadsheet found at the end of this document.

Roadways

Functional Classification
Each of the proposed roads serving the Corral Subdivision will be classified as Rural Local Roads based on primarily providing access from a collector (Yellowstone Mountain Club Trail and American Spirit Road) to land adjacent to the collector network. All roads within and directly servicing this subdivision will be used by members and employees of the Yellowstone Club, who are familiar with the road.

Design Speed
The design speed of the roadway is an important consideration that determines many other design features such as sight distance, curve radii, and roadside safety among others. Within the Yellowstone Mountain Club, the posted speed *limit* is 25 miles per hour (mph), however there are several areas within the Yellowstone Club that have speed limits of 20 mph.

The proposed roads within the Corral are located in a relatively congested area with parking being close to the streets. While these roads have a low traffic volume, the curvy nature and off street parking correlate to a lower speed limit. For these reasons, a 20 mph speed limit is recommended on these roads.

It is not expected that a substantial portion of subdivisions' traffic will consist of truck or recreation vehicle traffic on a long term basis; however construction of the buildings within the subdivision will require significant heavy truck traffic for a relatively short period of time.

Sight Distance
Providing adequate sight distance is necessary to allow drivers to safely stop their vehicle or to make the necessary maneuvers to avoid collisions with obstacles or fixed objects. The determining factors for sight distance are the design speed, driver's eye height, and the height of the object in the roadway or path of the vehicle. At the chosen design speed of 20 mph, the AASHTO recommended minimum design stopping sight distance is 115 feet. The Madison County Subdivision Regulations recommend a minimum sight distance of 240 feet, which has been assumed. The minimum values for the rate of vertical curvature, K (which is the length, L, of the vertical curve divided by the algebraic grade difference, A, of the intersecting grades), are 7 and 17 for crest and sag vertical curves, respectively. The enclosed construction plans incorporate these values into the road design.

Geometric Design
Grades
Depending on design speed and terrain considerations, maximum grades are specified to provide for safe travel and the operating characteristics of vehicles. For a design speed of 20 mph in

mountainous terrain, the recommended maximum grade for a rural local road is 16%, however due to winter driving conditions, a maximum design grade of 10% is assumed.

Cross Slopes
Proper drainage is a key consideration in determining the design roadway cross slope. For a paved roadway with smooth riding qualities, the roadway cross slope is usually between 1.5% and 2%. The roadways in this subdivision have been designed with a cross slope of 2%.

Superelevation
AASHTO's *A Policy on Geometric Design of Highways and Streets, 2004* provides a recommended maximum super-elevation rate of 8% in these types of areas with paved roadways. However, due to the winter driving conditions, a maximum of 4% is assumed for the roadways within this subdivision.

Width of Traveled Way, Shoulder, and Roadway
The needed width of traveled way is determined by the number of travel lanes, design speeds, traffic volumes, and the functional classification of the roadway. In most cases, it is desirable to have an adequate shoulder width for vehicles to be at least one foot (1 foot) away from the edge of the traveled way when stopped. However, when terrain conditions do not make this possible or when traffic volumes do not justify wider shoulders, a minimum shoulder width of two feet (2 ft.) should be provided. For this subdivision, a minimum 22 foot wide traveled way has been assumed, with a 1 foot wide shoulder on either side of a 20 foot wide asphalt surface. There is a portion of each road that has parking located on the side of the roads. Parking spaces along the roads, whether parallel parking or perpendicular to the roadways, are 10 feet wide and 22 feet long.

Foreslopes
Primary considerations in determining the appropriate foreslope from the edge of the shoulder include the stability of site soils, terrain and right-of-way constraints, and the safety of vehicles that leave the traveled way. Due to the mountainous environment, steep side slopes are required in order to minimize disturbance. A maximum foreslope of 2:1 (Horizontal: Vertical) has been assumed.

Roadside Safety
For vehicles that may leave the traveled way, it is important to provide a recovery area that is free from obstacles or other fixed objects that could potentially cause significant damage to those vehicles or injury to a driver and his or her passengers. It has been assumed that a minimum clear zone of 7 to 10 feet be provided from the edge of the traveled way that is free from obstructions or other fixed objects.

Erosion Control
In an effort to control the discharge of pollutants (which includes sediment runoff) to adjacent sites, ditches, streams, or waters of the United States, the State of Montana requires that measures be taken both during and after construction to control erosion. Additionally, erosion control can limit the potential for roadway damage due to storm water runoff, snow melt runoff, or even wind erosion in some cases. Proper measures should be incorporated during construction

for the control of soil erosion, dust, construction debris, and the preservation of existing vegetation not within the limits of construction. Following construction, measures such as seeding, mulching, or other protective measures should be completed to insure continued erosion protection. A construction storm water permit has been prepared and will be implemented for this project.

Traffic Control

The placement of roadway signing within this subdivision should be done in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD) published by the United States Federal Highway Administration, standards as adopted by the Montana Department of Transportation (MDT), and Madison County standards where appropriate. The MUTCD presents the minimum standards for the placement of traffic control devices and insures the uniform usage of traffic control devices nationwide; providing signage or devices that are visible, easily recognized and understood, and that their usage is necessary. Signage for this subdivision has been designed in accordance with the MUTCD, and is included on the construction plans.

CONCLUSIONS

The roadways within the Corral Subdivision are designed in accordance with the criteria outlined in this report and applicable standards. These roads will function efficiently and provide for the safe movement of vehicles.

REFERENCES

1. American Association of State and Highway Transportation Officials. (2004). A Policy on the Geometric Design of Highways and Streets. Fifth Edition. Washington, DC: Author.

2. American Association of State and Highway Transportation Officials. (2001). Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT$400). Washington, DC: Author.

3. Gallatin County. *July* 1996). Gallatin Canyon/Big Sky Capital Improvements Policy. Bozeman,
MT: Author.

4. Institute of Transportation Engineers. (2003). Trip Generation. 7''' Edition. Washington, DC: Author.

5. Madison County. (April 2015). Madison County Subdivision Regulations. Virginia City, MT: Author.

6. Montana Department of Transportation. June 2006). Road Design Manual. Helena, MT: Author.

7. Montana Department of Transportation. July 1999). Traffic Engineering Manual. Helena, MT: Author.

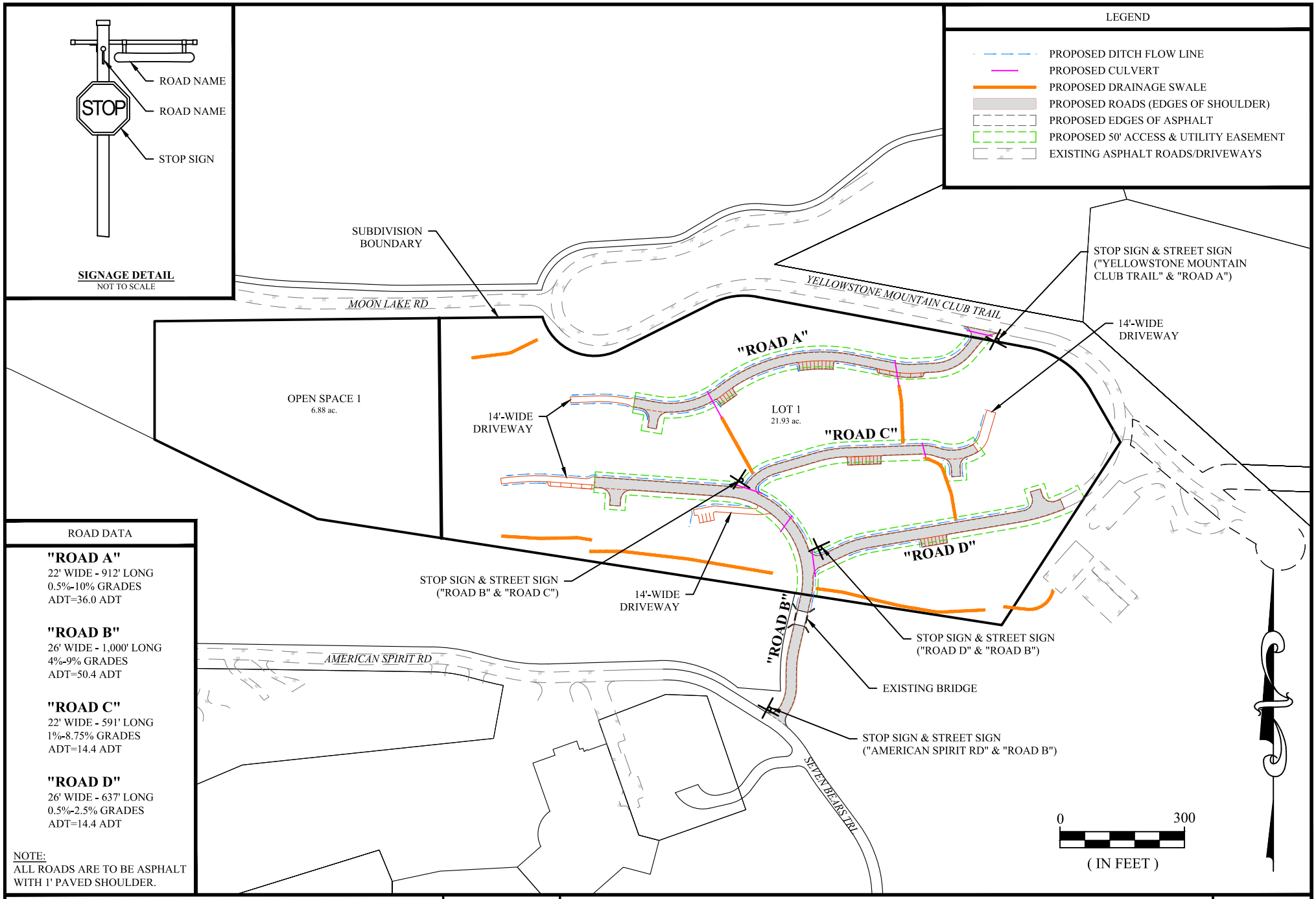
8. Stover, Vergil G. and Frank K. Koepke. (2002). Transportation and Land Development. 2nd Edition. Washington, DC: Institute of Transportation Engineers.

9. Transportation Research Board. (2000). Highway Capacity Manual 2000. Washington, DC: Author.

10. United States Department of Transportation, Federal Highway Administration. (November 2004). Manual on Uniform Traffic Control Devices. 2003 Edition with Revision Number 1 Incorporated. Washington, DC: Author.

APPENDIX A

GEOMETRIC DESIGN CRITERIA



ROAD DATA

"ROAD A"
22' WIDE - 912' LONG
0.5%-10% GRADES
ADT=36.0 ADT

"ROAD B"
26' WIDE - 1,000' LONG
4%-9% GRADES
ADT=50.4 ADT

"ROAD C"
22' WIDE - 591' LONG
1%-8.75% GRADES
ADT=14.4 ADT

"ROAD D"
26' WIDE - 637' LONG
0.5%-2.5% GRADES
ADT=14.4 ADT

NOTE:
ALL ROADS ARE TO BE ASPHALT WITH 1' PAVED SHOULDER.

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 06/2016

THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

ROAD EXHIBIT

PROJECT NO. .

FIGURE NUMBER 1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\CORRAL-ROADS.dwg Plotted on Jun/13/2016

The Corral Subdivision
Internal Road Design Parameters

Rural Local Road System (page 380-389, GDOH&S)

The Corral Internal Roads	**Design**	**Allowable**	**Reference**
ADT	400	<1500	
Peak Traffic	48.2		
Design Speed (mph)	20	30	(3) Exhibit 5-1
Design Stopping Distance (ft)	240	115	MCSR GDOH&S Exhibit 3·
K (crest)	7	7	GDOH&S Exhibit 3-72
K (sag)	17	17	GDOH&S Exhibit 3-75
Passing Lanes	No		
Maximum Grade (%)	7.5	16	GDOH&S Exhibit 5-4
Cross Slope (%)	2	1.5-2	GDOH&S Page 383
Number of Lanes (per direction)	1		
Width of Roadway (including shoulder) (ft)	20	20	GDOH&S Exhibit 5-5
Superelevation (assume e_{max} and f_{max} as limiting factors in design)			
number of lanes rotated	1	-	
coefficient of friction, f_{max} (see exhibit 3-12, p 139 of GDOH&S)	0.26	.005-.4	
minimum curve radius, R_{min} (-2% super) (ft) (see formula 3-9, p 133, GDOH&S	111.1		
minimum curve radius, R_{min} (0% super) (ft) (see formula 3-9, p 133, GDOH&S)	102.6		
minimum curve radius, R_{min} (2% super) (ft) (see formula 3-9, p 133, GDOH&S)	95.2		
minimum curve radius, R_{min} (4% super) (ft) (see formula 3-9, p 133, GDOH&S)	88.9		
minimum curve radius, R_{min} (6% super) (ft) (see formula 3-9, p 133, GDOH&S)	83.3		
maximum relative gradient (%)	0.74	0.74	
runout length (2% super) (ft)	27.0		
runout length (4% super) (ft)	54.1		
runout length (6% super) (ft)	81.1		
Constrained Condition Horizontal Alignment			
SIGNAGE OF THESE CURVES IS REQUIRED!			
reduced design speed	20		
coefficient of friction, f_{max}	0.175	.005-.4	
minimum curve radius, R_{min} (4% super) (ft)	70.0		
minimum curve radius, R_{min} (6% super) (ft)	65.0		
maximum relative gradient (%)	0.78	0.78	
runout length (4% super) (ft)	67.0		
runout length (6% super) (ft)	100.0		
Minimum Foreslope	3:1	3:1	
Maximum Cut Slope	2:1	2:1	
Maximum Fill Slope	2:1	2:1	
Bridges			
Minimum clear roadway width (ft)	30	30	
Design Structural Loading	HS20	HS20	
Minimum Vertical Clearance (ft)	15	14	
Horizontal Clearance (ft)(from edge of traveled way)	10	7-10	
Right of Way Width (ft)	60		
Intersection Design (unchannelized)			
maximum deviation from perpendicular	60 degrees		
minimum corner radius (ft)	25		
maximum grade at intersection (%)	4		
minimum runout of critical grade (ft)	50		

APPENDIX B

TRIP GENERATION DATA

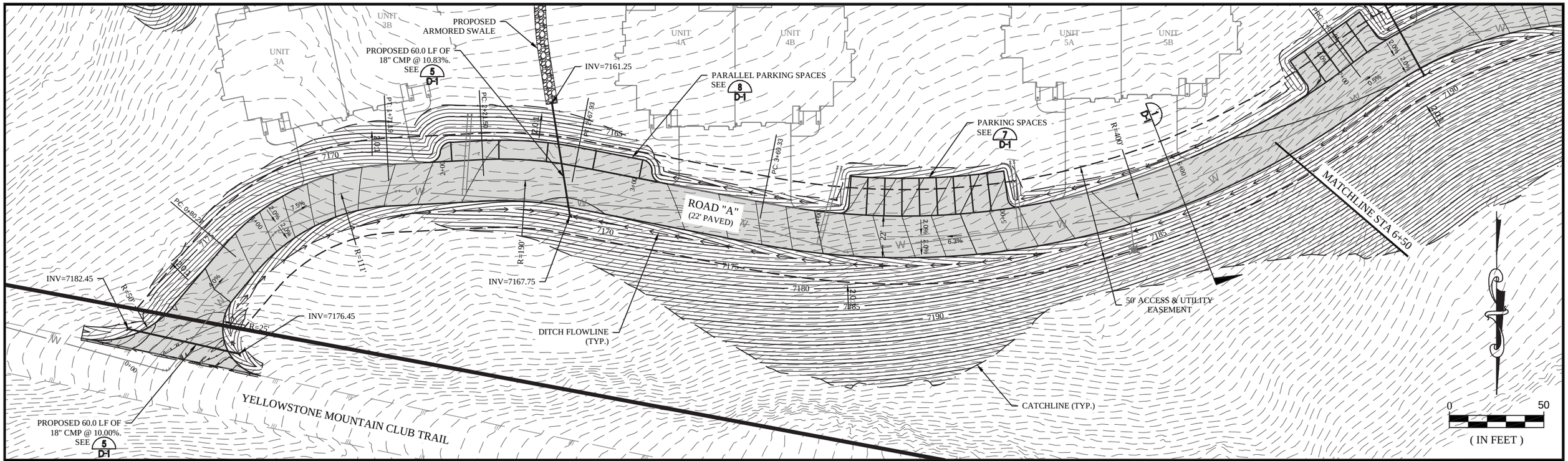
The Corral Subdivision
Traffic Volumes

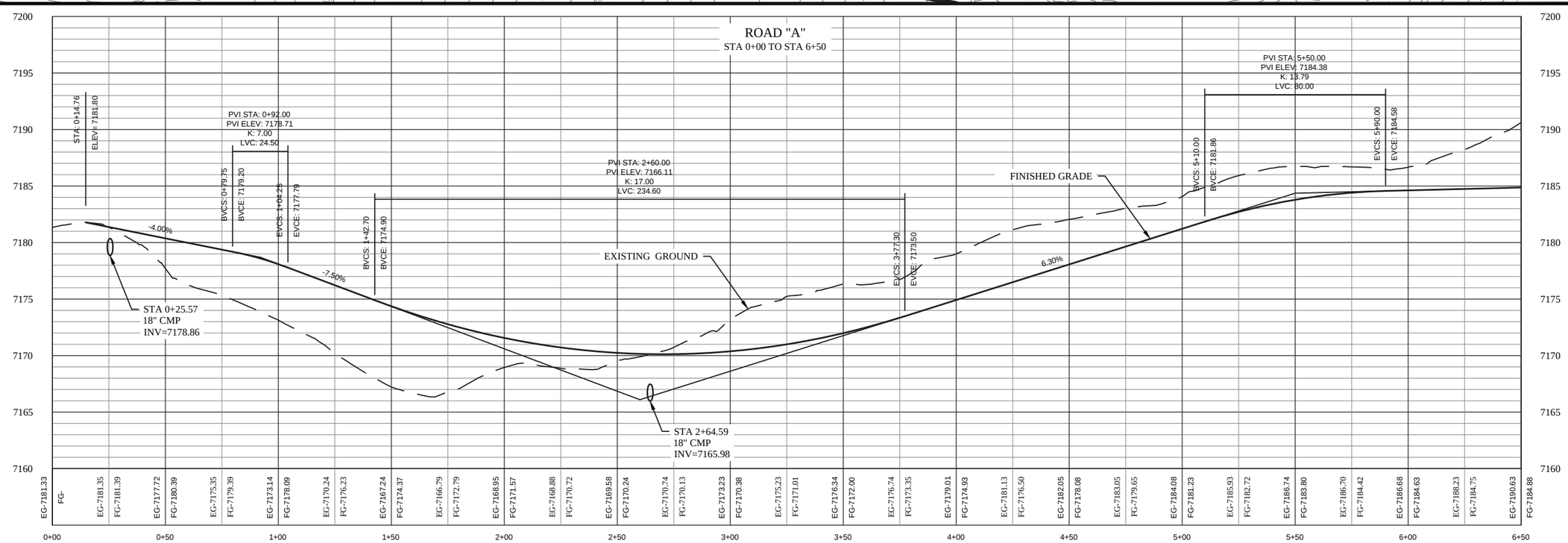
The Corral Subdivision Trip Calculation

					WEEKDAY DATA				SATURDAY DATA			SUNDAY DATA		
ROAD NAME	SERVICE AREA	ITE CODE	QTY	UNITS	WEEKDAY ADT RATE (per unit)	WEEKDAY TOTAL	WEEKDAY AM PEAK VOLUME	WEEKDAY PM PEAK VOLUME	SATURDAY ADT RATE (per unit)	SATURDAY VOLUME	SATURDAY PEAK VOLUME	SUNDAY RATE (per unit)	SUNDAY VOLUME	SUNDAY PEAK VOLUME
Road A	The Corral	260	10	Recreational Homes	3.60	36.00	1.60	2.60	3.07	30.70	3.60	2.93	29.30	3.60
Road B	The Corral	260	14	Recreational Homes	3.60	50.40	2.24	3.64	3.07	42.98	5.04	2.93	41.02	5.04
Road C	The Corral	260	4	Recreational Homes	3.60	14.40	0.64	1.04	3.07	12.28	1.44	2.93	11.72	1.44
Road D	The Corral	260	6	Recreational Homes	3.60	21.60	0.96	1.56	3.07	18.42	2.16	2.93	17.58	2.16

APPENDIX C

ROADWAY PLAN, PROFILE, & DETAILS





SCALE:
HORZ: 1"=50'
VERT: 1"=10'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

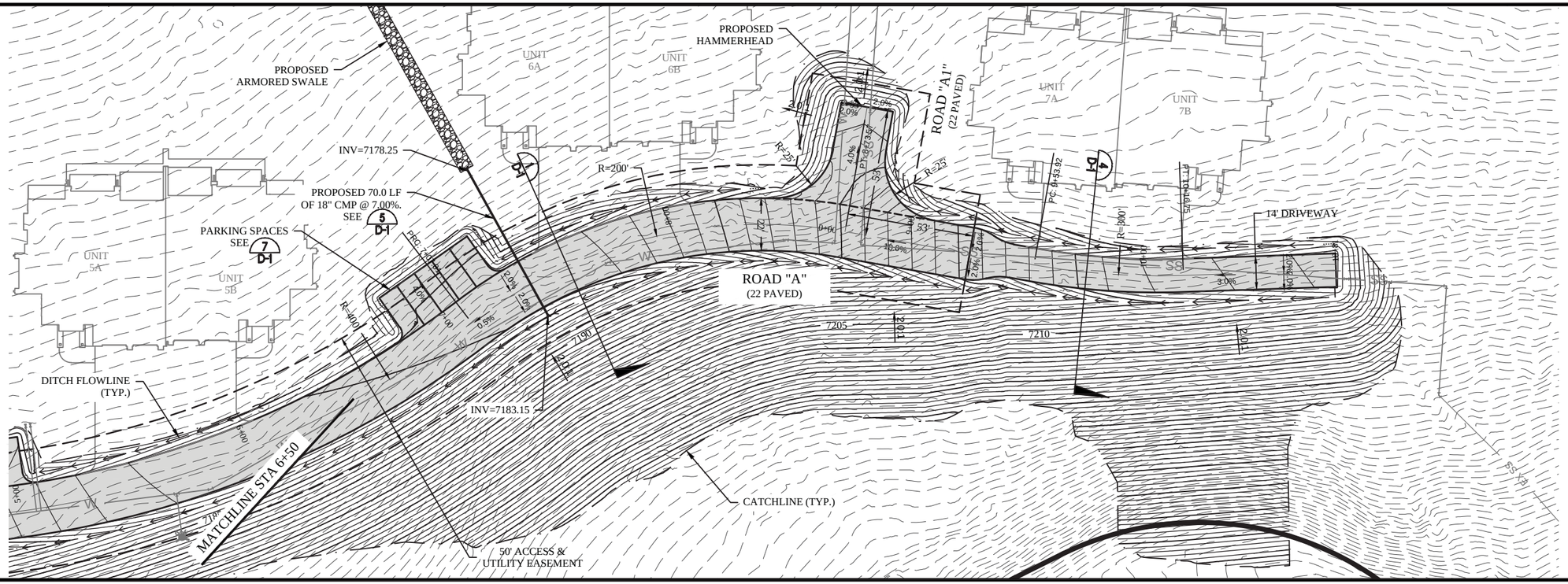
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016

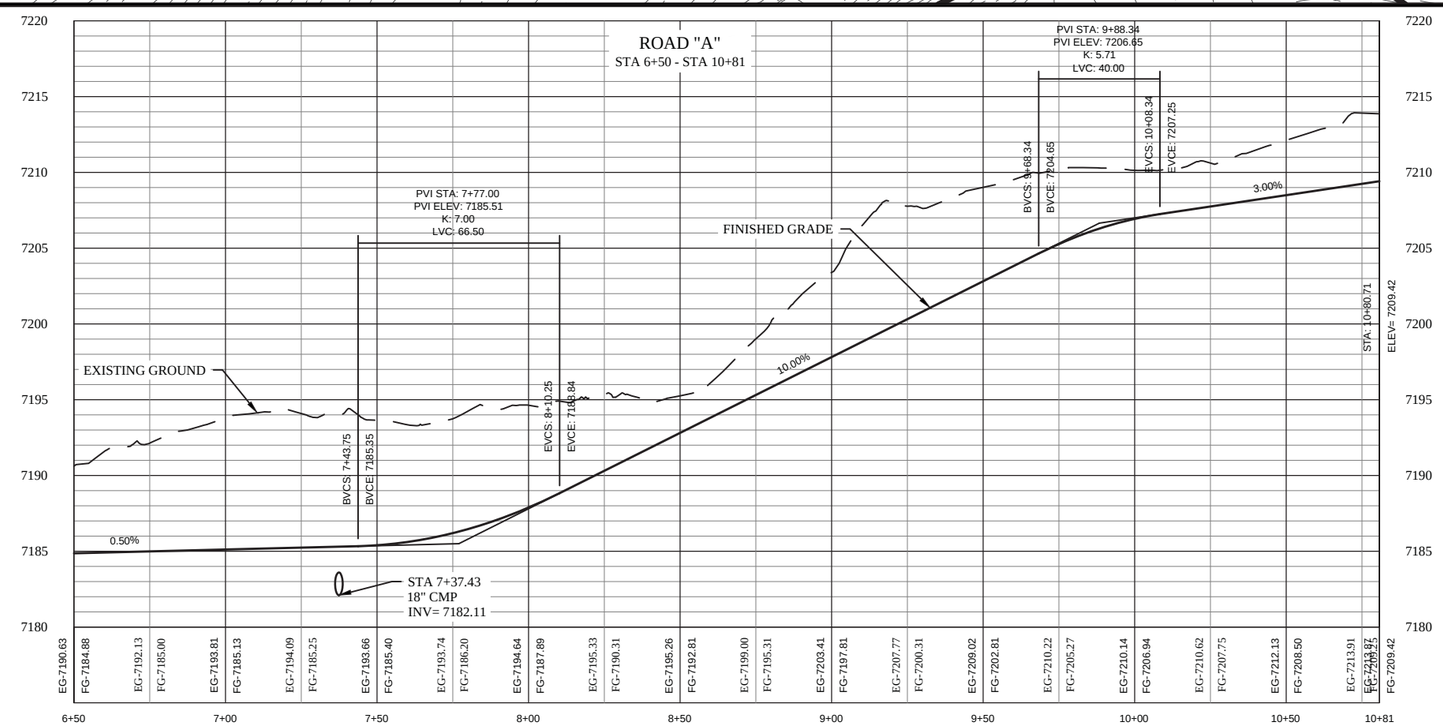
BIG_SKY — YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION — MONTANA

ROAD "A" PLAN & PROFILE
STA 0+00 - STA 6+50

PROJECT NO. 0001.061

FIGURE NUMBER
R-1





SCALE:
HORZ: 1"=50'
VERT: 1"=10'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016

BIG_SKY

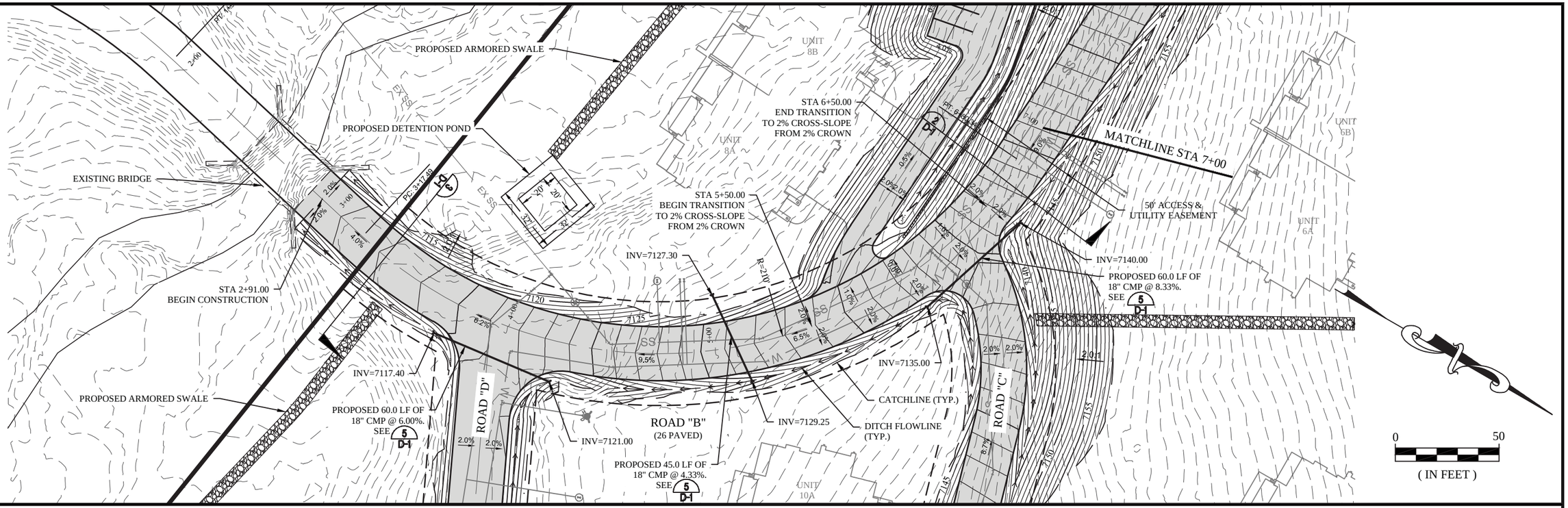
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION

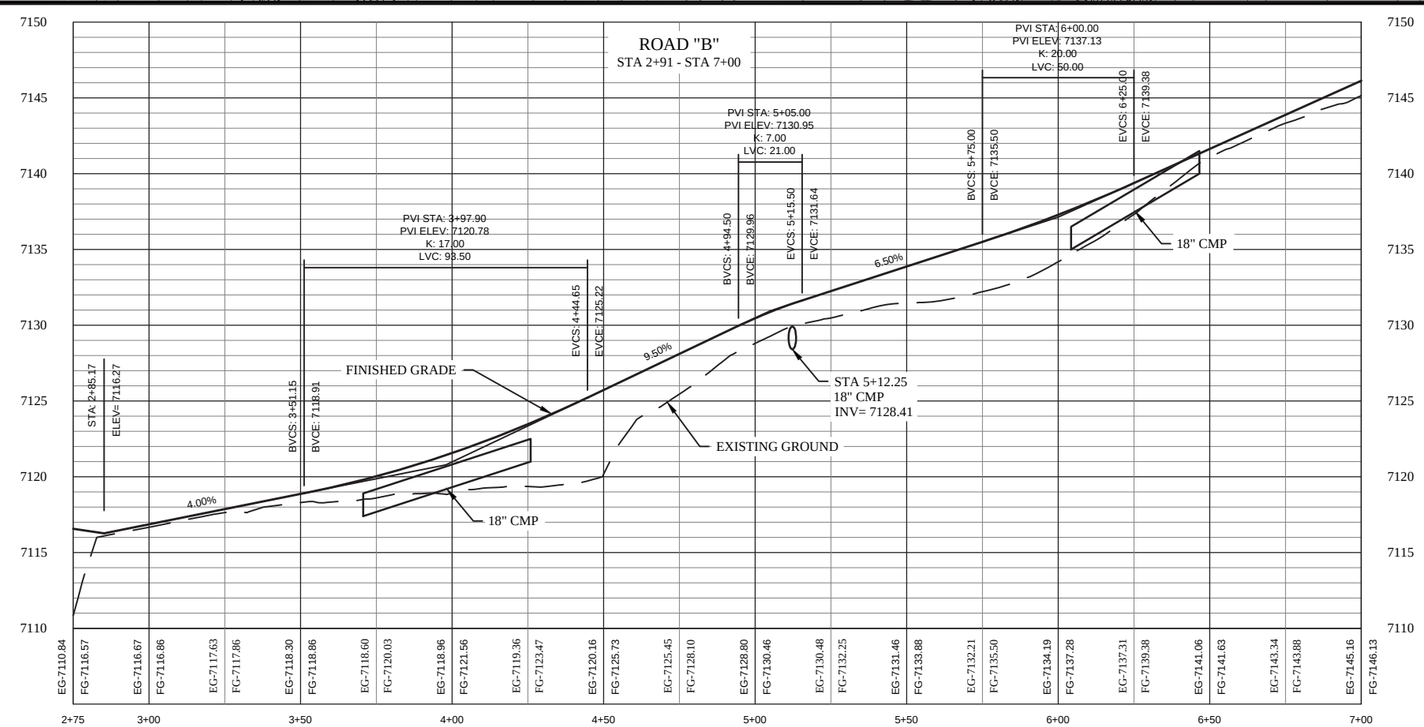
MONTANA

ROAD "A" PLAN & PROFILE
STA 6+50 - STA 10+81

PROJECT NO.
0001.061

FIGURE NUMBER
R-2





SCALE:
HORZ: 1"=50'
VERT: 1"=10'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016

BIG_SKY

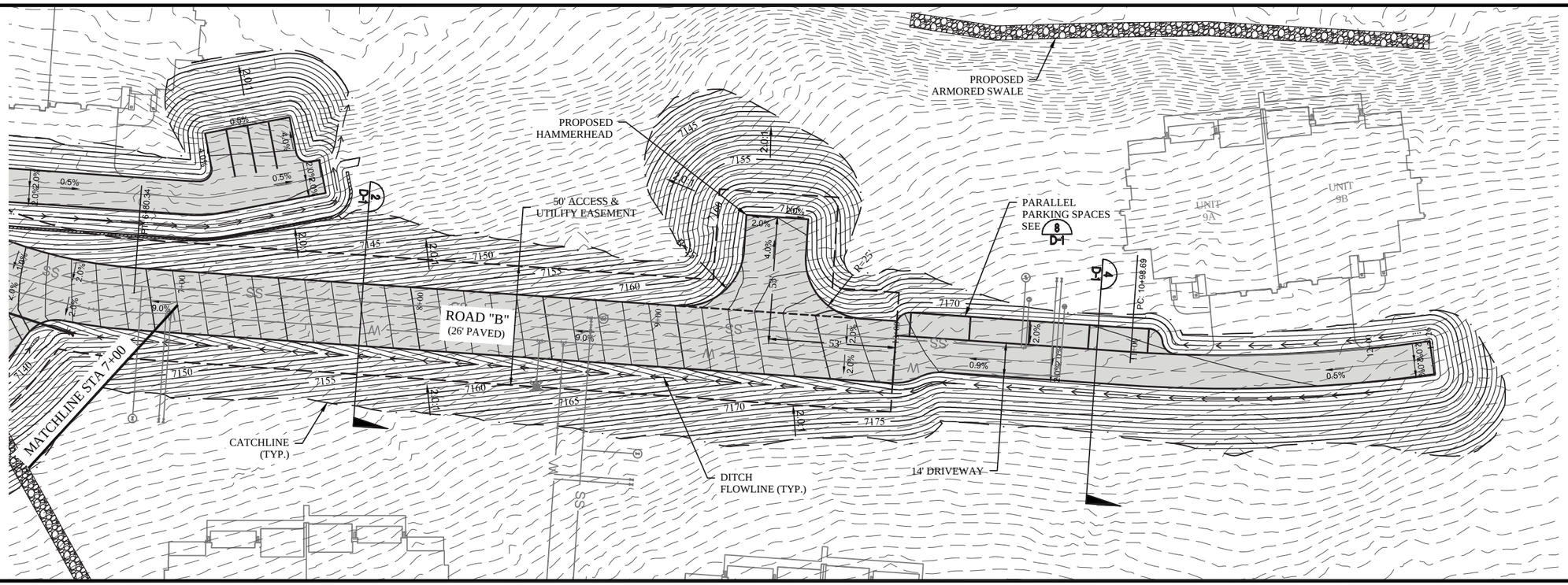
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION

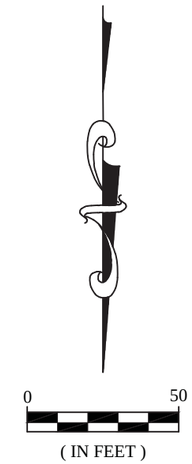
MONTANA

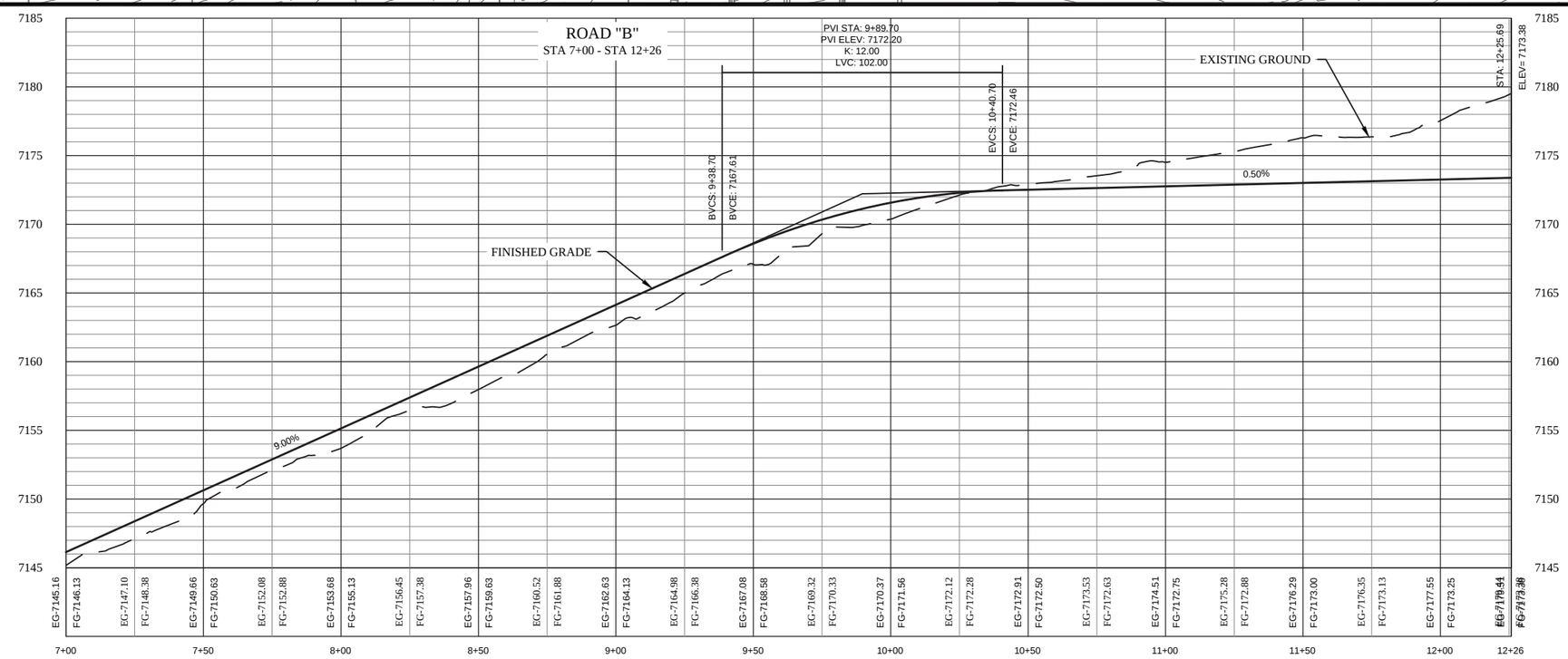
ROAD "B" PLAN & PROFILE
STA 2+91 - STA 7+00

PROJECT NO.
0001.061

FIGURE NUMBER
R-3







SCALE:
HORZ: 1"=50'
VERT: 1"=10'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

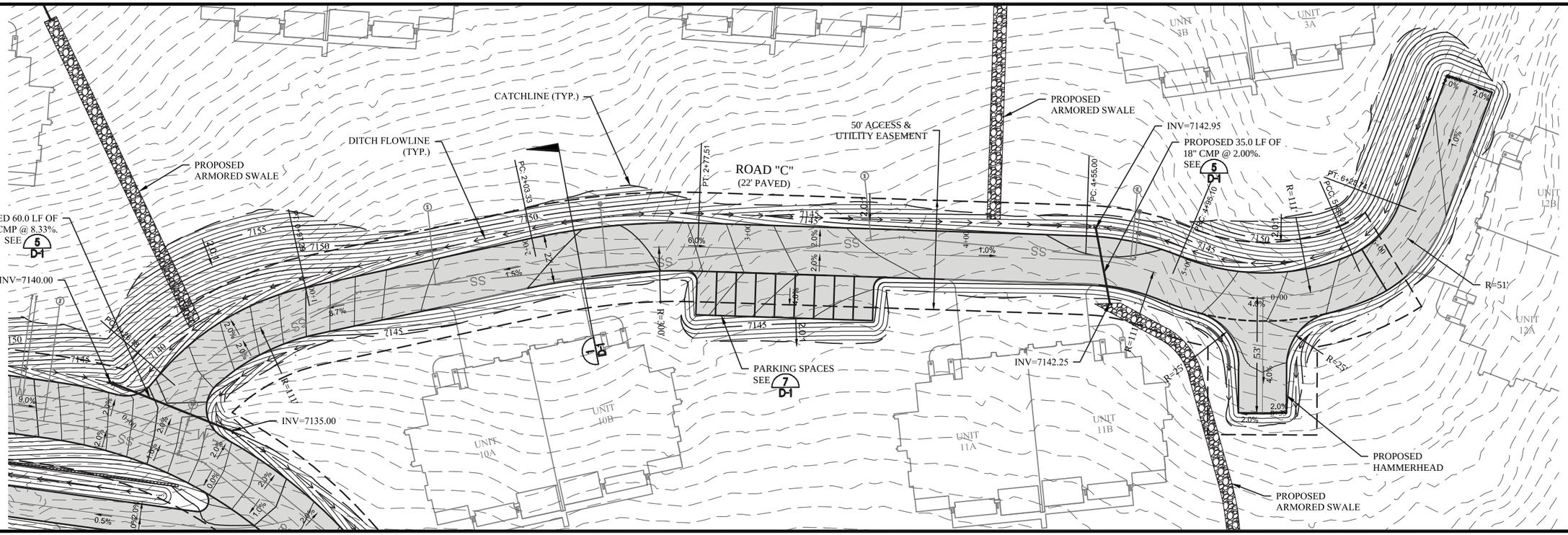
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016

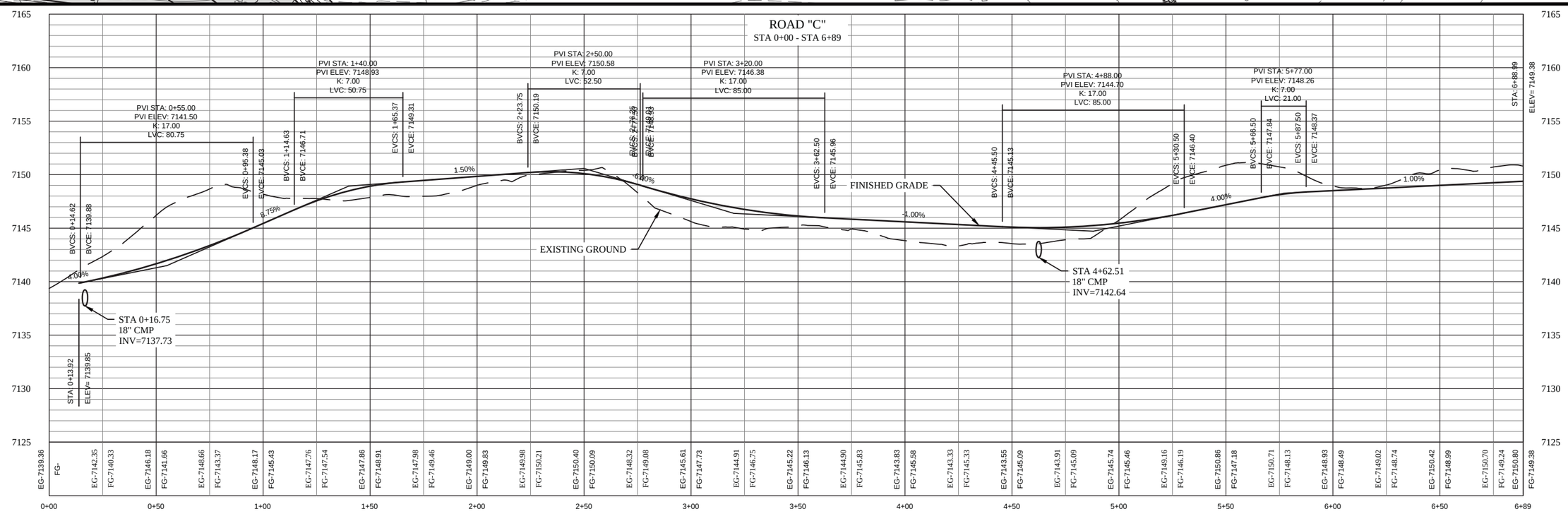
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

ROAD "B" PLAN & PROFILE
STA 7+00 - STA 12+25

PROJECT NO. 0001.061

FIGURE NUMBER
R-4





HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 6/2016

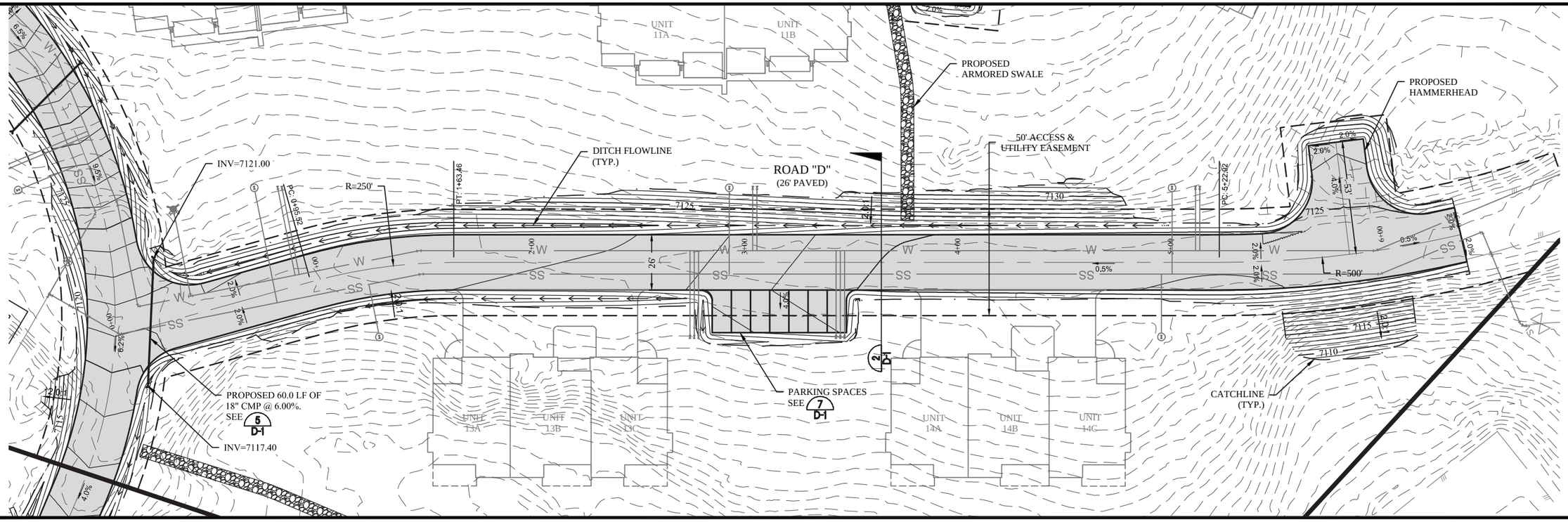
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

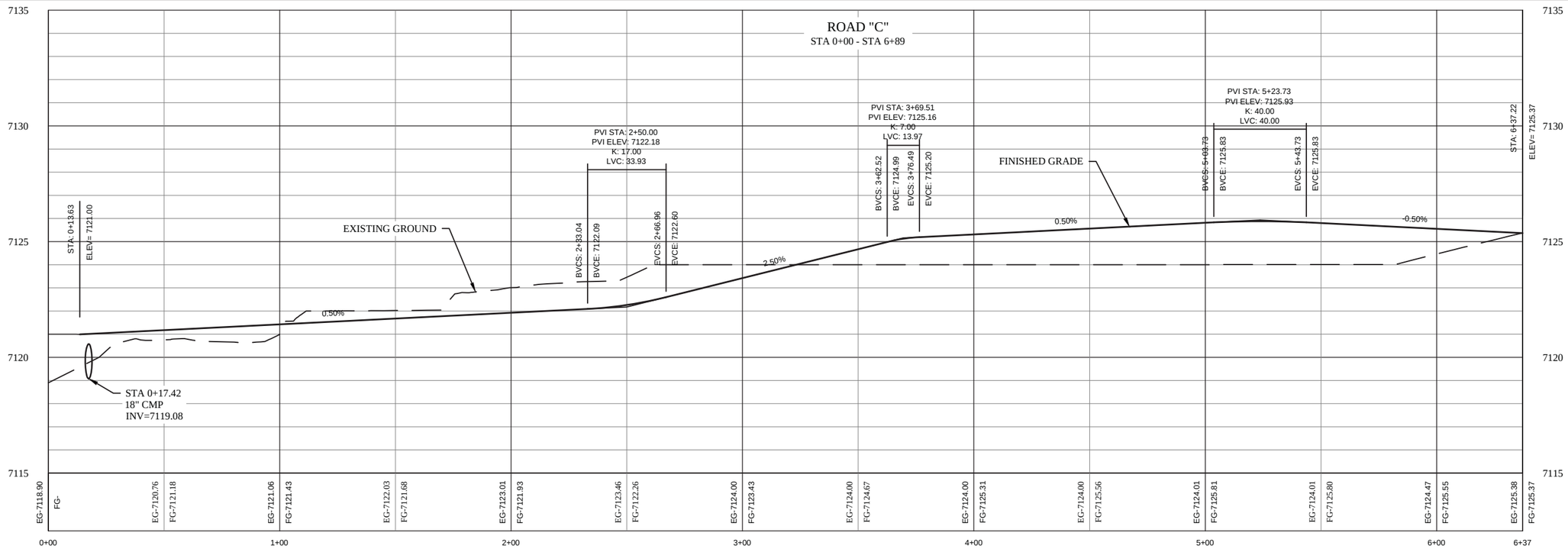
ROAD "C"
PLAN & PROFILE

PROJECT NO. 0001.061

FIGURE NUMBER R-5

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016





SCALE:
HORZ: 1"=50'
VERT: 1"=5'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

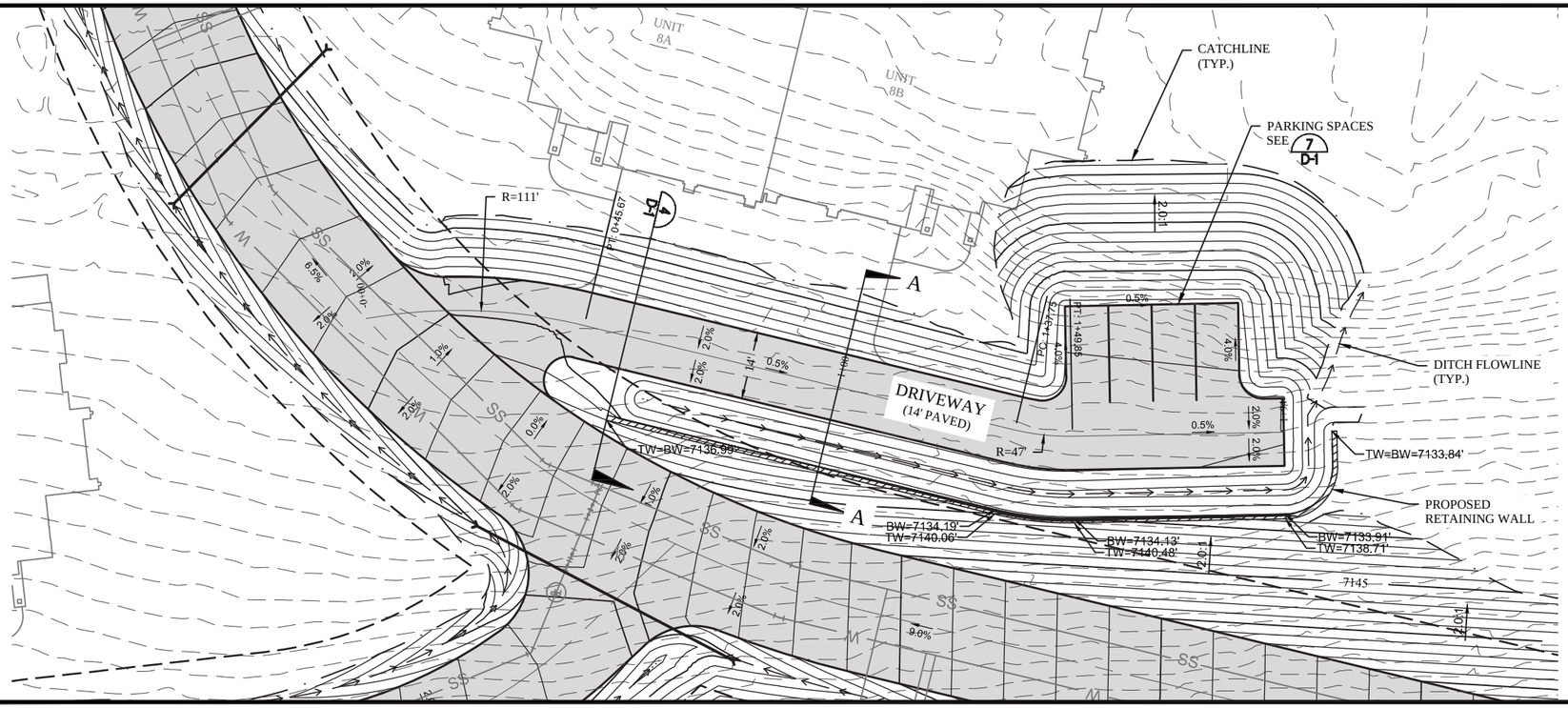
BIG_SKY — YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION — MONTANA

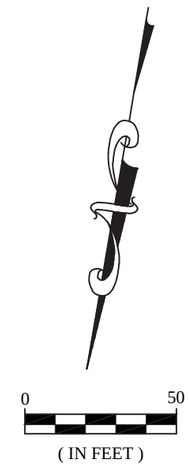
ROAD "D"
PLAN & PROFILE

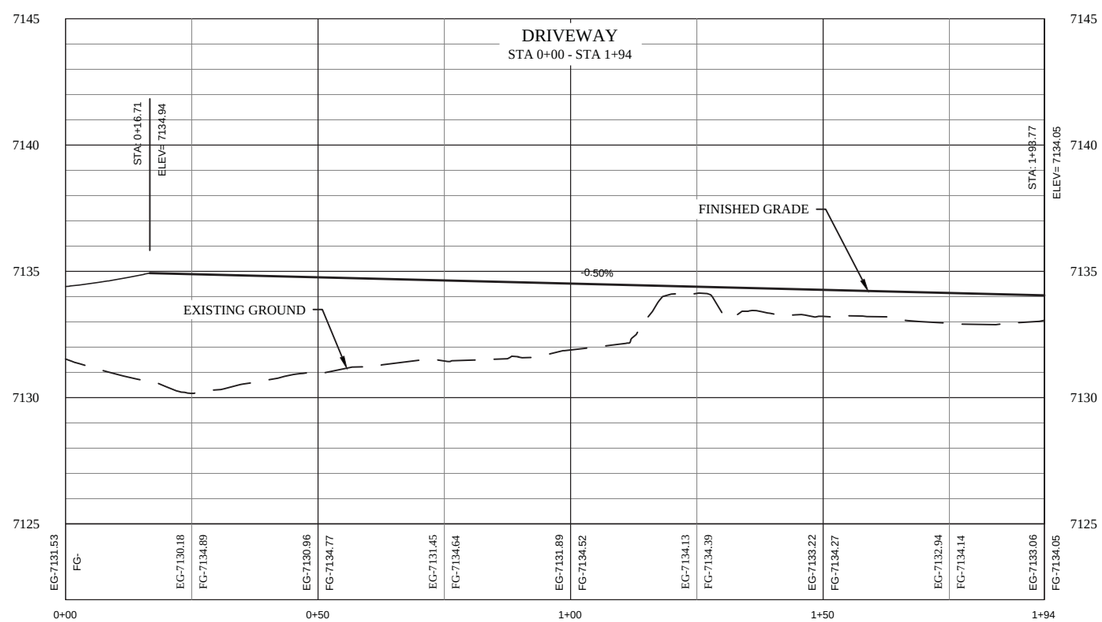
PROJECT NO. 0001.061

FIGURE NUMBER R-6

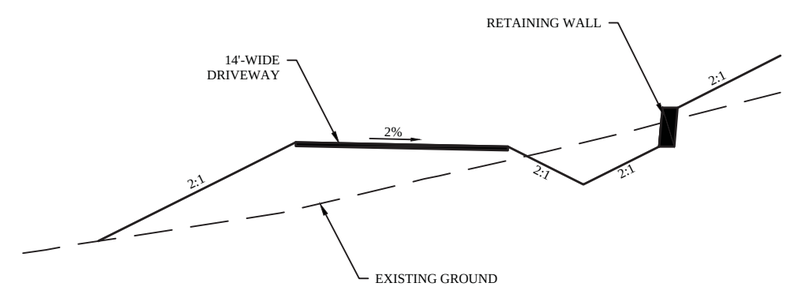
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016







SCALE:
HORZ: 1"=30'
VERT: 1"=6'



SECTION A-A
SCALE: 1"=10'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

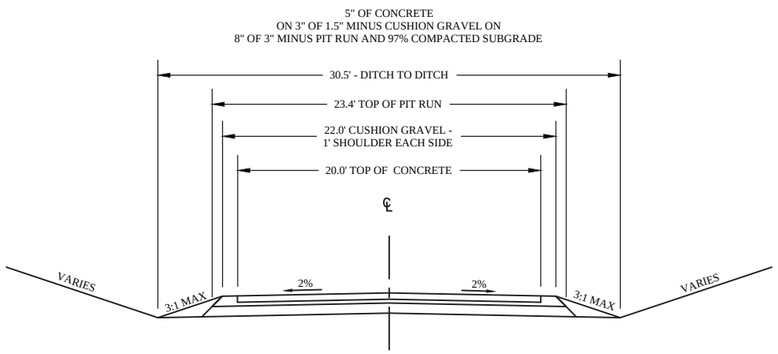
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/20/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

UNIT 8 DRIVEWAY / RETAINING WALL

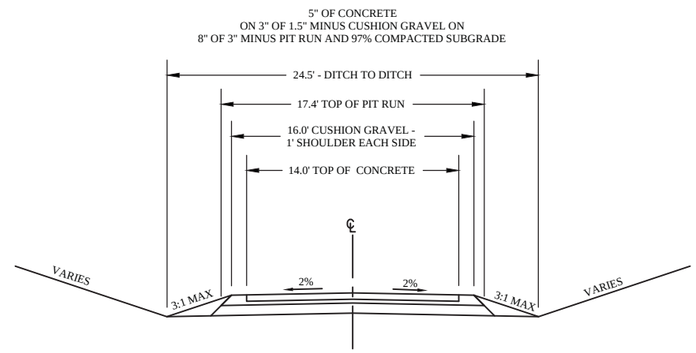
PROJECT NO. 0001.061

FIGURE NUMBER R-7



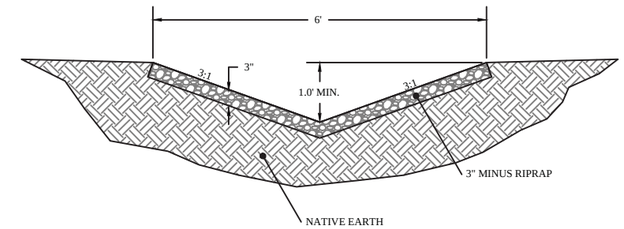
1 TYPICAL ROAD SECTION

SCALE: NTS (FOR MAIN ROADS)



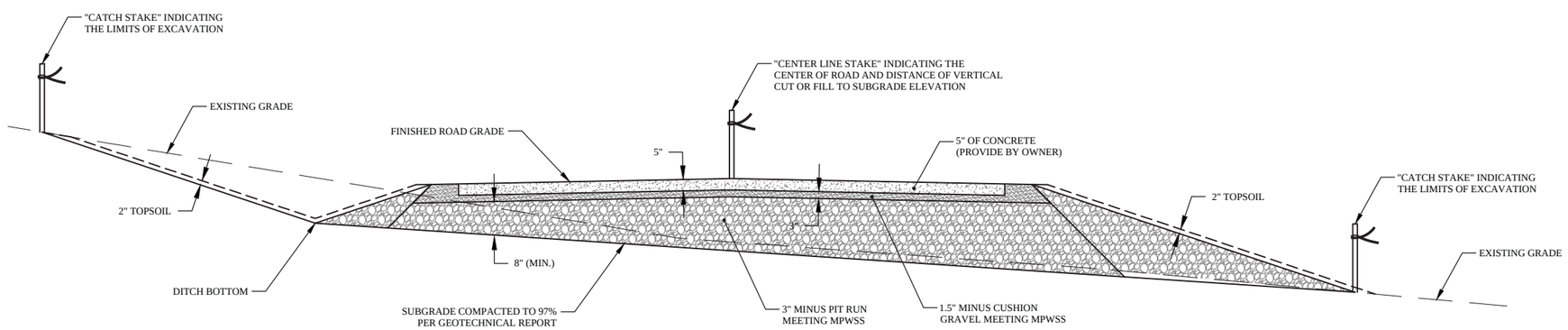
2 TYPICAL DRIVEWAY SECTION

SCALE: NTS (FOR FARRIS' HOUSE DRIVEWAY)



3 R-2 DITCH

NTS



4 ROAD STAKING DETAIL

SCALE: NTS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 07/2015

N BAR RANCH
ROADS & DRIVEWAYS CONSTRUCTION PLANS
FERGUS COUNTY MONTANA

ROADWAY DETAILS

PROJECT NO. 0011.005

FIGURE NUMBER D-1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\14064\ACAD\DESIGN 5\SHEETS\D-1.dwg Plotted by jon hockaday on Jun/20/2016

Appendix M

YELLOWSTONE CLUB

Yellowstone Club Employee Housing Update

2013-2014 Outlook

Overview

As a general update, and request from Madison County Planning in conjunction with the Yellowstone Club Preliminary Plat submittal for the American Spirit subdivision Phase 2, we formally submit this overview of employee housing. The following overview will address Yellowstone Club's (YC) current and future employee needs and how YC is meeting those needs. YC remains committed to the needs of the employees that allow YC to continue to operate and thrive looking forward.

Current Employee Needs and Numbers

Winter Operations: YC currently operates a full service private ski area which incorporates 12 ski lifts, 3 restaurants and 20 cabins available for member use on a short term basis. Winter operations, development and security require approximately 470 employees. Of the 470 employees 300 are seasonal (68 part time) and 170 are year round full time.

Summer Operations: The completed golf course is operational. In addition, 3 restaurants and general mountain summer activities are staffed accordingly. Summer operations require approximately 250 employees. Of the 250 employees 80 are seasonal (30 part time) and 170 are year round full time.

Other Operations: Additionally, the Yellowstone Club Public Safety and Security (security and fire department) is in operation on a year round basis. Also, the YC accounting department (15 employees) has been relocated to a satellite office in Bozeman.

Future Employment Needs

Over the next 5-7 years, YC anticipates adding additional real estate offerings and some additional amenities. However, the core YC services are currently staffed appropriately and it is not projected to require additional staffing that is linear with the growth of YC. Additional staffing will be necessary as YC grows but, it is projected that our current staffing will grow by 30% when YC is fully built out. Currently, YC is approximately 75% constructed from an operations and amenity base.

The management staff is projected to remain static over the next 5 years. The largest gain in the employment at YC will be attributed to seasonal employees who are involved with YC operations. It is anticipated that the gains in the seasonal employee category will be in part offset by the real estate operations natural decline due to project completion.

One Yellowstone Club Trail
P.O. Box 161097 ^ Big Sky, Montana ^ 59716 ^ *Tel* {888} 700-7748 ^ {406} 995-4900 ^ *Fax* {877} 443-5698
www.yellowstoneclub.com

Employee Level of Ownership

1. YC continues to pay its employees at the high end or above the national averages for the various job categories. YC has generally maintained wage structure and levels throughout the recession. YC continues to maintain an attractive benefit plan that includes full medical, 401K, free lunches and a free bus program.
2. Housing in Big Sky and surrounding areas is relatively inexpensive when compared to other resort areas around the United States.
3. The recent recession has forced interest rates and prices to a historic low.

Location of Ownership

The Big Sky community continues to grow. The surrounding resorts Big Sky Mountain, Moonlight Basin, YC and Spanish Peaks are all seasonal and all require seasonal employment. The culture in Big Sky generally reflects the seasonality of the economy that drives it. Tourism and seasonal use predominately populate the area. Through various interviews and a recent survey with employees it has become evident that a majority of employees would rather live in Bozeman and the surrounding area. The employees don't feel that this is an economic decision. Many employees feel a desire to have ties to a community that isn't driven by seasonal activities. The availability for youth activities, stores, schools and overall diversity is generally more desirable to the employee than proximity.

Yellowstone Club Bus Transit Program

YC provides a bus program for employees free from Four Corners to the Yellowstone Club daily. The bus has a very diverse schedule and is available to every employee. YC takes great efforts to match operations and the bus schedule to accommodate almost every employee. The program not only takes traffic off of HWY 191, it also allows employees to work at YC and not endure additional costs in transportation in doing so. The employee can save on vehicle maintenance and gives them piece of mind, knowing that the commute is stress free. YC pays around $520,000 annually for this service and we feel it's one of the more important features to allowing easy access to work.

Big Sky Housing Program

For employees who desire to live in the Big Sky area, YC has established an affordable rental program that is subsidized by YC. YC has committed to 11 condo units that are currently under lease. The 11 units are spread between Firelight Meadows and Lone Peak Townhomes in the Meadow Village of Big Sky. The total capacity of the 11 units is 38 employees. The cost to the employee is $250.00/month. The cost to the employee is well below the rental average in the Big Sky area. The difference in rental cost is subsidized by YC.

The result of this program is that during the winter season YC is providing affordable housing options to 12% of its employees that are non management. In the summer season this option is available to 24% of its employees that are non-management.

Resort Tax/Chamber of Commerce Affordable Housing Study

Recently the Resort Tax Board approved the funding request from the Big Sky Chamber of Commerce to facilitate an affordable housing study in the Big Sky area. This is going to provide the community with the necessary information to put together an action plan that encompasses the Big Sky area as a whole. I am currently sitting the group that will interface with the program professionals. Total cost of the study is $80,000. Once the study is completed I will circulate it to the planning department.

Conclusion

The information contained in this update suggests that current employee housing demands are being addressed. The planning of affordable housing is an ongoing effort that presents many challenges. In order to present uniform equity with employees and offer uniform benefits is an ongoing balance act. We feel that, overall, we are addressing our employees concerns and allowing them to make choices that are within their economic capacity.

Additionally, the Yellowstone Club is committed, in conjunction with the local affordable housing task force (Chamber of Commerce), to participate financially with other developers and resorts in the Big Sky area for meeting future needs. The newly funded study will provide answers as to how the community as a whole can favorably respond to the needs as we continue to grow as a community.

Sincerely,

Mike Ducuennois
Vice President of Development
Yellowstone Mountain Club

Cc:

Justin Houser PE

http://www.bozemandailychronicle.com/news/economy/gallatin-gateway-inn-leased-to-yellowstone-club/article_1e9b553c-e665-5ccd-a7ed-82a8040949d3.html

SPOTLIGHT

Gallatin Gateway Inn leased to Yellowstone Club

By Lewis Kendall Chronicle Staff Writer Dec 2, 2015

Chronicle File Photo

The Yellowstone Club recently agreed to a five-year lease with the owner of the Gallatin Gateway Inn to house club employ historic inn, which closed in 2013.

6 remaining of 7

Welcome! Please enjoy the Chronicle's free content.

After more than two years of inactivity, the Gallatin Gateway Inn is set to house Yellowstone Club employees.

Around 80 employees from the YC, Moonlight Basin and the Spanish Peaks Mountain Club will move into the building in the next two weeks.

The Yellowstone Club recently agreed to a five-year lease with owner M&M Hospitality and hopes to use the historic building to augment the lack of housing in Big Sky.

“Each year it’s been more and more challenging to find housing in Big Sky,” said Yellowstone Club spokesman Charlie Callander. Callander did not specify what the club would charge employees, but said that rooms would be “pretty reasonable given what the Big Sky rate is.”

The inn closed in 2013 after its previous owners, Charles and Bonnie White, were forced to deed the $2.5 million property to Rocky Mountain Bank in order to avoid foreclosure. M&M then bought the 88-year-old building last March and has spent the past year renovating it.

The club will offer meal service and a shuttle from the inn, located off Gallatin Road, to Big Sky. Seasonal employees will occupy the building year-round, but Callander said the club will keep the inn open for visitors and Gallatin Gateway community gatherings.

The inn will host a “Breakfast with Santa” event on Dec. 12.

The Gallatin Gateway Inn was constructed in 1927 to bring passengers on the “Milwaukee Road” — a stretch of railroad lines connecting the West Coast with the Great Lakes — to the Gallatin Valley to visit Yellowstone National Park.

The club plans to have all its employees housed by its opening day on Dec. 11.

Kendall can be reached at lkendall@dailychronicle.com. Kendall is on Twitter at @lewdak

---

Lewis Kendall

Lewis Kendall covers business for the Chronicle. He is also editor of the Business Journal.

Appendix N

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: 41H 117151 00 PROVISIONAL PERMIT
Version: -- ORIGINAL RIGHT
Version Status: ACTIVE

Owners: YELLOWSTONE MOUNTAIN CLUB LLC
PO BOX 161097
BIG SKY, MT 59716 1097

Priority Date: October 3, 2001 at 11:57 AM
Enforceable Priority Date: October 3, 2001 at 11:57 AM

Purpose (use): MULTIPLE DOMESTIC
IRRIGATION
FISHERY
COMMERCIAL

Maximum Flow Rate: 1200 GPM

Maximum Volume: 1485.80 AC-FT

Source Name: GROUNDWATER
Source Type: GROUNDWATER

Points of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		E2SWNW	7	7S	3E	MADISON
Period of Diversion:	JANUARY 1 to DECEMBER 31					
Diversion Means:	WELL					
2		NESENW	7	7S	3E	MADISON
Period of Diversion:	JANUARY 1 to DECEMBER 31					
Diversion Means:	WELL					
3		SESENW	7	7S	3E	MADISON
Period of Diversion:	JANUARY 1 to DECEMBER 31					
Diversion Means:	WELL					
4		SWNWNE	7	7S	3E	MADISON
Period of Diversion:	JANUARY 1 to DECEMBER 31					
Diversion Means:	WELL					

Reservoir: OFF STREAM **Reservoir Name:**

Govt Lot	Qtr Sec	Sec	Twp	Rge	County
	N2NESE	18	7S	3E	MADISON

Depth: 15.00 FEET
Surface Area: 2.10 ACRES
Current Capacity: 15.80 ACRE-FEET

Reservoir: OFF STREAM **Reservoir Name:**

Govt Lot	Qtr Sec	Sec	Twp	Rge	County
	NWSENE	7	7S	3E	MADISON

Depth: 15.00 FEET
Surface Area: 2.80 ACRES
Current Capacity: 28.00 ACRE-FEET

Reservoir: OFF STREAM **Reservoir Name:**

Govt Lot	Qtr Sec	Sec	Twp	Rge	County
	S2NW	7	7S	3E	MADISON

Depth: 15.00 FEET
Surface Area: 4.00 ACRES
Current Capacity: 30.00 ACRE-FEET

Reservoir: OFF STREAM **Reservoir Name:**

Govt Lot	Qtr Sec	Sec	Twp	Rge	County
	SENE	18	7S	3E	MADISON

Depth: 35.00 FEET
Surface Area: 6.32 ACRES
Current Capacity: 110.60 ACRE-FEET

Reservoir: OFF STREAM **Reservoir Name:**

Govt Lot	Qtr Sec	Sec	Twp	Rge	County
	W2W2NE	7	7S	3E	MADISON

Depth: 15.00 FEET
Surface Area: 1.50 ACRES
Current Capacity: 11.20 ACRE-FEET

Purpose (use): MULTIPLE DOMESTIC
Households: 864
Volume:
Period of Use: JANUARY 1 TO DECEMBER 31

Place of Use: (27 total records)

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1				1	7S	2E	MADISON
2				2	7S	2E	MADISON
3				11	7S	2E	MADISON
4				12	7S	2E	MADISON
5				13	7S	2E	MADISON
6				14	7S	2E	MADISON
7				23	7S	2E	MADISON
8				24	7S	2E	MADISON
9				5	7S	3E	MADISON
10				6	7S	3E	MADISON
11				7	7S	3E	MADISON
12				8	7S	3E	MADISON
13				17	7S	3E	MADISON
14				18	7S	3E	MADISON
15				31	6S	3E	MADISON
16			SE	32	6S	3E	MADISON

Purpose (use): IRRIGATION
Irrigation Type: SPRINKLER
Volume:
Period of Use: JUNE 1 TO OCTOBER 15

Place of Use: (27 total records)

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1	35.00		SE	7	7S	3E	MADISON
2	25.00		SW	8	7S	3E	MADISON
3	20.00		NW	17	7S	3E	MADISON
4	20.00		NE	18	7S	3E	MADISON
Total:	100.00						

Purpose (use): FISHERY
Volume:
Period of Use: JANUARY 1 TO DECEMBER 31

Place of Use: (27 total records)

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SENE	18	7S	3E	MADISON
2			N2NESE	18	7S	3E	MADISON
3			S2NW	7	7S	3E	MADISON
4			NWSENE	7	7S	3E	MADISON
5			W2W2NE	7	7S	3E	MADISON

Purpose (use): COMMERCIAL **Purpose Clarification:** SNOWMAKING
Volume:
Period of Use: NOVEMBER 1 TO MARCH 15

Place of Use: (27 total records)

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			W2W2W2	7	7S	3E	MADISON
2			E2	12	7S	2E	MADISON

Geocodes/Valid: 25033707101010000 - Y 25033708101010000 - Y 25033718101010000 - Y
25033717202270000 - Y

Remarks:

THIS PERMIT IS ISSUED SUBJECT TO A SEPARATE SETTLEMENT AGREEMENT BETWEEN ALL THE PARTIES.

Appendix O

PRELIMINARY PLAT/PLAN of

THE CORRAL P.U.D. SUBDIVISION

AN UNPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E, AND THE NW1/4 SECTION 7, T7S, R3E, AND TRACT 2 OPEN SPACE OF YELLOWSTONE MOUNTAIN CLUB PHASE 4, P.M.M., MADISON COUNTY, MONTANA

OWNER
YELLOWSTONE DEVELOPMENT, LLC
YELLOWSTONE MOUNTAIN CLUB, LLC
P.O. BOX 161097
BIG SKY, MONTANA 59716

PURPOSE
TO CREATE 1 RESIDENTIAL CONDOMINIUM LOT AND 1 OPEN SPACE LOT

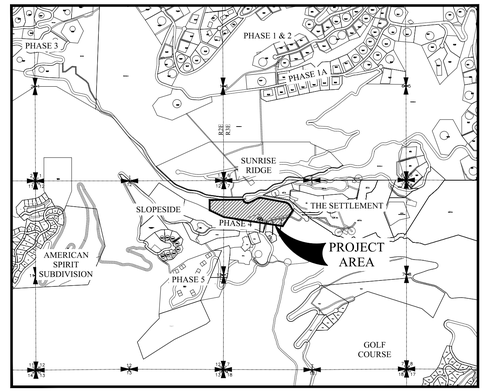
NOTE: CURRENT LAND USE = VACANT UNPLATTED LAND

LAND USE
- OPEN SPACE
- RESIDENTIAL CONDOMINIUM LOT

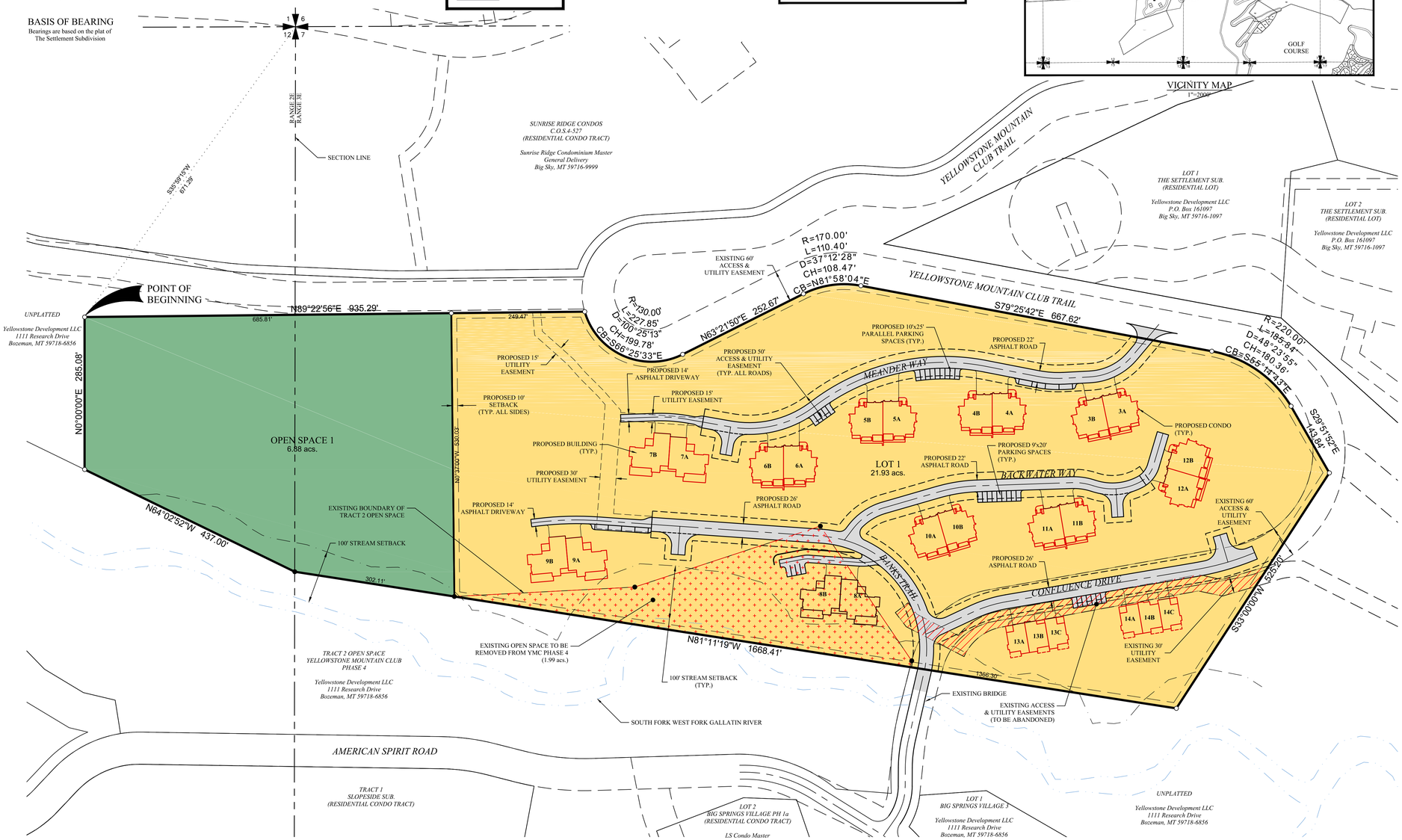
LEGEND
- SET REBAR AND BLUE PLASTIC CAP MARKED "MORRISON MAIERLE, INC. 16971LS"
- FOUND REBAR & CAP AS MARKED

100 0 50 100
(IN FEET)

BASIS OF BEARING
Bearings are based on the plat of The Settlement Subdivision



VICINITY MAP
1"=2000'



CERTIFICATE OF CONSENT

We, the undersigned property owners, do hereby certify that we have caused to be surveyed, subdivided and platted into lots, as shown by the plat hereto annexed, the following described land in Madison County, to-wit:

A tract of land situated in the NW1/4 Section 7 , T7S, R3E, P.M., Madison County, Montana, and being further described as follows:

Commencing at the northwest corner of Section 7;
Thence S39°59'15"W a distance of 671.29 feet to the Point of Beginning;
Thence N89°22'56"E a distance of 935.29 feet to a point on the west line of Yellowstone Mountain Club Trail;
Thence continuing along said west line along a non-tangent curve to the left for a distance of 227.85 feet; said curve having a radius of 130.00 feet, a central angle of 100°25'13", a chord bearing of S66°25'33"E, and a chord length of 199.78 feet;
Thence N63°21'50"E a distance of 252.67 feet to a curve to the right for a distance of 110.40 feet;
Said curve having a radius of 170.00 feet; a central angle of 37°12'28", a chord bearing of N81°58'04"E, and a chord length of 108.47 feet;
Thence S79°25'42"E a distance of 667.62 feet to a curve to the right for a distance of 185.84 feet;
Said curve having a radius of 220.00 feet, a central angle of 48°23'55", a chord bearing of S55°14'43"E, and a chord length of 180.36 feet;
Thence S29°51'52"E a distance of 143.84 feet;
Thence S33°00'00"W a distance of 525.20 feet;
Thence N81°11'19"W a distance of 1668.41 feet;
Thence N64°02'52"W a distance of 437.00 feet;
Thence N0°00'00"E a distance of 285.08 feet to the Point of Beginning.

Said tract contains 28.81 acres, more or less and is subject to all easements.

The above described tract of land is to be known and designated as THE CORRAL P.U.D. SUBDIVISION, and the roads, access, and utility easements shown on said plat are hereby granted for the use of the Yellowstone Mountain Club Property Owners Association and the Yellowstone Mountain Club Owners, their heirs, successors and assigns, forever.

CERTIFICATE OF EXEMPTION

I certify that tract OPEN SPACE 1 is exempt from Montana Department of Environmental Quality review pursuant to Section 17.36.605(2)(a) ARM , which excludes parcels that have no existing facilities for water supply, waste water disposal, storm drainage, and solid waste disposal, if no new facilities will be constructed on the parcels.

WAIVER OF RIGHT TO PROTEST

We, the undersigned property owners of this subdivision, do hereby waive the right to protest creation of Rural Improvements Districts. In doing so, we do not waive any right to comment, and or appeal any assessment formula which may be proposed if we believe it to be inequitable. The waiver shall be binding upon the heirs, assigns, and purchasers of all lots within this subdivision.

Yellowstone Development, LLC,
a Montana limited liability company

BY: YC Holdings LLC, a Delaware limited liability company, its sole member

BY: CH YC Manager LLC, a Delaware limited liability company, its sole manager

BY: _____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Development, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

Yellowstone Mountain Club, LLC,
a Montana limited liability company

BY: YC Holdings LLC, a Delaware limited liability company, its sole member

BY: CH YC Manager LLC, a Delaware limited liability company, its sole manager

BY: _____
Name: Patrick O'Sullivan
Title: Managing Director and Chief Financial Officer

Commonwealth of Massachusetts)
) ss:
County of Suffolk)

On this _____ day of _____, 2016, before me appeared Patrick O'Sullivan, to me personally known or proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached instrument, who, being by me duly sworn (or affirmed), did say that he signed said instrument voluntarily for its stated purpose as the Managing Director and Chief Financial Officer of CH YC Manager LLC, a Delaware limited liability company, in its capacity as the sole manager of YC Holdings LLC, a Delaware limited liability company, in its capacity as the sole member of Yellowstone Mountain Club, LLC, a Montana limited liability company.

_____ (official signature and seal of notary)
Notary Public
My commission expires: _____

CERTIFICATE OF SURVEYOR

I, the undersigned, Hans J. Streufert, Professional Land Surveyor, do hereby certify that the survey shown on the attached plat of THE CORRAL P.U.D. SUBDIVISION was performed under my supervision, that said survey was made between _____ and _____; that said survey is true and complete as shown and that the monuments are of the character and nature and occupy the positions shown thereon. I further certify that in accordance with ARM 24.183.1101(1)(d), monuments which have not been set by the filing date of this instrument due to public improvements construction or weather conditions will be set by _____, 2016.

Dated this _____ day of _____, 2016.

_____
Hans J. Streufert, PLS
MT Reg No. 16971LS
Morrison-Maierle, Inc.

CERTIFICATE OF COUNTY TREASURER

I hereby certify, pursuant to Section 76-3-611(1)(b), MCA, that no real property taxes or special assessments assessed and levied on the land described below and encompassed by the proposed plat of THE CORRAL P.U.D. SUBDIVISION are delinquent:

See Legal Description of land

Dated this _____ day of _____, 2016.

_____
Treasurer of Madison County

CERTIFICATE OF COUNTY COMMISSION

The County Commission of Madison County, Montana does hereby certify that it has examined this subdivision plat and, having found the same to conform to law, approves it this _____ day of _____, 2016.

ATTEST:

_____ _____ _____, Montana
Commissioner

_____ _____ _____, Montana
Commissioner

_____ _____ _____, Montana
Commissioner

CERTIFICATE OF CLERK AND RECORDER

STATE OF MONTANA)
) ss.
County of Madison)

Filed for record this _____ day of _____, 2016, at _____ o'clock.

BK._____ Pg._____ Doc. #_____

_____
Madison County Clerk and Recorder

MORRISON MAIERLE, INC.
An Employee-Owned Company
ENGINEERS SCIENTISTS SURVEYORS PLANNERS SINCE 1945
PO Box 1113, 2880 Technology Blvd. W., Bozeman, MT. 59771 Phone: (406) 587-0487 Fax: (406) 522-6702

1/4 SEC.	SECTION	TOWNSHIP	RANGE
NW	7	7S	3E

PRINCIPAL MERIDIAN, MONTANA
MADISON COUNTY, MONTANA

CLIENT: YELLOWSTONE DEVELOPMENT

FIELD WORK: MMI
DRAWN BY: JCH
CHECKED BY: HJS

DATE: 10/12/16
SCALE: 1"=100'
PROJ #:

PLOTTED DATE: Oct/11/2016 – 05:07:29 pm
DRAWING NAME: K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\PREPLAT\CORR
SHEET 1 OF 2
PLOTTED BY: GroundFloor

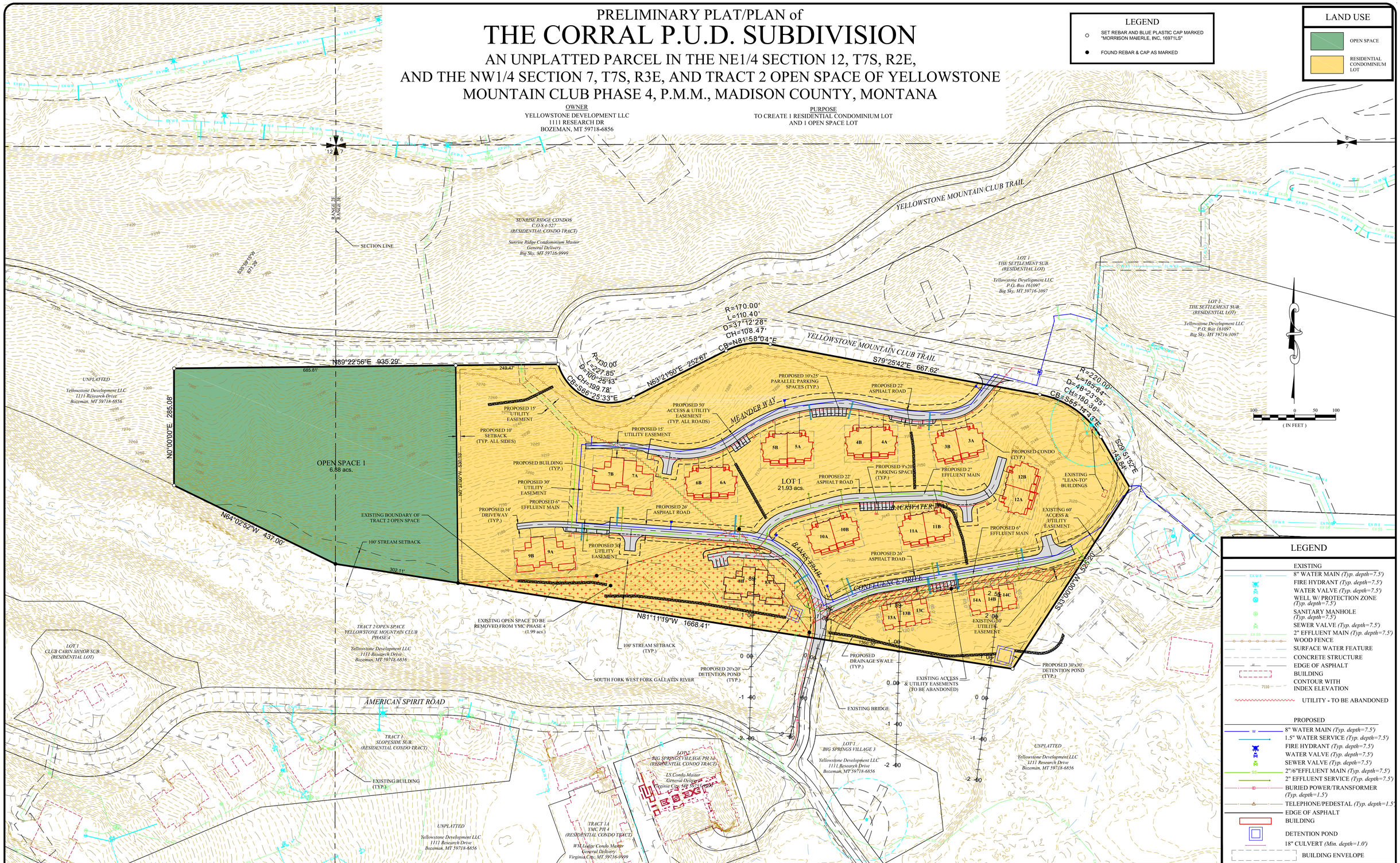
PRELIMINARY PLAT/PLAN of

THE CORRAL P.U.D. SUBDIVISION

AN UNPLATTED PARCEL IN THE NE1/4 SECTION 12, T7S, R2E, AND THE NW1/4 SECTION 7, T7S, R3E, AND TRACT 2 OPEN SPACE OF YELLOWSTONE MOUNTAIN CLUB PHASE 4, P.M.M., MADISON COUNTY, MONTANA

OWNER
YELLOWSTONE DEVELOPMENT LLC
1111 RESEARCH DR
BOZEMAN, MT 59718-6856

PURPOSE
TO CREATE 1 RESIDENTIAL CONDOMINIUM LOT
AND 1 OPEN SPACE LOT



LEGEND

EXISTING
- 8" WATER MAIN *(Typ. depth=7.5')*
- FIRE HYDRANT *(Typ. depth=7.5')*
- WATER VALVE *(Typ. depth=7.5')*
- WELL W/ PROTECTION ZONE *(Typ. depth=7.5')*
- SANITARY MANHOLE *(Typ. depth=7.5')*
- SEWER VALVE *(Typ. depth=7.5')*
- 2" EFFLUENT MAIN *(Typ. depth=7.5')*
- WOOD FENCE
- SURFACE WATER FEATURE
- CONCRETE STRUCTURE
- EDGE OF ASPHALT
- BUILDING
- CONTOUR WITH INDEX ELEVATION
- UTILITY - TO BE ABANDONED

PROPOSED
- 8" WATER MAIN *(Typ. depth=7.5')*
- 1.5" WATER SERVICE *(Typ. depth=7.5')*
- FIRE HYDRANT *(Typ. depth=7.5')*
- WATER VALVE *(Typ. depth=7.5')*
- SEWER VALVE *(Typ. depth=7.5')*
- 2"/6"EFFLUENT MAIN *(Typ. depth=7.5')*
- 2" EFFLUENT SERVICE *(Typ. depth=7.5')*
- BURIED POWER/TRANSFORMER *(Typ. depth=1.5')*
- TELEPHONE/PEDESTAL *(Typ. depth=1.5')*
- EDGE OF ASPHALT
- BUILDING
- DETENTION POND
- 18" CULVERT *(Min. depth=1.0')*
- BUILDING ENVELOPE

NOTES:
- ALL AREAS OUTSIDE OF THE BUILDING ENVELOPE WILL BE CONSIDERED COMMON AREAS
- CONTOUR INTERVAL = 2'

MORRISON MAIERLE, INC.
An Employee-Owned Company
ENGINEERS SCIENTISTS SURVEYORS PLANNERS SINCE 1945
PO Box 1113, 2880 Technology Blvd. W, Bozeman, MT, 59771 Phone: (406) 587-0687 Fax: (406) 522-6702

1/4 SEC.	SECTION	TOWNSHIP	RANGE
NW	7	7S	3E

PRINCIPAL MERIDIAN, MONTANA
MADISON COUNTY, MONTANA

CLIENT: YELLOWSTONE DEVELOPMENT

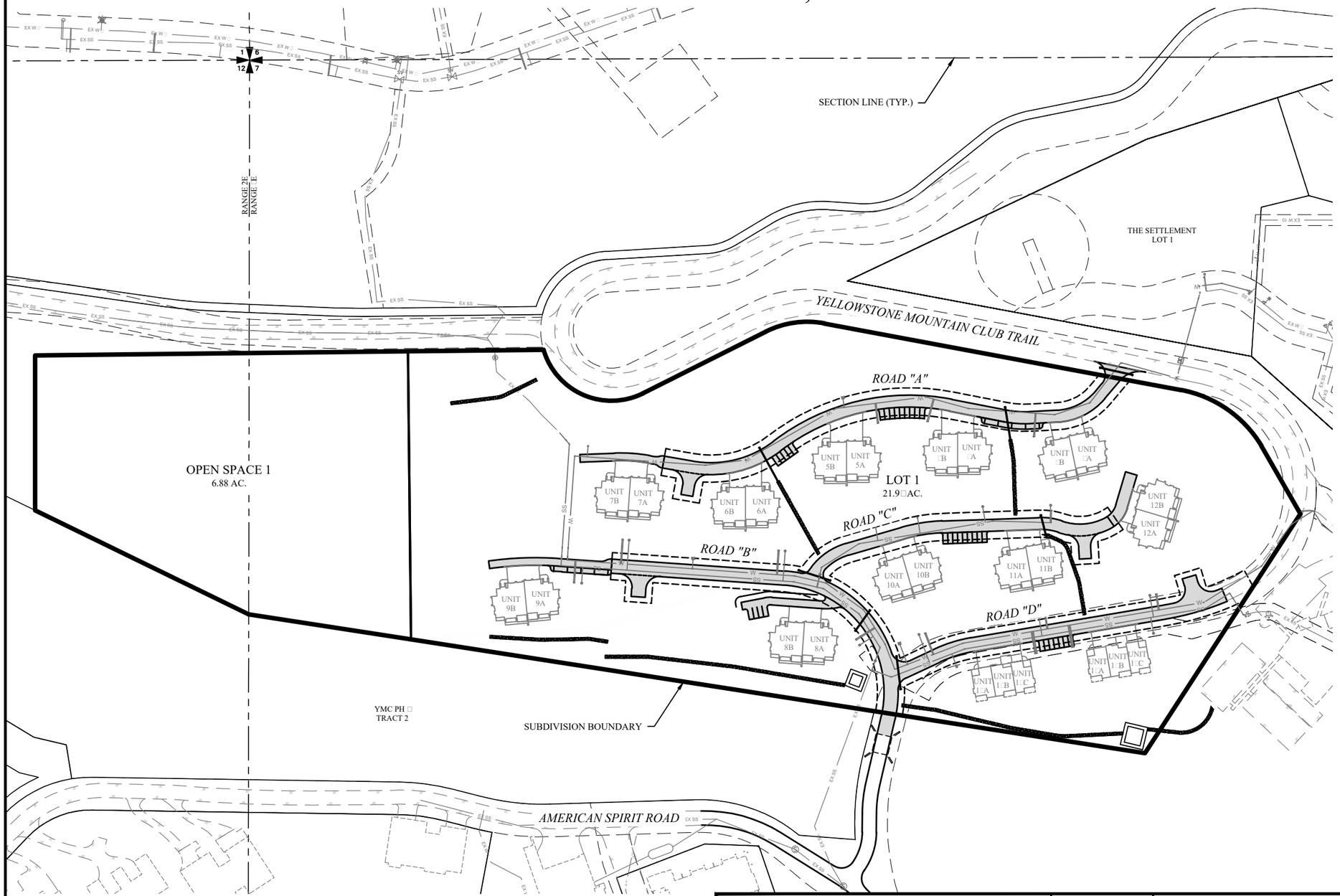
FIELD WORK: MMI
DRAWN BY: JCH
CHECKED BY: HJS

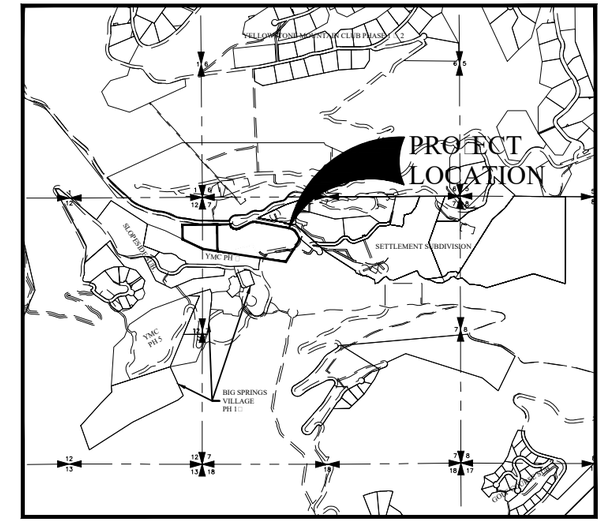
DATE: 10/12/16
SCALE: 1"=100'
PROJ #:

PLOTTED DATE: Oct/11/2016 – 05:05:09 pm
DRAWING NAME: K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\PREPLAT\CORR
SHEET 2 OF 2 PLOTTED BY: GroundFloor

Appendix P

CONSTRUCTION DRAWINGS
FOR
THE CORRAL P.U.D. SUBDIVISION
MADISON COUNTY, MONTANA





VICINITY MAP

SCALE 1" 000

SHEET NO.	DRAWING NO.	TITLE
GENERAL		
1	G 1	COVER SHEET
2	G 2	MISCELLANEOUS LEGENDS AND NOTES
CIVIL SHEETS		
	C 1	SITE DEMOLITION PLAN
	GD 1	OVERALL GRADING DRAINAGE PLAN
ROAD SHEETS		
5	R 1	ROAD "A" PLAN PROFILE STA 0 00 STA 6 50
6	R 2	ROAD "A" PLAN PROFILE STA 6 50 STA 10 81
7	R	ROAD "B" PLAN PROFILE STA 2 91 STA 7 00
8	R	ROAD "B" PLAN PROFILE STA 7 00 STA 12 25
9	R 5	ROAD "C" PLAN PROFILE
10	R 6	ROAD "D" PLAN PROFILE
11	R 7	UNIT 8 DRIVEWAY RETAINING WALL
WATER SHEETS		
12	W 1	WATER LINE "A" STA 0 00 STA 6 97
1	W 2	WATER LINE "A" STA 6 97 STA 1 00
1	W	WATER LINE "A" STA 1 00 STA 17 28
15	W	WATER LINE "B" STA 0 00 STA 6 00
16	W 5	WATER LINE "B" STA 6 00 STA 12 50
17	W 6	WATER LINE "B" STA 12 50 STA 16 56
SEWER SHEETS		
18	SS 1	SEWER LINE "A" STA 0 00 STA 7 50
19	SS 2	SEWER LINE "A" STA 7 50 STA 1 25
20	SS	SEWER LINE "B"
21	SS	SEWER LINE "C"
DETAIL SHEETS		
22	D 1	ROAD SECTIONS DETAILS W STREET SIGNS
2	D 2	WATER DETAILS
2	D	SEWER DETAILS
25	D	STORMWATER DETAILS
26	D 5	BMP DETAILS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH

DATE: 6/2016

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\COVER SHEET.dwg Plotted on J n/2 2016

BIG_SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

COVER SHEET

PROJECT NO. 0001.061

FIGURE NUMBER G 1

MATERIAL SYMBOLS

- CONCRETE
- CMU PLAN
- CMU SECTION
- METAL STUD WALL PLAN
- STUD WALL PLAN
- MASONRY VENEER
- GYPSUM WALL BOARD
- RIGID INSULATION
- BATT INSULATION
- PLYWOOD
- STEEL
- WOOD, ROUGH CONTINUOUS
- WOOD, ROUGH NON□CONTINUOUS
- WOOD, FINISHED
- GROUND SURFACE
- ACOUSTICAL TILE

ARCHITECTURAL LEGEND

- ACTIVE
- INACTIVE
- INDICATES PAIR OF DOORS
- 3 — DOOR NUMBER
- F / A24 — WINDOW TYPE; DWG. NO. WINDOW ELEV. OCCURS ON
- 103 — ROOM NUMBER
- 1 — NOTE INDICATOR
- ACCESS HATCH
- INDICATE HINGE SIDE: SIDE WHERE LINES MEET (RIGHT SIDE ON SYMBOL)
- WALL — FIRE EXTINGUISHER "X" = NUMBER IN SPECS — FEXT–"X"

TOPOGRAPHIC LEGEND

- BOUNDARY AND/OR PROPERTY LINE
- FENCE LINE
- EASEMENT LINE
- SECTION LINE OR DLC LINE
- CENTERLINE
- BT — BURIED TELEPHONE
- E□ISTING ROAD
- E□ISTING CULVERT
- HORIZONTAL□VERTICAL CONTROL POINT
- CONTROL POINT
- COORDINATE POINT
- B□1 — BORING LOCATION AND NUMBER. SEE SPECS FOR BORING LOGS.
- □2□00 — SURVEY HUB AND TAC□ WITH STATION
- U.S. GOVERNMENT BOUNDARY MAR□ER. FOUND C.O.E. BRASS CAP STAMPED W□NO.
- BM□2 — BENCHMAR□ LOCATION AND NUMBER OR EASEMENT CORNER REBAR
- POINT OF INTERSECTION, SET 5□8"□18" REBAR W□L.S. CAP STAMPED "C□□29"
- P□□ — PIEZOMETER LOCATION AND NUMBER
- 1000 — E□ISTING GRADE
- 1000 — FINISH GRADE
- □2.6 — ELEVATION ORIGINAL GROUND
- EDGE OF TREES, BRUSH
- 12" — E□ISTING TREE W□APPRO□. TRUN□ DIAMETER
- BUSH
- NEW TREE AS SPECIFIED
- PROPOSED MANHOLE
- E□ISTING UTILITY OR TELEPHONE POLE
- NEW UTILITY OR TELEPHONE POLE
- DITCH SHOWING DIRECTION OF FLOW
- 1000 — E□ISTING CONTOUR
- 1000 — NEW CONTOUR
- □1 — E□ISTING EMBAN□MENT. SLOPE AS NOTED □
- □1 — NEW EMBAN□MENT OR CUT SLOPE. SLOPE AS NOTED □
- □□□ — HORIZONTAL DISTANCE □VERTICAL DISTANCE
- RIPRAP
- 23 / D-6 — SECTION REFERENCE ON PLAN□; SECTION NUMBER; SHEET ON WHICH SECTION APPEARS
- 23 / D-6 — DETAIL REFERENCE (ON PLAN OR DETAIL)□; SECTION REFERENCE (ON SECTION); DETAIL□SECTION NUMBER; SHEET ON WHICH DETAIL□SECTION (OR DETAIL□SECTION REFERENCE) APPEARS

NOTES:□

1. □SYMBOL USED ONLY WHERE RE□UIRED FOR CLARITY.
2. IN GENERAL, E□ISTING STRUCTURES AND FACILITIES ARE NOTED AS "E□ISTING" AND ARE SHOWN IN LIGHT LINE WEIGHTS, OR AS SCREENED BAC□GROUND. NEW STRUCT□URES ARE SHOWN IN HEAVY LINE WEIGHTS.

MECHANICAL LEGEND AND NOTES

GENERAL PIPING NOTES

1. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS. MINIMUM COVER SHALL BE 7'-6" UNLESS OTHERWISE SHOWN.
2. SIZE OF FITTINGS SHOWN ON DRAWINGS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
3. LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL BE AS SPECIFIED.
4. APPROPRIATE STANDARD WALL PIPE DETAIL SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.
5. ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.
6. SYMBOLS. LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE DRAWINGS, WHEREVER APPLICABLE. ALL OF THE VARIOUS APPLICATIONS ARE NOT NECESSARILY USED IN THE PROJECT.
7. THRUST BLOCKS ARE NOT GENERALLY SHOWN ON THE DRAWINGS. ALL BURIED PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT WELDED, GROOVED END OR SCREWED PIPING, SHALL BE PROVIDED WITH THRUST PROTECTION AT ALL DIRECTION CHANGES, UNLESS OTHERWISE NOTED. SEE THRUST DETAILS AND NOTES ON DRAWINGS.
8. WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTOR IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTOR.
9. VALVE BOXES REQUIRED FOR ALL VALVES IN A BURIED SERVICE.
10. NUMBER AND LOCATION OF UNIONS SHOWN ON DRAWINGS ARE ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.
11. THE CONTRACTOR FOR THIS CONTRACT IS RESPONSIBLE FOR THE COORDINATING AND PERFORMING THE CONNECTION OF THE PIPING AND ASSOCIATED APPURTENANCES INSTALLED UNDER THIS CONTRACT TO BOTH THE EXISTING PIPING AND FACILITIES AND TO THE WORK OF OTHER CONTRACTORS, AS NOTED.
12. PRIOR TO SUBMITTING PIPING DRAWINGS FOR ANY NEW PIPE THAT IS TO CONNECT TO AN EXISTING PIPE OR STRUCTURE, THE CONTRACTOR SHALL EXPOSE THE EXISTING PIPE OR STRUCTURE TO VERIFY ITS EXACT LOCATION. SIZE, MATERIALS. AND INVERT ELEVATIONS.

PIPING DESIGNATION

EXAMPLE

16"RW

16" RW

PIPE. USE FLOW STREAM IDENTIFICATION LEGEND, ON DWG. G-3. SEE PIPING SCHEDULE IN THE SPECIFICATIONS.

NOMINAL PIPE DIAMETER

VALVE DESIGNATIONS

CONTROL VALVES:

XV OR XCV — DESIGNATION ALL VALVES AS SHOWN ON P&IDs. X=PROCESS VARIABLE

FLOW DIRECTION

VALVE SYMBOL

MANUAL VALVES:

8"□V□00

SIZE OF VALVE

VALVE DESIGNATION

VALVE TYPE, SEE SPECIFICATIONS

GENERAL NOTES□

1. STANDARD SYMBOLS AND ABBREVIATIONS ARE SHOWN ON STANDARD LEGEND SHEETS. THEREFORE, SOME SYMBOLS OR ABBREVIATIONS SHOWN ON THE STANDARD LEGENDS MAY NOT BE SHOWN ON THE PLANS.

PIPE AND FITTING SYMBOLS

DOUBLE LINE / SINGLE LINE

- EXISTING PIPE (SCREENED)
- NEW PIPE
- EXISTING PIPE TO BE ABANDONED
- EXISTING PIPE TO BE REMOVED
- WELDED JOINT
- GROOVED END JOINT - FLEXIBLE
- GROOVED END JOINT - RIGID
- FLANGED JOINT
- MECHANICAL JOINT
- HUB & SPIGOT JOINT (RUBBER GASKET PUSH-ON)
- BALL JOINT
- FLANGE COUPLING ADAPTER
- FLEXIBLE COUPLING
- FLEXIBLE COUPLING WITH THRUST TIES
- STEEL BELLOWS EXPANSION JOINT
- ELASTOMER BELLOWS EXPANSION JOINT
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- LATERAL UP
- LATERAL DOWN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- UNION
- BLIND FLANGE
- PLUG
- CAP
- ANCHOR
- ELBOW 90 DEGREE
- CROSS
- TEE
- ELBOW 45 DEGREE
- LATERAL

NOTES:

1. ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS. FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.
2. SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.
3. EXISTING PIPE AND EQUIPMENT IS SHOWN LIGHT-LINED AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN HEAVY LINED.
4. UNDERGROUND PIPING MAY BE SHOWN DASHED ON MECHANICAL DRAWINGS.

VALVE SYMBOLS

- GV — GATE
- KF — KNIFE GATE
- BF — BUTTERFLY
- GLOBE
- BALL
- V — VEE-BALL
- SEAT PORT — ECCENTRIC PLUG W/REQUIRED SEAT LOCATION
- PLUG OR COCK
- FP — FULL PORT PLUG
- NEEDLE
- DIAPHRAGM
- PINCH
- SWING CHECK
- DOUBLE DISK CHECK
- BALL CHECK
- HOSE VALVE
- X — NON FREEZE HOSE VALVE X = NO. IN SPECS
- X — NON FREEZE HOSE VALVE WITH HOSE RACK X = NO. IN SPECS
- S — SAMPLE
- MUD
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE
- REGULATED SIDE — PRESSURE CONTROL
- MULTI-PORT VALVE (BALL VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN.) ARROWS INDICATE FLOW PATTERN. SEAT PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
- S — SOLENOID

MISCELLANEOUS PIPING SYMBOLS

- STRAINER
- SIGHT GLASS
- FLEXIBLE (ELASTOMER) PIPE CONNECTION
- GAUGE WITH COCK
- THERMOMETER
- ROTAMETER
- A — GALVANIC ANODE
- XX — AIR SET XX = SUPPLY PRESSURE - PSIG
- PS 26-1-2 — TYPICAL INSTRUMENT SYMBOL (SEE I & C LEGEND)
- WATER BLOW OFF VALVE
- FIRE HYDRANT
- CATHODIC PROTECTION TEST STATION
- CATHODIC PROTECTION ANODE
- FILTER

GATE SYMBOLS

EL. VIEW / PLAN VIEW

- SLUICE
- BUTTERFLY
- FLAP
- SHEAR
- FABRICATED SLIDE

GENERAL DESIGN DESIGNATIONS

SECTION (LETTER) OR DETAIL (NUMERAL) DESIGNATION

A □□□

ON DRAWING WHERE SECTION OR DETAIL IS TA□EN□: DRAWING NUMBER WHERE SHOWN

ON DRAWING WHERE SECTION OR DETAIL IS SHOWN□: DRAWING NUMBER(S) WHERE TA□EN

DRAWING NUMBER (OR SAME DRAWING)

DETAIL AND SECTION DESIGNATION

STANDARD DETAIL NUMBER — □□□□□ — STANDARD DETAIL DESIGNATION SEE DRAWING D□1 THRU D□□ AT END OF DRAWINGS

PLUMBING FIXTURE INDENTIFICATION

DF	DRINKING FOUNTAIN
EEW	EMERGENCY EYE WASH
KSK	KITCHEN SINK
LAV	LAVATORY
SH	SHOWER
SK	SINK
SSH	SAFETY SHOWER
SSK	SERVICE SINK
WC	WATER CLOSET
WH	WATER HEATER
WS	WASH STATION
UR	URINAL
VC	VANITY CABINET

EXAMPLE: FIXTURE LEGEND — LAV — NO. IN SPECIFICATIONS

VALVE ACTUATOR SYMBOLS

- PA — PNEUMATIC w/ POSITIONER
- PS — PNEUMATIC w/ SOLENOID
- E — ELECTRIC
- EP — ELECTRIC w/ POSITIONER
- H — HYDRAULIC
- MANUAL
- S — SOLENOID

PIPE AND FITTING END PATTERNS

B	BELL
S	SPIGOT
F	FLANGE
PE	PLAIN END
GE	GROOVED END
M□	MECHANICAL □OINT
PO	PUSH□ON

E□AMPLE□ — M□ — F — PE

MISCELLANEOUS MECHANICAL/ PLUMBING SYMBOLS

- PS — PRESSURE SWITCH
- HOSE RACK (TYPE AS INDICATED)
- SSH–X — SAFETY SHOWER AND EYEWASH X = NO. IN SPECIFICATIONS
- XCO — X = F – FLOOR CLEANOUT; D – DECK CLEANOUT; W – WALL CLEANOUT; V – VENT CLEANOUT
- HD–XY — HUB DRAIN X = NO. IN SPECS Y – P WITH PRIMED TRAP
- FD–XY — FLOOR DRAIN X = NO. IN SPECS Y – P WITH PRIMED TRAP
- OD–X — OVERFLOW DRAIN X = NO. IN SPECS
- RD–X — ROOF DRAIN X = NO. IN SPECS
- AD–XY — AREA DRAIN X = NO. IN SPECS Y – P WITH PRIMED TRAP

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C., 2016

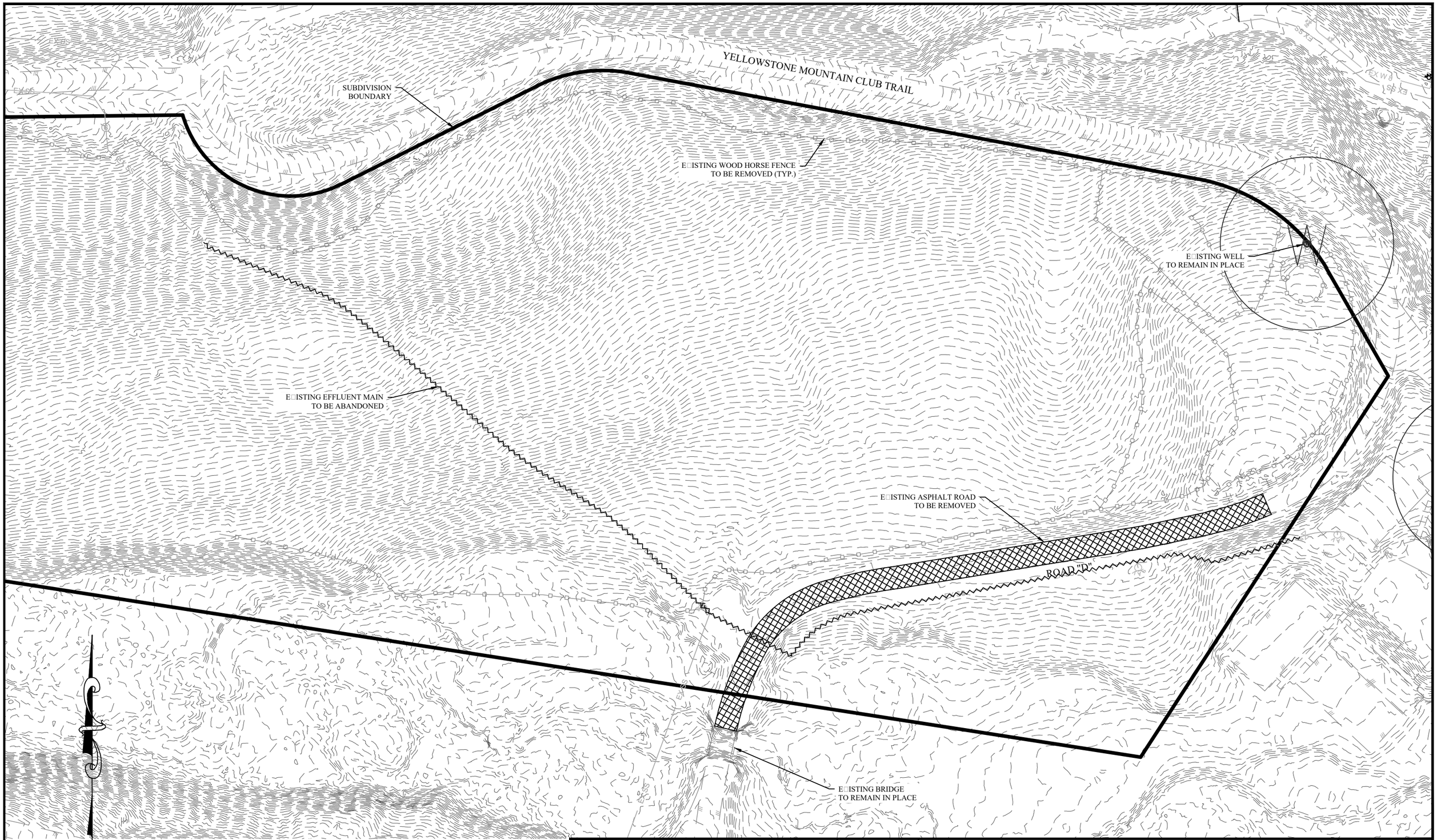
DRAWN BY: JCH
DATE: 06/2016

BIG_SKY — YELLOWSTONE MOUNTAIN CLUB THE CORRAL P.U.D. SUBDIVISION — MONTANA

MISCELLANEOUS LEGENDS AND NOTES

PROJECT NO. 0001.061

FIGURE NUMBER G□2



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
© COPYRIGHT HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\DEMO PLAN.dwg Plotted on J□n/2□/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

SITE DEMOLITION PLAN

PROJECT NO. 0001.061

FIGURE NUMBER C□1

YELLOWSTONE MOUNTAIN CLUB TRAIL

ROAD "A"

ROAD "B"

ROAD "C"

ROAD "D"

FLOWLINE (TYP.)

18" CMP CULVERT (TYP.)

PROPOSED ARMORED SWALE (TYP.). SEE DETAIL THIS SHEET

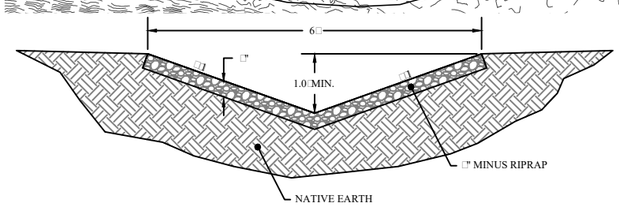
PROPOSED 2 2 DETENTION POND

PROPOSED 2 2 DETENTION POND

SOUTH FOR WEST FOR GALLATIN RIVER

UNIT 7B
UNIT 7A
UNIT 6B
UNIT 6A
UNIT 5B
UNIT 5A
UNIT 9B
UNIT 9A
UNIT 8B
UNIT 8A
UNIT 10B
UNIT 10A
UNIT 11A
UNIT 11B
UNIT 12B
UNIT 12A
UNIT A
UNIT B
UNIT 1A
UNIT 1B
UNIT 1C
UNIT 1D
UNIT 1E
UNIT 1F

0 100
(IN FEET)



ARMORED SWALE DETAIL

NTS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH

DATE: 6/2016

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\GRADING DRAINAGE.dwg Plotted on J n/2 2016

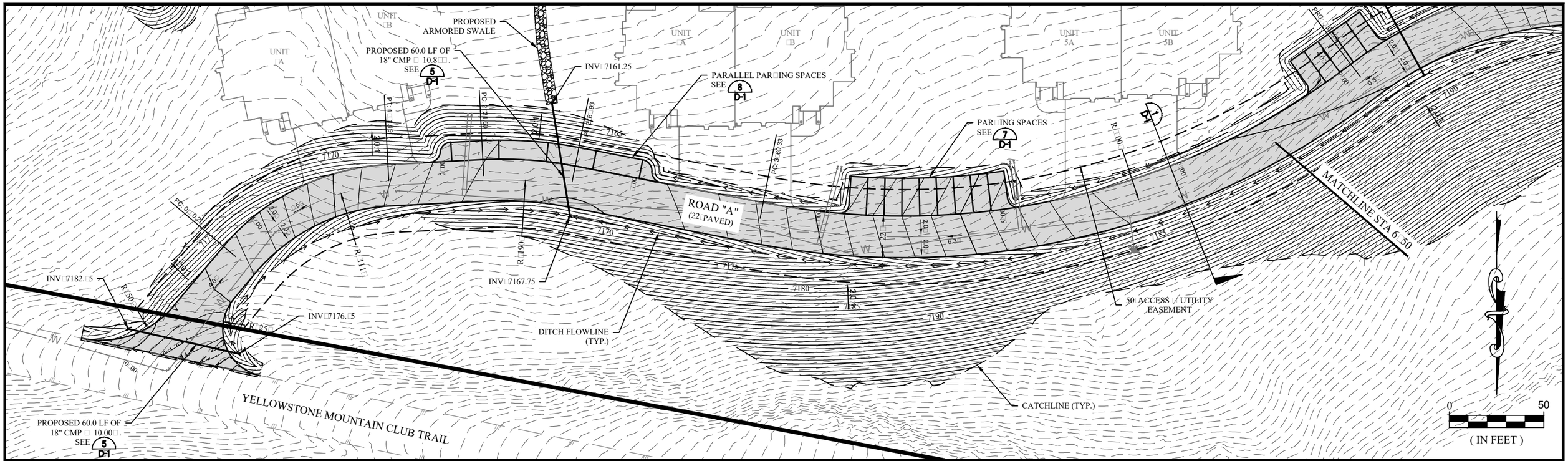
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION

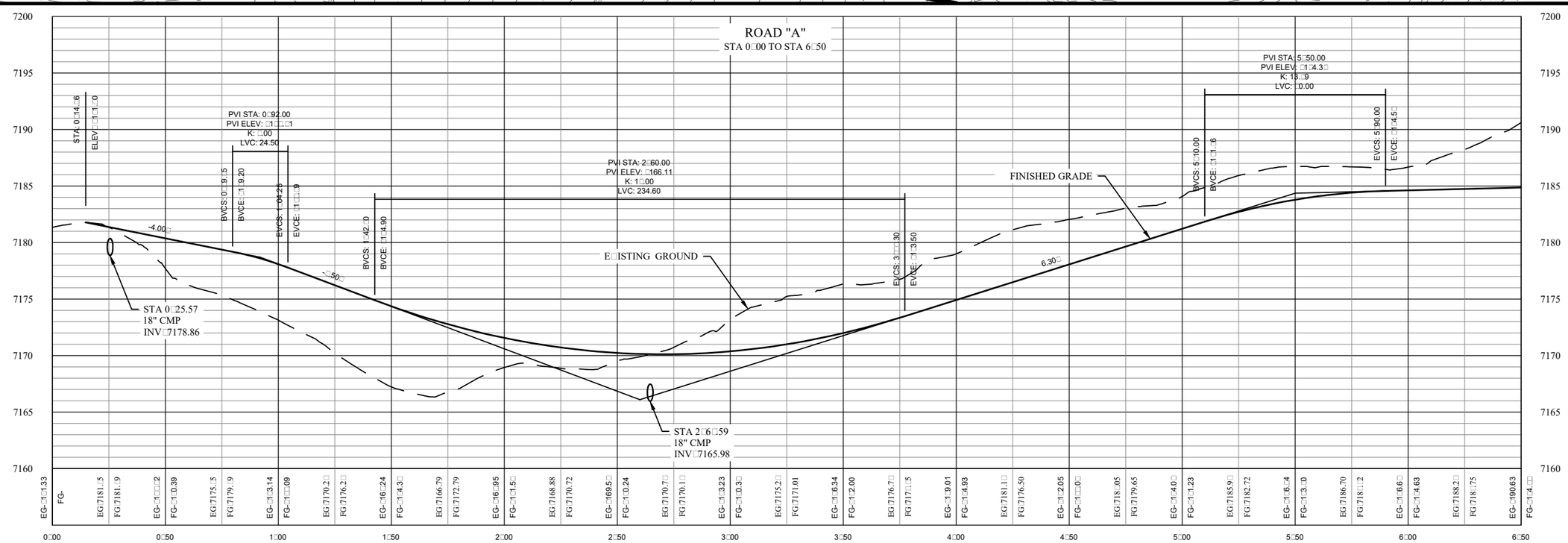
BIG SKY MONTANA

OVERALL GRADING PLAN

PROJECT NO. 0001.061

FIGURE NUMBER GD1





SCALE□
HORZ□1"□50□
VERT□1"□10□

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. □ 2016

DRAWN BY: JCH
DATE: 6/2016

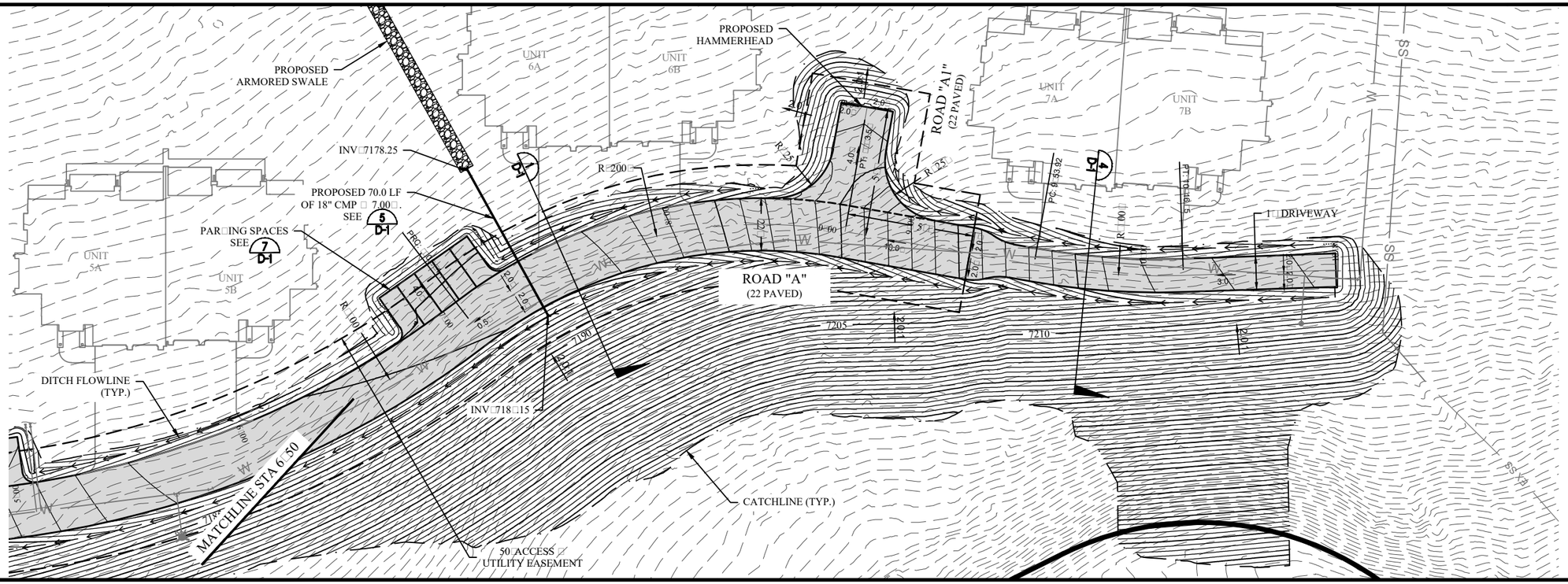
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on J□n/2□/2016

BIG_SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

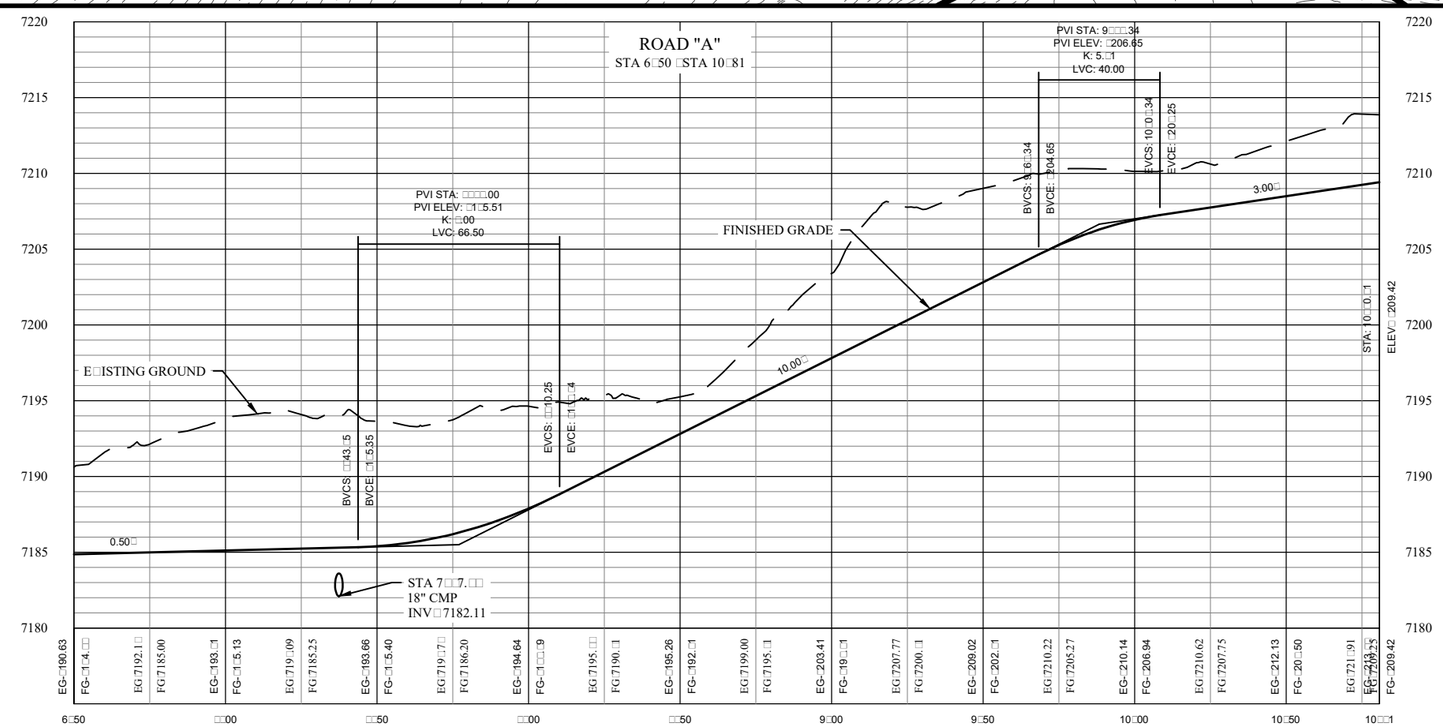
ROAD "A" PLAN □ PROFILE
STA 0□00 - STA 6□50

PROJECT NO. 0001.061

FIGURE NUMBER R□1



0 50
(IN FEET)



SCALE
HORZ 1" 50
VERT 1" 10

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

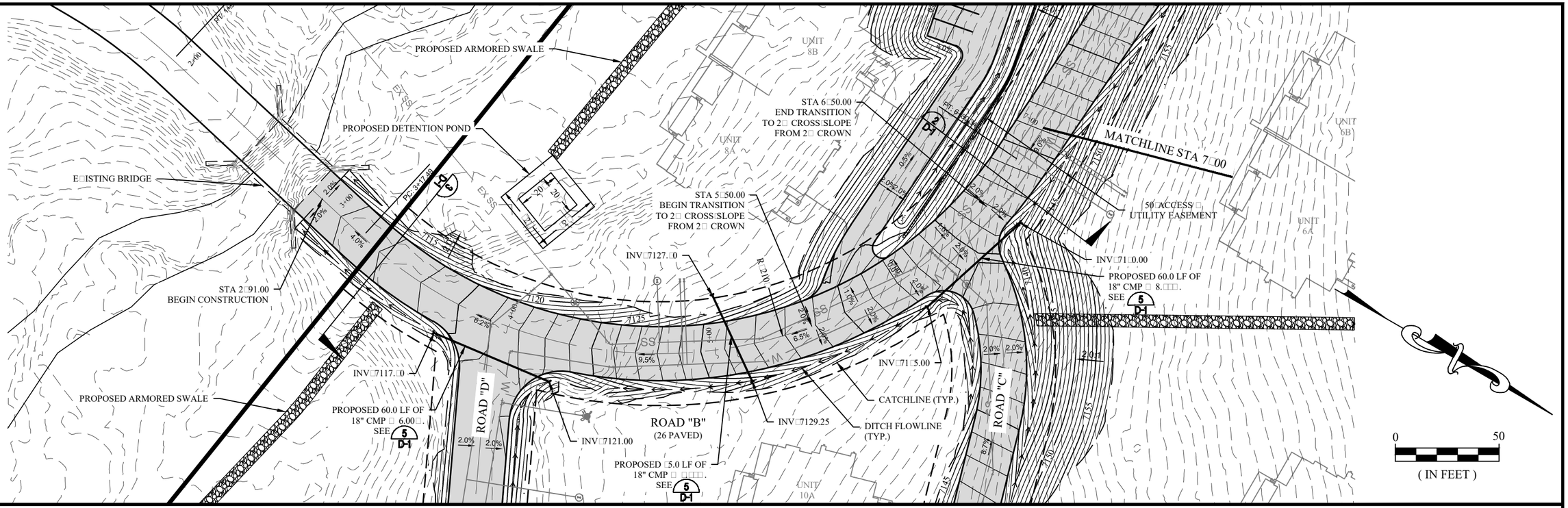
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on J n/2 /2016

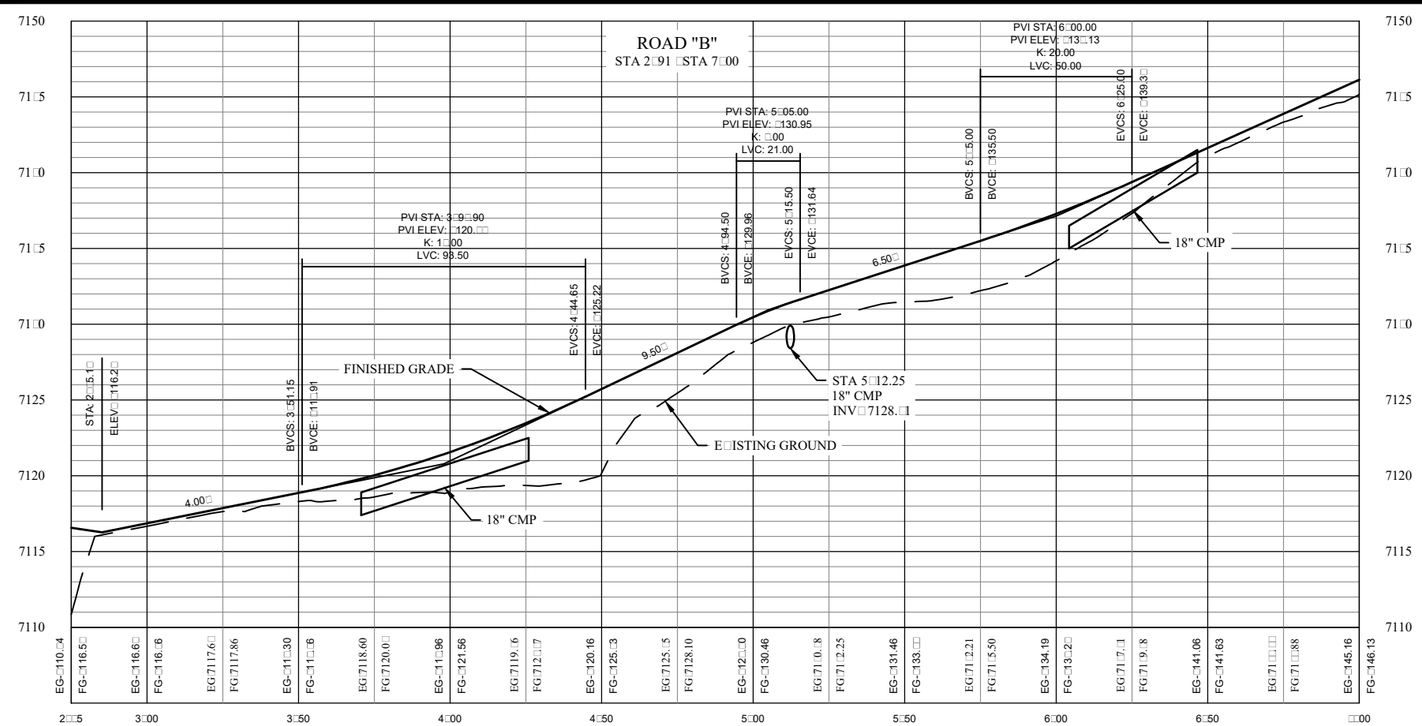
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

ROAD "A" PLAN PROFILE
STA 6+50 - STA 10+1

PROJECT NO.
0001.061

FIGURE NUMBER
R 2





HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 6/2016

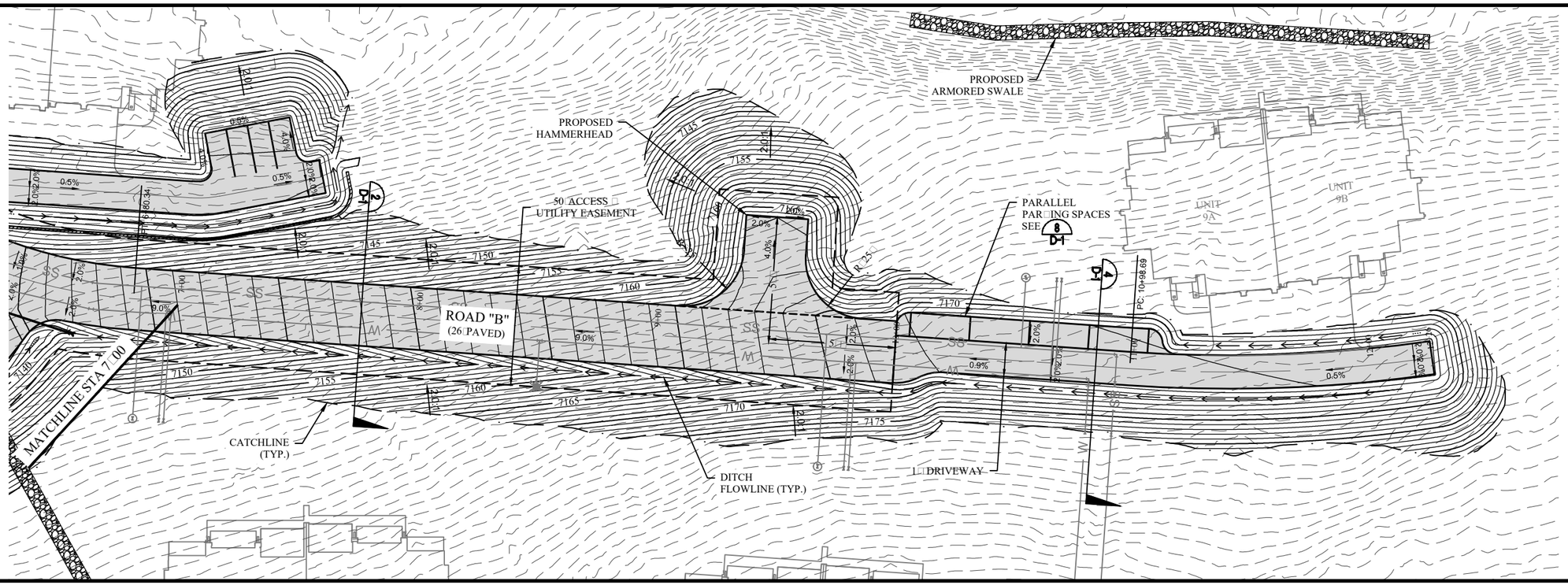
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on J□n/2□/2016

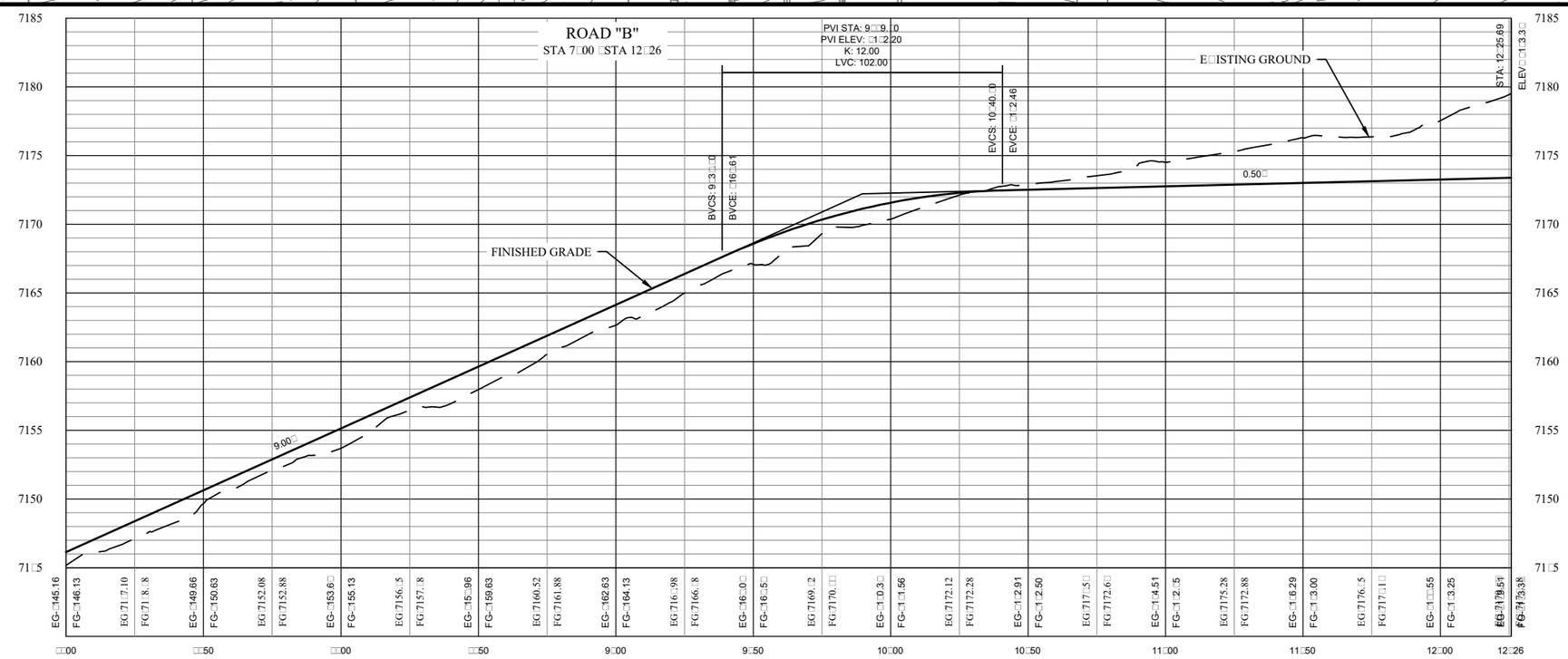
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

ROAD "B" PLAN □ PROFILE
STA 2□91 - STA □□00

PROJECT NO. 0001.061

FIGURE NUMBER
R□□





SCALE:
HORZ: 1" = 50'
VERT: 1" = 10'

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
© COPYRIGHT HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

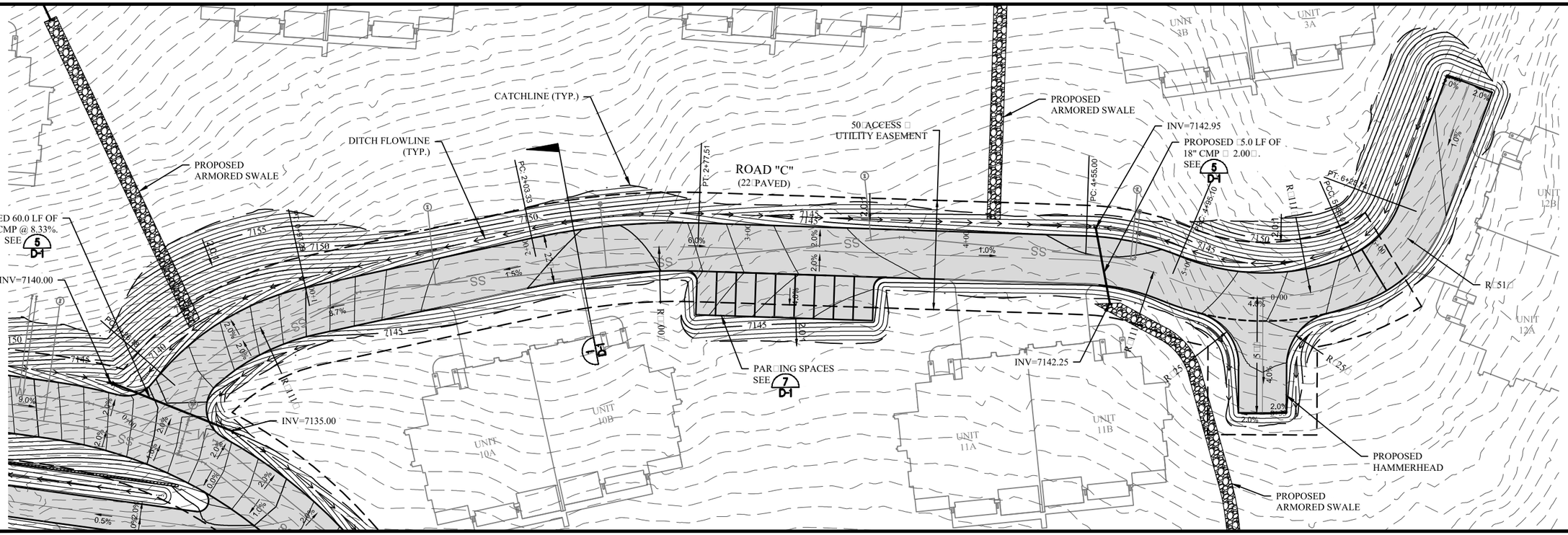
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on Jun/27/2016

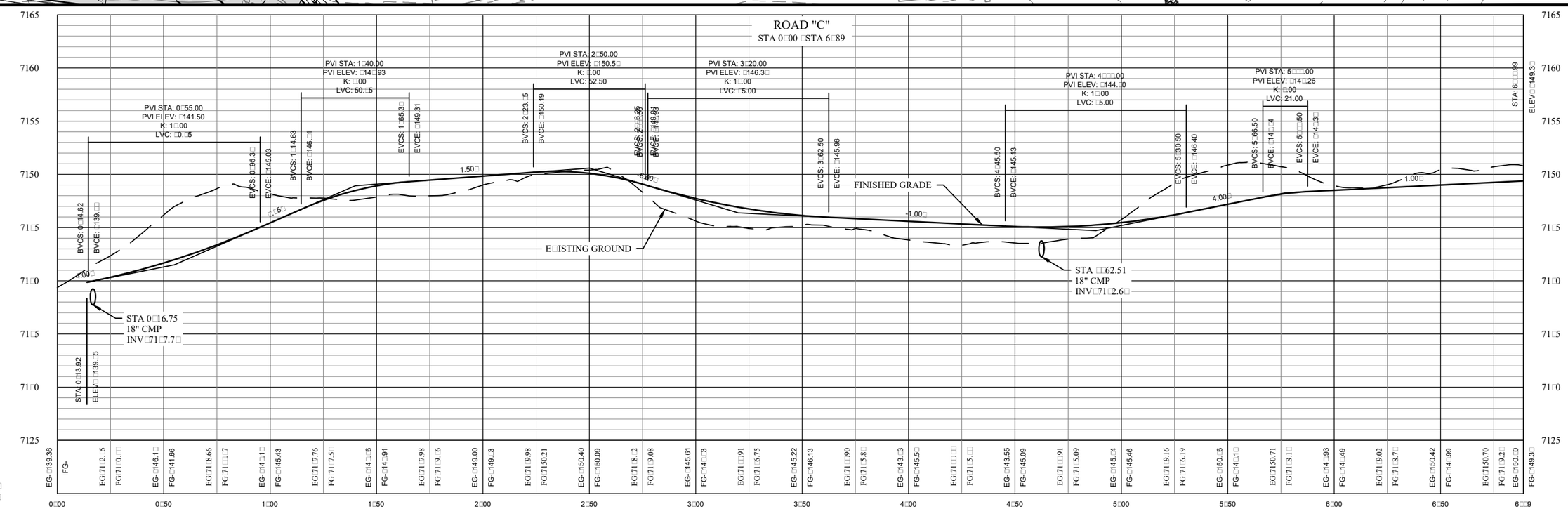
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

ROAD "B" PLAN & PROFILE
STA 7+00 - STA 12+25

PROJECT NO. 0001.061

FIGURE NUMBER R-[illegible]





HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

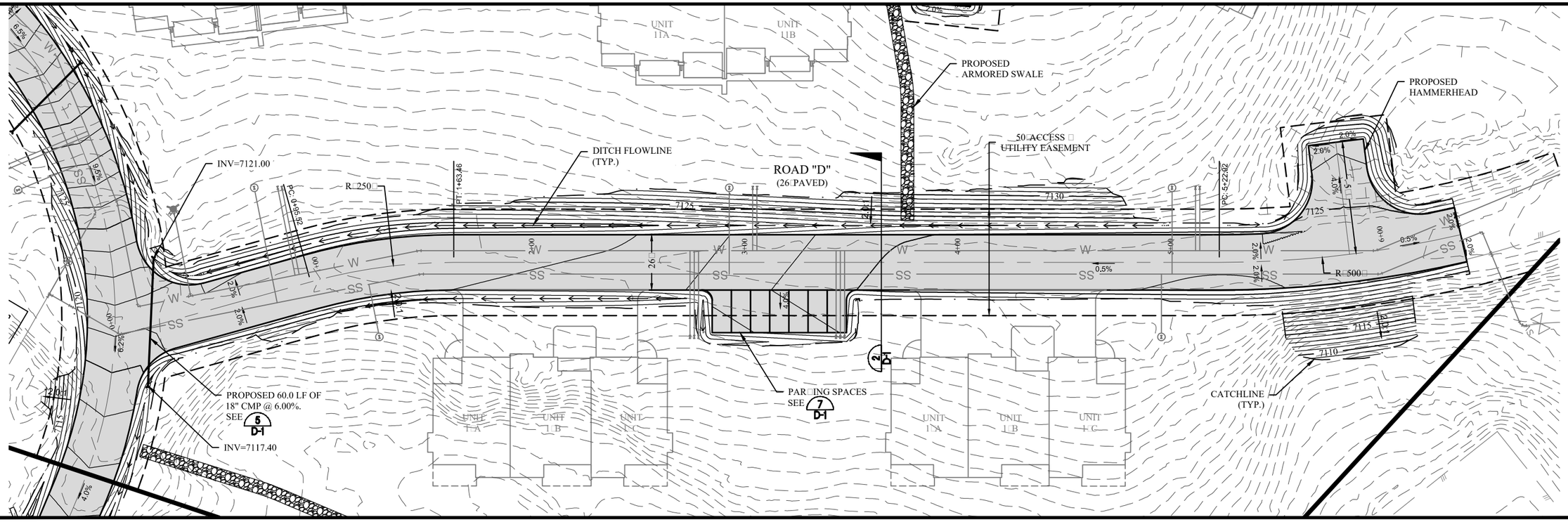
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on J n/2 /2016

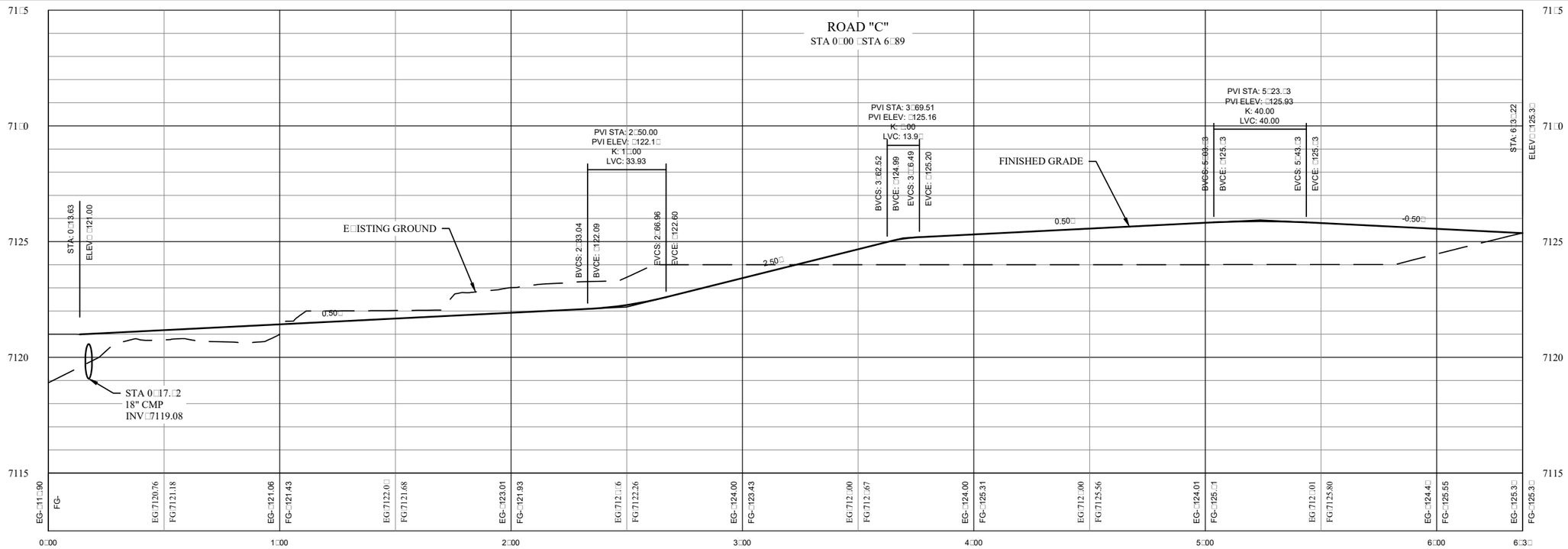
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

ROAD "C"
PLAN PROFILE

PROJECT NO. 0001.061

FIGURE NUMBER R5





SCALE
HORZ 1" 50
VERT 1" 5

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 6/2016

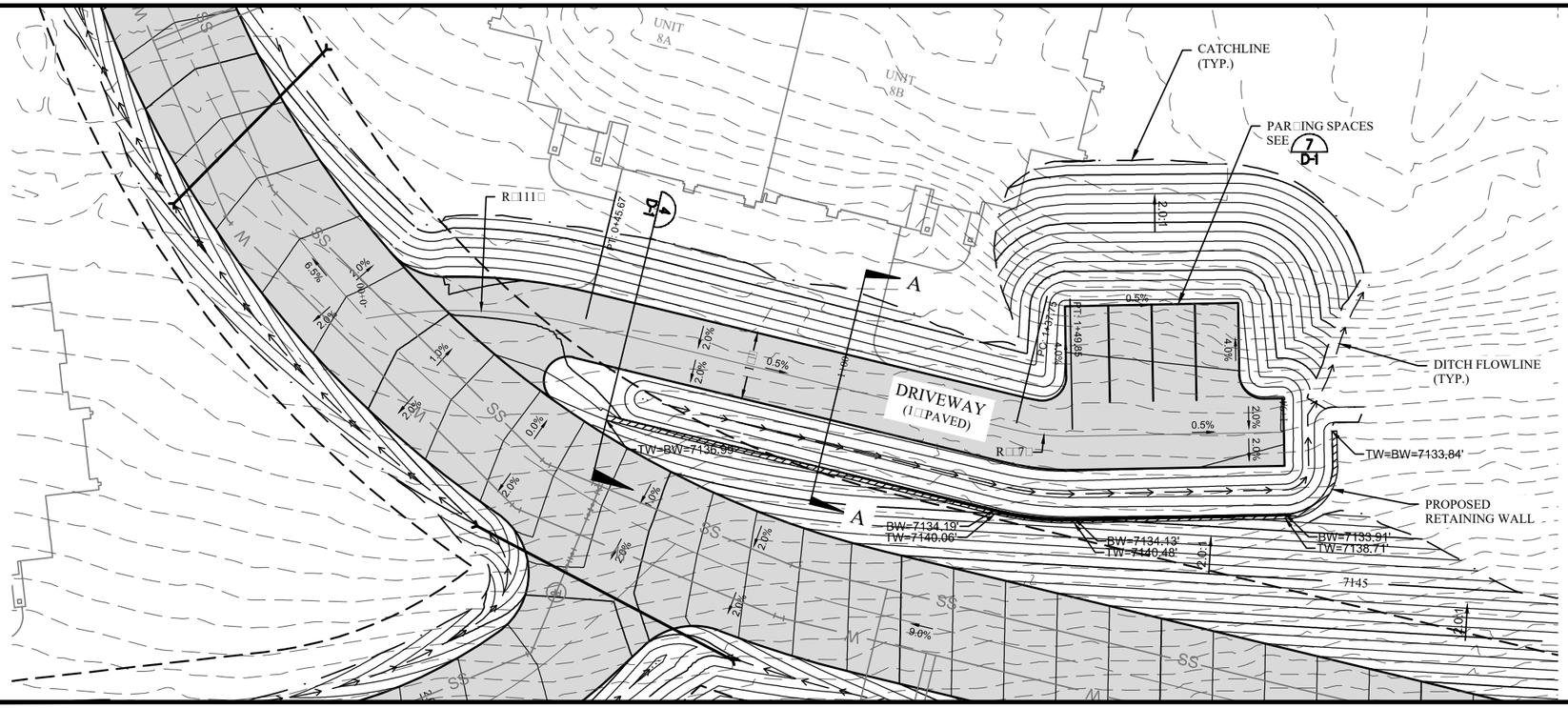
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on J n/2 /2016

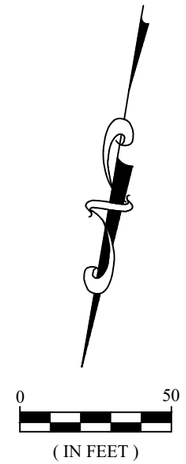
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

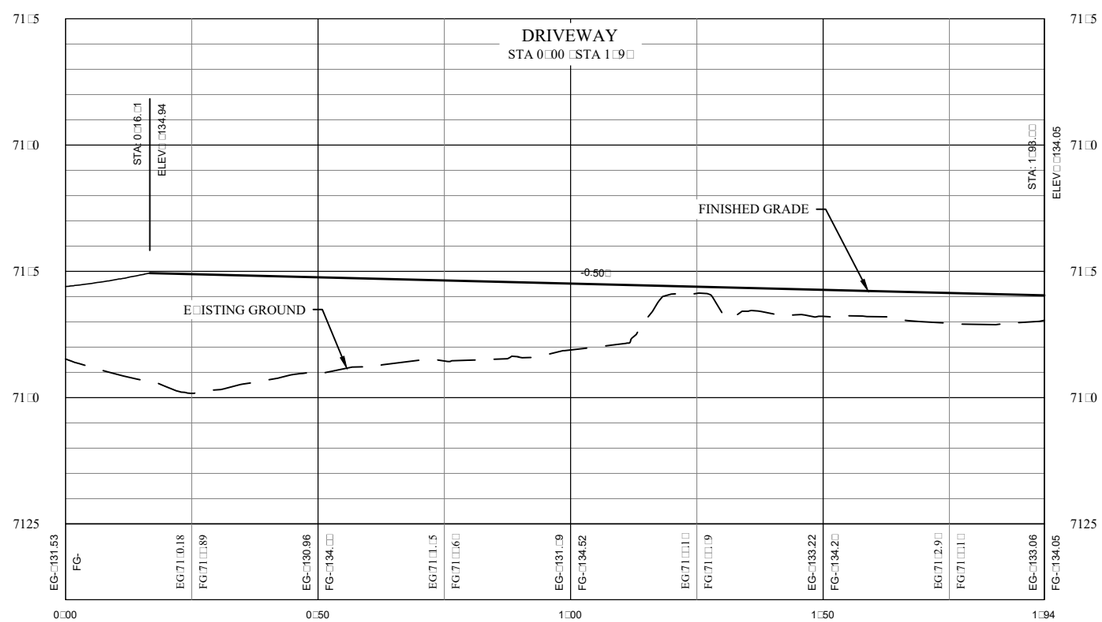
ROAD "D"
PLAN PROFILE

PROJECT NO. 0001.061

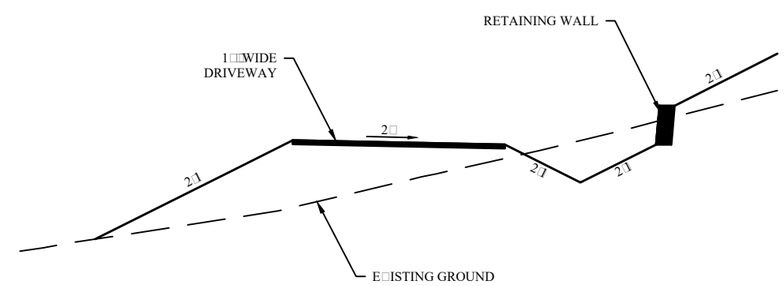
FIGURE NUMBER R6







SCALE□
HORZ□1"□0□
VERT□1"□6□



SECTION A□A
SCALE□1"□10□

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

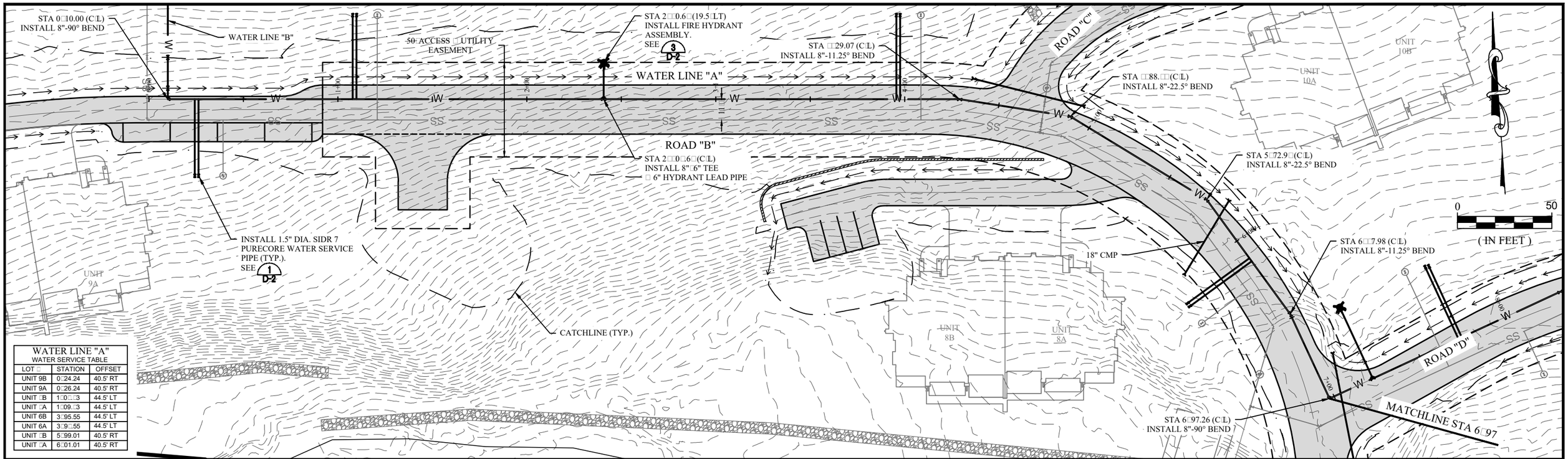
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\ROAD SHEETS.dwg Plotted on J□n/2□/2016

BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

UNIT □ DRIVEWAY / RETAINING WALL

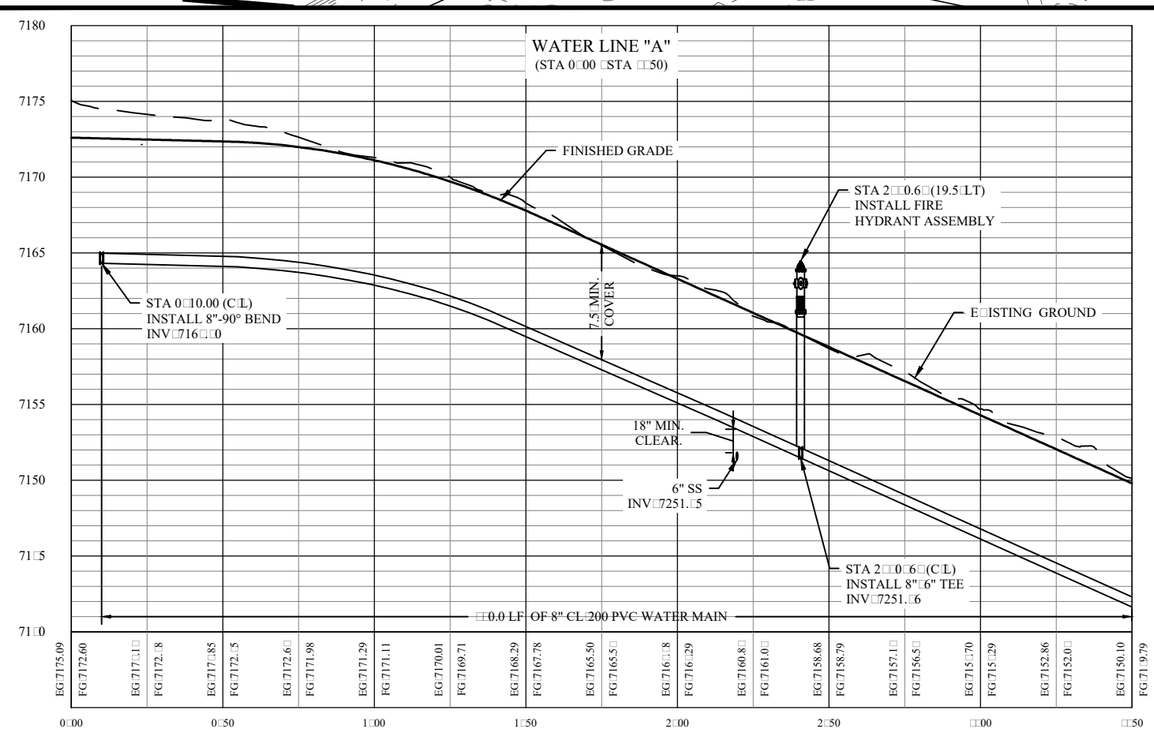
PROJECT NO. 0001.061

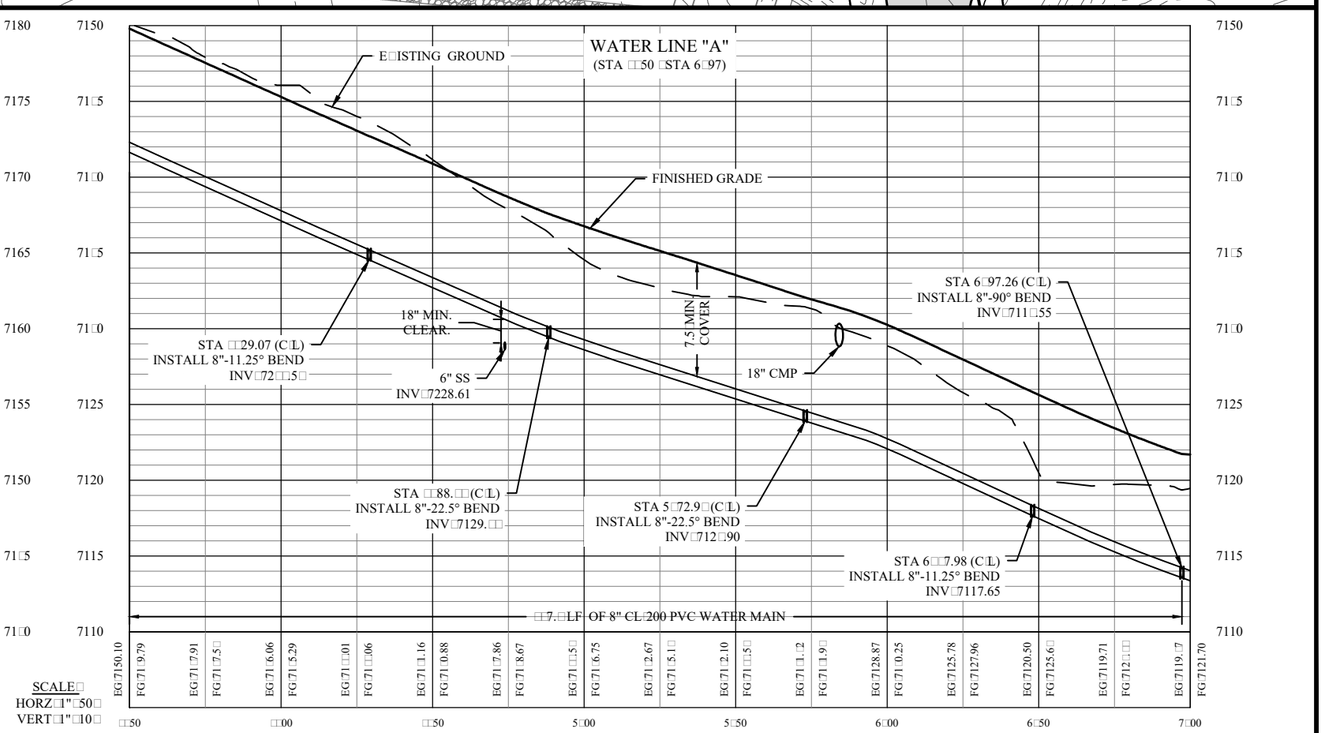
FIGURE NUMBER R□7



WATER LINE "A"
WATER SERVICE TABLE

LOT □	STATION	OFFSET
UNIT 9B	0□24.24	40.5' RT
UNIT 9A	0□26.24	40.5' RT
UNIT □B	1□0□□3	44.5' LT
UNIT □A	1□09.□3	44.5' LT
UNIT 6B	3□95.55	44.5' LT
UNIT 6A	3□9□55	44.5' LT
UNIT □B	5□99.01	40.5' RT
UNIT □A	6□01.01	40.5' RT





SCALE:□
HORZ:□1"□50□
VERT:□1"□10□

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

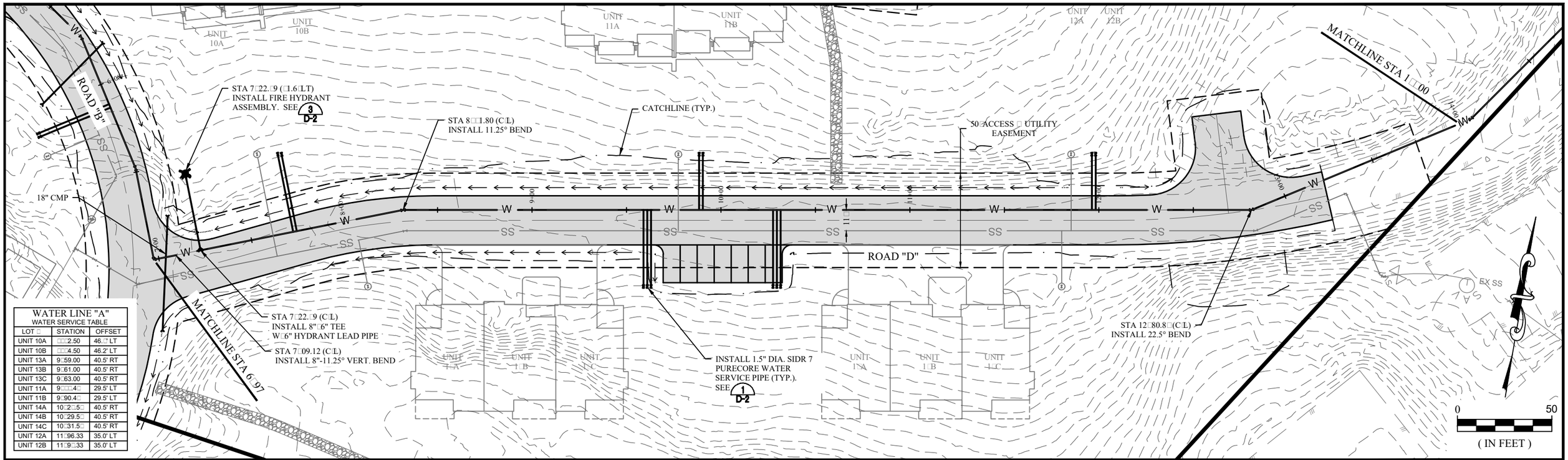
BIG_SKY — YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION — MONTANA

WATER LINE "A"
STA 0□00 - STA 6□9□

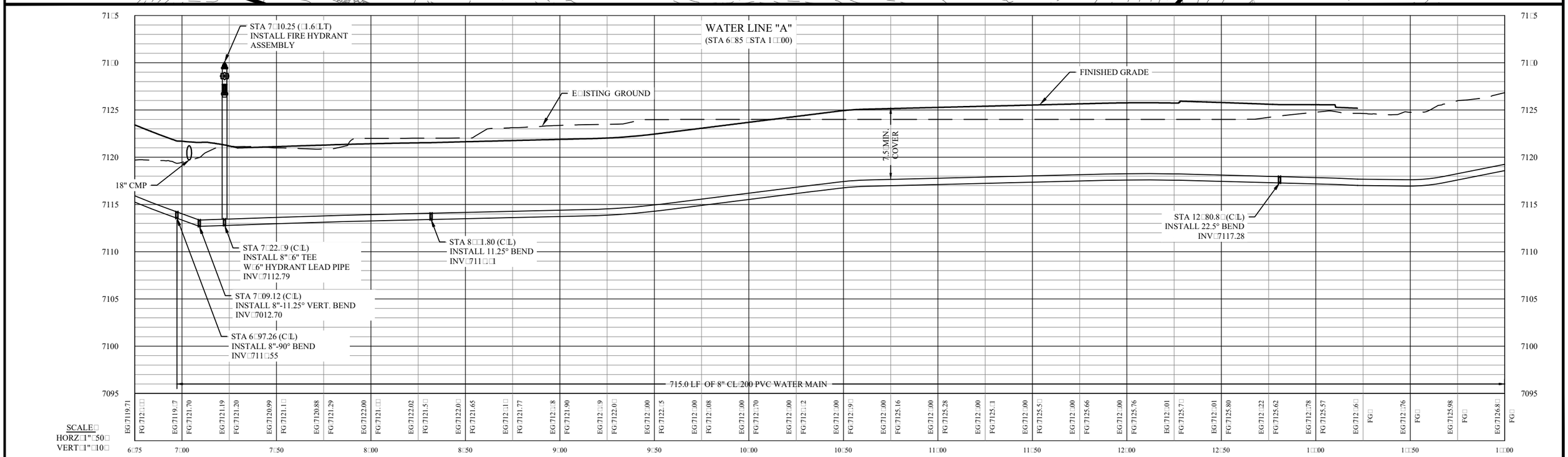
PROJECT NO. 0001.061

FIGURE NUMBER
W□1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\WATER SHEETS.dwg Plotted on J□n/2□/2016



WATER LINE "A" WATER SERVICE TABLE		
LOT □	STATION	OFFSET
UNIT 10A	□□□2.50	46.□ LT
UNIT 10B	□□□4.50	46.2' LT
UNIT 13A	9□59.00	40.5' RT
UNIT 13B	9□61.00	40.5' RT
UNIT 13C	9□63.00	40.5' RT
UNIT 11A	9□□□4□	29.5' LT
UNIT 11B	9□90.4□	29.5' LT
UNIT 14A	10□2□5□	40.5' RT
UNIT 14B	10□29.5□	40.5' RT
UNIT 14C	10□31.5□	40.5' RT
UNIT 12A	11□96.33	35.0' LT
UNIT 12B	11□9□33	35.0' LT



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
CONSULTING CIVIL ENGINEERS · ENGINEERING SURVEYORS

DRAWN BY: JCH
DATE: 6/2016

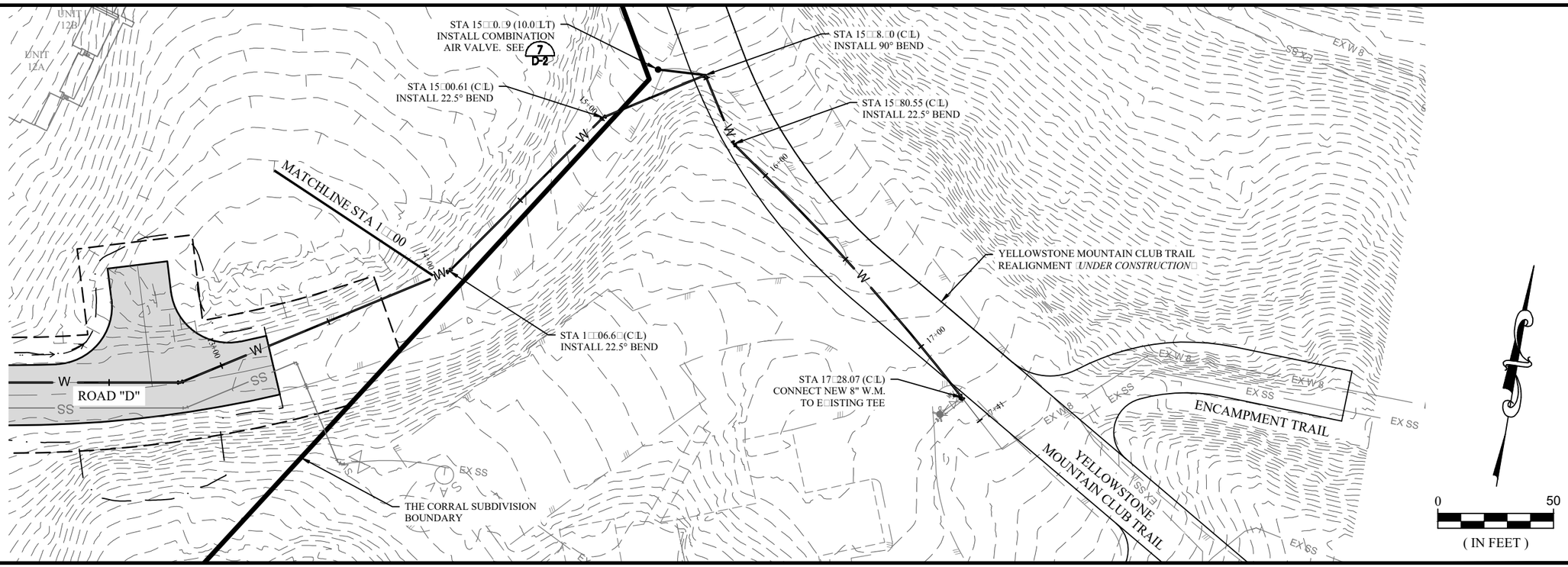
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\WATER SHEETS.dwg Plotted on J□n/2□/2016

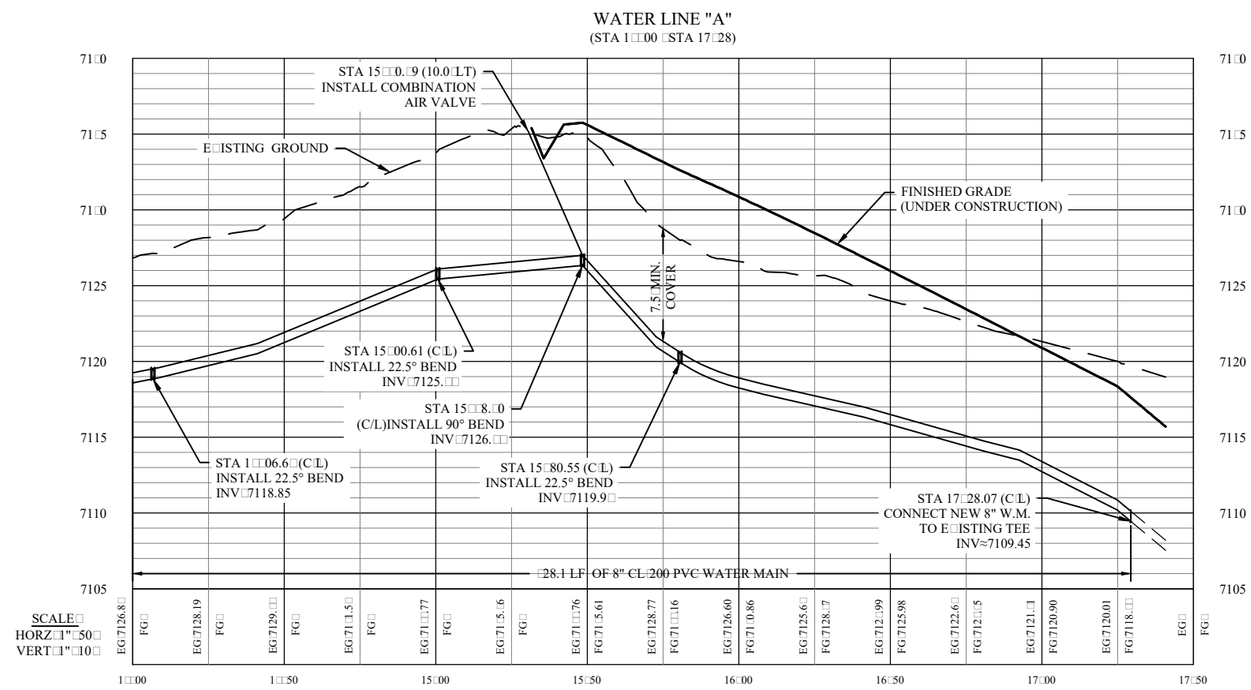
BIG_SKY — YELLOWSTONE MOUNTAIN CLUB — MONTANA
THE CORRAL P.U.D. SUBDIVISION

WATER LINE "A"
STA 6□9□ - STA 14□00

PROJECT NO. 0001.061

FIGURE NUMBER
W□2





HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 6/2016

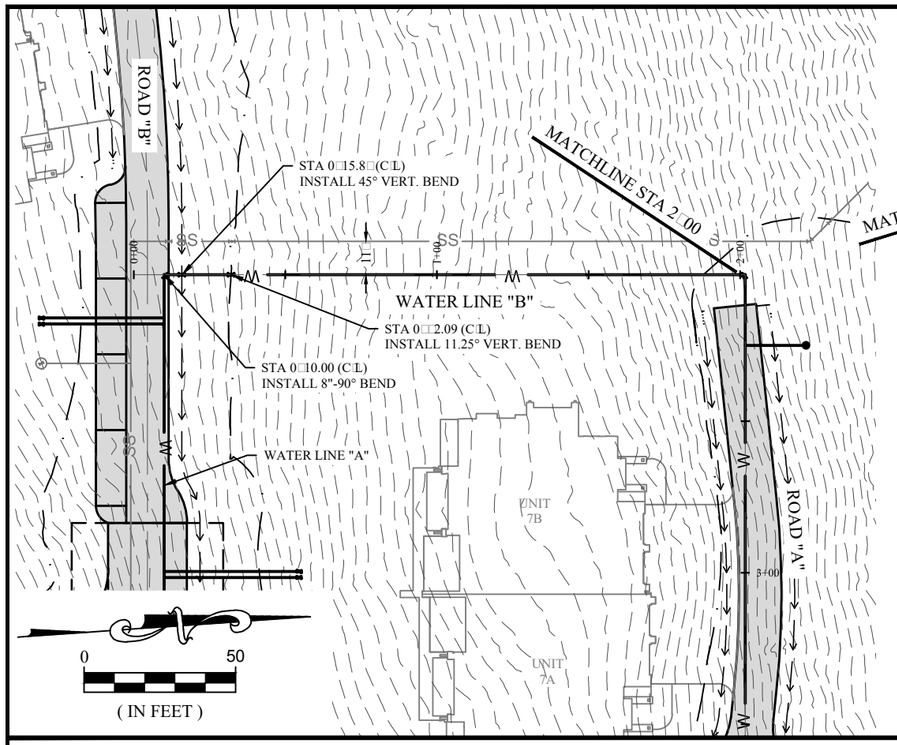
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

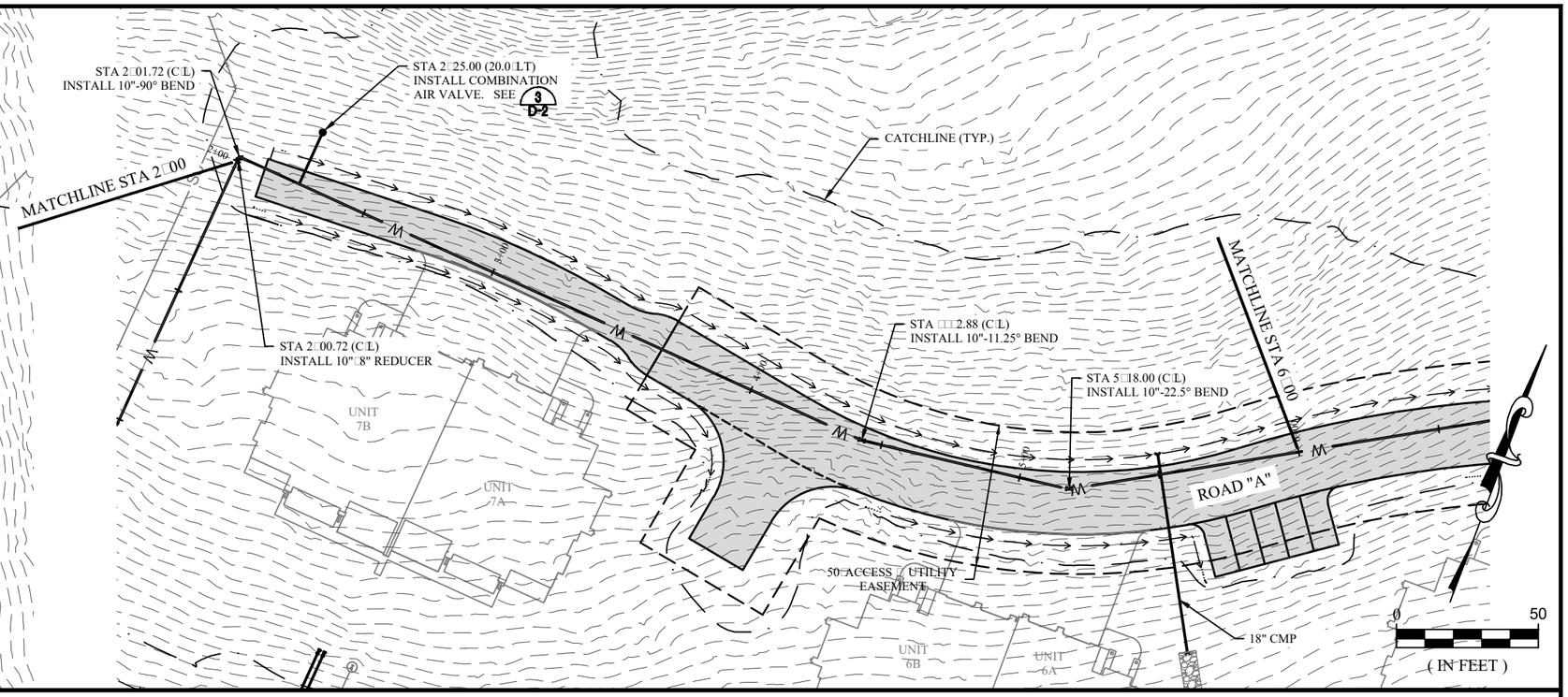
PROJECT NO. 0001.061

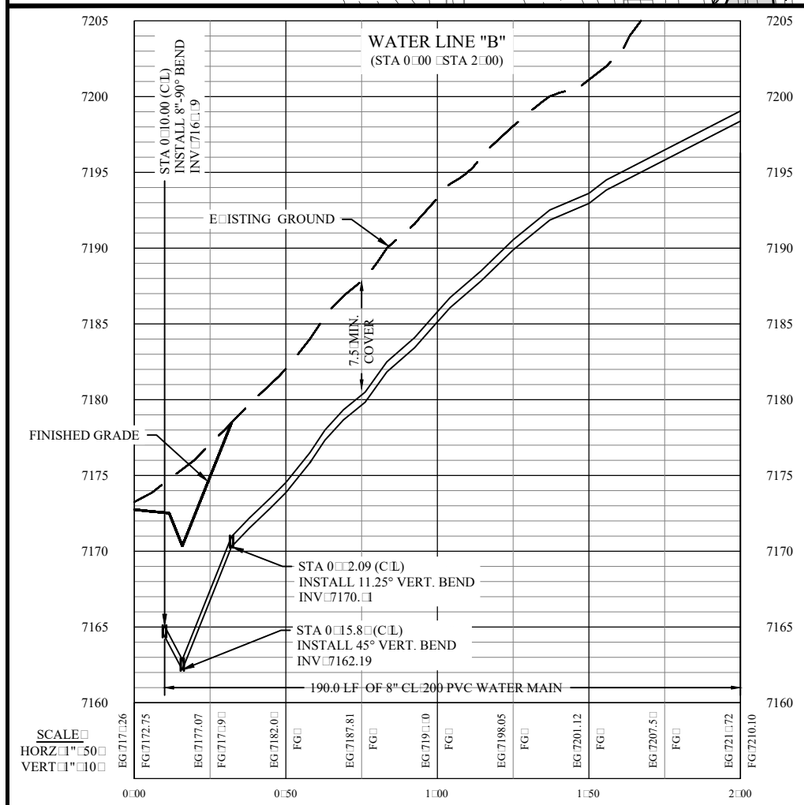
WATER LINE "A"
STA 14□00 - STA 1□□2□

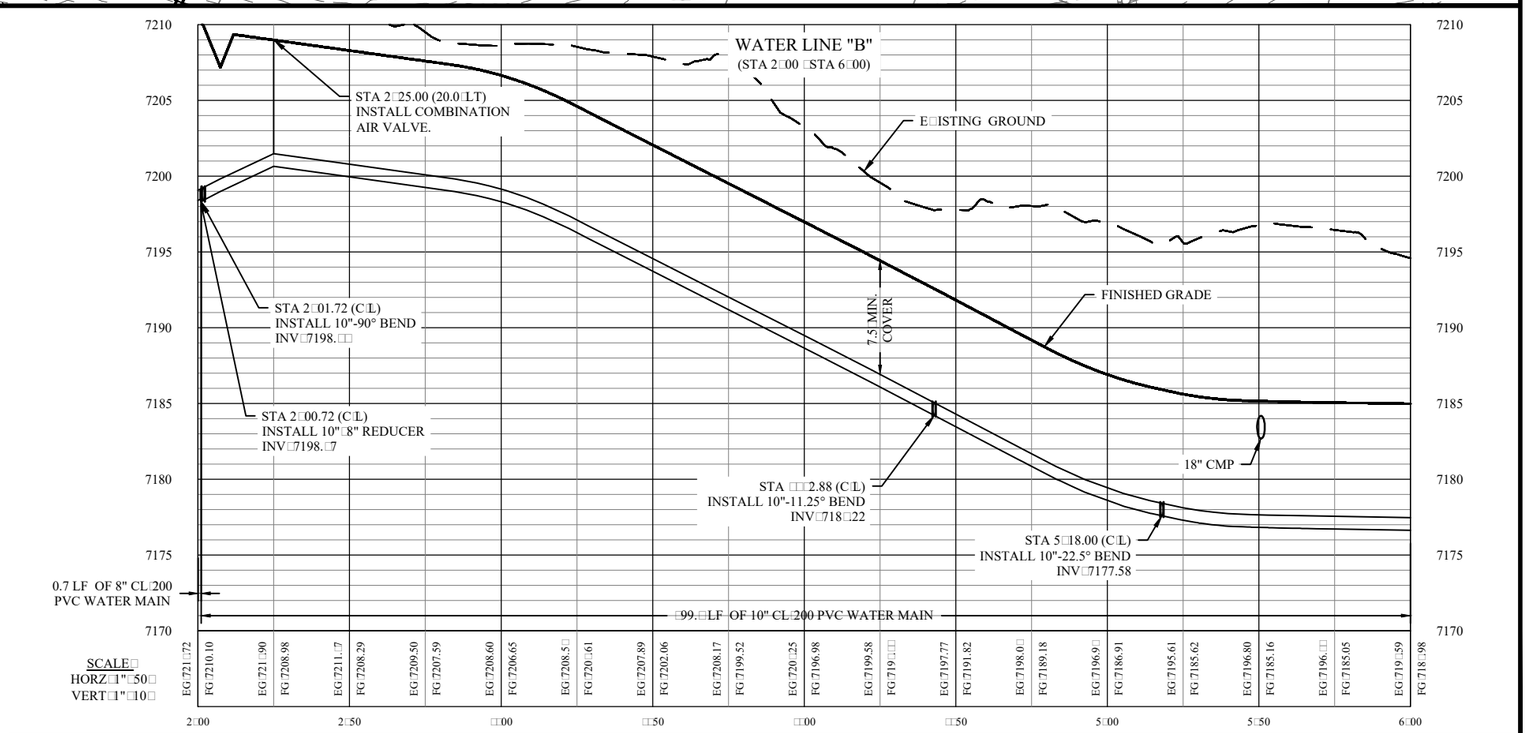
FIGURE NUMBER
W□□

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\WATER SHEETS.dwg Plotted on J□n/2□/2016









HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
© COPYRIGHT HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

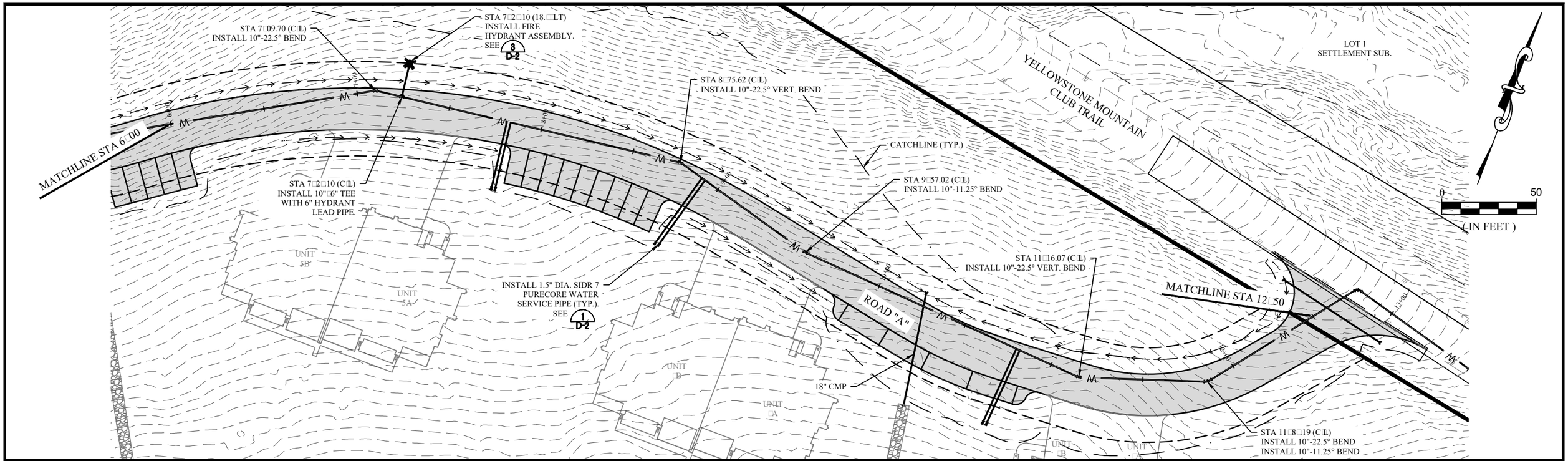
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

WATER LINE "B"
STA 0□00 - STA 6□00

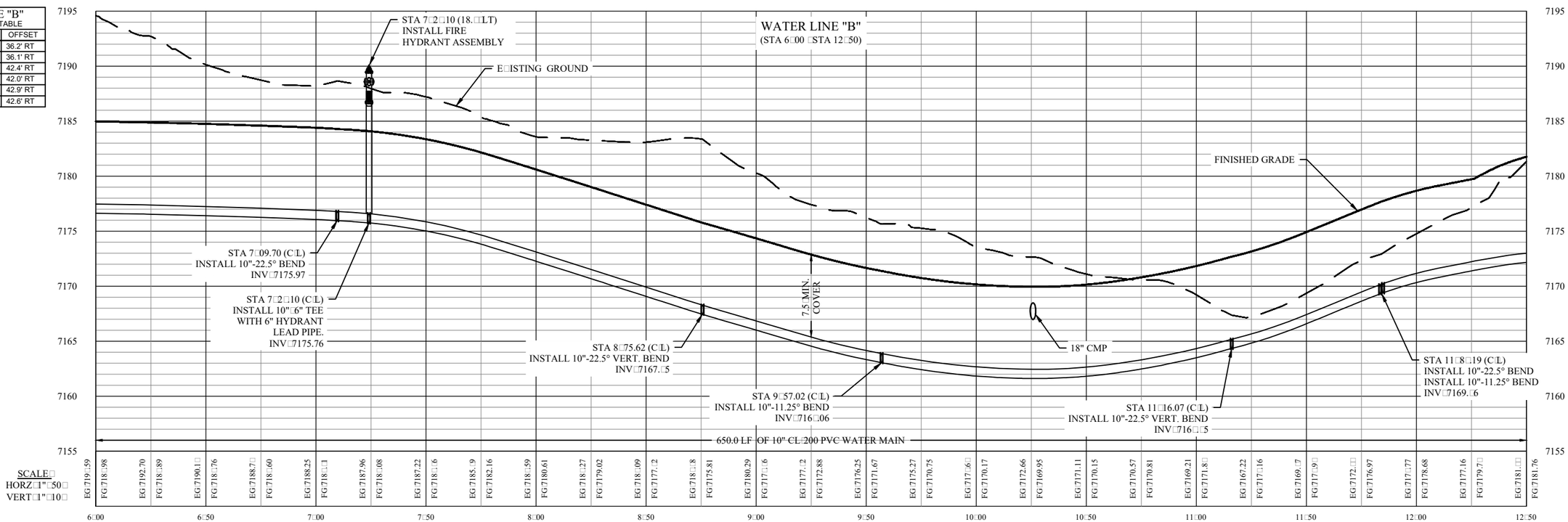
PROJECT NO.
0001.061

FIGURE NUMBER
W□□

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\WATER SHEETS.dwg Plotted on J□n/2□/2016



WATER LINE "B" WATER SERVICE TABLE		
LOT □	STATION	OFFSET
UNIT 5B	□□□1.2□	36.2' RT
UNIT 5A	□□□3.2□	36.1' RT
UNIT 4B	□□□9.61	42.4' RT
UNIT 4A	□□91.61	42.0' RT
UNIT 3B	10□□9.□0	42.9' RT
UNIT 3A	10□□1.□0	42.6' RT



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © 2016 HOUSER ENGINEERING P.C. - 2016

DRAWN BY: JCH
DATE: 6/2016

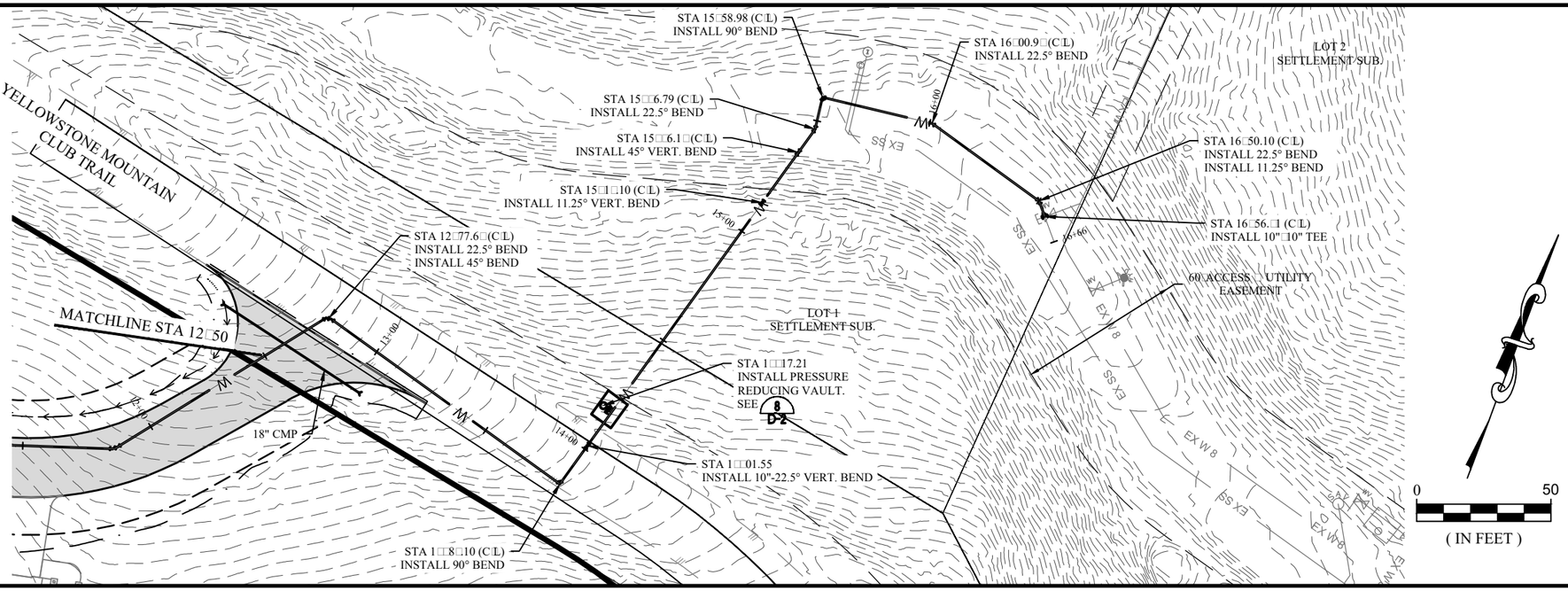
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\WATER SHEETS.dwg Plotted on J□n/2□/2016

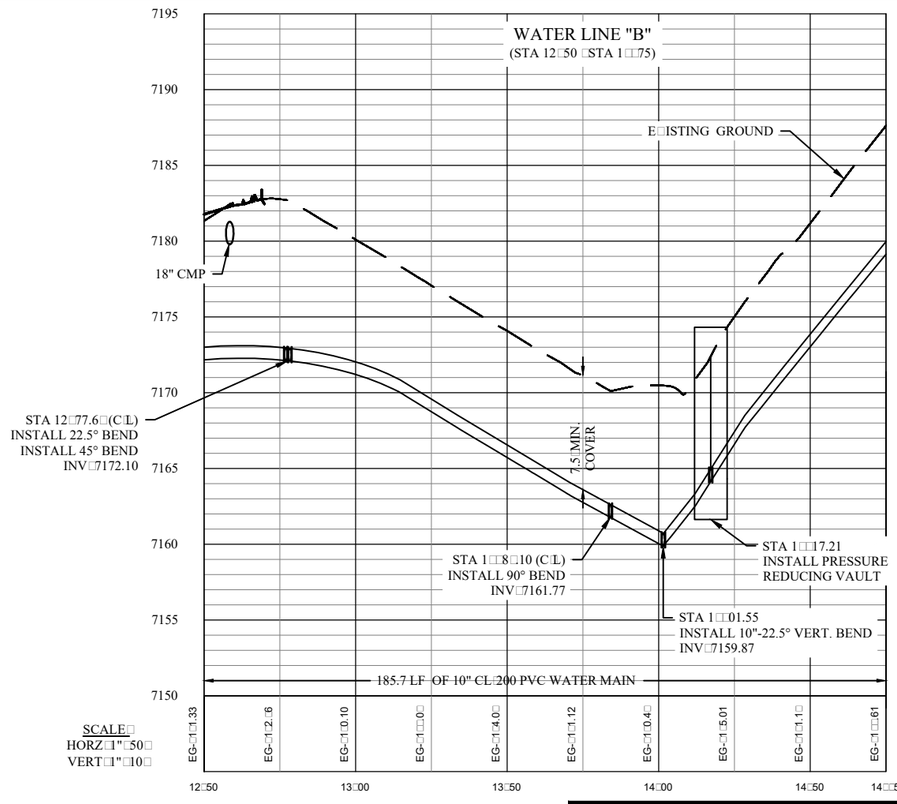
BIG SKY — YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION — MONTANA

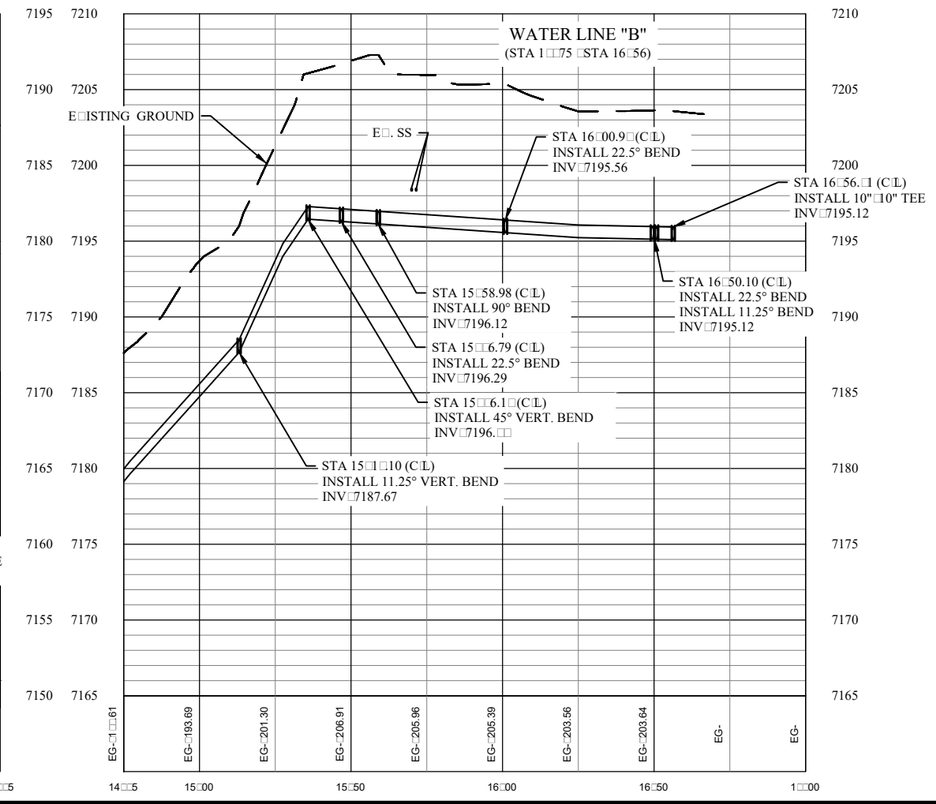
WATER LINE "B"
STA 6□00 - STA 12□50

PROJECT NO. 0001.061

FIGURE NUMBER
W□5







SCALE□
HORZ□1"□50□
VERT□1"□10□

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 6/2016

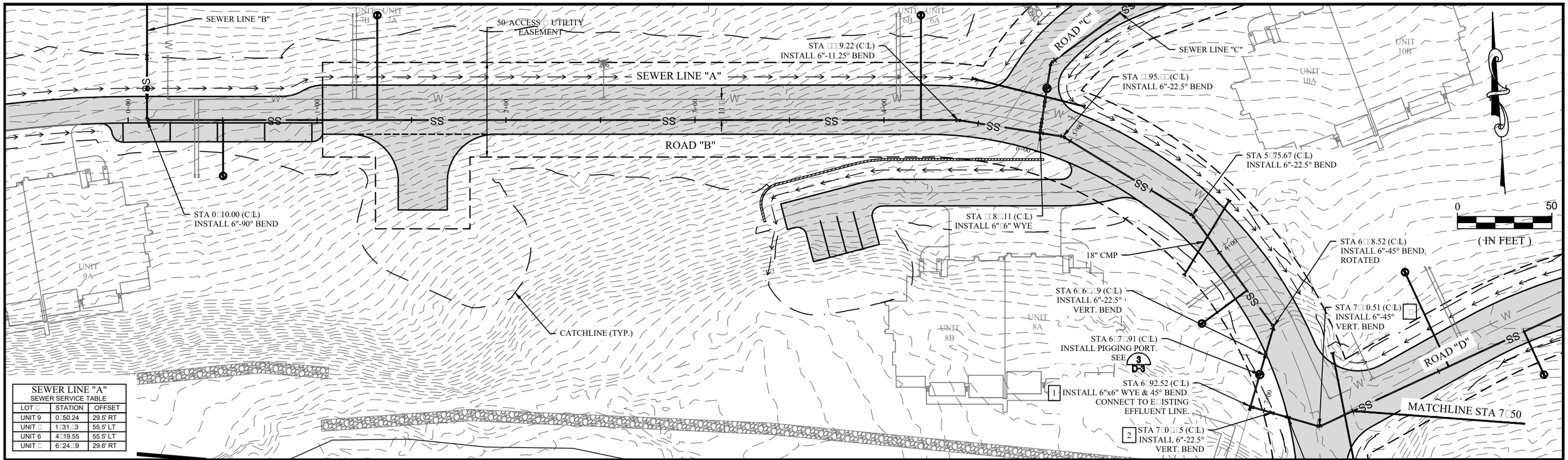
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\WATER SHEETS.dwg Plotted on J□n/2□/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

WATER LINE "B"
STA 12□50 - STA 16□56

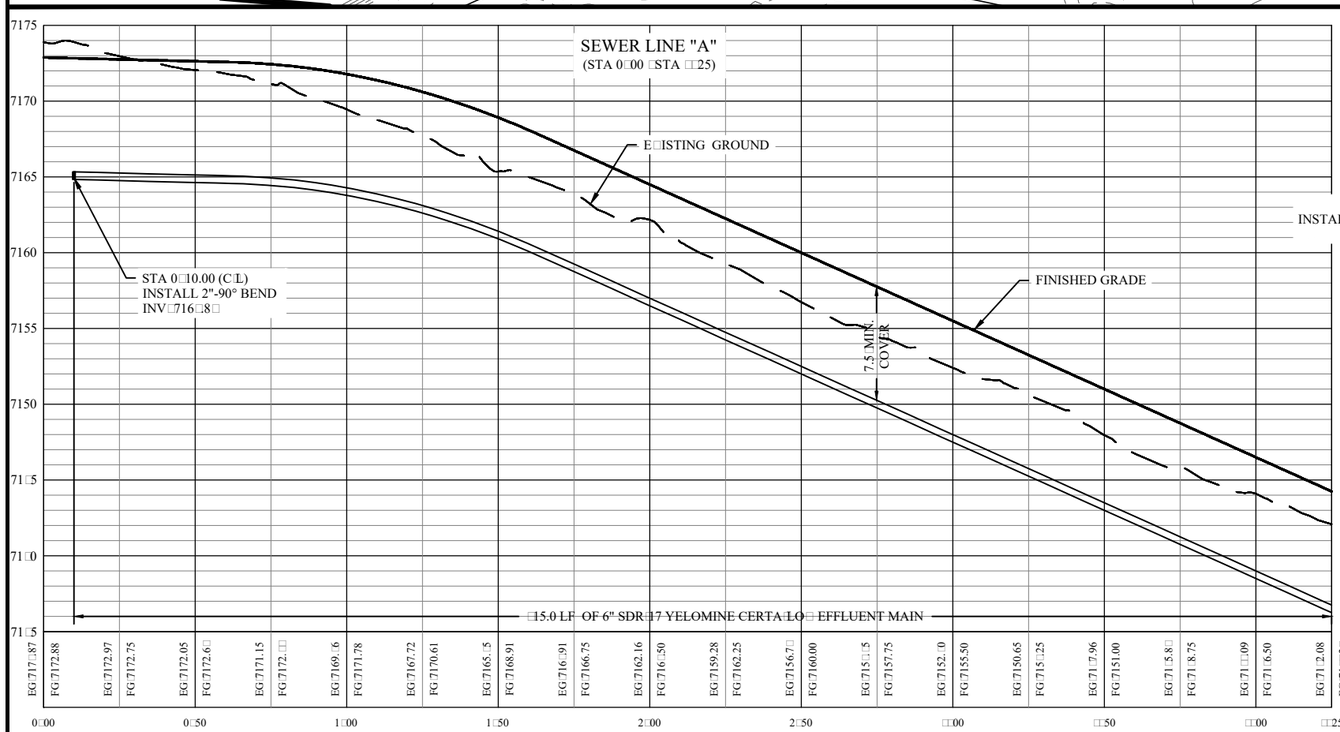
PROJECT NO.
0001.061

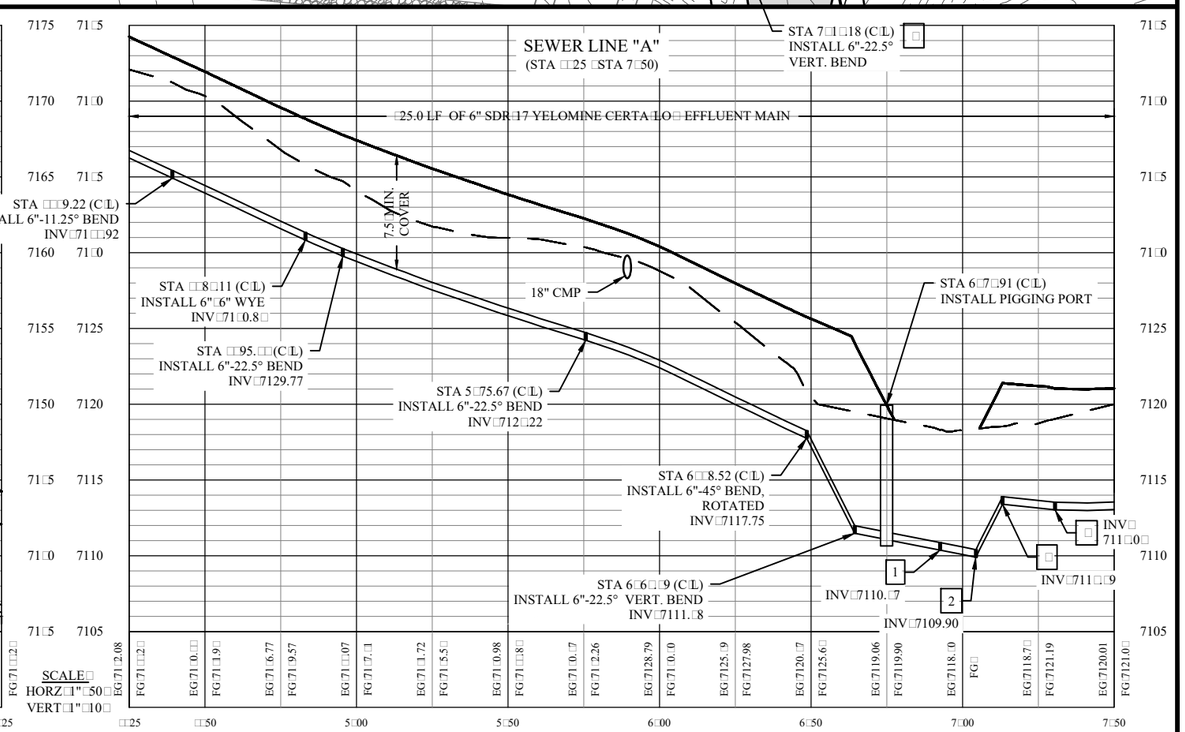
FIGURE NUMBER
W□6



SEWER LINE "A"
SEWER SERVICE TABLE

LOT □	STATION	OFFSET
UNIT 9	0□50.24	29.5' RT
UNIT □	1□31.□3	55.5' LT
UNIT 6	4□19.55	55.5' LT
UNIT □	6□24.□9	29.6' RT





HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

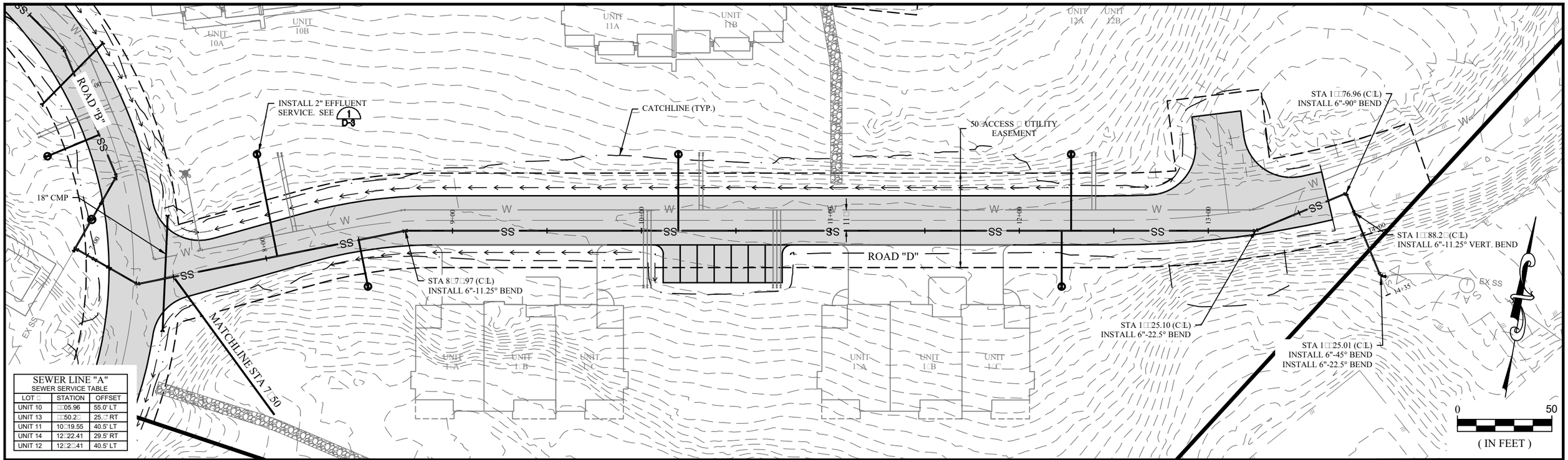
BIG_SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

SEWER LINE "A"
STA 0□00 - STA □□50

PROJECT NO. 0001.061

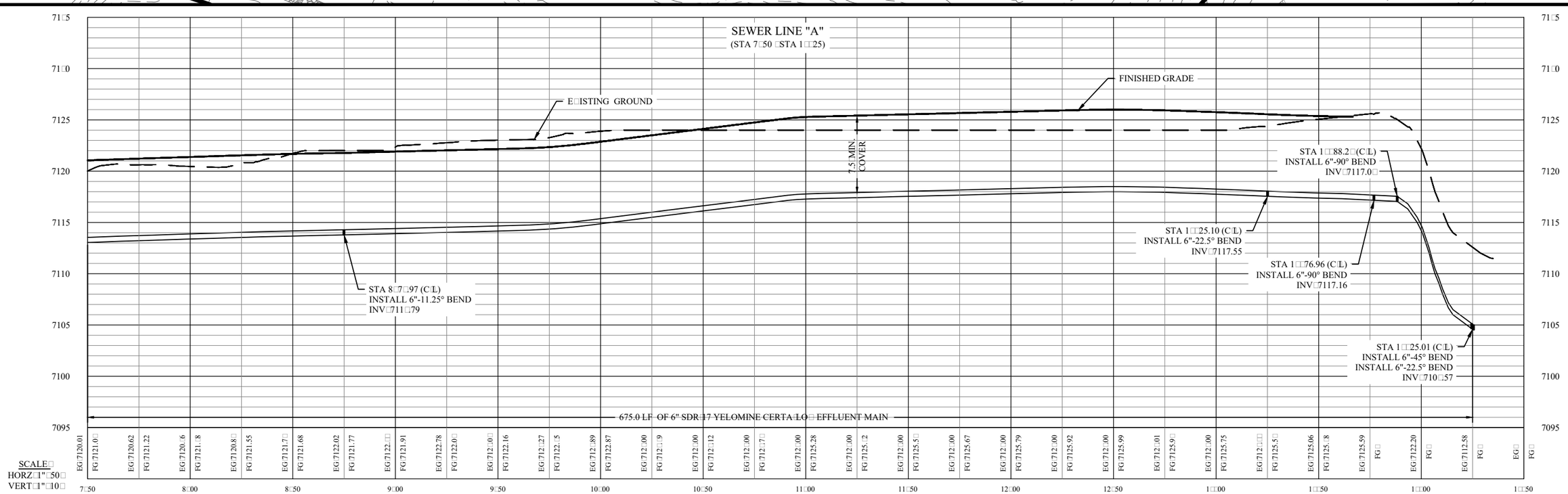
FIGURE NUMBER SS□1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\SEWER SHEETS.dwg Plotted on J□n/2□/2016



SEWER LINE "A"
SEWER SERVICE TABLE

LOT #	STATION	OFFSET
UNIT 10	1+05.96	55.0' LT
UNIT 13	1+50.2	25.0' RT
UNIT 11	10+19.55	40.5' LT
UNIT 14	12+22.41	29.5' RT
UNIT 12	12+2.41	40.5' LT



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

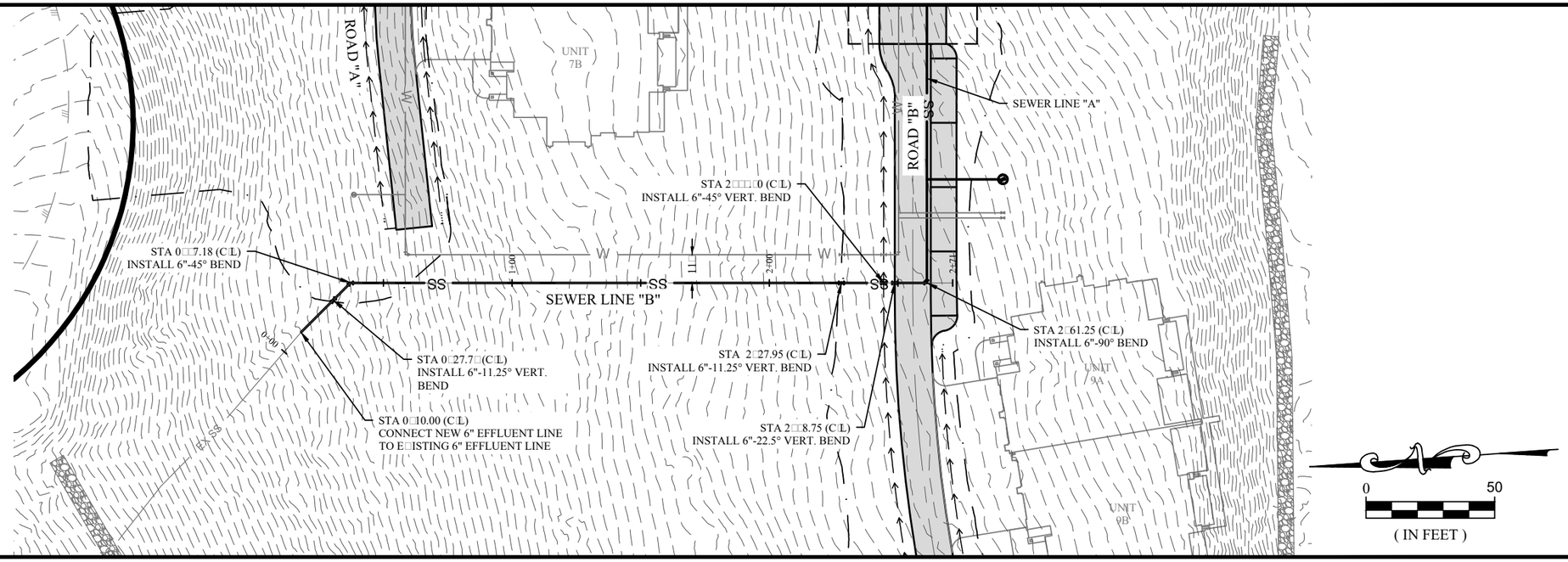
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\SEWER SHEETS.dwg Plotted on Jun/2/2016

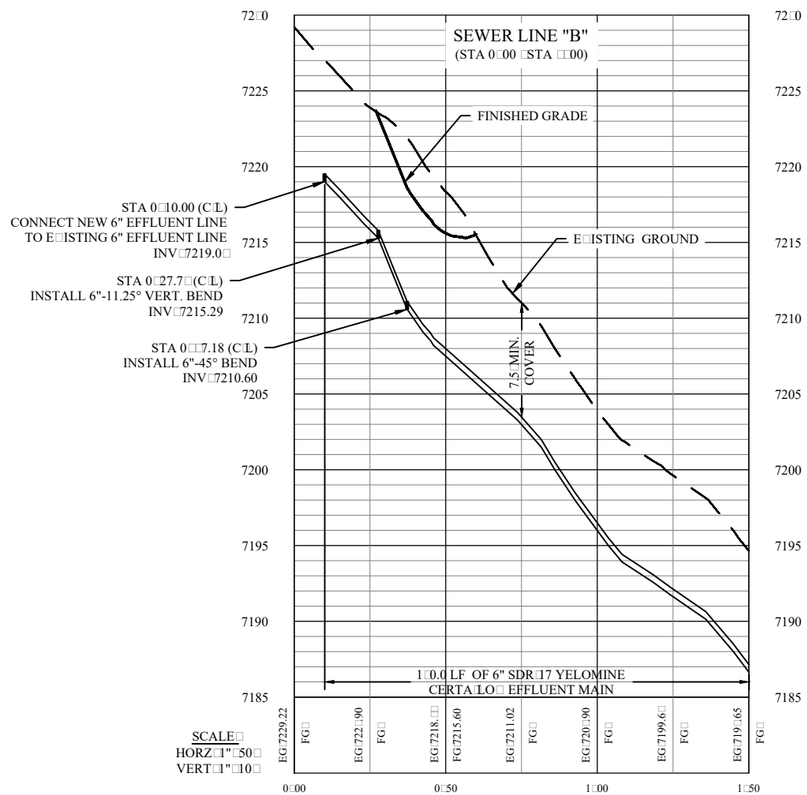
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

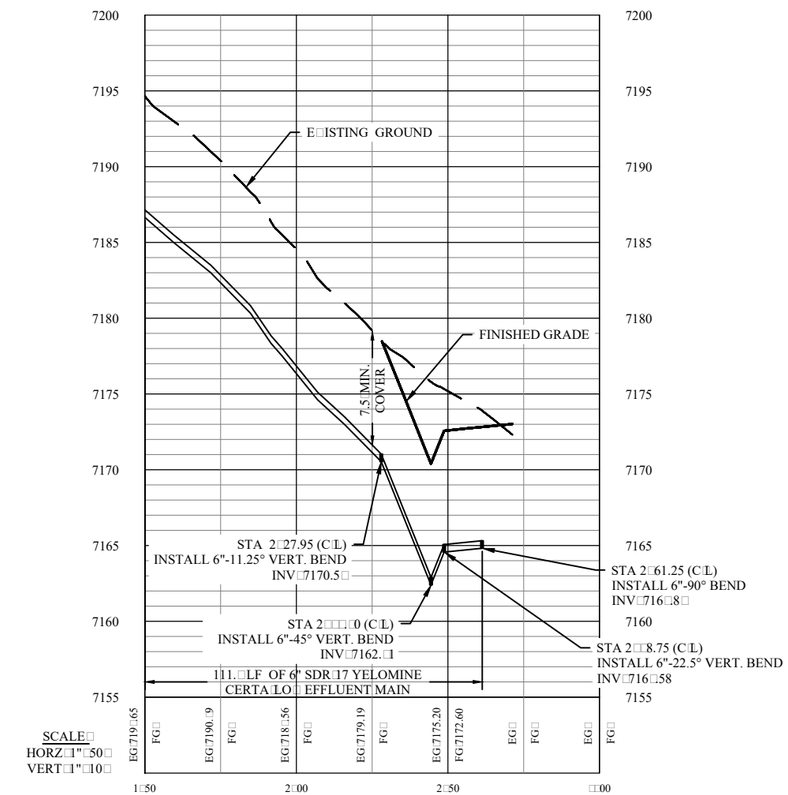
SEWER LINE "A"
STA 7+50 - STA 14+25

PROJECT NO. 0001.061

FIGURE NUMBER SS2







HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 6/2016

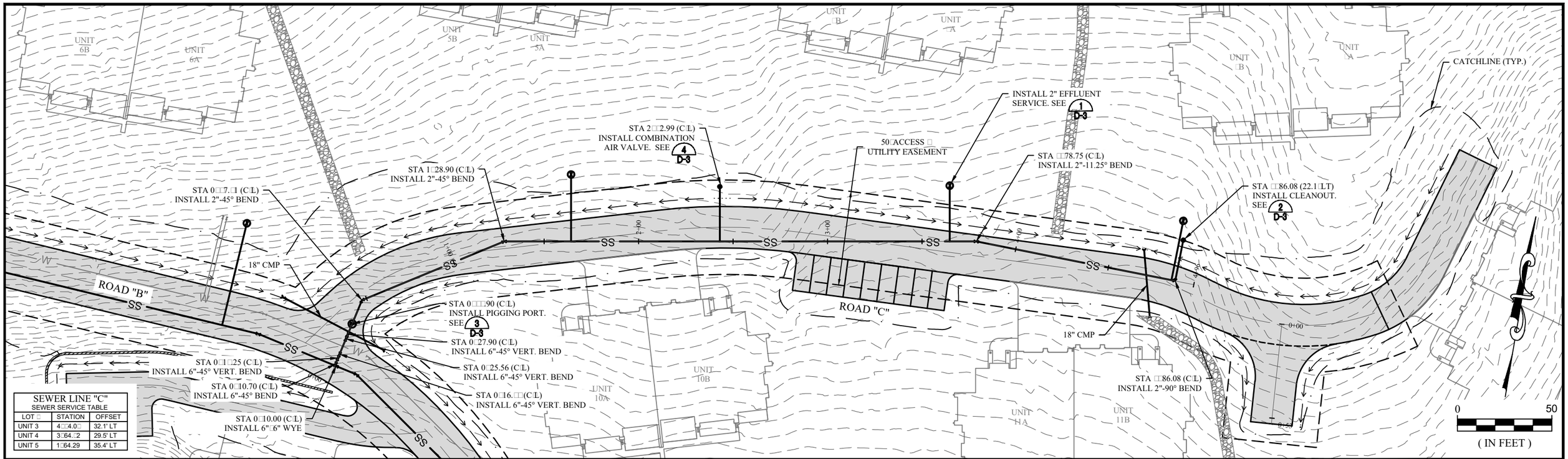
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\SEWER SHEETS.dwg Plotted on J□n/2□/2016

BIG SKY — YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION — MONTANA

SEWER LINE "B"

PROJECT NO. 0001.061

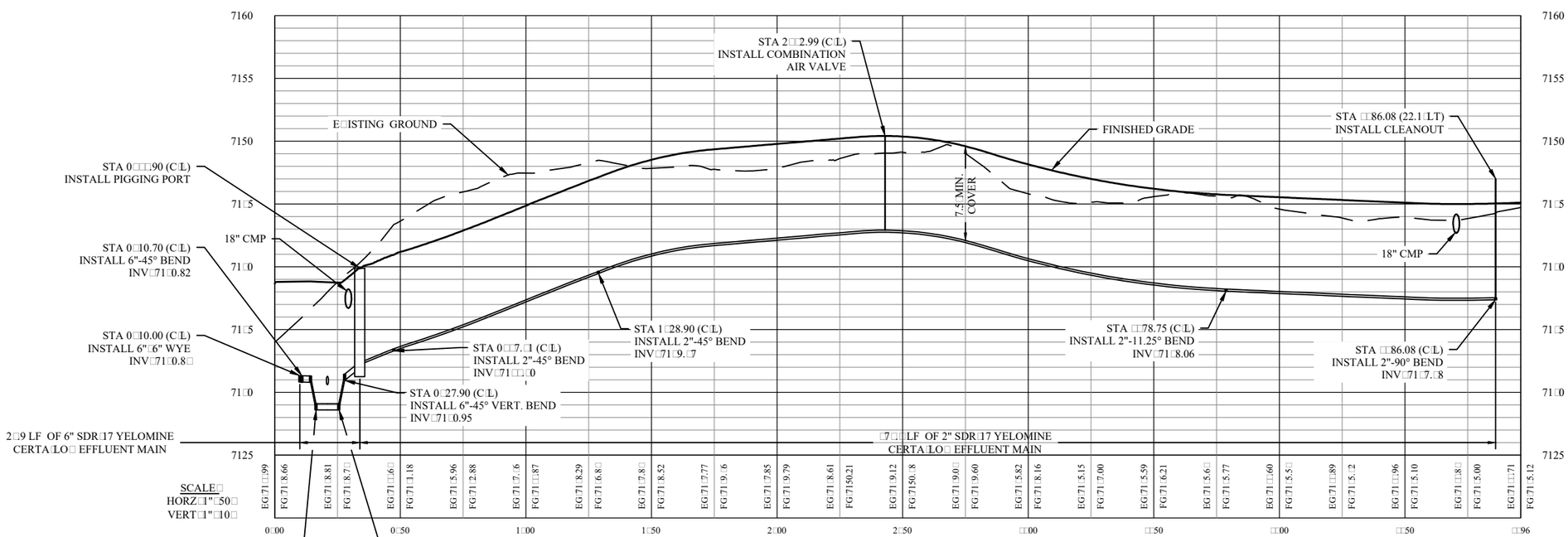
FIGURE NUMBER SS□□



SEWER LINE "C"
SEWER SERVICE TABLE

LOT □	STATION	OFFSET
UNIT 3	4□□4.0□	32.1' LT
UNIT 4	3□64.□2	29.5' LT
UNIT 5	1□64.29	35.4' LT

SEWER LINE "C"
(STA 0□00 □STA □□86)



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 6/2016

BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

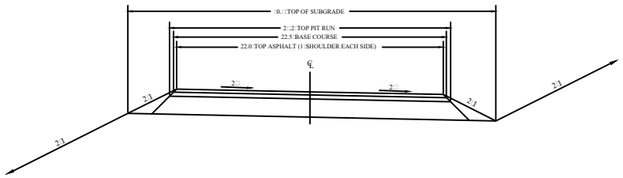
SEWER LINE "C"

PROJECT NO. 0001.061

FIGURE NUMBER SS□□

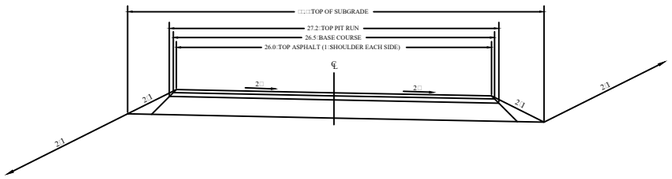
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\SEWER SHEETS.dwg Plotted on J□n/2□/2016

□" OF COMPACTED ASPHALT TYPE "B" PG 58□28 ON
□" OF 1 1□2" MINUS COMPACTED CRUSHED BASE COURSE ON
18" OF 6" MINUS CRUSHED SUB□BASE COURSE (PIT RUN) OR APPROVED E□UAL



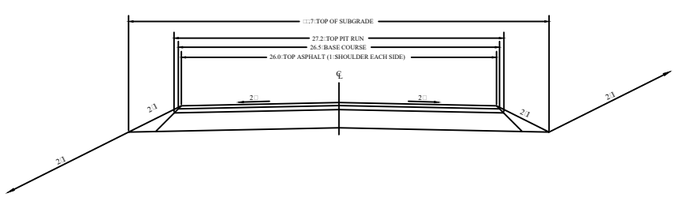
1 R-1 R-2 R-3 TYPICAL 22□ROAD SECTION
NTS

□" OF COMPACTED ASPHALT TYPE "B" PG 58□28 ON
□" OF 1 1□2" MINUS COMPACTED CRUSHED BASE COURSE ON
18" OF 6" MINUS CRUSHED SUB□BASE COURSE (PIT RUN) OR APPROVED E□UAL



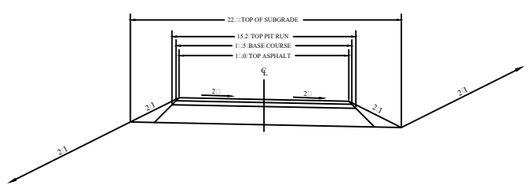
2 R-1 R-2 R-3 R-4 R-7 TYPICAL 26□ROAD SECTION (CROSS□SLOPE)
NTS

□" OF COMPACTED ASPHALT TYPE "B" PG 58□28 ON
□" OF 1 1□2" MINUS COMPACTED CRUSHED BASE COURSE ON
18" OF 6" MINUS CRUSHED SUB□BASE COURSE (PIT RUN) OR APPROVED E□UAL

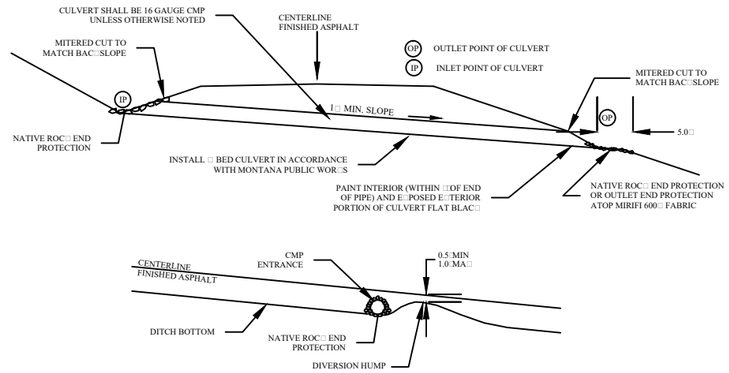


3 R-3 TYPICAL 26□ROAD SECTION (CROWN)
NTS

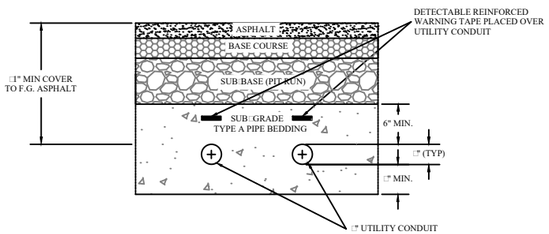
□" OF COMPACTED ASPHALT TYPE "B" PG 58□28 ON
□" OF 1 1□2" MINUS COMPACTED CRUSHED BASE COURSE ON
18" OF 6" MINUS CRUSHED SUB□BASE COURSE (PIT RUN) OR APPROVED E□UAL



4 R-2 R-4 R-7 TYPICAL 1□ROAD SECTION
NTS

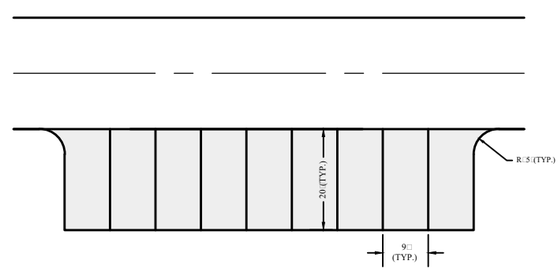


5 CULVERT INSTALLATION
NTS

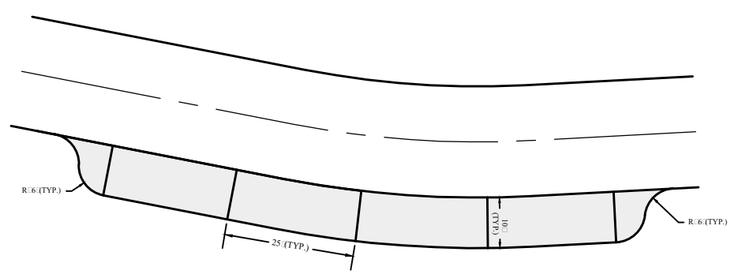


NOTE□PLACE LOCATE WIRE AND WARNING TAPE ABOVE EACH CONDUIT PIPE

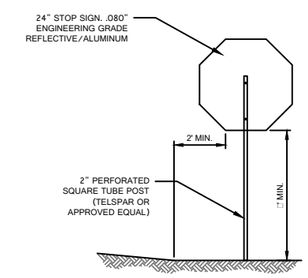
6 TYPICAL SECTION □UTILITY CONDUIT
NTS



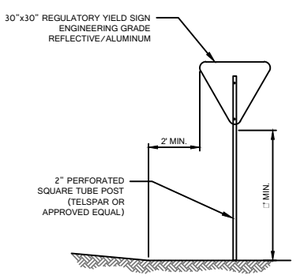
7 R-1 R-4 PERPENDICULAR PAR□ING SPACE DETAILS
SCALE: 1"=□0□



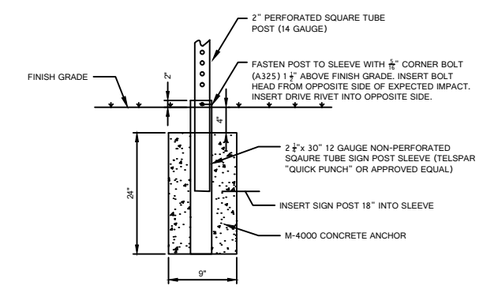
8 R-1 R-2 R-3 R-4 R-7 PARALLEL PAR□ING SPACE DETAILS
SCALE: 1"=□0□



REGULATORY STOP SIGN DETAIL



REGULATORY YIELD SIGN DETAIL



SIGN POST FOUNDATION DETAIL

9 REGULATORY SIGN DETAIL
SCALE: 1"=□0□

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. 2016

DRAWN BY: JCH
DATE: 06/2016

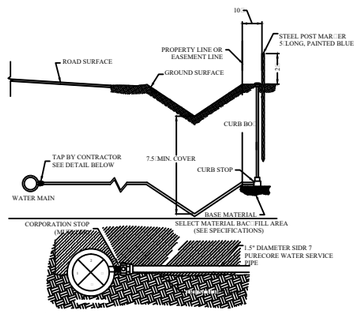
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

ROAD SECTIONS □ DETAILS W/ STREET SIGNS

PROJECT NO. 0001.061

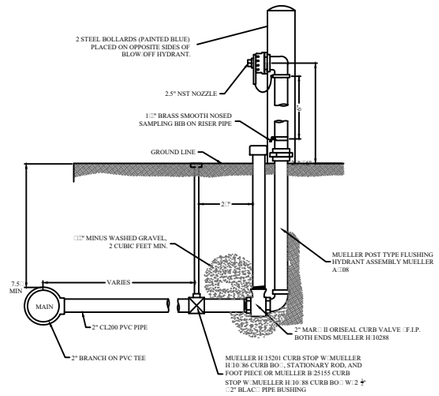
FIGURE NUMBER D□1

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\D-1.dwg Plotted on J□n/2□/2016



GENERAL NOTES:
1. WATER SERVICE LINES SHALL HAVE A MINIMUM 7.5 FOOT COVER MEASURED FROM THE E□ISTING GROUND SURFACE.
2. WATER SERVICE LINES SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
□. BEDDING SHALL BE 1" DIAMETER TO CURB STOP

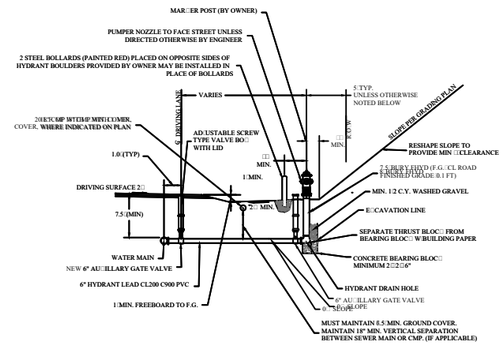
1 W-5 TYPICAL WATER SERVICE DETAIL (PROFILE VIEW)
NTS



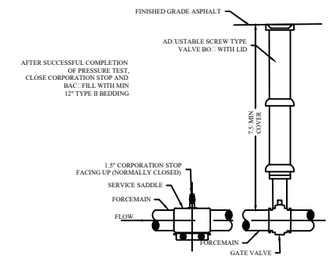
BLOW OFF HYDRANTS SHALL BE NON-FREEZING, SELF DRAINING TYPE WITH A 7.5' MIN. BURY. THESE HYDRANTS WILL BE FURNISHED WITH A 2" FIP INLET, WHICH OPENS TO THE LEFT. ALL OF THE WOR□ING PARTS SHALL BE OF BRONZE TO BRONZE DESIGN, AND BE SERVICEABLE FROM ABOVE GRADE WITH NO DIGGING. THE OUTLET SHALL ALSO BE BRONZE AND BE 2 + NST. HYDRANTS SHALL BE LOC□ABLE AND SHALL HAVE A SAMPLING BIB ATTACHED TO THE OUTSIDE OF THE RISER POST.

2 BLOWOFF HYDRANT DETAIL
NTS

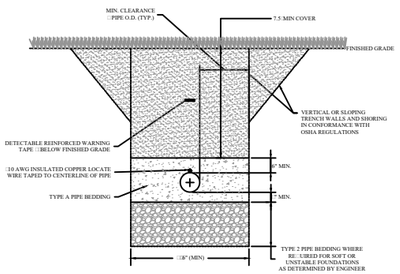
NOTES□
1. THRUST BLOC□ING TO BE IN CONFORMANCE WITH MPWSS
2. FOR BOLTED FITTINGS BLOC□ING SHALL NOT OBSTRUCT BOLTS.
□. HYDRANT WEEP HOLES TO REMAIN UNOBSTRUCTED.
□. MINIMUM □CLEAR ALL AROUND (TREES, SHRUBS, HEDGES, ETC.)
5. ENSURE HYDRANT AND W.V. ARE OUTSIDE OF DITCH BOTTOM



3 W-5 TYPICAL FIRE HYDRANT DETAIL (PROFILE VIEW)
NTS

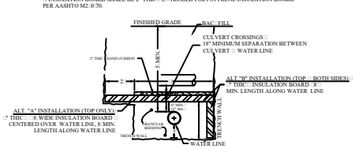


4 W-5 TYPICAL WATER VALVE BO□ DETAIL (PROFILE VIEW)
NTS

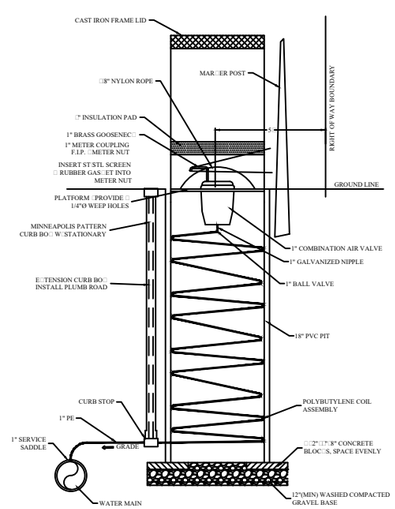


5 W-5 TYPICAL SECTION □SINGLE PIPE TRENCH DETAIL
NTS

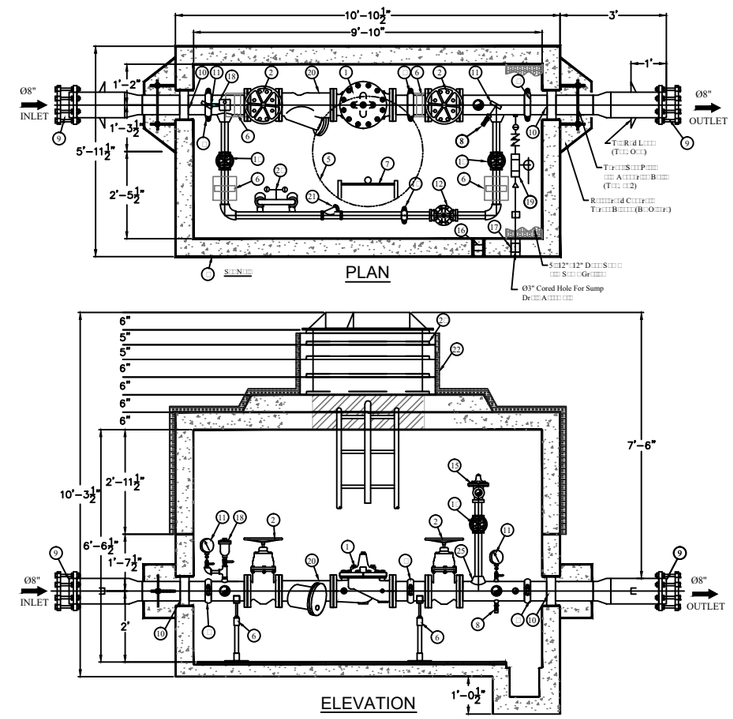
NOTES:
1. INSTALL INSULATION OVER ALL WATER LINES WITH LESS THAN 7' COVER TO FINISHED GRADE OR CULVERT. NOTIFY ENGINEER PRIOR TO PLACING INSULATION.
2. INSTALL INSULATION IN TWO 2" THIC□ LAYERS. ROTATE ORIENTATION OR STAGGER JOINTS TO PROVIDE 2 MIN. OVERLAP BETWEEN JOINTS.
3. INSULATION BOARD SHALL BE 2" THIC□E□TRUDED POLYSTYRENE INSULATION BOARD PER AASHTO M2 ß 70.



6 W-5 TYPICAL PIPE INSULATION DETAIL (PROFILE VIEW)
NTS



7 W-5 COMBINATION AIR RELEASE VALVE□WATER (PROFILE VIEW)
NTS



8 W-5 PRESSURE REDUCING VAULT
NTS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © 2016 HOUSER ENGINEERING, P.C. - ALL RIGHTS RESERVED

DRAWN BY: JCH
DATE: 06/2016

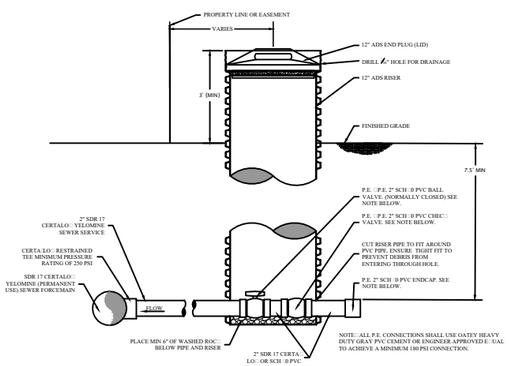
BIG SKY — YELLOWSTONE MOUNTAIN CLUB THE CORRAL P.U.D. SUBDIVISION — MONTANA

WATER DETAILS

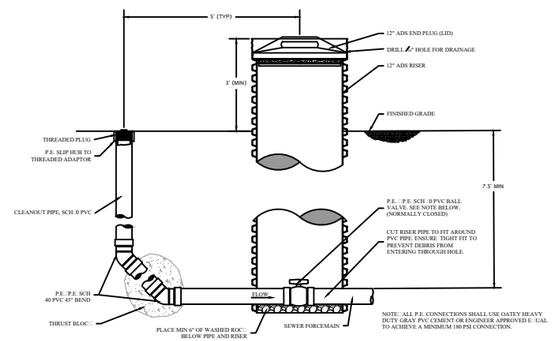
PROJECT NO. 0001.061

FIGURE NUMBER D□2

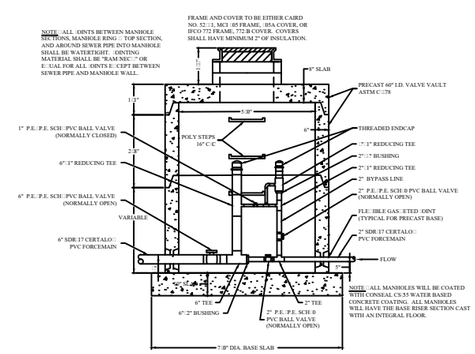
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\D-2 D-3.dwg Plotted on J□n/2□/2016



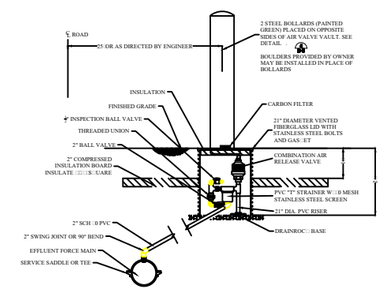
1 TYPICAL 2" EFFLUENT SERVICE DETAIL
SCALE NTS



2 SEWER CLEANOUT
SCALE NTS



3 PIGGING PORT WITH 2" INLET AND 6" OUTLET
SCALE NTS



4 COMBINATION AIR VALVE VAULT SEWER
SCALE NTS

HOUSER ENGINEERING P.C.
636 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © 2016 HOUSER ENGINEERING P.C. - ALL RIGHTS RESERVED

DRAWN BY: JCH
DATE: 06/2016

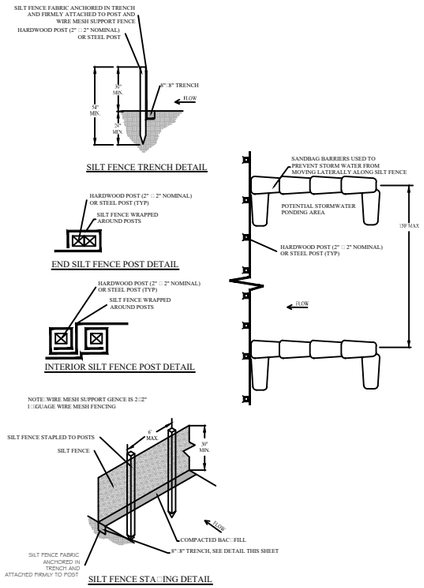
BIG_SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

SEWER DETAILS

PROJECT NO. 0001.061

FIGURE NUMBER D

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\D-2 D-3.dwg Plotted on J/n/2/2016



1 SILT FENCE INSTALLATION DETAILS
NTS

SILT FENCE

SILT FENCE IS DESIGNED FOR SHEET FLOW APPLICATIONS ONLY, AND SHIOULD NOT BE CONSTRUCTED ACROSS LARGE GULLIES OR OTHER CONCENTRATED FLOW PATHS. SILT FENCE IS A TEMPORARY BMP MADE OF PERMEABLE FABRIC THAT INTERCEPTS SEDIMENT FROM SHEET FLOW PRIOR TO LEAVING THE CONSTRUCTION SITE.

PRODUCT: FABRIC SHALL BE MIRAFI 100□, OR ENGINEER-APPROVED E□UAL. SUPPORT FENCE (IF USED) SHALL BE 2 INCH BY 2 INCH BY 1□GAUGE WIRE MESH FENCING IN □FOOT WIDE ROLLS. POSTS SHALL BE 2 INCH BY 2 INCH BY □5 FOOT LONG STANDARD (OR BETTER) HARDWOOD POSTS, OR □5 FOOT LONG STEEL FENCE POSTS WEIGHING 1.□□ POUNDS PER LINEAR FOOT. FASTENERS FOR WOOD POSTS SHALL BE HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG. FOR STEEL POSTS, USE TIE WIRES OR HOG RINGS.

LOCATION: TO PROMOTE OVERLAND SHEET FLOW THROUGH THE SILT FENCE, THE FENCE ALIGNMENT SHOULD BE AT A CONSTANT ELEVATION (□□8") FOR EACH CONTINUOUS LENGTH OF FENCE. SLOPE ALONG THE SILT FENCE ALIGNMENT SHOULD NOT E□CEED 0.5 PERCENT IN EITHER DIRECTION FOR A DISTANCE OF MORE THAN 100 FEET UNLESS USED IN COMBINATION WITH TEMPORARY SEDIMENT TRAPS. SILT FENCE SHALL NOT BE USED TO DIVERT FLOW AND S NOT INTENDED FOR CONCENTRATED FLOW CONDITIONS. ENDS OF EACH SEPARATE SECTION OF SILT FENCE SHOULD BE TURNED UPSLOPE A MINIMUM OF 1 FOOT IN ELEVATION TO PREVENT RUNOFF FROM GOING AROUND THE END OF THE FENCE. SILT FENCE IS NOT INTENDED FOR USE AS A MID SLOPE PROTECTION ON SLOPES GREATER THAN □3, OR IN AREAS WHERE UPSLOPE GRADIENTS ARE GREATER THAN 1:1 OR 200 LINEAL FEET. FOR SLOPES GREATER THAN 2:1 THAT CONTAIN A HIGH NUMBER OF ROC□S OR LARGE DIRT CLODS THAT COULD DISLODGE, CONTRACTOR SHALL INSTALL ADDITIONAL PROTECTION IMMEDIATELY AD ACENT TO THE BOTTOM OF THE SLOPE. SILT FENCE SHALL BE LOCATED AT LEAST □FEET FROM THE TOE OF ANY SLOPE UNLESS SPECIFICALLY CALLED OUT OTHERWISE. TYPICAL APPLICATIONS INCLUDE AT THE TOE OF E□POSED ERODIBLE SLOPES, DOWN SLOPE OF E□POSED SOIL AREAS, AROUND TEMPORARY STOC□PILES AND ALONG STREAMS AND CHANNELS.

CONSTRUCTION: DRIVE FENCE POSTS AT LEAST 2 FEET BELOW THE E□ISTING GROUND ELEVATION AT A MA□IMUM SPACING OF 6 FEET. E□CAVATE A TRENCH, IMMEDIATELY PRIOR TO SILT FENCE INSTALLATION, 8 TO 12 INCHES DEEP ON THE UPSLOPE SIDE OF THE POST ALIGNMENT AND HAUL E□CAVATED MATERIALS TO A STOC□PILE. DO NOT OVER E□CAVATE TRENCHES. E□TEND FENCE FABRIC AND WIRE SUPPORT FENCE (FABRIC ON THE UPSLOPE SIDE OF THE SUPPORT FENCE) TO THE BOTTOM OF THE TRENCH, AND FASTEN THE MATERIALS TO THE POSTS AT THE TOP, GROUND LEVEL AND HALFWAY IN BETWEEN. ON WIRE SUPPORT FENCE ENDS BY OVERLAPPING A MINIMUM OF 6 INCHES AND CONNECTING THE TWO SECTIONS WITH TIE WIRES OR HOG RINGS AT FOUR E□UALLY SPACED POINTS. IF FABRIC □JOINTS ARE NECESSARY, CUT THE WIRE SUPPORT FENCE, SANDWICH THE SUPPORT FENCE AND FABRIC ENDS BETWEEN TWO WOOD POSTS, AND BIND THE POSTS TIGHTLY TOGETHER, SECURELY ANCHORING FENCE MATERIALS TO BOTH POSTS. LENGTHWISE AT THE TOP OF THE SILT FENCE AND AT GROUND LEVEL, TIE FABRIC TO WIRE SUPPORT FENCE WITH TIE WIRE OR HOG RINGS AT A MAXIMUM SPACING OF 3 FEET. BACKFILL TRENCH WITH 3/4-INCH TO 1 ½ -INCH WASHED GRAVEL. CROSS BARRIERS SHALL BE INSTALLED A MINIMUM OF EVERY 150 LINEAL FEET OF SILT FENCE.

MAINTENANCE: CHEC□FOR SAGGING FENCES, TORN FABRIC AND SIGNS OF EROSION AND OR SEDIMENTATION DOWNSLOPE OF THE FENCE. MA□E REPAIRS AS NECESSARY. IF THE SILT FENCE FAILS DUE TO STORM RUNOFF INUNDATING THE FENCE, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED TO REMOVE SEDIMENT FROM AND CONVEY RUNOFF TO DOWNSTREAM DRAINAGE FACILITIES. REMOVE ACCUMULATED SEDIMENT FROM BEHIND SILT FENCES WHENEVER IT REACHES APPRO□IMATELY ONE□THIRD THE HEIGHT OF THE FENCE. REPAIR UNDERCUT SILT FENCES AS SOON AS POSSIBLE. APPRO□IMATE LIFE OF SILT FENCE IS 5 TO 8 MONTHS, BUT MAY BE E□TENDED AT ENGINEER'S/OPERATORS DISCRETION.

FINAL STABILIZATION: UPON FINAL STABILIZATION, OPERATOR OR CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT FENCE. REPAIR ANY HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCE CAUSED BY THE REMOVAL OF SILT FENCE. ENSURE REPAIRED AREAS ARE COMPACTED AND BLEND WITH AD ACENT GROUND. REMOVE ANY SEDIMENT ACCUMULATION TO LOCATION SPECIFIED BY ENGINEER OR OPERATOR.

SLOPE ROUGHENING

GENERAL: SOIL ROUGHENING IS A TEMPORARY EROSION CONTROL BMP USED AFTER ROUGH GRADING OF A CONSTRUCTION SITE. GROVES ARE PLACED HORIZONTALLY ALONG THE GRADIES (PARALLEL TO CONTOUR LINES) TO COLLECT RUNOFF AND REDUCE RUNOFF VELOCITY, INCREASE INFILTRATION, REDUCE EROSION, REDUCE SUN E□POSURE, TRAP SEDIMENT AND PREPARE THE SOIL FOR SEEDING OR MULCHING.

PRODUCTS: SLOPE ROUGHENING IS A PROCESS AND DOES NOT RE□UIRE ANY PRODUCTS.

LOCATION: THIS BMP SHOULD BE INSTALLED ON MODERATE TO SEVERE SLOPES DISTURBED FROM E□CAVATION IMMEDIATELY FOLLOWING DISTURBANCE. TOPSOIL SHOULD BE PLACED ON THE SURFACE TO SPEED REVEGETATION. SEEDING AND MULCHING SHALL BE INSTALLED AFTER SLOPE ROUGHENING. SLOPE ROUGHENING IS NOT APPROPRIATE FOR ROC□Y SLOPES. DO NOT PERFORM ON E□CESSIVELY CLAYEY SOILS OR WHEN SOILS ARE SATURATED.

CONSTRUCTION: FOR ALL FILL AREAS, COMPACT THE FILL MATERIAL IN 8" LIFTS TO THE FINAL GRADE. USING A DIS□, TILLER OR HARROW, DRAG THE E□UIPMENT ACROSS THE SLOPE PARALLEL TO THE CONTOURS. GROVES SHALL BE A MINIMUM OF □INCHES IN DEPTH AND LESS THAN 15 INCHES APART. USING A TRAC□ED VEHICLE (SANDY SOILS ONLY), TRAC□ PERPENDICULAR TO THE CONTOURS. SEED OR MULCH SLOPES AFTER ROUGHENING.

MAINTENANCE: INSPECT SLOPES FOR E□CESSIVE EROSION AND RILLS AFTER STORMS. AREAS OF E□CESSIVE EROSION SHOULD BE FILLED, COMPACTED, ROUGHENED AND RE-SEEDED IMMEDIATELY. INSPECT WEE□LY AT A MINIMUM AND BEFORE AND AFTER EACH RAIN EVENT.

FINAL STABILIZATION: FINAL STABILIZATION HAS OCCURRED ONCE THE SLOPES HAVE BEEN RE-VEGETATED.

FERTILIZER

GENERAL: ORGANIC OR INORGANIC MATERIAL OF NATURAL OR SYNTHETIC ORIGIN (OTHER THAN LIMING MATERIALS) THAT IS ADDED TO A SOIL TO SUPPLY ONE OR MORE PLANT NUTRIENTS ESSENTIAL TO THE GROWTH OF PLANTS.

PRODUCT: CONSISTS OF FAST AND SLOW RELEASE NITROGEN, PHOSPHOROUS AND POTASSIUM IN THE FOLLOWING COMPOSITION BY WEIGHT□:

- 16□ NITROGEN
- 20□ PHOSPHOROUS
- 10□ POTASSIUM

FERTILIZER WILL BE IN DRY STANDARD PELLET FORM.

LOCATION: FERTILIZER SHALL BE DELIVERED TO SITE IN THE ORIGINAL WATERPROOF CONTAINERS, EACH BEARING THE MANUFACTURES STATEMENT OF ANALYSIS, NET WEIGHT AND ADDRESS OF MANUFACTURER.

CONSTRUCTION: FERTILIZER IS TO BE DISTRIBUTED EVENLY AT 1000 LBS. PER ACRE OR 2□LBS. PER 1000 S□UARE FEET. APPLICATION WILL OCCUR WITHIN 2□HOURS PRIOR TO SEEDING OPERATIONS. FERTILIZER MAY BE APPLIED BY ONE OF THE FOLLOWING METHODS□:

- HAND BROADCAST MI□ED WITH OR WITHOUT SEED.
- MACHINE BROADCAST WITHOUT SEED.

MAINTENANCE: IF STORED AT SITE, PROTECT THE FERTILIZER FROM THE ELEMENTS AT ALL TIMES.

FINAL STABILIZATION: FERTILIZER IS NOT REMOVED FROM THE SITE, BUT IS INCORPORATED INTO THE RE-VEGETATION OF THE DISTURBED AREA.

TOPSOIL

GENERAL: A NATURAL SURFACE CAPABLE OF PRODUCING SATISFACTORY AGRICULTURAL CROPS AND OR TO PROVIDE PROPER SURFACE GRADING NEAR RESIDENTIAL BUILDINGS.

PRODUCT: A NATURAL SURFACE SOIL FREE OF MATTER THAT MAY BE HARMFUL TO PLANT GROWTH. IMPORTED SOIL SHALL HAVE A NEUTRAL PH AND BE COMPRISED OF 25□ WOODY DEBRIS. WOODY DEBRIS IS DEFINED AS COURSE ORGANIC MATERIAL THAT MEETS THE FOLLOWING CRITERIA□:

- LESS THAN 90□ IS SMALLER THAN □8 CM IN LENGTH.
- LESS THAN 50□ IS SMALLER THAN 15 CM IN LENGTH.
- LESS THAN 10□ IS SMALLER THAN 5 CM IN LENGTH.

LOCATION: TOPSOIL SHALL BE OBTAINED FROM THE ONSITE CLEARING AND GRUBBING EFFORTS OR SUPPLEMENTED BY AN APPROVED SOURCE.

CONSTRUCTION: SPREAD TOPSOIL OVER THE PREPARED ROUGH GRADE WITH MECHANICAL MEANS. TOPSOIL WILL BE APPLIED AT A MINIMUM DEPTH OF 2 INCHES AND A MA□IMUM OF □INCHES TO ALL DISTURBED AREAS. TOPSOIL STOC□PILED LONGER THAN 5 DAYS SHALL EITHER BE COVERED OR SEEDED IMMEDIATELY TO PREVENT NO□IOUS WEED INFESTATIONS. SEDIMENT CONTROLS MUST BE INSTALLED AROUND STORAGE PILES WHERE THE POTENTIAL FOR SEDIMENT TRANSPORT E□ISTS OR WHEN □URISDICTIONAL OR NON□URISDICTIONAL WATERS OF THE U.S. COULD BECOME IMPACTED.

MAINTENANCE: ALL TOPSOIL STOC□PILED FOR LONGER THAN 5 DAYS SHALL EITHER BE COVERED OR SEEDED IMMEDIATELY TO PREVENT NO□IOUS WEED INFESTATIONS. SEDIMENT CONTROLS MUST BE INSTALLED AROUND STORAGE PILES WHERE THE POTENTIAL FOR SEDIMENT TRANSPORT E□ISTS OR WHEN □URISDICTIONAL OR NON□URISDICTIONAL WATERS OF THE U.S. COULD BECOME IMPACTED.

FINAL STABILIZATION: IT SHALL LAST THE LENGTH OF TIME THE SITE REMAINS FOR FINAL RE-GRADING OR RE-VEGETATION.

SEEDING

GENERAL: SEEDING IS USED TO □UIC□LY PROVIDE EROSION PROTECTION, TRAP SEDIMENTS AND PROMOTE INFILTRATION ON DISTURBED AREAS AT A RELATIVELY LOW COST.

PRODUCT: SEED MI□SHALL BE A MINIMUM OF 95□ PURE LIVE SEED (PLS). PROVIDE THE FOLLOWING SEED MI□□□

SLENDER WHEATGRASS□6□-□LBS OF PLS/ACRE
MOUNTAIN BROME□12.0 LBS OF PLS/ACRE
HARD FESCUE□□-□LBS OF PLS/ACRE
CANADA BLUEGRASS□0.8 LBS OF PLS/ACRE
STREAMBAN□WHEATGRASS□5.6 LBS OF PLS/ACRE
THIC□SPI□E WHEATGRASS□5.6 LBS OF PLS/ACRE
BLUE BUNCH WHEATGRASS□6.2 LBS OF PLS/ACRE

LOCATION: SEEDING SHALL BE USED IN THE AREAS SHOWN ON THE SITEPLAN.

CONSTRUCTION: FERTILIZATION IS RE□UIRED FOR ALL AREAS SHOWN ON THE SITEPLAN. SEEDING SHOULD BE HAND BROADCASTED AND TA□E PLACE BETWEEN SEPTEMBER 1 NOVEMBER 15 AT THE RATE LISTED ABOVE. APPLY THE SEED AT □0 LBS/ACRE. SCARIFY THE SOIL IMMEDIATELY PRIOR TO AND FOLLOWING SEEDING TO INCORPORATE SEED TO AN AVERAGE DEPTH OF 15 MM INTO THE SOIL.

MAINTENANCE: RE-FERTILIZATION, IRRIGATION AND OR MULCHING MAY BE NEEDED IF SOIL OR MOISTURE CONDITIONS ARE NOT ADE□UATE. RE-SEED AREAS WHERE THE SEED DID NOT SUCCESSFULLY GERMINATE. ENSURE NO EROSION ON SLOPES AFTER RAINFALL EVENTS.

FINAL STABILIZATION: SEEDING WILL NEED TO BE ESTABLISHED PRIOR TO PRO□ECT COMPLETION.

VEGETATED BUFFER STRIP

GENERAL: VEGETATED BUFFER STRIPS PROVIDE EROSION CONTROL, INFILTRATION, BIOFILTRATION AND VELOCITY DISSIPATION BY USING E□ISTING VEGETATION AS A BEST MANAGEMENT PRACTICE.

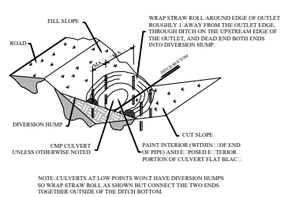
PRODUCT: E□ISTING VEGETATION.

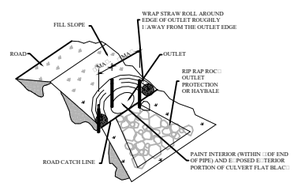
LOCATION: APPROPRIATE APPLICATIONS AND LOCATIONS INCLUDE STAGED OR PHASED PRO□ECTS THAT SE□UENCE CONSTRUCTION AROUND E□ISTING VEGETATION, E□ISTING WETLANDS, FLOODPLAINS, STREAM BAN□S, PERIMETERS OF CONSTRUCTION PRO□ECTS AND STEEP SLOPES. VEGETATED BUFFER STRIPS CAN ALSO BE USED TO MAINTAIN PRE-CONSTRUCTION DRAINAGE PATTERNS AND VEGETATION. CONSIDERATION SHALL BE GIVEN DURING THE LAYOUT OF THE SITE AS TO VEGETATION TYPE, ROOT DEPTH, TEMPORARY ACCESS ROADS AND STORAGE/TRAFFIC AREAS TO ENSURE PRESERVATION OF E□ISTING VEGETATION.

CONSTRUCTION: PRIOR TO CONSTRUCTION, DEDICATION OF VEGETATED BUFFER STRIPS SHALL BE WELL MAR□ED ONSITE TO PREVENT ACCIDENTAL DISTURBANCE. TEMPORARY FENCING IS ENCOURAGED TO ENSURE THERE BE NO DISTURBANCE TO E□ISTING VEGETATION. □EEP CONSTRUCTION E□UIPMENT AWAY FROM THE DRIP LINES OF E□ISTING TREES. UNLESS OTHERWISE NOTED IN THE PRO□ECT'S SPECIFICATIONS, MAINTAIN ALL IRRIGATION SYSTEMS AND UNDERGROUND UTILITIES. LOCATE CONSTRUCTION MATERIALS, FIRE PITS, TO□IC OR CORROSIVE CHEMICALS OR OTHER CONSTRUCTION MATERIALS, CLEARED VEGETATION, STAGING AREAS, E□UIPMENT STORAGE, AND PAR□ING AREAS AWAY FROM VEGETATED BUFFER STRIPS OR WITHIN THE DRIP LINES OF TREES TO MINIMIZE ROOT COMPACTION AND DAMAGE TO E□ISTING VEGETATION. ENSURE ALL WOR□ERS ONSITE UNDERSTAND THE PURPOSE OF THIS BMP.

MAINTENANCE: DURING CONSTRUCTION, ENSURE VEGETATED BUFFER STRIPS ARE CLEARLY MAR□ED AND THAT ONSITE PERSONNEL UNDERSTAND THE LOCATION AND PURPOSE OF THIS BMP. IRRIGATION, WEED AND PEST CONTROL, MOWING, FERTILIZING, LIMING, AND PRUNING MAY BE RE□UIRED TO MAINTAIN AN ADE□UATE VEGETATED BUFFER STRIP. INSPECT BI-WEE□LY FOR GULLY FORMATION, DAMAGE DUE TO THE ABOVE LISTED CAUSES, CONCENTRATED STORMWATER FLOWS OR ACCUMULATION OF SEDIMENT. REPAIR DAMAGED FENCING AND VEGETATION AS SOON AS POSSIBLE.

FINAL STABILIZATION: UPON FINAL STABILIZATION, REMOVE ALL SIGNAGE, FENCING AND RELATED E□UIPMENT FROM THE SITE.





1 EROSION CONTROL PROTECTION DETAILS
NTS

INLET/OUTLET PROTECTION

GENERAL: INLET/OUTLET PROTECTION PROVIDES ENERGY DISSIPATION OF WATER AT THE OUTFLOW OF CULVERTS. OUTLET PROTECTION PREVENTS SCOUR TO STORMWATER OUTLETS AND MINIMIZES THE POTENTIAL FOR DOWNSTREAM EROSION BY REDUCING THE VELOCITY OF CONCENTRATED STORMWATER FLOWS.

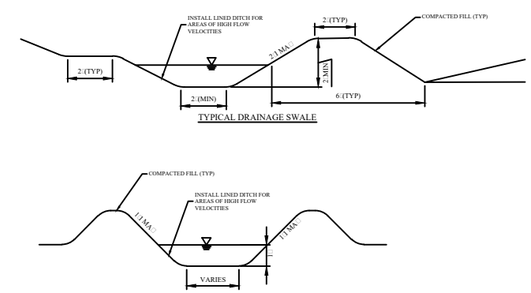
PRODUCTS: WADDLES, STRAW ROLLS, RIP RAP, GROUTED RIP RAP, CONCRETE APRON, FILTER FABRIC

LOCATION: OUTLET PROTECTION IS NEEDED AT ALL OUT FALLS WHERE CONCENTRATED FLOW IS ANTICIPATED. E□AMPLES INCLUDE CULVERTS, DRAINS, DITCHES, DRAIN PIPES, SWALE OUTLETS AND CHANNEL SECTIONS WHERE THE VELOCITY OF FLOW AT THE OUTLET WILL E□CEED THE PERMISSIBLE VELOCITY OF THE RECEIVING CHANNEL OR AREA.

CONSTRUCTION: ENSURE DOWNSTREAM SITES ARE PROTECTED FROM EROSION DUE TO INCREASES IN THE VOLUME, VELOCITY AND PEA□FLOW RATE OF STORMWATER RUNOFF FROM THE PRO□ECT SITE. WHILE CONDUCTING LAND DISTURBING ACTIVITIES, LIMIT THE PEA□ RATE OF RUNOFF FOR THE 2 YEAR, 2□HOUR STORM TO 50□ OF THE RELEASE RATE FOR E□ISTING SITE CONDITIONS.

MAINTENANCE: INSPECT TEMPORARY MEASURES WEE□LY AND PRIOR TO AND AFTER STORM EVENTS. INSPECT APRON FOR DISPLACEMENT OF DISSIPATION DEVICES AND OR DAMAGE TO THE UNDERLYING FABRIC AND REPAIR AS NEEDED. INSPECT FOR SCOUR BENEATH THE DISSIPATION DEVICES AND AROUND THE OUTLET. REPAIR DAMAGE TO SLOPES OR UNDERLYING FILTER FABRIC IMMEDIATELY.

FINAL STABILIZATION: TEMPORARY DEVISES SHALL BE COMPLETELY REMOVED AS SOON AS THE SURROUNDING DRAINAGE AREA HAS BEEN STABILIZED, OR AT THE COMPLETION OF CONSTRUCTION. PERMANENT DEVICES SHALL REMAIN AS DESIGNED.



1 TYPICAL DRAINAGE SWALE/DITCH DETAILS
NTS

SWALE/DITCH

GENERAL: SWALES ARE STRUCTURES THAT INTERCEPT, DIVERT AND CONVEY SURFACE RUN□ON, GENERALLY SHEET FLOW, TO PREVENT EROSION.

PRODUCT: CONSTRUCTED WITH E□ISTING SOILS AND STABILIZED WITH SEED, SOD, MULCH, RIPRAP OR EROSION CONTROL BLAN□ET. ALL SWALES WILL UTILIZE SEED WITH EROSION CONTROL BLAN□ET FOR THIS PRO□ECT.

LOCATION: SWALES ARE USED TO INTERCEPT, DIVERT AND CONVEY SURFACE RUNOFF DOWN SLOPING LAND TO A STABILIZED OUTLET POINT. SWALES ARE COMMONLY USED TO PREVENT CONCENTRATION OF STORMWATER RUNOFF ABOVE OR BELOW STEEP GRADIES, OR AT MID-SLOPE LOCATIONS TO INTERCEPT SHEET FLOW AND CONVEY CONCENTRATED FLOWS. SWALES CAN ALSO BE USED TO CARRY STORMWATER AWAY FROM ROADWAYS, BUILDINGS OR OTHER FACILITIES. SWALES WITH E□CESSIVE DESIGN FLOWS SHALL BE LINED TO PREVENT E□CESSIVE SCOURING.

CONSTRUCTION: CONSTRUCT SWALES PRIOR TO UPSTREAM DISTURBANCE. E□CAVATE THE SWALE AS SHOWN IN THE AD□ACENT ILLUSTRATION. SEED ALL DISTURBED AREAS WITHIN AND AROUND SWALE IF IT WILL BE IN USE FOR MORE THAN 1□DAYS. ALL DISTURBED SOILS SHALL BE ADE□UATELY COMPACTED. ALL OUTLETS SHALL BE STABILIZED PRIOR TO BEING PLACED INTO OPERATION.

MAINTENANCE: OPERATOR SHALL CHEC□FOR SCOURING OR SEDIMENT DEPOSITION WITHIN THE SWALE. SWALES SHOULD BE INSPECTED EVERY TWO WEE□S, OR AFTER A STORM EVENT RESULTING IN GREATER THAN 0.5 INCHES OF RAIN, BEFORE FINAL STABILIZATION HAS OCCURRED. AFTER FINAL STABILIZATION, PERMANENT SWALES SHALL BE INSPECTED BI-ANNUALLY. ENSURE THERE IS NO EVIDENCE OF E□CESSIVE SCOURING OR SEDIMENTATION, DAMAGE TO LININGS (IF APPLICABLE), AND THAT THE SWALE IS FUNCTIONING AS DESIGNED.

FINAL STABILIZATION: TEMPORARY SWALES SHALL BE COMPLETELY REMOVED WITHIN □0 DAYS OF FINAL STABILIZATION.

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
COPYRIGHT © HOUSER ENGINEERING P.C. - 2016

DRAWN BY: JCH
DATE: 20/2016

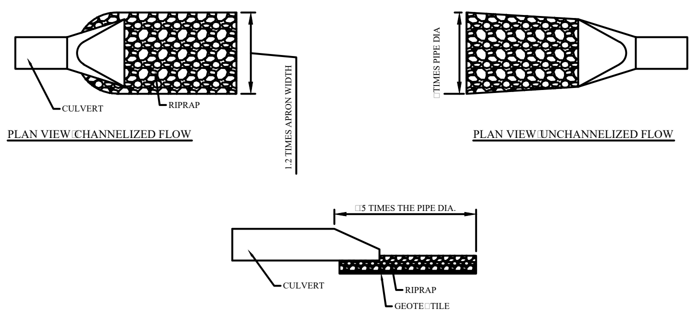
BIG SKY — YELLOWSTONE MOUNTAIN CLUB — THE CORRAL P.U.D. SUBDIVISION — MONTANA

STORMWATER DETAILS

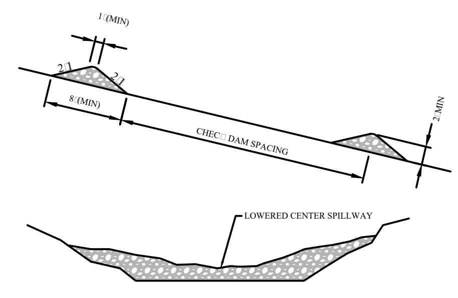
PROJECT NO. 0001.061

FIGURE NUMBER D□

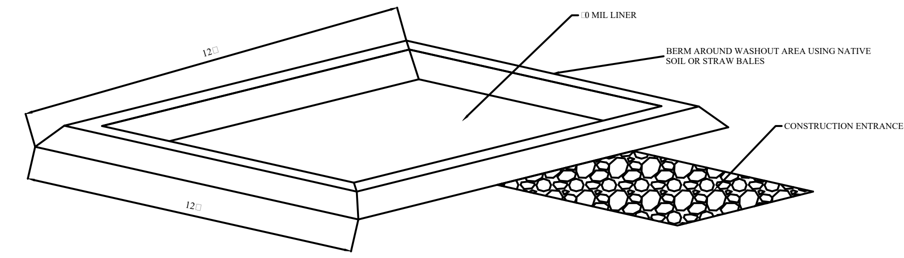
F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\D-4.dwg Plotted on J□n/2□/2016



1 RIPRAP DETAIL
NTS



2 CHEC□ DAM DETAIL
NTS



3 CONCRETE WASHOUT DETAIL
NTS

RIPRAP

GENERAL□RIPRAP IS A TEMPORARY OR PERMANENT, EROSION RESISTANT GROUND COVER OF LARGE, LOOSE, ANGULAR STONE THAT SLOWS THE VELOCITY OF CONCENTRATED RUNOFF OR STABILIZES SLOPES WITH SEEPAGE PROBLEMS AND□OR NON□COHESIVE SOILS. RIPRAP PREVENTS SCOUR AND REDUCES THE VELOCITY AND□OR ENERGY OF CONCENTRATED STORM WATER FLOW. RIPRAP CAN PROTECT DOWNSTREAM PROPERTIES AND WATERWAYS FROM CONSTRUCTION DISTURBANCES THAT INCREASES THE VOLUME, VELOCITY AND PEA□ FLOW RATE OF STORMWATER RUNOFF. THE DESIGN SHOULD LIMIT THE PEA□ RATE OF RUNOFF FOR THE 2□YEAR, 2□HOUR STORM TO 50□ OF THE RELEASE RATE FOR E□ISTING SITE CONDITIONS. ALL TEMPORARY ON□SITE CONVEYANCE CHANNELS SHALL BE DESIGNED AND CONSTRUCTED TO WITHSTAND THE E□PECTED VELOCITY OF FLOW FROM A 2□YEAR, 2□HOUR FRE□UENCY STORM FOR THE DEVELOPED CONDITION WITHOUT EROSION.

PRODUCT□RIPRAP SHALL CONSIST OF WELL GRADED, LARGE, LOOSE, ANGULAR STONES.

LOCATION□RIPRAP SHALL BE USED WHERE THERE IS CONCENTRATED, HIGH VELOCITY RUNOFF OR WHERE STABILIZED SLOPES WITH SEEPAGE PROBLEMS AND□OR NON□COHESIVE SOILS E□IST. RIPRAP IS USED IN SOIL□WATER INTERFACES, WHERE THE SOIL CONDITIONS, WATER TURBULENCE, WATER VELOCITY AND E□PECTED VEGETATIVE COVER, ARE SUCH THAT THE SOIL MAY ERODE UNDER THE DESIGN FLOW CONDITIONS. AT THE OUTLETS OF ALL PIPES AND CHANNELS, RIPRAP MAY BE USED TO PREVENT EROSION OF OUTLETS AD□ACENT STREAMBAN□S, SLOPES AND DOWNSTREAM REACHES. E□AMPLES OF SOME APPLICATIONS ARE OUTLETS OF PIPES, DRAINS, CULVERTS, SLOPE DRAINS, DIVERSION DITCHES, SWALES, OR CHANNELS, AND AT THE TOE OF MILD TO STEEP SLOPES. THIS BMP IS COMMONLY USED IN CON□UNCTION WITH OTHER BMP□S.

CONSTRUCTION□CONSTRUCTION OF BMP□S UTILIZING RIPRAP SHALL BE SE□UENCED SO THAT THE RIP RAP IS PLACED WITH THE MINIMUM POSSIBLE DELAY. DISTURBANCE OF AREAS WHERE RIPRAP IS TO BE PLACED SHOULD BE UNDERTA□EN ONLY WHEN FINAL PREPARATION AND PLACEMENT OF THE RIPRAP CAN FOLLOW IMMEDIATELY BEHIND THE INITIAL DISTURBANCE. WHERE RIPRAP IS USED FOR OUTLET PROTECTION, THE RIPRAP SHOULD BE PLACED BEFORE OR IN CON□UNCTION WITH THE CONSTRUCTION OF THE PIPE OR CHANNEL SO THAT IT IS IN PLACE WHEN THE PIPE OR CHANNEL BEGINS TO OPERATE. A SYNTHETIC FILTER FABRIC SHALL BE PLACED UNDER THE RIPRAP TO HELP PREVENT SCOURING OF UNDERLYING SOILS.

MAINTENANCE□RIPRAP COVERINGS SHOULD BE INSPECTED EVERY TWO WEE□S, OR AFTER A STORM EVENT RESULTING IN GREATER THAN 0.5 INCHES OF RAIN, BEFORE FINAL STABILIZATION HAS OCCURRED. AFTER FINAL STABILIZATION, RIP RAP SHALL BE INSPECTED BI□ANNUALLY. ENSURE SMALLER ROC□ OR UNDERLYING SOILS ARE NOT CARRIED AWAY DURING HIGH WATER FLOWS. ENSURE UNDERLYING SOILS ARE NOT BEING SCOURED AND THAT FILTER FABRIC IS SERVICEABLE. FOR APPLICATIONS WHERE RIPRAP HAS BEEN GROUTED, ENSURE GROUT IS SERVICEABLE. REPAIR DAMAGE TO RIPRAP IMMEDIATELY.

FINAL STABILIZATION□RIPRAP MAY REMAIN IN PLACE, UNLESS OTHERWISE INDICATED BY OPERATOR□OWNER.

CHEC□ DAM

GENERAL□CHEC□ DAMS ARE BMP□S CONSTRUCTED OF ROC□, SANDBAGS, OR FIBER ROLLS, PLACED ACROSS A NATURAL OR MAN□MADE CHANNEL OR DRAINAGE DITCH. CHEC□ DAMS REDUCE SCOUR AND CHANNEL EROSION BY REDUCING FLOW VELOCITY AND ENCOURAGING SEDIMENT DROPOUT.

PRODUCT□CONSTRUCTED WITH ROC□, SANDBAGS, OR FIBER ROLLS.

LOCATION□CHEC□ DAMS MAY BE INSTALLED IN SMALL OPEN CHANNELS WHICH DRAIN LESS THAN 10 ACRES, STEEP CHANNELS WHERE STORM WATER RUNOFF VELOCITIES E□CEED 5 FT□SEC, DURING THE ESTABLISHMENT OF GRASS LININGS IN DRAINAGE DITCHES OR CHANNELS, OR IN TEMPORARY DITCHES WHERE A SHORT LENGTH OF SERVICE DOES NOT WARRANT ESTABLISHMENT OF EROSION□RESISTANT LININGS. CHEC□ DAMS ARE NOT INTENDED TO BE USED IN STREAMS OR IN CHANNELS THAT ARE ALREADY GRASS LINED UNLESS INCREASED EROSION IS E□PECTED.

CONSTRUCTION□CONSTRUCTION OF CHEC□ DAMS SHALL ALLOW WATER TO POND BEHIND THE CHEC□ DAM DURING RAINFALL EVENTS. INSTALL CHEC□ DAMS APPRO□IMATELY 15 FEET FROM THE OUTFALL DEVICE. 2 YEAR FLOODS AND GREATER SHALL BE ABLE TO PASS OVER THE CHEC□ DAM WITHOUT OVERTOPPING ROADWAY, INCREASING UPSTREAM FLOODING OR CAUSING DAMAGE TO THE CHEC□ DAM. CHEC□ DAM INTERVALS SHALL BE □00 FEET FOR CHANNELS 1□□□, 200 FEET FOR CHANNELS □□□, AND 100 FEET OR LESS FOR CHANNELS GREATER THAN □□. CHEC□ DAMS CONSTRUCTED FROM GRAVEL MUST BE 100□ PASSING THE 50 MM SIEVE AND 10□ MA□IMUM PASSING THE □75 MM SIEVE. DAM MATERIAL MAY BE PITRUN OR CRUSHED AGGREGATE. DO NOT CONSTRUCT OUT OF STRAW BALES OR SILT FENCE.

MAINTENANCE□AFTER E□CESSIVE RAINFALL EVENTS, CHEC□ DAMS RE□UIRE THAT ALL SEDIMENT BE REMOVED AND PROPERLY DISPOSED OF, AND IN SOME CASES, REPLACED. MA□IMUM SEDIMENT HEIGHT IS 1□□OF THE HEIGHT OF THE CHEC□ DAM.

FINAL STABILIZATION□CHEC□ DAMS CAN BE LEFT IN PLACE FOLLOWING CONSTRUCTION ACTIVITIES AND ALLOWED TO ACCUMULATE SEDIMENT AND VEGETATION.

CONCRETE WASHOUT AREA

GENERAL□A CONCRETE WASHOUT AREA PROTECTS WATER □UALITY PARAMETERS THAT CAN BE AFFECTED BY THE INTRODUCTION OF CONCRETE. CONCRETE AFFECTS THE PH OF WATER CAUSING SIGNIFICANT CHEMICAL CHANGES IN WATER BODIES AND HARM TO A□UATIC LIFE.

PRODUCT□A TEMPORARY DISPOSAL AREA FOR CONCRETE WASTE RESULTING FROM CONCRETE E□CESS, FRESH CONCRETE MI□, OR CONCRETE SAW□CUT DUST. THE WASTE SOURCES ARE TRUC□ AND E□UIPMENT WASHING OR CONCRETE DUST AND CONCRETE DEBRIS RESULTING FROM DEMOLITION.

LOCATION□THE CONCRETE WASHOUT AREA WILL BE USED ON ANY CONSTRUCTION PRO□ECT THAT INVOLVES THE DEMOLITION OF E□ISTING CONCRETE OR THE USE OF FRESH CONCRETE WHERE THE WASTE CONCRETE MUST BE DISPOSED OF ON□SITE. IT IS ILLEGAL TO DUMP WASTE CONCRETE INTO VACANT AREAS ON THE □OB□SITE, OR INTO DITCHES OR DRAINAGE FACILITIES.

CONSTRUCTION: USE A 30 MIL PVC LINER (GEO-MEMBRANE) WITH A THICKNESS OF 0.030". BERM AROUND THE EDGES AS SHOWN. STRAW BALES MAY BE USED IN PLACE OF BERMING. IF STRAW BALES ARE USED, PLACE ON THEIR EDGE SO THAT THE BINDER TWINE DOES NOT MA□E CONTACT WITH THE GROUND. E□TEND THE POLY LINER PAST THE BERM OR BALES AND WRAP THE POLY LINER AROUND OVER THE TOP OF THE ENTIRE BERM OR BALES. IF BALES ARE USED, DRIVE REBAR OR OTHER METHOD OF HOLDDOWN INTO THE CENTER OF EACH END OF EACH BALE TO ANCHOR THE BALE.

MAINTENANCE□THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND□OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR WASTE CONCRETE. WASTE MATERIAL FROM CONCRETE WASHOUT OPERATIONS MUST BE REMOVED AND LEGALLY DISPOSED OF WHEN IT HAS ACCUMULATED TWO□THIRDS OF THE WET STORAGE CAPACITY OF THE STRUCTURE.

FINAL STABILIZATION□WHEN CONSTRUCTION WOR□ IS FINISHED, THE CONCRETE WASHOUT AREA MUST BE REMOVED. THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER ACCEPTED BY THE LOCAL □URISDICTION.

CONCRETE WASTE MANAGEMENT

GENERAL□CONCRETE WASTE MANAGEMENT PROTECTS WATER □UALITY PARAMETERS THAT CAN BE AFFECTED BY THE INTRODUCTION OF CONCRETE. CONCRETE AFFECTS THE PH OF WATER CAUSING SIGNIFICANT CHEMICAL CHANGES IN WATER BODIES AND HARMING A□UATIC LIFE.

PRODUCT□A TEMPORARY DISPOSAL AREA FOR CONCRETE WASTES RESULTING FROM CONCRETE E□CESS, FRESH CONCRETE MI□, OR DUST. THE WASTE SOURCES ARE TRUC□ AND E□UIPMENT WASHING OR CONCRETE DUST AND CONCRETE DEBRIS RESULTING FROM DEMOLITION.

LOCATION□THE PRACTICE WILL BE USED ON ANY CONSTRUCTION PRO□ECT THAT INVOLVES THE DEMOLITION OF E□ISTING CONCRETE OR THE USE OF FRESH CONCRETE AND THE WASTE CONCRETE MUST BE DISPOSED OF ON□SITE. IT IS ILLEGAL TO DUMP WASTE CONCRETE INTO VACANT AREAS ON THE □OB□SITE, OFFSITE, OR INTO DITCHES OR DRAINAGE FACILITIES.

CONSTRUCTION□REFER TO THE FOLLOWING DRAWINGS OF THE MOST COMMON TYPES OF DISPOSAL AREAS. DEVELOP PRE□DETERMINED, SAFE CONCRETE DISPOSAL AREAS AWAY FROM THE STORMWATER CONVEYANCE SYSTEM. ADD THE LOCATION TO THE BMP MAP WHEN THE LOCATION IS DETERMINED AND PLACE A SIGN NEAR THE DUMP SITE IF RE□UIRED BY REGULATIONS. FIND OUT THE DEPTH OF THE GROUNDWATER TABLE AND THE SOIL PERMEABILITY TO DETERMINE IF LINING IS NEEDED. PROVIDE ADE□UATE STORAGE BASED ON FRE□UENCY OF CLEANOUT AND VOLUME OF WASTE. EDUCATE DRIVERS AND E□UIPMENT OPERATORS ON PROPER DISPOSAL AND E□UIPMENT CLEANING PROCEDURES AND ENFORCE PROCEDURES.

MAINTENANCE□CHEC□ THE WASHOUT AREA PERIODICALLY TO MA□E SURE THAT THE WASH WATER CONTAINMENT IS NOT LEA□ING. CHEC□ THE LINER FOR DAMAGE THAT WOULD ALLOW LEA□AGE INTO THE GROUNDWATER. IF TORN, REPLACE IMMEDIATELY. THE SILT FENCE TOE□IN SHOULD NOT PERMIT LEA□AGE UNDER THE SILT FENCE. REMOVE DRY WASTE CONCRETE BEFORE THE PIT BECOMES FULL TO PREVENT OVERFLOW. DISPOSE OF DRY CONCRETE AT A RECYCLING FACILITY. MAINTAIN STABILIZED ENTRANCES IF ENTRANCE IS RE□UIRED.

FINAL STABILIZATION□WHEN CONSTRUCTION WOR□ IS TERMINATED, THE DISPOSAL AREA MUST BE REMOVED. THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER ACCEPTED BY THE LOCAL □URISDICTION.

SANITARY□SEPTIC WASTE MANAGEMENT

GENERAL□PROPER SANITARY AND SEPTIC WASTE MANAGEMENT PREVENT THE DISCHARGE OF POLLUTANTS TO STORMWATER FROM SANITARY AND SEPTIC WASTE BY PROVIDING CONVENIENT, WELL□MAINTAINED FACILITIES, AND ARRANGING FOR REGULAR SERVICE AND DISPOSAL.

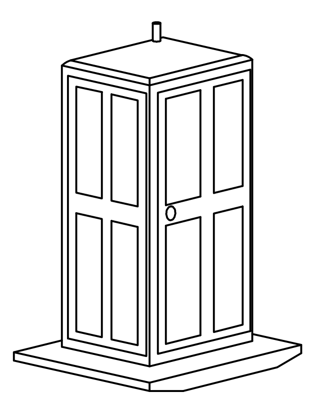
PRODUCT□SANITARY OR SEPTIC WASTES SHOULD BE TREATED OR DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL RE□UIREMENTS BY REPUTABLE, LICENSED SANITARY AND SEPTIC WASTE HAULERS. IF USING AN ONSITE DISPOSAL SYSTEM, SUCH AS A SEPTIC SYSTEM, LOCAL HEALTH AGENCY RE□UIREMENTS MUST BE FOLLOWED.

LOCATION□SANITARY SEPTIC WASTE MANAGEMENT PRACTICES ARE SUITABLE FOR USE AT ALL CONSTRUCTION SITES THAT USE TEMPORARY OR PORTABLE SANITARY AND SEPTIC WASTE SYSTEMS.

CONSTRUCTION□PROCEDURES□
- PORTABLE TOILETS MUST BE PROVIDED IF NO PERMANENT FACILITIES ARE AVAILABLE.
- SANITARY FACILITIES MUST BE PROVIDED ON THE SITE IN CLOSE PRO□IMITY TO AREAS WHERE PEOPLE ARE WOR□ING.
- LOCATE PORTABLE TOILETS A MINIMUM OF 20 FEET AWAY FROM STORM DRAIN INLETS, CONVEYANCE CHANNELS, OR SURFACE WATERS. IF UNABLE TO MEET 20□FOOT DISTANCE RE□UIREMENT, PROVIDE CONTAINMENT FOR PORTABLE TOILETS.
- TEMPORARY SANITARY FACILITIES SHOULD BE LOCATED AWAY FROM DRAINAGE FACILITIES, WATERCOURSES, AND FROM TRAFFIC CIRCULATION.
- UNTREATED RAW WASTEWATER SHOULD NEVER BE DISCHARGED OR BURIED.
- TEMPORARY SEPTIC SYSTEMS SHOULD TREAT WASTES TO APPROPRIATE LEVELS BEFORE DISCHARGING.
- TEMPORARY SANITARY FACILITIES THAT DISCHARGE TO THE SANITARY SEWER SYSTEM SHOULD BE PROPERLY CONNECTED TO AVOID ILLICIT DISCHARGES.
- SANITARY AND SEPTIC FACILITIES SHOULD BE MAINTAINED IN GOOD WOR□ING ORDER BY A LICENSED SERVICE.
- REGULAR WASTE COLLECTION BY A LICENSED HAULER SHOULD BE ARRANGED BEFORE FACILITIES OVERFLOW.

MAINTENANCE□REGULAR WASTE COLLECTION BY A LICENSED HAULER SHOULD BE ARRANGED BEFORE CONSTRUCTION BEGINS. IF HIGH WINDS ARE E□PECTED, PORTABLE SANITARY FACILITIES MUST BE SECURED WITH SPI□ES OR WEIGHED DOWN TO PREVENT OVER TURNING. UNTREATED RAW WASTEWATER SHOULD NEVER BE DISCHARGED OR BURIED. TEMPORARY SEPTIC SYSTEMS SHOULD TREAT WASTES TO APPROPRIATE LEVELS BEFORE DISCHARGING. TEMPORARY SANITARY FACILITIES THAT DISCHARGE TO THE SANITARY SEWER SYSTEM SHOULD BE PROPERLY CONNECTED TO AVOID ILLICIT DISCHARGES. SANITARY AND SEPTIC FACILITIES SHOULD BE MAINTAINED IN GOOD WOR□ING ORDER BY A LICENSED SERVICE.

FINAL STABILIZATION□TEMPORARY OR PORTABLE SANITARY FACILITIES SHALL BE REMOVED AT THE END OF THE CONSTRUCTION OF THE PRO□ECT. DISTURBED SOIL AREAS RESULTING FROM REMOVAL SHALL BE PERMANENTLY STABILIZED.



4 SANITARY□SEPTIC WASTEMANAGEMENT DETAIL
NTS

PAINT WASHOUT BARREL

GENERAL□A PAINT WASHOUT BARREL IS USED TO CLEAN PAINT BRUSHES, PAINT ROLLERS, AND OTHER PAINT E□UIPMENT USED DURING HOME OR BUILDING CONSTRUCTION. TOOLS ARE CLEANED INSIDE THE BARREL.

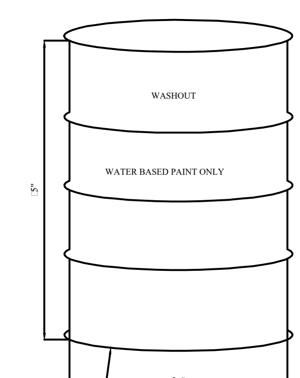
PRODUCT□AN UNCOVERED METAL BARREL OR DRUM WITH WASH WATER THAT IS CONTAINED INSIDE.

LOCATION□PAINT WASHOUT BARRELS ARE SUITABLE FOR USE AT ALL CONSTRUCTION SITES THAT USE LATE□ PAINT AND STUCCO. THE BARRELS ARE ALSO USED TO WASH DRYWALL TOOLS. □EEP BARRELS AWAY FROM ROOF RUNOFF, AND AS FAR AWAY FROM THE CURB AS POSSIBLE.

CONSTRUCTION□ALLOW PLENTY OF FREEBOARD FOR RAIN EVENTS. WATER MUST BE RECYCLED□FILTERED. RECYCLED OR UNUSED WATER MUST MEET LOCAL WATER □UALITY STANDARDS PRIOR TO DISCHARGING INTO WASTEWATER SYSTEMS. SEE ABOVE FOR APPRO□IMATE DIMENSIONS OF BARREL RECOMMENDED.

MAINTENANCE□PUMP BARREL OUT AT LEAST ONCE PER WEE□. DISCARD DAMAGED BARRELS. RECYCLE AND FILTER THE WATER. □EEP MAINTENANCE RECORDS.

FINAL STABILIZATION□REMOVE AT THE END OF THE CONSTRUCTION OF THE PRO□ECT. DISTURBED SOIL AREAS RESULTING FROM REMOVAL SHALL BE PERMANENTLY STABILIZED.



5 PAINT WASHOUT BARREL
NTS

HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

DRAWN BY: JCH
DATE: 06/2016

BIG_SKY
YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
MONTANA

PROJECT NO. 0001.061

BMP DETAILS

FIGURE NUMBER D□5

F:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\SHEETS\D-5.dwg Plotted on J□n/2□/2016

Appendix Q

Yellowstone Club Fire Department
1 Yellowstone Club Trail P.O. Box 161097 Big Sky, MT 59716 (406)995-7909

September 23, 2016

Madison County Planning
Attention: Charity Fetcher
PO Box 278
Virginia City, MT 59755

RE: The Corral P.U.D. Subdivision

Charity,

The Corral P.U.D. Subdivision project will be constructed under the Yellowstone Club Guidelines Design Guidelines. The following are requirements for this subdivision:

- All occupied structures to have an approved fire suppression system installed and operable at all times. Design and installation must be according to all applicable NFPA Standards.

- All occupied structures to have an approved fire alarm system installed and operable at all times. Design and installation must be according to all applicable NFPA Standards.

- Defensible Space around all structures. The Defense Space must follow requirements set forth for the reduction of fuels within 200 feet of structures. The guidelines also offer suggestions for the type of vegetation used in landscaping to reduce fire danger.

- Subdivision access will be by paved road with a minimum with of 26 feet and a public right of way of 60 feet. All driveways to have a minimal width of 14 feet.

Additional Fire Protection Features:

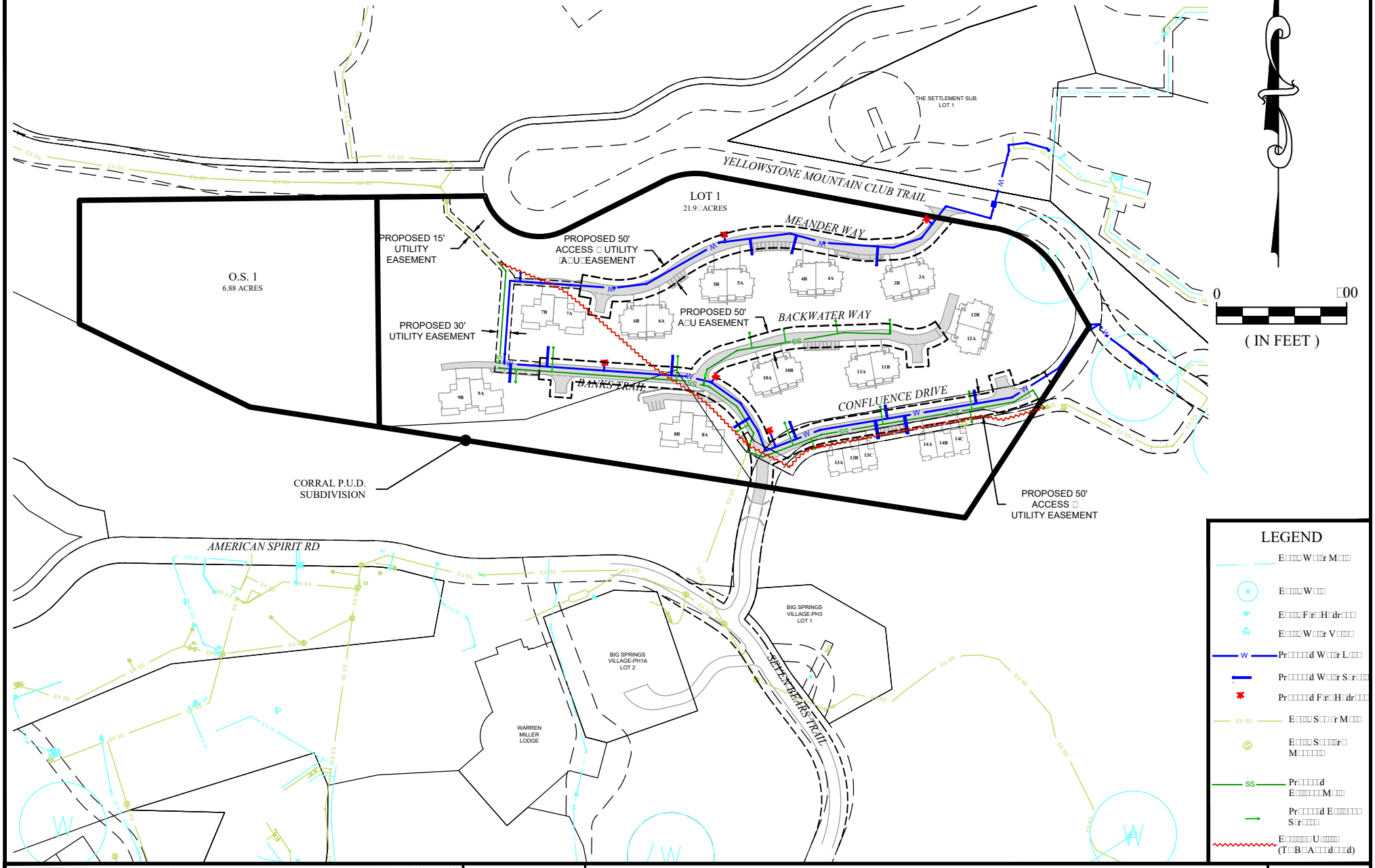
Fire hydrants will be located less than 1000 feet from all occupied structures. Each fire hydrant will have a tested flow rate of 1500 gallons per minute or more.

Please contact me if you have any further questions.

Sincerely,

Jason Manley
Fire Chief

THE CORRAL P.U.D. SUBDIVISION
FIRE PROTECTION PLAN



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 09/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

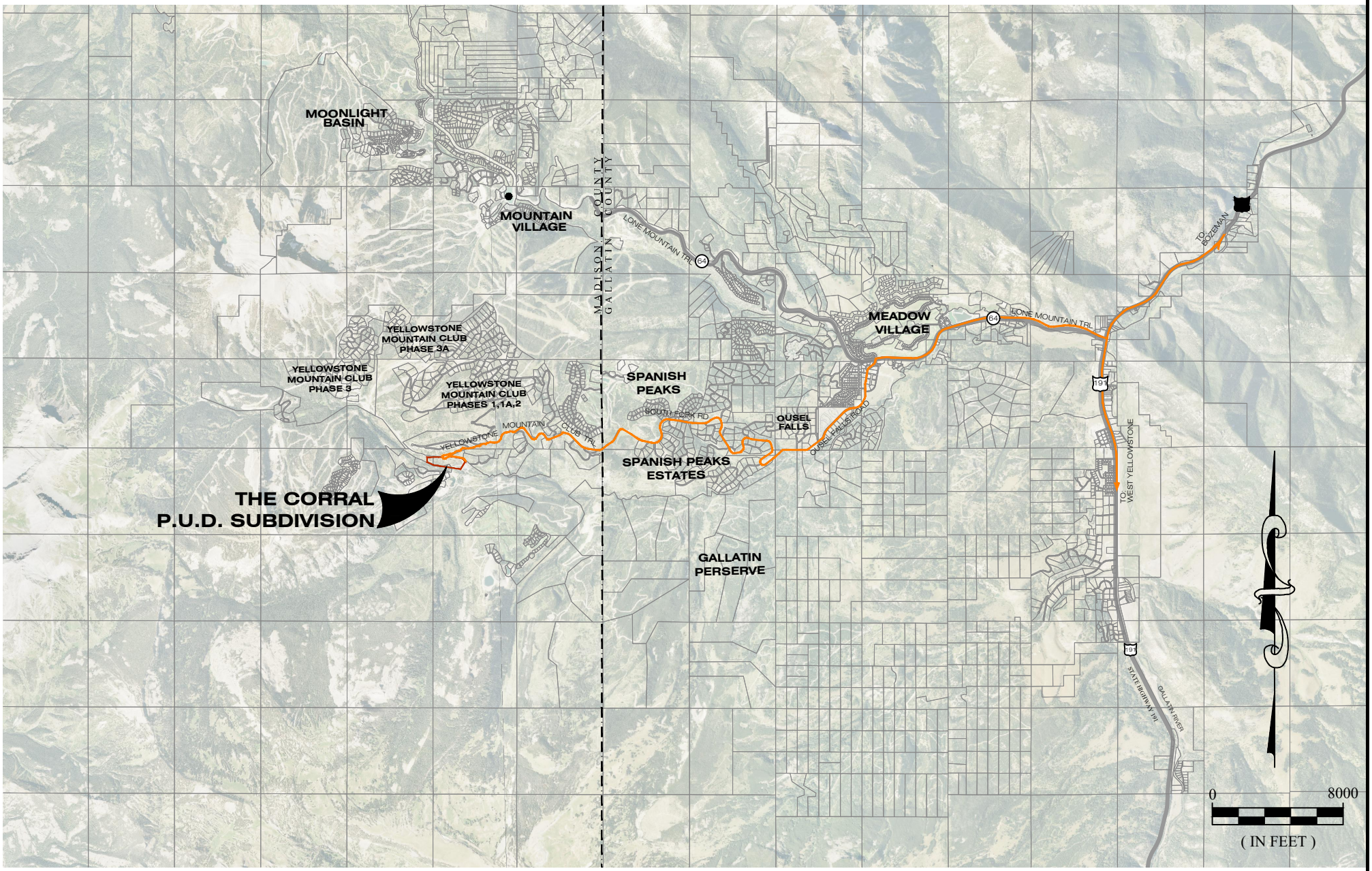
FIRE PROTECTION PLAN

PROJECT NO. 0001.061

FIGURE NUMBER 9

K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 9 - FIRE PLAN.dwg Plotted on Sep/26/2016

THE CORRAL P.U.D. SUBDIVISION
ACCESS MAP



HOUSER ENGINEERING P.C.
626 FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718

COPYRIGHT © HOUSER ENGINEERING P.C., 2016

DRAWN BY: JCH
CHK'D. BY: JLH
APPR. BY: JLH
DATE: 09/2016

YELLOWSTONE MOUNTAIN CLUB
THE CORRAL P.U.D. SUBDIVISION
BIG SKY MONTANA

ACCESS MAP

PROJECT NO. 0001.061

FIGURE NUMBER 10

K:\CIVIL 3D PROJECTS\Civil 3D Projects\15024\ACAD\EXHIBITS\FIG 10 - ACCESS MAP.dwg Plotted on Sep/14/2016

YELLOWSTONE CLUB
FIRE DEPARTMENT

STANDARD OPERATING PROCEDURES

"MAY-DAY" COMMUNICATIONS

VERSION 3/06

PURPOSE

The purpose of this procedure is to identify the roles and responsibilities of all the parties involved at an incident where a "May-Day" has been transmitted.

"MAY-DAY" RADIO MESSAGE

The radio message "May-Day" will be used by fire fighters to report their status as being lost, trapped, or injured and needing rescue. Any member may use "May-Day" to report a lost fire fighter. Any report of "May-Day" will receive priority radio traffic. . The term "May-Day" will be reserved ONLY to report a lost, trapped, or injured fire fighter(s). The term "emergency traffic" will be used to report all other emergencies.

COMMAND RESPONSIBILITIES

Command will maintain an awareness of the location of fire fighters on the fireground primarily through assignments and the accountability system. In the event that a fire fighter cannot be located through a PAR, or any other time a fire fighter is missing, the captain or any member should announce a "May Day." The term "May Day" will indicate a lost, trapped, or injured fire fighter. Command shall respond to a "May Day" by implementing a rescue plan for the fire fighter(s).

MISSING FIRE FIGHTER?

Company officers and individual fire fighters who suspect a fire fighter is missing must notify the incident commander immediately. The incident commander MUST ALWAYS assume that the missing fire fighter is lost in the building until the member is accounted for. The system must include the ability to identify when a fire fighter is going to be delayed beyond his/her SCBA air time. The plan should include:

- Fire operations during rescue efforts
- Expanding organization
- Establish/deploy the RIC/Rescue Sector
- Assign a chief officer if available to manage the Rescue Sector
- Medical operations
- Family support branch officer
    - Member support--debriefing, etc.
- Logistics--specialized equipment
- Safety
- Support activities

- Media control--information management

CHANGE THE STRATEGY AND PLAN TO A HIGH PRIORITY RESCUE EFFORT

The Incident Commander must restructure his/her strategy and action plan to include a fire fighter rescue effort. This may seem obvious to most. However, incident commanders can become overwhelmed by the emotion related to the crisis at hand and may become hooked on reacting to tasks rather than looking at the global picture. This can lead to disorganization and delays that can be fatal to the missing fire fighter.

Accurate information must be quickly obtained and acted upon. Additional resources must be immediately obtained. Rapid commitment of the RIC/Rescue Sector must occur. These resources must be organized and controlled. The Command organization must expand. The strategy, plan, and objectives must be quickly communicated to Command staff and sector officers. The plan and rescue activities must be continually monitored and revised as necessary. Conditions and updated information causes changes in the plan and objectives. The Incident Commander must communicate any changes to the Command staff and sector officers.

IMMEDIATELY REQUEST ADDITIONAL ALARMS/MUTUAL AID

In many situations, all resources on-scene may already be committed to fire fighting positions. Some fire fighters may already be approaching physical exhaustion, their SCBA's may be nearly empty. Relocating committed forces is difficult and slow. At least one mutual aid alarm with medical component should be immediately requested upon a report of a lost, trapped, or injured fire fighter. Additional mutual aid alarms may need to be requested based on circumstances and potential. There should be no hesitation in requesting additional resources.

INCLUDE A MEDICAL COMPONENT WHEN REQUESTING ADDITIONAL RESOURCES

Medical personnel will be needed to treat rescued fire fighters. The incident commander must ensure that an adequate number of EMS resources are responding as well as an adequate number of ambulances to transport injured fire fighters. The incident commander should understand that the situation is critical, and that fire fighters sometimes tend to overextend themselves when searching for a missing fire fighter, resulting in additional fire fighters becoming injured. Adequate medical resources must be readily available and on site.

UTILIZE A CENTRALIZED STAGING AREA

All additional resources will be sent to a centralized staging area. The incident commander should commit resources from staging based on needs at the site. Staging

controls resources and ensures that there is a route in and out of the scene, free of congestion, for rescues to transport recovered fire fighters.

COMMIT THE RAPID INTERVENTION CREW/RESCUE SECTOR

All significant fire fighting operations will have a rapid intervention crew (RIC)/Rescue Sector assigned. This team should be fully outfitted with protective clothing, SCBA, etc., and monitoring all tactical radio traffic. Upon report of a missing fire fighter, the incident commander has a completely fresh crew/crews fully outfitted, available for commitment to an immediate search and rescue of the last known area of the missing fire fighter(s). The RIC team, or any fresh crew(s) in staging, must be immediately sent to the rescue area. The commitment of additional crews, however, must be controlled and organized.

There is a direct relationship to the routine use of RIC teams and fire fighter survivability on the fire ground. The significance of the routine use of RIC teams to fire fighter survivability on the fireground is substantial. National Fire Protection Association studies reveal that a majority of fire fighter fatalities occur at residential fires. Once the fire is declared under control, the incident commander has the option to cancel the mutual aid company's response, utilize the company as a fresh crew for relief, or to conduct overhaul if needed. At multiple alarms, additional companies will be assigned to the "Rescue Sector".

WITHDRAW COMPANIES FROM THE AFFECTED AREA, IF APPROPRIATE, TO OBTAIN A ROLL CALL AND RECONNAISSANCE INFORMATION

In some situations, such as collapse or explosion, crewmembers may get separated. The only practical method, to obtain an accurate PAR of effected crews, may be to withdraw them to the exterior. In addition, withdrawal may be the only way to quickly obtain accurate information and reconnaissance on exactly where trapped members may be, routing to victims, debris locations, and the type of rescue equipment needed. Once the roll call and reconnaissance information is quickly obtained, crews can be re-assembled into a more organized rescue effort.

Withdrawal is a judgment call based on circumstances at the time, information available, and resources. It may not be practical or possible to do. However, the absolute need for an accurate roll call and information on missing fire fighters remains a critical priority. If it's determined not to withdraw, a detailed roll call must be obtained from each sector for all crews operating under his/her direction.

DO NOT ABANDON FIRE FIGHTING POSITIONS--HOLD POSITIONS AND PREVENT FIRE SPREAD

The reasons for a rapid intervention crew/Rescue Sector, and the immediate request for additional resources, becomes very clear with this critical fireground need. If a missing fire fighter(s) is to survive, the incident commander must keep the fire out of the rescue area. Without rescue teams in place, any rescue effort will be significantly delayed and a

decision must be made. Does he/she relocate companies committed to fire combat to the rescue effort and allow the fire to spread? Or does he/she hold the fire positions and wait for additional resources for the rescue effort? With a RIC team in place, the incident commander can initiate an immediate rescue effort without withdrawing or relocating fire combat companies.

In most situations the incident commander cannot allow the fire to spread. If anything, these fire combat positions need to be reinforced. Additional companies should be sent to priority positions to keep the fire out of the rescue area. Large caliber handlines and master-stream appliances should be deployed when safe to do so. Adequate water supply must be obtained for this reinforced response.

ASSIGN A CHIEF OFFICER TO THE RESCUE SECTOR

The incident commander is faced with a time critical crisis. Critical decisions and strong management of rescue operations is essential. A chief officer should be assigned to direct the rescue sector and rescue operations if not already assigned. Depending on the size of the rescue area and the complexity of operations, more than one chief officer may be needed to fill additional support positions or sectors.

ASSIGN A SAFETY SECTOR TO THE RESCUE OPERATION

Rescue operations are high risk. The operation may be taking place in a post-collapse environment. Flashover may have occurred. The incident commander must avoid sustaining additional injuries. Each additional injury requires a resource commitment that will draw away from the priority rescue effort. A safety sector in the affected area will help control the risk taking. The officer will be able to conduct an assessment of the hazards allowing time for the rescue sector officer to concentrate on the critical rescue effort. These sector officers must work hand in hand to insure that a safe and effective rescue operation is conducted.

INDIVIDUAL RESPONSIBILITIES

- to follow directions from superiors
- to continue with assignment unless otherwise directed
- to keep your cool

Every member on the scene should listen specifically for a "May-Day" as fireground noise could cover a call for the "May-Day."

LOST/TRAPPED FIRE FIGHTER BASIC SELF-SURVIVAL

VERSION 3/06

The nature of fire fighting places the fire fighter at risk of becoming lost or trapped. The toxic environment provides only a narrow window of survivability. Survival depends on a mix of predictable self survival actions by the lost fire fighter and the incident commander.

BASIC SELF-SURVIVAL RESPONSIBILITIES

The Number 1 Basic Self-Survival responsibility is ***DON'T GET TRAPPED/LOST, OR RUN OUT OF AIR.***

The rescue of trapped or lost fire fighters in a burning building is especially time sensitive because we work with a limited air supply.

- All Company Officers entering the Hazard Zone must have a portable radio and personal rescue tools.
- All members entering the Hazard Zone should have a portable radio and personal rescue tools
- Minimum crew size is two and crew members must remain intact.
- Crews must have an assignment and must be working under the direct supervision of a Company Officer or Command.
- Crews will follow Air Management guidelines of leaving the structure or hazardous environment when the air supply reaches **50%** (One Half Air).

CALL FOR HELP IMMEDIATELY

Fire fighters who find themselves lost or trapped must immediately use "May Day" to announce their situation while they continue to attempt to find their way out. Fire fighters should not delay notification of distress. Notifications should occur as soon as the fire fighter THINKS he or she is in trouble. The longer you wait to tell somebody you are in trouble the more you jeopardize yourself and the rescuers lives.

"MAY-DAY" RADIO MESSAGE

The radio message "May-Day" will be used by a lost or trapped fire fighter to report their status as being in trouble and needing rescue. **Any report of "May-Day" will receive priority radio traffic.** The term "May-Day" will be reserved ONLY to report lost or trapped fire fighters. The term "emergency traffic" will be used to report other emergencies or changing fireground communications.

Lost fire fighters should give Command information as to who they are, how many fire fighters, what area they were operating in, where they THINK they are (as accurately as possible), description of building structures surrounding them, sounds of nearby activities, (i.e., ventilation saw noise), or any other information that might direct rescue crews (RIC) to their location.

OTHER RADIO CHANNEL

If a lost fire fighter can not contact Command, dispatch, or any other units on the assigned radio channel, the fire fighter should go to another channel to attempt contact and declare an emergency. It's important to find any channel that works. Once communication is established remain on that channel and messages will be relayed to Command.

ACTIVATE PASS DEVICE

As soon as a fire fighter recognizes he/she is lost or trapped, the PASS device must be manually activated to sound the audible tone. The device must remain on until rescued. If the device interferes with the lost fire fighters communicating critical radio messages to incident commander or rescuers, the device may be turned off temporarily. Once messages are completed, the device must again be manually activated.

CREWS STAY TOGETHER

Members that separate from each other make it difficult for rescuers to find all fire fighters. Crew members that stay intact as a crew enhance their chances for ALL being rescued and allows easier, more efficient extrication.

FOLLOW THE HOSE OUT

Crew members should stay with the hose line and follow it out whenever possible. All fire fighters must remember that the male couplings lead toward the nozzle (the fire), female side of the couplings toward the pump (outside). The hose line should always be treated as a safety line to the outside. Where lifeline ropes are in use, follow the lifeline to the exterior.

SEARCHING FOR AN EXIT

A lost fire fighter should always attempt to get out of the building by whatever means possible. Where doors, windows, or other egress is not available, fire fighters should next attempt to reach an exterior wall.

Once at the wall he/she will be able to search for doorways, windows, and hallways which generally lead to the outside. Rescuers will first search hallways, around walls, and around windows and doors, before sweeping large interior areas. For this reason, fire fighters must avoid collapsing in the middle of open spaces. Getting to hallways, doors,

or windows will increase the chances of being rescued early. Breeching walls for escape or fresh air can aid in survivability. These actions also provide predictable activities that will aid rescuers.

RETREAT TO A SAFE REFUGE

Where the fire fighter cannot find a way out, but there is a safe refuge (protective room or floor) away from the fire that the fire fighter can retreat to, he/she should take advantage of this location. Command and the rescuers should then be advised of the location by whatever means possible.

STAY CALM AND CONSERVE AIR

A conscious effort must be made by the lost fire fighter to control breathing. Unnecessary talking or physical activity must be ceased, unless absolutely needed. Fire fighters must control and pace their physical exertion activities in order to extend their SCBA air supply.

HORIZONTAL POSITION

If a fire fighter cannot get out, he should assume a horizontal position on the floor that maximizes the audible affects of the PASS device. The fire fighter should attempt to take this position at an exterior wall, doorway or hallway that maximizes quick discovery by rescue crews.

FLASHLIGHTS/TAPPING NOISE

If assuming a position to await rescuers, the fire fighters should attempt to position his flashlight toward the ceiling. This will enhance the rescuer's ability to see the light and locate the downed fire fighter. If able, the fire fighter should attempt tapping noises to assist rescuers in locating him (i.e., hitting a tool against a metal roll-up door).

COMPANY OR SECTOR OFFICERS

Company officers who are unable to locate a crew or fire fighters assigned to them, must immediately notify command and use "MAY-DAY" to notify all personnel operating on the fireground. When possible the company or sector officer should include who's missing, last known location, and actions being taken. Fire fighting positions must not be abandoned during the rescue effort; the Company Officers and Command MUST control free-lancing. Command will initiate a rescue effort.

RIC/RESCUE SECTOR

Version 3/06

PURPOSE

This procedure will define the response, tasks and organization of Rapid Intervention Crews (RIC)/Rescue Sector.

OBJECTIVE

The objective of RIC is to have a fully equipped rescue team onsite, in a ready state, to immediately react and respond to rescue firefighters.

RIC will be established anytime firefighters are on air inside a structure, or command deems it necessary.

IRIC (Initial RIC)

- Temporary two-person RIC assigned at the outset of an incident to allow teams to enter an IDLH, or potential IDLH atmosphere.

One primary IRIC member must be solely dedicated to tracking interior personnel. Their function is to account for location of interior crews and initiate a fire fighter rescue. This position requires an attack line, radio, PPE, and SCBA.

The secondary IRIC member is permitted to take on other roles, such as, safety officer, or equipment operator. This position requires a radio with PPE and SCBA nearby to be donned as soon as possible.

Standard Implementation IRIC Four-Person Crew

IRIC can be used when a mobile Command mode is utilized by the first arriving company officer making an interior attack on a working fire with the nozzle person. The plug person assumes the primary IRIC position and the engineer assumes the secondary IRIC position.

Standard Exceptions to the IRIC Requirement at Structure Fires

1. When there is a reported or suspected life hazard where immediate action could prevent the loss of life.
2. When the fire is in an incipient stage that could be controlled by a portable fire extinguisher, without the use of PPE or SCBA..

DEPLOYMENT

Command has the following options for use of RIC companies:

1. To address all critical fire ground factors within the Risk Management Profile.
2. Assign the company to RIC duties and designate Rescue Sector/Branch
3. If assigned to anything other than RIC duties, Command should request additional companies as RIC units.
4. Cancel the company en-route after the declaration of fire under control AND PAR's have been obtained from all crews.
5. Assign other duties; such as relief for working crews, overhaul duties, etc.

RIC/RESCUE SECTOR RESPONSIBILITIES

- Monitor tactical radio channel en-route.
- Initiate tactical worksheet (location/position of apparatus and interior crews)
- Utilize standard staging procedures.

Develop and Communicate an Incident Action Plan (focus is to reduce risks to personnel)

- Consider critical fire ground factors
- Consider air management (elapsed time)
- Consider fire fighter fatigue
- Consider radio communications

Develop and Communicate a Search Plan

- Consider the point of entry for crew/member in trouble
- Consider the last known location of crew/member in trouble
- Consider your water supply/hoseline selection (speed, mobility, and length)
- Assign tasks to entry crew (camera, air, tools, taglines, etc.)
- Monitor your air supply
- Provide timely reports (C.A.N.) to Command or Rescue Branch

Develop and Communicate a Rescue Plan

- Consider relay rescue (call additional resources early)
- Consider alternative exit points
- Consider carry vs. drag techniques (obstructions, heat, visibility)
- Monitor your air supply
- Provide timely reports (C.A.N.) to Command

RIC/Rescue Sector Functions

- Monitor tactical radio channel, RIC bag and thermal imaging camera

- Retrieve RIC bag and thermal imaging camera (confirm equipment is in ready state)
- Recon the hot zone (apparatus placement, points of entry, alternate doors and windows)
- Request additional resources
- Provide additional means of egress for roof operations or companies operating above the ground floor
- Remove security bars/devices
- Coordinate the opening of doors and windows
- Illuminate entrance and exits
- Position Target Exit Device
- Confirm utilities are secure
- Communicate the search plan
- Communicate the rescue plan
- Notify Command (C.A.N. report) RIC/Rescue Sector "Ready"

Initial Entry Team Operations

- Execute the search plan
- Locate the fire crew/member
- Assess fire fighter and environment
- Transfill air and package fire fighter
- Monitor entry team air supply
- Provide C.A.N. report to Command
- Prepare to extricate fire fighter

Back-up Entry Team Operations

- RIC for entry team
- Communicate rescue plan
- Secure additional resources (as needed)
- Prepare for relay rescue
- Provide exterior support for initial entry team

HIGH-RISE FIRES

For high-rise fires, RIC's will be assigned to standby positions in the Resource Sector location, stairwell, or other appropriate location(s). A secondary standby location may be in the Lobby Sector location. RIC Company must take RIC bag to the Resource or Lobby Sector and standby.

COMMITMENT TO RESCUE OF A LOST OR TRAPPED FIRE FIGHTER

Units should initially be deployed to locate injured or lost firefighters, and render aid and assistance to the member. The RIC Company(s) will then report their position and conditions to command for deployment of appropriate rescue resources to extricate the member if necessary.

Fireground Strategy

VERSION 3/06

PURPOSE

The following procedure outlines the fireground strategy to be employed at structure fires. Fireground operations will fall in one of two strategies, OFFENSIVE OR DEFENSIVE. The two strategies are based on a standard Risk Management Plan that is to be employed at ALL structure fires. This is the basis for this procedure.

WITHIN A STRUCTURED RISK MANAGEMENT PLAN

WE MAY RISK OUR LIVES A LOT TO PROTECT *SAVABLE* LIVES.

WE MAY RISK OUR LIVES A LITTLE TO PROTECT *SAVABLE* PROPERTY.

WE WILL NOT RISK OUR LIVES AT ALL TO SAVE WHAT IS ALREADY LOST.

Considering the level of risk, the Incident Commander will choose the proper strategy to be used at the fire scene. The strategy can change with conditions or because certain benchmarks (i.e., ALL CLEAR) are obtained. The strategic mode will be based on:

- The building (type of construction, condition, age, etc.)
- Structural integrity of the building (contents vs. structural involvement)
- The fire load (what type of fuel is burning and what's left to burn)
- The fire and/or smoke conditions (extent, location, etc.)
- The rescue profile (savable occupants/survivability profile)

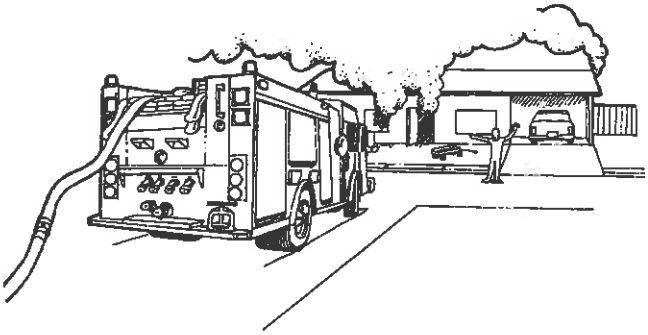
The Incident Commander is responsible for determining the appropriate fireground strategy. Once the appropriate strategy is initiated, it becomes the Incident Commander's job to ensure that all personnel are operating within the strategy. By controlling the fireground strategy, the Incident Commander is providing overall incident scene safety. The proper strategy will be based on the following:

- Avoiding simultaneous OFFENSIVE and DEFENSIVE strategies in the same fire area. This typically happens by first committing personnel to interior positions, then operating master streams from exterior positions. This places interior crews in danger of injury or death.
- Matching the appropriate strategy to the fire conditions of the structure, and minimizing risk to firefighters.

Managing fireground strategy must start with the arrival of the first unit and be constantly monitored and evaluated throughout the entire incident. The initial Incident Commander *will include the fireground strategy in the on-scene report.* As Command is transferred to later arriving officers, these officers assuming Command must evaluate the fireground strategy based on the Risk Management Plan.

Fireground strategy provides a starting point to begin fireground operations. Once the strategy is announced, all firefighters know whether to operate on the interior or exterior of the building. The fireground strategy cannot be a mystery to anyone; everyone operating on the fireground must be operating in the same strategy mode: Offensive *or* Defensive.

OFFENSIVE STRATEGY



Within the framework of the Risk Management Plan, the structure must first be determined to be safe to enter. Once determined safe, an Offensive Fire Attack is centered around RESCUE. *When safe to do so*, The Yellowstone Club Fire Department will initiate offensive operations at the scene of structure fires. The following are guidelines for offensive fire attacks:

Assign RIC team prior to entry

Initial attack efforts must be directed toward supporting a primary search--the first attack line must go between the victims and the fire to protect avenues of rescue and escape.

Determine fire conditions and extent before starting fire operations (as far as possible). *Don't operate fire streams into smoke.*

Offensive fires should be fought from the INTERIOR-UNBURNED SIDE (interior capability is the principal offensive strategy factor).

Avoid exterior application of water during offensive operation. This is usually the very worst application point.

Avoid fire attack from the burning side of the building. An attack from the burning side generally will drive the fire, smoke, and heat back into the building and drive the interior fire control forces out of the building.

Companies must resist the urge to focus only on the fire (this is known as the "candle moth" syndrome or "tunnel vision"). In some cases, the most effective tactical analysis involves an evaluation of what is *not* burning rather than what is actually on fire. The unburned portion represents where the fire is going and should establish the framework for fire control activities and requirements.

Command must consider the most critical direction and avenues of fire extension, plus its speed, particularly as they affect:

- Rescue activities
- Level of risk to firefighters
- Confinement efforts
- Exposure protection

Command must allocate personnel and resources based upon this fire spread evaluation.

Command must not lose sight of the very simple and basic fireground reality that at some point firefighters must engage and fight the fire. Command must structure whatever operations are required to PUT WATER ON THE FIRE. The rescue/fire control-extension/exposure problem is solved in the majority of cases by a fast, strong, well-placed attack. Command must establish an attack plan that overpowers the fire with ACTUAL water application, either from offensive or defensive positions.

Command must consider the seven sides (or sectors) of the fire: front, rear, both sides, top, bottom, and interior. Fires cannot be considered under control until all seven sides are addressed. Failure to do so frequently results in fire extension.

Where the fire involves concealed spaces (attics, ceiling areas, construction voids, etc.), it becomes paramount that companies open up and operate fire streams into such areas. Early identification and response to concealed space fires will save the building. Officers who hesitate to open up because they don't want to beat up the building may lose the structure.

Early ventilation (natural or positive pressure) is a major support item that must be addressed during concealed space attacks. This must be initiated early and be well coordinated. Ventilation openings should be made in the fire area. Positive pressure should be injected from the unburned side and exit out of the fire area.

Command must get ahead of the fire. Command must make critical decisions that relate to cutoff points and develop a pessimistic fire control strategy. It takes a certain amount of time to get water to a location, and the fire continues to burn while the attack is being set up. Command must consider where the fire will be when attack efforts are ready to actually go into operation; if misjudged, the fire may burn past the attack/cutoff position before resources and personnel are in position. Don't play "catch up" with a fire that is burning through a building. Project your set-up time, write off property, and get ahead of the fire. Set up adequately ahead of the fire, then overpower it.

WRITE-OFF PROPERTY THAT IS ALREADY LOST, and go on to protect exposed property based on the most dangerous direction of fire spread. Do not continue to operate in positions that are essentially lost.

The basic variables relating to attack operations involve:

- Location/position of attack
- Size of attack
- Support functions

Command develops an effective attack through the management of these factors. Command must balance and integrate attack size and position with fire conditions, risk, and resources.

Many times offensive/defensive conditions are clear cut and Command can quickly determine the appropriate strategy. In other cases, the situation is MARGINAL and Command must initiate an offensive interior attack, while setting up defensive positions on the exterior.

THE ONLY REASON TO OPERATE IN MARGINAL SITUATIONS IS RESCUE.

The effect of the interior attack must be constantly evaluated, and the attack abandoned if necessary. Strategy changes can develop almost instantly or can take considerable time. Command must match the strategy with the conditions. The Incident Commander controls overall incident scene safety by determining the proper strategy to be used.

If the Incident Commander doesn't change strategies from offensive to defensive until the building is disassembling itself due to structural damage, Command is late in strategy determination and on the receiving end of the building's decision governing the new strategy to be employed. Often times when the building gets to make those decisions, firefighters become traumatized (physically and/or emotionally). THE INCIDENT COMMANDER DETERMINES THE STRATEGY, THE BUILDING SHOULDN'T.

Command should abandon marginal attacks when:

- A primary all clear is obtained and the situation is still marginal.
- The roof is unsafe or untenable. Especially working fires in large unsupported, or lightweight trussed attic spaces.
- Interior forces encounter heavy heat and cannot locate the fire or cannot make any progress on the fire.
- Heavy smoke is being forced from the building under pressure and is increasing.

Command needs to constantly evaluate conditions while operating in marginal situations. This requires frequent and detailed reports from Officers.

In certain situations Command should strongly consider not committing crews to the interior of a structure unless he/she receives a report that the roof of the structure is safe to operate on and under. It is better to go from an offensive to a defensive strategy too soon rather than too late.

DEFENSIVE STRATEGY

The decision to operate in a defensive strategy indicates that the offensive attack strategy, or the potential for one, has been abandoned for reasons of personnel safety, and the involved structure has been conceded as lost (the Incident Commander made a conscious decision to write the structure off).

The announcement of a change to a defensive strategy will be made as Emergency Traffic and all personnel will withdraw from the structure *AND MAINTAIN A SAFE DISTANCE FROM THE BUILDING*. Captains will account for their crews and ~~and~~ advise the I.C. on the status of their crew. Officers will notify Command of the status of the crews assigned to their sector. A PAR (Personnel Accountability Report) shall be obtained after any switch from offensive to defensive strategy.

Interior lines will be withdrawn and repositioned when changing to a defensive strategy. Crews should retreat with their hose lines if safe to do so. If retreat is being delayed because of hose lines, and it's unsafe to stay in the building, hose lines should be abandoned.

All exposures, both immediate and anticipated, must be identified and protected. The first priority in defensive operations is personnel safety; the second is exposure protection.

The next priority may be to knock down the main body of fire. This may assist in protection of exposures but does not replace it as a higher priority.

Master streams are generally the most effective tactic to be employed in defensive operations. For tactical purposes, a standard master stream flow of 750 GPM should be the guideline. Adjustments may be made upward or downward from this figure but it is very significant in the initial deployment of master streams.

When the exposure is severe and water is limited, the most effective tactic is to put water on the exposure and, if need be, from the interior of the exposure.

Once exposure protection is established, attention may be directed to knocking down the main body of fire and thermal-column cooling. The same principles of large volume procedures should be employed.

Fire under control means the forward progress of the fire has been stopped and the remaining fire can be extinguished with the on-scene resources; it does not mean the fire is completely out. When the fire is brought under control, Command will notify Dispatch utilizing the standard radio report of "FIRE CONTROL." Dispatch will record the time of this report. Command must initiate a PAR report from all on-scene sectors and crews.

If defensive operations are conducted from the onset of the incident, Command will notify Dispatch that there will not be a primary search completed for the affected structure(s).

IMPLEMENTATION OF INCIDENT SAFETY OFFICER

VERSION 3/06

SCOPE

This procedure applies to all Yellowstone Club Fire Department employees responsible for emergency response.

OVERVIEW

2nd

It will be standard practice to implement a Safety Officer at any first alarm or multiple alarm incident, special operations rescue, trench rescue, confined space rescue, and first alarm hazardous materials incidents. In addition, an Incident Safety Officer should be implemented at any incident of special hazard presenting an unusual risk to fire fighters, customers, or the general public.

This procedure in no way diminishes the responsibility of each and every member's commitment to safe work behaviors and to operate within standard operating procedures at all times. Company officers carry an additional responsibility of ensuring that all members of their crew are operating in a safe manner. Chief officers must also ensure that operations are conducted safely.

IC will be established by the first arriving member or company and the Incident Command System will be implemented at any incident.

The IC is responsible for assigning a Safety Officer from those member on scene or enroute.

THE SAFETY OFFICER WILL AUTOMATICALLY ASSUME THE INCIDENT SAFETY OFFICER (ISO) RESPONSIBILITIES UPON HIS/HER ARRIVAL AT THE INCIDENT FOLLOWING THE APPROPRIATE COMMAND PROCEDURES AND A BRIEFING. THE IC MUST BE NOTIFIED OF THE ASSUMPTION OF SAFETY RESPONSIBILITIES FOR ACCOUNTABILITY AND SCENE MANAGEMENT PURPOSES.

It will be the responsibility of the IC to establish a strategy/action plan that includes a safety plan for the incident. This safety plan must be communicated to the Safety officer. The IC may request Safety to develop and recommend an appropriate safety plan.

THE SAFETY OFFICER REPORTS DIRECTLY TO THE IC AND HAS FULL AUTHORITY TO TERMINATE, SUSPEND, OR ALTER ANY UNSAFE CONDITION OR ACTION.

The Safety Officer intervention at scene operations involves three approaches. First is for life threatening situations; the second is for non-life threatening situations; the third approach occurs in the on-going incident planning process.

Any LIFE THREATENING conditions will be corrected immediately and directly. Where time permits, the IC must be notified. Corrective action will be initiated by the IC immediately. In obvious life threatening situations that do not allow time for the IC's intervention, the Safety Officer shall immediately stop any action, or countermand any order, under these circumstances by DIRECT and IMMEDIATE intervention (i.e., order crews out of a building, countermand an order for crews to go to the roof etc.). Such action may be taken with the understanding that the Safety works for the IC and is accountable to the IC for actions taken. THE IC MUST BE IMMEDIATELY ADVISED OF ANY DIRECT INTERVENTION BY THE SAFETY OFFICER UNDER THESE CIRCUMSTANCES. A change of strategy and/or tactics by the IC may be required as a result of the Safety officer's actions. Sector officers may have to be notified of hazards, required safety corrections, or updated on the strategic plan, tactics, and objectives.

EMERGENCY TRAFFIC SHOULD BE USED FOR ANY CRITICAL EMERGENCY NOTIFICATIONS/ALERTS REQUIRED AT THE INCIDENT SCENE!

The second approach is for non-life threatening situations and involves a more "one-on-one" correction of safety problems with individual firefighters, company officers, and/or sector officers (i.e. require SCBA, correct ladder position) and often does not affect incident strategy. This approach is the most frequent type of interaction. Where corrective action does not affect the IC's strategy, The IC may not need to be notified. Corrected items should, however, be noted for discussion at a critique of the incident.

The third approach occurs in the on-going incident planning process. Upon the implementation of the Safety Sector, the IC must provide the Safety Officer an overview of the incident action plan and specific details of the safety plan. The Safety officer, upon his/her arrival, will confirm that a safety plan is in effect, review it, and provide recommendations as needed. In some cases the IC may request that the Safety officer develop a proposed safety plan and recommendations for the IC.

The IC must be kept aware of any adjustments that affect overall site operations, and the strategic plan, via frequent and timely progress reports.

The Safety Officer must remain a part of the on-going planning process with the IC.

The officer, assuming Safety Officer responsibilities, may utilize any previous Safety officers to his/her best advantage, coordinating resources, and incident assignments as approved by the IC.

SAFETY SECTOR RESPONSIBILITIES

1. After being assigned the Safety Officer will confirm a safety plan with the IC, the assigned Safety officer will assume Safety Sector.
2. Safety officer will don full protective clothing including SCBA and begin to observe all exterior areas of the incident and identify any structural or hazardous conditions. He or she will then give a report of these conditions to the IC in form of a CAN (conditions, actions, needs) report.
3. Insure that RIT/RIC's are properly positioned and that all personnel are wearing proper protective clothing and equipment.
4. Insure that all crews and personnel are operating safely and consistently within existing safety standards.
5. Safety officer has the authority to terminate, suspend, or alter any unsafe operations or actions. He/she can initiate emergency traffic if needed.
6. When assigned this function by Command, coordinate the use of other technical specialists, in the continual evaluation of incident risk and provide corrective measures as needed.
7. Monitor the health and welfare of all personnel and ensure that they are not over-extended, and are rehabilitated in an effective manner. Rehab should be a component of the safety plan.
8. Provide the IC frequent progress reports on safety related issues.
9. On large operations, it may be advisable to establish a Safety Branch or multiple safety sectors such as North, South, and possibly roof-top (geographically functional areas).
10. Safety officer will maintain a liaison with the IC to update and review the on-going incident safety plan.
11. Review and address accountability and rehab.

Fireground Safety

TACTICAL POSITIONING

Positioning of operating companies can severely affect the safety/survival of such companies. Personnel must use caution when placed in the following positions:

- Above the fire (floors/roof)
- Where fire can move in behind them
- Where sector cannot control position/retreat
- When involved with opposing fire streams
- Combining interior and exterior attack
- With limited access--one way in/out
- Operating under involved roof structures
- In areas containing hazardous materials
- Below ground fires (basements, etc.)
- In areas where a backdraft potential exists
- Above/below ground rescue

The safety of firefighting personnel represents the major reason for an effective and well-timed offensive/defensive decision and the associate write-off by the IC. THE TWO STRATEGIES ARE BASED ON A STANDARD RISK MANAGEMENT PLAN THAT IS TO BE EMPLOYED AT ALL STRUCTURE FIRES.

WITHIN A STRUCTURED RISK MANAGEMENT PLAN

- WE MAY RISK OUR LIVES A LOT TO PROTECT SAVABLE LIVES
- WE MAY RISK OUR LIVES A LITTLE TO PROTECT SAVABLE PROPERTY
- WE WILL NOT RISK OUR LIVES AT ALL TO SAVE WHAT IS ALREADY LOST

When operating in a defensive strategy, operating positions should be as far from the involved area as possible while still remaining effective. Position and operate from behind barriers if available (fences, walls, etc.).

The intent is for personnel to utilize safe positioning where possible/available, in an effort to safeguard against sudden hazardous developments such as backdraft explosion, structural collapse, etc.

When operating in an offensive strategy, be aggressively offensive. An effective, coordinated interior attack operation directed toward knocking down the fire eliminates most eventual safety problems.

Due to the inherent hazards of the fire or incident scene, efforts must be made by the IC to limit the number of personnel on the fireground to those assigned to a necessary function. All personnel shall be:

- Positioned in Staging.
- Assigned to a task or operating within a sector.
- Having completed an assignment and no other assignment is available within that sector, crews should be assigned to a Resource, Staging, or Rehabilitation Sector until such time as they can be reassigned to an operating sector or released to in-service status.

The intent of this procedure is to minimize fireground confusion/congestion and to limit the number of personnel exposed to fireground hazards to only those necessary to successfully control the operation. Individuals or crews shall be restricted from wandering about the fireground or congregating in non-functional groups. If personnel have not been assigned to a sector or do not have a necessary staff function to perform, they shall remain outside the fireground perimeter.

When it is necessary to engage personnel in exceptionally hazardous circumstances (i.e., to perform a rescue), IC will limit the number of personnel exposed to an absolute minimum and assure that all feasible safety measures are taken.

In extremely hazardous situations (flammable liquids, LP gas, special operations, etc.) the IC will engage only an *absolute minimum number of personnel* within the hazard zone. Unmanned master streams will be utilized wherever possible.

In situations where crews must operate from opposing or conflicting positions, such as front vs. rear attack streams, roof crews vs. interior crews, etc., utilize radio or face-to-face communications to coordinate your actions with those of the opposing crew in an effort to prevent needless injuries. IC should notify Sector Officers or Company Officers of opposing or conflicting operations.

Ground crews must be notified and evacuated from interior positions before ladder pipes go into operation.

Do not operate exterior streams, whether hand lines, master streams, ladder pipes, etc., into an area where interior crews are operating. This procedure is intended to prevent injuries to personnel due to stream blast and the driving of fire and/or heavy heat and smoke onto interior crews.

When laddering a roof, the ladder selected shall be one which will extend 2' - 3' above the roof line. This shall be done in an effort to provide personnel operating on the roof with a visible means of egress.

If possible, when laddering buildings under fire conditions, place ladders near building corners or fire walls as these areas are generally more stable in the event of structural failure.

When operating either above or below ground level, establish at least two (2) separate escape routes/means where possible, (such as stairways, ladders, exits, etc.), preferably at opposite ends or diagonal corners of the building or separated by considerable distance.

Hot Zone The Hot Zone will be defined as any area that requires an SCBA, charged hoseline, special protective clothing, or in which firefighting personnel are at risk of becoming lost, trapped, or injured by the environment or structure. The following situations would be included inside the Hot Zone:

- Entering a structure reported to be on fire
- Operating in close proximity to the structure during exterior operations
- Confined Space
- Trench Rescues
- Operating close to crane operations or close to swift water operations
- Building collapse
- Operating close to helicopter operations
- Extrication

ALL FIREFIGHTERS WORKING IN THE HOT ZONE SHALL BE IN CREWS OF A MINIMUM OF TWO PERSONNEL. THE ACCOUNTABILITY SYSTEM WILL BE IN PLACE.

Warm Zone The Warm Zone will be defined as just outside of the Hot Zone where the firefighters start their operations on the fireground. This zone is where the firefighter is not at risk of becoming lost, trapped, or injured by the environment or structure. The following functions could be done in this zone:

- Forward fire apparatus working the incident (i.e.; engines, ladders)
- Laying lines
- HMRT and TRT developing strategies and tactics
- Utility trucks
- Special equipment needs
- Accountability Officer
- FIRE Investigations

If at any time firefighters in the Warm Zone become threatened, this area would become a Hot Zone.

Cold Zone The Cold Zone will be defined as outside of the Warm Zone where no one is at risk because of the incident. The following functions could be done in this area:

- IC

- Level I & Level II staging
- Support and Staff personnel
- Canteen
- Rehab
- Media
- P.D. Liaison
- INTERVIEWING THE RESPONSIBLE PARTY

ALL PERSONNEL ENTERING THE HOT ZONE SHALL:

- **WEAR FULL TURNOUTS**
- **HAVE CREW INTACT**
- **BE ASSIGNED TO A SECTOR**

ALL OTHERS STAY OUTSIDE.

SECTORS

The safety of firefighting personnel represents a major reason for fireground sectorization. Sector commanders must maintain the capability to communicate with forces under their command so that they can control both the *position* and *function* of their companies.

Sector officers and company officers shall be able to account for the whereabouts and welfare of all crews/crew members under their assignment.

Company officers shall insure that all crew members are operating within their assigned sector only. Crews will not leave their respective sectors unless authorized by the sector officer.

When crews are operating within a sector, company officers shall keep the sector officer informed of changing conditions within the sector area, and particularly those changing conditions which may affect the safety of personnel.

Hazards that will affect only a specific sector area should be dealt with within that sector and need not necessarily affect the entire operation.

REHABILITATION

It is the intent of this Sector to reduce the fatigue and trauma experienced during difficult operations to a reasonable (and recoverable) level and is in no way intended to lessen the individual and collective efforts expected of all members during field operations.

In an effort to regulate the amount of fatigue suffered by fireground personnel during sustained field operations, sector officers should frequently assess the physical condition of their assigned companies. When crew members exhibit signs of serious physical or mental fatigue, the entire crew should be reassigned to a Rehabilitation Sector if possible. Company officers shall request reassignment to Rehabilitation Sector from their sector officer. The company officer's request shall indicate the crew's position/condition, etc., and shall advise as to the need for a replacement crew. Individual crews shall not report to the Rehabilitation Sector unless assigned by the IC. Crew members shall report to and remain intact while assigned to Rehab.

It is the on-going responsibility of IC to summon adequate resource to tactical situations to effectively stabilize that situation, and to maintain adequate resource during extended operations to complete all operational phases.

The rotation of companies will be utilized by IC during extended operations to provide an effective on-going level of personnel and their performance.

SAFETY SECTOR

The recognition of situations which present inordinate hazards to fireground personnel and the proper response to safeguard personnel from those hazards is of critical importance to all fire department operations.

IC has the responsibility to recognize situations involving a high risk to personnel and to initiate appropriate safety measures.

The IC shall establish a Safety Sector at incidents involving an inordinate danger to personnel. IC should consider establishing a Safety Sector on any situation where it may be advantageous to the overall safety of operations.

The IC may designate any available personnel to establish a Safety Sector when the need is indicated. This should be a high priority assignment.

The establishment of a Safety Sector or the presence of a Safety Officer in no way diminishes the responsibility of all officers for the safety of their assigned personnel. Each and every member shall utilize common (safety) sense and work within the intent of established safety procedures at all times.

STRUCTURAL COLLAPSE

Structural collapse has been a major cause of serious injury and death to fire fighters. The possibility of structural collapse should be a major consideration in the development of any tactical plan.

Structural collapse is always a possibility when a building is subject to intense fire. In fact, if fire is allowed to affect a structure long enough, structural failure is inevitable.

Regardless of the age and exterior appearance of the building, the possibility exists that a principal structural supporting member is being seriously affected by heat and may collapse, inflicting serious injury to firefighters.

Example: A 100' length of unprotected steel will expand 9" when heated to 1100o F.

In the typical fire involved building, the roof is the most likely candidate for failure, however failure of the roof may very likely trigger a collapse of one or more wall sections. This is especially true if the roof is a peak or dome type which may exert outward pressure against both the bearing and non- bearing walls upon collapse. In multi-story buildings or buildings with basements, the floor section above the fire may collapse if supporting members are directly exposed to heat and flames.

A knowledge of various types of building construction can be invaluable to the Fire Officer from a safety standpoint as certain types of construction can be expected to fail sooner than others. For example: light weight truss and bar joist roof construction can be expected to fail after minimal fire exposure.

Structures have been known to collapse without warning but usually there are indications which may tip off an alert fire officer. Action shall be taken to avert any imminent hazard.

Signs of building collapse may include:

- Cracks in exterior walls.
- Bulges in exterior walls.
- Sounds of structural movement--creaking, groaning, snapping, etc.
- Smoke or water leaking through walls.
- Flexible movement of any floor or roof where firefighters walk.
- Interior or exterior bearing walls or columns--leaning, twisting or flexing.
- Sagging or otherwise distorted rooflines.
- Time of fire involvement.

The following construction features or conditions have been known to fail prematurely or to contribute to early structural failure when affected by fire.

Contributing Factors:

- Parapet walls.
- Large open (unsupported) areas--supermarkets, warehouses, etc.
- Large signs or marquees--which may pull away from weakened walls.
- Cantilevered canopies--which usually depend on the roof for support and may collapse as the roof fails.
- Ornamental or secondary front or sidewalls--which may pull away and collapse.
- Buildings with light weight truss, bar joist, or bow string truss, roofs.

- Buildings supported by unprotected metal--beams, columns, etc.

Buildings containing one or more of the above features must be constantly evaluated for collapse potential. These evaluations should be a major consideration in determining the strategy, i.e. offensive/defensive.

It is a principal IC responsibility to continually evaluate and determine if the fire building is tenable for interior operations. This on-going evaluation of structural/fire conditions requires the input of company officers advising their sectors and of sectors advising the IC of the conditions in their area of operation.

Most structures are not designed to withstand the effects of fire, and can be expected to fail if exposed to heavy fire involvement. If after 10-15 minutes of interior operations heavy fire conditions still exist, IC should initiate a careful evaluation of structural conditions, and should be fully prepared to withdraw interior crews and change to a defensive strategy.

If structural failure of a building or section of a building appears likely, a perimeter must be established a safe distance from the area which may collapse. All personnel must remain outside this perimeter.

EVACUATION

Interior firefighting operations should be abandoned when the extent of the fire prohibits control or the structure becomes unsafe to operate within. When such conditions make the building untenable, evacuate, account for personnel, regroup, recommunicate, and redeploy.

Our primary concern, when a hazard which may affect the safety of fire personnel becomes apparent, is the welfare of those personnel. In an effort to protect personnel who may suffer the adverse effects of hazards such as structural collapse, explosion, backdraft, etc., a structured method of area evacuation must be utilized, one which will provide for the rapid/effective notification of those personnel involved, and one which will be able to accurately account for those personnel.

The method of evacuation selected will vary depending on the following circumstances:

- Imminence of the hazard
- Type and extent of hazard
- Perception of the area affected by the hazard

The emergency traffic announcement is designed to provide immediate notification for all fireground personnel.

The use of "Emergency Traffic" should be initiated only when the hazard appears to be imminent or has just occurred.

Any member has the authority to utilize the "Emergency Traffic" announcement when it is felt that a notable danger to personnel is apparent; however, considerable discretion should be applied to its use - emergency traffic announcements become ineffective if overused.

When an imminent hazard has been realized, the emergency traffic process should be initiated. Usually a company or sector officer will be the initiator. The initiator should describe the apparent hazard and order a positive response, usually to evacuate a particular area or section, according to the scope of the hazard.

If possible, the sector officers of those areas to be evacuated should request an acknowledgment of the emergency traffic dispatch from those crews to be evacuated.

Upon receipt of the emergency traffic evacuation order, company officers shall assemble their crews and promptly exit to a safe location, where the company officer will report a PAR for all crew members. Shortly after the evacuation order, sector officers shall begin the process of accounting for all evacuated crews. When all affected crews and crew members are accounted for, the Sector officer will report a PAR for that Sector. At this time a more specific determination as to the reality/extent of the hazard can be made and efforts initiated to redeploy/redirect attack forces.

Building evacuation generally involves a shift from an offensive to a defensive strategy. In such cases, Command must develop a corresponding operational plan and must communicate that plan to all operating companies. It is extremely important that everyone gets the word that a shift in strategy has been made. This transition can be time consuming based on companies interior positions.

Hazards of a less than imminent nature should usually be handled by a consultation of the IC, sector officers and/or the Safety Officer, Fire Protection Engineer, company officers or outside agency authorities. These officers or specialists should make a determination of the nature and possible effect of the suspected hazard, and advise ic so that a more knowledgeable decision as to the proper course of action can be made.

Crews retreating from interior operations often require hoseline protection. The protection afforded to firefighting personnel in such situations represents a major function of back-up lines.

SEARCH AND RESCUE

Search and rescue should be performed according to an efficient, well planned procedure which includes the safety of search crew personnel.

The object of the search effort is to locate possible victims, not create additional ones by neglecting the safety of the search crew.

Prior to entering the search area, all search team members should be familiar with a specific search plan including the overall objective, a designation of the search area, individual assignments, etc. This may require a brief conference among crew members before entering the search area to develop and communicate the plan.

Individual search activities should be conducted by two or more members when possible.

Company officers must maintain an awareness of the location and function of all members within their crew during search operations.

A brief look around the floor below the fire may provide good reference for the search team, as floors in multi-story occupancies usually have a similar layout.

Whenever a search is conducted that exposes search crews to fire conditions (particularly above the fire floor) the search team should be protected with a charged hoseline, in order to insure a safe escape route.

If search personnel are operating without a hose line, life lines should be used when encountering conditions of severely limited visibility.

HIGH-RISE SAFETY

Fire personnel conducting operations in high-rise buildings are faced with many non-typical hazards due to the design, elevation, limited access/egress, etc., inherent in these buildings. High-rise buildings containing a working fire are considered a high hazard area.

STAIRWAYS/ELEVATORS

If a working fire is suspected in a high-rise building, the following procedures shall be adhered to:

- Utilize stairways to go aloft.
- Elevators may be used to go aloft provided the following measures have been taken.

A. The elevator shaft must be checked to insure that heat/fire have not damaged the hoist mechanism, etc. This can be done by checking the space between the door frame and the elevator car and shining a light up the shaft. If smoke or fire are visible in the shaft, **DO NOT USE THE ELEVATOR**.
B. Before using an elevator, the nearest enclosed stairway should be identified. Should the elevator stop at a floor with heavy SMOKE or intense heat, firefighters can then head directly for the stairs without losing time searching for them.
C. You must verify that the floor you are going is uninvolved. This can be done by utilizing the following measures.

Elevators With Firefighter Service Feature

- Engage the Emergency Operations.
- Take elevator to the floor two floors below the suspected fire floor.
- Be prepared to close the elevator door immediately, usually by removing your finger from the door control button, if fire or smoke are visible on the floor.

Elevators without the Emergency Operations shall not be used if a working fire is indicated.

If elevators are used to transport personnel and equipment, beware of exceeding the maximum load capacity of the elevator.

When operating around a highrise building where the potential hazards of falling glass and debris exist, a fireground perimeter shall be established 200' from the building and shall be observed by all fire personnel as a high hazard area.

Other perimeters will be at the discretion of the IC, based on need.

Engines supplying water shall utilize hydrants outside the perimeter when possible.

Command and staff support personnel shall remain outside the perimeter unless entering the area to assist with interior operations.

THERMAL IMAGING CAMERA DEPLOYMENT

VERSION 3/06

PURPOSE

The purpose of this procedure is to identify the strategic and tactical approach for the deployment of thermal imaging cameras (also referred to as TIC's).

SIZE-UP

The TIC may provide valuable information during size-up, which can assist the Incident Commander in determining the strategy and formulating the incident action plan. Early identification of tactical priorities/needs can prove beneficial in placing initial and subsequent attack lines. When a company officer or incident commander arrives on the scene, one of the first challenges is to identify the location of the fire. A TIC can save a great deal of time by helping to pinpoint a concentration of heat within a particular area of the building, especially in large commercial or multistory structures. An incident commander, armed with this knowledge, can better direct firefighters regarding their point of entry and plan of attack so as to optimize their resources.

Even before firefighters enter a burning structure, the incident commander or company officer can accomplish a great deal from the exterior with the aid of thermal imaging technology. Some factors that can be assessed from the outside include finding the seat of the fire, observing changing or spreading conditions, identifying critical building construction features and identifying conditions that could threaten structural integrity

DEPLOYMENT

The early and rapid deployment of the Thermal Imaging Camera (TIC), while operating in an Offensive Strategy, may enhance the visibility in a visibly diminished atmosphere, thus increasing firefighter safety and survival, as well as improving the survival potential of our customers.

The TIC can also be deployed while operating in a Defensive Strategy. It can provide the Incident Commander or Company Officer with valuable information during size-up. Early identification of structural compromise, fire location in the structure, e.g. attic, and identification of severely threatened exposures would provide valuable information when determining the strategy. This information would also aid in identifying key tactical positions/needs. By deploying a TIC to the exposures, information could be obtained as to the extent of impingement to the exposed structure, early identification of avenues of fire spread and possibly any hot spots, which could cause extension.

It shall be the responsibility of the Company Officer/Command to rapidly deploy the TIC in a visibly diminished atmosphere or in an atmosphere that may suddenly become visibly diminished.

PRIMARY APPLICATION

The primary use of the TIC for the fire department is for conducting search/rescue and crew accountability tasks. The use of a TIC can prove to be a useful tool during search and rescue tasks by reducing the amount of time it may take using standard search techniques. This will lead to a more effective and organized search, while quickly identifying the fire. By locating the fire quickly, we will better be able to determine our tactical priorities and rescue priorities (do we remove the victims from the fire or remove the fire from the victims).

The TIC will enhance the ability to maintain crew accountability by increasing the vision capabilities of the operator/Company Officer. This will ultimately lead to enhanced firefighter safety while working in a hostile environment. **This does not replace the accountability tasks required of the captain and each individual operating on the fireground. We must stay together in complex situations and/or structures in order to enhance our survival.**

While the TIC may enhance the operation of the crews on the fireground, it is imperative to realize, that with any tool, there are limitations. TIC deployment into the operation should not propagate a sense of security. Crews and TIC operators must be aware that the TIC may malfunction and sole reliance on the camera is not prudent firefighting. Additionally, it should not replace or violate the core of our experience, training, safety procedures, or standard firefighting practices/principles. As always, safety must be the top priority.

Positive Pressure Ventilation

VERSION 3/06

PURPOSE

This procedure identifies the tactical application of positive pressure ventilation during structural fire operations and other techniques for use.

BENEFITS

Positive pressure ventilation (PPV) has many benefits to fire operations. They include:

1. PPV rapidly removes heat and smoke from the building, thus reducing the fires ability to propagate and advance.
2. PPV causes an improving atmosphere--thus improving patient survivability profiles.
3. Rapid removal of smoke improves fire fighters ability to conduct search and rescue operations as well as effective loss control operations.
4. The improved atmosphere and visibility increases the fire fighters ability to conduct the attack/extinguishment operations.
5. The improved atmosphere reduces fire fighter heat stress.
6. PPV reduces loss caused by smoke and fire damage to the structure.
7. PPV can reduce the need and risk of roof ventilation at many fires.

APPLICATION

All engine and ladder companies are equipped with high volume positive pressure fans. All offensive fire operations qualify for early application of PPV. Command should order PPV where appropriate and early in the operation. Companies should expect to apply PPV and crews should dismount apparatus planning to take fans to the fire scene.

PLACEMENT OF FANS

Positive pressure fans should be placed at the point of entry(s) from the unburned side of the fire.

Fans should be positioned 12-15 feet back from the entry point. The objective is to create a pressure "cone" effect around the door. This position will also allow access for crews to enter the building.

Where additional fans are required, placing two or more fans in "tandem"--one behind the other is more effective than side by side.

REQUIRE TACTICAL CONSIDERATIONS

Positive pressure ventilation is effective only when applied properly. Two major items are required:

1. An "exit" for the pressurized air must be provided and must be located in the fire area. This is generally a window, door or other opening.
2. Positive pressure ventilation must be injected from the unburned side of the fire.
3. It will be the company officers responsibility to ensure that these two requirements are completed prior to injecting positive pressure into the structure.

CONTROLLING AIR FLOW

Air flow from PPV must be controlled throughout the operation. Too many openings or exit points reduce the effectiveness of PPV. In some cases, windows and doors that are already open may need to be closed to direct the air flow into the fire area, or the most densely affected smoke area. As one area is cleared of smoke, that area may need to be sealed off and another exit created in another area of the structure to direct the air flow into the next area to clear.

ATTIC FIRES

Isolated attic fires can benefit from PPV. During initial attack, fire crews should use small openings in the ceiling for water application. This will prevent the clear environment below the ceiling from rapidly filling with smoke. Moving from one room to another and "punching" the nozzle through the ceiling and using a fog application is very effective. Use of penetrating nozzles is also recommended. Loss control measures should be initiated simultaneously with fire attack.

An "exit" for PPV in the attic must be in place. Most roofs/attics have pre-existing vents typically at the end of the attic space in a vertical wall. These are often adequate for an "exit".

Some structures may have a "sealed" attic space with no in place vent openings. In this case, opening a vertical wall on one end of the attic or cutting a vent hole in the roof may be required. If pre-existing vents are too small, they may need to be enlarged.

Once PPV is in place, large sections of the ceiling can be pulled. PPV will keep the environment below the ceiling clear. Salvage covers or black plastic should be applied first before ceiling is pulled.

MULTI-STORY/HIGH-RISE

Multi-story or high-rise fires require greater coordination and additional fans.

Stairwells should be used to direct air flow from PPV. A stairwell should be selected. An exit in the fire area (i.e., window) is a first choice. In some situations, a stairwell on the opposite side of the fire area can be used. An exit for the exhaust must be obtained. A roof door is appropriate.

Multiple fans may be required. Two or more fans may be needed at the base of the building. Additional fans may be needed on landings at various levels in the stairwell. A fan will be needed at the entry to the fire floor.

Multi-story and high-rise positive pressure ventilation is complex. A Ventilation Officer should be established to coordinate all aspects of PPV on all floors.

POSITIVE PRESSURE FOR EXPOSURE CONTROL

In some cases, PPV can be used for exposure control. This is most effective with common attics (i.e., strip shopping centers, apartment complexes) or where separating walls may have been breached (i.e. plumbing, cracks, etc).

The objective is to introduce PPV ahead of a moving fire and force it back into the fire area.

An exit point in the fire area is needed in most cases.

For exposure control, the fans(s) would be placed at an entry point at most severe exposure first. If a heavy smoke condition exits, it may be beneficial to create a temporary opening (i.e., door) to allow an exit for the pressure and smoke. Once smoke has cleared, the exit should be closed, the building sealed, so that it will "over pressurize" the exposure. An opening in the ceiling will be required to pressurize the attic area. Over pressurized air will force hot gases back across the beaches, or back down common attic spaces towards the fire area. This can prevent fire spread extension.

The second most critical exposure would then receive PPV in a similar manner.

The next priority would be the fire occupancy.

LARGE BUILDINGS

Buildings with large square footage may require multiple fans, perhaps at more than one location to effectively remove smoke. These situations are more complex and require close coordination of PPV with all sector officers. Command should consider a Ventilation Officer to coordinate all ventilation operations in large buildings.

PRECAUTIONS

Positive pressure ventilation can create problems if not effectively managed, monitored, and coordinated. Be aware of the problems listed below and take appropriate corrective action.

1. An exit must be in the burned area or the fire may be pushed into unburned portion.
2. Because of positive pressure, a "blow torch" effect of fire blowing far out of the exit may occur.
3. This is normal and predictable; adjacent exposures may need to be protected.
4. Do not direct a fire stream into an operating PPV exit point.
5. All concealed spaces need to be checked for extension.
6. Company officers will be responsible for monitoring and coordinating the application of PPV.
7. The gas powered fans do produce carbon monoxide and breathing apparatus may be required when PPV is used during overhaul operations.

High-Rise Plans

For

Warren Miller Lodge

And

Mutual-Aid Responses

VERSION 3/06

This plan is intended to adapt Standard Operating Procedures and systems to a high-rise mode of operations.

High-rise fires present unique problems to firefighters accustomed to operating at ground level, primarily those of access, rescue, fire control, exposure protection, ventilation, and personnel safety. Successful high-rise fire operations are initially offensive using aggressive positions and postures in all tactical tasks and functions.

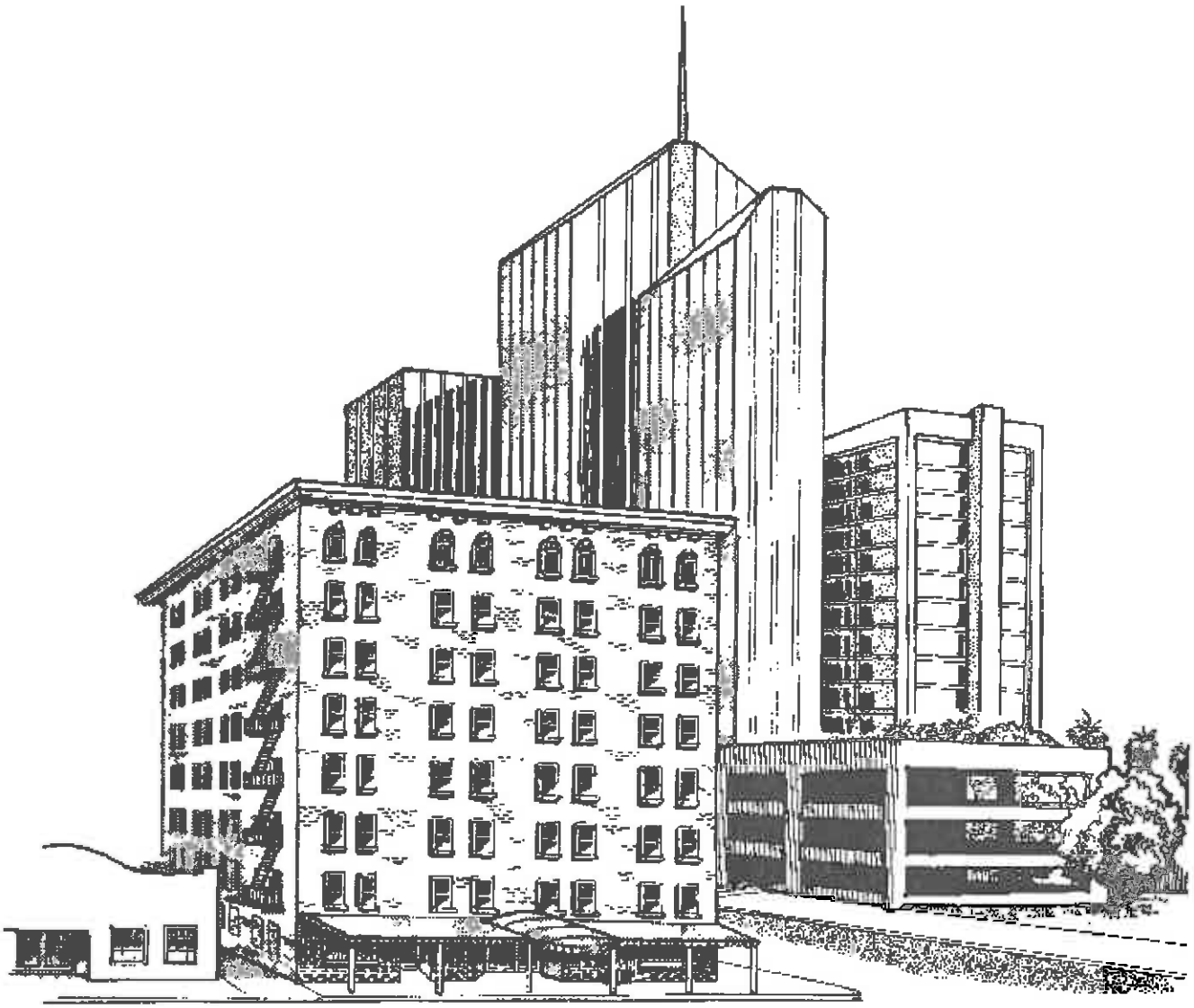
HIGH-RISE INCIDENT OVERVIEW

Access to the building is complicated by the possibility of falling glass, by building setbacks, and is often limited to only one face of the building. Access to floors beyond the reach of aerials is limited to stairwells that are typically closely spaced in the 'core' area of the floor. The location of the stairwells may, or may not be at the unburned portion of the floor, and may cause the firefighters to enter directly into the fire rather than from the 'outside in' as we are accustomed.

Rescue of occupants trapped on the involved floor is slow, and if they are too high to be evacuated by aerials, rescue is compounded by the necessity of using the stairs and possibly going through the fire to reach them. If the occupants do reach the stairwells, a building population larger than the number of firefighters on duty may be attempting to descend the same stairs from which we must stage, extend hose, and fight fire.

Fire Control is compounded both by the inevitable delayed response to the fire floor, and by increasingly more severe fire loads in larger, more open, and lighter weight structures.

Prior to the 1940's, high-rise floors were relatively small, utilizing operable windows for natural light and ventilation. These predominantly steel-framed structures were encased and subdivided with heavy masonry walls, (and the codes we use today for fire resistance of structural members were based on the then, normal fire loading of 8000 B.T.U.'s per pound of contents). The result was slow moving fires in small compartments with the building mass absorbing much of the energy of the fire. The following is an example of a Modern high-rise prior to the 1940's.



Modern high-rises are as much as 75% lighter in mass than these earlier buildings. They are also taller, with open landscaped floors as large as 20,000 sq. ft. The content loading in a modern high-rise can generate as much as 2-1/2 times the B.T.U. output of the fires from which the fire codes were derived.

These large, open floors provide ample oxygen and fuel, and high-rise fires are capable of reaching flashover in under 10 minutes. Couple this with a typical response time of 20 minutes to the fire floor and you may find a fire on arrival that is already beyond the ability of hand lines to control, and beyond the limits of the structure to contain. There are other problems. Because high-rise buildings are tightly sealed to contain the conditioned air, they are a serious potential for backdrafts. Add to this a potential for open shafts, unprotected vertical openings in remodeled and new structures, electrical hazards, and unrelieved heat and smoke and it should be apparent how difficult the extinguishment of a high-rise fire can become.

The exposures are stacked vertically (the direction the smoke convection and heat conduction want to go), and the size of the lines used to effect control and protect exposures is limited to those that can be deployed and connected in stairwells. Multiple avenues of extension through the floors exist. Most will resist fire to some extent, but a serious fire will eventually find some opening to the upper (and lower) levels.

Placing multiple lines to cover the numerous exposure points on the floor above is a slow and cumbersome task. It is very difficult to get adequate resources above an extending fire in time to stop it.

Safety is a primary concern because of poor egress/escape, unforgiving fire behavior, excessive heat and smoke, panic of occupants, and fatigue of firefighters.

Providing ventilation for attacking crews, without extending the fire to upper floors, is also very difficult. We cannot ventilate vertically through the concrete slabs to the floor above, we can only ventilate horizontally and mechanically. Ventilation is usually accomplished by breaking the glass from the floor above. This exposes the floors above to flame, the firefighters on the fire floor to unpredictable winds, and persons on the ground to broken glass. If ventilation is not accomplished, the fire gases and heat will eventually pressurize into the core and extend to other floors.

Even when ventilation is effected, it may be sometime before the heat is lifted and vision improves because the heat is impounded in the slabs above and below, and will continue to generate steam from water from the hose streams. A high-rise floor fire is like an above-ground basement fire, and the firefighters must be prepared for a lengthy, punishing operation.

Resource Demand. Resources required to control and extinguish a high-rise fire are substantial. Experience with major high-rise fire reflects the need for 200-300 fire personnel. In addition, a major support effort and Command structure is required to maintain a campaign firefighting effort.

EVACUATION POLICY

The evacuation route available to occupants of a high-rise building are normally limited to two stairways. The stairways are also the prime access route for firefighting forces to make an attack.

Occupants in the immediate fire area should first be evacuated as quickly as possible to three floors below the fire floor or other safe environment. Further evacuation should be based on risk to the occupants, since premature evacuation often hinders fire control efforts and adds to general confusion at the scene. The determination of risk and the decision to evacuate should be made by personnel on the floor and coordinated by Command.

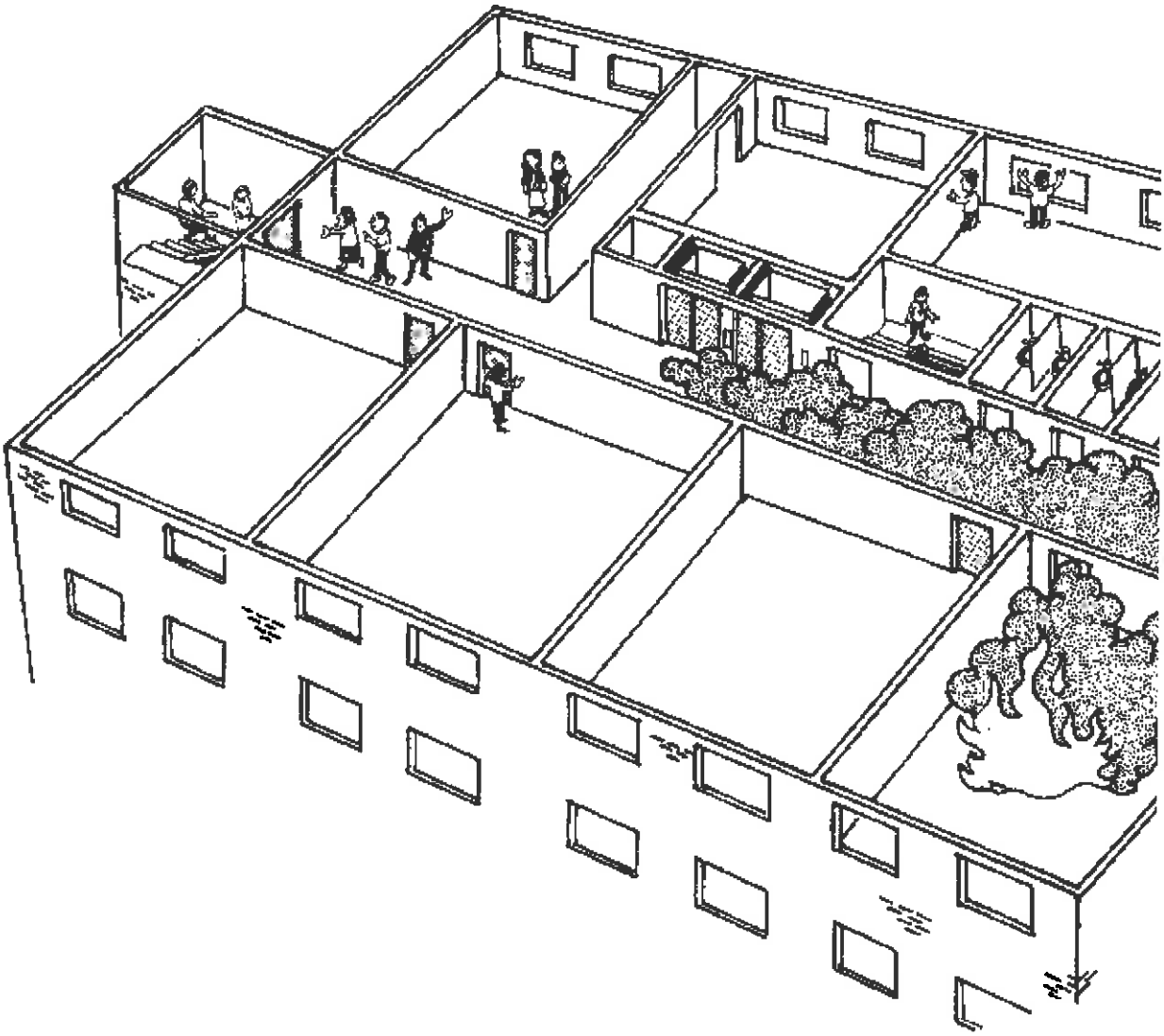
Subsequent evacuations should be managed to avoid interference with operations as much as possible.

HIGH-RISE TACTICAL OPERATIONS

The TACTICAL OBJECTIVES in a high-rise fire are:

1. **Secure and maintain a viable exit stairwell**. We may not be able to control the fire in time to prevent extension to the remaining occupied floors. We must protect the way out and our way in.
2. **Rescue any immediately threatened occupants**. An aggressive offensive, coordinated attack has proven to be the most effective tactical option in the majority of high-rise fire situations. Rescue, in most cases, should be limited to those in immediate danger on the fire floor(s). The remaining occupants should be

kept in or removed to safe refuge within the building.



3. **Stop the production of life threatening heat and smoke by extinguishing the fire**. Continuous relief of heat and smoke and proper application of water on the fire floor(s) until extinguishment.
4. **Manage the spread of existing heat and smoke throughout the building by pressurizing the stairwells, controlling the building H.V.A.C., and, if possible, cross ventilation of the fire floor.** As soon as possible relieve the pressure of heated, toxic gases to prevent them from moving into the core and onto other unoccupied floors.
5. **Start Property conservation early and address loss control in all objectives**.

IMMEDIATE PRIORITIES

The initial arriving units to a fire in the Lodge should be concerned with:

1. Requesting additional resources if there is evidence of a fire.
2. Establishing Command and Lobby Sector. Assessing lobby conditions, verifying actual fire and fire location(s).
3. Providing, or verifying, a continuous water supply.
4. Supporting the sprinkler system (if present).
5. Identifying the fire floor.
6. Providing for the life safety of persons in immediate danger.
7. Obtaining keys for each accessible door. Distributing keys, stair locations, and floor schematics to crews.
8. Recalling and assuming control of the elevators.
9. Assessing stairs, designating firefighting/evacuation stairs.
10. Providing for search and extinguishment on the fire floor.
11. Providing for firefighter safety, survival, accountability, and welfare.

INITIAL ATTACK

The officer leading the attack will be responsible for selecting the method of ascent to the reported fire area (elevator, stairs) depending on conditions and safety concerns. The annunciator panel must be checked for additional information prior to ascending to fire floors.

As soon as the fire floor is reached and identified, the officer will give Command a progress report of conditions on the fire floor, immediate needs, and a confirmation of the actual fire floor(s) number. Command should then establish the fire floor as a Sector (Floor 4 = Sector 4).

When a building has multiple standpipes, the fire floor Sector Officer must advise Command where water is needed and Command will confirm the availability of pumped water to that particular riser.

At least one member shall remain in the lobby area as Lobby Sector and to gain control of all elevators using Emergency Recall or Fire Feature. Lobby Sector must maintain accountability for attack companies and their method of ascent.

The Initial Attack companies will go upstairs with only SCBA's, bottles, portable radios, flashlights, hose packs, and forcible entry tools. If access is via an elevator, an extinguisher should also be taken. Other equipment will be pooled in the lobby until a Resource Sector is established.

WATER SUPPLY

Command, or the initial engine on the scene should have an engine from the 1st assignment spotted on a hydrant sufficiently close to the connections for the standpipe/sprinklers to properly supply the system. In most cases, it is best to have the engine at a hydrant away from the risk of falling glass, but in very tall buildings the pumper must be located at the base of the tower to provide adequate pressures. If there

are multiple standpipes, hose must be connected to each inlet. If the chosen hydrant is not close to the dedicated fire department access, then the crew and equipment can be dropped at the designated entrance and the Engineer continue to the hydrant to make the connections (the Captains and crew members may assume Lobby control functions in many cases). Dry standpipes should be pressurized according to standard hydraulic calculations. In wet systems, the lines should be wetted, but not pressurized until verification that the fire pump is not operating. Wet systems may require that the fire engine duplicate the systems pressure provided by the fire pump. Lobby may be able to verify the building fire pump operation from the Fire Control Room by sending a crew member to the pump room.

The pump operator should take a position away from the hazard of falling glass until pumping operations are necessary. If available, hose should be protected from glass and debris. The pump operator should take shelter in engine cabs during pump operations to be protected from falling glass and other debris.

ACCESS

Companies must use extreme caution when approaching the building due to the possibility of falling glass (expect falling glass and don't loiter outside). Access to the building should be through a predetermined door as close as possible to the Fire Control Room

At least one set of keys should be retained in Lobby to access fire pump rooms, main electric rooms, etc. Access to the upper floors should be by elevator if possible. Elevators provide a faster, less fatiguing method of getting to upper floors and permit more equipment to be carried.

If the elevators are inoperable or unsafe for use, then the ascent must be made by stairs. Firefighters should utilize the least occupied stairs to avoid the crush of descending occupants.

If the stairs are full of smoke, provide fan pressurization at the base to prevent the consumption of air bottles before reaching the fire floor. Crews should limit hand carried equipment to hosepacks, forcible entry tools, and bottles.

LOBBY SECTOR

- Identify fire location(s) utilizing alarm panel, witness reports.
- Recall and assume control of elevators. Assess for F.D. use.
- Verify fire pump is running (water may need to be flowing before pump is activated). If there is no fire pump, cause standpipe to be charged by communicating with Command.
- Identify attack and evacuation stairwells (Attack from the stairs with a roof opening, if possible, so that smoke entering the stairs through the door you enter with a hose line can be exhausted.).

- Verify stair pressurization, if present. If not, fan pressurize attack stairs and evacuation stairs as soon as possible.
- Verify auto stair door unlocking.
- Verify air handler status. Shut down if not known to be beneficial.
- Direct Security, if available, to remove occupants exiting to the exterior through lobby or down stairs to a position away from the area of falling glass or debris.
- Do not silence alarm or direct occupants in a mode of evacuation until conditions are known -- until a size-up and report is made by crews on the fire floor and vertical extension is assessed on floor above.
- Verify emergency generator operation if building power is interrupted.
- Account for members going aloft. All units must be accounted for. Any crew or individual operating in the building shall have full protective gear, radio, forcible entry, and/or keys, and where possible, spare air bottles.

- Evacuate any occupants trapped in elevators at Lobby level.
- Divide the Lobby floor into areas for staging and treatment of occupants and staging of incoming firefighters and equipment.

The tasks assigned to Lobby are numerous and demanding. Command should provide additional resources as necessary to assure that critical tasks accomplished.

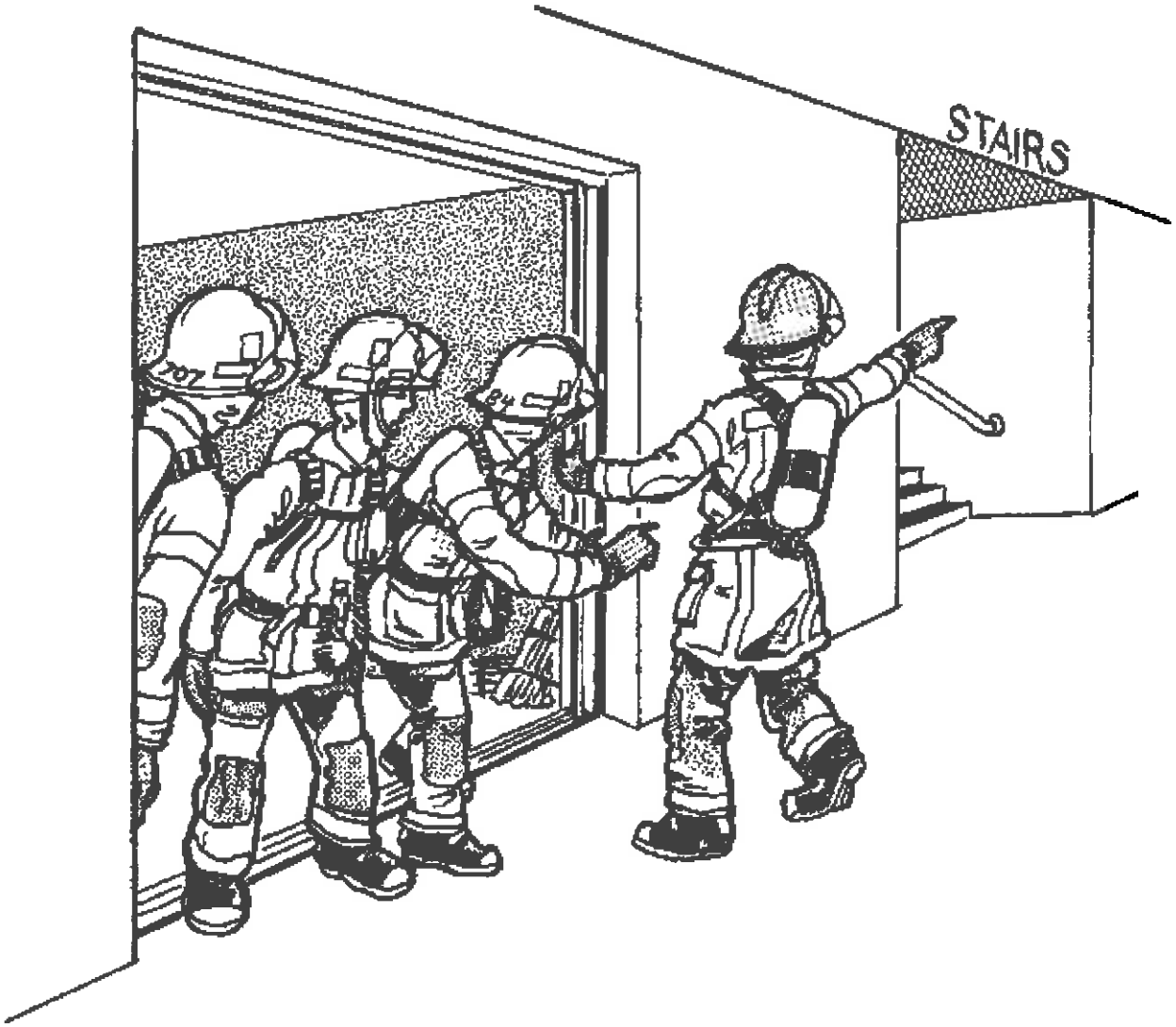
ELEVATORS

To expedite time of arrival to the fire floor and to avoid the occupants descending the stairs, crews should utilize elevators whenever safe and possible. Erratic elevator operation, however, has been the cause of numerous firefighters deaths, so the following conditions must be met before use.

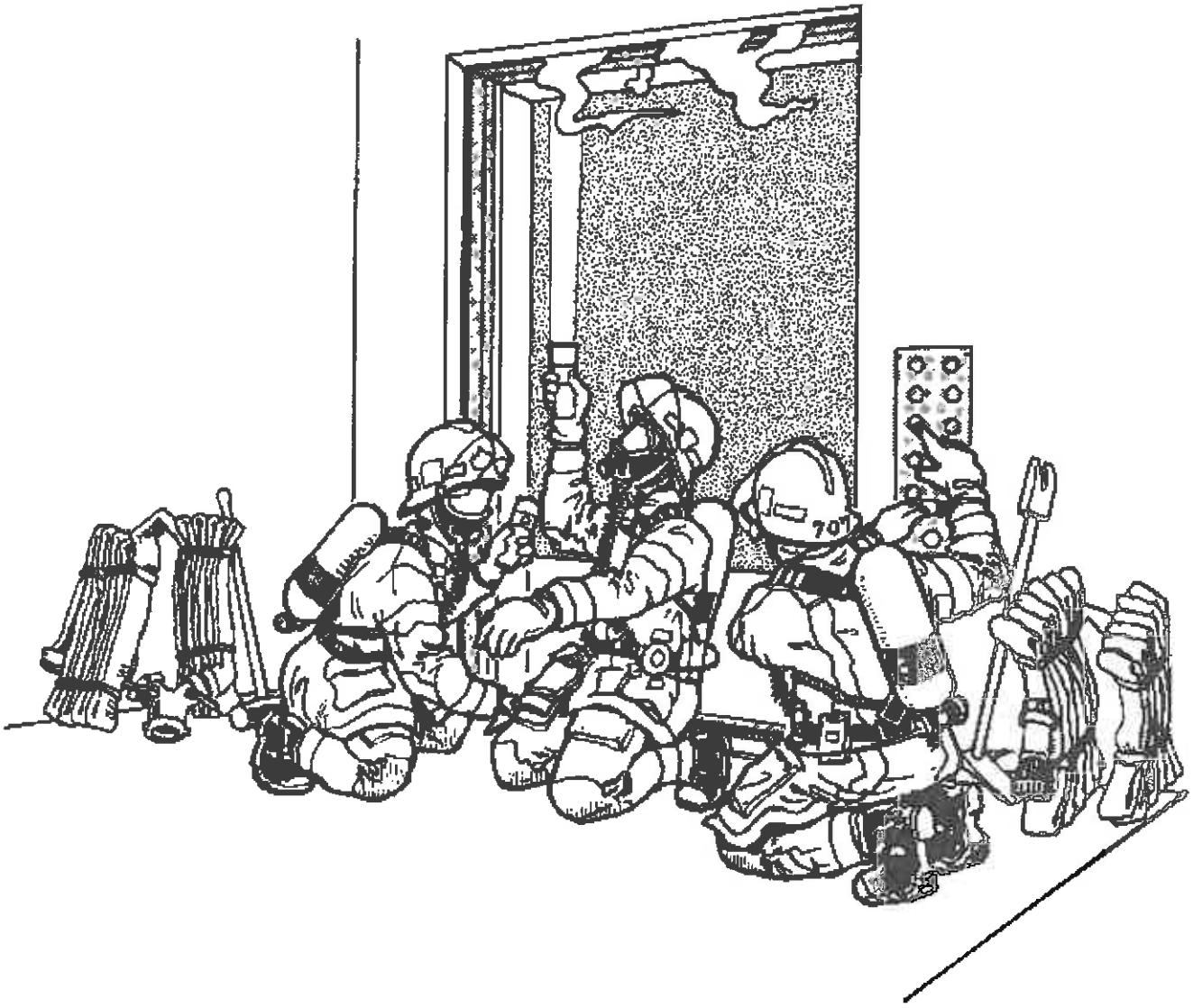
- Only elevators having A.N.S.I. II 'fire feature' may be used for fire department operations (A.N.S.I. Phase I provides for automatic recall of elevators when designated alarms are activated. A.N.S.I. Phase II provides for key activation and use of the recalled elevator cars.)
- The shaft must be clear of smoke.
- Only members trained in the operation, use, and methods of escape from elevators will operate the cars.

- Only one crew (with the operator) and equipment at a time will use the car to avoid overload, and to permit room for emergency maneuvers in the car.
- Crew and operator must be fully dressed with S.C.B.A. face pieces in position for quick donning before ascent.
- A radio, forcible entry tools, step ladder, water extinguisher, and spare bottle should remain in the car with the operator.
- Elevators that travel through a blind shaft should not be used. A blind elevator shaft is defined as the portion of a shaft where normal landing entrances are not provided. If an elevator whose shaft terminates below the fire floor is present, use that car. If not, utilize an elevator that serves all floors, that is remote from the fire floor, such as a freight elevator.
- Elevators with door opening restrictors should not be used unless forcible entry tools are left in the car..

- Avoid using the radio in or near the elevator control room. It may disrupt elevator controls.
- Know where the stairwells are prior to entering the elevator.



Crews beginning the ascent should attempt to stop the car at the first typical upper floor, but not over three floors, to verify that the 'fire feature' is working. While stopped at that floor, note the relationship of the elevator to the closest exit stairs in the event the car does become erratic and the door opens into flame on the fire floor. If the Lobby or Fire Control Room position indicator showed cars not returned to Lobby, it may be possible to combine the floor check with a search for the stalled cars on the way up. If the car performs properly, continue the ascent to two floors below the indicated fire floor. Check the shaft for smoke every time you open the door.



EMERGENCY ELEVATOR CONDITIONS

Normal elevator operations, fire feature, and the interlock safeties are all electronic programs and can be made erratic or inoperative by excessive heat and smoke. No one should use an elevator in a fire situation who is not trained to self-extricate from the car under emergency situations.

If you see smoke under pressure, or an accumulation of smoke so great you cannot see the top of the shaft, exit the car at that point and climb the remaining floors. If the 'fire feature' is still operational, the operator should exit and allow the car to be recalled to Lobby on 'bypass'. If the shaft is still clear, continue the ascent. Should the car, at any time, become erratic and unresponsive to operator commands, activate the Emergency Stop (The rebound from this sudden stop might place the car in an overload condition if it were loaded with two crews and equipment.). If the Emergency Stop fails, pry open the

car door and trip the interlock. If that fails, put on your facepieces, get low in the car, and if the door opens onto the fire floor, move to the stairwell under whatever protection you can gain from the extinguisher.

The elevators should not be used for occupant evacuation until fire control is achieved, unless the shaft is made of concrete or masonry, and does not open to the fire floor. The occupants do not have self-contained breathing apparatus or turnouts to shield them from smoke flashing in the shaftway, nor are they prepared to climb down the shaft, or make the drop to a misaligned floor from a stalled car.

STAIRWELLS

A first priority for Command/Lobby is the identification of the attack and evacuation stairwells and a size-up of smoke conditions in each. If the stairs exit into the lobby, the size-up can be made by Lobby Sector. If the stairs exit to the exterior, Command/Lobby must send runners with keys to assess each stair condition.

At the time of arrival to a significant fire, the occupants may be descending both stairs, as most high-rises require both stairs for effective evacuation. Any smoke in the stairwells at this point is probably the result of smoke pressure on the fire floor escaping into the stairs as the occupants exited the fire floor.

The purpose of built-in stair pressurization is to maintain a positive pressure in the stairwell and impound the smoke on the fire floor. Experience has shown that a small fire will be accelerated by the incoming air if the door is left open, but that most of the smoke will be held on the fire floor.

A primary objective of the first arriving units is to maintain a smoke-free exit way both for occupants leaving the building and for firefighters staging and preparing to extend hose.

A large volume fan should be placed at the opening to all stairs to pressurize the stairwell and to provide an upward current of air. This will help to hold the smoke out of the stairs and will allow the occupants to descend into a cleaner environment with every step.

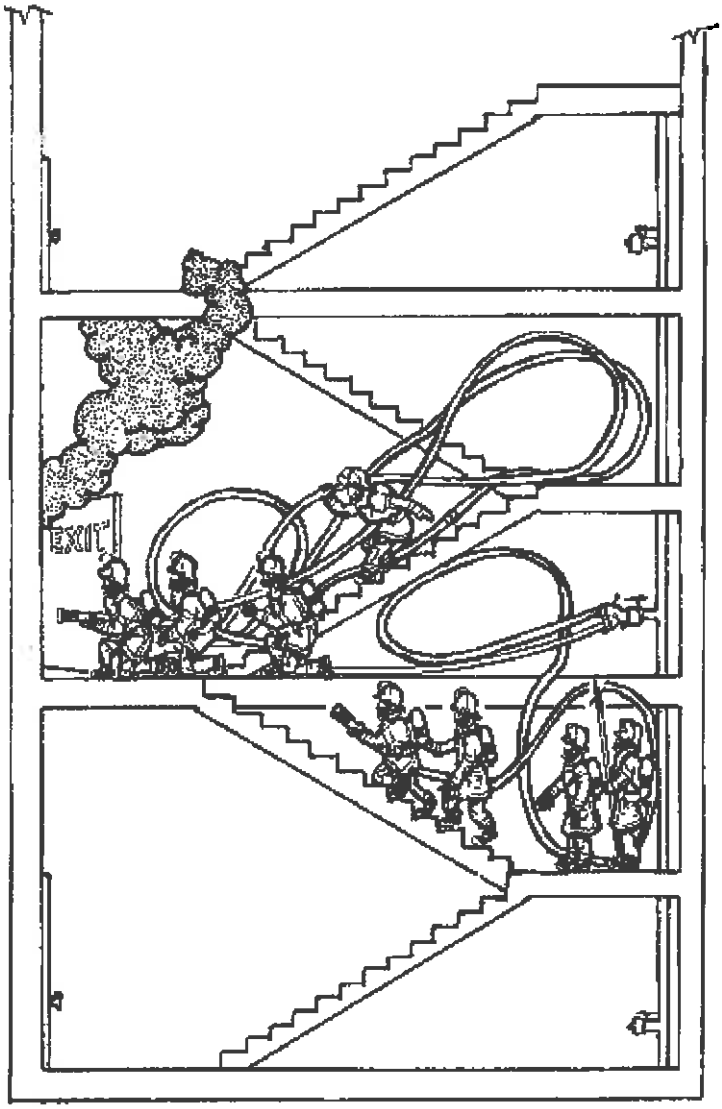
In buildings where the stairs continue to the basement level(s), the fans should be placed at that location to keep the noise out of the lobby. Gas fans placed in stairs without a roof opening should be replaced as soon as possible with electric fans to prevent an accumulation of carbon monoxide in the shaft.

When firefighters open the stairwell door to advance hose lines on the fire floor, significant smoke will enter the stairwell. Occupants descending from upper floors must be allowed to pass before opening the door and exposing them to hot gases and flame. Persons entering the stairwell after the door is opened and fire attack is initiated, should be directed across the building to the evacuation stairs when possible.

EXTENDING HOSELINES FOR INITIAL ATTACK

The possibility of backdrafts--the possibility of flare-ups from the sudden loss of windows--and the high probability of flashover temperatures all require that the initial attack line be charged before entering the floor. The easiest manner to extend hose onto a fire floor is to stretch it up the attack stairwell and pull it down as you advance onto the floor. Crews should layout the dry hose approximately 6" from the outside wall as they progress up the stairs.

When charged, the hose will expand against the wall without kinking. The firefighters extending hose on the upper landings will be exposed should the fire flash out the stair door and up the stairs. A back-up line with a fog nozzle should be in place before opening the door to advance the attack line, both to protect the attack crew and the firefighters in the stairwell.

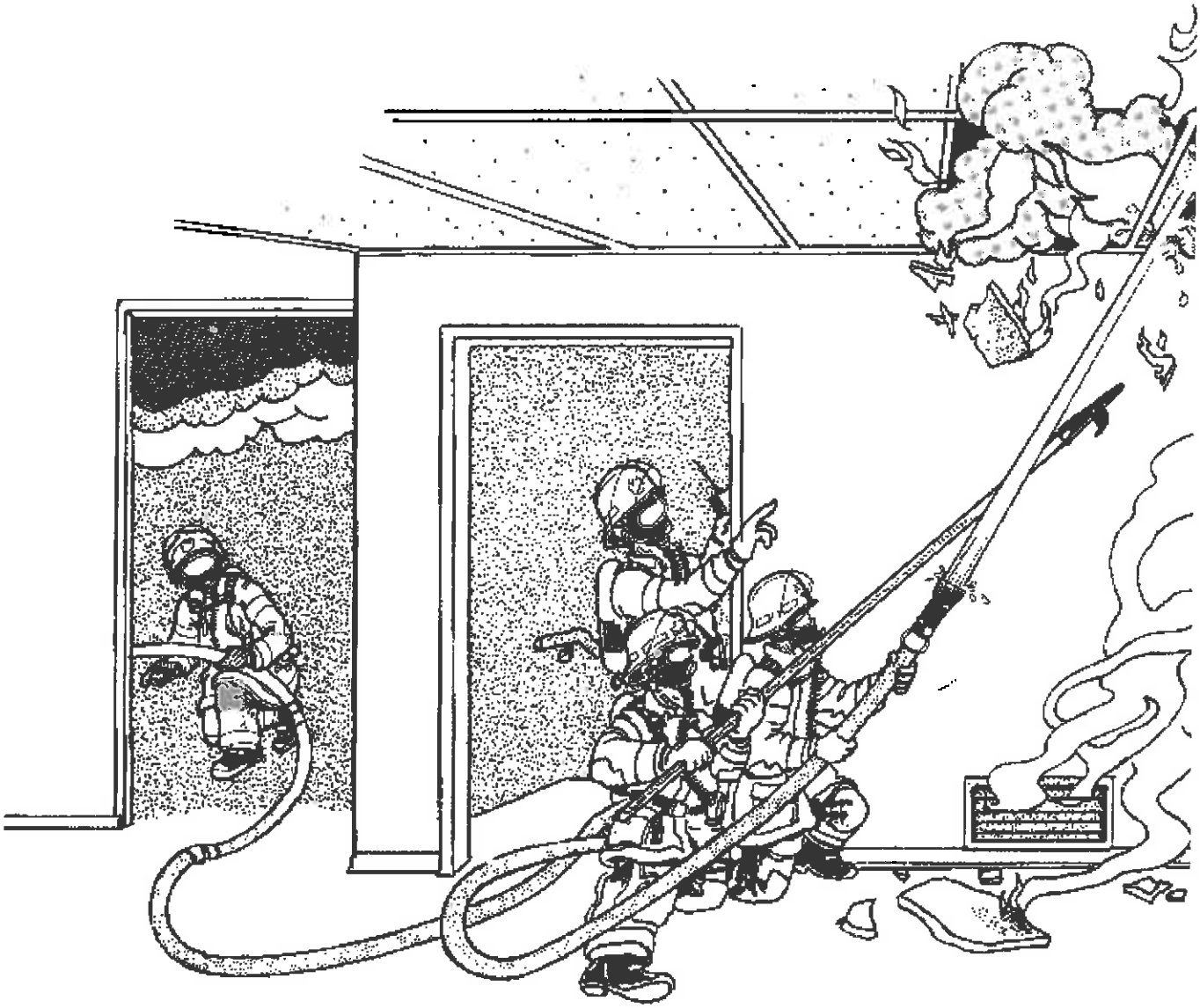


Connect both the attack line and the back-up line to the gated wye on the fire floor and assume a position below the level of the stair door as the door is opened or forced.

Heat from a fire near the stair door may have warped or expanded steel doors or jambs and they may have to be forced even though they are unlocked. Crews must insure that composite type stair doors are not consumed by the fire before occupants descending from above have passed. Protect these wood veneer, gypsum filled doors with fog streams.

THE INITIAL ATTACK

Crews preparing to enter the fire floor should be aware of the floor layout, including the locations of elevators, stairs, and floor subdivisions or zones. They should also be aware of the distribution pattern of the supply and return air systems. Smoke and heat under pressure will migrate to the lesser pressure of open shafts and return air ducts, usually located in the core. Crews may be crawling at floor level in limited vision, and the officer must select the most unobstructed approach, with the flow of heat away from the firefighters as much as possible.



Crews advancing on a high-rise fire should employ a straight stream or narrow angle fog when possible. This is both to reduce the amount of local steam production and to provide the maximum reach and volume for hose streams. The objective of the attack line is to create the greatest amount of steam conversion at the point of fuel gas generation (the seat of the fire), benefiting from cooling and smothering at that point. Steam created by directing fog streams into other heated areas will serve to reduce the overall heat on the floor, but will also penetrate the turnouts and hoods of the firefighters, making their progress toward the seat of the fire slower -- if not impossible.

For safety reasons, the initial line should be equipped with a fog nozzle. High-rise buildings are tightly sealed and present a great potential for backdrafts. In addition, the increasingly volatile loads created by synthetic furnishings and materials have accelerated the rate and intensity of burn. At the same time the structures are becoming more lightweight and decreasing in total mass. The result is an increased potential for rapidly

rising temperatures and flashover before arrival. The loss of windows can also suddenly accelerate the fire as driving winds bring new oxygen to the flame.

The plenum space above the dropped ceiling may represent the largest unobstructed space on the floor, as much as 25% of total floor volume. If fire conditions permit, crews should check the space for fire extension by pushing up one of the panels, but not in an area where impinging heat will impede the progress of the attack line. If high heat prevents standing and visually inspecting this space, hose streams can be used to rip down the panels, but crews must assess whether this will aide or impede their attack.

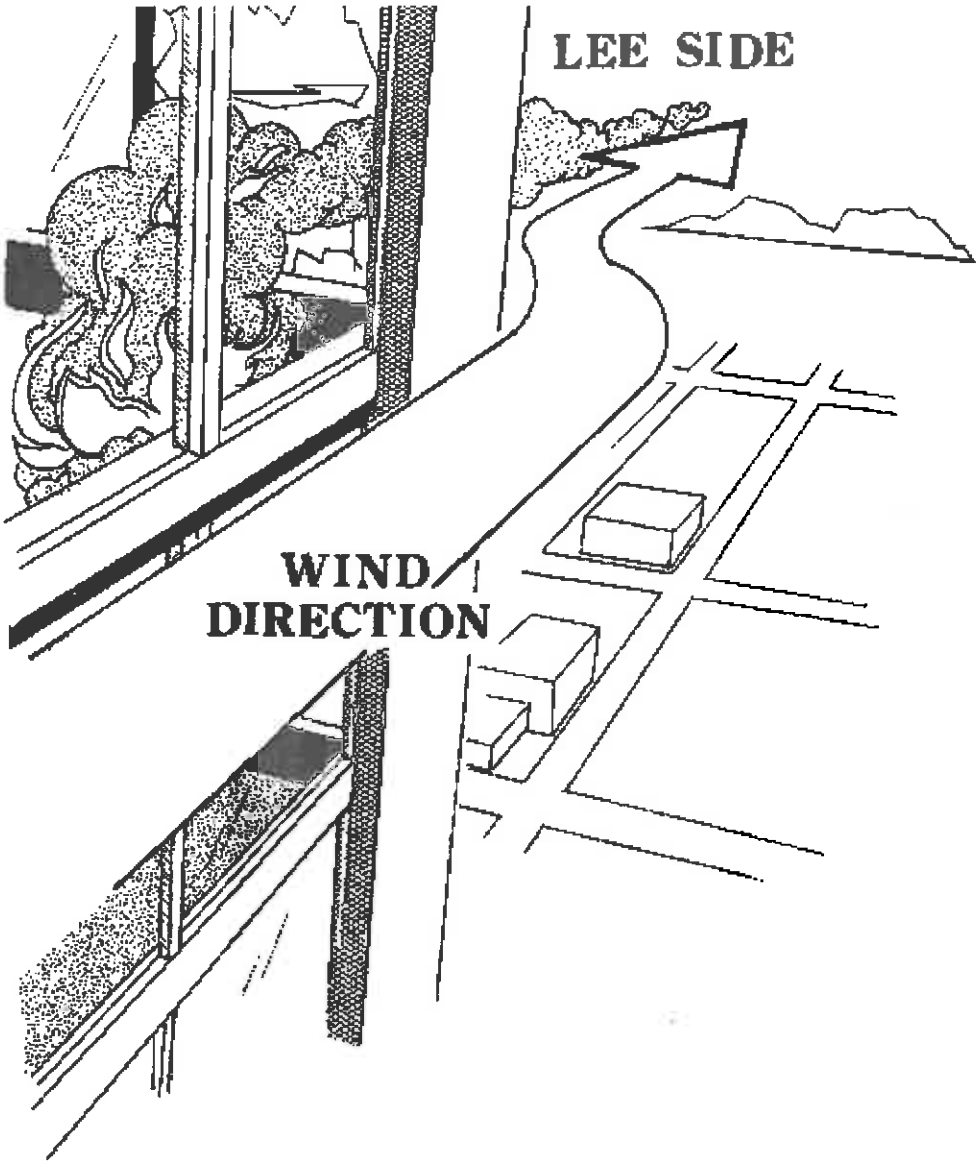
Firefighters advancing on a fire may find their progress blocked by partial walls or other subdivisions of the floor. Space dividing panels sometimes can be knocked down, and permanent walls of gypsum on steel studs may be breached to provide nozzle access to the fire.

Where possible, crews should attempt to flank the fire and convecting gases. Fires near the exterior walls are easier to flank and confine, but are more prone to rapid extension to the next level through broken glass.

Rescue on the fire floor is most difficult when the core area is involved. The core fire may have prevented occupants from reaching the stairs. Firefighters removing occupants may have to remove them through the flame back to the stairs.

Firefighters should search any involved floor with a charged line and use it as a reference point when searching. If the smoke is dense, return to the line after sweeping each room or area to orient yourself.

Providing ventilation on the fire floor is extremely difficult. Every effort must be made not to break the glass with hose streams until knockdown is achieved or wind conditions are known, as the sudden addition of wind driven oxygen may accelerate the fire beyond the limits of the attack line. Building exhaust systems, if present, may be employed to some advantage and the windows may be broken from above or below in a coordinated manner after wind direction and intensity are verified or after fire control. Crews on the upper, or lower floors, are not moving in smoke and heat and can determine the location of the lee side of any winds by removing a panel. Ventilating on the lee side reduces the potential for gusts pushing flame into the attack crews. Be cognizant of conditions in the building and achieve ventilation as soon as possible when crews are in hot, vulnerable tactical positions...or pull the crews out.



The severity of the heat in a serious fire may limit the time a firefighter can be on the fire floor to ten minutes or less. Command must provide for the immediate and continuous relief of these initial crews until fire control is achieved. Crews rotating off the floor and through Rehab can be assigned to the less demanding sectors and tasks remaining to be accomplished, such as beginning a property conservation effort on the floors below.

FLOOR ABOVE

The objectives of the crews operating on the floor above are to evacuate the floor, to assess and control vertical extension of the fire, and when possible, to provide ventilation for the floor below. In a protracted fire, the floor above will be subjected to intense heat, and any occupants must be removed as soon as possible to safe refuge.

Vertical extension must be checked in:

- Elevator shafts
- Supply air ducts/return air ducts/make up air ducts
- Utility shafts (pipes, electrical chases)
- Dumbwaiter/trash chutes/mail chutes
- Auto-ignition through failed window glass or mullions
- Around floor slabs at spandrels
- Auto-ignition through floors or raceways and expansion joints or cracks caused by floor failure.
- Floor materials directly above fire area.

All rooms and closets on the floor above must be opened for inspection. Dropped ceiling panels should be removed to locate the supply/return ducts and observe conditions in the plenum. Hollow columns and pipe chases may be checked by making small holes with a halligan tool.

A hose stream must be introduced at each point of extension including flooding the floor if the fire is communicating to the carpet and padding. *Caution must be observed in putting water into electrical distribution areas, including raceways in the floor.* Hose lines on the floor above can be introduced from the evacuation stairs if the floor is clear of smoke. If not, bring them down from upper landings in the attack stairway. The numerous points of possible extension require multiple lines. If present, house lines can be utilized for areas requiring a reduced volume, such as duct shafts. Care must be exercised not to breach shaft openings, breach spandrel panels, or break glass until necessary and hose lines are in place. If fire extends through the lower windows and melts the mullions or breaks out a window on the floor above, direct a fog stream into the opening, but avoid hitting the remaining glass if possible. The sudden cooling would cause the loss of additional panes and expose the entire floor to flame impingement.

Before ventilating from the floor above, the firefighters must first determine the direction of any winds. Winds at altitude can be many times stronger than at ground level and the introduction of wind gusts and new air on the fire floor could overwhelm the attack crews. The direction of wind at surface level may or may not be the same at higher elevations due to the effects of stratification, or disruptions in flow caused by other buildings.

If no wind is detected at ground level and the location of the fire on the floor below is known, then firefighters should begin the ventilation operation directly over the fire.

Crews on the floor above should place pressure tape, if available, on the window to be broken (if not tempered), advise Command that glass will be falling, break the panel by tapping, and pull the majority of the glass onto the floor.

After verifying that no significant wind is present and checking with the officer on the attack line and Command, they may then break out the lower panels. Tempered and even

double-pane, insulated glass is very difficult to break with lightweight tools such as a pike. Recessed windows and decorative screens will make this task even more difficult.

If strong winds are encountered at the upper level, crews must first locate the lee side of the wind by breaking out additional panels. If the lee side proves to be at the unburned end of the floor, it is inadvisable to vent until fire control is achieved, as smoke and heat will flow to the reduced pressure at the opening; quite possibly right over or through the attack team(s). Again, if ventilation is not possible and there is excessive heat on the fire floor withdraw the firefighers.

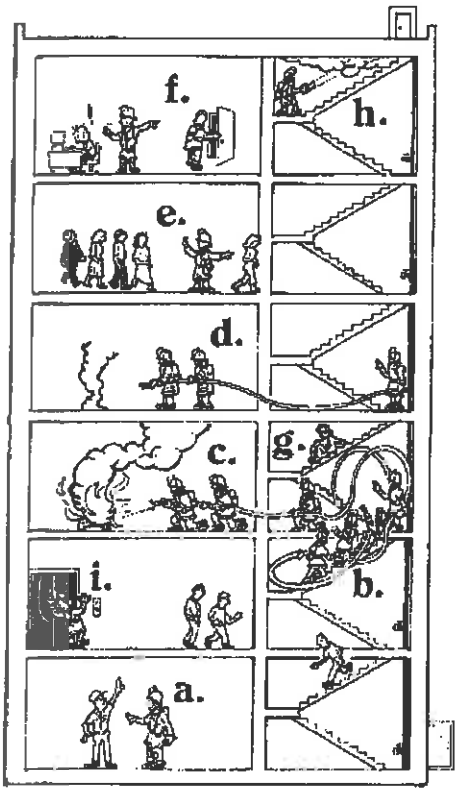
SAFETY ON THE HIGH-RISE INCIDENT

- Do not operate alone. A minimum for any task, except the elevator person, is two firefighters with a radio. Maintain a PAR at all times.
- Maintain full accountability, PASS alert, and radio protocols.
- Wear full protective gear at all times. Conditions can change rapidly.
- Do not operate on an involved floor without a charged hose line.
- Do not allow doors to lock behind you.
- Carry the necessary forcible entry tools.
- Be alert to backdrafts. High-rises are tightly sealed buildings. Feel metal jambs when assessing interior doors. A high-rise floor can have many compartments.
- Be cautious of open shafts or windows. Barricade all openings as soon as possible. Vision on the floor may be reduced even after ventilation because of impounded heat.
- Monitor your air closely. There is no diving out a window as at ground level. 'Out' may be a 100' crawl back to smoke-filled stairs.
- If you are sent into remote areas of the building, take a spare bottle. If you have not reached, or completed your objective by the time the first bottle is spent, use the second to immediately leave. *You cannot dependably break an upper window for air in a high-rise--especially in winter time. Both the pressure of fire gases in the cores and the upward winter time stack will bring smoke to the opening.*
- Maintain 200 foot clear perimeter around the building.
- Do not attempt to change bottles in smoke.
- Do not store bottles in the stairwell. You can trip and if the bottles get loose, they are dangerous to descending occupants.
- Use the hose line as a reference point when searching in smoke. Return to it after sweeping each room. If you become disoriented, remember female couplings take you back to the stairs.
- Be cautious of your back-swing when forcing doors and windows in smoke. Especially, do not follow the tool out a window.
- Shut off the floor electricity as soon as possible at the subpanel or in the main electric room. Be cautious of the electricity when breaching walls or pulling ceiling. Do not direct streams into the subpanel room or closet. Water leaking under the door can disrupt power to the building.

SUMMARY

The officers on the fire floor and the floor above the fire must continuously assess the progress of the fire. If multiple lines are in place, and the control on the fire floor is marginal, a defensive position must be put in place on the next floor up in anticipation of fire extending to that level.

A. Determine location & progress of fire.
B. Backup line in place before fire door opened.
C. Assess progress of attack crews.
D. Defensive Line above fire floor.
E. Consider full scale evacuation.
F. Initiate floor by floor search.
G. Relieve crews on attack lines.
H. Check all upper floors for smoke & fire.
I. Safety check elevators.



In the event the fire cannot be controlled, the officers must also advise Command that full scale evacuation should begin, as there can be no safe refuge in the building, especially above the fire, unless the fire floor is controlled.

Command, at this point, must provide for the integrity of the evacuation stairs and initiate a floor-by-floor search and evacuation of the upper floors. Flowing hose lines, however, cannot be abandoned and Command must also provide for continuous relief on the attack lines.

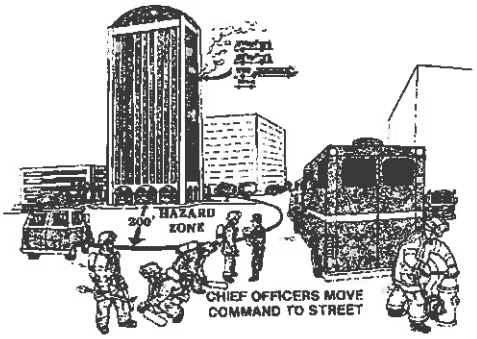
These procedures have outlined the critical objectives and tasks of the first responding units. They are intended to provide the best chance of stopping a serious fire, controlling extension of fire and smoke, and are designed to be placed in operation with the first assignment.

COMMAND STRATEGIES

The first arriving engine or ladder units are likely to be the most familiar with the specific characteristics of the involved building, and when they are the first to arrive, they should retain Command until the first Senior Officer or Chief arrives. If possible, company level Command can be mobile. The logical place for the initial arriving Company Officer to establish Command in a high-rise is in the lobby. Most of the information needed by

Command is available in the lobby/fire Control Room (verification of actual fire and fire location/s, number, and conditions of occupants exiting into lobby, location of elevators, status of fire pumps, stair pressurization, emergency generators, air handlers, etc.). By locating the initial company-level Command in the lobby, much unnecessary radio traffic and confusion are eliminated.

The first arriving Chief Officer will establish a Command location in the street. This location should provide the best visual advantage, but be clear of any falling glass and debris. The first arriving Chief Officer should relieve the initial incident commander of the Command function and assign that officer to Lobby only.



The immediate priorities of the first Command Officer are:

1. Establish strong Command position and transfer Command.
2. Verify that immediate priorities are being addressed.
3. Develop a strategic plan to address, rescue, fire control, and property conservation.
4. Provide for safety and accountability of firefighters.
5. Develop a strong Command organization.
6. Call for additional resources as needed.

EXPANDING THE COMMAND ORGANIZATION - WORKING FIRE

A working fire in a high-rise may not be controlled by the Initial Attack Companies. In such a case, the operation becomes prolonged and escalates into a major operation.

A strong organization is required to support a firefighting force above ground. The principal objective of this supporting organization is to provide the firefighting sectors with resources to operate effectively and to assist in solving some of the major problems involved in highrise structures.

Command must start to identify and build this organization as quickly as possible after assigning units needed for Initial Attack. These elements can be expanded upon as the availability of personnel increases.

The major elements which need to be considered in most working high-rise situations are:

- Fire Floor Sector
- Lobby Control
- Floor Above (Extension)
- Systems Branch (fire panel, stairwell, phones/communications, elevators, keys, building R.P./engineer)
- Ventilation
- Resource Sector
- RIC crew(s)
- Level II Staging
- Floor Below (Property Conservation)
- Evacuation
- Rehab
- Safety
- PIO
- Occupant Services

In addition to these elements, many or all of the Sector functions associated with standard operations may be required.

STAGING

Standard Level I Staging will be used by all first due companies. Level II Staging should be established by Command when requesting multiple alarms. Any apparatus parked in close proximity to the building, by companies assigned to the interior, should be moved to a Level II area as time permits. No apparatus should be parked within 200 feet of the building.

All apparatus should remain in this Staging Area unless needed for a specific purpose. Enclosed vehicles may be employed to move personnel and equipment from the Staging Area to the building, unless they are providing a water supply.

RESOURCE SECTOR/BRANCH

Early establishment of a Resource Sector/Branch is essential to reduce the time-factor in placing fire crews in fire attack positions. As soon as a Resource Sector is established, firefighting personnel and portable equipment (i.e., SCBA, hose, tools, etc.) should be immediately deployed from Staging to the Resource Sector.

CAMPAIGN FIRE

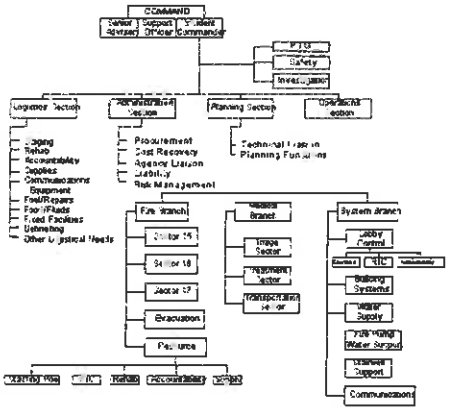
Campaign situations are those incidents which require large forces of personnel and equipment to control and continue for long periods of time. A campaign situation in a high-rise fire would be a fire involving an entire floor or more. The commitment of personnel to firefighting may require several sectors for tactical supervision and a full array of supporting sectors, branches, and sections would be activated.

As the incident escalates to a campaign event, the Command organization must continue to expand. All Section level positions (Operations, Planning, Logistics, Administration) will need to be implemented and staffed. Furthermore, additional Branch levels may be needed.

A communications plan for channel allocation must be established. Logistics will require its own channel. Each Branch should have its own separate channel when practical. The Accountability Officers and each of the section level operations may require a separate radio channel. If separate channels are not possible, then components should be concisely grouped to provide for the most effective use of the channels available.

In addition to these elements, a standard array of staff function sectors would be established and report to Command. Most of these (P.I.O., Safety, Investigation) are established automatically by arriving staff personnel. Senior Command Staff would provide support at the Command Post as necessary.

ORGANIZATIONAL CHART FOR A HIGH-RISE FIRE



Natural Gas Emergencies

VERSION 3/06

Fire department units may encounter natural gas in a variety of situations and incident types, each presenting a different set of hazards and problems. The following guidelines present an approach which will be applicable in the majority of situations, but do not replace good judgment and experience in dealing with any particular incident. The guidelines should be used whenever situations are encountered that do not clearly indicate that a different approach is required to more safely resolve the hazard.

Natural gas is much lighter than air and will usually dissipate rapidly in the outside environment. Inside buildings, however, it tends to pocket, particularly in attics and dead air spaces. The flammable limits are approximately 4% to 15% in air. Natural gas itself is non-toxic, however, it displaces oxygen and can result in asphyxiation if in a confined space. Flammable gas ranges can only be determined by a combustible gas instrument. Gas monitoring equipment is available on most YCFD units

Burning natural gas should not normally be extinguished, since this would change the situation from a visible to invisible hazard with explosive potential. Fires should be controlled by stopping the flow.

INCIDENTS AT WHICH AN EXPLOSION HAS OCCURRED

Units arriving at the scene of a structural explosion must consider natural gas as a possible cause. Explosions have occurred in structures which were not served by natural gas. Underground leaks may permit gas to travel considerable distances before entering a structure through the foundation, around pipes or through void spaces. In these circumstances, the cause of the explosion may be difficult to determine.

1. Until it can be determined that the area is safe from the danger of further explosions, evacuate all civilians and keep the number of fire department and/or other emergency personnel (i.e., gas company personnel) in the area, to the minimum number necessary to stabilize the situation. Take a pessimistic point of view.
2. Do not rely on gas odor. Use combustible gas indicators to check all suspected areas.
3. Check areas systematically using combustible gas indicators. Start outside of the area of the explosion, and move into the area until readings indicate detectable concentration. Map the readings for the affected area.
4. If a gas concentration is encountered inside, adjacent to, or underneath any building, secure all possible sources of ignition in the affected area. Cut electricity from outside the affected area to avoid arcing. Ventilate buildings where gas is found with explosion proof (intrinsically safe) equipment only.

5. The use of ground probes is essential to evaluate potential underground leaks. When gas company personnel are on the scene, ground probe readings and locations must be coordinated. Time, location, and concentration should be recorded for each probe--subsequent readings should be taken from same holes when possible.
6. Command shall provide for effective interaction between gas company personnel and the fire department. Gas company personnel are responsible for locating and eliminating leaks in the gas system. As industry specialists, they can provide Command with valuable assistance in the effective handling of these incidents. In most cases, a company officer with a portable radio will be required to supervise during on-site operations.
7. Command must ensure the safety and stability of the structure.

INCIDENTS INVOLVING A REPORTED GAS LEAK - NO FIRE OR EXPLOSION

Calls for "odor of gas," "gas leak," "broken gas line" and similar situations may range from minor to potentially major incidents. All of these should be approached as potentially dangerous situations.

With gas company personnel on the scene of an incident, it shall be standard procedure for the first fire department unit to provide effective interaction between agencies. Gas company personnel shall be responsible for locating and eliminating leak sources. Gas company personnel and/or the YCFD shall obtain a sufficient number of gas concentration readings, using their combustible gas indicators for Command to evaluate the hazard and take appropriate action.

In all cases, fire department units shall take whatever actions are necessary to provide for life and property safety.

The Hazardous Materials Plan should be used as a basic guide for these incidents. A minimum number of personnel should be allowed to enter the area to size-up the situation while any additional units stage in a location out of the potentially dangerous zone.

1. Evacuate any civilians in the area of escaping gas.
2. Attempt to locate the source of the gas and any shutoff devices available.
3. Gas leak situations within a building where the source of the leak is unknown or uncontrolled, the gas supply shall be shut off at the meter. Command shall ensure the meter is red-tagged and locked off until repairs are completed. This is most easily accomplished with the cooperation of the gas supplier at the scene.
4. If there is any indication of gas accumulating within a building, evacuate civilians from the structure and control ignition sources. Check for explosive concentrations with a combustible gas indicator if there is any suspicion of accumulation within a structure. Shut off electrical power from an outside breaker. Ventilate using explosion proof blowers to pressurize if necessary.

5. If gas company personnel must excavate to shut off a leak, provide stand-by protection with a charged 1-1/2-inch line and two fire fighters in full protective equipment and SCBA.

PERSONNEL SAFETY

All personnel working in the vicinity of a known or suspected gas leak shall wear full protective clothing with SCBA's. Personnel working in a suspected ignitable atmosphere (i.e., attempting to shut off a gas line) shall use SCBA and shall be covered by a manned protective hoseline. The number of exposed personnel will be kept to an absolute minimum at all times.

A Limited Access Zone shall be established and maintained around any suspected gas leak and "fire line" tape should be used to identify the Limited Access Zone when necessary.

Car Fires

VERSION 3/06

PURPOSE

This procedure identifies operational tactics for safe handling of motor vehicle fires.

FIRE CONTROL OPERATIONS

The minimum level of protection for firefighters is full protective clothing breathing air from their SCBA.

The minimum size of hoseline is the 1-1/2" handline.

APPARATUS PLACEMENT

Apparatus should be placed upwind and uphill of the incident if possible. This is to afford protection from hazardous liquids and vapors and reduces smoke in the work area.

Consideration must be given to using the apparatus as a barrier, to shield the incident scene from traffic hazards. Warning lights should be left operating, in conjunction with the use of traffic cones where needed. The use of flares by fire and security should be used with caution; consider the potential for flammable liquids and vapors.

Additional consideration should be given to positioning the apparatus at an angle to better allow the removal of any hose from the preconnect cross-lay compartments.

WATER SUPPLY

If the water carried on the responding apparatus will not be sufficient, early considerations must be given to additional water supply sources. A supply line or other engines/tenders may be required. Ladder companies may be used as an improvised standpipe at incidents on elevated freeways or parking garages.

FIRE ATTACK

A working fire involving the interior of the vehicle passenger compartment will damage the vehicle beyond repair. As such, the attack plan should consider the vehicle as a "write off" and a safe and appropriate approach and fire attack must be implemented.

Where patients are trapped in the vehicle, first water should be applied to protect the patients and permit rescue.

When rescue is not a factor, first water should be applied for several seconds to extinguish fire or cool down the area around any fuel tanks or fuel systems. This is especially important if the fuel tanks are Liquidified Petroleum Gas (LPG) or Liquid Natural Gas (LNG).

At least one member of the attack team must have forcible entry tools in his/her possession to provide prompt, and safe entry into the vehicle.

HAZARDS AND SAFETY CONSIDERATIONS

- Liquid Petroleum Gas (LPG) and Liquid Natural Gas (LNG) are becoming common place as fuel for vehicles. Pressure release devices can create a lengthy "blow torch" effect, or should the pressure relief device fail, a BLEVE may occur. Vehicles may not be marked to identify this fuel hazard. If there is flame impingement on a visible LPG/LNG storage tank, take action to control the fire and cool the tank.
- If vapors escaping from the storage tank relief valve have ignited, allow the LPG/LNG to burn while protecting exposures and cooling the tank. Flow of gas through piping can be controlled by shutting off the valve at the storage tank.
- Energy Absorbing Bumpers--Consist of gas and fluid filled cylinders that, when heated during a fire, will develop high pressures which may result in the sudden release of the bumper assembly. This could result in serious injury to anyone in its path. Bumper assemblies have been known to travel 25 feet.
- Batteries--Explosion hazard due to presence of hydrogen vapors. Avoid contact with battery acid. When the situation is stable, disconnect battery cables (ground cable first).
- Combustible Metals--Some vehicles have various parts made of combustible metals, such as engine blocks, heads, wheels, etc. When these metals are burning, attempts to extinguish them with water will usually add to the intensity of the fire. Large quantities of water, however, will cool the metal below its ignition temperature. After some initial intensification, the fire should go out. Dry chemical extinguishers can also be effective.
- Trunk/Rear Hatch/Engine Hoods--Hold-open devices may employ, along or in any combination with any of the following: springs, gas cylinders, extending arms, etc. When gas cylinders are exposed to heat, failure or rupture of these devices should be expected. Excessive pressure may develop in lift assists causing a trunk, hatch or hood to fly open with explosive force when the latch mechanism is released. To insure personal safety, be sure to allow sufficient clearance when releasing latches.
- Fires involving the trunk/cargo area should be approached with extreme caution. Contents may include toxic, flammable or other hazardous materials. Expect the worst!

- Fuel Tanks--May be constructed of sheet metal or plastic. A rupture or burn-through may occur with these tanks causing a rapid flash fire of the fuel. Do not
- Remove gas cap, as tank may have become pressurized. Do not direct hose stream
- into tank, as this will cause pressurization of tank, with a possible result of burning fuel spewing from the tank fill opening.
- Interior--Well sealed interiors of modern vehicles present the potential for backdraft. Use caution when opening doors or breaking windows. Appropriate approach, ventilation, and safety concerns must be considered. Have a charged handline ready before making entry.
- Vehicle Stability--Tires or split rims exposed to fire may explode, causing the vehicle to drop suddenly. Expect exploding rim parts or tire debris to be expelled outward from the sides. Approach from the front or rear of the vehicle for maximum protection from potential flying debris. Some larger vehicles, such as buses, employ an air suspension system. When these systems are exposed to heat or flame, they may fail, causing the vehicle to SUDDENLY drop several inches.

Brush/Wildland Fire

VERSION 3/06

This plan is intended to serve as an operational guide when any wildland fires, large or small, are encountered.

DECLARATION OF WILDLAND FIRE

The Yellowstone Club Fire Department may respond to a brush fire that consumes multiple acres, often in areas isolated from ground access. These fires typically demand a significant command and support staff to manage and will often require resources from other Fire Departments and Government agencies.

The IC will be responsible for requesting all needed resources. Any fire exceeding our resources will require the IC to call in additional manpower. This will be accomplished by contacting dispatch.

The Incident Commander will be responsible for developing and staffing the sections necessary to support incident needs. Each Section Officer will be responsible for developing an effective organization within each section to support Fire Operations.

Small fires on property will be handled with available personnel and resources. Larger fires on property, which have the potential to burn past the property line may need to handled by a Type 1, Type 2, or Type 3 team depending on the size of the incident. After handing a fire over, The Yellowstone Club Fire Department will continue to provide support where needed.

KEY FACTORS

The following factors have a critical effect on the burning characteristics of a wildland fire. The IC must maintain an awareness of these conditions and be prepared to react quickly well ahead of the fire. The factors are: WEATHER, FUEL, TOPOGRAPHY.

WEATHER

The IC must be aware of constantly changing weather conditions. During a normal summer day, weather patterns may change from morning to afternoon and night.

The IC should always be aware of the fire conditions, weather conditions and time of day. Remember that a large wildland fire can create dangerous convection currents that cause erratic fire behavior and spot fires far in advance of the fire head. Heavy winds also produce similar results.

Hot and dry conditions produce extremely rapid fire spread. A slight decrease in relative humidity will cause a significant increase in fire intensity. During extreme days surface-wetted fuel will dry in a few minutes.

FUEL

The fuel on property is mixed ranging from 1 hour fuels to larger 1000 hour fuels. Once an area has been burned, if it safe to do so, that area needs to MOPED UP. MOP UP is necessary to prevent embers from being blown into new fuel.

Although not a fuel type there are numerous structures on property, that could catch fire causing even more suppression problems.

TOPOGRAPHY

Fire burns uphill much more rapidly than downhill. On an uphill slope, the fire will tend to crown over the top and start spot fires a considerable distance down the receding slope. A large free-burning fire will tend to create its own convection currents and spot fires may be started. Access is often the most serious problem with topography.

Each shift should size-up areas with regard to fuel, topography and extent of exposure to structures. Particular attention should be paid to access roads and accessible areas where apparatus may travel. Natural fire breaks and potential exposure problems should be noted on the area maps provided for this purpose.

INCIDENT COMMAND

On every incident, establish IC and geographic sectors if needed as soon as possible. The IC/Command post should be in a location which will be safe and not have to move if the fire changes direction. Supporting elements should be able to setup at the Command Post.

The IC/Command Post will need a set of maps to plot progress, exposures and access. The units in the field, particularly geographic sectors, will have to report this information back to the IC via radio or personal contact.

TACTICS AND STRATEGY

Brush fires often present a large area of rapidly spreading fire. The critical decision is often where to attack the fire to the best advantage.

The basic brush fire philosophy is to aggressively stop the forward progress of fire whenever possible. Protection of exposures is the primary goal when immediate control is not possible.

A direct water attack is the fastest control evolution available to counteract wildfire spread. Clearly, many situations will not support this possibility. The IC must be prepared

to readjust and develop a defensive strategy to protect exposures while allowing the fire to burn to a location better suited for control. In these cases, it may be best to use vehicle access to position apparatus to protect exposed structures and allow the main body of fire to pass by.

When water is in short supply, it is usually most effective when applied to burning material instead of wetting fuel in advance. Seriously exposed structures should be kept wet.

As fire spread becomes critical, the IC must be prepared to call for additional resources. This determination must be made early.

On large open grass fires, the IC must take advantage of natural fire barriers that will assist in control measures, such as: dry sandy washes, roads, trails, rock outcroppings, patch fuels, etc.

The IC must quickly develop a firefighting plan. The following is a list of size-up considerations that greatly affect tactics and strategy.

1. Location of fire head or heads. The fast moving part of the fire.
2. Pertinent burning conditions--weather, time of day, etc.
3. Type of fuel--light, heavy fuel.
4. Exposures--improvements, buildings, crops, etc.
5. Size of fire and rate of speed.
6. Special hazards--hot spots, spot fires, developing heads.
7. Manpower needs.
8. Fuel continuity.
9. Accessibility into fire area.
10. Water resource--tenders, hydrants, etc.
11. ~~Line of retreat. How can I escape?~~

During interface fires involving brush and structures it may be necessary to retain a 2-1 structural assignment in staging and be prepared to assign those units to conduct structural firefighting if needed. These staged resources will be turned out and equipped to carry out interior structural firefighting.

MOP-UP

When addressing mop up operations, the IC should:

- Determine the distance inside the control line to be overhauled (for small fires, this may be the entire burn area).
- During rehab of mop up crews, ensure at least two firefighters remain in the area to monitor for re-ignition or spread of fire.
- Schedule for follow-up checks by crews to ensure the fire is out in mopped up perimeter.

SUPPRESSION

After primary line work, either a wet or dug line, is completed and a fire is "Under Control," many things remain to be done to make the fire line safe and put the fire out. This work is called mop up. The objective of mop up is to put out all fire embers or sparks to prevent them from crossing the fire line.

A certain amount of mop up work is done along with line building. Mop up becomes an independent part of firefighting as soon as the spread of the fire is stopped and all line has been completed. Ordinarily, mop up is composed of two actions; putting the fire out, and disposing of fuel either by burning to eliminate it, or removing the fuel so it cannot burn.

The principles of mop up follow:

1. Start work on each position of line just as soon as possible after line construction and burning out are completed. Treat most threatening situations first.
2. Allow fuel to burn up if it will do so promptly and safely.
3. On small fires, all fire should be extinguished in the mop up, where quantities of burning material are not so large as to make this impractical.
4. On large fires, completely mop up enough of the area adjacent to the line to be certain no fire can blow, spot, or roll over the fire line under the worst possible conditions.
5. Search for smoldering spot fires.
6. All smoldering material that is not put out with water or dirt should be spread well inside of lines.
7. Eliminate or put into a safe area all less flammable fuels, such as rotten logs and snags that are outside but near the control line.
8. Eliminate all burned trees inside of line that could throw sparks over line or fall over the line.
9. Put all rolling material in a position that it cannot possibly roll across the line.
10. Look for indications of hot spots. Some are gnats swarming, white ash, ground which shows pin holes, and wood boring insects.
11. Use water wherever possible and practical in mop up.
12. Use water sparingly, but use enough to do the job. Match the amount of water to the job.
13. Adding Class A foam to water will greatly increase effectiveness in mop up of deep-burning fuels.

SAFETY

1. PERSONNEL SAFETY

   In the wildland fire setting a proper brush uniform not only increases firefighter safety it also is much more comfortable and functional. A proper brush uniform consists of leather ankle high boots. Nylon hiking boots are inappropriate because of the melting and sticking potential of the nylon. Flamex uniform pants and a

fatigue shirt will be used in conjunction with a brush jacket. Helmets should be worn to prevent heat absorption from the highly vascular scalp area.

Structural firefighting gear is not designed for wildland firefighting and should not be utilized for wildland fires. Safety equipment should include work gloves and eye protection. Particle masks are recommended. Extras should be carried along to replace wet or clogged masks which inhibit air flow and cause C02 rebreathing.

Remember that heat is a major safety problem and all personnel should be kept well hydrated. Personnel should have access to drinking water and carry canteens or similar water containers. Sterile water bottles can be cleaned, filled with drinking water, and carried in the brush jacket pockets.

Wildland firefighting is a physically demanding operation and members should be fit and prepared mentally for a very hot, fast moving, and dangerous environment.

2. SCENE SAFETY
   A. Wildland fires are fast moving and extremely dangerous. These scenes require that all personnel understand these basic wildland firefighting orders.
      1. Size-up! Base all actions on current and expected behavior.
      2. Pay attention! Know what the fire is doing at all times.
      3. Have escape routes. Crew leaders should identify them and make sure the crew knows about them.
      4. Maintain good communications. Between the IC, Sectors and Crews.
      5. Give clear instructions and follow the order model to ensure they are understood.
      6. Maintain control of personnel. Crew leaders must account for all crew members at all times.
      7. Always post a lookout
      8. Keep informed on weather, wind direction, forecast, etc.
      9. Remember safety first, fight fire aggressively but safely.
      10. Be alert, keep calm, think clearly, act decisively.

   B. CREW SAFETY

      Wildland fires demand that Crew leaders maintain a high level of awareness regarding crew accountability. Crew members can easily become spread out and not visible in rugged and rocky terrain. Crew leaders must maintain communication with and control over crew members to ensure a safe operation. Wildland firefighting will still employ the buddy system. Watch out for each other.

C. INCIDENT COMMAND RESPONSIBILITIES

The first arriving company officer who establishes IC must address the life safety, fire control, and property conservation benchmarks. In a wildland fire setting the life safety benchmarks must include firefighters as well as civilians. The IC must have a plan that includes safety zones for firefighters and equipment. These zones should be established early on to ensure all incoming resources are aware of them. Individual sectors can establish safety zones depending on need or location. Safety zones should be easily accessible and large enough to support rehab and equipment caches. Aerial operations should not be located near safety zones.

- IC should concern itself with strategy and allow sectors to dictate tactics
- Make early offensive/defensive decisions
- Gather adequate resources
- Think ahead - way ahead
- Support sectors
- Protect and rehab firefighters

AERIAL OPERATIONS

A direct attack on a wildland fire may be assisted by aerial resources. Aerial attacks should be considered where ground crews cannot access the fire. Otherwise a coordinated ground attack should be established to contain and control brush and wildland fires.

Water or slurry when dropped from aerial firefighting units can severely injure ground crews if they are struck. When aerial operations are underway ground crews must maintain constant communication with their Sector Commander to be informed on the location of the water drops. When water drops will expose ground crews must move 200' off the line, uphill and perpendicular to the fire line. During water drop operations ground crews must be a minimum of 200' from the drop site.

Fire Cause Investigation

VERSION 3/06

I. It is the responsibility of Command to provide for fire cause investigation on the following fire-related emergencies: structure fires, explosions, fire Code-related situations and of every fire incident causing serious injury/death or property loss/damage.

This must be accomplished after fire control activities and salvage, and before taking overhaul actions which could hinder the investigation.

There is a responsibility to determine fire cause in all cases. The officer in charge will be responsible for determining when a fire investigator is needed, based on information gathered or the circumstances of the fire. Currently, all fire investigations will be provided by The Yellowstone Club Fire Chief. If any additional assistance is needed, the State Fire Marshall's Office may be contacted.

No investigator is needed for the following situations but the company officer is responsible for the completion of an accurate Field Incident Report and N.F.I.R.S. Incident Report to document the fire cause:

- Minor fires where cause is determined to be accidental;
- Scalding burns, electrical accidents, and minor accidental burn injuries;
- Car fires originating in engine area during vehicle operation, or abandoned autos, or vehicle arsons with no witnesses or suspects on scene;
- Minor grass, fence, or trash fires with no witnesses or suspects
- Traffic accident fatalities involving fire subsequent to collision are investigated by Montana Highway Patrol;

II. If the incident is determined to be of a minor nature (e.g. accidental, with no injuries and slight fire damage) and the cause can be determined easily by the Company Officer on the scene through information received or by investigations of the fire scene (e.g. a stove fire with food remains on stove), units on the scene shall gather the information needed and accurately complete the required reoprts for NFIRS. If a victim requests information regarding their fire loss, for insurance purposes, the company officer can give the fire department incident number which will enable the victim to access fire department information regarding the fire.

III. When a fire investigator is on the scene or responding, companies shall delay non-essential overhaul and secure the fire scene until a fire investigator arrives. Salvage and all unnecessary interim activities which may alter or contaminate the fire scene, or which may interfere with a subsequent origin and cause

investigation must be discontinued until authorized to continue by the responding fire investigator.

Command shall assign personnel to protect the fire scene and maintain custody of the scene until the arrival of a fire investigator, especially when delay in response to the scene by an Investigator has been indicated.

IV. After achieving fire control, Command shall release companies not required to complete investigation and overhaul. In some cases involving lengthy investigation periods, companies may return to quarters and return later to the scene to complete overhaul activities when requested by investigators.

Command shall turn over jurisdiction of the fire area to the Investigator as soon as possible after the fire is stabilized. The investigator may retain jurisdiction (if a State Agency) until the investigator releases it back to Command. The investigator may inform Command that they intend to maintain custody of the scene for further investigation.

The investigator may request from Command any personnel or equipment necessary for the investigation. Command shall make every attempt to meet such requests, to the extent possible under the prevailing circumstances.

V. All personnel shall cooperate with the fire investigator. Protection of the fire scene and preservation of physical evidence must be a primary concern once life safety is secured and fire control is achieved. An attempt to identify the victim and any witnesses who are at the fire scene must be made as soon as possible, and shall not be delayed until the investigator is actually on the scene. Obtaining the identification of witnesses is critical to the conduct of the subsequent investigative process. If Sheriff's Deputies are at the scene, the company officer may request them to obtain such information and identification for fire investigators, but if Sheriff's Deputies are unable to comply with the request (as the result of other circumstances which may take precedence) the company officer retains this responsibility.

VI. Destruction of Evidence: It is incorrect to believe that evidence is completely destroyed by fire. This misconception is the reason many incendiary fires have never been brought to the attention of the courts.

Evidence is not destroyed in fires except in very rare cases. The form, shape, color, size, and weight may be altered, but evidence can still be identified upon trained examination. It is critically important to preserve evidence by not moving fire debris unnecessarily.

The fire department must protect the fire scene from unnecessary damage during firefighting operations. Special care must be exercised during extinguishment to avoid washing out evidence through misuse of fire streams. Overhaul presents the greatest potential for damage to evidence which may be used by the fire

investigator and Sheriff's Department in subsequent court cases and prosecution. Salvage operations should be minimal until the investigation can be completed, and should be confined to diminishing eventual loss. Companies assigned to loss control should incorporate scene security and evidence preservation into their plan to stop the loss.

The fire scene is the investigator's laboratory. They must search it carefully and thoroughly, photograph the scene in place, diagram all evidence placement, and collect and preserve all evidence.

The fire scene must be guarded. Evidence cannot be used in court unless the investigator can establish a chain of custody by proving who found the evidence, where it was found, and prove that evidence was not tampered with while in official custody. To ensure that the chain of custody remains unbroken, the scene must remain demonstrably in the custody of the fire department. Thus, at a fire scene where it has been determined that custody must be maintained, a guard must be posted, and custody must be maintained until the scene is released. No unauthorized persons may enter the scene. The fire department has the legal authority to close the scene entirely, even to the property owner or to other interested person/s. It is vital that the fire department prevent personnel from unnecessarily walking through a fire area, walking on, obscuring evidence, or picking up and moving evidence. This shall include both fire department personnel and the media. If it is essential that evidence be moved or if necessary firefighting operations may damage evidence, the evidence must be covered or its location marked before moving it carefully to a secure location.

The Montana State Fire Marshall's Office has available a specially-trained accelerant detection dog, assigned to a fire investigator handler. The dog is used by the handler to identify possibly accelerant-contaminated evidence in the fire scene debris. Personnel should avoid contact with the dog unless given permission by the dog handler.

The Gallatin or Madison County Sheriff's Department is responsible to investigate all non-arson crimes discovered at fire scenes and fire department personnel will report such crimes to police and cooperate with police officers and detectives. Police and fire department investigators will conduct joint investigation of fire deaths or life-threatening injuries at fire scenes:

- Fire department investigators determine the fire cause and arson crime only;
- Sheriff's Department Coroner is responsible for identification and removal of all bodies from fire scene.

Rehabilitation

VERSION 3/06

It is the policy of The Yellowstone Club Fire Department that no member will be permitted to continue emergency operations beyond safe levels of physical or mental endurance. The intent of this policy is to lessen the risk of injury that may result from extended field operations under adverse conditions. This procedure is in no way intended to diminish initial fire attack aggressiveness.

The Rehabilitation Sector, radio designation REHAB, will be utilized to evaluate and assist personnel who could be suffering from the effects of sustained physical or mental exertion during emergency operations. Rehab will provide a specific area where personnel will assemble to receive:

1. A physical assessment
2. Revitalization - rest, hydration and refreshments
3. Medical evaluation and treatment of injuries
4. Continual monitoring of physical condition
5. Transportation for those requiring treatment at medical facilities
6. Initial stress support assessment
7. Reassignment

A Rehab Team concept will be utilized wherever possible to establish and manage the Rehab Sector. This team will consist of:

1. Rehab Truck
2. Utility Truck
3. ALS/BLS Company
4. Designated Officer with Crew

At times, due to the incident size or geographic barriers, it may be necessary to establish more than one Rehab Sector. When this is done, each sector will assume a geographic designation consistent with the location at the incident site, i.e, Rehab South, Rehab North.

Rehab should be located adjacent to the Command Post whenever possible. The Rehab Sector area boundaries may be defined with blue tape and will have **only one** entry point. It should be divided into the following three sections:

ENTRY POINT

HYDRATION AND REPLENISHMENT

MEDICAL TREATMENT AND TRANSPORT

Salvage

VERSION 3/06

This procedure describes guidelines for conducting salvage operations. Virtually every fire, small or large, produces a need for some form of salvage operations.

Salvage includes activities required to stop direct and indirect fire damage in addition to those required to minimize the effects of firefighting operations. This includes losses from water, smoke and firefighting efforts.

Salvage operations must be aimed at aggressively controlling loss by the most expedient means. Salvage objectives are:

- Stop or reduce the source of damage
- Protect or remove contents

The IC will provide for salvage at all fires or other incidents posing potential damage to property.

Salvage operations most often involve early smoke removal and covering building contents with salvage covers or plastic. In some cases, the contents of all threatened areas, where appropriate, can be removed to a safe location. When removal is not practical, contents should be grouped in the center of rooms, raised off of the floor and covered to provide maximum practical protection.

The following items should be considered when addressing salvage.

- Type, value and location of contents
- The extent and location of the fire
- Recognition of existing and potential damage sources
- Estimate of required resource

Extent and Location of Fire

Salvage efforts should begin in areas most severely threatened by damage. In most cases that will be areas directly adjacent to or below the fire area. Additional salvage activities should expand outward until all areas of potential loss are secured.

Recognition of Existing and Potential Damage Sources

All firefighting activities have the potential to damage property and contents. The key to successful salvage is to distinguish between excessive damage, and damage that is

required to reduce potential fire damage. Aggressive loss stop activities reduces the damage incurred during firefighting operations.

Type, Value and Location of Contents

Replacement price and value should be primary considerations when performing salvage operations. It is often difficult to separate value from price, however, salvage crews should weigh the worth (value) of items in addition to their dollar cost. Business records, for example, have extremely high value to business owners while their price represents only the paper they are printed on. Pictures, wall paintings, family mementos, etc., may have very high personal value to the property owner.

Estimate of Required Resource

An early request for manpower and salvage equipment can significantly reduce loss. The first company assigned to salvage should consider the size-up factors and request sufficient resources to stabilize the situation.

Salvage Equipment

Common salvage equipment includes salvage covers and boxes, rolled plastic, hall runners, brooms and squeegees.

Where salvage covers must be left on scene, arrangements should be made for pickup later. The IC or the loss control officer should schedule a return walk through by the Fire Department to insure post-incident damage is not occurring.

Customer Service

The IC and/or the loss control officer should meet with the property owner or responsible party, to determine/identify the salvage priorities. The earlier this can be done, the greater the opportunity to identify high value/priority items or areas. In some cases, when safe to do so, allowing the property owner/occupant to be escorted through the building by fire department personnel can be of great assistance to the loss stop operation.

Overhaul

VERSION 3/06

This procedure describes guidelines for conducting overhaul operations. The main objective of overhaul operations is to seek out and extinguish all remaining fire and control loss, stabilize the incident scene by providing for firefighter safety and to secure the structure. Rekindles must always be eliminated. Additional objectives should include:

- Preserve evidence
- Secure the fire scene

When addressing overhaul operations, the IC should:

- Ensure overhaul is conducted safely.
- Ensure all fire is extinguished.
- During rest breaks of fire crews, insure at least two firefighters remain in the fire area to detect any possible hidden fire and re-ignition.
- Use early and continuing positive pressure ventilation to maintain an acceptable working environment and reduce loss.
- Meet with the property owner or occupant concerning overhaul operations.
- Closely coordinate overhaul with fire investigators.

Customer Relations

The IC or the company officer should meet with the property owner or occupant to explain the reasons for overhaul operations. In some cases, when safe to do so, allowing the property owner or occupant to be escorted through the fire area can help them understand the need for overhaul operations. Proper loss stop operations should, of course, be completed prior to any walk-through.

Allowing the property owner or occupant the opportunity to remove personal possessions/valuables, or boxing and removing these items for them is excellent customer service and loss control opportunity.

Every effort should also be made to assist the property owner in any way possible and answer any questions.

Hidden Fires

Fire suppression operations often overlook small pockets of fire concealed in construction voids or hidden under debris. Overhaul activities must thoroughly search the fire scene to detect and extinguish these hidden fires or "hot spots" before they rekindle.

Floor, wall or ceiling areas showing evidence of extensive decomposition due to fire should be thoroughly examined during overhaul. Additional areas to check include wooden door jambs, air conditioning vents and registers, base- boards, door and window casings, and around light fixtures and electrical outlets. TIC's, axes, pike poles, and halogen tools are most commonly used for this purpose. Attic fires pose a special hazard for rekindle where insulation has been exposed to fire. Large areas can receive fire damage and can be located in difficult to reach areas. In some cases, all insulation must be removed to extinguish all remnants of fire. Plenum spaces, soffits and pipe chases should receive careful inspection as they provide possible routes for fire to spread throughout a structure. Failing to overhaul these areas invites fire extension to uninvolved building areas.

The IC will be responsible for insuring that the fire area has been thoroughly overhauled and no hidden fire remains. The company officer last leaving the scene will be responsible for insuring total fire extinguishment.

Evidence Preservation

Companies performing overhaul should continuously weigh the importance of preserving evidence with the desire to immediately remove debris and completely extinguish all traces of fire. In some cases, it may be necessary to monitor spot fires until investigators arrive on the scene. Where possible, evidence should remain untouched, undisturbed and in its original location. Where circumstances prohibit this, evidence should be removed under the direction of a fire investigator.

Securing the Fire Scene

Securing the fire scene is also a function of overhaul. Securing refers to actions required to protect the structure and contents from any further loss after fire suppression companies have departed from the scene. Roof ventilation holes and broken windows should be covered to reduce weather damage and deter vandalism. The rolled plastic is ideal for this use. For safety reasons, remaining glass shards should be removed from the frames of broken windows prior to installing covers and always prior to leaving the scene. If necessary, doors and windows may need to be boarded up to prevent unauthorized entry or vandalism.

Securing the scene also includes the actions required to insure the safety of all persons likely to visit the incident scene. Once a hazard zone is established during firefighting operations, it must not be abandoned prior to removing or stabilizing the hazard. Overhaul companies must provide a means of identifying and guarding hazards that cannot be removed or stabilized. Barricades, hazard tape, and the posting of guards are all suitable methods depending upon the severity of hazard.

FIRE PROTECTION PLAN
YELLOWSTONE MOUNTAIN CLUB
BIG SKY, MONTANA

EXECUTIVE SUMMARY

A Fire Protection Plan for Phases 1 - 3 of the Yellowstone Mountain Club was provided by Bruce Suenram of Fire Logistics, Inc. This Plan provided a comprehensive study of fire protection measures for the Phases 1 – 3 subdivisions. Since then, the Public Safety and Privacy Incorporated, the entity that provides fire protection services to the Yellowstone Mountain Club, has expanded upon these recommendations to enhance the fire protection measures. This document outlines the fire protection measures that exist within the overall Yellowstone Mountain Club property.

FIRE PROTECTION PLAN

This fire protection plan provides a series of mitigation measures which substantially reduce the risk of disastrous losses from an encroaching wildfire or wildland/urban interface fire. The items listed below are to be considered the minimum standards for development within Yellowstone Mountain Club.

WATER SUPPLY AND DISTRIBUTION

All existing and proposed developments shall provide an adequate water supply for fire fighting purposes. Below are the general guidelines for water supply and distribution systems.

Fire Flow and Storage

> 1,000 gallons a minute for a two-hour duration (1000 X 60 X 2 = 120,000 gallons of water storage for fire fighting purposes).
>
> A 50% reduction is allowed for sprinklering all the buildings in the development = 60,000 gallons of water for fire fighting purposes.

Hydrant Spacing

Hydrants are installed and spaced no more than 1200 feet apart.

Pipe Sizing

System piping should be sized to deliver the required fire flows. Listed above, including individual sprinkler systems within structures.

FIRE SPRINKLERS

All residential structures are to be equipped with automatic fire sprinklers.

EARLY DETECTION

All structures will be equipped with early detection, fire and smoke alarms that will be monitored by the security personnel or a property management entity, unless occupied “full time”.

STRUCTURAL DESIGN AND CONSTRUCTION

How a building is designed and constructed is one of the most important factors in providing a fire safe environment for a home in a wildland/urban interface area. The Yellowstone Mountain Club Architectural Review Committee's Design Guidelines shall ensure structures within YMC comply with the following requirements:

Roof Coverings

All roofing materials shall either be constructed to meet Class C flame spread ratings or be treated with a flame retardant material, such as those marketed by Flame Safe of the Rockies, to meet a Class C flame spread rating. If wood shakes or shingles are treated to achieve a Class C flame spread rating, they are to be maintained in that treated condition according to the retardant manufacture's specifications. Alternative materials shall be reviewed by the PSPI prior to construction on a case by case basis.

Exterior Walls

Most home fires in urban areas have internal sources of ignition. By contrast, home fire ignitions during a wildland/urban interface fire are almost entirely external. The fire-resistance of exterior walls becomes very important and in wildland/urban interface areas the construction of exterior walls must be limited.

The exterior walls shall be constructed of materials approved for a minimum of one-hour-rated fire-resistive construction on the exterior side or constructed with approved noncombustible construction. An exception would be allowed for heavy timber or log wall construction.

Overhangs and Stilt Construction

Structures with overhangs or stilt construction are usually ignited by flames sweeping against the underside of the projection or the building itself. Eave, balconies, and other similar overhangs shall be constructed with undersides of materials that are approved for a minimum of one-hour-rated fire-resistive construction. For structures proposed to be supported wholly or in part on stilts, encase the underfloor areas to the ground line with materials that are approved for a minimum of one-hour-rated fire-resistive construction.

Windows

Windows can easily be a weak point in the fire protection of a home in a wildland/urban interface fire. They allow radiated heat to enter at such an intensity that interior materials (e.g., furniture, draperies) are ignited, and they admit convective heat, fire brands, or flames when they are open or broken.

Exterior windows, window walls and sky lights should be of extra-strength glass (e.g., tempered or multilayered glazed).

Vents

Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs should not exceed 144 square inches each. The vents should be covered with noncombustible mesh with openings not to exceed ¼ inch.

ACCESS

One of the most important aspects of land development from the fire protection perspective is access. Adequate ingress and egress routes are essential to allow safe and rapid passage for both fire apparatus and private vehicles in opposite directions simultaneously.

Roads

Ingress and egress roads are proposed to provide access throughout The Yellowstone Mountain Club and they will be constructed to the standards required by Madison County or the American Association of State Highway and Transportation Officials (AASHTO).

The road rights of way (or fuel breaks) should be at least 60 feet. This will allow the construction of the roadway and driving lanes with enough space on either side of the roadways for fuel reduction. The road rights of way should be maintained to ensure the roadway can be used as an escape route, an access route for the fire department and as a fire break.

Driveways

Driveways should be constructed with an unobstructed width of 14 feet and a minimum unobstructed height of 15 feet. Driveways greater than 150 feet in length should be provided with turnarounds for fire apparatus.

Fire Access Easements

A minimum 20 foot emergency access easement should be provided and maintained to allow access by fire apparatus to all dedicated open space. This fire apparatus access can be utilized as a portion of the trail system within the development, thus serving multiple purposes.

Air

At least one full service helipad has been constructed within the YMC property boundaries. The pad should be a minimum of 30 feet in diameter with a pad surface capable of supporting a type I (Bell 214) helicopter plus a full payload. A fire hydrant should be installed next to the helipad for filling helicopter buckets or other acceptable method of filling buckets should be considered (such as the pond near the lodge). The helipad will also service the development and immediate area in case of a special medi-vac situation requiring helicopter transport. The helipad should also be constructed with an additional clear area around the pad with no trees to block the helicopter approach and take off.

Trails

The trail systems will not only provide the users with grand vistas of Pioneer Mountain, the Spanish Peaks and Madison Range, but will serve to help break up fuel beds as thy also serve as fuel breaks. As a result, the trail systems in The Yellowstone Mountain Club development will serve as a key component of the wildland fire defense strategy for the subdivision.

The trail systems shall be multi-functional allowing fire department access to the rear of lots (if possible); compartmentalize fuels, thus breaking up the fuel beds to limit the size of a wildfire; serve as a fire break to slow down fire spread; and keep the members and their guests out of the standing vegetation, thus reducing the potential for an off road fire starting in the development.

The trails should be constructed 6 feet in width with 2 feet of maintained shoulders on either side. The trails should be located in such a way to compliment the defensible space around adjacent homes.

The trail bed should be maintained annually with an herbicide and the shoulders should be mowed or weed-eaten. Tree limbs along the trail system should be limbed-up. This will provide an effective fire break of 10 feet in all areas where the trail system is provided.

Signage

Street and road signs and their supports should be of non-combustible construction and be installed according to the standards of the Madison County or AASHTO/MVTCD.

MAINTENANCE

Many fire resistant features are incorporated into a home during the planning, designing, constructing, and landscaping phases of home building. However, in wildland/urban interface areas, maintenance begins the day the homeowner moves into their home and must continue as long as the building stands.

The roof is one of the most critical points in annual maintenance for protection of the home from a conflagration during a wildland/urban interface fire. Any place where windblown needles and leaves accumulate is an ideal place for windborne fire brands to drop. Remove all loose flammables from roofs, eaves, and rain gutters at the beginning of each fire season.

During the fire season, firewood and other combustible material should not be stored in unenclosed spaces beneath buildings or structures, or on decks or under eaves, canopies or other projections or overhangs. Firewood should be stored in the garages (so long as they are sprinkled) or defensible spaces at least 20 feet away from the home.

VEGETATION MANAGEMENT

To reduce the hazard rating for a wildland/urban interface area, a vegetation management plan is required. A vegetation management plan, properly implemented, reduces the amount of fuel available for wildfire, thus mitigating the probability of a rapidly spreading wildland/urban interface fire. The potential for a devastating crown fire is reduced by a properly implemented vegetation management plan. Elements of the plan include the defensible space around the home, fuel breaks and removal of slash, snags, other ground fuels, ladder fuels and dead trees thinning of live trees.

Past logging, road building, fires, and other activities have modified the vegetation in the area. These changes have resulted in different mosaics on the landscape. These different mosaics have been mapped into four fuel types that represent different degrees of fire hazard due to the composition of the vegetation within those fuel types.

Within the fire environment of fuels, weather and topography, the fuel component is the only one which can be modified in the attempt to reduce or eliminate the wildfire threat.

Changing the fuel characteristics can effectively reduce the fire hazard of the fire intensities to a point where the fire threat is manageable. Fuel treatment options include elimination of all fuels creating a fuel break and reducing the fuels quantity or loadings. These options will be effective in breaking up a fuels continuity and isolating fuels or developments.

Vegetation management activities are needed to reduce the fire hazard in the area, and to make it less likely that losses occur as a result of either natural or man caused fires. Using the four fuel types as guides, recommendations are made to aid landowners in the reducing the fire hazard within the area by modifying the vegetation.

The following techniques are available to manage vegetation for fire protection:

1. Hand Clearing – The most common method for the homeowner. Common tools include rakes, axes, shovels and pruning saws.

2. Mechanical – A quick method to reduce or remove a large amount of flammable vegetation. Tools and machinery include tractors, lawn mowers, chippers and the power-string trimmer.

3. Grazing – A simple and often overlooked method. Grazing can be a useful method to reduce some grasses and shrubs thereby reducing fuels. Cattle, sheep, goats, and other grazers can be employed depending on terrain and vegetation type.

4. Piling – Piling of the residues created by the thinning and pruning is one way to dispose of the fuel that results from these operations. Piling can be done either by hand, or by machine if there is enough room to operate. Normally, unusable boles, limbs, etc. can be bucked up into pieces small enough to hand pile. Piles must be kept away from any live vegetation if the piles are to be burned after they dry out.

5. Chemical – The application of herbicides either to kill existing plants or to prevent the growth of undesirable vegetation.

6. Prescribed Burning – The application of fire to natural vegetation under controlled conditions of weather, fuel, moisture, etc. to burn out flammable vegetation. Prescribed burning should be carried out in compliance with local policies and regulations.

7. Pruning – Pruning is usually done at the same time as the thinning. After the trees to be removed are thinned out, the remaining trees are pruned. Pruning removes excess branches (ladder fuels), both live and dead that are the closest to the ground.

8. Irrigation – During prolonged dry weather, homeowners should irrigate their landscape and surrounding vegetation to increase its live and dead fuel moisture content.

9. Thinning – Thinning is applied to trees that are too close together to grow properly, and thus creating a fuel hazard that increases the risk of fire spreading.

10. Chipping – Another method to reduce the slash is to chip the excess material. This operation leaves small, easily disposed, chips.

11. Logging – Selective logging under carefully prescribed conditions will reduce the fuels on the site, and in some locals provide a small profit from the harvested trees.

Defensible Space

Each year many families lose their homes and possessions to the ravages of wildfire throughout the West. Chances for the home's survival can be greatly increased if the homeowner performs some basic fire safety activities such as creating a defensible space.

Defensible space refers to an area around the home where the native vegetation has been modified to reduce the wildland/urban interface fire threat to the home and provides a safe area for fire fighters to work effectively and safely. There are three benefits to defensible space which includes the opportunity:

1. For the fire department to succeed in the interface fire environment.
2. For the home to survive a wildland-urban interface fire on its own.
3. To prevent a fire from spreading from the home to the surrounding vegetation.

Slope affects the size of the defensible space. Homes near steep slopes will need to clear additional vegetation to mitigate the effects of the radiant and convective heat currents and flame lengths. The slope should be planted in drought and fire resistant plants.

A defensible space of at least 30-300 feet shall be required around all homes in this development. See the individual fuel types for requirements.

<u>Landscaping</u>

The landscaping plan of the homeowner is an integral component of the defensible space developed by the homeowner. If each lot was thought of in terms of three zones, with each zone having a different purpose and emphasis in the overall defensible space concept for the property.

Zone A consists of the area from immediately adjacent to the home to a distance of approximately five feet. The primary purpose of this zone is to have the least flammable type of landscaping immediately adjacent to the home to prevent ignition from firebrands and direct flame contact. Considerations for Zone A are:

1. Remove native shrubs and trees, unless they are deciduous or low growing.
2. Remove pine needles and redistribute to bare areas elsewhere.
3. Plant low growing, high moisture content vegetation such as lawn, flowers, and ground covers. Remove plant material once it has cured. Use supplemental irrigation to keep plants green in this zone.
4. Consider using decorative rock mulches.

Zone B lies between five feet and at least 30 feet from the home. This zone provides the critical area where fire fighters can defend the home and where the fuels have been substantially reduced in height and volume. Considerations for Zone B are:

1. Remove all dead, trees, shrubs, and branches.
2. If desired, leave small groups of existing native shrubs. Keep well maintained. Reduce height and remove branches that are near the ground. Remove all other native shrubs.
3. Provide for at least 10 to 15 foot separation between individual shrubs and/or groups of shrubs.
4. Native trees are allowable so long as there is a large separation between the crowns of adjacent trees and ladder fuels are removed.
5. A thin layer of pine needles that is compact and lying flat to the ground is acceptable.
6. Bare ground in this zone is unacceptable because of soil erosion concerns.
7. Use lawn, ground covers, erosion control grasses, low growing deciduous shrubs, and mulches in this zone. Keep plants green during fire season. Use supplemental irrigation if necessary. Remove cured plant material.

Zone C represents the remainder of the property that lies outside the formal landscaped area. This zone should be modified as described in creating and maintaining a defensible space.

FUEL MODIFICATION PLAN

A detailed fuel modification plan shall be developed and maintained for the open spaces which shall protect the structures from an approaching wildfire. The fuel modification plan shall be reviewed by adjacent fire departments and the Gallatin National Forest.

Fuel Breaks

Fuel breaks are strips or areas of land in which the volume of vegetative fuels are reduced to an acceptable level and maintained in that condition. A properly designed fuel break will use the

existing land form, line, form, color and texture to provide a sweeping visually pleasing break in the vegetation. The fuel break design will create more edge for fauna while reducing fuel loading, fuel bed continuity, and provide an access for fire protection and suppression when needed.

Fuel break opportunities within The Yellowstone Mountain Club that already exist or will be developed are all existing roads, new roads, trails, ski runs, ski access trails, ski lifts, service roads, and utility corridors. These fuel breaks should also be maintained and utilized as hiking trails, jogging paths, horseback riding trails, ATV paths, cross country skiing trails, ski access routes, and service roads. Maintaining these fuel breaks or trails is important not only for the users but for fire protection. Further development of the fuel break system needs to be coordinated along with the development of the property to ensure that the fuel beds are manageable from a fire protection prospective.

Back Country Fuel Breaks

Any large wildfire that would threaten Yellowstone Mountain Club would most likely come out of the area to the west that is within the South Fork West Fork Gallatin River, or out of the southwest that is within Muddy Creek. The forest fuels in this area consist mainly of the mature timber (lodgepole pine) type that has open grassy meadows with areas of scattered Douglas-fir along the lower southerly aspects. Fires that originate in this area have a continuous fuel source for spread towards and into the Yellowstone Mountain Club and Big Sky. Fuels modification within this area would be to selective harvest with fuels cleanup in areas to break up the continuous lodgepole pine stands.
By prioritizing the areas and assessing the risks, a burning program could be developed that would benefit multiple resource values.

FUEL TREATMENT

Fuel treatment options include any activity that will reduce or minimize the availability of fuels to fire or will reduce the intensities produced while being consumed by fire. Options include complete or selective harvesting of trees with slash cleanup to reduce both ground and aerial fuels. The thinning of existing stands to specific spacing. Pruning the remaining standing trees to remove the ladder fuels that could carry fire into the canopies. Piling, chipping, or burning the resulting fuels that are removed. Grazing of livestock can reduce the grass component. Low intensity prescribed fires can eliminate the smaller ground fuels and encroaching saplings that become ladder fuels. The combinations of several of these vegetation treatments can be very effective in reducing fire potential and intensities of future wildfires Fuel treatment modification areas available would be next to all roads, along trails and paths, around all developed areas, along natural topographical breaks such as ridges and natural changes in vegetative cover.

FUEL TREATMENT GUIDELINES

Some general principles and objectives in treating fuels are to reduce the ground fuels, eliminate the ladder fuels that can carry a fire from the ground to the tree canopies, reduce the larger fuels that will add or increase the fire’s intensities, breakup a continuous fuel bed, and thinning of the aerial fuels

(canopies) to prevent or reduce the possibility of torching and crowning. The following are some general fuel treatment guidelines classified by the use of the land and by fuel groups or models:

Developed Areas

Fuel Model 1, short grass and scattered lodgepole pine regeneration.

Within the planned developed portions of this fuel type, vegetation meeting the fire resistive plant definition need to be planted in Aone "A" around the homes. Trees should be kept at least twenty feet away from all buildings. Trees should be pruned up to eliminate ladder fuels on the lots.

All roads should have at least 10 foot shoulder maintained on the uphill side to prevent fires from originating from motorists.

A standard defensible space of 30 feet and fire resistive landscaping will be sufficient in this fuel type.

Fuel Model 2, grass with scattered brush or timber overstory.

These fuels are similar to those in Fuel Model 1, except that the open shrub and timber can contribute to the fire intensity. Thinning to a 20 foot spacing between trees will be sufficient to reduce the fire hazard, except where crowns may still be touching after thinning. In that case, spacing should be increased so the tree crowns are freed from adjacent crowns. At least 40% of the live crown should be left. Pruning should remove all dead branches, and some live branches can be removed also if necessary. The thinned trees should be removed for later disposal. These treated areas then followed by a low intensity prescribed fire will remove remaining ground fuels and other encroaching seedlings thus improving the stand for many years. Grazing will be helpful in keeping grass areas from increasing fuels.

These areas should be thinned, with the encroaching saplings removed within the right-of-ways of the roads and trail stem, thus serving as a portion of the fuel break system.

A standard defensible space of 30 feet and fire resistive landscaping will be sufficient in this fuel type.

Fuel Model 8, closed canopy timber stands, composed mainly of smaller lodgepole pine, with a compact litter layer.

A slow burning ground fire with low flame lengths are generally the rule here. The only modification in this fuel type, if any, would be to remove any heavier fuels that are within 50 feet of the timber edge. This would prevent a flare up of the occasional jackpots or heavier fuel concentrations within this fuel complex Thinning should probably occur in this type in 20 – 30 years.

A standard defensible space of 30 feet and fire resistive landscaping will be sufficient in this fuel type.

Road rights of way should be maintained to provide a fuel break and prohibit fires from spreading beyond the area of fire origin.

Fuel Model 10, closed canopy mature timber stands with abundant ladder fuels and large loads of dead material on the forest floor.

Fuel modification required within this fuel complex is quiet extensive consisting of harvesting much of the overstory and then treating the remaining slash. The purpose here is to remove enough of the overstory and ground fuels so that an existing ground fire or approaching crown fire cannot be sustained within the crowns. The fire would drop to the ground or stay within the ground fuels where it could effectively be controlled by suppression forces. The treatments should be for at least 300 feet on the downside of any development, 200 feet laterally, and 150 feet on the uphill side. Along roadways the distance should be at least 100 feet to keep new fires small and suppression forces a possible anchor against approaching fires. Fire resistant species such as the Douglas-fir would be the desired species to leave in place. All slash created and existing ground fuels would need to be treated. Burning of the entire treated area would eliminate most all of the fuels, these would be low intensity controlled burns and could be repeated every 6 to 10 years to maintain a viable fuel break.

Recommended defensible space for this fuel type is 300 feet on the downhill side of any home, 200 feet laterally, and 150 feet on the uphill side.

Open Space Areas

Fuel Model 1.

A mosaic of grass and trees should be developed. Trees should comprise approximately four of every ten acres. The trees can be left in clumps, patches, and stringers depending on current arrangement and desired results. These new stands should be thinned or treated to create the desired mosaic while still leaving islands of reproduction for viewing and wildlife concerns. These trees will require some thinning in ten to twenty years. Grasses will comprise the remaining area, and should be controlled through grazing or other methods. Fuel breaks should be constructed in this type, particularly in mid-slope area between the developed area and the main road to the base area. These fuel breaks can use old roads in the area and should run across the area. Fuel breaks work best if maintained with the edges mowed or cut back about 10 feet. They should be kept free of fuel, and can also double as cross country ski trails, hiking trails, and etc.

Fuel Model 2.

Treatments that are needed include some thinning, pruning, and grazing. In the open space areas, thinning should be done adjacent to the developed portions to allow for reduced

hazard for approximately 200 feet. A 20 foot spacing should be sufficient except where crowns may still be touching after thinning. In that case, spacing should be increased to where crowns are freed from adjacent crowns. Grazing will be helpful in keeping grass areas from increasing fuels. These treated areas then followed by a low intensity prescribed fire will remove remaining ground fuels and other encroaching seedlings thus improving the stand for many years.

Fuel Model 8.

The only modification in this fuel type if any would be to remove any heavier fuels that are within 50 feet of the timber edge. This would prevent a flare up of the occasional jackpots or heavier fuel concentrations within this fuel complex. Thinning should probably occur in this type in 20 – 30 years.

Fuel Model 10.

Fuel modification required within this fuel complex needs to be extensive, consisting of harvesting much of the overstory and then treating the remaining slash. Along the roadways the distance should be at least 100 feet to keep new fires small and suppression forces a possible anchor against approaching fires. Several methods could be used here; yarding out all material on steep slopes, machine piling of all slash and existing fuels on slopes under 35%, hand piling on steeper slopes, and then burning of all piles in the late fall. Burning of the entire treated area would eliminate most all of the fuels, these would be low intensity controlled burns and could be repeated every 6 to 10 years to maintain a viable fuel break.

Appendix R

HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

August 22, 2016

The Corral Subdivision at Yellowstone Mountain Club, Floodwater calculations –South Fork of the West Fork of the Gallatin River

PEAK FLOWRATE CALCULATIONS

In preparing the Corral Subdivision at Yellowstone Mountain Club, floodwaters from the South Fork of the West Fork of the Gallatin River (South Fork) were required to be established. This river currently does not have a floodplain delineated, therefore, the flood elevation was calculated using the best information available and known data from downstream gaging stations. There is no published data to support the high water elevation or flow through this stretch of the river. In order to calculate the floodwaters, stream statistics of the river were gathered to make a conservative estimate of the high water level by applying some statistical assumptions. Two methods were used to estimate flow, while a third estimate was also considered based on the estimates of Rich Chandler and Bill Hertzog during the 1997 spring runoff.

The first method used was to determine the ratio between the 7Q10 flow and the highest recorded water flow at the gaging station, and apply that as a peaking factor to the local conditions at the proposed bridge. The second method is to quantify the flow/basin area and apply it to the local conditions at the proposed bridge. The third estimate was also assumed based on visual observations and incorporated into the analysis. Below is a summary of these analyses.

Analysis #1: Compare 7Q10 versus high water elevation to determine peak flow factor:

The nearest gaging station on the Gallatin River is site #37 located near Gallatin Gateway. Stream data is readily available through the USGS. Unfortunately, this site is greater than 20 miles downstream and has a considerably larger basin area than the stretch of river that is of concern. This data has been used as a baseline for known steam statistical data that will be extrapolated to the stretch of river adjacent to the subdivision.

In 2000, a technical report provided by Nicklin Earth and Water was prepared that measured flow rates for portions of the South Fork approximately a mile downstream of the anticipated subdivision. This report provided flow data for the 7 day, 10 year flows (7Q10) at the sampled location of 7.72 cfs (reach 7, mile 1, see page 13 of "Technical Memorandum Revised Narrative Standards Evaluation Spanish Peaks Subdivision Gallatin County, Montana"). No high water elevations or flows were given in this report or any other publication.

In contrast, the 7Q10 at the Gallatin Gateway station was measured at 204 cfs, while the peak flowrate through the station was measured at 9160 cfs. The relationship of the peak flowrate to the 7Q10 flow rate was used to determine the "peaking factor". This resulted in a peaking factor of 44.95. Applying

this peaking factor to the 7Q10 flow found adjacent to the subdivision resulted in a calculated peak flow rate of 347 cfs.

Analysis #2: Compare peak flowrate using drainage area calculation:

The second method for determining the peak flow rate was to use a known basin area for a given gaging station (station #37 near Gallatin Gateway was again used), then determine the basin area of the river that is adjacent to the subdivision (sub-basin). Once the basin areas for both have been determined, divide the sub-basin by the gaged basin to determine the percentage of flow that a given stretch of river contributes to the gaging station data. The percentage is then applied to the statistical data provided by the USGS to determine the peak flowrate. This method is commonly used by the MDEQ in determining stream flows. The total drainage area of Gallatin River steam data site #37 is 825 square miles as per the USGS data. As listed above, the peak flowrate at this site was 9160 cfs as measured in 1997.

The total drainage area of the South Fork of the West Fork of the Gallatin River has been calculated using USGS maps. The total drainage area upstream of the proposed bridge site is 30.4 square miles. Assuming the drainage areas contribute consistent flows to the rivers, a maximum flowrate of 338 cfs is calculated adjacent to the subdivision.

Analysis #3: Estimate of flow based on 1997 observations:

The third estimate for determining the peak flow rate was from the observations of an engineer, Bill Hertzog that was present during the runoff of 1997. At that time, Bill estimated the South Fork of the West Fork River to be flowing approximately 1,000 cfs based on his observations and experience. There were no measurements supporting this estimate, nor were there any statistical findings or data that support his conclusion. While this estimate is more than twice the values calculated above, this flowrate was used to as a conservative estimate to ensure the proposed structures were safe from flooding.

The maximum flowrate adjacent to the Corral Subdivision will assume the largest flowrate listed above, which is 1,000 cfs.

Supporting documentations and calculations are enclosed in the following pages.

HIGH WATER LEVEL CALCULATIONS

Once the peak flowrate was determined, this flowrate was modeled at 4 points across the South Fork of the West Fork of the Gallatin River. Several iterations were calculated, namely 400 cfs, 500 cfs and 1,000 cfs. These calculations are included in the following pages. The 1,000 cfs value was used in the determination of the high water levels adjacent to the subdivision.

Four sections were taken downgradient of each structure and the existing bridge to determine what the calculated high water elevation would be adjacent to each structure. A table listing the elevation of each structure and the corresponding high water elevations is listed below.

HOUSER
ENGINEERING P.C.
626 SOUTH FERGUSON AVENUE, SUITE 1 BOZEMAN, MONTANA 59718
ph. 406-548-7820 email: justin@houserengineering.com

Section	Adjacent Structure	Lowest Level of Structure (ft)	High Water Elevation (ft)	Vertical Separation (ft)
A	8	7123.15	7113	10.15
B	bridge	7114.5	7113.36	1.14
C	13	7111	7102.03	8.97
D	14	7114	7091.96	22.04

Conclusion:

The calculations listed above provide three methods for calculating maximum flowrates within the South Fork of the West Fork of the Gallatin River. The most conservative estimate of 1,000 cfs was assumed and sections of the channel were modeled to determine water surface elevation using open channel flow calculation methods. In each case, the lowest finished floor elevations of the building structures were between 8.97 and 22.04 feet higher in elevation than the adjacent floodwaters, proving that the proposed structures are a safe distance from flood hazards.

Irregular Section (S-Fork-2) Report

Label	Solve For	Friction Method	Roughness Coefficient	Channel Slope (%)	Water Surface Elevation (ft)	Discharge (ft^3/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Top Width (ft)	Normal Depth (ft)	Velocity (ft/s)
Irregular Section A-400cfs	Normal Depth	Manning Formula	0.060	2.865	7112.41	400.00	112.90	145.28	0.78	145.23	1.35	3.54
Irregular Section A-500cfs	Normal Depth	Manning Formula	0.060	2.865	7112.53	500.00	130.60	149.64	0.87	149.57	1.47	3.83
Irregular Section A-1000cfs	Normal Depth	Manning Formula	0.060	2.865	7113.00	1000.00	202.16	157.69	1.28	157.52	1.94	4.95
Irregular Section B-400cfs	Normal Depth	Manning Formula	0.060	2.865	7111.04	400.00	52.96	21.90	2.42	18.59	5.70	7.55
Irregular Section B-500cfs	Normal Depth	Manning Formula	0.060	2.865	7111.54	500.00	62.61	23.81	2.63	20.21	6.20	7.99
Irregular Section B-1000cfs	Normal Depth	Manning Formula	0.060	2.865	7113.36	1000.00	104.80	30.52	3.43	25.80	8.02	9.54
Irregular Section C-400cfs	Normal Depth	Manning Formula	0.060	3.301	7101.41	400.00	102.18	125.94	0.81	125.84	1.11	3.91
Irregular Section C-500cfs	Normal Depth	Manning Formula	0.060	3.301	7101.53	500.00	117.98	129.08	0.91	128.96	1.23	4.24
Irregular Section C-1000cfs	Normal Depth	Manning Formula	0.060	3.301	7102.03	1000.00	185.68	141.77	1.31	141.57	1.73	5.39
Irregular Section D-400cfs	Normal Depth	Manning Formula	0.060	4.487	7090.83	400.00	63.10	47.51	1.33	47.19	2.69	6.34
Irregular Section D-500cfs	Normal Depth	Manning Formula	0.060	4.487	7091.07	500.00	75.13	52.58	1.43	52.23	2.93	6.66
Irregular Section D-1000cfs	Normal Depth	Manning Formula	0.060	4.487	7091.96	1000.00	131.02	74.66	1.75	74.23	3.82	7.63

Cross Section for Irregular Section A-400cfs

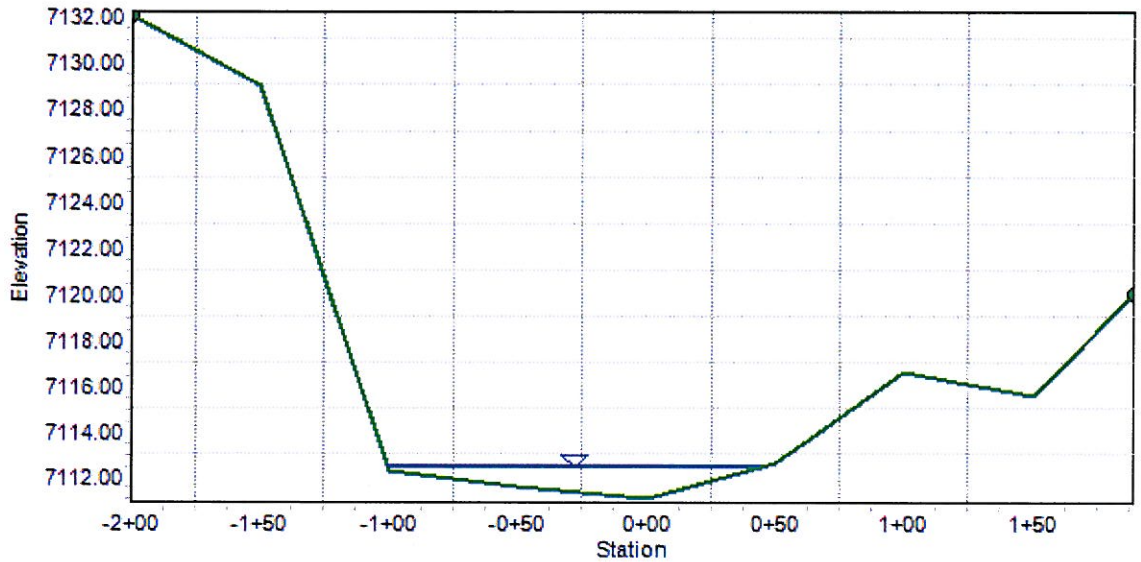
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.865	%
Normal Depth	1.35	ft
Discharge	400.00	ft³/s

Cross Section Image



Cross Section for Irregular Section A-500cfs

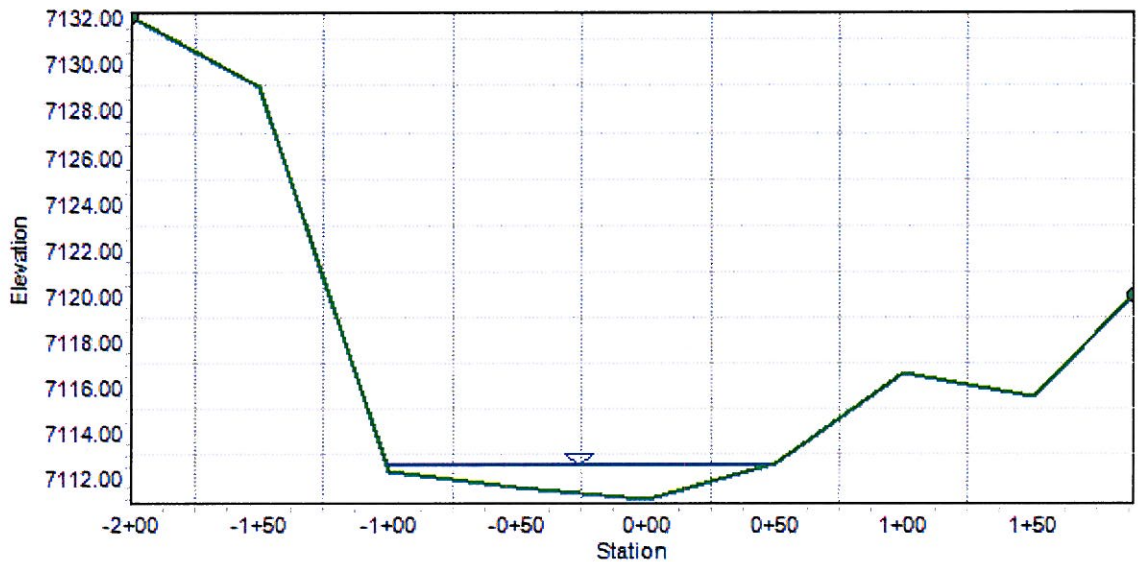
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.865	%
Normal Depth	1.47	ft
Discharge	500.00	ft^3/s

Cross Section Image



Cross Section for Irregular Section A-1000cfs

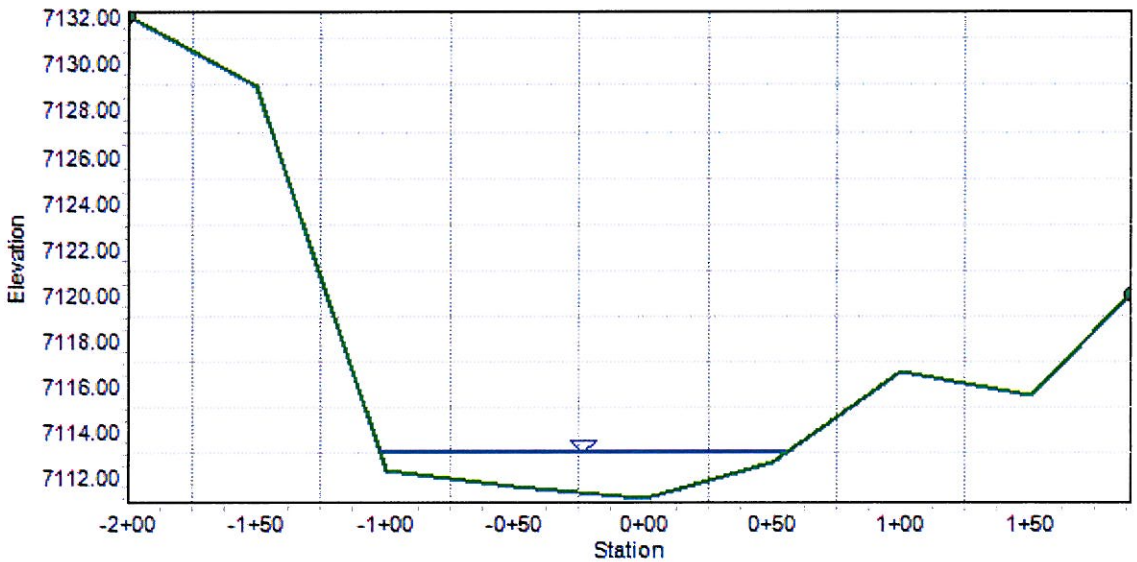
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.865	%
Normal Depth	1.94	ft
Discharge	1000.00	ft³/s

Cross Section Image



Cross Section for Irregular Section B-400cfs

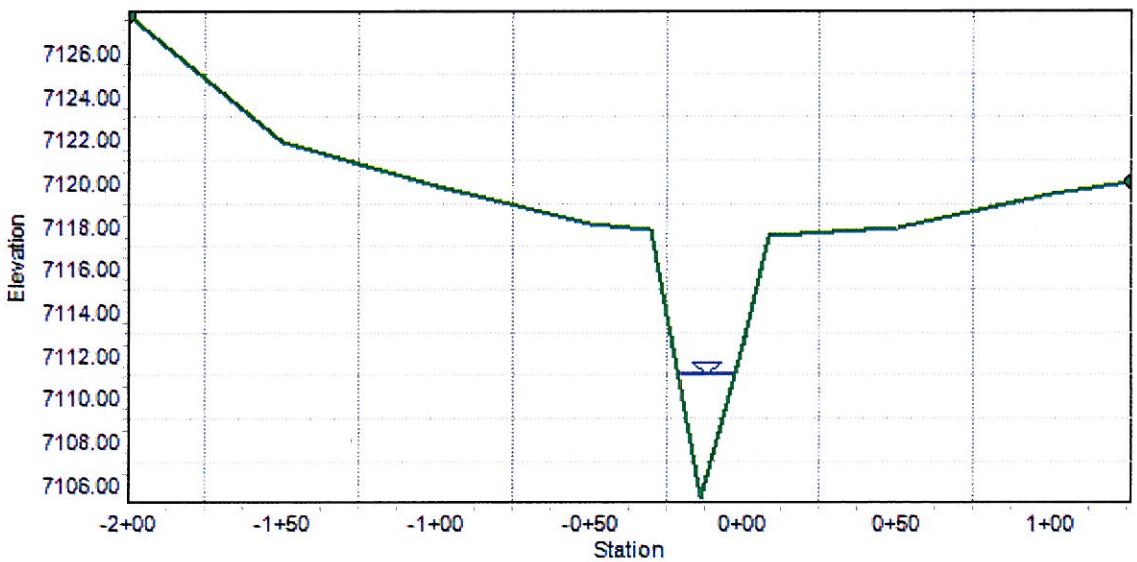
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.865	%
Normal Depth	5.70	ft
Discharge	400.00	ft^3/s

Cross Section Image



Cross Section for Irregular Section B-500cfs

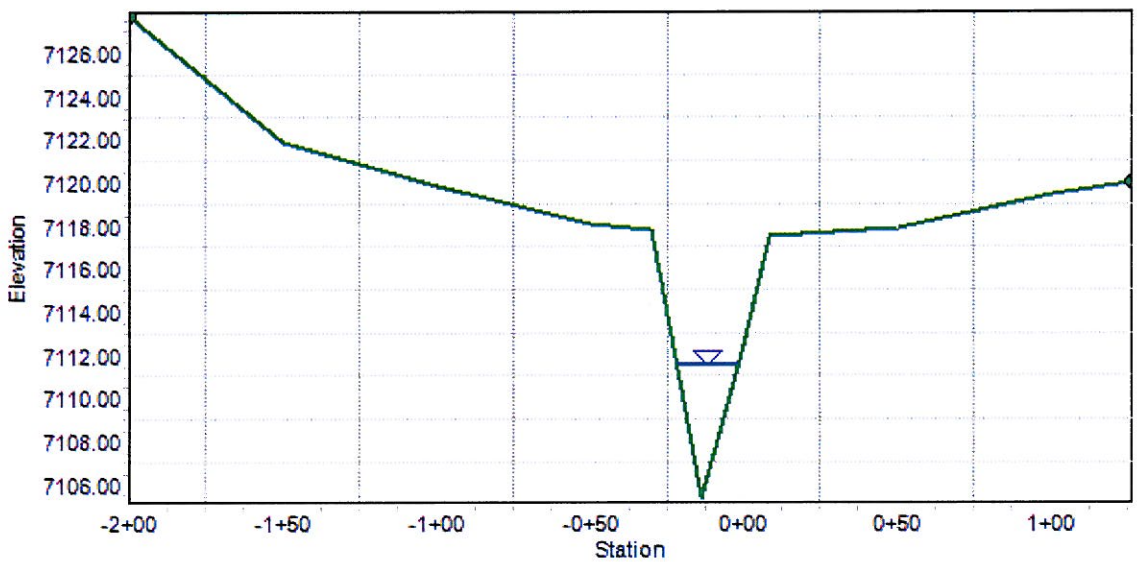
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.865	%
Normal Depth	6.20	ft
Discharge	500.00	ft³/s

Cross Section Image



Cross Section for Irregular Section B-1000cfs

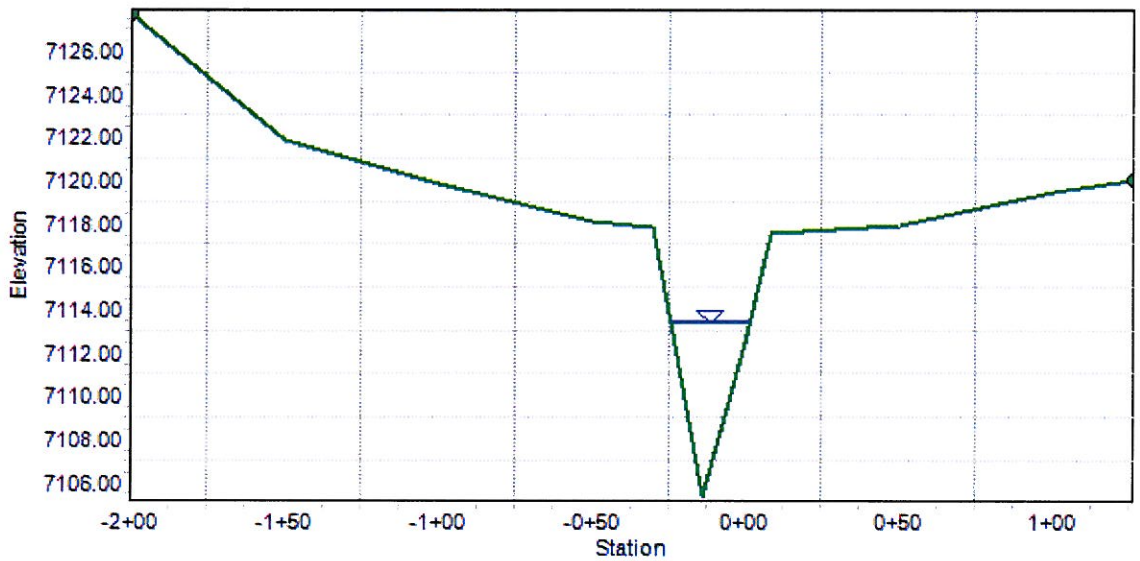
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.865	%
Normal Depth	8.02	ft
Discharge	1000.00	ft³/s

Cross Section Image



Cross Section for Irregular Section C-400cfs

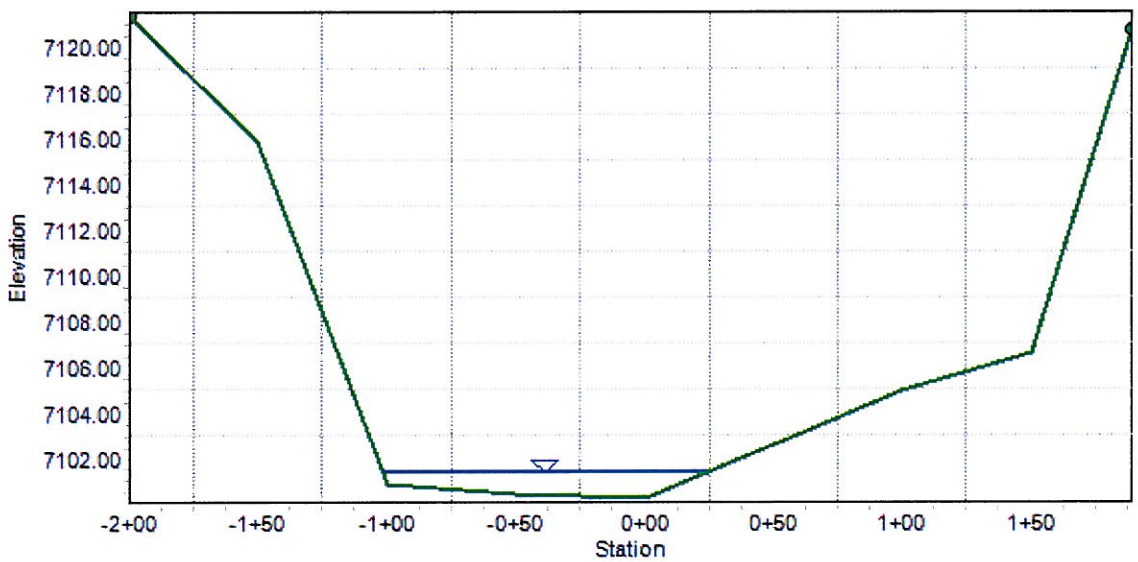
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.301	%
Normal Depth	1.11	ft
Discharge	400.00	ft³/s

Cross Section Image



Cross Section for Irregular Section C-500cfs

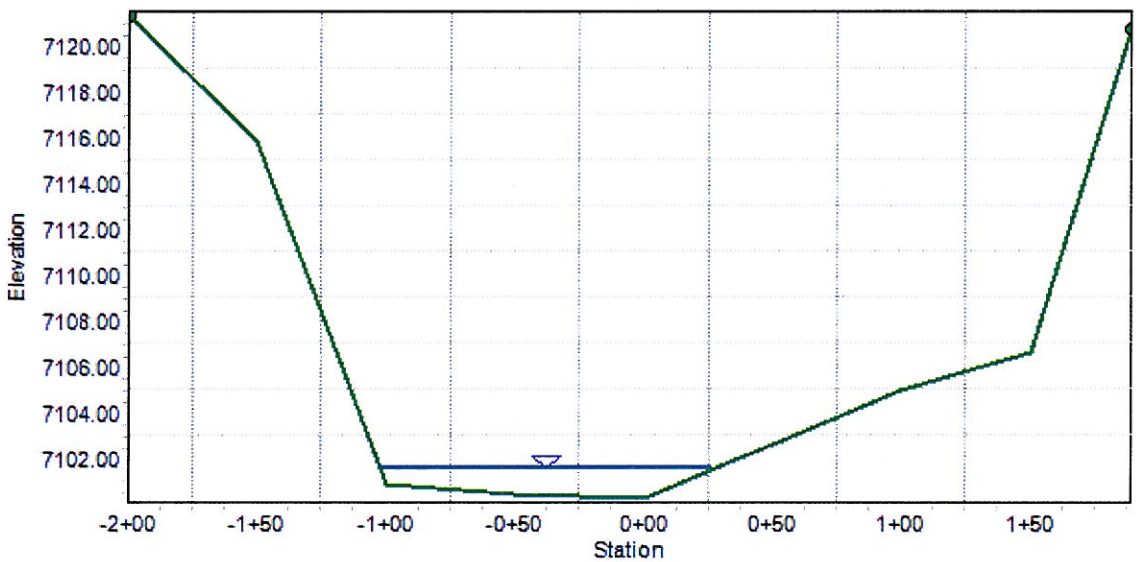
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.301	%
Normal Depth	1.23	ft
Discharge	500.00	ft^3/s

Cross Section Image



Cross Section for Irregular Section C-1000cfs

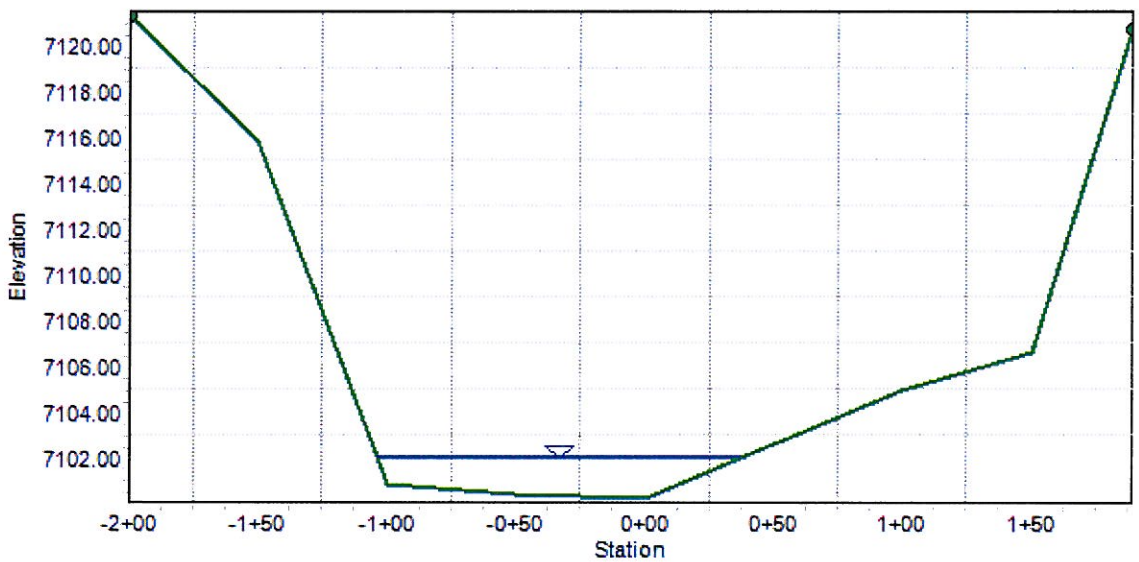
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.301	%
Normal Depth	1.73	ft
Discharge	1000.00	ft³/s

Cross Section Image



Cross Section for Irregular Section D-400cfs

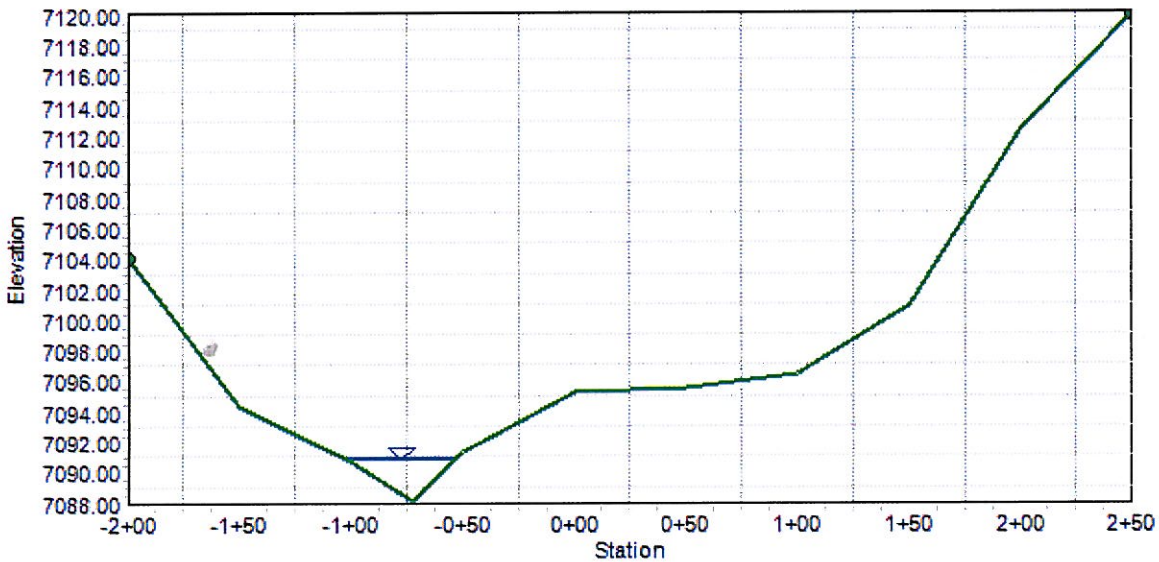
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.487	%
Normal Depth	2.69	ft
Discharge	400.00	ft³/s

Cross Section Image



Cross Section for Irregular Section D-500cfs

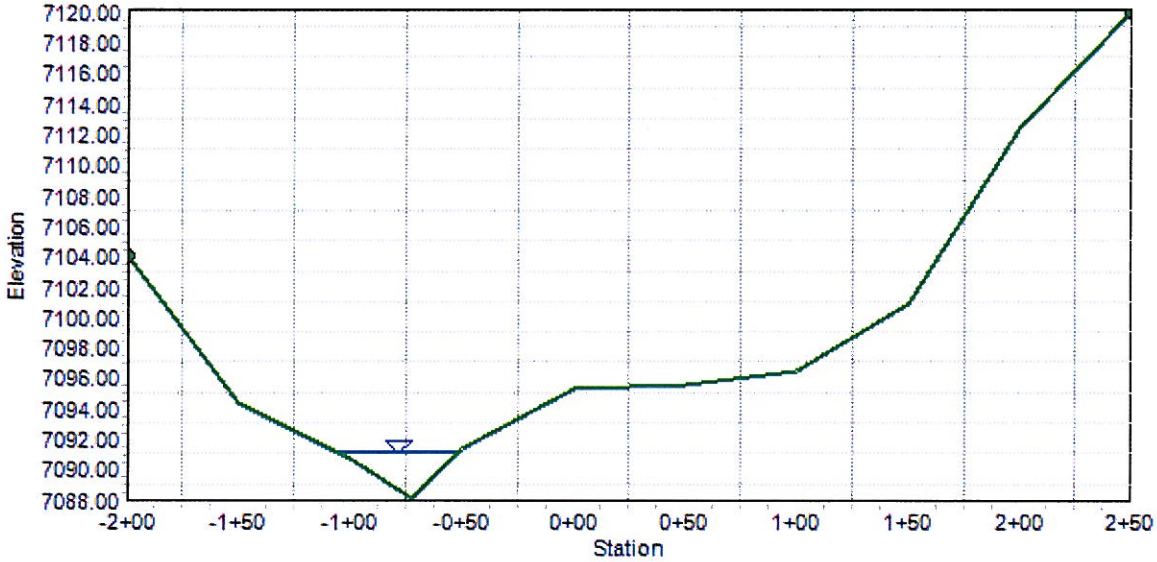
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.487	%
Normal Depth	2.93	ft
Discharge	500.00	ft³/s

Cross Section Image



Cross Section for Irregular Section D-1000cfs

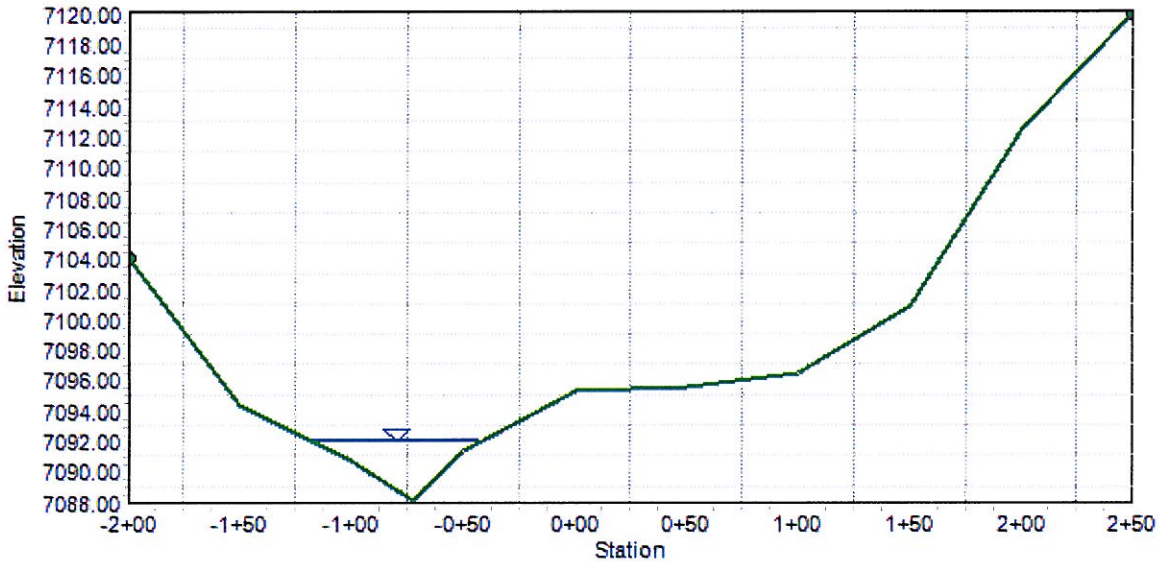
Project Description

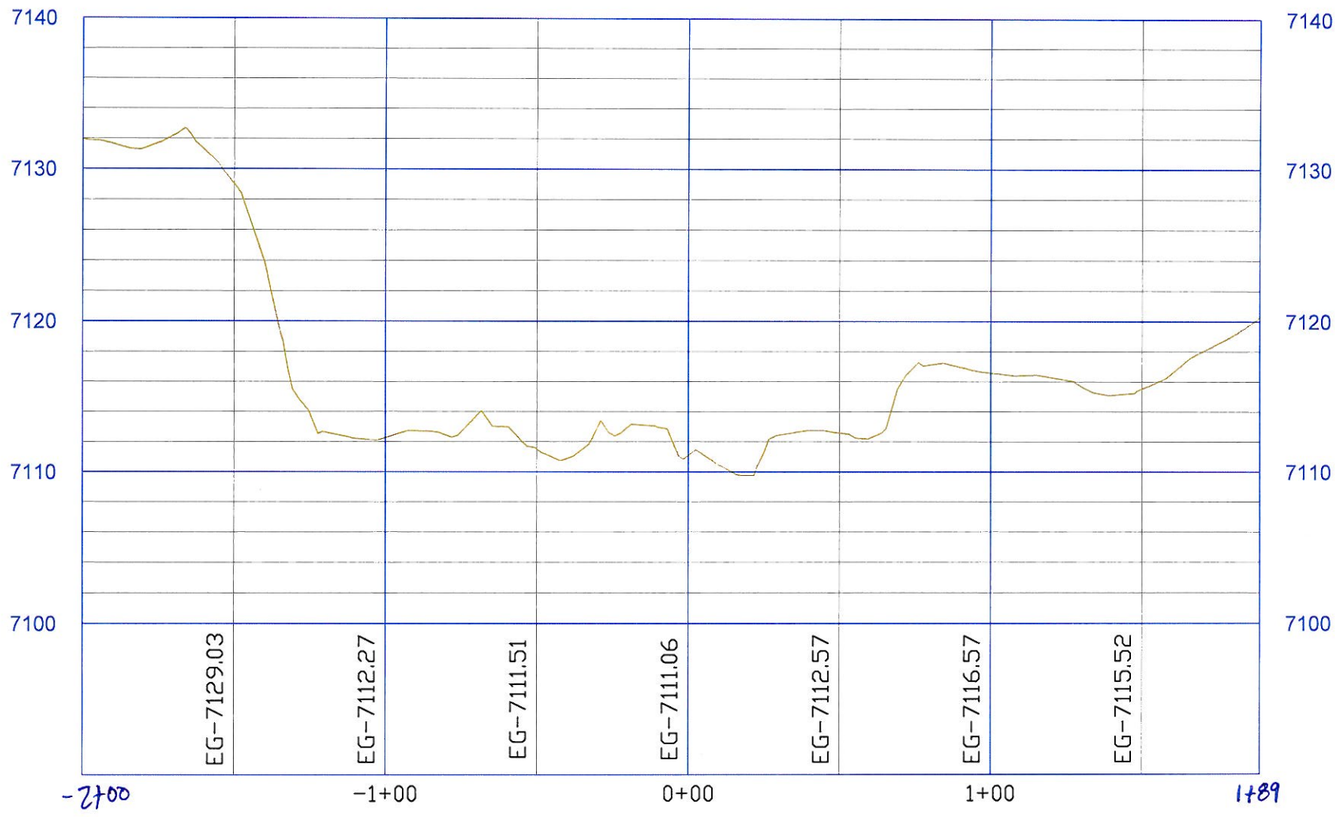
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

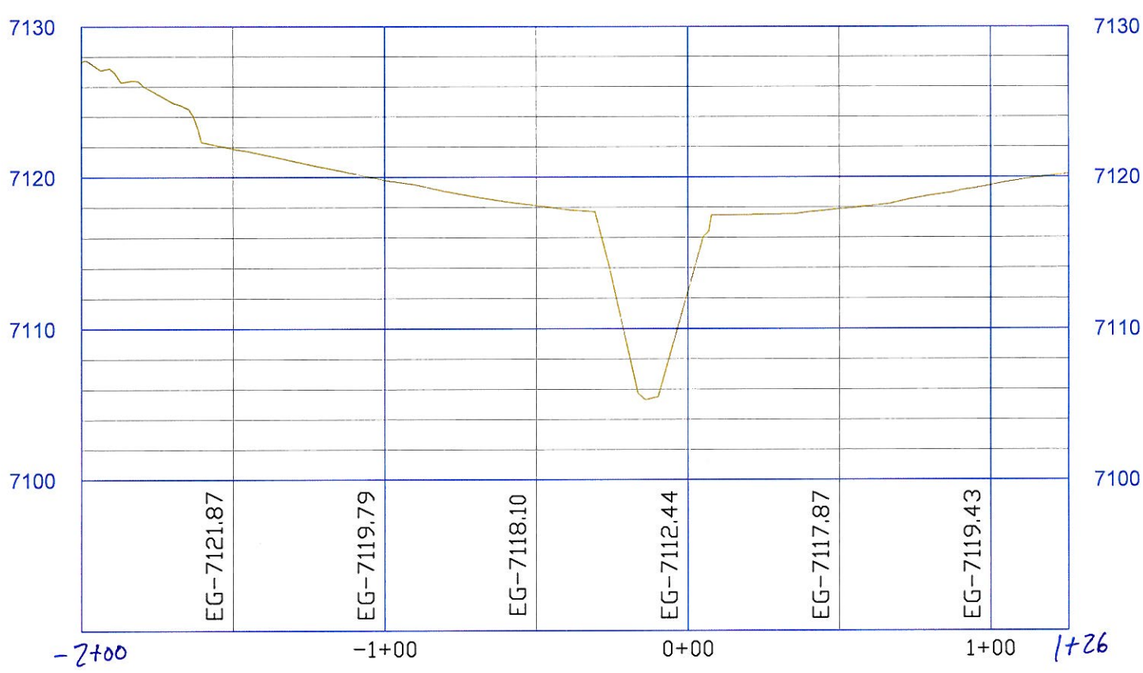
Channel Slope	4.487	%
Normal Depth	3.82	ft
Discharge	1000.00	ft³/s

Cross Section Image




7140
7130
7120
7110
7100
EG-7129.03
EG-7112.27
EG-7111.51
EG-7111.06
EG-7112.57
EG-7116.57
EG-7115.52
-2+00
-1+00
0+00
1+00
1+89

A


7130
7120
7110
7100
EG-7121.87
EG-7119.79
EG-7118.10
EG-7112.44
EG-7117.87
EG-7119.43
-2+00
-1+00
0+00
1+00
1+26

1:50

B

7130
7120
7110
7100
7090
7080
-2+00
-1+00
0+00
1+00
2+00
EG-7094.32
EG-7090.76
EG-7091.38
EG-7095.33
EG-7095.58
EG-7096.51
EG-7100.93
EG-7112.47
EG-7119.93

D

7120
7110
7100
7090
-2+00
-1+00
0+00
1+00
2+00
EG-7115.86
FG-7115.86
EG-7100.92
FG-7100.92
EG-7100.44
FG-7100.44
EG-7100.30
FG-7100.30
EG-7102.59
FG-7102.59
EG-7104.96
FG-7104.96
EG-7106.61
FG-7106.61

C

1:50