



FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

All sections must be addressed, or the application will be considered invalid



I. APPLICANT INFORMATION

A. Applicant Name: Bozeman Sunrise Rotary Club; Joe Souther, Community Service Chair

Mailing Address: P.O. Box 6523

City: Bozeman State: MT Zip: 59771-6523

Telephone: (406) 595-6482 E-mail: southerjt@gmail.com

B. Contact Person (if different than applicant): Doug Chandler

Address: c/o Allied Engineering, 32 Discovery Drive

City: Bozeman State: MT Zip: 59718

Telephone: 406 579-2150 E-mail: doug@alliedengineering.com

C. Landowner and/or Lessee Name Bridger Vale, LLC
(if different than applicant): being transferred to City of Bozeman, Parks Department

Mailing Address: Mitch Overton, Director of Parks and Rec., 814 N. Bozeman Ave.

City: Bozeman State: MT Zip: 59715

Telephone: (406) 582-3222 E-mail: moverton@bozeman.net

II. PROJECT INFORMATION

A. Project Name: Glen Lake Outlet Stream Restoration & Fish Block

River, stream, or lake: Glen Lake Outlet ditch, tributary to East Gallatin

Location: Township: 1S Range: 6E Section: 31

Latitude: 45.706571° Longitude: -111.039495° *within project (decimal degrees)*

County: Gallatin

B. Purpose of Project:

Restore the existing Glen Lake outlet ditch into a meandering spring creek through a newly acquired parcel of land appended to the Glen Lake Rotary Park. The restored stream will have a gravel bed, adjacent wetlands, reduced bank slopes, riparian vegetation, pools and riffles, and a fish block at its exit point from Glen Lake Park. The purpose of the restoration will include educational opportunities for the public and possible spawning areas for trout that are presently stocked in the lake by Montana Fish, Wildlife and Parks.

C. Brief Project Description (attach additional information to end of application):

Glen Lake was created during the reclamation of a former gravel pit. The pit depth was about 30 to 40 feet. Since the created lake is spring fed, the outflow is relatively constant during the year. The existing ditch was created to allow outflow from the lake and maintain a near-constant lake water surface elevation. The ditch was excavated as a steep-banked linear channel along the property line between the parcels owned by Sunfish Park Community Association and Bridger Vale, LLC. As an indication of its support of the project Bridger Vale is donating approximately 1.2 acres of land to be added to the Glen Lake Rotary Park in addition to its PUD park dedications. The ditch extends about 200 feet to the north then about 300 feet to the west along said property boundary to where it ultimately flows into the Manley Road drainage ditch.

The proposed construction will create a meandering and more natural stream and riparian zones through the new park addition. A portion of the restoration was partially completed at the lower end of the new park land by the City of Bozeman during their Manley Road SID improvement project. The proposed project will restore about 340 feet more of the existing ditch from Glen Lake down to the restored channel constructed during the Manley Road improvements. The proposed project will create about 420 feet of new meandering channel and will also enhance the vegetation and place a fish block on the re-aligned lower channel. The created channel will include a 2- to 4-foot-wide flow area with gentle side slopes. The channel bottom will be sand, gravel, and cobbles with occasional boulders. The banks and side slopes will be constructed with gravel and covered with topsoil as shown on Sheets D-1 and D-2.

The proposed project has been planned and incorporated into City of Bozeman Glen Lake Rotary Park masterplan by the Bozeman Sunrise Rotary Club (BSRC) and Partners. The availability of the land and the timing of the project has been partially enabled by the recent development of the Bridger Vale PUD and by the recent City of Bozeman Manley Road Improvement SID project. The BSRC is committed to constructing the remaining portions of the project using club funding and member contributions and labor, as we have done for many similar projects at this park. However, our available cash funding is insufficient to get the project done this year. We are requesting \$23,500 from Future Fisheries Program as outlined in the attached line-item budget.

- D. Length of stream or size of lake that will be treated (project extent): 340 ft total rebuild upper reach + 165 ft veg enhance + fish block on lower reach.
- Length/size of impact, if larger than project extent (e.g., stream miles opened): 420 + 165 = 585 ft

E. Project Budget:

Grant Request (Dollars):	\$ 23,500 = wetland delin + matls split + equip rent
Matching Dollars:	\$ 25,323 = Rotary Club Cash
Matching In-Kind Services:*	\$ 15,677 = Club Labor & Donated Services/matls
<i>*salaries of government employees are not considered matching contributions</i>	
Other Contributions (not part of this app)	\$ 16,764 = Completed City SID lower reach
Total Project Cost:	\$ 81,364 = Grand Total Project Cost

F. **Attach** itemized (line item) budget – see *budget template*

- G. **Insert or attach** a project location map showing the project area in relation to a major landmark or town. Please indicate if the project location is on public or private property.

See attached project location map. The ditch to be abandoned is along the property line between the parcels owned by Sunfish Park Community Association and Bridger Vale, LLC. The reclaimed stream channel will be located on land to be donated to the City of Bozeman by Bridger Vale, LLC.

- H. **Attach** specific project plans (e.g., detailed sketches, plan views [showing location and type of channel modifications], example photographs), current condition photographs, and maps. **If project involves water leasing or water salvage complete and attach a supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).*

Attach letters or statements of support. This includes landowner consent, community or public support, and fish biologist support.

- I. BSRC has been working on Glen Lake Rotary Park for over 25 years and has been working on this project for nearly a decade with the existing landowners (Bridger Vale, LLC, Sunfish Park Community Association) and the City of Bozeman (who will own the park land in the near future when the Bridger Vale project gets final platted) to develop a plan that is supported by the existing landowners and by the community. All three entities signed the 404/310 permit application and are enthusiastic participants in the project. In addition, BSRC recently permitted and constructed a restoration project (removal of a culvert and replacement with a bridge) on the State of Montana land (which is leased to the City of Bozeman as Park Land) near the upstream extent of this project at the outlet of Glen Lake. During that permitting process (and during the permitting of the downstream City of Bozeman Manley SID project) the overall project design was discussed and input was received from Montana Fish, Wildlife and Parks fishery biologists. The FWP biologists (and others) support the creation of spawning habitat in the new channel. They also support the concept of a fish screen to prevent movement of potential fish from Glen Lake downstream to the East Gallatin River. The detailed plans for the fish screen are not presently finalized but the hydrology (small contributing surface drainage resulting in relatively small flood flows) encourages a rather simple fish screen on the upstream end of the new road culvert at downstream end of the project. BSRC is open to additional input from Future Fisheries Biologists regarding the design location of the fish block. From several perspectives, it may be beneficial to place the fish block in a short culvert upstream of the presently planned location at the downstream end of the project. This could potentially provide fish spawning habitat for trout swimming upstream from East Gallatin River on the downstream side of the fish block, and it could provide a better overtopping spill conditions for extreme events or potential clogging of the screen. BSRC would welcome additional input from Future Fisheries biologists and is still able to adapt the fish screen plans as needed. In any case, Bozeman Sunrise Rotary volunteers will provide periodic maintenance and cleaning of the fish screen. Based on our experience cleaning the former culvert outlet to Glen Lake (which was impacted by beaver activity), we are familiar with the required effort.

- Glen Lake Outlet stream restoration & fish barrier 005-2022
- J. The project agreement includes a 20-year maintenance commitment. Please indicate (yes or no) that you will ensure project protection for 20 years. Discuss your ability to meet this commitment.
- Yes ☒ No ☐

BSRC has been in existence since 1992. We are a leader in community service in Bozeman. Soon after its founding, the Club in partnership with the City of Bozeman contributed to the creation, improvement and maintenance of what is now known as Glen Lake Rotary Park. The City of Bozeman has committed to maintaining the stream restoration project with assistance and leadership from the BSRC.

- K. **Describe or attach** land management & maintenance plans, including changing to grazing regimes, that will ensure protection of the restored area.

The City of Bozeman has committed to maintaining the stream restoration project with assistance and leadership from the BSRC. While the new parkland vegetation will be primarily native upland and riparian species, maintenance is expected to include occasional mowing, temporary irrigation, weed control and cleaning of the fish block.

III. PROJECT BENEFITS (attach additional information to end of application):

- A. What species of fish will benefit from this project?

Trout presently in Glen Lake may find suitable downstream spawning habitat in the restored stream to become at least a partially self-sustaining population.

The proposed fish block will provide wild trout in the East Gallatin River better protection against invasion by potential non-native fish species in Glen Lake.

If the fish block is moved slightly upstream, wild trout that are occasionally observed moving upstream in the existing ditch (presumably from the East Gallatin River) would also be provided spawning habitat in the restored spring creek.

- B. How will the project protect or enhance wild fish habitat?

The springs that source Glen Lake (a restored gravel pit) are in the lake so there are no incoming tributary spawning locations for the mix of wild and stocked trout that presently exist in Glen Lake. BSRC volunteers have observed large trout swimming up the existing ditch (presumably from the East Gallatin River approximately 3,000 feet north of Glen Lake) which is connected by a perineal flow in the existing drainage ditch and Manley Road ditch.

The proposed fish screen at the downstream end of the restoration (at an existing culvert inlet) will provide better assurance that non-native fish species that exist in Glen Lake will not move down the existing ditch to the East Gallatin River.

If the fish block is moved slightly upstream from the presently planned location, the lower reaches of the project may provide spawning habitat for wild trout in the East Gallatin River. BSRC is happy to accept input from Future Fisheries on this design element.

The fish screen location is not subjected to much flood flow (since it is a small contributing drainage) and will be maintained by the BSRC and the City of Bozeman Parks and Recreation Department. The BSRC and City of Bozeman have a long history of cooperative building and maintaining this park.

- C. Will the project improve fish populations and/or fishing? To what extent? What are the expected short term and long-term benefits to the fishery?

The springs that source Glen Lake (a restored gravel pit) are in the lake so there are no incoming tributary spawning locations for the mix of wild and stocked trout that presently exist in Glen Lake. BSRC volunteers have observed large trout swimming up the existing ditch (presumably from the East Gallatin River approximately 3,000 feet north of Glen Lake) which is connected by a perineal flow in the existing drainage ditch and Manley Road ditch. The restoration will include possible spawning areas for trout that are presently wild or stocked in Glen Lake by Montana Fish, Wildlife and Parks. With the creation of a downstream spawning habitat, an at least partially self-sustaining population of wild trout could be established in Glen Lake.

If the fish block location is moved slightly upstream from the present plan, the project could also provide spring creek spawning habitat for wild fish that make their way upstream from the East Gallatin River.

We estimate that the impacted wetlands along the ditch are approximately 355 feet long by 6 feet wide (i.e., 2130 sf) and that the restored wetland configuration will be approximately 440 feet long by 12-ft wide which equals 5280 sq. ft of wetlands, which is a 2.5 to 1 ratio of new wetlands to impacted wetlands plus an increase in quality and quantity of riparian habitat.

The proposed fish screen at the downstream end of the restoration (at an existing culvert inlet) will provide better assurance that non-native fish species that exist in Glen Lake will not move down the existing ditch to the East Gallatin River. The fish screen location is not subjected to much flood flow (since it is a small contributing drainage) and will be maintained by the BSRC and the City of Bozeman Parks and Recreation Department.

- D. Will the project increase public fishing opportunity for wild fish and, if so, how?

The proposed improvements are expected to provide increase fish productivity by improving the habitats for both fish spawning and growth. As described previously, the project will decrease the potential for sediment buildup in the stream, reduce potential encroachment of non-native species on the lake and stream habitats, and increase the wetland habitat of the channel by 2.5 times.

- E. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

The outflow from Glen Lake is presently an excavated ditch aligned with the property boundary between Bridger Vale, LLC and the Sunfish Park Community Association. The alignment or even the existence of a historical channel from this area is unknown, but the present alignment is clearly manmade and based on the property boundary. As such, the ditch bed and banks have no natural geomorphology such as a gravel bed or flood plain. However, the flow is perennial and relatively constant and the turnover keeps Glen Lake quite clean. This steady flow likely receives some sediment in the current steep-sided, marginally vegetated ditch banks, but the proposed configuration with a gravel bed and flatter banks that will support better vegetation and less erosion from the proposed aquatic/wetland/riparian habitat.

F. What public benefits will be realized from this project?

The project will add form and function and improved hydrology and biologic diversity to the existing Glen Lake outflow. It will also create an aesthetically pleasing environment -- visually, recreationally and biologically. As proposed, it will provide excellent opportunities for public recreation and education.

G. Will the project interfere with water or property rights of adjacent landowners? (explain):

No. The project site will become City of Bozeman property. There are some pre-existing stock watering rights with the property, but with the planned development and use, those water rights will not be needed or used.

H. Will the project result in the development of commercial recreational use on the site? (explain):

No. The project site will become City of Bozeman park property with free (but regulated) recreational use by the public.

I. Is this project associated with the reclamation of past mining activity?

Yes, to some extent. The upstream Glen Lake was created during the reclamation of a former gravel pit, which may have unwittingly intercepted and enhanced groundwater flow from underlying aquifers. The gravel pit depth was about 30 to 40 feet. The existing ditch was created to allow outflow from the lake and maintain a near-constant lake water surface elevation. The natural surface drainage of this area was likely more to the northeast, but that drainage was likely blocked by the old City of Bozeman Landfill, that was closed several decades ago.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____



Date: 11/15/2021

Sponsor (if applicable): Community Service Chair, Bozeman Sunrise Rotary Club

Submittal: **Applications must be signed and received on or before November 15 and May 15 to be considered for the subsequent funding period.** Late or incomplete applications will be rejected.

Mail to: FWP Future Fisheries Fish Habitat Bureau PO Box 200701 Helena, MT 59620-0701	Email: Future Fisheries Coordinator FWPFFIP@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov
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Applications may be rejected if this form is modified.

FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

Glen Lake Rotary Park Stream Restoration Project
Bozeman Sunrise Rotary Club
November 15, 2021

Attachments

Section II. F.

Itemized Budget Spreadsheet

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

005-2022

Both tables must be completed or the application will be returned

PROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	FUTURE FISHERIES REQUEST	MATCH (Cash or Services)**	OTHER (Not part of this application)	TOTAL
Personnel***								
Survey	1	GPS & Drone	\$2,300.00	\$ 2,300.00		2,300.00	644.00	\$ 2,944.00
Design	1	align, typ section	\$2,400.00	\$ 2,400.00		2,400.00	672.00	\$ 3,072.00
Engineering	1	grading plans	\$5,600.00	\$ 5,600.00		4,600.00	1,568.00	\$ 6,168.00
Permitting	1	404, 310, COB	\$6,000.00	\$ 6,000.00	3,000.00	3,000.00	1,680.00	\$ 7,680.00
Oversight	1	stake, grade, veg	\$3,000.00	\$ 3,000.00	-	3,000.00	840.00	\$ 3,840.00
				\$ -				\$ -
		Sub-Total		\$ 19,300.00	\$ 3,000.00	\$ 15,300.00	\$ 5,404.00	\$ 23,704.00
Travel								
Mileage	0		\$0.00	\$ -				\$ -
Per diem	0		\$0.00	\$ -				\$ -
		Sub-Total		\$ -	\$ -	\$ -	\$ -	\$ -
Construction Materials****								
plants	1	ea	\$6,000.00	\$ 6,000.00	3,000.00	3,000.00		\$ 6,000.00
Seeds and soils	1	ea	\$2,000.00	\$ 2,000.00	1,000.00	1,000.00	560.00	\$ 2,560.00
temp irrigation	1	ea	\$5,000.00	\$ 5,000.00	2,500.00	2,500.00		\$ 5,000.00
Pit Run	500	CY	\$20.00	\$ 10,000.00	5,000.00	5,000.00	2,800.00	\$ 12,800.00
Boulders	20	CY	\$150.00	\$ 3,000.00	1,500.00	1,500.00		\$ 3,000.00
Fish Block	1	ea	\$2,000.00	\$ 2,000.00	1,000.00	1,000.00		\$ 2,000.00
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
		Sub-Total		\$ 28,000.00	\$ 14,000.00	\$ 14,000.00	\$ 3,360.00	\$ 31,360.00
Equipment, Labor, and Mobilization								
Planting	1	equip rental	\$2,000.00	\$ 2,000.00	2,000.00		2,000.00	\$ 4,000.00
Irrigation install	1	equip rental	\$500.00	\$ 500.00	500.00			\$ 500.00
Excavator & loader	1	equip rent & fuel	\$4,000.00	\$ 4,000.00	4,000.00		6,000.00	\$ 10,000.00
Fish Block	1	install	\$1,000.00	\$ 1,000.00		1,000.00		\$ 1,000.00
Planting	200	hrs club labor	\$20.00	\$ 4,000.00		4,000.00		\$ 4,000.00
Seeding	40	hrs club labor	\$20.00	\$ 800.00		800.00		\$ 800.00
Irrigation	80	hrs club labor	\$30.00	\$ 2,400.00		2,400.00		\$ 2,400.00
Site Grading	120	hrs club labor	\$30.00	\$ 3,600.00		3,600.00		\$ 3,600.00
				\$ -				\$ -
		Sub-Total		\$ 18,300.00	\$ 6,500.00	\$ 11,800.00	\$ 8,000.00	\$ 26,300.00
TOTALS				\$ 65,600.00	\$ 23,500.00	\$ 41,100.00	\$ 16,764.00	\$ 81,364.00

OTHER REQUIREMENTS:

All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used). Do not use government salaries as match. Describe here or in text.

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a justification or minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of \$1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Additional details:

APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Bozeman Sunrise Rotary Club	\$ 15,677.00	\$ 25,323.00	\$ 41,000.00	Y
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
TOTALS	\$ 15,677.00	\$ 25,323.00	\$ 41,000.00	

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Previously completed portions of City Manley Rd SID		\$ 16,764.00	\$ 16,764.00	Y - done
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
TOTALS	\$ -	\$ 16,764.00	\$ 16,764.00	

Section II. G. & H.

Project Location and Plans

GLEN LAKE

STREAM RESTORATION

LOCATION: GLEN LAKE ROTARY PARK
BOZEMAN, MT

LATITUDE: 45.706029° LONGITUDE: -111.039791°

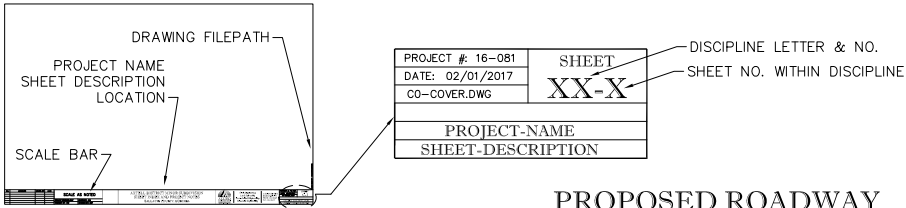
CLIENT: ROTARY CLUB

NOVEMBER 17, 2020 SET NO. _____

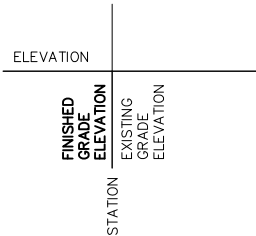
PROJECT MANAGER: DOUG CHANDLER, PE
DESIGN ENGINEER: ANDREW GRAHAM, PE

SHEET INDEX		SHEET INDEX	
SHEET NO.		SHEET NO.	
GENERAL SHEETS		C2-4	STREAM SECTIONS
C0-0	COVER SHEET	C2-5	STREAM SECTIONS
C0-1	EXISTING CONDITIONS	C2-6	STREAM SECTIONS
C0-2	ORTHOMOSAIC OVERVIEW	LANDSCAPE SHEETS	
CIVIL SHEETS		L-1	LANDSCAPE PLAN
C1-1	DESIGN PLAN – UPSTREAM	L-2	LANDSCAPE DETAILS
C1-2	DESIGN PLAN – DOWNSTREAM	DETAILS	
C1-3	STREAM RESTORATION – PLAN & PROFILE	D-1	DETAILS
C1-4	STREAM RESTORATION – PLAN & PROFILE	D-2	DETAILS
C1-5	STREAM RESTORATION – PLAN & PROFILE		
C2-1	STREAM SECTIONS – PLAN VIEW		
C2-2	STREAM SECTIONS – PLAN VIEW		
C2-3	STREAM SECTIONS		

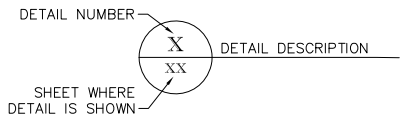
AESI STANDARD BORDER FORMAT



PROPOSED ROADWAY PROFILE LABEL KEY



PLAN SHEET DETAIL CALLOUTS



32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
FAX (406) 582-5770
www.alliedengineering.com

Civil Engineering
Geotechnical Engineering
Land Surveying



Glen Lake Outlet stream restoration & fish barrier

CIVIL ABBREVIATIONS:

AESI	ALLIED ENGINEERING SERVICES, INC.	MAX	MAXIMUM
AC	ACRE	MH	MANHOLE
AVE	AVENUE	MIN	MINIMUM
		MJ	MECHANICAL JOINT
BLDG	BUILDING	MP	MID POINT
BM	BENCHMARK	MPWSS	MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
BOG	BACK OF GRATE (GUTTER)	N	NORTH
CL	CENTERLINE	PC	POINT OF CURVATURE
CMP	CORRUGATED METAL PIPE	PE	PLAIN END
CO	CLEAN OUT	PE	POLYETHYLENE
CONC	CONCRETE	PI	POINT OF INTERSECTION
COB	CITY OF BELGRADE	PL	PROPERTY LINE
CY	CUBIC YARD	PSI	POUNDS PER SQUARE INCH
DI	DUCTILE IRON	PT	POINT OF TANGENCY
DIA	DIAMETER	PVC	POLYVINYL CHLORIDE
DWG	DRAWING	R	RADIUS
E	EAST	RP	RADIUS POINT
EA	EACH	RCP	REINFORCED CONCRETE PIPE
EG	EXISTING GRADE	ROW	RIGHT-OF-WAY
ELEV	ELEVATION	RT	RIGHT
EOG	EDGE OF GRAVEL	S	SOUTH
EOP	EDGE OF PAVEMENT	SCH	SCHEDULE
EX	EXISTING	SD	STORM DRAIN SECTION
FETS	FLARED END TERMINAL SECTION	SG	SUBGRADE
FG	FINISHED GRADE	S	SANITARY SEWER MAIN
FHYD	FIRE HYDRANT	SS	SANITARY SEWER SERVICE
FL	FLANGE	ST	STREET
FL	FLOWLINE	STA	STATION
FM	SEWER FORCE MAIN	STD	STANDARD
FT	FEET	SY	SQUARE YARD
GPM	GALLONS PER MINUTE	TBM	TEMPORARY BENCH MARK
GV	GATE VALVE	TBC	TOP BACK OF CURB
HDPE	HIGH DENSITY POLYETHYLENE	TDH	TOTAL DYNAMIC HEAD
HORZ	HORIZONTAL	TYP	TYPICAL
HP	HIGH POINT	UG	UNDERGROUND
HWY	HIGHWAY	VERT	VERTICAL
IE	INVERT ELEVATION	W	WATER MAIN
IN	INCH	W	WEST
INV	INVERT	W/O	WITHOUT
LF	LINEAR FEET	WS	WATER SERVICE
LP	LOW POINT		
LT	LEFT		

LEGEND

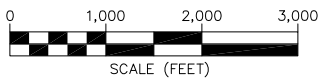
PROPERTY LINE	PROPOSED LOT LINE
FOUND MONUMENT	PROPOSED RIGHT-OF-WAY LINE
CONTROL POINT	PROPOSED MAJOR CONTOUR (5' INTERVAL)
EX. MAJOR CONTOUR (5' INTERVAL)	PROPOSED MINOR CONTOUR (1' INTERVAL)
EX. MINOR CONTOUR (1' INTERVAL)	PROPOSED ROAD CENTERLINE
EX. EDGE OF ROAD	PROPOSED CURB AND GUTTER
EX. DRAINAGE CULVERT	PROPOSED SIDEWALK
EX. FENCE	PROPOSED WATER MAIN
EX. TREE ROW	PROPOSED WATER SERVICE
EX. PINE TREE	PROPOSED GATE VALVE
EX. WATER MAIN	PROPOSED FIRE HYDRANT
EX. GATE VALVE	PROPOSED SEWER MAIN
EX. FIRE HYDRANT	PROPOSED SEWER FORCE MAIN
EX. WELL	PROPOSED SEWER SERVICE
EX. SEWER MAIN	PROPOSED SEWER MANHOLE
EX. SEWER MANHOLE	PROPOSED STORM DRAIN LINE
EX. OVERHEAD POWER LINE	PROPOSED STORM DRAIN CURB INLET
EX. OVERHEAD POWER POLE	PROPOSED DRAINAGE CULVERT
EX. UNDERGROUND FIBER OPTICS LINE	PROPOSED DRAINAGE DIRECTION
EX. TELEPHONE/FIBER OPTICS PEDESTAL	PROPOSED DRAINAGE ARROW
	PROPOSED SIGN POST

GENERAL NOTES AND SPECIFICATIONS:

- THE CONTRACTOR MUST ADHERE TO THE PROJECT PLANS AND SPECIFICATIONS. THE CONSTRUCTION COMPANY MUST BE A LICENSED CONTRACTOR WITH THE STATE OF MONTANA AND BE COVERED BY LIABILITY INSURANCE.
- THE EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLAN ARE BASED ON A STANDARD UTILITY LOCATE WITH NO FIELD EXPLORATIONS CONDUCTED TO CONFIRM THEIR LOCATIONS & DEPTHS. THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES BY CALLING THE NATIONAL 811 "CALL BEFORE YOU DIG" TELEPHONE NUMBER PRIOR TO CONSTRUCTION ACTIVITIES.
- CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES AND STRUCTURES WHERE NEW FACILITIES CROSS OR CONNECT. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY GRADE MODIFICATIONS WITHOUT DELAYING THE WORK. ALL UTILITY CROSSINGS SHALL BE POTHOLED OR VACUUMED AS NECESSARY PRIOR TO EXCAVATING OR BORING TO ALLOW THE CONTRACTOR TO PREVENT GRADE OR ALIGNMENT CONFLICTS.
- AT LEAST 10 BUSINESS DAYS BEFORE BEGINNING ANY EXCAVATION, THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF UNDERGROUND FACILITIES AND COORDINATE THE WORK WITH THE OWNERS OF SUCH UNDERGROUND FACILITIES. THE INFORMATION SHOWN OR INDICATED IN THE CONTRACT DOCUMENTS WITH RESPECT TO EXISTING UNDERGROUND FACILITIES IS BASED ON INFORMATION AND DATA OBTAINED FROM THE OWNERS OF THE FACILITIES WITHOUT FIELD EXPLORATION, AND AS SUCH, OWNER AND ENGINEER ARE NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SUCH INFORMATION OR DATA.
- NO TRENCHES IN ROADS OR DRIVEWAYS SHALL BE LEFT IN AN OPEN CONDITION OVERNIGHT. ALL SUCH TRENCHES SHALL BE BACKFILLED, COMPACTED AND CLOSED BEFORE THE END OF EACH WORK DAY AND NORMAL TRAFFIC FLOWS RESTORED.
- IF THE ENGINEER IS CONTRACTED FOR CONSTRUCTION STAKING, ENGINEER SHALL BE CONTACTED PRIOR TO STAKING. PROVIDE ADVANCED NOTICE SUFFICIENT TO ACCOMMODATE CONSTRUCTION, 7 WORKING DAYS IS MINIMUM, AND MAY VARY DEPENDING UPON AVAILABILITY.
- LIGHTING, ELECTRICAL, NATURAL GAS, COMMUNICATIONS, LANDSCAPING, ETC. ARE TO BE DESIGNED BY OTHERS.
- FINAL QUANTITIES MAY BE HIGHER OR LOWER THAN THOSE ESTIMATED, PENDING FIELD FINDINGS, SITE CONDITIONS, ETC.
- STRIP THE EMBANKMENT FOUNDATION AREA, BORROW AREAS AND ALL AREAS TO RECEIVE FILL TO A MINIMUM DEPTH OF 6 INCHES AND AS REQUIRED TO REMOVE ALL ORGANIC SOILS, VEGETATIVE MATTER, ROOTS, AND OTHER PERISHABLE, LOOSE OR OBJECTIONABLE MATERIAL INCLUDING FROZEN SOIL THAT MIGHT INTERFERE WITH COMPACTION OF EMBANKMENT LIFT OR THE BONDING OF EMBANKMENT TO FOUNDATION. OBJECTIONABLE MATERIAL WILL BE AS DETERMINED BY THE ENGINEER. PERFORM STRIPPING OPERATIONS IN A MANNER TO CONSERVE ALL TOPSOIL THAT CONTAINS ORGANICS. MASS GRADING TO BE COMPLETED BY OTHERS PRIOR TO WATER, SANITARY SEWER, AND STORM DRAINAGE INFRASTRUCTURE (\pm 0.2 FT WITHIN ROAD RIGHT-OF-WAY).
- TRANSPORT STRIPPED MATERIALS TO STOCKPILE AREAS OUTSIDE OF WATERWAYS AND WETLANDS, SUBJECT TO APPROVAL. COORDINATE WITH OWNER TO IDENTIFY STOCKPILE AREAS. LOCATE PILES SO AS NOT TO AFFECT THE OPERATION OF THE EXISTING OPERATIONS, OR INTERFERE WITH THE WORK.
- TAKE PRECAUTIONS TO PRESERVE, IN A SOUND CONDITION, THE MATERIAL BELOW AND BEYOND THE LINES OF ALL EXCAVATIONS.
- PERFORM OPERATIONS SO THAT THE EXCAVATIONS WILL YIELD AS MUCH SUITABLE MATERIAL FOR CONSTRUCTION PURPOSES AS PRACTICABLE.
- REUSE, AS MUCH AS IS PRACTICABLE, ALL SUITABLE MATERIALS FROM REQUIRED EXCAVATION IN THE PERMANENT CONSTRUCTION. SEPARATE UNSUITABLE MATERIALS AND REMOVE THEM FROM THE WORK AREA AS SOON AS PRACTICABLE.
- SPREAD OUT AND ALLOW MATERIALS TO DRY THAT ARE TOO WET FOR IMMEDIATE COMPACTION UNTIL THE WATER CONTENT IS REDUCED SUFFICIENTLY FOR PLACEMENT IN THE EMBANKMENT. AERATING AND DRYING IS INCIDENTAL TO THE WORK.
- WATER-CONDITION MATERIALS THAT ARE TOO DRY FOR IMMEDIATE COMPACTION. MOISTURE CONDITIONING IS INCIDENTAL TO THE WORK.
- LEVEL AND TRIM WASTE PILES TO REASONABLY REGULAR LINES, AND SLOPE TO DRAIN.
- REMOVE SOFT, WET, OBJECTIONABLE, OR OTHERWISE UNSUITABLE MATERIALS AS DETERMINED BY THE ENGINEER.
- DE-WATER AS NECESSARY TO PREVENT THE ACCUMULATION AGAINST OR THE INTERMINGLING OF WATER WITH THE FILL.
- PERFORM EXCAVATION AND PLACEMENT OPERATIONS SUCH THAT THE EMBANKMENT MATERIALS ARE MIXED AND BLENDED TO PROVIDE THE MOST HOMOGENEOUS SECTION AND BEST DEGREE OF COMPACTION AND STABILITY PRACTICAL. ALL FILL SHOULD BE PLACED IN HORIZONTAL LIFTS AND COMPACTED TO AT LEAST 95% OF ASTM D-698. PROVIDE PRIMARY WATER CONDITIONING, MIXING AND BLENDED IN STOCKPILES AS NEEDED. DISTRIBUTE THE FILL IN A LIFT SUCH THAT IT IS FREE FROM LENSES, POCKETS, STREAKS, OR LAYERS DIFFERING MATERIALLY IN TEXTURE OR GRADATION FROM THE SURROUNDING FILL.
- CONTROL AND CONDUCT ALL TRANSPORTING, STOCKPILING, EXCAVATION, PRODUCTION, AND PLACEMENT OPERATIONS TO MINIMIZE CONTAMINATION, SEGREGATION, AND PARTICLE BREAKDOWN.
- CARRY OUT COVERAGES OF COMPACTION EQUIPMENT SO THAT THE COMPACTIVE EFFORT IS DISTRIBUTED UNIFORMLY AND IN A SYSTEMATIC MANNER OVER THE ENTIRE LIFT.
- ALL CONSTRUCTION ASSUMES A STABLE COMPACTED SUBGRADE IS ACHIEVED PRIOR TO PLACEMENT OF NEW FACILITIES.
- COORDINATE WITH UTILITY COMPANIES REGARDING ALL UTILITY CROSSINGS AND ANY POTENTIAL UTILITY CONFLICTS.



LOCATION MAP



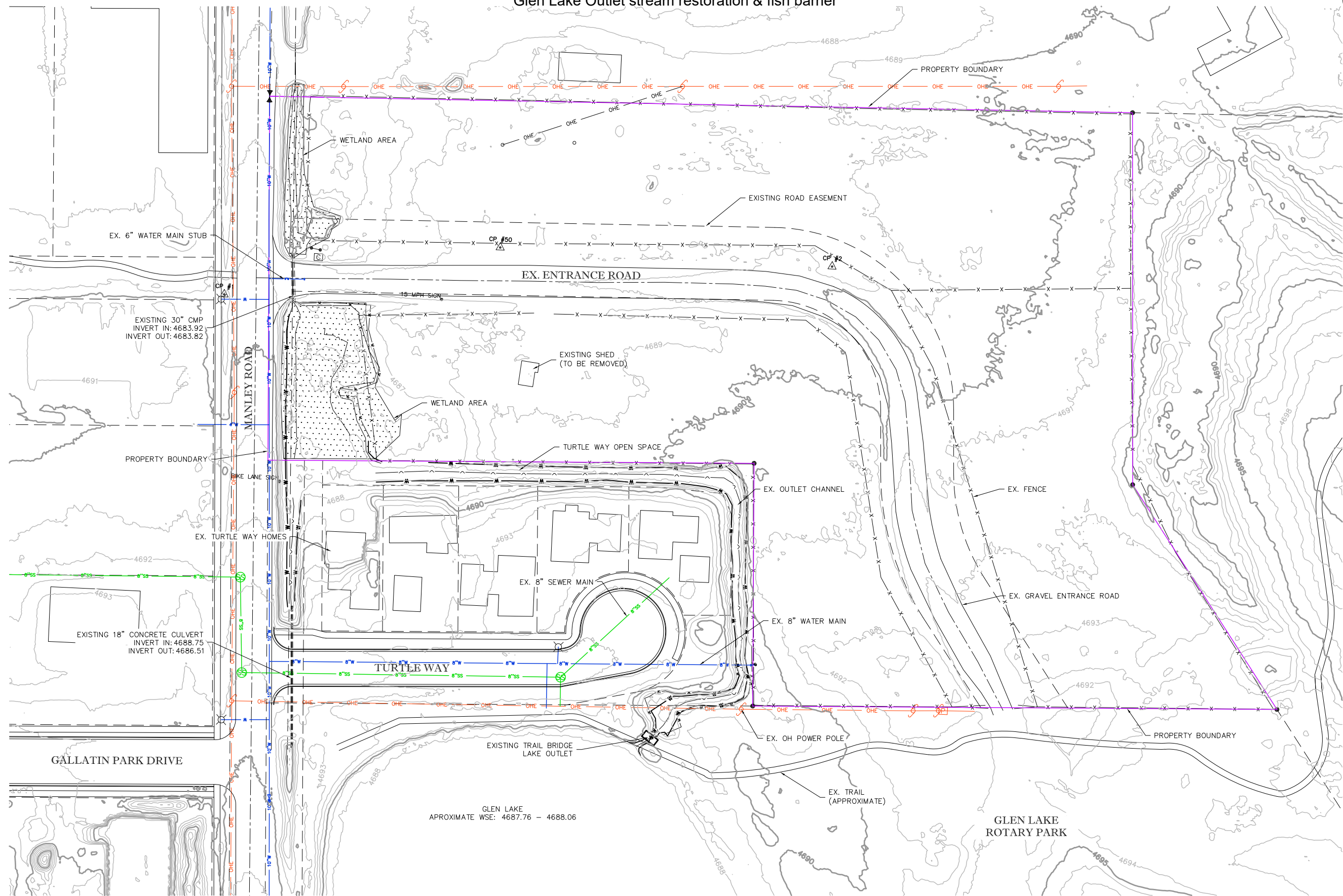
STREAM RESTORATION
CO-0 COVER SHEET

STREAM RESTORATION
BOZEMAN, MONTANA


NO.	REVISIONS	DATE

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005-2022



CONTOURS SHOWN BASED ON 2018 COB LIDAR FLIGHT

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				PROJECT ENGINEER: DSC	DRAWN BY: ASG
				DESIGNED BY: ASG	REVIEWED BY: DSC

GLEN LAKE STREAM RESTORATION EXISTING CONDITIONS BOZEMAN, MT

32 DISCOVERY DRIVE
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C0-1

GLEN LAKE STREAM REST. EXISTING CONDITIONS

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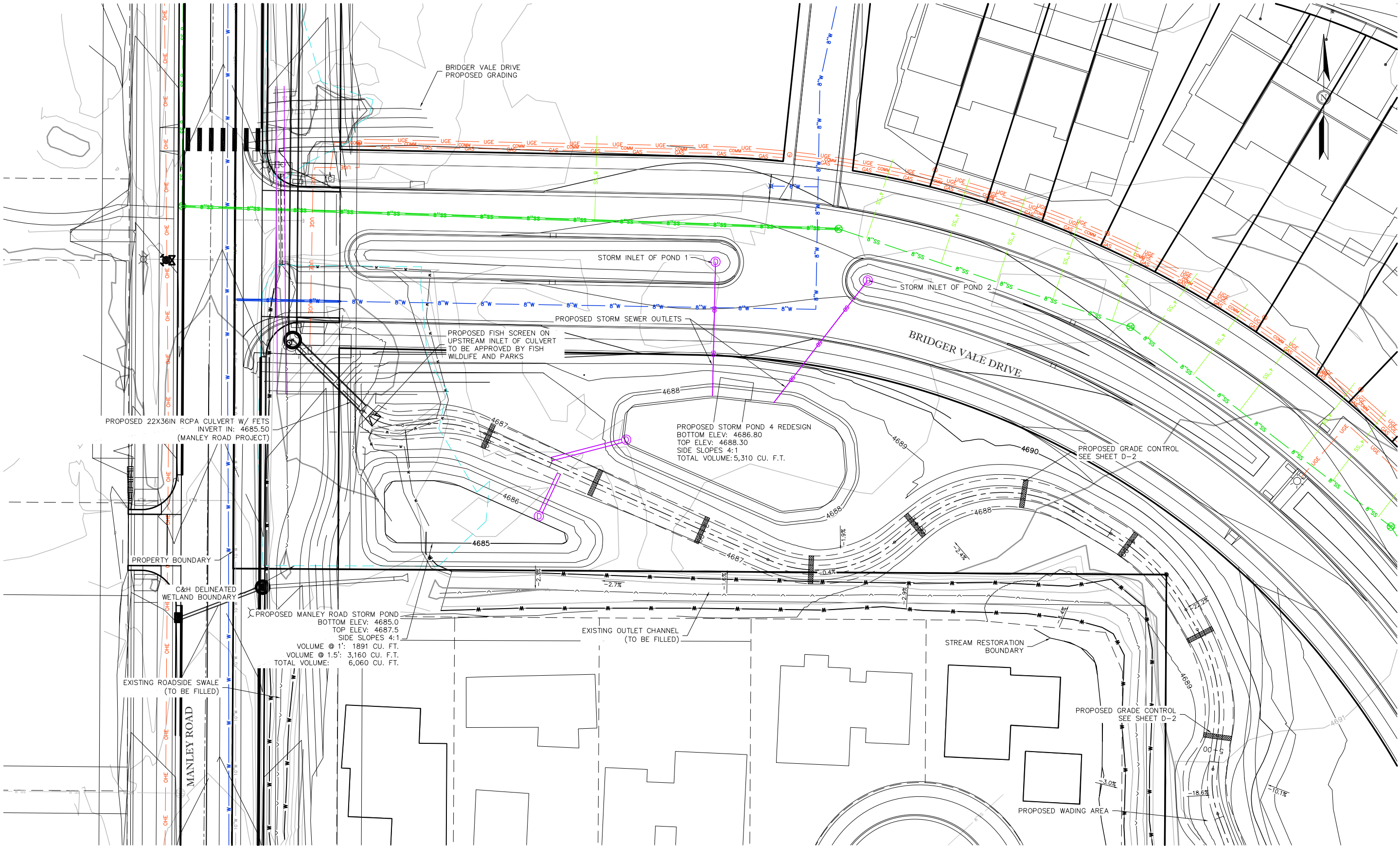
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GLEN LAKE STREAM REST.
DESIGN PLAN



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0 20 40 60 SCALE (FEET)	
PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY: ASG	REVIEWED BY: DSC

GLEN LAKE STREAM RESTORATION DESIGN PLAN - DOWNSTREAM BOZEMAN, MT	
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PROJECT #: 05-067 DATE: 05/13/2021	SHEET C1-2
GLEN LAKE STREAM REST. DESIGN PLAN	

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				PROJECT ENGINEER: DSC	DRAWN BY: ASG
				DESIGNED BY: ASG	REVIEWED BY: DSC

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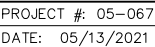
GLEN LAKE STREAM REST.
PLAN & PROFILE

005-2022



GLEN LAKE STREAM RESTORATION
RESTORED STREAM - PLAN & PROFILE
BOZEMAN, MT

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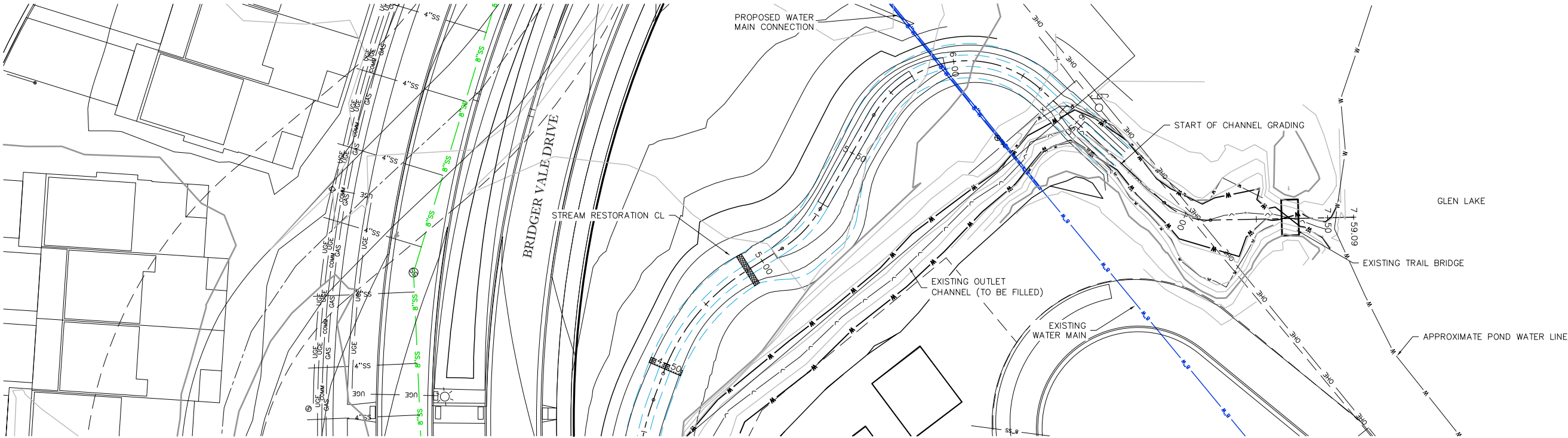
GLEN LAKE STREAM REST.
PLAN & PROFILE

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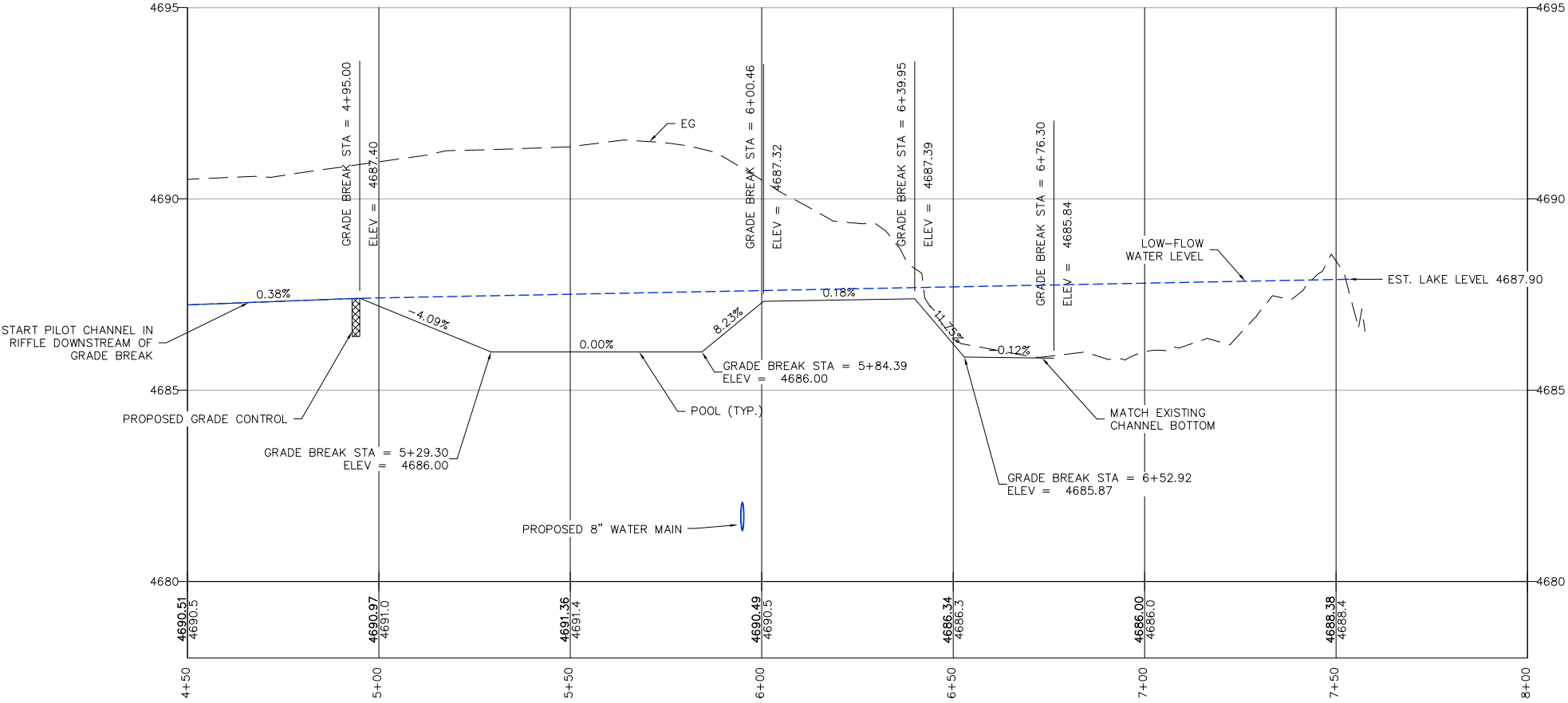
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Glen Lake Outlet stream restoration & fish barrier

005-2022



STREAM RESTORATION - PLAN VIEW



STREAM RESTORATION - PROFILE VIEW

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PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY: ASG	REVIEWED BY: DSC

GLEN LAKE STREAM RESTORATION
RESTORED STREAM - PLAN & PROFILE
BOZEMAN, MT

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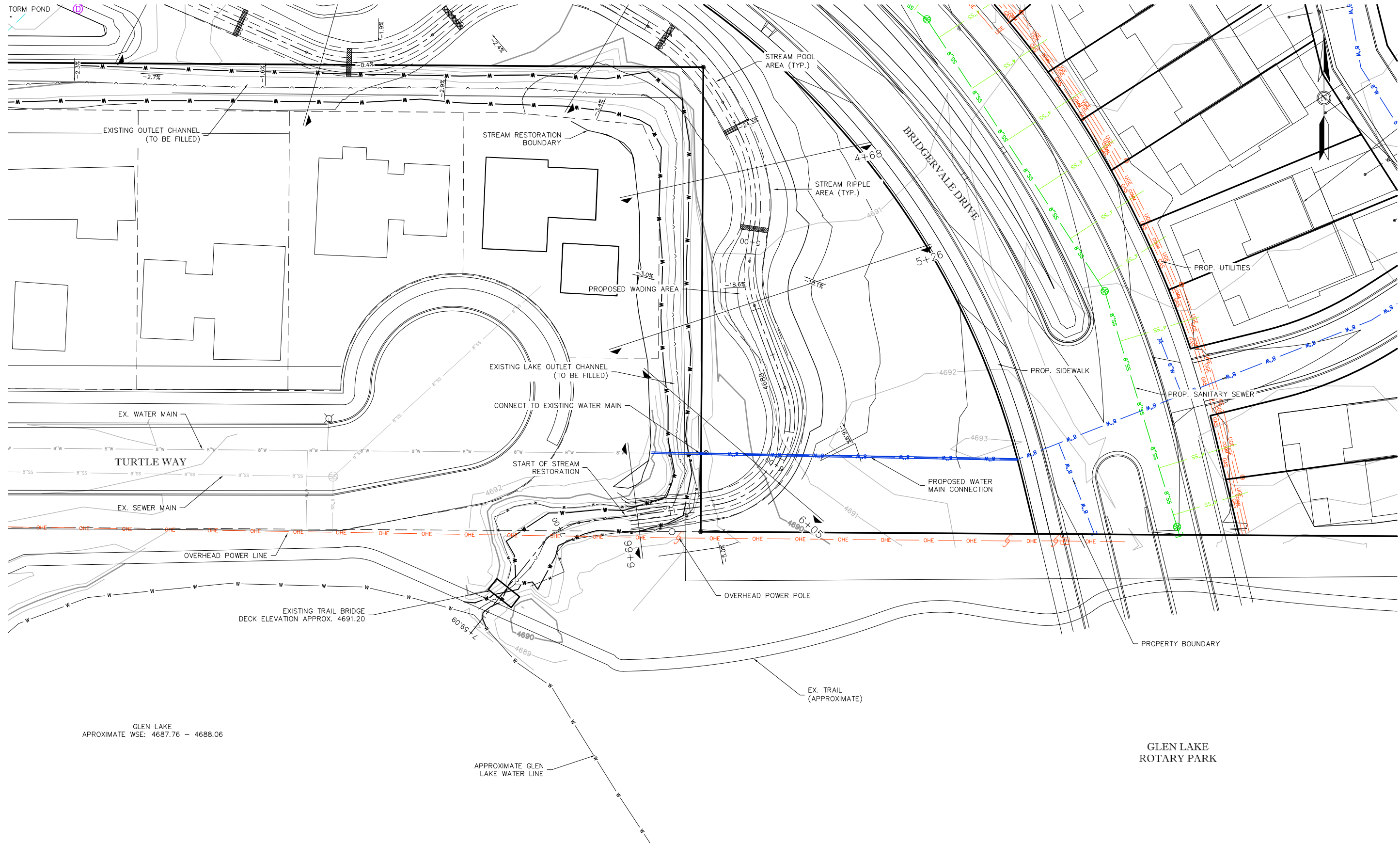


PROJECT #: 05-067
DATE: 05/13/2021

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GLEN LAKE STREAM REST.
PLAN & PROFILE

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PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY: ASG	REVIEWED BY: DSC

GLEN LAKE STREAM RESTORATION
STREAM SECTIONS - PLAN VIEW
BOZEMAN, MT

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FAX (406) 582-5770
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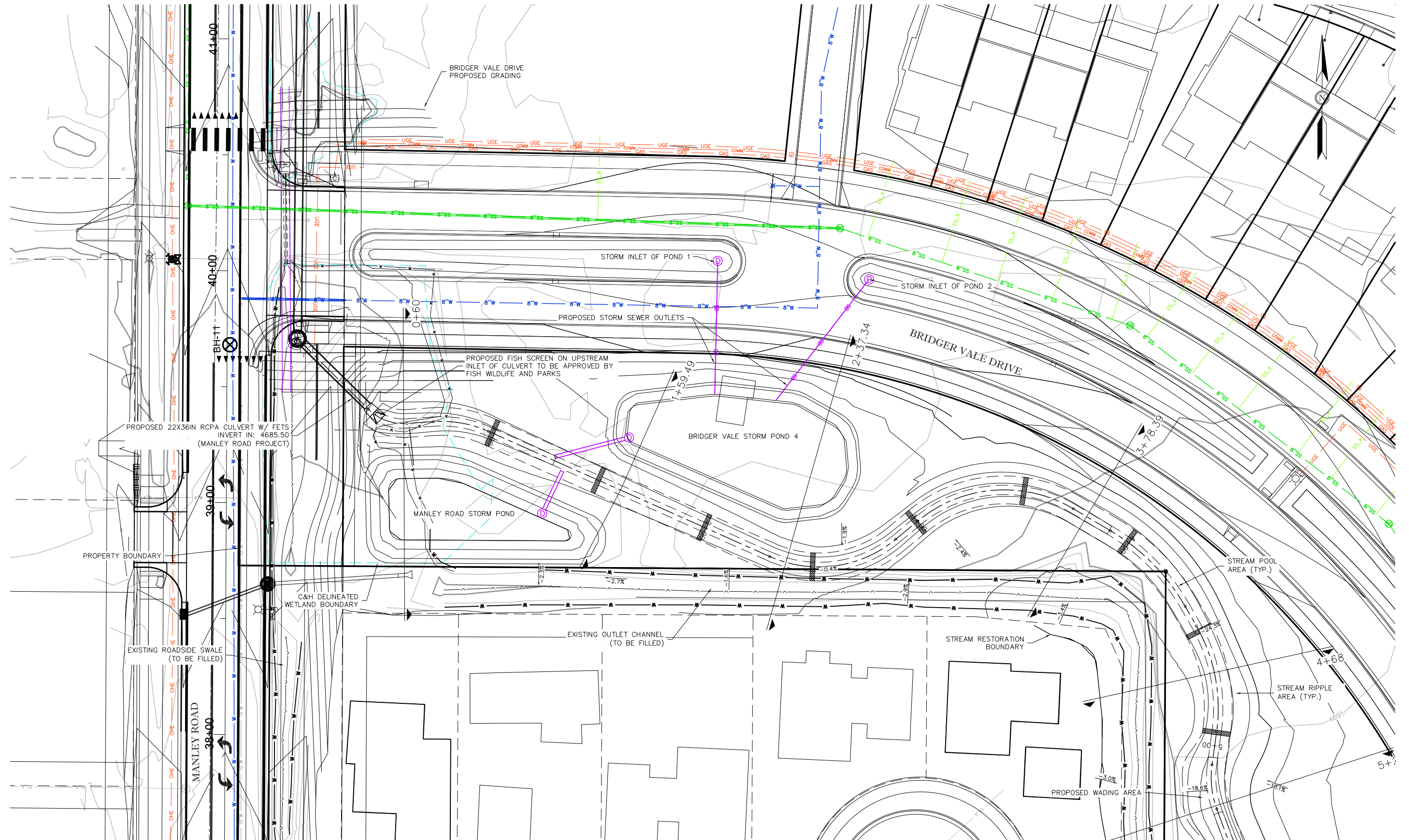
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GLEN LAKE STREAM REST.
DESIGN PLAN



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GLEN LAKE STREAM RESTORATION
STREAM SECTIONS - PLAN VIEW
BOZEMAN, MT

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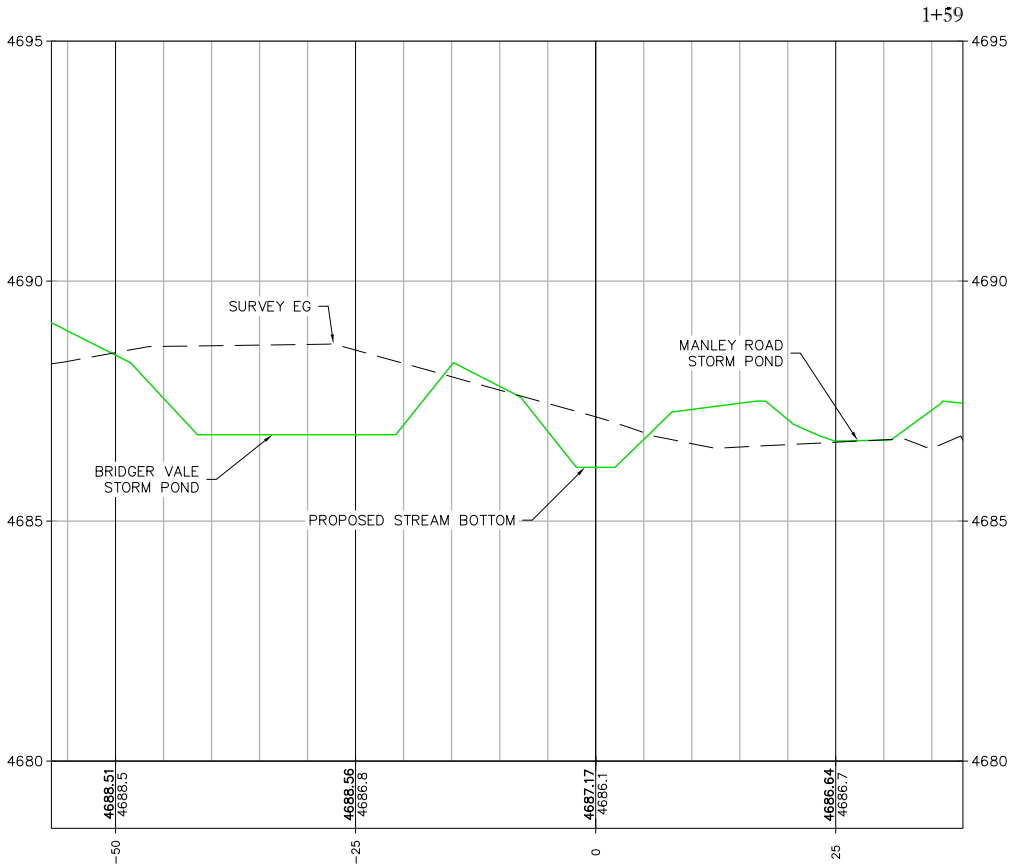
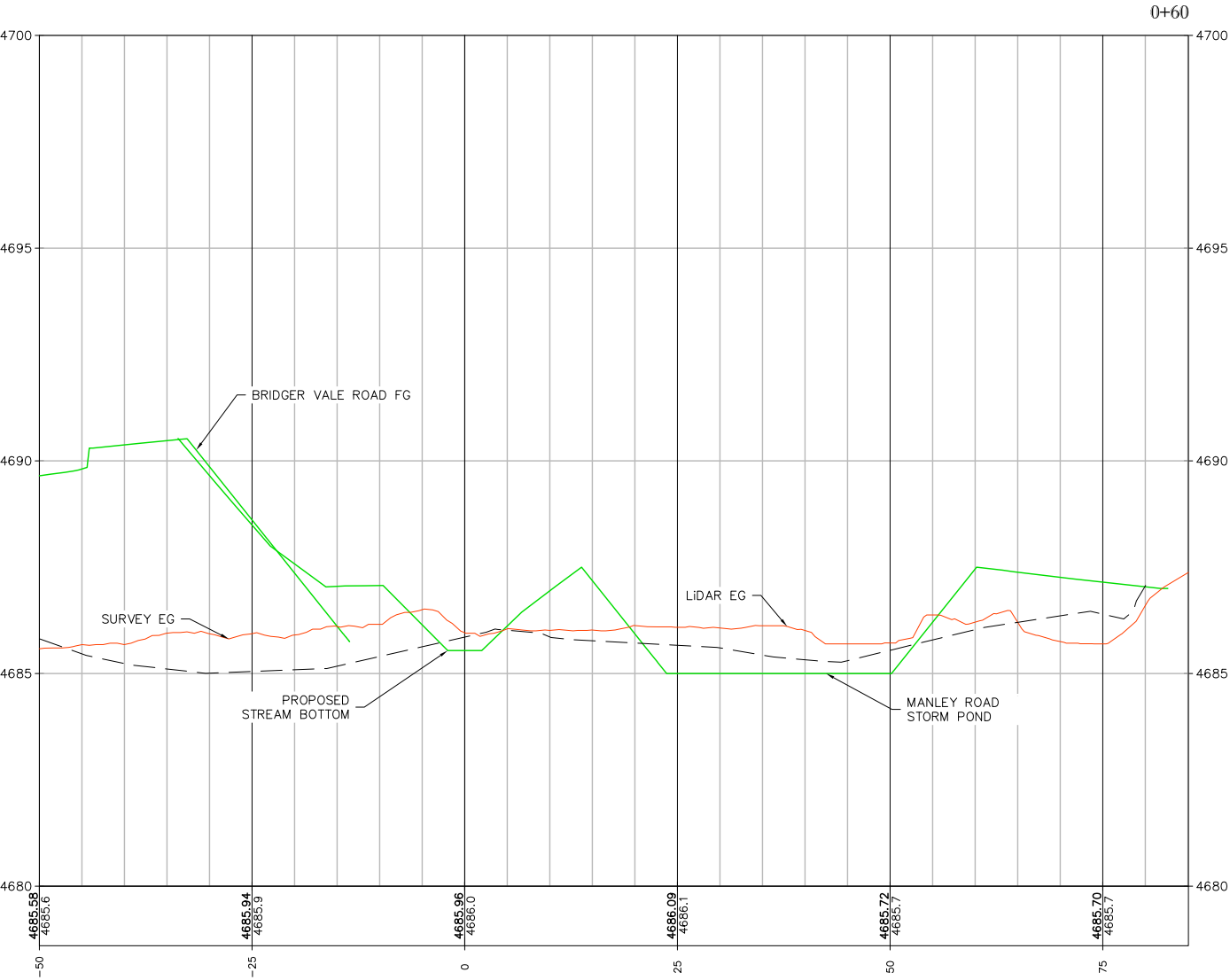
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DATE: 05/13/2021

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GLEN LAKE STREAM REST.
DESIGN PLAN



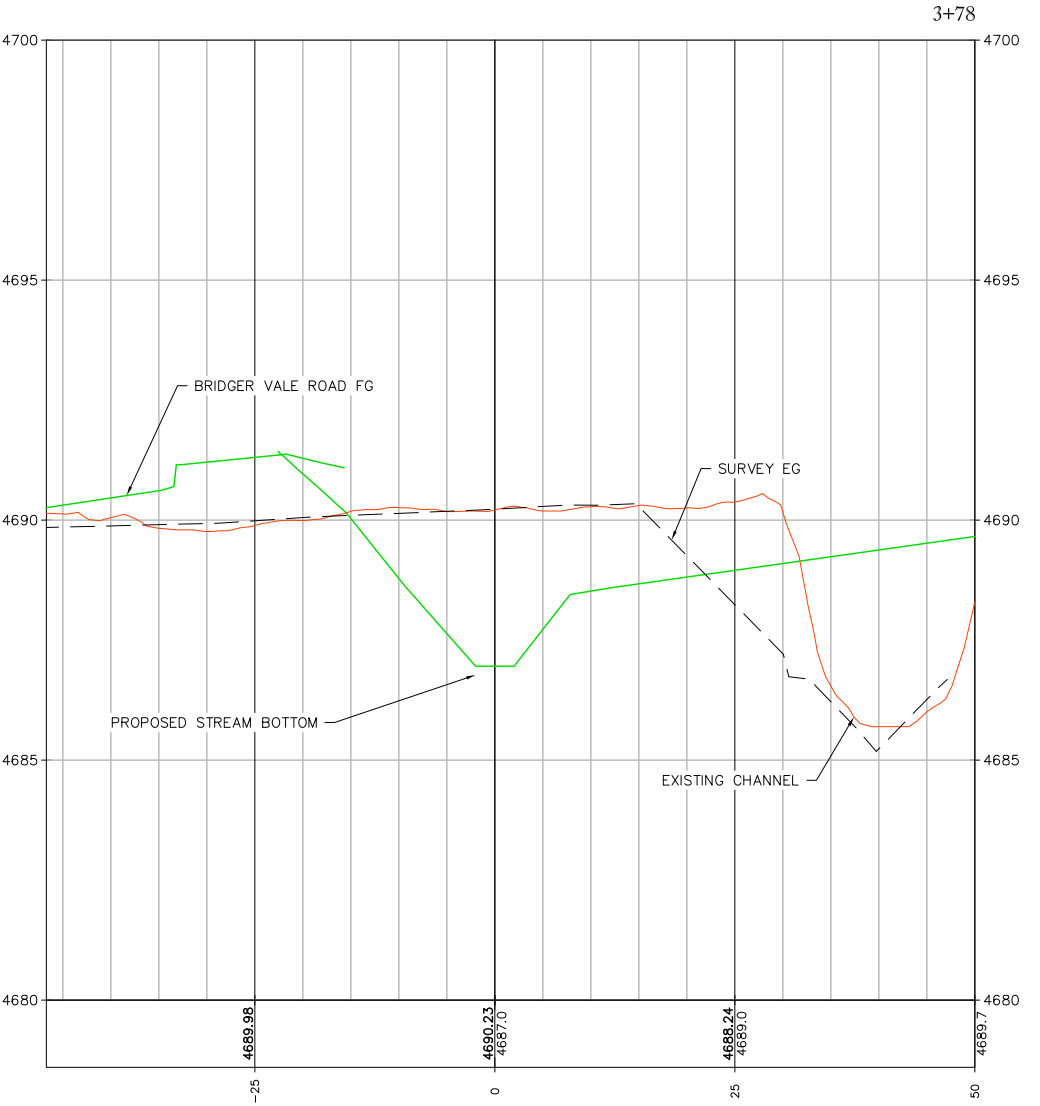
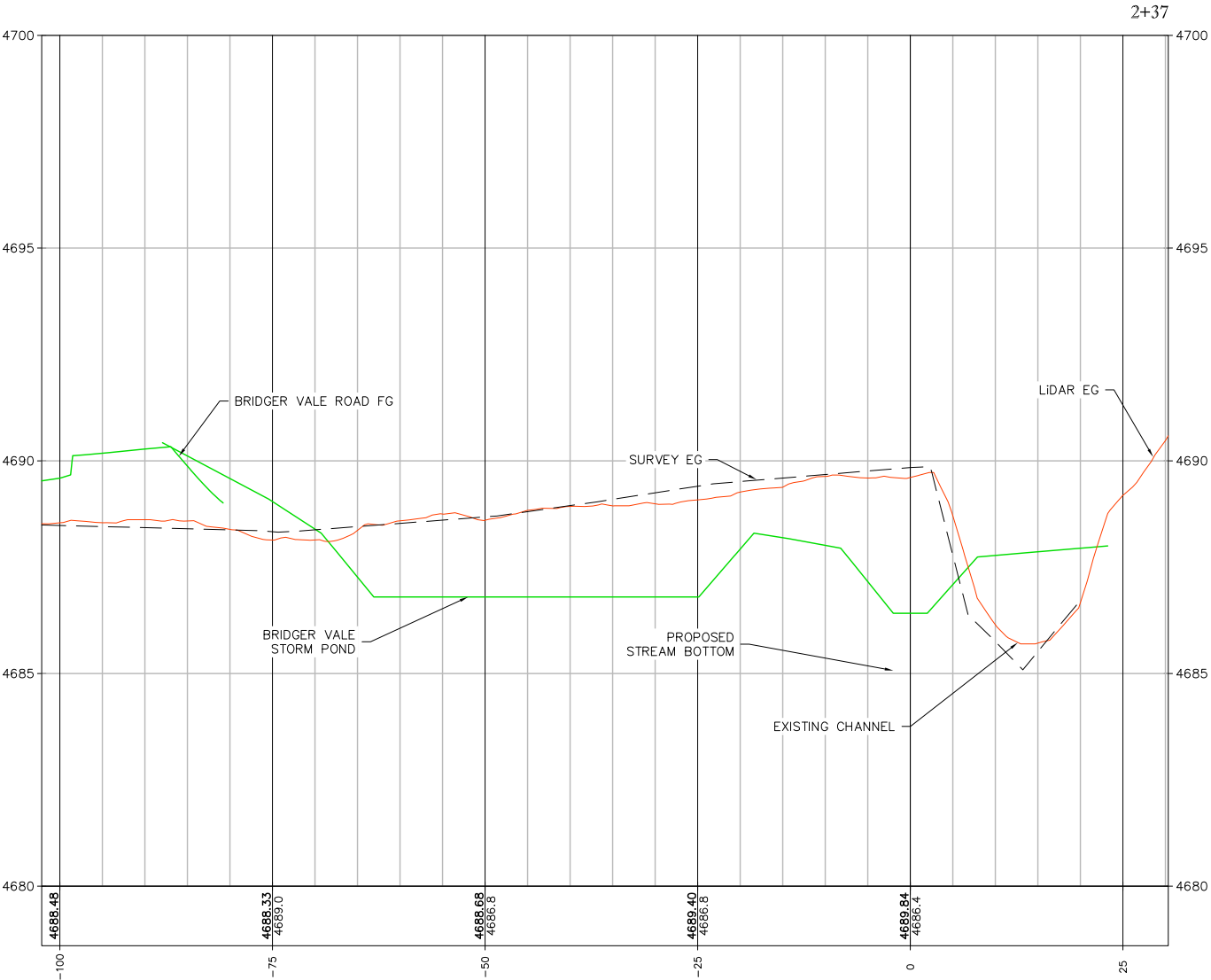
LEGEND:

- 2018 COB LIDAR EG SURFACE
- COMBINED SURVEYED EG SURFACE*
- STREAM RESTORATION FG

* COMBINED SURVEY SURFACE IS A COMBINATION OF C&H ENGINEERING FIELD SURVEY AND ALLIED ENGINEERING'S FIELD SURVEY COMPLETED ON AUGUST 9, 2019.

SECTION NOTES:
ALL SECTIONS ARE BASED ON ALIGNMENT GOING
UPSTREAM TO DOWNSTREAM. SECTIONS SAMPLED
LOOKING UPSTREAM LEFT TO RIGHT.

NO.	REVISIONS	DRAWN BY	DATE	HORIZONTAL SCALE FEET 0 10 20	VERTICAL SCALE FEET 0 2.5 5	GLEN LAKE STREAM RESTORATION STREAM - SECTIONS BOZEMAN, MT	32 DISCOVERY DRIVE BOZEMAN, MT 59718 PHONE (406) 582-0221 FAX (406) 582-5770 www.alliedengineering.com	Civil Engineering Geotechnical Engineering Land Surveying		PROJECT #: 05-067	SHEET
										DATE: 11/17/2020	C2-3
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				DESIGNED BY: ASG	REVIEWED BY: DSC					SECTIONS	



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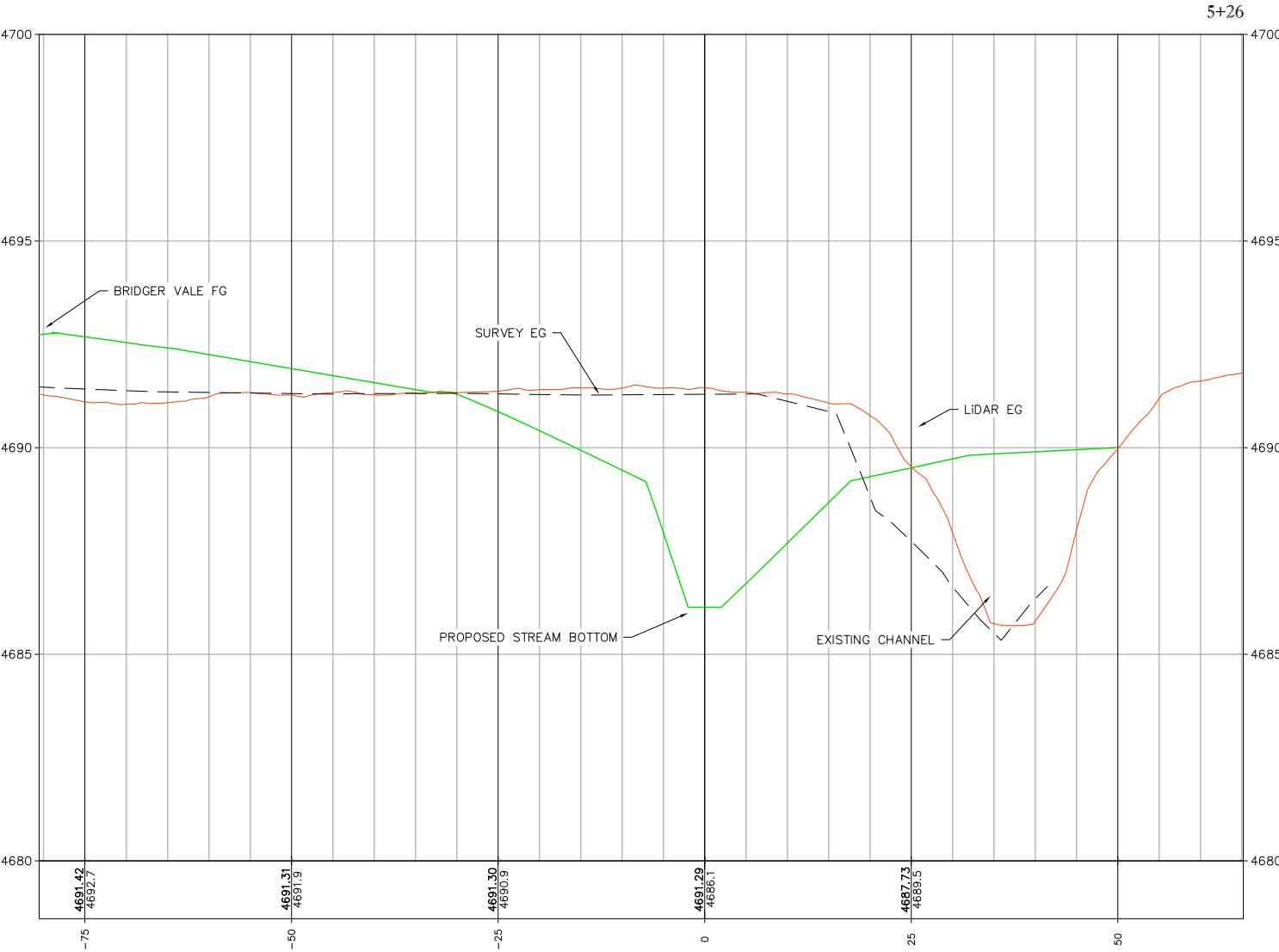
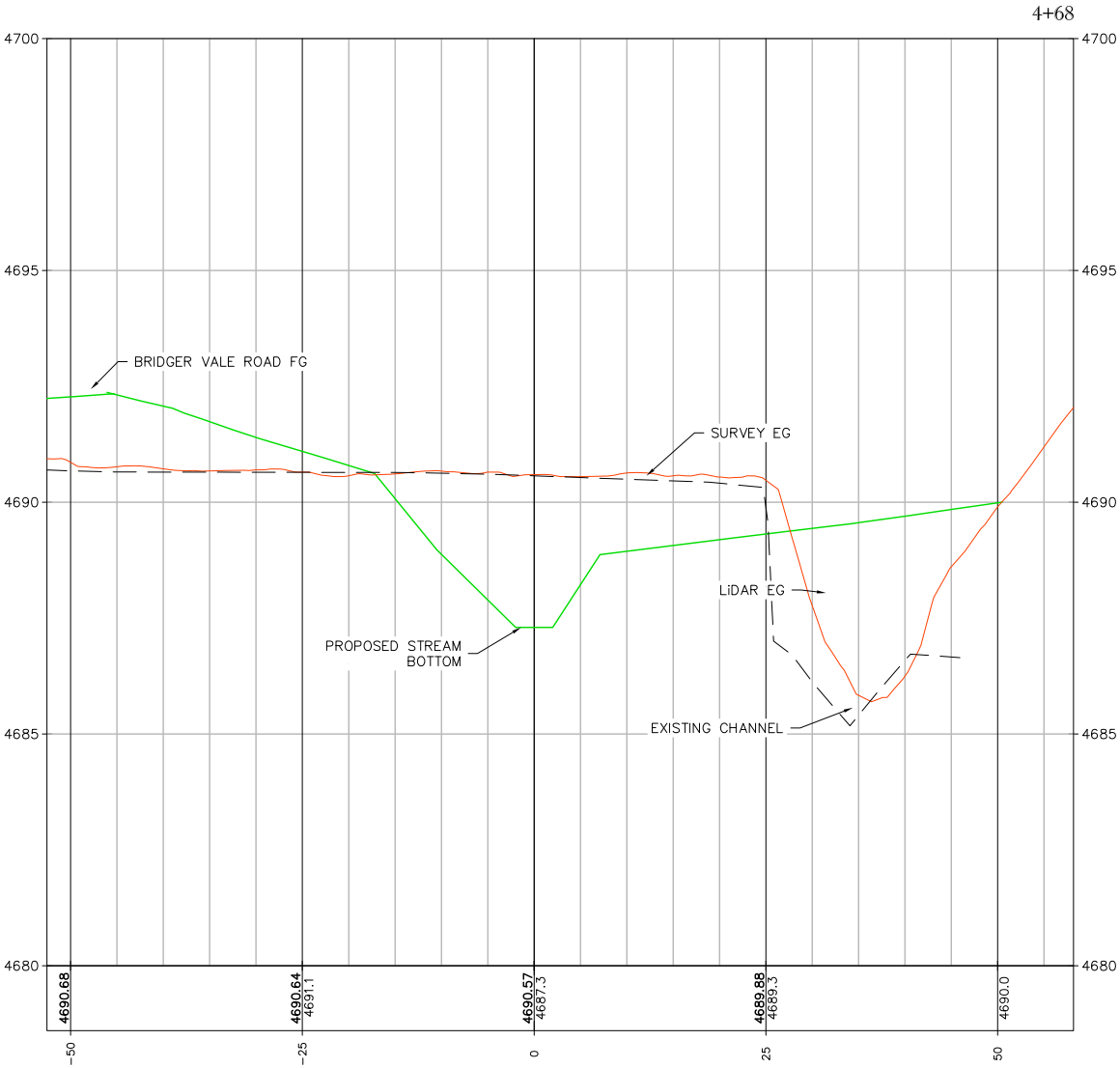
- 2018 COB LIDAR EG SURFACE
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					PROJECT ENGINEER: DSC													DATE: 11/17/2020										
					DESIGNED BY: ASG													GLEN LAKE STREAM REST.										
				DRAWN BY: ASG		REVIEWED BY: DSC										SECTIONS												

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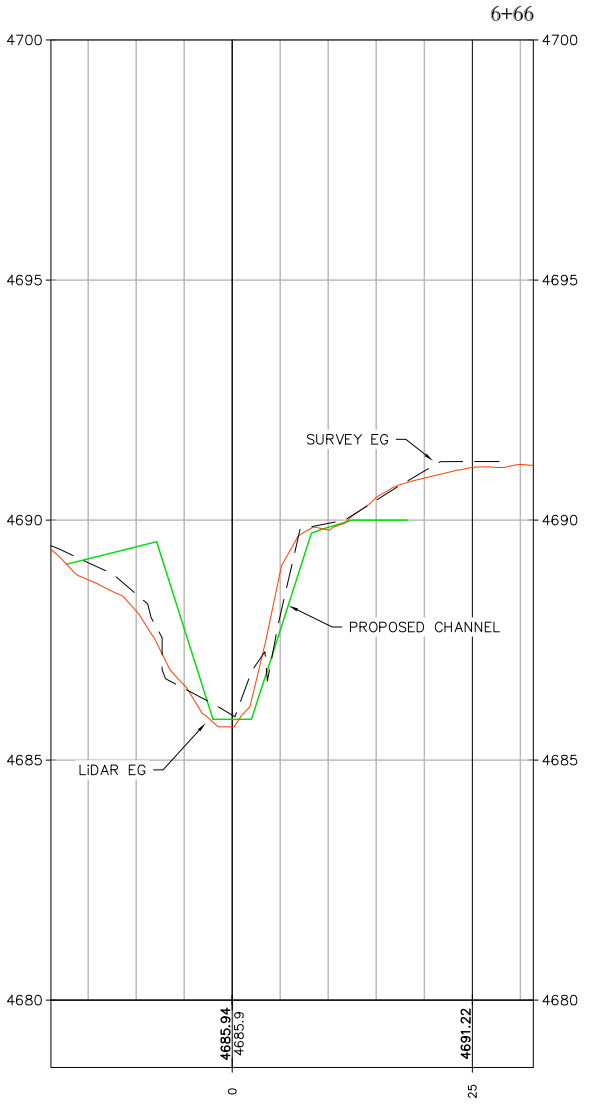
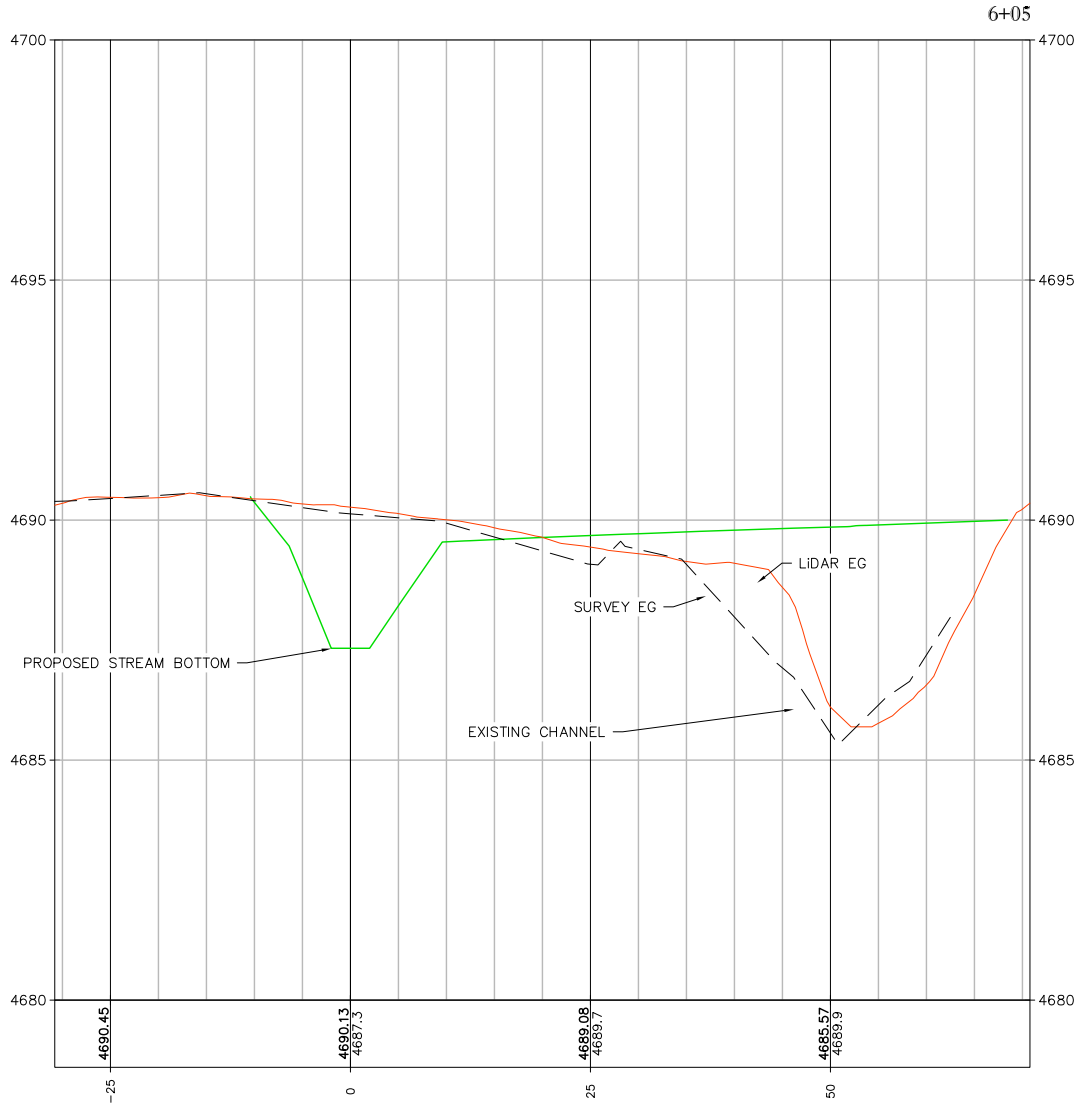


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- STREAM RESTORATION FG

* COMBINED SURVEY SURFACE IS A COMBINATION OF C&H ENGINEERING FIELD SURVEY AND ALLIED ENGINEERING'S FIELD SURVEY COMPLETED ON AUGUST 9, 2019.

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LEGEND:

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					DATE: 11/17/2020						C2-6	
				PROJECT ENGINEER: DSC	DRAWN BY: ASG							
				DESIGNED BY: ASG	REVIEWED BY: DSC							

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							DATE: 11/17/2020	D-1
						GLEN LAKE STREAM REST.		
						DETAILS		

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DETAILS</h1> <h2>BOZEMAN, MT</h2> </div> | <div style="display: flex; justify-content: space-between;"> <div> <p>32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
FAX (406) 582-5770
www.alliedengineering.com</p> </div> <div> <p>Civil Engineering
Geotechnical Engineering
Land Surveying</p> </div> <div>  </div> </div> | PROJECT #: 05-067
DATE: 11/17/2020 | SHEET
<div style="font-size: 2em; font-weight: bold;">D-2</div> |
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DETAILS</p> </div> </div> | | | | |
| DESIGNED BY: ASG | | REVIEWED BY: DSC | | | | | | |

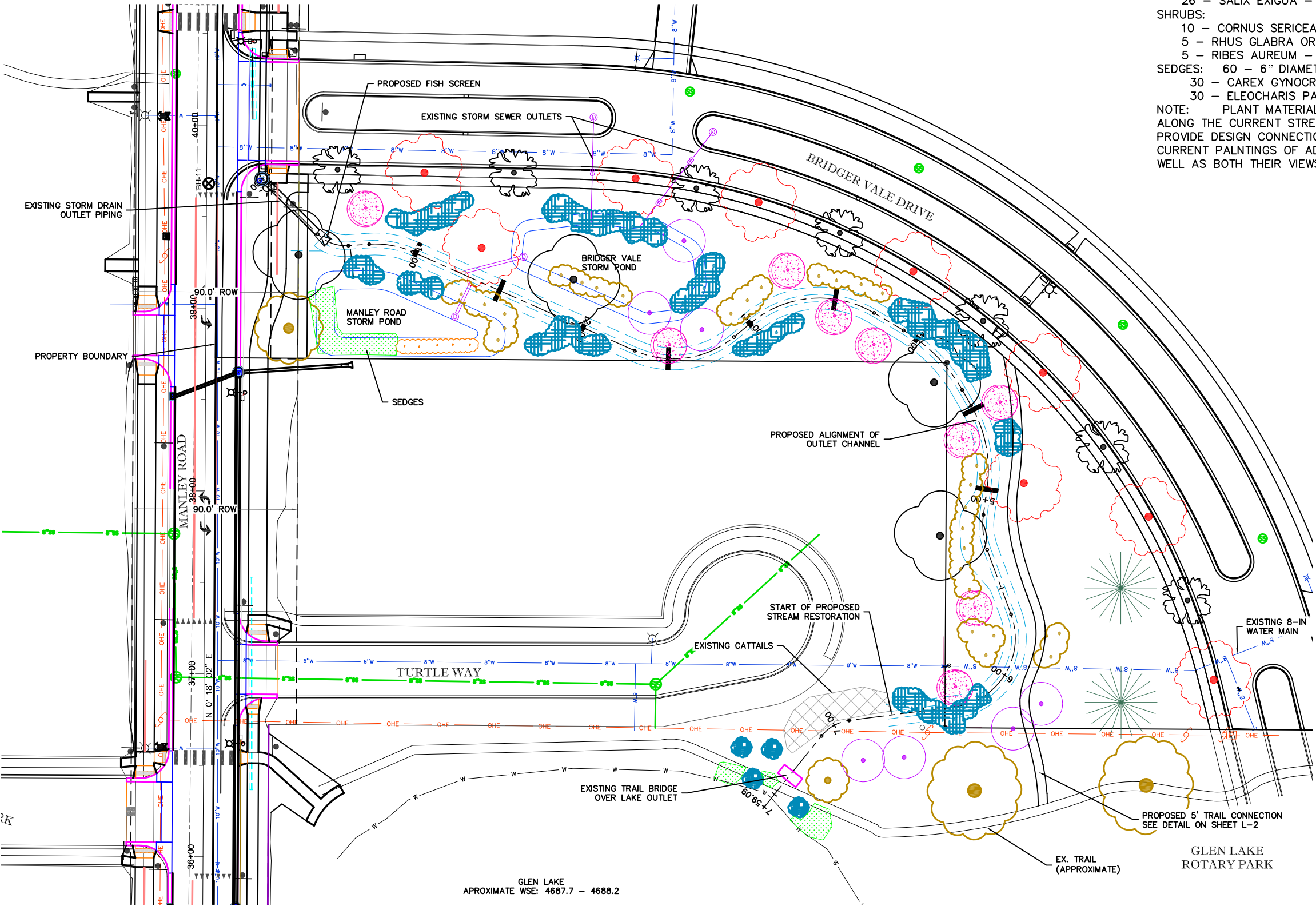
CREATED BY: BOB FARRINGTON B.S.R.C LANDSCAPE ARCHITECT

- TREES:
- 6- QUERCUS ALBA – WHITE OAK (VARIETY SAME AS ADJACENT BOULIVARD)
 - 5 – POPULUS DELTOIDES – COTTONWOOD VARIETY ‘SIOUXLAND’
 - 6 – POPULUS TREMULOIDES – ASPEN
 - 2 – PSEUTOSUGA MENZIESII – DOUGLAS FIR
 - 18 – PRUNUS VIRGINIANA – CHOKE CHERRY
 - 26 – SALIX EXIGUA – SNADBAR WILLOW (CUTTINGS AVAILABLE ON-SITE)

- SHRUBS:
- 10 – CORNUS SERICEA – RED TWIG DOGWOOD
 - 5 – RHUS GLABRA OR TRIOBOTA – SMOOTH SUMAC OR SQUAWBUSH
 - 5 – RIBES AUREUM – GOLDEN CURRANT

- SEDGES: 60 – 6” DIAMETER PLUGS DUG UP FROM WETLAND AREAS WITHIN PARK
- 30 – CAREX GYNOCRATES – NORTHERN BOG SEDGE
 - 30 – ELEOCHARIS PALASTARUS – CREEPING SPIKE RUSH

NOTE: PLANT MATERIALS WERE CHOSEN TO REFLECT SOME EXISTING SPECIES ALONG THE CURRENT STREAM LOCATION, TO ECHO VALLEY RIPARIAN SPECIE, PROVIDE DESIGN CONNECTIONS TO THE NEW BOULEVARD PARKWAY RESPECTONG CURRENT PAINTINGS OF ADJACENT TREES ON THE BACK YARDS OF TURTLE WAY AS WELL AS BOTH THEIR VIEWS INTO THE PARK AND THEIR PRIVACY FROM THE PARK.



PLANTING LEGEND:

- MULCH TREE
- CHOKE CHERRY TREE
- COTTONWOOD TREE
- DOGWOOD TREE
- ELM TREE
- DOUGLAS FIR PINE TREE
- ASPEN TREE
- ALPINE CURRANT BUSH
- SEDGES

NO.	REVISIONS	DRAWN BY	DATE

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY: ASG	REVIEWED BY: DSC

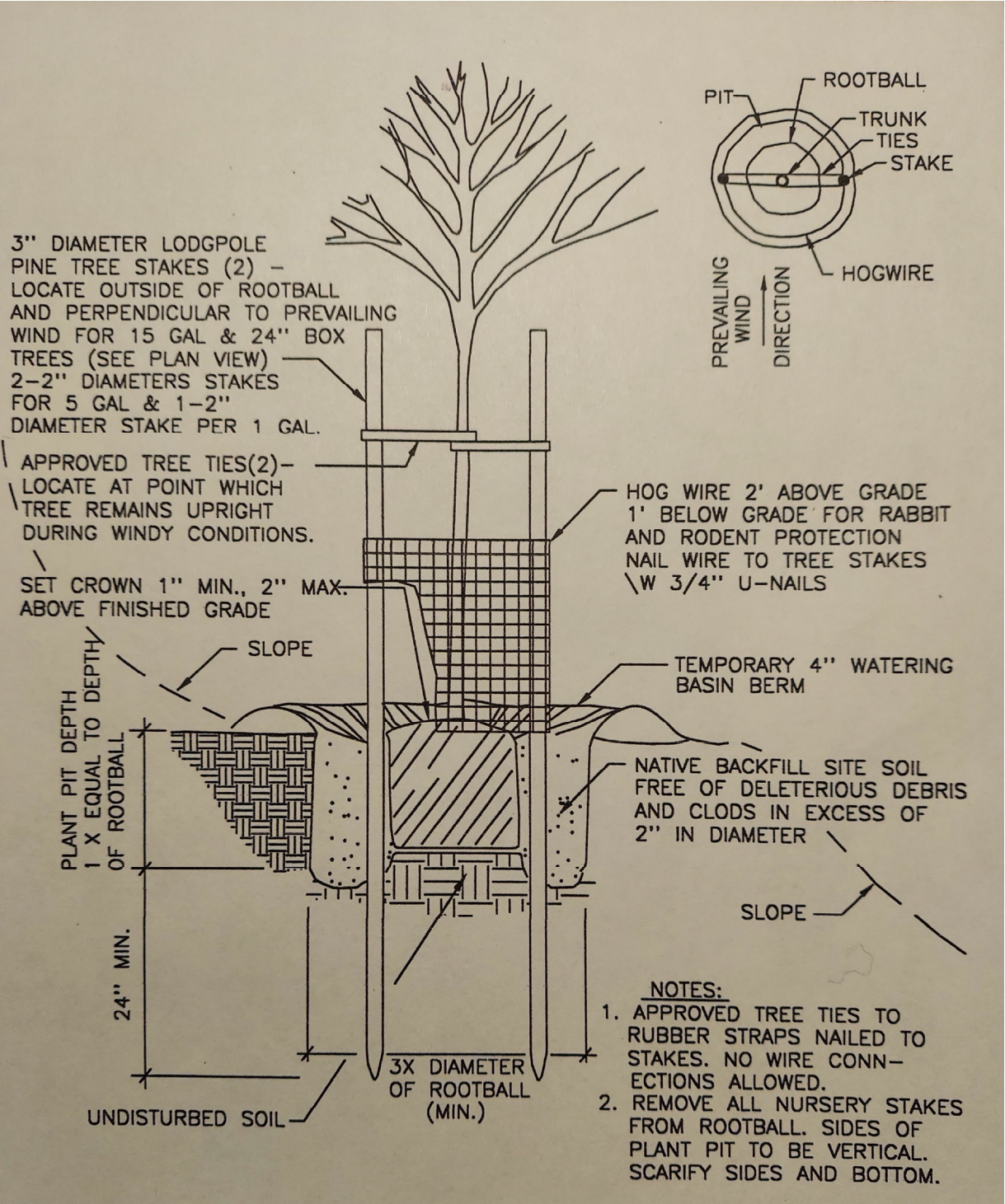
GLEN LAKE STREAM RESTORATION
LANDSCAPE PLAN
BOZEMAN, MT

32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
FAX (406) 582-5770
www.alliedengineering.com

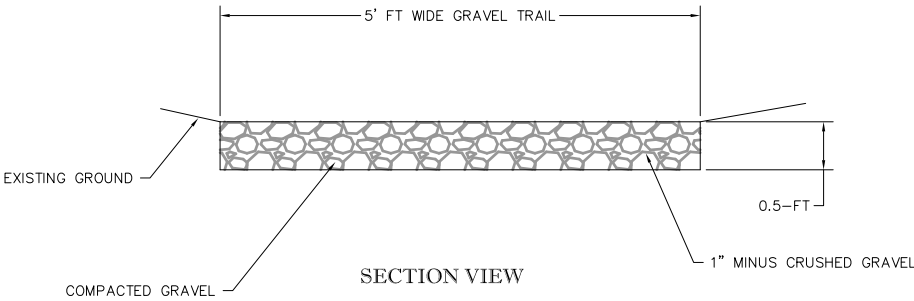
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PROJECT # 05-067	SHEET L-1
DATE: 05/13/2021	
GLEN LAKE STREAM REST.	
LANDSCAPE PLAN	



1
L-2
DETAIL
TREE PLANTING DETAIL
NTS



2
L-2
DETAIL
GRAVEL TRAIL TYPICAL SECTION
1" = 1'

NO.	REVISIONS	DRAWN BY	DATE

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY: ASG	REVIEWED BY: DSC

GLEN LAKE STREAM RESTORATION
LANDSCAPE DETAILS
BOZEMAN, MT

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PROJECT #: 05-067
DATE: 05/13/2021

SHEET
L-2

GLEN LAKE STREAM REST.
LANDSCAPE DETAILS

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Section II. I.

Statements of Support

Statements of Support are included in the Section II.I. text.