

RIVER ROCK PARK MASTER PLAN

PREPARED FOR: CITY OF BILLINGS
PARKS, RECREATION & PUBLIC LANDS
390 North 23rd Street
Billings, Montana 59101

SUBMITTED BY: BOYER LAND, LLC
2810 Central Ave., Unit C
Billings, Montana 59102

PREPARED BY: PEAKS TO PLAINS DESIGN PC
404 North 31st Street, Suite 405
Billings, Montana 59101





RIVER ROCK PARK

ABOUT THE PARK

River Rock Park consists of two tracts of land totaling 6.02 acres located within the proposed River Rock Estates Subdivision generally located south of the High Ditch and north of the Big Ditch on the west side of 46th Street West in Billings, Montana. This park is also adjacent to the existing Rimrock West Park.

The developer has donated two tracts of park land, one consisting of 0.54 acres (23,491 square feet), runs along the High Ditch on the north border, generally dedicated for purposes of the Heritage Trail. The second tract consists of 5.48 acres (238,599 square feet) and is located in the southeast corner of the subdivision, immediately west of Rimrock West Park.

The River Rock Park master plan will guide development of the park to provide unique amenities to the area, compliment Rimrock West Park, and be a recreational resource to the River Rock Estates Subdivision.

ADJACENT PARK – RIMROCK WEST PARK

Rimrock West Park consists of approximately 10 acres and is located immediately east of River Rock Park. Rimrock West Park was developed in 2005 and consists of large unprogrammed open space, a playground, off-street parking, multi-purpose trail and a storm water detention pond. Currently, Rimrock West Park is well used by the neighborhood residents and its greater open space is used for Little Guy Football and soccer practices.

OVERALL GOALS OF THE RIVER ROCK PARK MASTER PLAN

The master plan is an overall guiding document for the future development of River Rock Park. There are several circumstances unique to the park site this plan will address including:

- The final configuration of the detention basin and the percentage the maximum pool will occupy.
- How nuisance flows will be handled.
- Pedestrian circulation and park amenities.
- Illustrate how River Rock Park will be integrated with Rimrock West Park to provide a seamless transition between the two parks.
- Provide a detailed opinion of probable cost of improvements with factors adjusting for inflation for five years.

MASTER PLAN PROCESS

The master plan process was guided by the policy provided by the City of Billings Parks, Recreation and Public Lands Department (PRPL). The procedure included the hiring of a consultant by the developer, who is responsible for the creation or compilation of base data, review of legal requirements, meeting with staff, facilitating public meetings and preparing the plan for approval.

PUBLIC MEETINGS

Two public meetings were held on May 26, 2011 and June 21, 2011 at Arrowhead Elementary School. The meetings were legally advertised and property owners within the Rimrock West Subdivision were notified of each meeting by postcard sent to the property owner's address.

The first public meeting included a review of the planning process, overview of the proposed subdivision, a presentation of a preliminary design concept and opportunity for Q&A as well as an opportunity for written feedback regarding elements of the plan and general comments. Thirteen people signed in at the first meeting. Returned comments are included in the appendix.

The second public meeting reviewed the purpose of the process, presentation of the comments received from the public, an explanation on how the design addressed those comments, a presentation of the proposed draft design, review of implementation of the park elements and approval schedule. Ten people signed in for the second meeting. Returned comments are included in the appendix.



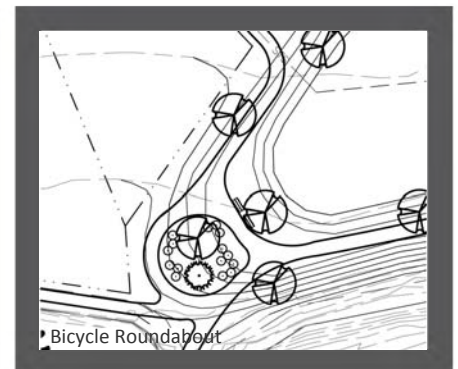
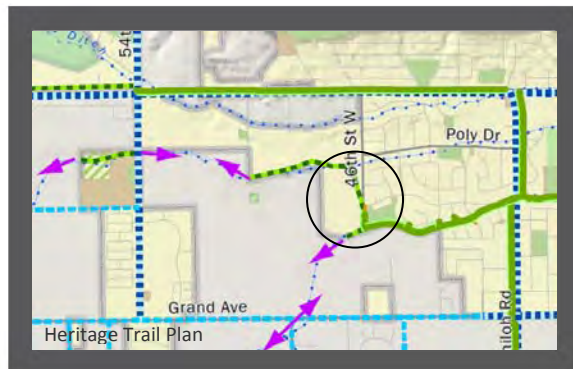
PARK LAND ELEMENTS

HI-LINE DITCH TRAIL

In the Heritage Trail Plan, the Hi-Line Ditch and the Big Ditch are shown as designated trail routes. A 20-foot wide dedicated linear park will be provided along the south side of the Hi-Line Ditch which a 10-foot pedestrian trail may be constructed. The park land to accommodate the Hi-Line Ditch trail consists of 0.54 acres specifically for this purpose.

BIG DITCH TRAIL

An existing multi-use trail runs along the south side of Rimrock West Park and ends approximately 10 feet short of the west property line. As part of this plan, provisions are made to extend the trail along the south edge of the park and traverse along the top of the berm separating the detention pond and the Big Ditch. At the southwest corner of the park, near lot 10 and 11, a bike roundabout is suggested due to the fact that the trail has the potential to “branch” in three directions. The trail can continue to run south, following the Big Ditch; it may continue west following an old drainage ditch to the subdivision’s west property line; and it may continue north to tie into South Stone Creek Trail road, between lots 11 and 12.



PEDESTRIAN CIRCULATION

In addition to the two trail corridors defined above, additional pedestrian circulation has been addressed within and around the park. Additional street right-of-way is being provided along 46th Street West. Although this 24 feet of right-of-way is *not* park land, it will contain a meandering 5-foot wide sidewalk that runs from the north side of Rangeview Drive to the north boundary of the River Rock Estates Subdivision. This sidewalk will connect the two trail corridors identified above.

On the south side of Rangeview Drive, this sidewalk will connect on the west side of the intersection of Rangeview Drive and 46th Street West, continue to the south for approximately 125 feet, then connect to the existing trail extension that connects to the Big Ditch Trail.

Pedestrians can utilize the sidewalks and trails in both parks, and a loop connecting the sidewalks and trails is approximately one-half mile.

DETENTION BASIN

The storm drainage system for River Rock Estates Subdivision consists of a series of surface sheet and gutter flow, underground piping, a detention pond and discharge into the Big Ditch. The storm drainage system has been sized by an engineer to accommodate the 2-year and 10-year storm events as dictated by the City of Billings Stormwater Management Manual (SWMM), dated February 2003.

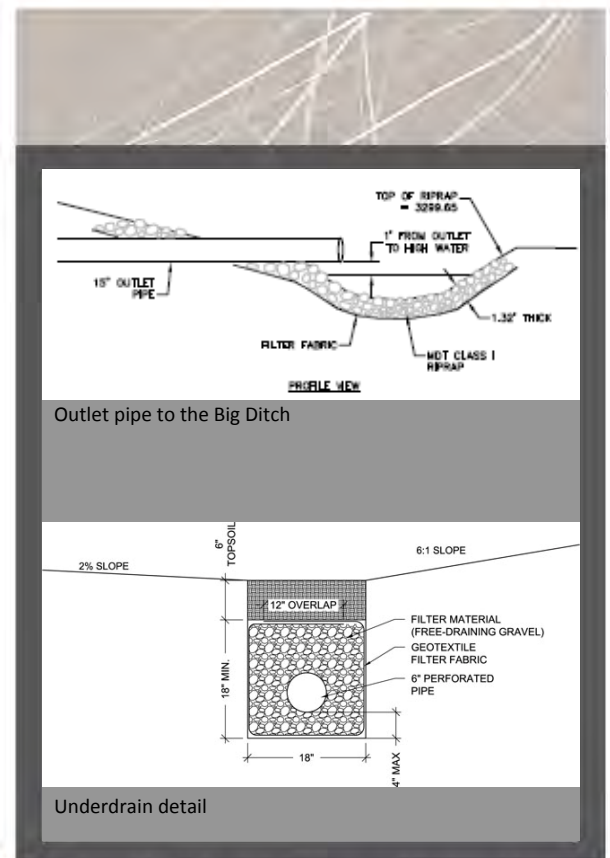
A detention pond is located on the south side of River Rock Park. The configuration of the pond allows for unprogrammed open space activities during non-storm events. The surface area of the detention pond is 1.5 acres, or 25 percent of the dedicated park land area. However, the detention pond is designed to drain completely within 24 hours of a 100-year storm event to the Big Ditch. The storm water calculations include up to 5 cubic feet per second of flow from the eastern two-thirds of the future subdivision to the north of River Rock Estates.

A stormwater discharge agreement has been entered into between the subdivider and the Big Ditch Company. The stormwater flows from the River Rock Estates subdivision are permitted to discharge to the pre-development rate as outlined in the SWMM or the DEQ Circular 8, whichever is more restrictive.

A 15-inch outlet pipe transports the water in the detention pond to the Big Ditch. The invert out elevation of the pipe is set at one-foot higher than the high water mark in the ditch, preventing water from the ditch to back up into the pond.

Nuisance flows will be handled through an under drain system that picks up outflows from the 12-inch pipe on the west side of the park, and transport those flows underground to the storm drain outlet structure located at the east end of the park.

On the south edge, a berm with 4:1 slopes to the ditch and 6:1 slopes to the pond creates the south edge of the basin. A spillway crest is centered on the berm, which the trail will traverse over the spillway.



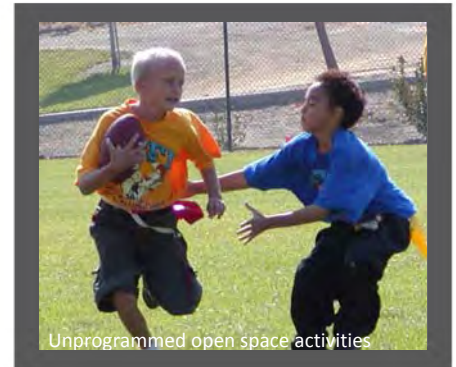
UNPROGRAMMED OPEN SPACE

Unprogrammed open space is a vital component of the Billings' park systems. These spaces consist of large open areas, graded near 2 percent or less and are clear of built elements or vegetation. The demand for these types of spaces is high. Rimrock West Park is heavily used by organized groups for sports practices and gatherings. River Rock Park contains almost 3 acres of this type of space. The spatial dimensions of the layout and grading accommodate at least one regulation-sized junior high soccer field.

The open space will be bordered on the east and west sides by deciduous and evergreen trees. The unprogrammed open space will consist of a low water turf-type seed mix and will be irrigated. The fence line currently along the east boundary of River Rock Park will be removed. No visible boundaries will be set between the two parks at this location. The east side of the park will blend into the west side of Rimrock West Park, creating a seamless transition between the two parks.

LAWNS AND NATIVE LAWN AREAS

The unprogrammed open space areas will receive a seed mix that is conducive to heavy foot traffic, responds well to weekly mowing and is appropriate for the soil conditions. The final seed mix may vary due to improvements in varieties between the adoption of this master plan and actual implementation. However, this seed mix provides a guideline for the master plan.



Irrigated Lawn Mix:

- 20 percent Grande II Tall Fescue
- 20 percent Spyder LS Tall Fescue
- 20 percent SR 8650 Tall Fescue
- 20 percent Titanium Tall Fescue
- 10 percent Champion Perennial Ryegrass
- 10 percent Moonlight SLT Kentucky Bluegrass

A native lawn mix is recommended for the steep slopes along side the Big Ditch Trail, reducing the amount of lawn area required for irrigation and weekly maintenance. Note that a native mix takes approximately two years for proper establishment. During the establishment period, weed control and possibly reseeded for erosion control may be necessary.

Native Lawn Mix

- 30 percent Hard Fescue
- 20 percent Canada Bluegrass
- 15 percent Fairway Crested Wheatgrass
- 15 percent Sheep Fescue
- 10 percent Sodar Streambank Wheatgrass
- 10 percent Perennial Ryegrass

IRRIGATION SYSTEM

The large, open space in the main park area will have an automatic irrigation system. The irrigation system shall comply with the City of Billings PRPL standards and requirements for Maxicom Central Controls. The irrigation system is usually the most expensive piece of infrastructure located within a park.

There are four possible water sources to supply the irrigation system at River Rock Park. Domestic, potable water is available at the north end of the park, in a water main line below Ridgeview Drive. However, utilizing a new potable water source will increase construction costs due to the system development fees.

Another option is to utilize the existing potable water connection in Rimrock West Park. This water connection currently has a 4-inch service line with a 2-inch meter. Upsizing the meter from a 2-inch to a 3-inch meter would provide an additional 190 gallons per minute for the system in River Rock Park, plus the system development fees would be the difference of cost from a 2-inch to 3-inch meter. If this water source is selected, a new irrigation controller would be necessary for River Rock Park.

An exempt well could be drilled to supply the water for the irrigation. Under current State law, the maximum production out of the well can only be 35 gallons per minute or 10-acre feet per year, whichever is less without going through the water rights process. These limitations are constantly under scrutiny from the State Legislature, and may change at any time. However, pursuing a groundwater right is an option in this area.

The agreement with the Big Ditch Company to allow stormwater discharge specifically states that shares purchased under the stormwater agreement do not constitute an agreement or right to remove water from the ditch for any purpose. However, a separate purchase of shares could be considered for purposes of irrigating the park. The result would be the placement of a pump station to filter and provide the necessary capability to do such work.



PARKING LOT

As part of the platting process, an off-street parking area is required immediately east of Lot 2, Block 6. Six parking stalls are required with a 10 foot landscape buffer on the west side.

PICNIC SHELTER

Through the master plan process, staff and meeting attendees indicated a need for a picnic shelter and/or additional picnic tables to be placed in the most active areas of River Rock Park. The picnic shelter is depicted on the master plan immediately south of the parking area for ease of loading/unloading, garbage control and views to the playground in Rimrock West Park. The diagram depicts a 16-foot by 24-foot shelter, which would cover two tables; however, during implementation, the actual size and design would be decided.

PLAYGROUND

During the public process, several meeting attendees cited the need for additional playground area to compliment the existing structures at River Rock Park. It was suggested that a smaller, preschool-aged playground be placed within the vicinity of the picnic shelter. A 660 square foot playground area is depicted on the master plan. During implementation, the actual size and configuration would be determined.



SITE FURNITURE & ADDITIONAL AMENITIES

Miscellaneous site furniture such as picnic tables, benches, interpretative signs and trash receptacles are additional amenities that could be provided in this neighborhood park.

Trees and some shrubs are depicted on the plan for graphical representation. The actual tree species will be determined at the time of implementation and placed appropriately within the site conditions. However, in general, the intent is to keep as much of the unprogrammed open space as open as possible, and place the trees in these areas along the perimeter of the park. In addition, staff requested that trees be concentrated around the parking lot, shelter and playground area for microclimate control.

IMPLEMENTATION

SPECIAL IMPROVEMENT DISTRICT

A Special Improvement District (SID) will be created when building permits are issued for 60% of all the lots in River Rock Estates. This assessment will fund the park improvements detailed in the approved park master plan. At the time of the creation of the SID, the City of Billings will engage in a public process to determine to what extent the improvements are paid for through the SID. At a minimum, the SID will cover any remaining grading and earthwork, the irrigation system and water source, the seeding of turf and native grasses and trees.

Additional improvements of this master plan may include the picnic shelter, Heritage Trail extensions, sidewalks, parking lot, playgrounds and site furniture. These are considered to be optional improvements. The property owners, through a public process, will have the opportunity to decide if these improvements are appropriate for the initial phase of implementation.

DEVELOPER REQUIREMENTS

The developer is required to implement the necessary grading for the stormwater detention pond, storm drain pipe, seeding of disturbed soils, the under drain and the sidewalk along 46th Street West.

PARK MAINTENANCE DISTRICT

Immediately upon approval of the Final Plat, the lots associated with River Rock Estates Subdivision will form a park maintenance district (PMD) to fund the on-going operational and maintenance expenses associated with the park. After the park is developed, the PMD will be re-evaluated to see if cost savings can be achieved through combining area PMDs.

Opinion of Probable Costs (2011 dollars)

Required improvements paid through the SID	\$254,248
Optional improvements at the discretion of the property owners	\$319,594
TOTAL	\$573,842

Average cost per acre at total build out:
\$95,323

Note that optional improvements may be funded through other means such as grants, private fund raising, donations, etc.

A breakdown of costs and inflation projections is included in the Appendix.

APPENDIX

Master Plan Graphics
Opinion of Probable Cost
Comments Received from Public Meetings
Stormwater Design Report
Stormwater Engineering Plans
Stormwater Discharge Agreement





MASTER PLAN
RIVER ROCK PARK

TRACT 2 REMAINDER
 C.O.S. No. 3273





RIVER ROCK PARK

DRAFT MASTER PLAN

OPINION OF PROBABLE COST

Project: River Rock Park

Phase: Master Plan

Date: July 13, 2011

Prepared By: Peaks to Plains Design, PC

		Year 1	Year 2	Year 3	Year 4	Year 5
	TOTAL	Inflation at	Inflation at	Inflation at	Inflation at	Inflation at
REQUIRED IMPROVEMENTS PAID THROUGH A SID		2.4%*	2.4%	2.4%	2.4%	2.4%
Irrigation System & Water Source	\$ 109,825	\$ 112,461	\$ 115,160	\$ 117,924	\$ 120,754	\$ 123,652
Earthwork	\$ 35,344	\$ 36,192	\$ 37,061	\$ 37,950	\$ 38,861	\$ 39,794
Seeding	\$ 23,852	\$ 24,424	\$ 25,011	\$ 25,611	\$ 26,226	\$ 26,855
Trees	\$ 5,750	\$ 5,888	\$ 6,029	\$ 6,174	\$ 6,322	\$ 6,474
General Overhead, Fees & Contingency	\$ 79,477	\$ 81,384	\$ 83,338	\$ 85,338	\$ 87,386	\$ 89,483
TOTAL	\$ 254,248	\$ 260,350	\$ 266,599	\$ 272,997	\$ 279,549	\$ 286,258
OPTIONAL IMPROVEMENTS AT THE DISCRETION OF THE PROPERTY OWNERS AT THE TIME OF IMPLEMENTATION						
Picnic Shelter & Concrete Pad	\$ 38,550	\$ 39,475	\$ 40,423	\$ 41,393	\$ 42,386	\$ 43,403
Non-Heritage Trail Sidewalks	\$ 7,740	\$ 7,926	\$ 8,116	\$ 8,311	\$ 8,510	\$ 8,714
Playground	\$ 35,263	\$ 36,109	\$ 36,976	\$ 37,863	\$ 38,772	\$ 39,703
Site Furniture	\$ 5,819	\$ 5,959	\$ 6,102	\$ 6,248	\$ 6,398	\$ 6,552
Parking Lot	\$ 32,034	\$ 32,803	\$ 33,590	\$ 34,396	\$ 35,222	\$ 36,067
Hi Ditch Trail	\$ 78,819	\$ 80,711	\$ 82,648	\$ 84,631	\$ 86,662	\$ 88,742
Big Ditch Trail and Connection to future subdivision to the west	\$ 121,369	\$ 124,282	\$ 127,265	\$ 130,319	\$ 133,447	\$ 136,649
TOTAL	\$ 319,594	\$ 327,264	\$ 335,119	\$ 343,161	\$ 351,397	\$ 359,831
TOTAL ALL IMPROVEMENTS	\$ 573,842	\$ 587,614	\$ 601,717	\$ 616,158	\$ 630,946	\$ 646,089
<i>Cost per acre (6.02 acres)</i>	\$ 95,323	\$ 97,610	\$ 99,953	\$ 102,352	\$ 104,808	\$ 107,324

*Average annual inflation 2001-2010 was 2.38%. Source: <http://www.usinflationcalculator.com/inflation/historical-inflation-rates/>

River Rock Estates Subdivision

River Rock Park Master Plan

Public Meeting #1

May 26, 2011

Thank you for taking the time to attend tonight's meeting. We are interested to read about your thoughts regarding the following questions. If you have additional comments, please send them to Mark Jarvis, Parks Planner; City of Billings Parks, 390 N. 23rd St., Billings, MT 59101 or (406) 657-8367 or jarvism@ci.billings.mt.us.

1. What type of activities do you think would take place in River Rock Park? How often do you think those activities would occur?

- Neighborhood use out of
- Sports practice (soccer - little guy football)

2. What types of amenities do you think are important to both subdivisions and/or parks?

① Picnic shelter / ② Play ground equipment for
pov school kids.

→ Add to existing in Rimrock

3. Should a formal path or sidewalk connect the proposed parking lot to the unprogrammed open space? Why or why not?

If it will keep down ~~water~~ ~~down~~
on grass, mud etc.

4. A proposed picnic shelter with room for two tables is proposed south of the parking lot and west of the Rimrock West playground. Is the proximity of the shelter appropriate to other features of both parks? Is the proposed size (for two tables) appropriate?

Yes

5. Do you feel if it is appropriate to leave part of River Rock Park natural (with native grasses) in order to reduce maintenance costs?

Yes - keep down basic natural
- original near the play field

Please provide any other comments regarding the River Rock Park Master Plan on the back.

Combine with Rimrock West
EJ Wilkerson

Poly Drive was made wide - Why isn't the new sub-div. hooking up with Poly instead of Rangerview - which is curvy & narrow

River Rock Estates Subdivision

River Rock Park Master Plan

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1. What type of activities do you think would take place in River Rock Park? How often do you think those activities would occur?

The entire city uses the park now - Kids use it for senior parties - Ironwood, Arrowhead, Grand Ave. etc. all use this park. Y.C.C.

2. What types of amenities do you think are important to both subdivisions and/or parks?

Playground equipment.

3. Should a formal path or sidewalk connect the proposed parking lot to the unprogrammed open space? Why or why not? yes

4. A proposed picnic shelter with room for two tables is proposed south of the parking lot and west of the Rimrock West playground. Is the proximity of the shelter appropriate to other features of both parks? Is the proposed size (for two tables) appropriate? no

5. Do you feel if it is appropriate to leave part of River Rock Park natural (with native grasses) in order to reduce maintenance costs? no

Please provide any other comments regarding the River Rock Park Master Plan on the back.

Are the construction trucks going to use 46th instead of Rangerview?
Why isn't Poly an access since it is wider than Rangerview? Poly is straight!

River Rock Estates Subdivision
River Rock Park Master Plan
Public Meeting #1
May 26, 2011

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1. What type of activities do you think would take place in River Rock Park? How often do you think those activities would occur? -picnic tables yes -

playground for ages 2-5 to share
with playground @ Rimrock West.

2. What types of amenities do you think are important to both subdivisions and/or parks? -

proper drainage - water drainage

3. Should a formal path or sidewalk connect the proposed parking lot to the unprogrammed open space? Why or why not? ?

4. A proposed picnic shelter with room for two tables is proposed south of the parking lot and west of the Rimrock West playground. Is the proximity of the shelter appropriate to other features of both parks? Is the proposed size (for two tables) appropriate?

more tables and shelter
4 tables

5. Do you feel if it is appropriate to leave part of River Rock Park natural (with native grasses) in order to reduce maintenance costs? no

Please provide any other comments regarding the River Rock Park Master Plan on the back.

River Rock Estates Subdivision

River Rock Park Master Plan

Public Meeting #1

May 26, 2011

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1. What type of activities do you think would take place in River Rock Park? How often do you think those activities would occur?

SOCCER, FOOTBALL, ETC. PRACTICE - 3 X A WEEK
FAMILY PICNICS, KID ACTIVITIES - DAILY

2. What types of amenities do you think are important to both subdivisions and/or parks?

PLAYGROUND EQUIPMENT FOR CHILDREN OF ALL AGES.
PICNIC AREAS FOR LARGE GROUPS.
LOTS OF TREES

3. Should a formal path or sidewalk connect the proposed parking lot to the unprogrammed open space? Why or why not?

NO. A WASTE OF MONEY

4. A proposed picnic shelter with room for two tables is proposed south of the parking lot and west of the Rimrock West playground. Is the proximity of the shelter appropriate to other features of both parks? Is the proposed size (for two tables) appropriate?

1ST OFF, THE PARK NEEDS MORE TABLES. TWO TABLES IS CERTAINLY NOT ENOUGH. RIMROCK WEST DOESN'T REALLY HAVE MUCH FOR FEATURES. IT DOESN'T LOOK LIKE RIVER ROCK WILL EITHER

5. Do you feel if it is appropriate to leave part of River Rock Park natural (with native grasses) in order to reduce maintenance costs?

THE PARK ISN'T NEEDED TO BEGIN WITH. NATIVE GRASSES ARE FOR THE PRAIRIE.

Please provide any other comments regarding the River Rock Park Master Plan on the back.

SEE BACK

HAVING A PARK FOR EVERY NEW DEVELOPMENT IS A WASTE OF MONEY. RIMROCK WEST, IF IT WERE FURTHER DEVELOPED WOULD SERVE BOTH SUBDIVISIONS. RIMROCK WEST IS REALLY JUST A STORM DRAIN AREA WITH THE PARK AS A AFTER THOUGHT.

IF THE CITY REALLY THINKS THAT ALL SUBDIVISIONS NEED A PARK THEN PLACE THE PARK IN THE MIDDLE OF THE SUBDIVISION NOT IN THE AREAS THAT DEVELOPERS KNOW THEY CAN'T BUILD HOUSES, LASTLY THE DEVELOPER SHOULD PAY FOR AND DEVELOP THE PARK IN THE BEGINNING, NOT HAVE THE NEW HOME OWNERS PAY FOR IT.

River Rock Estates Subdivision

River Rock Park Master Plan

Public Meeting #1

May 26, 2011

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1. What type of activities do you think would take place in River Rock Park? How often do you think those activities would occur? *Family play - sports year round*

2. What types of amenities do you think are important to both subdivisions and/or parks?

*Small children play equipment ages 2-6
Picnic tables*

3. Should a formal path or sidewalk connect the proposed parking lot to the unprogrammed open space? Why or why not? *I don't see a need unless the*

planned soccer area would interfere.

4. A proposed picnic shelter with room for two tables is proposed south of the parking lot and west of the Rimrock West playground. Is the proximity of the shelter appropriate to other features of both parks? Is the proposed size (for two tables) appropriate?

*Location is fine - more than 2 tables
is needed*

5. Do you feel if it is appropriate to leave part of River Rock Park natural (with native grasses) in order to reduce maintenance costs?

*If natural grass renders it unusable what's
the point - a park needs to be more than
grass.*

Please provide any other comments regarding the River Rock Park Master Plan on the back.

*15 acres - (2 parks combined) of grass seems
quite silly to me. Play areas, picnic, equipment
is what makes sense. Maintenance should be
left separate.*

River Rock Estates Subdivision
River Rock Park Master Plan
Public Meeting #1
May 2011

The problem with the current proposal is the amenities at the new portion of the park (River Rock) will pale in comparison to that of those currently paid for and maintained by Rim Rock. And if the plan is for a seamless park, then River Rock and Silver Creek should pay to establish the River Rock portion of the park with all three subdivisions (Rim Rock, River Rock & Silver Creek) to pay equally for maintenance of the combined park.

From the sound of the proposal, Silver Creek would have no SID or maintenance fees AND will have a lower than required financial contribution being some of the land being donated for River Rocks development will benefit Silver Creek.

The questions you have about the park:

1. The activity and frequency of use of the park **totally** depends upon the facilities available.
2. Amenities for the park should include **pre-school** play equipment and a shelter with adequate seating for the demand anticipated at the park. Please also consider other painted play area like hopscotch, 4 square etc. I would hope the city has templates that parks and schools can use where it would be an inexpensive addition to a path by the play or picnic area.
3. If there is a path to the open space, it should loop to connect to somewhere so it can be used as a walk/run/bike path. If not it should have a bench at the end of the path.
4. The proposed area for picnic shelter is good but seriously inadequate . There should be enough seating for families to picnic or sports teams, like soccer, to have snacks. There should be at least 4-6 picnic tables, preferably room for 8 to 10 to accommodate multiple groups.

5. It is important to keep maintenance cost to a minimum, but it appears the city is willing to accept lots of useless land: area planned for native grass and the water retention area which will be a swap for mosquitoes. By observing Rim Rock Parks water drainage area, the areas in both parks will be useless with Rim Rocks being worse if it is to be a water retention area. As someone at the meeting pointed out at times, like these, the drainage ditch is already full and I fear that trying to add more water to it will cause damaging floods somewhere. Especially with the increase in severe weather the country including this area have come to experience in recent time. Although no one can predict the future, we can be wisely prepared for what is reasonable to expect in this tumultuous climate.

Other comments:

After attending the River Rock Park public meeting, my biggest concern is in the fundamentals of the plotting, in that some of the land donated will be in exchange for allowing Silver Creek subdivision to be developed - at an unspecified time. The people entering the agreement now (city council members and current land owner/developer) may not be the ones having to finalize/settle the agreement. Laws and topography might change between now and when the land is requested to be plotted for development, leaving the city in a compromised position. It should be all or nothing at the time of plotting. If ANY land donation for Silver Creek development is to be accepted, then ALL plotting of Silver Creek should be done at this time. It would be unethical to not have a complete legal agreement between the city and developer for Silver Creek. The only way to do that is remove any allowances (laws might change between now and when it is developed) for Silver Creek or include plotting of Silver Creek with River Rock and the land donation/financial settlement as required by law. The current proposal also leads to a problem of Silver Creek **not** paying for development or maintenance fees for their local park.

River Rock Estates Subdivision
River Rock Park Master Plan
Public Meeting #2
June 21, 2011

Thank you for taking the time to attend tonight's meeting. The purpose of tonight's meeting is to present the draft master plan and receive feedback on your opinion about the design of River Rock Park. If you have additional comments, please send them to Mark Jarvis, Parks Planner; City of Billings Parks, 390 N. 23rd St., Billings, MT 59101 or (406) 657-8367 or jarvism@ci.billings.mt.us.

Comments or suggestions regarding the draft master plan for River Rock Park:

I'm concerned about the lack of ~~many~~^{enough} parking spaces. When there are organized activities such as soccer, etc, there is a definite lack of parking in the existing Bemrock West subdivision. With the number of allotted spaces (proposed) I'm concerned there will be overflow parking on the residential streets. It becomes a parking problem for the homeowners.

Kim Peil

River Rock Estates Subdivision
River Rock Park Master Plan
Public Meeting #2
June 21, 2011

Thank you for taking the time to attend tonight's meeting. The purpose of tonight's meeting is to present the draft master plan and receive feedback on your opinion about the design of River Rock Park. If you have additional comments, please send them to Mark Jarvis, Parks Planner; City of Billings Parks, 390 N. 23rd St., Billings, MT 59101 or (406) 657-8367 or jarvism@ci.billings.mt.us.

Comments or suggestions regarding the draft master plan for River Rock Park:

① Good ^{advance} public outreach, inform ahead of development / SID

② Ensure homeowners are aware of SID. Post sample master plans on web & "SAMPLE / EXAMPLE" of what a 'demo' park plan & companion SID assessment to more inform -

③ SUGGEST: one option should include developed Heritage Trail System through River Rock (along both ditches to west until subdivision ends)

④ Keep it simple. make productive use of Berms (skidding / rolling) but also incorp. large rocks on berms for "jumping" spaces (Country Manor Park).

⑤ At 10% } re-do those meetings / or regularly
30% } inform so it is anticipated not
50% } negative.

⑥ Don't lock-in development @ 60% sooner if wanted sooner.

River Rock Estates Subdivision
River Rock Park Master Plan
Public Meeting #2
June 21, 2011

Thank you for taking the time to attend tonight's meeting. The purpose of tonight's meeting is to present the draft master plan and receive feedback on your opinion about the design of River Rock Park. If you have additional comments, please send them to Mark Jarvis, Parks Planner; City of Billings Parks, 390 N. 23rd St., Billings, MT 59101 or (406) 657-8367 or jarvism@ci.billings.mt.us.

Comments or suggestions regarding the draft master plan for River Rock Park:

River Rock West has a great deal of open grass practice space, which is used by the entire city. What is lacking is more playground space, tables, benches, walking paths, trees & shelter. It appears that this master plan will only give us more grass to water & maintain.

STORMWATER DESIGN REPORT

FOR

RIVER ROCK ESTATES SUBDIVISION

BILLINGS, MONTANA

INTRODUCTION

River Rock Estates Subdivision is generally located between Poly Drive and Rangeview Drive, on the western side of 46th Street West in Billings, MT. This report details the necessary stormwater management facilities required for this project site. The design conforms to the City of Billings Stormwater Management Manual (SWMM), dated February 2003.

GENERAL INFORMATION

The proposed storm drainage system for this project consists of a series of surface sheet and gutter flow, underground piping, a detention pond, and discharge into an existing irrigation ditch which runs along the southern edge of the property. The underground system is comprised of 12-, 18-, 24-, and 27-inch pipe and 48- and 60-inch diameter concrete manholes, with curb inlets at appropriate locations around the site. The total surface area contributing to stormwater flow is approximately 36 acres and the existing slopes on-site range up to 2.5%, generally sloping to the south. The storm drainage system has been sized to accommodate the 2-year and 10-year storm events. This system has also been designed to convey up to 5 cfs from the future Silvercreek Subdivision to the north.

CALCULATION PARAMETERS

The following calculations are based on the design procedures documented in the SWMM for the City of Billings, Sixth Edition, dated February 2003.

The estimated post-development area flowing to each stormwater inlet is displayed on the stormwater exhibit (Figure 1). For each of these areas, weighted “CN” values were determined based on the respective ratios of lot area to street area. This area lies in the Wanetta soil group (Group “B”), which results in a “CN” value of 72 for the lots and 90.2 for street right-of-ways. For the SCS method, the direct runoff is reported in Table 2-8 of the City of Billings Stormwater Management Manual (SWMM). The flow calculations for each basin can be found in the Appendix.

INLET CALCULATIONS

SWMM states the 2-year and 10-year storms must not overtop the curb. The maximum allowable flow depth is then 0.46 feet, which equals the vertical distance from the flow line to the top of curb. All inlets on this site are sag inlets with the exception of two on-grade inlets along North River Rock. To be conservative, it was assumed that all of the flow bypassed these on-grade inlets and continued to the next sag inlet.

SWMM Chapter 4 allows a sag inlet operate as a weir up to a depth of 0.40 feet. Since the allowable depth is 0.46 feet, the weir equation and the orifice equation were compared at that depth. It was determined that the weir equation provided a more conservative constraint. Calculating the flow for the inlets using the weir equation at a depth of 0.46 feet gives:

$$Q = 3.0 * P * d^{1.5}$$

Where, P = perimeter of inlet excluding curb side = 4.92 feet

d = depth = 0.46 feet

$$Q = 3.0 * 4.92 * 0.46^{1.5} = \mathbf{4.60 \text{ cfs}}$$

Since the maximum flow is less than 4.60 cfs to each inlet (highest flow to a single inlet is 3.72 cfs), no additional inlets will be needed at the sag curves.

UNDERGROUND PIPE CAPACITY

Pipe sizing was based on the SCS Method as outlined within SWMM. The 2-year storm event’s total flow was found to be 6.32 cfs for River Rock Estates Subdivision alone. The pipe network of River Rock, however, must also accommodate a portion of the flow, up to 5 cfs, from the eastern two-thirds of the future Silvercreek subdivision. The proposed pipe capacities are found by utilizing Manning’s formula:

$$Q = (1.49/n) * A * R^{2/3} * S^{1/2} \text{ where all variables are as defined in the SWMM.}$$

The following table summarizes each proposed pipe run and its slope, calculated capacity, contributing basins, and the total flow it will need to carry.

Pipe Size (inches)	Slope (%)	Capacity (cfs)	Contributing Basins	Total Flow (cfs)
12	0.50	2.52	Basins 13 and 14	0.73
18	0.50	7.46	Silvercreek	5.00
18	2.00	14.92	Basins 3,4, and 10	1.70
24	0.50	16.04	Silvercreek, 1, 2, & 5	6.54
27	0.25	21.89	Silvercreek + Combined River Rock	11.32

The SWMM also specifies that the 100-year storm flow shall not exceed a depth of 18 inches over the gutter. Using the same parameters described above, the 100-year flow rate for Basin 9 (the largest) is found to be 8.83 cfs. For this case, the maximum depth allows for the use of the orifice equation:

$Q = 5.37 * A * d^{1/2}$ where all variables are as defined in SWMM and A is assumed to be 60% of the total inlet area.

Holding the depth constant at 1.5 feet, the capacity of the grate inlet serving Basin 9 is found to be 11.35 cfs and is therefore sufficient to prevent a ponding depth greater than 1.5' over the gutter.

To account for head loss, the system was modeled with the *Hydraflow "Storm Sewers"* program. This program graphically displays the hydraulic grade line versus finished ground. For the 2-year storm, finished ground needed to be higher than the hydraulic grade line. In the case of a 10-year storm, however, the hydraulic grade line could be up to 0.46' higher than the finished ground line, due to the allowable spread in the gutter. This model indicated the inlet and pipe system was capable of handling all of the flow from River Rock and the eastern two-thirds of Silvercreek during the 2-year storm event. For the 10-year storm event, however, only 5 cfs of the total 21.04 cfs from Silvercreek could be handled by the pipe system without over-topping the curb. To verify that the remaining 16.04 cfs could surface flow to a detention basin in Silvercreek and not over-top the curb, Manning's equation was applied to the typical cross-section of a local street. This calculation showed surface flow could be as high as 31.10 cfs.

The City of Billings SWMM states that during the 100-year storm event, water may reach a depth of 1.5' over the gutter. Since none of the sag vertical curves is deeper than 1.5', all stormwater could overtop the road high points and reach the retention pond in the park via the parking lot. Manning's equation was used to find the maximum surface flow with a cross-section that extended 1.5' above the gutter flow line. This calculation yielded a result of 647.17 cfs. Since this flow is greater than the total 100-year flow from both subdivisions, it indicates that the inlet and pipe system can accommodate the 100-year storm event without exceeding a water depth of 1.5' over the gutter.

CONCLUSIONS

The above calculations illustrate that the proposed storm drainage facilities are capable of accommodating the required 2-year and 100-year flow conditions as specified in the City of Billings SWMM.

Determining Direct Runoff Depth (R) from 2-8

Basin	Residential Area (sq. mi.)	Residential CN	Street Area (sq. mi.)	Street CN	Composite CN	R (2-yr)	R (10-yr)	R (100-yr)
1	0.0043	72.0	0.0009	90.2	75	0.142	0.483	1.218
2	0.0003	72.0	0.0003	90.2	81	0.280	0.740	1.620
3	0.0036	72.0	0.0010	90.2	76	0.160	0.520	1.270
4	0.0048	72.0	0.0009	90.2	75	0.142	0.483	1.218
5	0.0008	72.0	0.0011	90.2	83	0.340	0.860	1.780
6	0.0004	72.0	0.0006	90.2	83	0.340	0.860	1.780
7	0.0043	72.0	0.0003	90.2	73	0.110	0.410	1.110
8	0.0004	72.0	0.0006	90.2	83	0.340	0.860	1.780
9	0.0039	72.0	0.0028	90.2	80	0.180	0.560	1.330
10	0.0003	72.0	0.0006	90.2	84	0.370	0.900	1.830
11	0.0001	72.0	0.0006	90.2	88	0.540	1.120	2.170
12	0.0000	72.0	0.0004	90.2	90	0.629	1.266	2.336
13	0.0005	72.0	0.0007	90.2	83	0.340	0.860	1.780
14	0.0006	72.0	0.0006	90.2	81	0.280	0.740	1.620

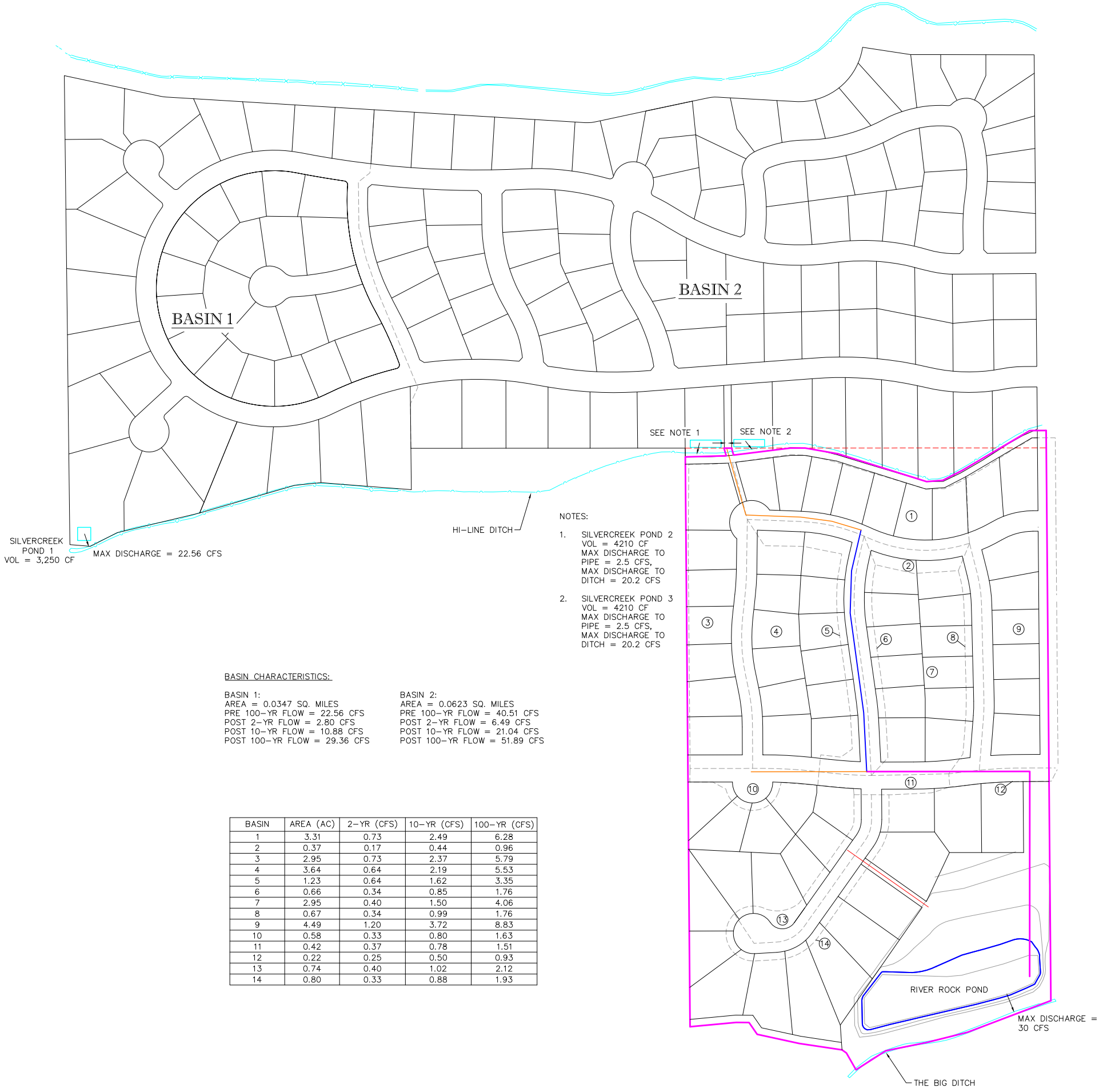
Time of Concentration

Basin	Lot Length (ft)	Lot Slope (%)	Lot Vel. (fps)	Gutter Length (ft)	Gutter Slope (%)	Gutter Vel. (fps)	Time of Conc. (min)	Hydrograph Used
1	100	1.5	0.7	460	1.0	2.0	6.21	0.1
2	30	1.7	0.8	115	1.3	2.3	1.46	0.1
3	165	1.0	0.7	665	2.5	3.1	7.50	0.1
4	645	2.5	1.1	145	0.7	1.7	11.19	0.2
5	40	1.8	1.0	830	2.2	3.0	5.28	0.1
6	20	1.5	0.9	565	2.4	3.1	3.41	0.1
7	610	2.4	1.1	70	0.8	1.9	9.86	0.2
8	20	8.0	2.0	510	2.4	3.1	2.91	0.1
9	240	1.4	0.8	550	2.4	3.1	7.96	0.1
10	0	1.0	1.0	340	0.7	1.7	3.33	0.1
11	0	1.0	1.0	230	1.2	2.2	1.74	0.1
12	0	1.0	1.0	240	1.1	2.1	1.90	0.1
13	20	8.0	2.0	400	0.5	1.4	4.93	0.1
14	20	8.0	2.0	500	0.5	1.4	6.12	0.1

Peak Runoff = qP x R x A

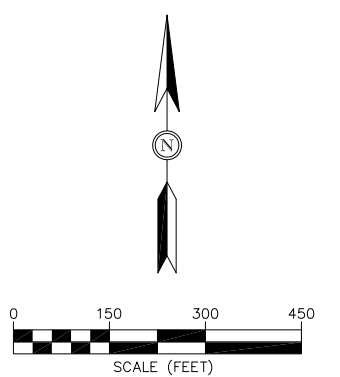
Basin	qP	2-yr R (cfs)	10-yr R (cfs)	100-yr R (cfs)
1	991	0.73	2.49	6.28
2	991	0.17	0.44	0.96
3	991	0.73	2.37	5.79
4	796	0.64	2.19	5.53
5	991	0.64	1.62	3.35
6	991	0.34	0.85	1.76
7	796	0.40	1.50	4.06
8	991	0.34	0.99	1.76
9	991	1.20	3.72	8.83
10	991	0.33	0.80	1.63
11	991	0.37	0.78	1.51
12	991	0.25	0.50	0.93
13	991	0.40	1.02	2.12
14	991	0.33	0.88	1.93
		6.88	20.16	46.44

Hour	qP
0.10	991
0.20	796
0.30	658
0.40	575
0.50	496
0.75	388
1.00	316
1.25	271
1.50	236
2.00	192



LEGEND

- 27" STORM MAIN
- 24" STORM MAIN
- 18" STORM MAIN
- 12" STORM MAIN
- - - DITCH
- - - DRAINAGE BASIN



**RIVER ROCK SUBDIVISION
RIVER ROCK & SILVERCREEK STORM EXHIBIT
BILLINGS, MONTANA**

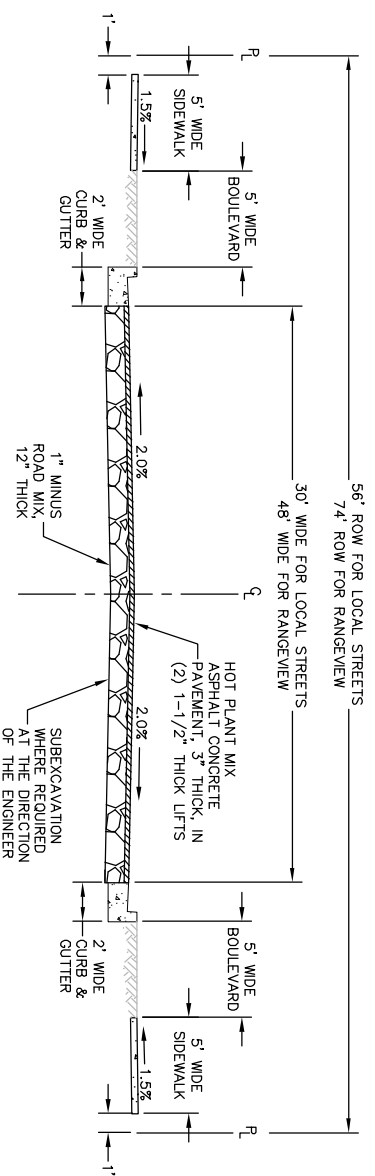
32 DISCOVERY DRIVE
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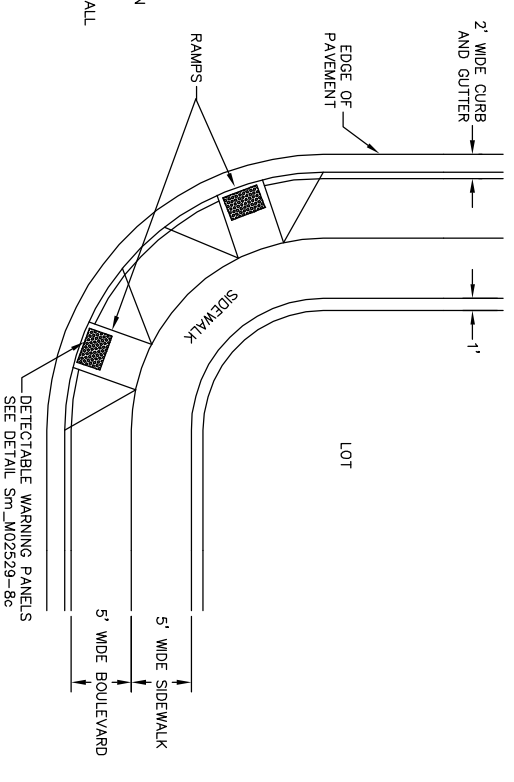
PROJECT #: 06-169
DATE: 09/12/08
PROJECT ENGINEER: JDB
DRAWN BY: JAJ
REVIEWED BY: JDB

**FIGURE
1**

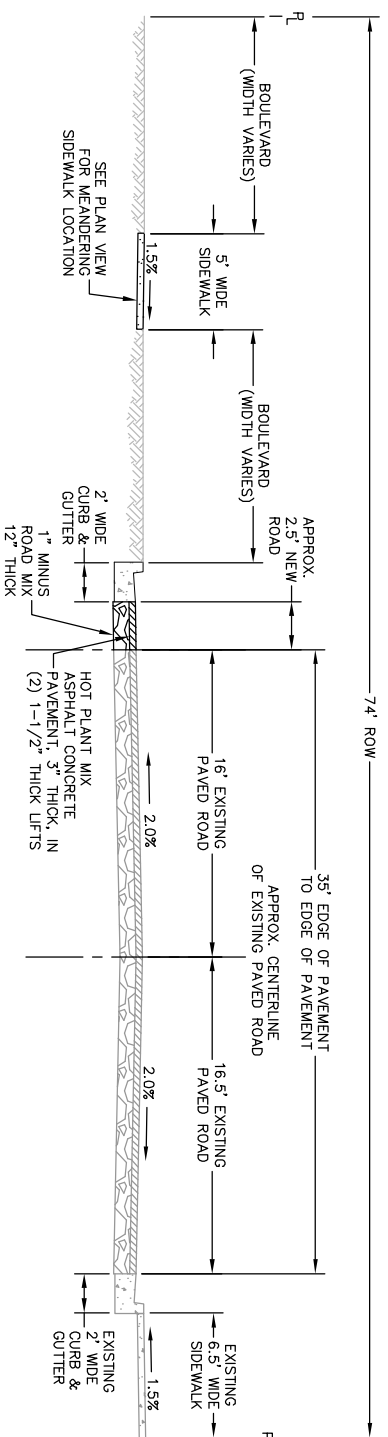


1 SECTION
C2-4-7 TYPICAL ROAD CROSS SECTION
SCALE (FEET)

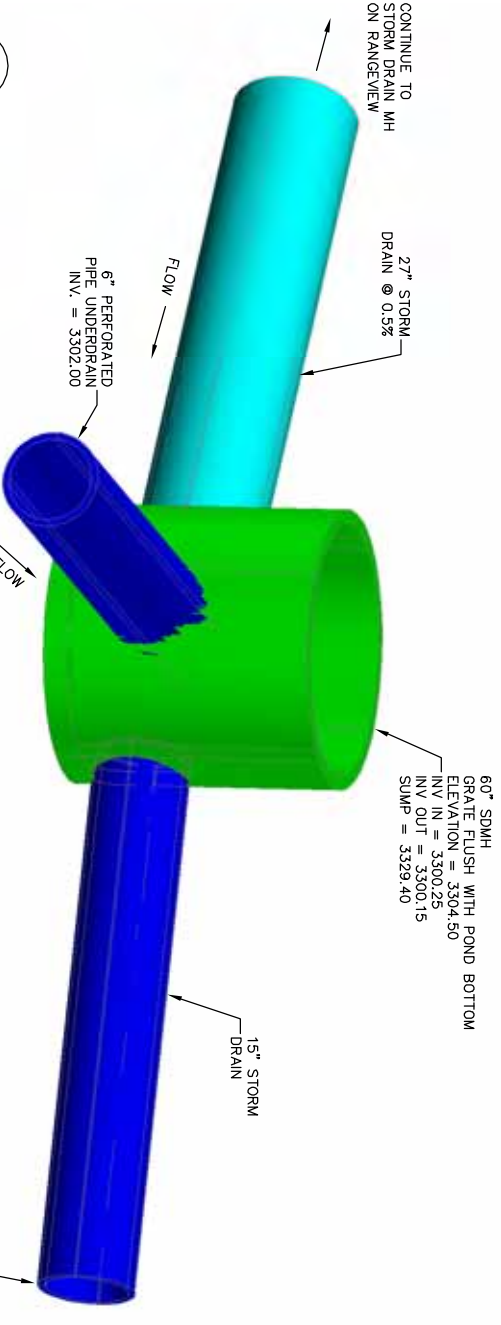
- NOTES:
1. DOWEL WALK TO CURB AND GUTTER WITH 2" MAX. ON CENTER, EPOXY COATED #4 REBAR, 1' IN LENGTH.
 2. DETECTABLE WARNING PANELS TO BE INSTALLED ON ALL RAMPS.



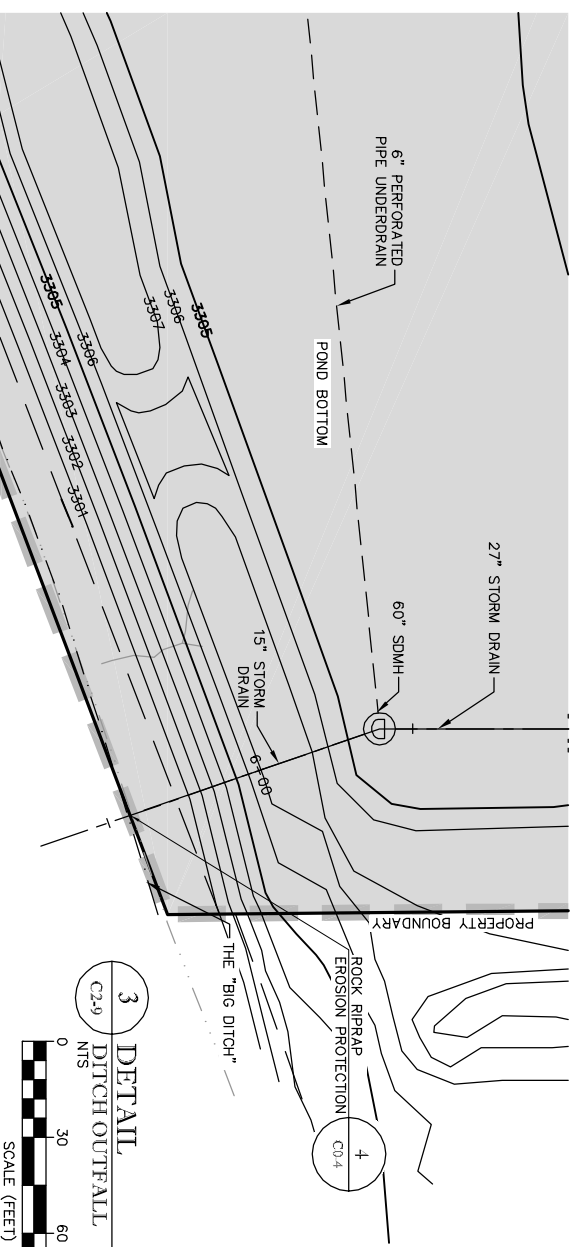
1 DETAIL
ALL ACCESSIBILITY RAMP DETAIL
NTS



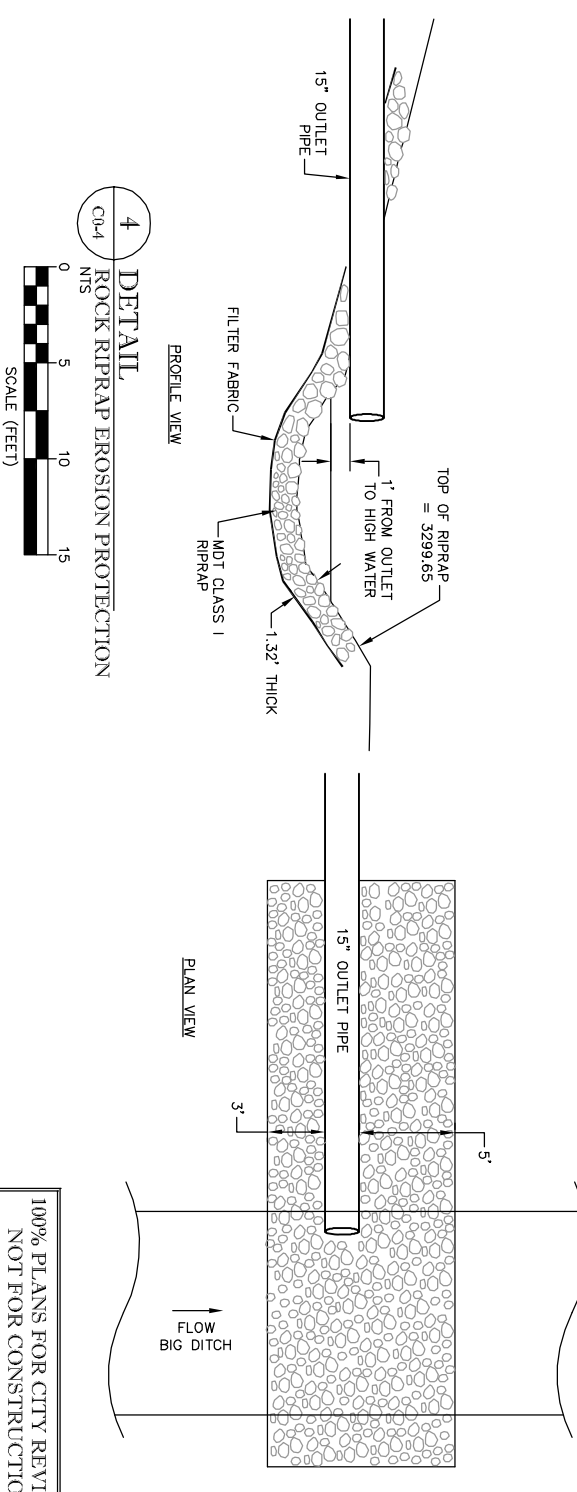
2 SECTION
C2-8 46th ST. WEST CROSS SECTION
SCALE (FEET)



2 DETAIL
C2-9 STORM DRAIN OUTLET STRUCTURE
NTS



3 DETAIL
C2-9 DITCH OUTFALL
NTS
SCALE (FEET)



4 DETAIL
C0-4 ROCK RIPRAP EROSION PROTECTION
NTS
SCALE (FEET)

100% PLANS FOR CITY REVIEW - NOT FOR CONSTRUCTION

NO.	REVISIONS	DRAWN BY	DATE

SCALE AS NOTED	PROJECT ENGINEER: JAJ	DRAWN BY: JAJ
DESIGNED BY: JAJ	REVIEWED BY: PJS	

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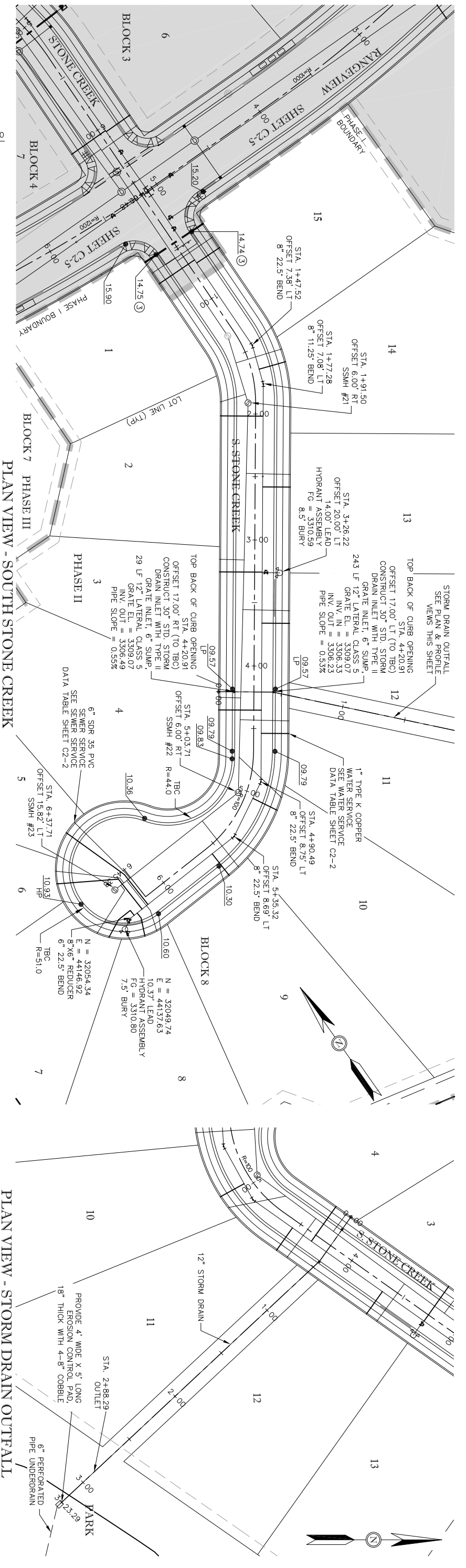
RIVER ROCK SUBDIVISION - PHASE I
DETAILS AND CROSS-SECTIONS
BILLINGS, MONTANA

32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
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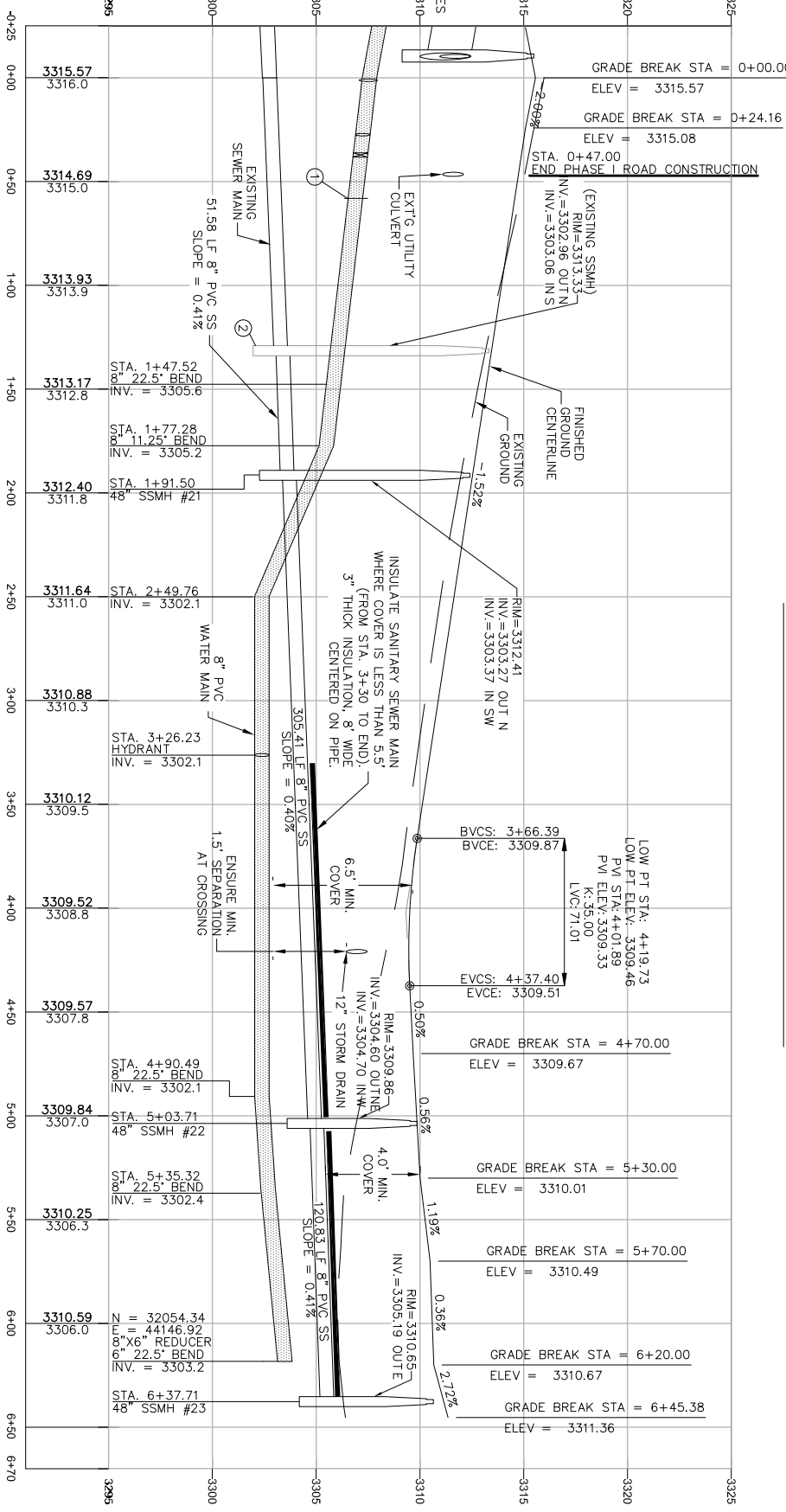
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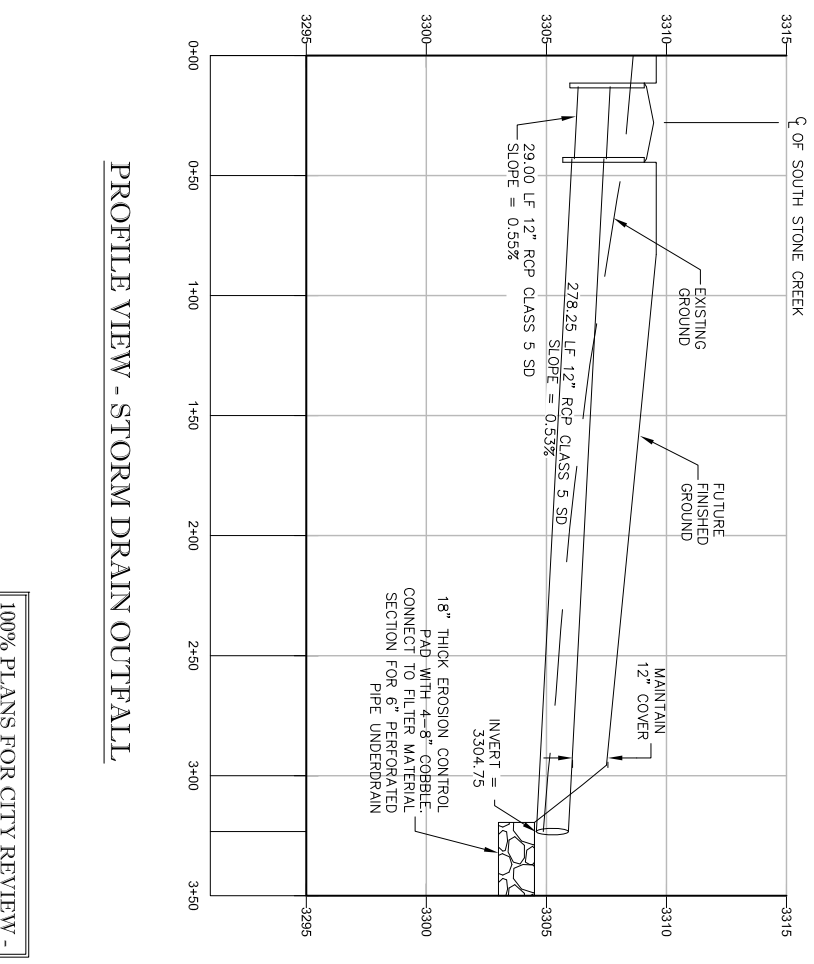
PROJECT #: 06-169	SHEET
DATE: 04/18/11	C0-4
RIVER ROCK SUBDIVISION DETAILS & CROSS-SECTIONS	



PLAN VIEW - SOUTH STONE CREEK



PROFILE VIEW - SOUTH STONE CREEK

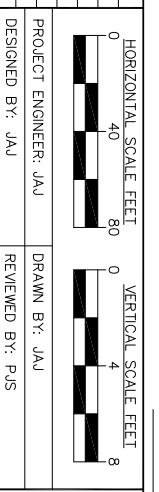


PROFILE VIEW - STORM DRAIN OUTFALL

- ① REMOVE AND DISPOSE OF EXISTING END CAP - CONNECT TO EXISTING 8\"/>
- ② REMOVE PLUG - CONNECT TO EXT'G SSMH INV. ELEV. = 3303.14*
- ③ CARRY NORMAL CROWN OF SIDE STREET TO CURB RETURN

*CONTRACTOR SHALL VERIFY ELEVATIONS OF EXISTING INSTALLATIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES GREATER THAN 0.1'.

NO.	REVISIONS	DRAWN BY	DATE



PROJECT ENGINEER: JAU
DESIGNED BY: JAU

DRAWN BY: JAU
REVIEWED BY: PJS

RIVER ROCK SUBDIVISION - PHASES II AND III SOUTH STONE CREEK STA. 0+00 TO 6+45 BILLINGS, MONTANA

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PROJECT #:	06-169	SHEET:	C2-5
DATE:	04/18/11	RIVER ROCK SUB.	
		SOUTH STONE CREEK	

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**RIVER ROCK ESTATES SUBDIVISION
PARK AND POND GRADING
BILLINGS, MONTANA**

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FAX (406) 582-5770
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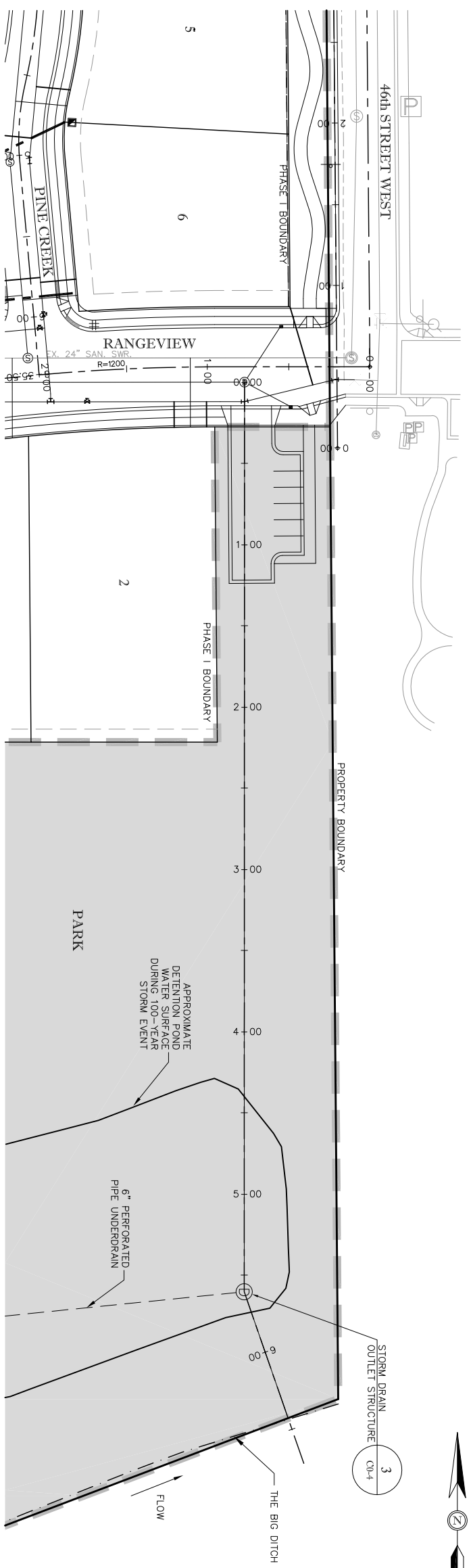
**Civil Engineering
Geotechnical Engineering
Land Surveying**



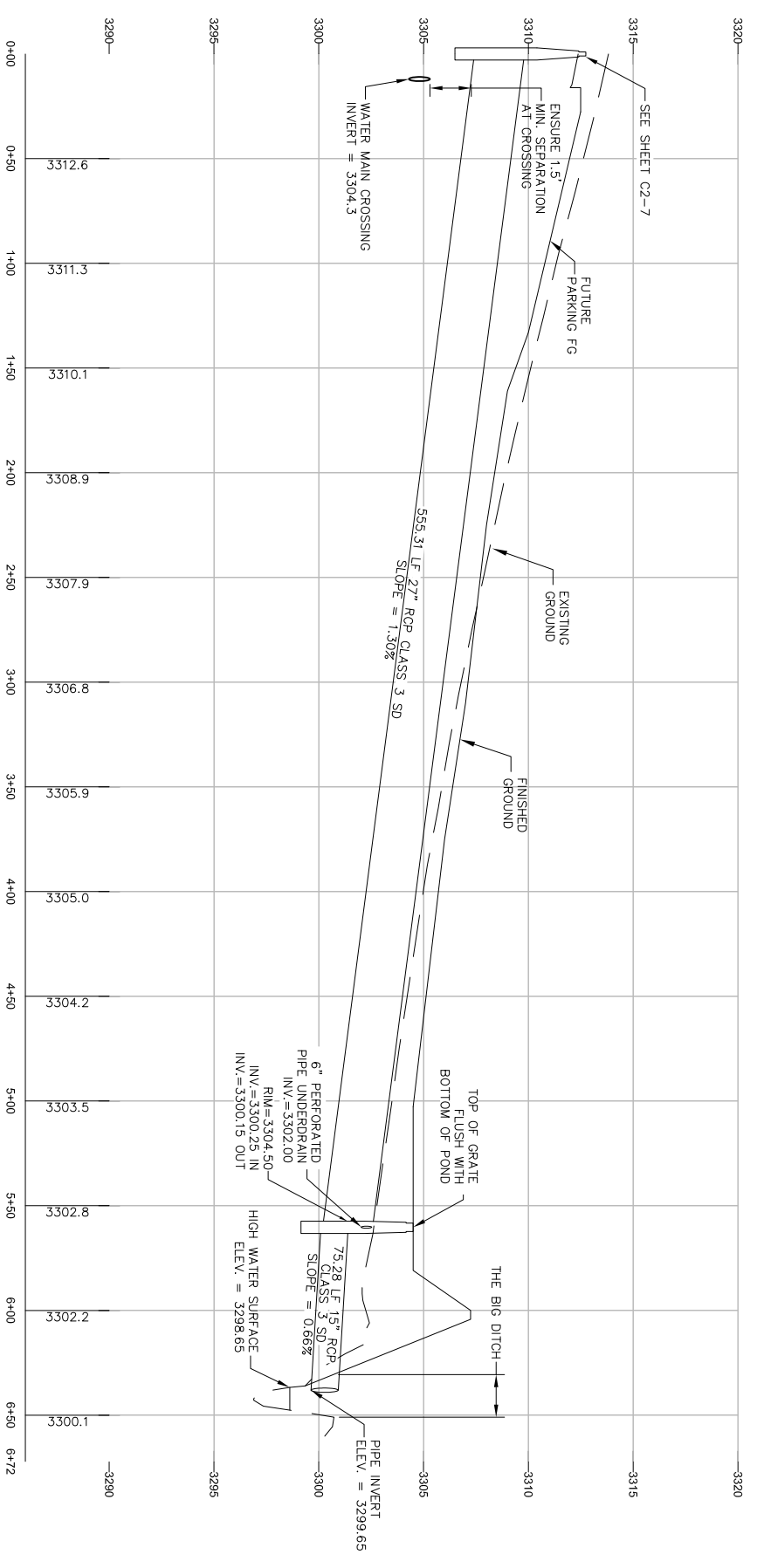
PROJECT #: 06-169
DATE: 06/23/11
PROJECT ENGINEER: GF
DRAWN BY: JAJ
REVIEWED BY:

FIGURE
1

L:\2006\06-169 Design Builders Sub Review\dwg\River Rock - AES\POND GRADING 20110623.dwg

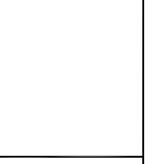


PLAN VIEW - STORM DRAIN OUTFALL



PROFILE VIEW - STORM DRAIN OUTFALL

NO.	REVISIONS	DRAWN BY	DATE



PROJECT ENGINEER: JAJ
DESIGNED BY: JAJ

DRAWN BY: JAJ
REVIEWED BY: PJS

**RIVER ROCK SUBDIVISION - PHASE I
STORM DRAIN OUTFALL TO DITCH**
BILLINGS, MONTANA

32 DISCOVERY DRIVE
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100% PLANS FOR CITY REVIEW -
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PROJECT #:	06-169	SHEET:	C2-9
DATE:	04/18/11	PROJECT:	RIVER ROCK SUBDIVISION STORM OUTFALL TO DITCH

Return to:
Allied Engineering
32 Discovery Drive
Bozeman, MT 59718

STORMWATER DISCHARGE AGREEMENT

RIVER ROCK ESTATES SUBDIVISION

This agreement is made and entered into this 22nd day of July, 2008, by and between **BOYER LAND, LLC**, whose address for the purpose of this agreement is 2810 Central Avenue, Unit C; Billings, Montana 59102, hereinafter referred to as "Subdivider," and the **BIG DITCH COMPANY**, hereinafter referred to as "Irrigator".

WITNESSETH:

WHEREAS, Subdivider proposes to utilize a portion of the "Big Ditch" to accept stormwater runoff from the River Rock Estates subdivision; and

WHEREAS, Irrigator maintains the right to maintain the Big Ditch and have control over all inflows and outflows to the ditch; and

WHEREAS, the City of Billings, as one of the conditions of River Rock Estates subdivision plat approval, requires the Subdivider and Irrigator to enter into an agreement whereby said stormwater flows may be permitted into the Big Ditch in so long as the Association pays the required fees and the ditch is in operation;

THEREFORE, THE PARTIES TO THIS AGREEMENT, for and in consideration of the mutual promises herein contained and for other good and valuable consideration, do hereby agree as follows:

1. Stormwater flows from the River Rock Estates subdivision Via a retention pond in the River Rock Estates Park shall be permitted to discharge to the pre-development rate as outlined in the City of Billings Stormwater Management Manual or Department of Environmental Quality Circular 8, whichever is more restrictive.

2. Any discharge to the Big Ditch shall be limited to less than or equal to the pre-development rate of runoff of the area encompassed by the River Rock Estates subdivision.
3. Subdivider agrees to pay a one-time fee of \$2,500.00 to Irrigator to discharge to the Irrigator, which shall be contemporaneously with the execution of this agreement.
4. Subdivider agrees to purchase five (5) shares of the Big Ditch Company at a cost of \$20.00 per share to permit discharge into the Big Ditch. Subdivider may assign and transfer the shares to the River Rock Homeowner's Association.
5. Subdivider agrees to pay occasional dues as may be specified by the Irrigator in proportion to the number of shares owned. Upon transfer of shares from the Subdivider to the Homeowners' Association (under the provisions of the River Rock Estates Subdivision Improvements Agreement), Subdivider shall be relieved of any responsibility or obligation to pay future assessments or dues and all future assessments and dues shall be paid by the Association and the dues shall become the obligation of the Homeowner's Association.
6. Subdivider agrees that the ownership of the ditch shares does not constitute an agreement or right to remove water from the ditch for any purpose. Subdivider also agrees to include appropriate provisions in homeowners' documents and covenants that explicitly prohibit the removal of water from any ditch on or adjacent to the property.
7. Irrigator agrees to allow discharge of stormwater runoff from the River Rock Estates subdivision to the Big Ditch pursuant to the Storm Water Management Plan.
8. Subdivider agrees to form a Homeowners' Association or other entity that will be responsible for common maintenance and upkeep of the subdivisions (the "Association"). Subdivider agrees to transfer ownership of the shares at a suitable time, as specified in the subdivision covenants, to the Association(s). The Homeowners' Association will be responsible for common maintenance and upkeep of the subdivision. Subdivider agrees that a one-time \$25.00 transfer fee will be payable at the time of the ownership change of the shares.
9. Subdivider agrees to include appropriate provisions in the Association documents or covenants that require the Association to collect a fee of \$25.00 per residence per year, for each residence for which an Occupancy Permit has

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal on the day and year hereinabove written.

Amy Lynn Mackay
Notary Public in and for the State of Montana
Printed name: Amy Lynn Mackay
Residing at Billings, Montana
My commission expires: October 25, 2011



404 North 31 Street, Suite 405, Billings, Montana 59101 | Phone: 406.294.9499 | Fax: 406.294.9670
studio@peakstoplains.com | www.peakstoplains.com

