Downtown Bozeman Creek Park(ing) Project

Conceptual Plan

18 May 2012

CONFLUENCE

Thomas, Dean & Hoskins, Inc.
TD&H
Engineering Consultants

DESIGN 5
Landscape Architecture and Planning

intrinsik
ARCHITECTURE
INCORPORATED

DESIGN TEAM CONTACT INFORMATION

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PROJECT SUMMARY

This project seeks to redesign the public parking lot and adjacent section of Bozeman Creek northwest of the intersection of South Rouse Avenue and East Babcock Street in Downtown Bozeman. The project objectives are to: 1) enhance Bozeman Creek and create a creek side park; 2) maximize public parking function and capacity; and 3) mitigate stormwater issues.

The design team including Intrinsik Architecture, Inc., TD&H Engineering, Confluence and Design 5 was selected in the early Fall of 2011. The design process consisted of three primary phases:

1) Site Reconnaissance/Date Collection

Civil Survey
Site Assessment & Photo Inventory
Online Public Survey (192 participants)
Individual Meetings with Key Stakeholders

2) Concept Development

Development of Three Alternatives
Preliminary Estimates
Additional Stakeholder Meetings
Meetings with Planning & Engineering Departments
Public Presentation & Meeting
Public Comment Period (33 written comments received)

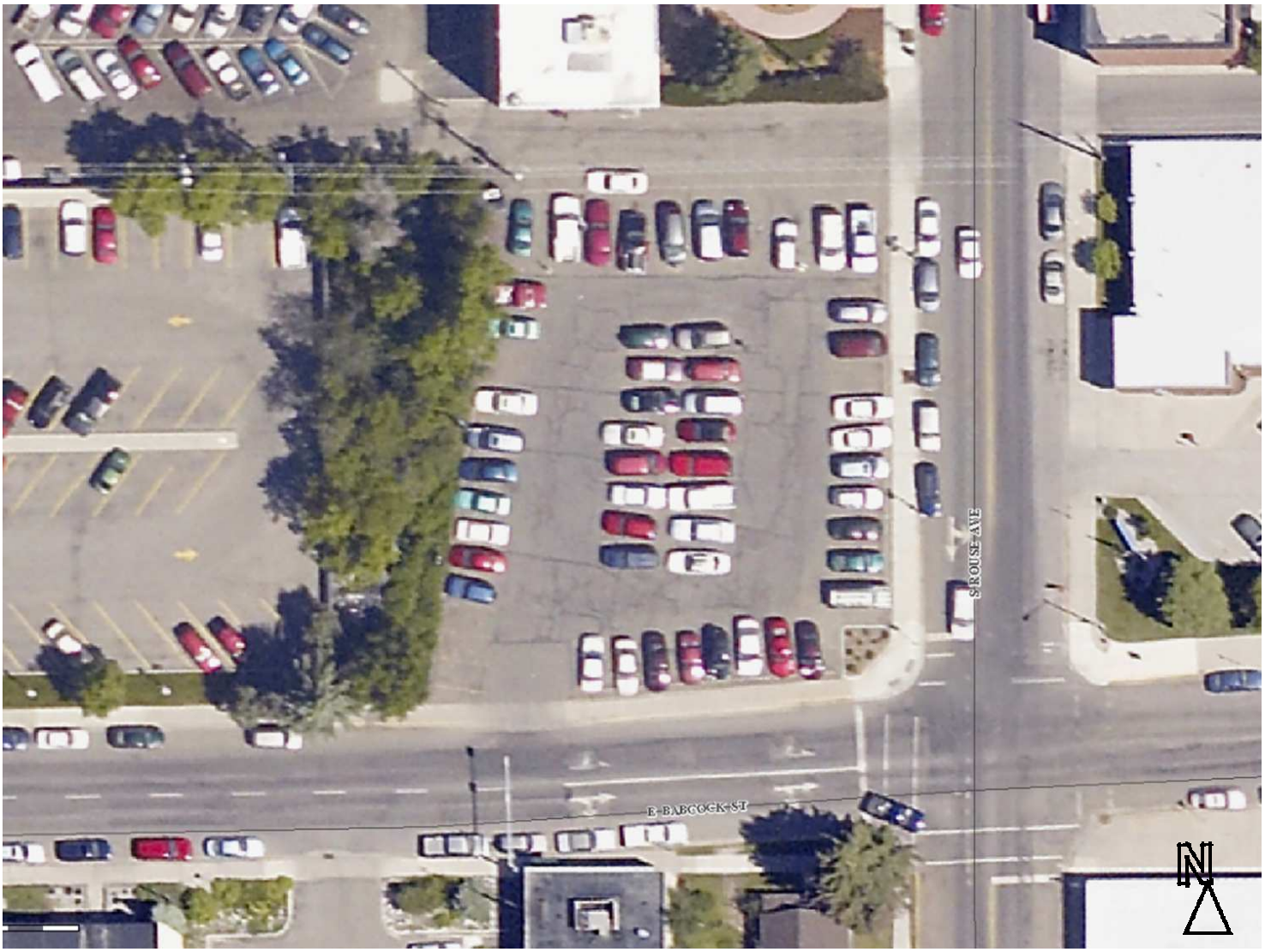
3) Develop Recommended Option

Overall Conceptual Plan
Preliminary Landscape Plan
Preliminary Creek Improvement Plan
Preliminary Civil Grading & Drainage Plan
Cost Estimate
Final Report

The attached recommended conceptual plan balances the three project goals and would transform the parking lot from a dysfunctional downtown eyesore into a community asset.

This conceptual plan is the first of many steps needed to complete this project. The next steps include securing funding, design development, permitting, construction drawings/bid documents, bidding and finally construction and construction administration.

AERIAL IMAGE



Source: Bozeman GIS Dept.

Existing Aerial Image - NTS

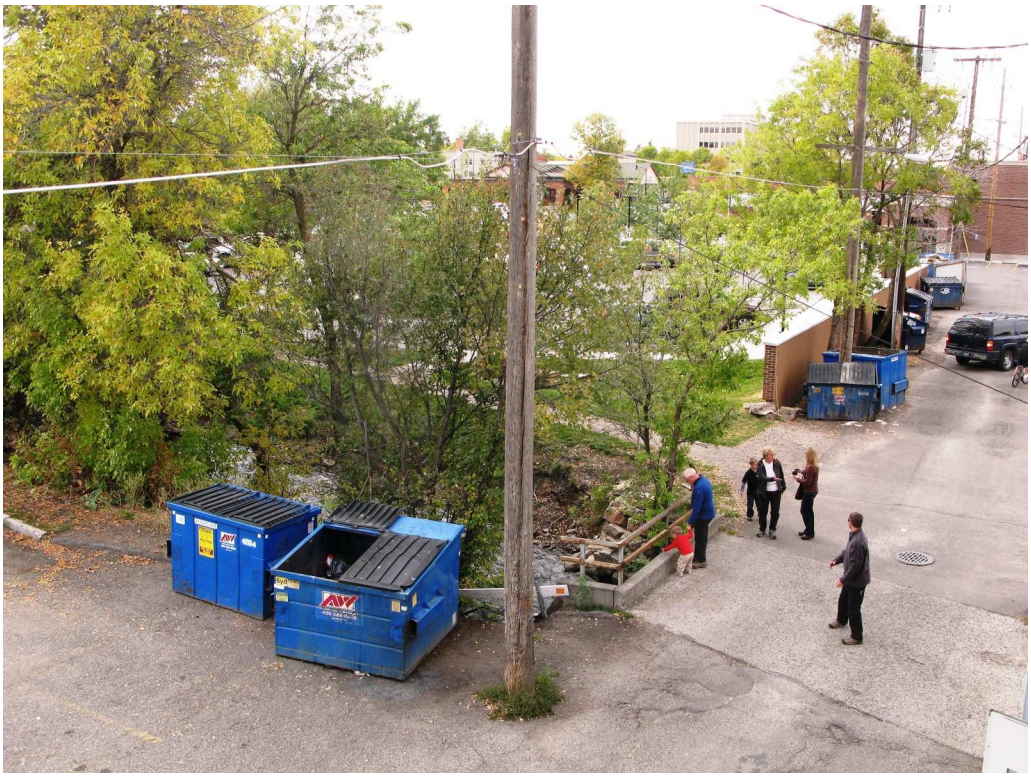
PHOTO INVENTORY

Historic Photo of Parking Lot - 1942 (Source: Gallatin Historical Society)

Current Panoramic View of Parking Lot (note nonconforming spaces)

Minimal Buffer to the Creek

PHOTO INVENTORY



View of the Alley and Dumpsters

Minimal Corner Landscaping

Erosion on the East Bank

PHOTO INVENTORY

View of Creek looking south under culvert

View looking north from Babcock Avenue

View looking North along Rouse

Parking
The public parking lot is located northwest of the corner of East Babcock Street and South Rouse Avenue, just south of Main Street. The current parking configuration does not meet City standards including space dimensions, back up maneuverability, floodplain development requirements, stormwater facilities, snow storage and access. The lot is currently uncomfortably striped for 44 spaces; however only 32 spaces would actually fit on the lot legally following today's Unified Development Code standards for parking lot development.

Grading & Drainage
There is a slight ridge on the site, running north-south. Approximately the east 1/3 of the site drains northeast and the rest drains northwest. The existing curb along the creek trains the runoff north to the area behind the garbage dumpsters across the alley from the Eagles. It then picks up trash and dumps into the creek just upstream of the bridge/culvert in the alley. There is no system currently in place to screen out or filter any of the trash, sediment, oils, grease or nutrients that pollute the stream.

Riparian Vegetation
Existing riparian vegetation consists of Green Ash, Chokecherry and an understory of mostly Poplar. Non-native grasses provide groundcover. Largely absent is wetland and floodplain vegetation typical of streams in the northern Rocky Mountains. Riparian habitat is poor and provide little cover or habitat for fish or terrestrial wildlife.

Vegetation
The southeast corner of the parking lot has a small landscape island that is maintained by the city. (3) Spirea, (3) Viburnum, (1) Mugo Pine and (1) Currant are currently planted. The north edge of parking lot is defined by Soroptimist Park. The park has a large Cottoneaster hedge that separates the park from the parking lot. Nearly all existing on-site vegetation would need to be replaced to accommodate the enhancement of the creek and the reconfiguration of the parking lot.

Channel Geometry
Bozeman Creek within the project area has been strongly impacted by urban development. The stream flows in concrete box culverts beneath Babcock Street and Main Stream upstream and downstream of the project area, respectively. Within the project area, the channel has been straightened, which has eliminated stream meanders and increased gradient to a 1.5 percent slope.

Floodplain
The floodplain has been filled with various materials up to the edge of the stream. This has confined high flows within the channel and greatly increased erosive forces on the bed and banks. The stream currently has no functional floodplain and contains most flood flows within its banks. The 100-year flood is forced out of the channel by the undersized box culvert beneath Main Street.

Stream Banks
The stream banks have been stabilized in some locations with slabs of concrete sidewalk and rock riprap, but the banks are eroding in other locations. The upstream left bank (looking downstream) is confined by a concrete wall that is a remnant of a former building foundation.

Stream Bed
The bed of Bozeman Creek is composed of large cobbles, gravel, pieces of riprap, concrete rubble, and other debris. The bed material has become very coarse over time as finer materials have been stripped away by high flows.

Instream Habitat
Stream habitat is relatively uniform, consisting of one long riffle from one end of the project to the other. The stream lacks pool habitat, bank cover, and spawning beds. Consequently, the stream provides poor habitat for fish.

Stream Constraints & Opportunities
Opportunities for restoration are constrained by the location of the project site within an urban area. For example, the existing box culverts at the upstream and downstream ends of the project significantly limit the ability to modify channel slope and sinuosity. Infrastructure on all sides of the stream channel further limit opportunities to allow the channel to migrate laterally or to create a fully functional floodplain. These constraints limit the ability to completely restore the stream.

In light of these constraints, the project site provides opportunities to improve habitat and aesthetics within the Bozeman Creek corridor. For example, the stream bed could be modified to include pools and spawning habitat. A slight meander could be added to the planform without affecting adjacent infrastructure. The channel margins could be excavated to create a modest floodplain on each side. Native riparian and floodplain vegetation could be added to provide cover habitat for fish and wildlife. These improvements need to acknowledge the need to keep the stream channel in place.

LEGEND

EXISTING	DESCRIPTION
⊛	WELL
○	MANHOLE
o	BARRIER POST
	BUILDING
	CONCRETE
3415	CONTOUR
	CONTROL POINT W/ NUMBER
	BUSH
	CURB & GUTTER
	CULVERT
	EDGE OF ASPHALT
	EDGE OF GRAVEL
	FENCE - CHAIN LINK
	FENCE - WOOD
	FIRE HYDRANT
	GAS METER
	GUY WIRE
	INLET
	LIGHT POLE
E	OVERHEAD ELECTRIC
TEL	OVERHEAD COMMUNICATIONS
⊗	UTILITY POLE
	CONCRETE WALL
	TRAFFIC SIGN
	TREE - DECIDUOUS
	HANDICAP PARKING SPACE
G	GAS
S	SANITARY SEWER
SD	STORM DRAIN
T	UNDERGROUND COMMUNICATIONS
W	WATERLINE
	VALVE
	ELECTRICAL METER
●	SURVEY MONUMENT
	PROPERTY LINE
	PLATTED LOT LINE
	1% CHANCE FLOOD LIMIT
4793.59	1% CHANCE FLOOD X-SECTION W/ COB VERTICAL DATUM ELEV.

NOTES

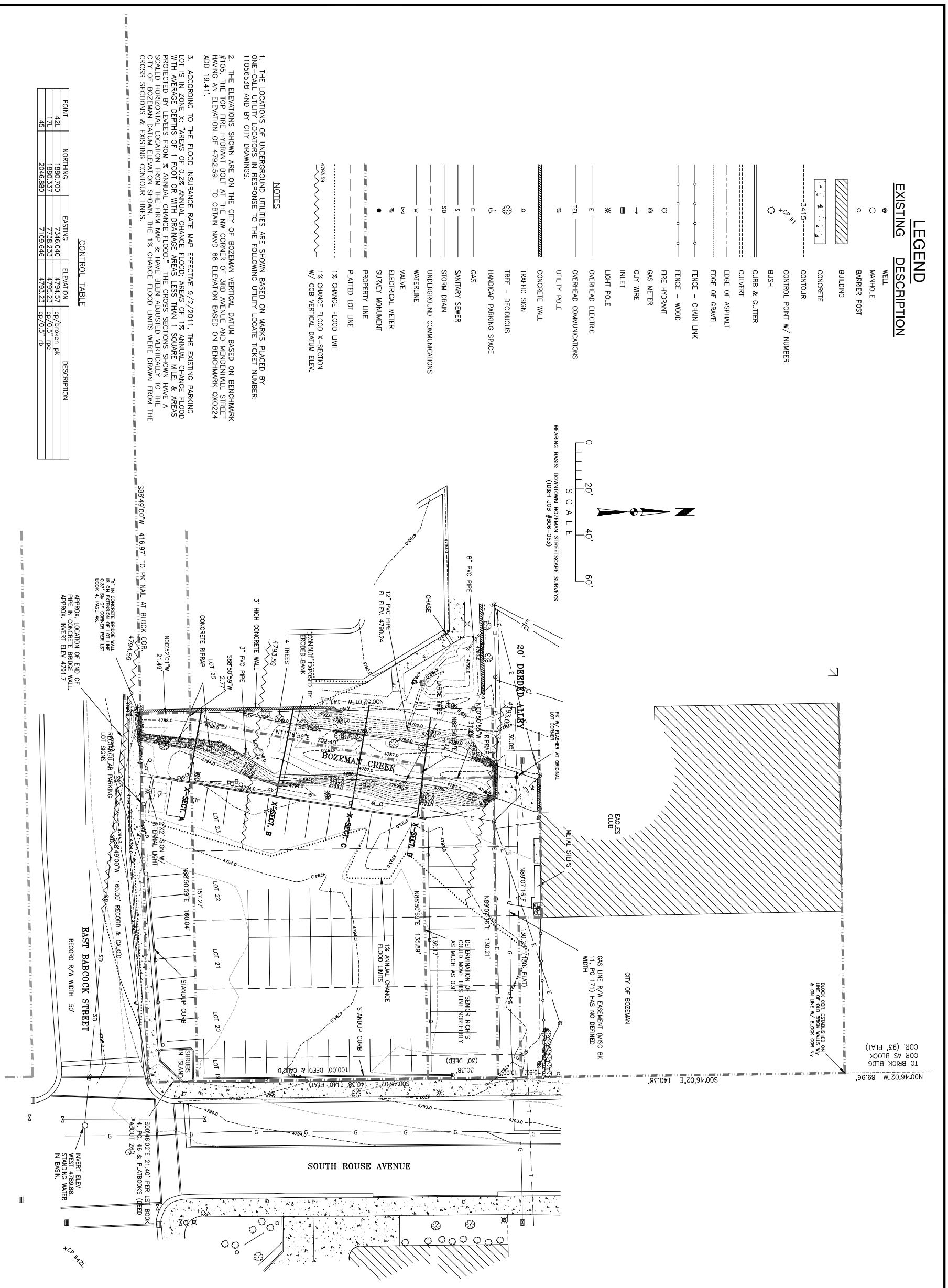
1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE SHOWN BASED ON MARKS PLACED BY ONE-CALL UTILITY LOCATORS IN RESPONSE TO THE FOLLOWING UTILITY LOCATE TICKET NUMBER: 11056538 AND BY CITY DRAWINGS.

2. THE ELEVATIONS SHOWN ARE ON THE CITY OF BOZEMAN VERTICAL DATUM BASED ON BENCHMARK #105, THE TOP FIRE HYDRANT BOLT AT THE NW CORNER OF 3RD AVENUE AND MENDENHALL STREET HAVING AN ELEVATION OF 4792.59. TO OBTAIN NAVD 88 ELEVATION BASED ON BENCHMARK QX0224 ADD 19.41'.

3. ACCORDING TO THE FLOOD INSURANCE RATE MAP EFFECTIVE 9/2/2011, THE EXISTING PARKING LOT IS IN ZONE X: "AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; & AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD." THE CROSS SECTIONS SHOWN HAVE A SCALED HORIZONTAL LOCATION FROM THE FIRM MAP & HAVE BEEN ADJUSTED VERTICALLY TO THE CITY OF BOZEMAN DATUM. ELEVATION SHOWN THE 1% CHANCE FLOOD LIMITS WERE DRAWN FROM THE CROSS SECTIONS & EXISTING CONTOUR LINES.

CONTROL TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
42L	1880.700	7346.040	4794.57	cp/broken pk
17L	1880.337	7738.233	4795.23	cp/0.5" rpc
45	2046.880	7109.646	4793.23	cp/0.5" rb



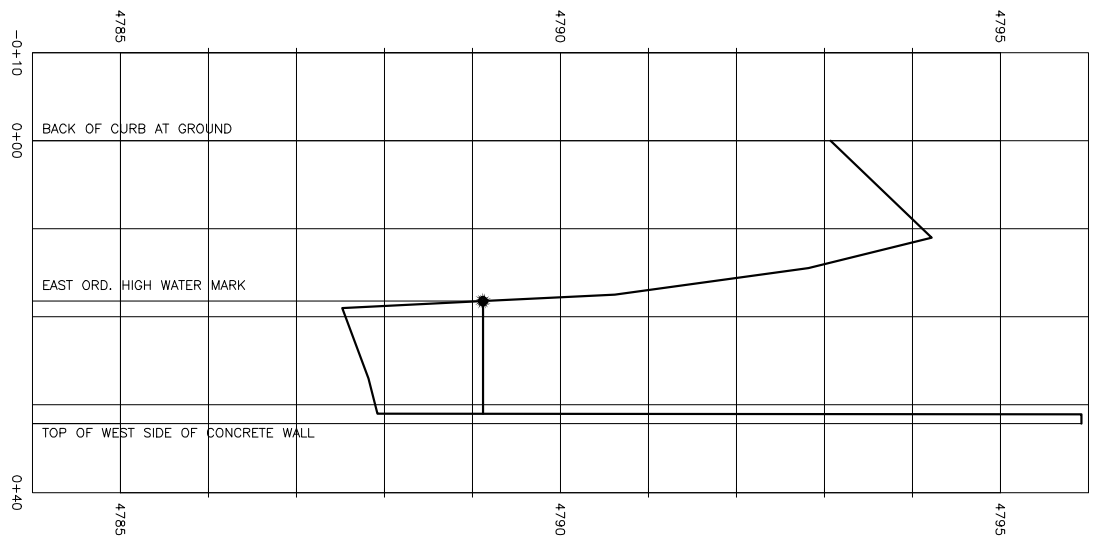
SHEET 1 OF 2	CAD NO. 1106TS.DWG	**BOZEMAN CREEK GREENSPACE** **BOZEMAN, MONTANA** **BK 118, PG 392 & BK 90, PG 564, INCLUDING PORTIONS OF LOTS 19 - 24 OF BLOCK C, ORIGINAL PLAT OF BOZEMAN**	DRAWN BY: DESIGNED BY: SA QUALITY CHECK: DATE: 9/26/11 JOB NO. B11-067 FIELDBOOK 162/19

REVISIONS
BY SCA DATE 10/27/11 DESCR SHOW PARTIAL FLOODPLAIN INFO.
BY SA DATE 11/14/11 DESCR ADDITIONAL TOPO & XSECTION OF CREEK
BY DATE DESCR

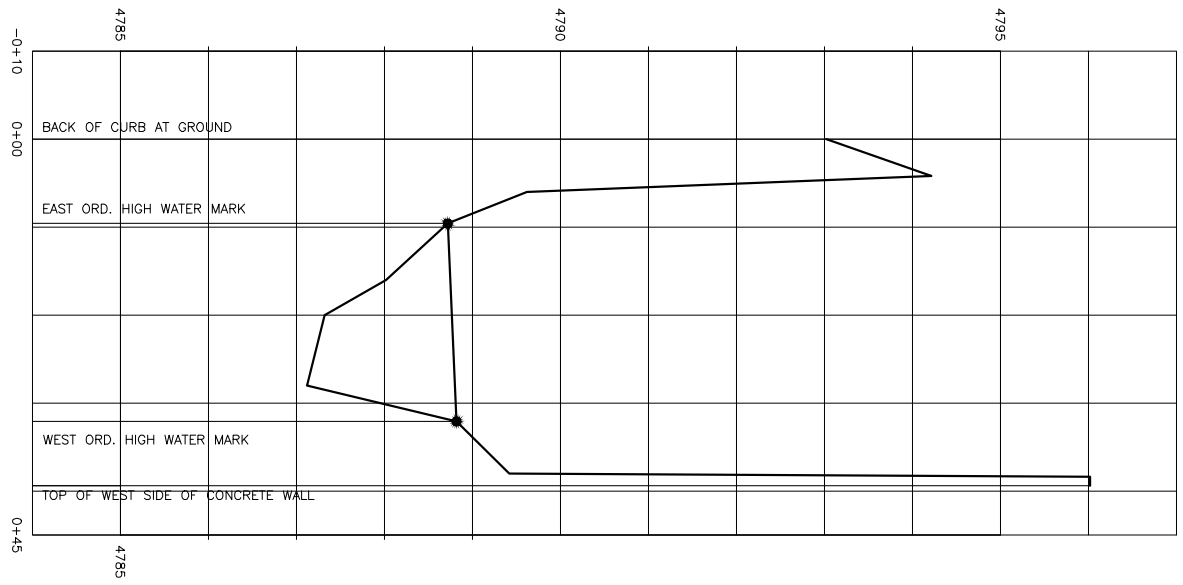
TD&H

THOMAS, DEAN & HOSKINS, INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL–HELENA MONTANA
SPOKANE WASHINGTON
LEWISTON IDAHO

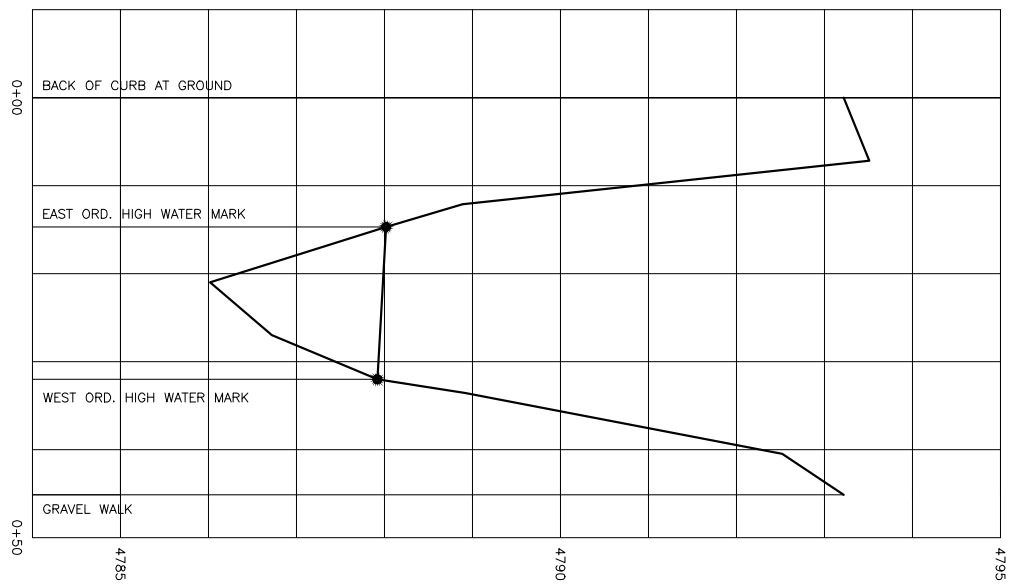
CROSS SECTION A



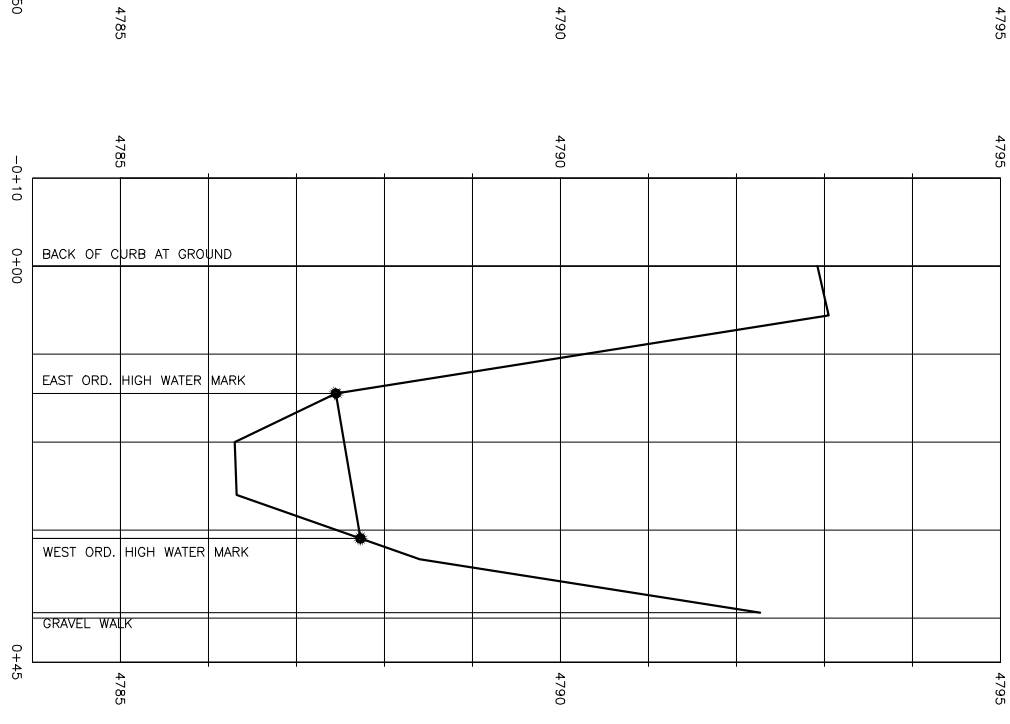
CROSS SECTION B



CROSS SECTION C



CROSS SECTION D



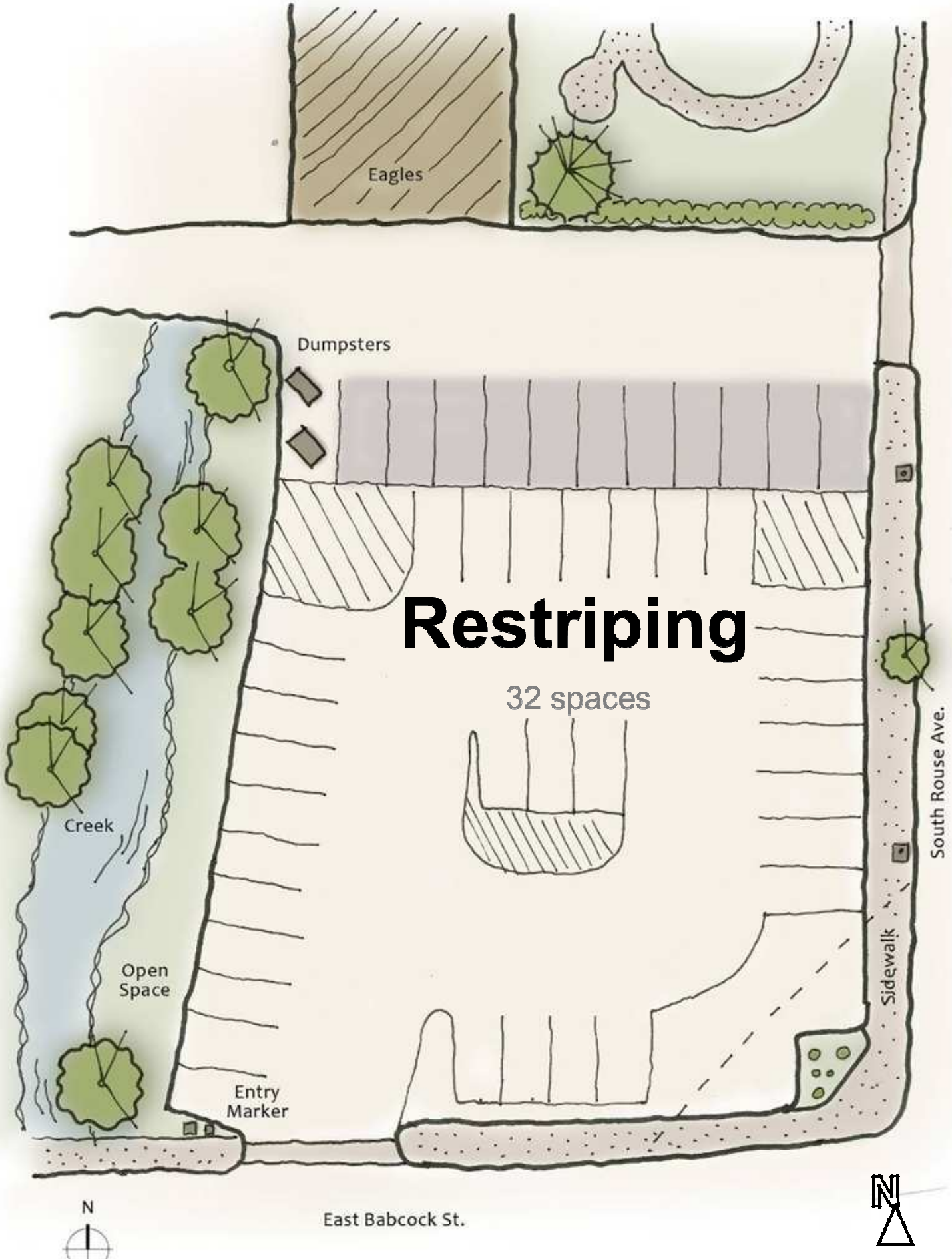
BOZEMAN CREEK GREENSPACE
BOZEMAN, MONTANA

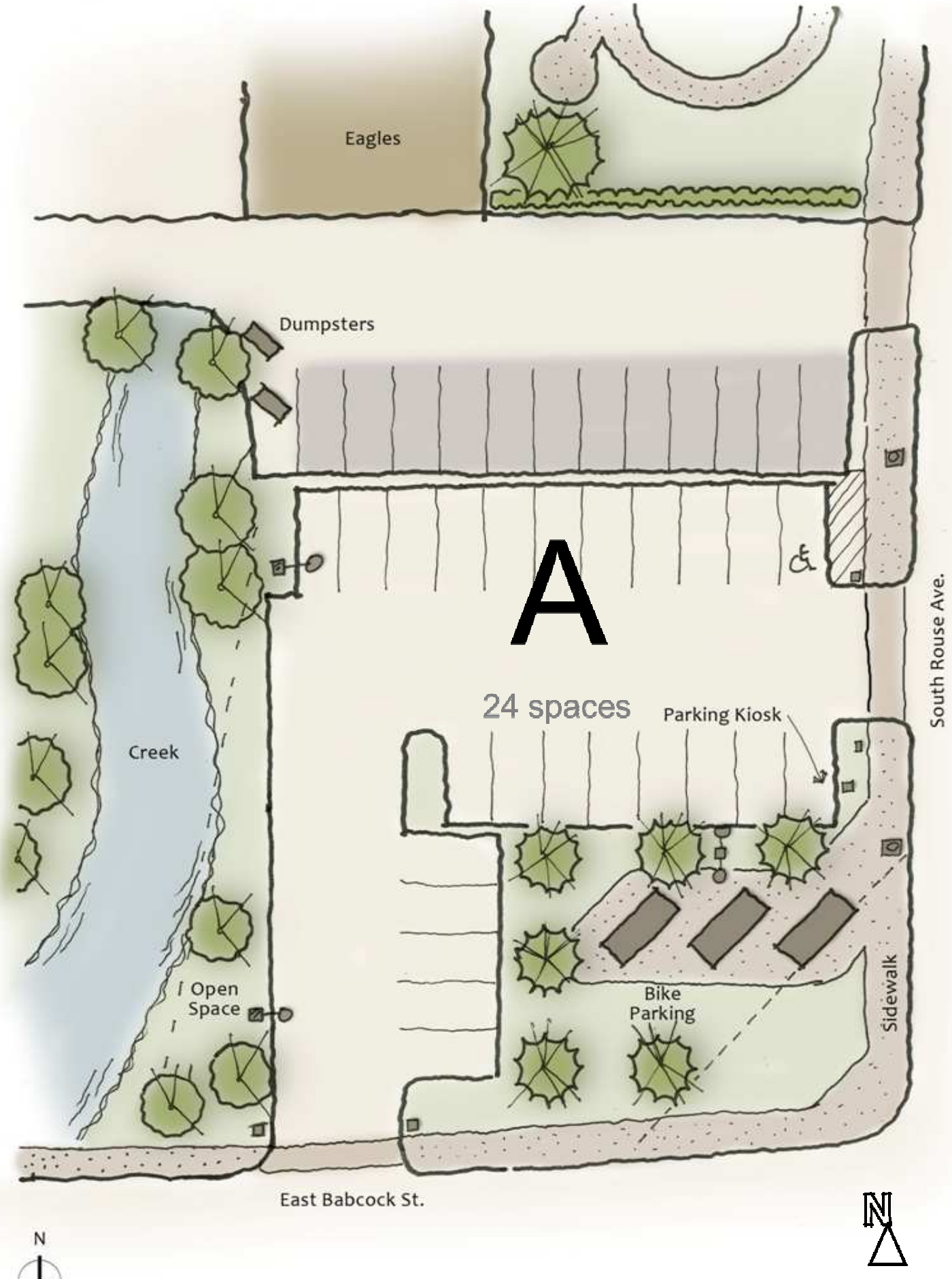
BK 118, PG 392 & BK 90, PG 564, INCLUDING PORTIONS OF LOTS 19 - 24 OF BLOCK C, ORIGINAL PLAT OF BOZEMAN

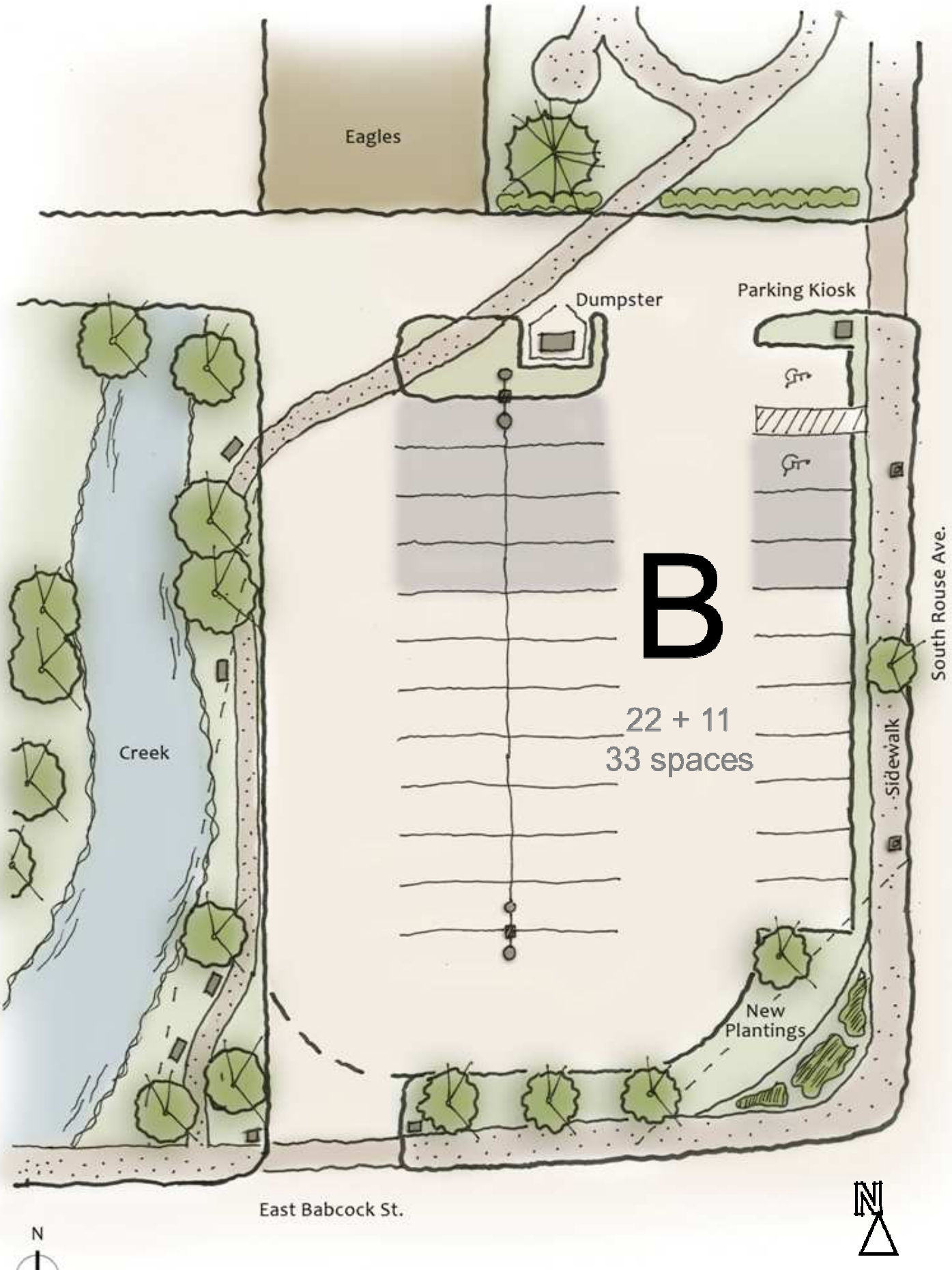
SHEET 2 OF 2
CAD NO. 1106775.DWG
FIELDBOOK
JOB NO. B11-067
DATE: 9/26/11
QUALITY CHECK:
DESIGNED BY:
DRAWN BY: SA

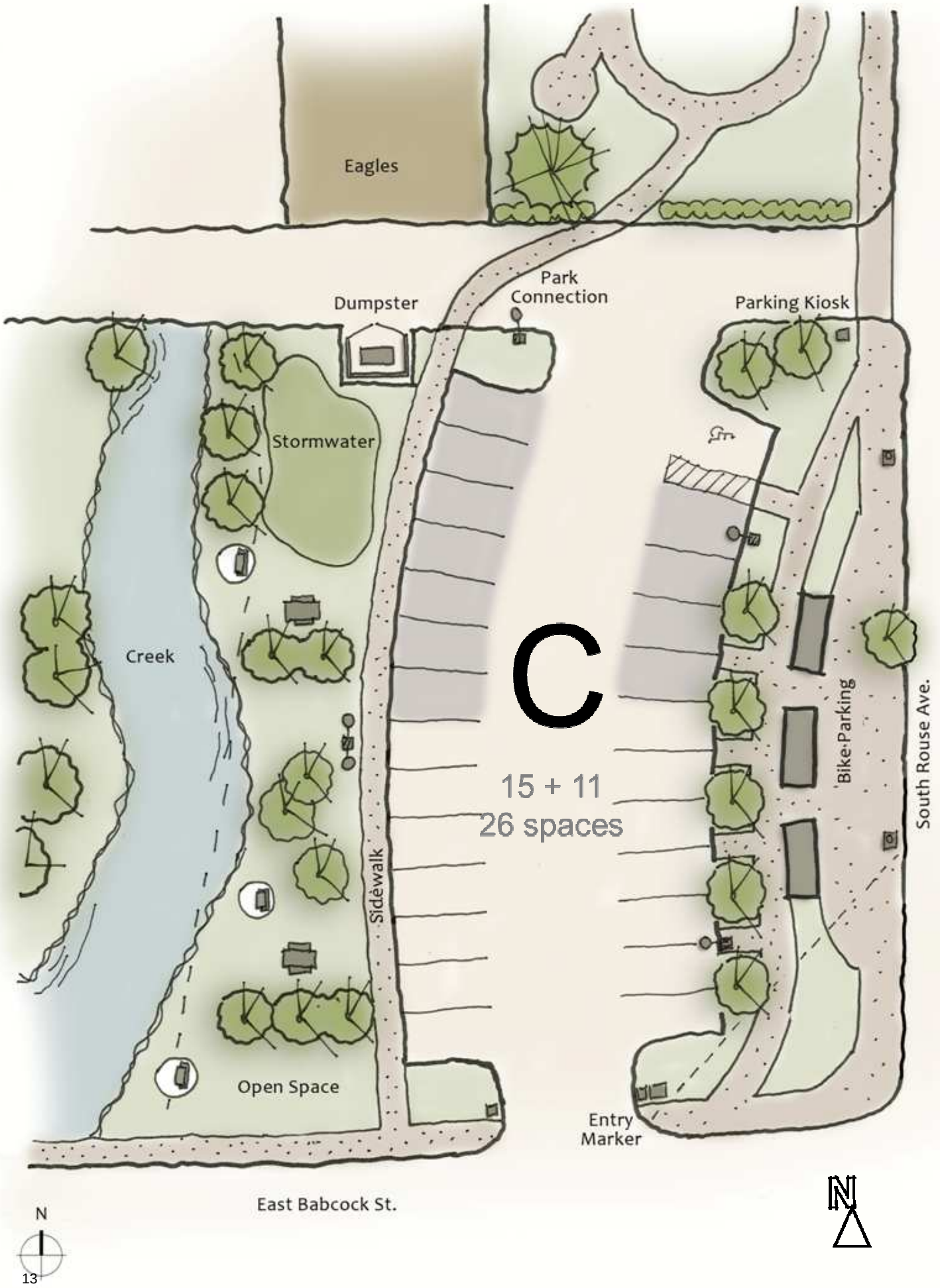
REVISIONS
BY SCA DATE 10/27/11 DESCR SHOW PARTIAL FLOODPLAIN INFO.
BY SA DATE 11/14/11 DESCR ADDITIONAL TOPO & XSECTION OF CREEK
BY DATE DESCR

TD&H
THOMAS, DEAN & HOSKINS, INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL–HELENA MONTANA
SPOKANE WASHINGTON
LEWISTON IDAHO


Eagles
Dumpsters
Restriping
32 spaces
Creek
Open Space
Entry Marker
Sidewalk
South Rouse Ave.
East Babcock St.
N
N


Eagles
Dumpsters
A
24 spaces
Parking Kiosk
South Rouse Ave.
Creek
Open Space
Bike Parking
Sidewalk
East Babcock St.
N
N


Eagles
Dumpster
Parking Kiosk
B
22 + 11
33 spaces
Creek
South Rouse Ave.
Sidewalk
New
Plantings
East Babcock St.
N
N


Eagles
Park Connection
Dumpster
Parking Kiosk
Stormwater
Creek
C
15 + 11
26 spaces
Bike Parking
South Rouse Ave.
Sidewalk
Open Space
Entry Marker
East Babcock St.
N
N

RECOMMENDED PLAN NARRATIVE

OVERALL PLAN

While each of the three alternatives has costs and benefits, the majority of the public comment supported Option C which included the least number of parking spaces but the largest green area adjacent to the creek. On the other side of the issue, business owners in the area adamantly oppose any decrease in the number of spaces. The design team used this public input to come up with a fourth option that includes 28 public parking spaces, no changes to the Eagles parking lot and a medium sized creek buffer that the public can safely enjoy.

Overall, this option best balances the three identified project goals:

1) Enhance Bozeman Creek and create a creek side park

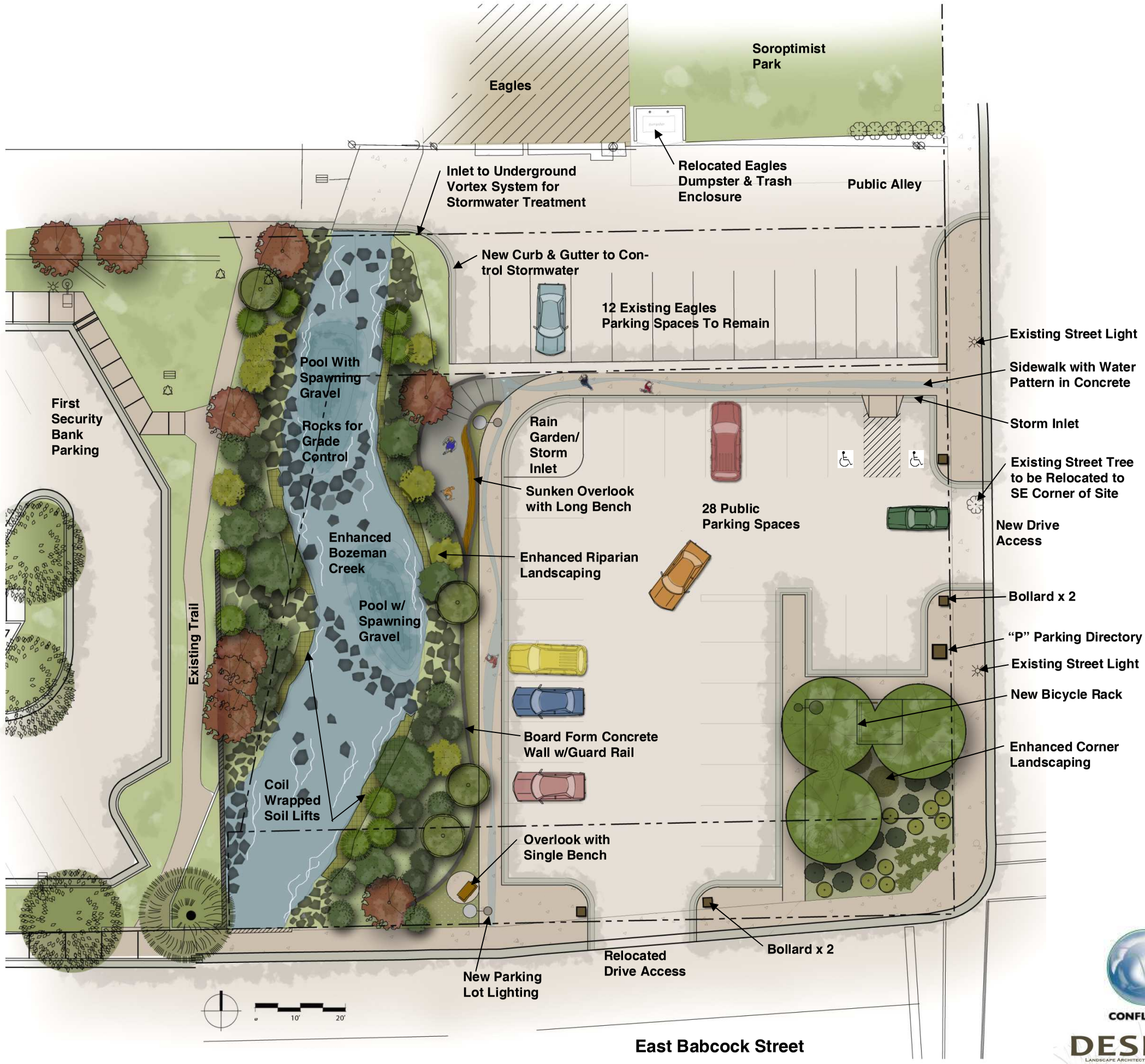
The amount of physical space available for a park is fairly limited by the equally important project goal to maximize public parking capacity discussed below. Due to safety and maintenance concerns, the area directly adjacent to the creek is proposed to be a natural riparian area not directly accessible by the public. Instead, two new overlooks, a concrete wall with a guard rail and educational signage will allow for safe public enjoyment and awareness of the creek. See the landscape narrative and plan for more detail.

2) Maximize public parking function and capacity

The existing paved lot can legally accommodate 32 parking spaces. The recommended plan includes 28 public spaces for a net loss of two parking spaces. This loss of only two spaces allows for the creation of the creek side park, further development of the corner landscaping and adequate stormwater mitigation.

3) Mitigate stormwater issues

The recommended plan significantly improves the stormwater situation for this property as well as for the adjacent Eagles property to the north. Currently, untreated stormwater runs directly into the creek. The proposed stormwater plan includes treatment by the rain garden and the vortex system prior to discharge into the creek. The installation of additional curb and gutter as well as the relocation of the dumpster will also improve the stormwater situation for the area. See the Grading and Drainage narrative and plan for more detail.



CONFLUENCE

intrinsik ARCHITECTURE INCORPORATED

DESIGN 5 Landscape Architecture and Planning

TD&H Engineering

DOWNTOWN BOZEMAN CREEK PARK(ING) PROJECT

RECOMMENDED CONCEPTUAL PLAN

S1

MAY 18, 2012

Channel Geometry
The channel cross-section will be modified to create a bankfull channel 22 to 26 feet wide and 2.25 feet deep. The banks will be approximately 1-foot higher than the water surface elevation at base flow. These channel dimensions were adapted for the site from reference measurements used in restoring the stream at Bogert Park. A slight meander will be created but overall gradient will still be approximately 1.5 percent.

Floodplain
The right bank will be excavated to create a floodplain at the estimated bankfull elevation along most of the project. Another small floodplain area will be developed on the left bank near the middle of the project. The floodplains will be sloped slightly toward the channel to provide drainage.

Stream Banks
The stream banks will be stabilized by stacking decorative flat stone (18" to 30 " thick and 3' to 6' wide) to form retaining walls at outlet and inlet of the existing box culverts at the upstream and downstream ends of the project. Stacked decorative stone installed on the outside banks of pools will also be used to stabilize the channel and provide cover for fish. The remainder of the stream banks will be stabilized with topsoil wrapped in two layers of biodegradable erosion control fabric made of coconut fibers.

Stream Bed
Most of the stream bed will be reconstructed with large, rounded cobbles (6" to 12") to maintain channel stability and to provide habitat for aquatic insects. Large cobbles and small boulders (1' to 2' diameter) will be installed to form grade controls at the upstream ends of pools. These grade controls will be approximately 10 feet wide, with a slope of 5 percent, and will extend beneath the stream banks and floodplain to help keep the channel from adjusting vertically or laterally.

Instream Habitat
Two pools will be constructed to provide deep holding water and overwinter habitat for fish. The tails of each pool will be covered with ½" to 3" round gravel suitable for spawning by trout. The remainder of the stream bed will be riffle habitat. Random boulders 2' to 3' in diameter will be embedded within the riffles to provide additional cover and resting sites for fish. Stacked stone placed on the outside banks of pools will be configured to provide undercut bank cover for trout.

Results
The proposed restoration actions will greatly improve aesthetics and habitat for fish and wildlife while maintaining channel stability. The proposed floodplain will reduce the depth of many flood flows; however, the downstream box culvert will continue to force the 100-year flow out of the channel. Riparian vegetation (discussed in more detail in the landscape narrative) will help to stabilize the stream banks and floodplain and will provided needed cover for fish and wildlife.

BOZEMAN CREEK PARKING LOT PROJECT
CONCEPTUAL DESIGN

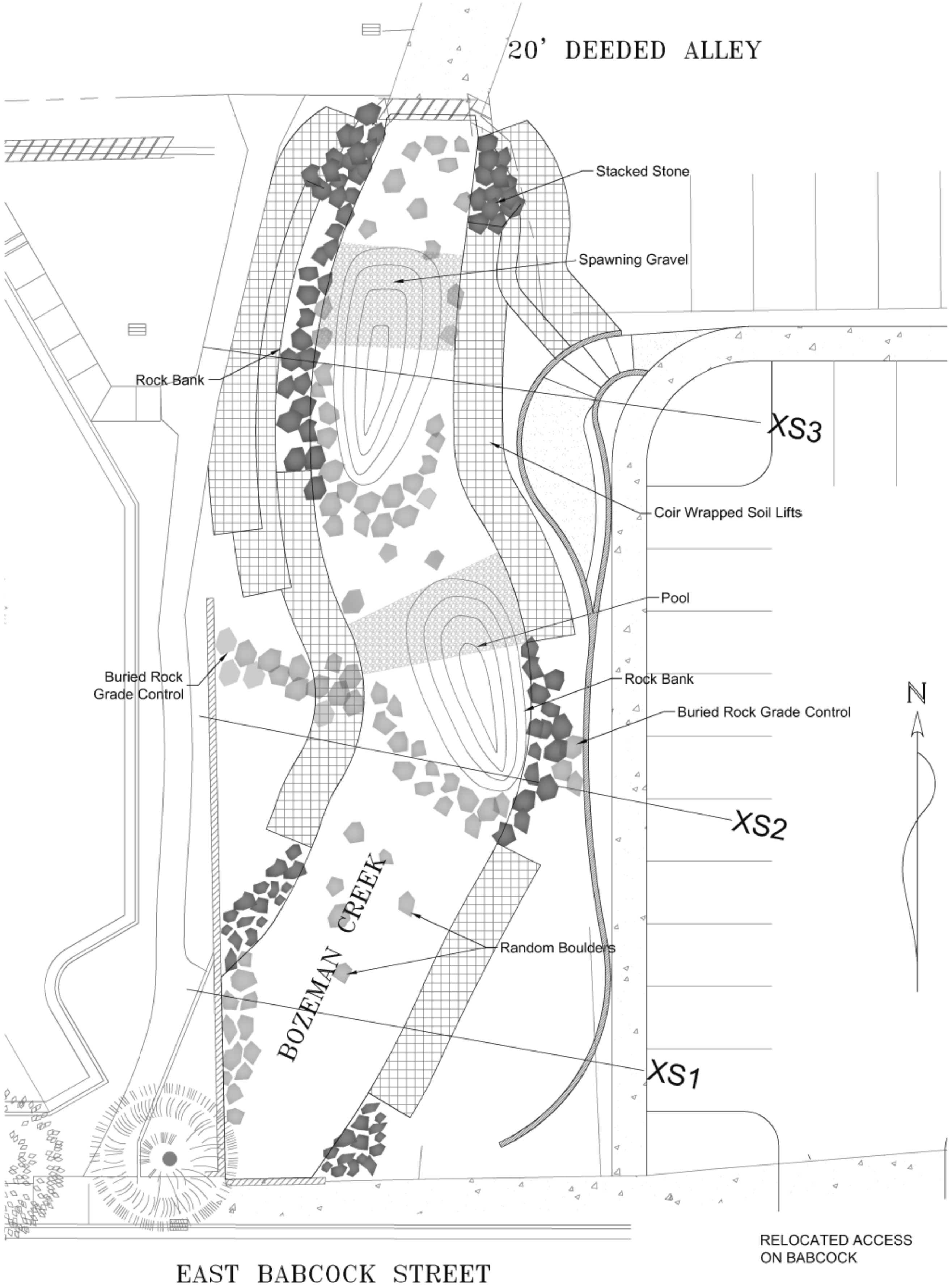
PLAN VIEW AND CROSS SECTIONS

SHEET: 1

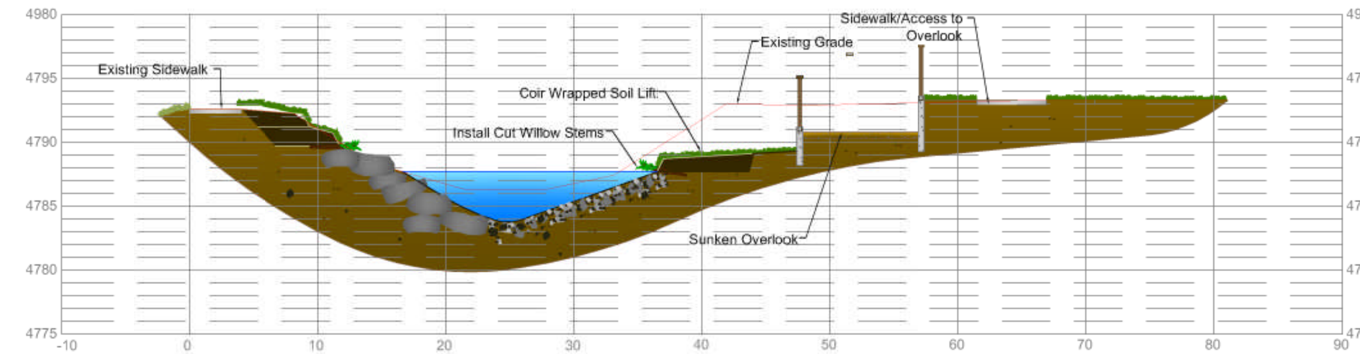
DRAWN BY: T.T. | DATE: 05/14/12
DESIGNED BY: J.L., T.T. | CCI JOB NO: IAL001
CHECKED BY:

REV.	DATE	DESCRIPTION	BY	APPD

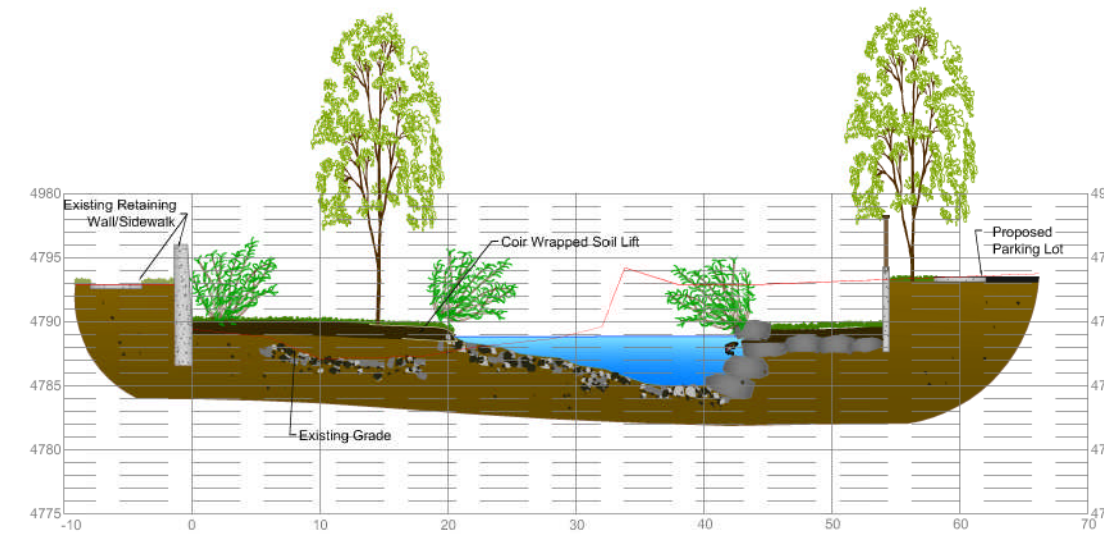
CONFLUENCE consulting incorporated



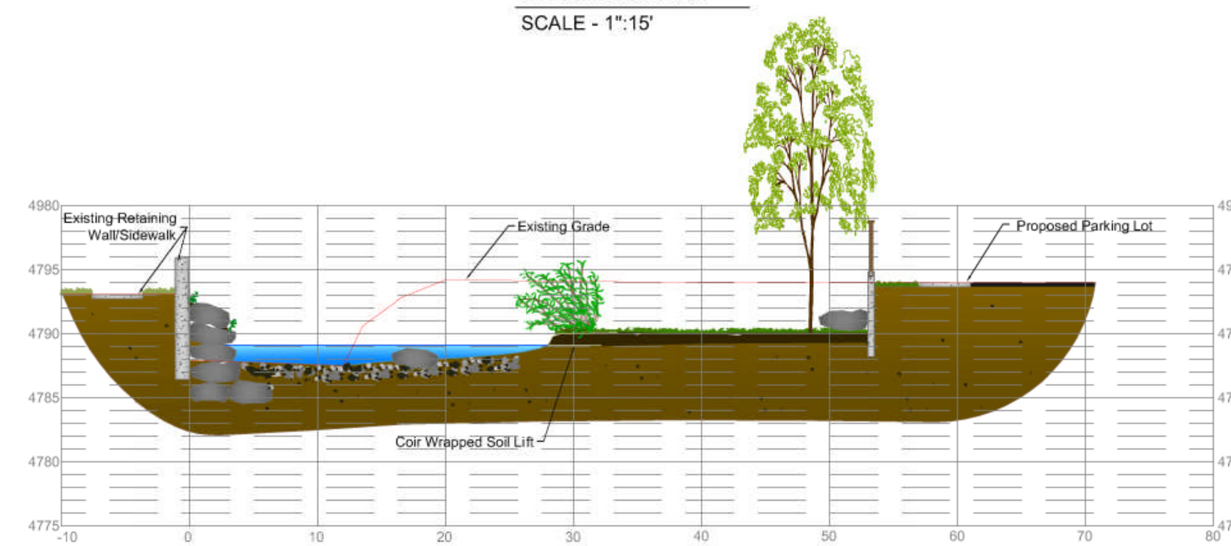
Site Plan
SCALE - 1":20'



Cross Section 3
SCALE - 1":15'



Cross Section 2
SCALE - 1":15'



Cross Section 1
SCALE - 1":15'

NOT FOR CONSTRUCTION

Riparian Vegetation
Native riparian vegetation such as willows, redosier dogwoods, alders, sedges, and rushes will be planted along the stream banks and floodplain. This vegetation will stabilize soils and provide needed cover for fish and terrestrial wildlife.

Overlooks
Two overlooks will be constructed to accommodate different users at the lot. The south overlook is a simple bench on a concrete pad. This area will look downstream and afford pedestrians the chance to watch the stream without walking north along the edge of the parking lot.

The second overlook is at the northwest corner of the lot and brings pedestrians closer to the water's edge. The overlook is sunken down 2.5 feet, nestling in to the ground as the stream bank begins to rise. At this location pedestrians will be closer to the water and vegetation. Views, both upstream and downstream, are excellent. This location is also adjacent to two deep pools where the public may be able to spot fish. A curving wood bench would also cantilever from the east concrete wall for a place to sit and view the stream or eat lunch. The overlook offers physical separation from both the parking lot and the stream. There is no direct access to the stream from this location. For safety purposes it is not advised that the public has access to the water as Bozeman Creek flows swiftly under Main Street from this point.

Curving Wall
The restoration work associated with the creek will create a large floodplain. That floodplain elevation is 4 feet lower than the finished grade for the parking lot. This necessitates the creation of a wall along the entire length of the parking lot. A curving, board form concrete wall could be cost effective and visually interesting with the right aesthetic applied. At the north end of the lot, the wall would split and create the landing for the northern overlook. The wall would only rise 4 inches above grade on the parking lot side so a railing is needed along its entire length. Railing styles will be considered at a later stage of design.

Colored Sidewalks
Standard width sidewalks are shown bordering the west and north edges of the parking lot. In order to give visual clues to the public that there is more to this parking lot than just cars, colored and patterned concrete can be utilized. A sinuous, water like pattern cut and died in the sidewalk could offer visual and textural clues that there is more to be discovered by taking that sidewalk. The patterns would terminate at the north overlook, adjacent to the stream.

Landscape Island / Bike Parking
Additional trees and shrubs will accent the southeast corner of the project. The landscape island will be significantly larger due to the reconfiguration of the parking lot. A Honey Locust tree that was located along Rouse will be relocated to the landscape island. Please see the attached planting schedule for more detail.

A bike parking location has also been located in the new island. This location is well lit and will afford space for about 8 bicycles. Various methods for securing bikes can be determined at the construction document phase.

PLANT LEGEND

SYM	BOTANICAL NAME COMMON NAME	SIZE	TYPE	NOTES	#
	TREES				
	PRUNUS VIRGINIANA 'SCHUBERT' CANADA CHOKECHERRY	2-1/2" CAL	B&B	SINGLE STEM	7
	GLEDITSIA TRIACANTHOS COMMON HONEYLOCUST	2-1/2" CAL	B&B	SINGLE STEM	3
	BETULA NIGRA RIVER BIRCH	8'-10' HT.	B&B	MULTI-STEM	9
	SHRUBS				
	SALIX DRUMMONDIANA DRUMMOND WILLOW	5 GAL	POT	PER PLAN	3
	CORNUS SERICEA RED TWIG DOGWOOD	5 GAL	POT	PER PLAN	12
	PRUNUS TOMENTOSA NANKING CHERRY	5 GAL	POT	PER PLAN	4
	SPIREA JAPONICA 'FROEBEL' FROEBEL SPIREA	5 GAL	POT	PER PLAN	12
	RIBES AUREUM GOLDEN CURRANT	5 GAL	POT	PER PLAN	17
	SALIX BEBBIANA BEBB WILLOW	5 GAL	POT	PER PLAN	7
	ALNUS INCANA SPECKLED ALDER	5 GAL	POT	PER PLAN	9
	SALIX LASIANDRA PACIFIC WILLOW	5 GAL	POT	PER PLAN	2
	GRASSES				
	HELICTOTRICHON SEMPERVIVENS BLUE OAT GRASS	1 GAL	POT	PER PLAN	14
	TAXUS X MEDIA 'TAUNTONII' TAUNTONS YEW	1 GAL	POT	PER PLAN	6
	SEEDING				
	COIR FABRIC WITH SEED	344 SF	PER SEED MIX SPECS		
	BROADCAST SEEDED AREA	3,206 SF	PER SEED MIX SPECS		

ROUSE PARK(ing)
Bozeman, MT

DESIGN 5
LANDSCAPE ARCHITECTURE AND PLANNING
4249 Cover Street, Bozeman, Montana
406.600.0342

CHECKED BY: TMS, JMS
FILE: Rouse Parking
DATE: 5/13/12
PROJECT: Rouse Park
DIR: c:/design/clients

SITE CONCEPT

L1.0

MAY 13, 2012

Grading & Drainage

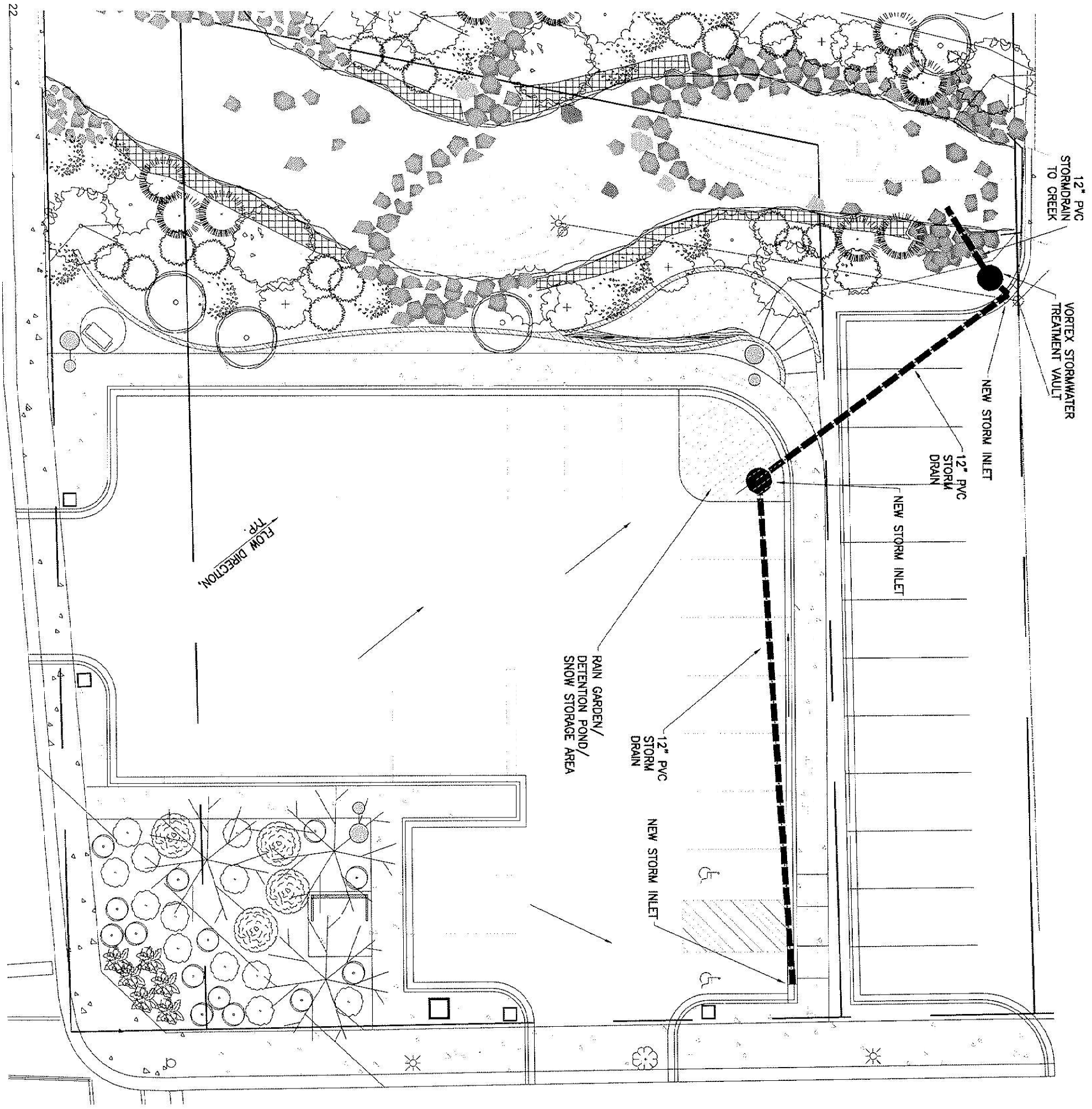
The recommended plan provides a simple, effective plan for accommodating storm water. The parking lot grading will be very similar to the existing grading of the lot. This is driven by the fact that the Eagles lot will be left mostly intact. In addition, the option ties in to Rouse Avenue and Babcock Street. So on three sides, the lot is constrained and must matching existing elevations.

By installing the new east-west curb, gutter and sidewalk, some runoff will be redirected to a new storm inlet in the northeast corner of the new lot. Water will then flow in a storm drain pipe to the new northwest inlet, where it will pick up more runoff. That runoff from the west portion of the lot, which is a majority of the runoff will first pass through a rain garden/ detention pond. That rain garden/pond will catch sediment and debris before allowing the flow to merge with the other runoff and continue to the final northwest inlet. That final northwest inlet would capture most of the runoff from the Eagles lot.

All the combined runoff would then pass through a buried vortex type stormwater treatment vault unit. That unit will remove oils, grease, trash, sediments and many of the urban runoff contaminants that are toxic to the stream. It will provide the final cleansing before discharge to Bozeman Creek.

Maintenance such as removing trash, sediment and debris will be needed throughout the system. Garbage will catch on the surface inlet grates. Trash and sediment will have to be cleaned out of the rain garden/ detention pond as well. That area will double as a snow storage area in the winter, and will accumulate sand and trash. And the vortex treatment unit will need regular cleaning to remove oils, grease, trash, and sediment.

In the end, this system will provide a much higher quality runoff from the site, and will slow down the runoff, thus reducing the peak flow and reducing flooding impacts downstream.



0 100' 200' 300'
SCALE

N

ROUSE PARK(ING)

CIVIL GRADING AND DRAINAGE PLAN

SHEET SHT #

D5-PREFERRED-OPTION.DWG

DRAWN BY:
DESIGNED BY:
QUALITY CHECK:
DATE:
JOB NO.
FIELDBOOK

TD&H Engineering
tdhengineering.com
GREAT FALLS-BOZEMAN-KALISPELL MONTANA
SPOKANE WASHINGTON
LEWISTON IDAHO

REVISIONS
BY DATE DESCR
BY DATE DESCR
BY DATE DESCR

BOZEMAN CREEK PARK(ing) PROJECT
Preliminary Estimate

Parking Lot Improvements

ITEM	DETAIL	QTY	UNIT	PRICE	COST	
4" Yellow Striping		534	LF	0.9	$ 481	
Curb and Gutter		473	LF	14.5	$ 6,859	
Sidewalk		1627	SF	10.75	$ 17,490	
Pedestrian Ramp		1	EA	3500	$ 3,500	
New Asphalt		986	SY	24.5	$ 24,157	
Stormdrain Inlet/Vortext Treatment Vault		1	EA	18500	$ 18,500	
Stormdrain Inlet		2	EA	2000	$ 4,000	
12" PVC Piping		145	LF	25	$ 3,625	
Rain Garden / Detention Pond		1	LS	3000	$ 3,000	
Demolish Existing Parking Lot		1	LS	9000	$ 9,000	
					Subtotal	**$ 90,611**
EAGLES LOT IMPROVEMENTS						
Cut and Remove Asphalt		200	LF	5	1000	
Curb and Gutter		200	LF	14.5	2900	
Stormdrain Inlet		1	EA	2000	2000	
					Subtotal	**$ 5,900**

Stream Improvements

ITEM	DETAIL	QTY	UNIT	PRICE	COST	
Grade control and bank armor stone	Rounded 1'-2' stone	180	CY	$ 50	9,000	
Rrandom boulder placement stone	Rounded 2'-3' stone	45	CY	$ 80	3,600	
Stream bed material	Rounded 4"-12" stone	200	CY	$ 35	7,000	
Spawning gravel	Rounded 1/4"-3" stone	50	CY	$ 45	2,250	
Stackable, flat decorative stone	Flat 18"-30" thick by 3'-6' wide	60	CY	$ 160	9,600	
Topsoil		140	CY	$ 35	4,900	
Woven coir BonTerra CF7	9' by 165'	3	rolls	$ 650	1,950	
Nonwoven coir North Americn Green C125BN	6' by 108'	4	rolls	$ 150	600	
Clearing, grubbing, and disposal	Concrete, rubble, floodplain soil, vegetation	1	lump sum	$ 5,000	5,000	
Channel construction	Equipment and labor	163	feet	$ 150	24,450	
Dewatering	Assume pumping entire stream	1	lump sum	$ 25,000	25,000	
					Subtotal	**$ 93,350**

Landscaping

ITEM	QTY	UNIT	PRICE	COST	
Board Form Concrete Wall / Overlook	52.5	CY	$85	4,463	
Concrete labor	1187	SF	$8	9,496	
Steel Rebar	800	LBS	$0.65	520	
Overlook Wood Bench	1	EA	$2,000	2,000	
Railings	190	LF	$35	6,650	
Poured / Stained Sidewalk	1168	SF	$15	17,520	
Shrubs (installed)	66	EA	$50	3,300	
Plant Plugs (Installed)	60	EA	$6	360	
Trees (Installed)	14	EA	$400	5,600	
Perennials (Installed)	20	EA	$21	420	
Seeding	3086	SF	$0.75	2,315	
Bike Rack / Pad site	1	EA	$900	900	
Benches (Installed)	1	EA	$1,300	1,300	
Educational Sign Display	1	EA	$2,000	2,000	
Earthwork	1	ALLOW	$5,500	5,500	
General Labor	1	ALLOW	$10,000	10,000	
Top soil	10	CY	$35	350	
Mulch	5	CY	$35	175	
Irrigation	1	ALLOW	$10,000	10,000	
Lighting (Installed)	3	EA	$ 6,500	19,500	
Bollards (Installed)	4	EA	$ 1,500	6,000	
One "P" Corner Directory Parking Sign (Installed)	1	EA	$ 5,000	5,000	
				Subtotal	**$ 113,368**

SUBTOTAL	$ 303,229
15% Contin.	15%
	$ 45,484
TOTAL	**$ 348,714**

***NOTE: Total does not include professional fees for final drawings or permitting fees.**