DRAINAGE PLAN
For
Crystal Prairie Lake Park
Phase II (B)

Wichita, Kansas

Date: December 10, 2012

Table of Contents:

Project Narrative and Analysis:

This drainage plan and report is phase 2 (or Phase B) of the mass grading and drainage plans for Crystal Prairie Lake Park which was previously called Kingsbury Park. This phase generally includes the north part of the park along the Arkansas River Levee and the Brooks Landfill. This report is intended to amend the Phase 1 (or Phase A) drainage plan and is not a "stand alone" document. The majority of the drainage information used to assess the site as a whole is included in the Phase 1 document. Only additional on-site drainage areas are included along with erosion control measures for both Phases I and II.

The entire site includes the south half of Section 23 and the northwest quadrant of Section 26, Township 26 South, Range 1 East. It is bounded on the west by Hoover Road, on the south by K-96 Highway, the East by the Arkansas River and Brooks Landfill, and the north by private property and proposed 49th St. The north boundary is currently undeveloped.

The existing site is undeveloped. The terrain is flat with a general slope of less than 1% in any direction. Cornejo Materials, Inc. is currently mining for sands and gravels on the property. The remaining area is being leased for agricultural use. The northeast portion of the site is west of the Arkansas River Levee with 2 flood structures penetrating the levee along the east property line with one to the northeast and one to southeast. Off-site runoff enters the site from the west and typically drains to an existing pond on the southeast side of the site. This pond appears to overtop into the ditch along K-96 Highway. There are existing monitoring wells on the west side of the Brooks Landfill and a water quality pond on the north side of the Brooks landfill that was placed to capture sediment from the closure of the landfill until seeding is established. There are also smaller water quality ponds to capture and treat landfill contact runoff while the landfill is active.

The proposed park development consists of approximately 223 acres of recreational groundwater lake constructed by Cornejo Materials, Inc. during mining operations for sand and gravel. A network of trails, roads, parking lots, and access trails will serve the park. Also shelters and buildings are being proposed along with a nature center near the Arkansas River.

The City plans to manage the stormwater through a series of Best Management Practices (BMPs) and "treatment trains." Off-site runoff will be routed through a sediment basin, wetland, and micropool before entering into the lake. This will facilitate the removal of pollutants during more frequent "first flush" rainfall events and is also being requested by the Groundwater Management District #2. Higher flows from infrequent rainfall events will bypass the treatment train to prevent flooding and damage to the treatment train. Other proposed Best Management Practices (BMPs) incorporated into the site include vegetated swales, sediment basins, micropools, Bio-swales, infiltration trenches, grassed channels, enhanced swales, vegetative filter strips, and stormwater wetlands. Along with these proposed BMPs, the area is planned to be restored with native vegetation. The City plans to start implementation during mining operations so that the BMPs can be useful both during the mining operations and once the mining of the area is complete.

On-site stormwater is planned to be routed, retained, and dissipated in the proposed groundwater lake including runoff from the offsite areas.

Off-site runoff enters Crystal Prairie Lake Park from the west through 2 - 30" pipe culverts under Hoover Rd. The approximate off-site drainage area is 403 acres and is currently undeveloped, private property. The majority of this area lies west of Hoover Road. The area adjacent to the west is part of the Edgewater Addition Subdivision. This subdivision, south of 45th Street, is currently being developed into a single family residential subdivision. Plans show that this area will contain the 100-year runoff event in the on-site groundwater lakes so this runoff was not included in the off-site drainage analysis. The areas north of 45th Street in the proposed Edgewater Addition Subdivision are also planned to retain the 100-year runoff event however this area has not been platted so it is included in the analysis of off-site runoff for Crystal Prairie Lake Park.

As these off-site areas develop, additional peak runoff will be detained on site to meet the City storm water requirements. Therefore, the existing peak runoff will not be increased by future development. Also to further manage runoff from these off-site areas as they develop, Best Management Practices will need to be installed to meet the City storm water requirements. In conclusion, the Crystal Prairie Lake Park drainage system can be designed for

existing peak flows that will not increase with development of the off-site drainage areas routed to Crystal Prairie Lake Park.

Additional runoff from approximately 50 acres from the west side of the Brooks Landfill is planned to enter the site and groundwater lake once grading operations are complete. This area has been added to the on-site area for the drainage analysis. A minor revision to the closure plan of the Brooks Landfill will be required to place fill on the existing landfill cap as shown on the grading plan.

The runoff from the proposed Crystal Prairie Lake Park is also planned to enter the groundwater lake. Only minimal runoff from back sloping will be directed to the Highway K-96 ditch and the detention pond north of the Brooks Landfill. Currently runoff from this site along with off-site runoff entering the site from the west is directed to the Highway K-96 ditch south of the site and/or towards the 2 flood structures in the Arkansas River levee on the east side of the site. Although the proposed park development will increase overall runoff, this increased runoff along with current runoff volumes will remain on site and dissipated and/or stored in the 223 acre proposed lake. Therefore the amount of runoff leaving the site will be drastically reduced when the park is completed. Analysis of on-site flow will only be pertinent to the capacity of on-site storm water conveyance systems and finished floor elevations of buildings and structures.

Existing Conditions For Runoff Considerations:

The total site area is 515 acres (including approximately 50 acres from the Brooks Landfill) and was originally agriculture land and/or grassland. However, the mining operations are currently proceeding that will increase the impervious area however rainfall on the lake and the proposed site will be retained on-site.

The off-site area contributing to drainage onto the site is approximately 403 acres. There is minimal impervious area contributing (less than 3 acres) with only 2 farmsteads located in this drainage area. The remaining impervious area is from Hoover Rd. which totals about 5 acres.

The predominant soils for the site are a sandy loam (Carwile Fine Sandy Loam and Canadian fine Sandy Loam) with additional loam soils (Nalim Loam). A Soil Map is included in the Phase 1 Drainage Plan and Report.

Existing flow paths are difficult to determine since the area is so flat. However, the existing survey map is included in the Phase 1 Drainage Plan and Report.

Existing Drainage Calculations are not applicable since proposed drainage patterns will retain flow on site as runoff drains into the groundwater lake created by the mining operations.

Post-Development Hydrologic Analysis:

The NRCS (SCS) Method was utilized to analyze both off-site runoff volume and proposed on-site runoff volume runoff entering the groundwater lake during the 100 year rainfall event. Runoff volume calculations are included in the Phase 1 Drainage Plan and Report. Runoff will be routed to and dissipated in the proposed groundwater lake since the groundwater lake does not have an outflow control structure. The proposed size of the lake is approximate 223 acres. Since proposed on-site runoff will mostly be routed to the groundwater lake the downstream drainage system should experience less flow from rainfall events. Also, runoff will be routed through stormwater management facilities and ponds prior to entering the groundwater lake. Typical outlet structures are included in the drainage plan along with off-site runoff treatment facility. See Drainage Plans.

The critical time of concentration for the 100-year rainfall event was calculated at approximately 2.5 hours. This time of concentration is based on the off-site runoff hydrograph contributing to the peak amount of runoff entering the lake.

On-site impervious area is planned at approximately 48 acres with about 223 acres of groundwater lake. With area from the Brooks Landfill, a total of 515 acres is contributing to the on-site drainage area. The curve number was calculated at 90 based on proposed development.

The 100-year rainfall event would result in an approximate 1.9’ rise in the groundwater lake if seepage of runoff into the underground portion of the aquifer is not considered – which results in a conservative estimate. The groundwater lake water elevation (normal pool) was measured at approximately 1324.00 in May of 2008. Groundwater elevations typically fluctuate within 2’ of the normal pool based on existing groundwater monitoring data. To accommodate this fluctuation the 1.9’ rise in water surface elevation was added to a pool elevation of 1326.00; thus resulting in a calculated elevation of 1328.00 for the 100-year lake elevation. However, historical monitoring well records have shown a 6.3’ rise in groundwater elevation during a major event (Flood of 1993); therefore the 100-year flood elevations for the lake are being placed at 1330.30. Therefore the lowest opening elevation will be set at 1’ above

the 100-year elevation at 1331.30. Opening elevations adjacent to storm water management ponds and swales will need to be determined based on final designs.

A plan and profile of the off-site runoff treatment facility is included in the Phase 1 Drainage Plan and Report. Normal pool elevations for the wetland and pool areas will be 1330.50 with the overflow weir elevations at 1332.50. Maximum water surface elevations during the 100-year rainfall event will be 1334.50.

This drainage plans also include rock weirs and rock level spreaders to control outlet flows from BMP pools and wetland areas. This type of outlet control is intended to serve the park during and immediately following the mass grading operations. Permanent outlet structures can be designed and installed as the park develops and funds become available. Additional BMP's will be integrated into the park as the infrastructure is constructed.

Southern Star Central Pipeline has a 16" gas line and 66' easement that encircles the north half of the site. The gas line enters the park near the levee on the southeast side of the site and runs to the north behind the levee. The gas line proceeds along the north side of the site; then on the west side of the site to 45th Street before exiting west under Hoover Road. Of course, significant costs can be associated with relocating the gas line, so this plan allows the gas line to remain at its current location. However, designing around the gas line and easement has resulted in a few retention areas that will be used as water quality features designed to drain within 72 hours by infiltration. Storm water ponding above the capacity of the retention basin will be routed to the lake over the gas line and away from streets and structures. Locations and calculations for retention times are included in the plan sheets.

Permits and Floodplains

The Crystal Prairie Lake Park site is not within a floodplain as it is currently protected by levees. See the FEMA FIRM map in the Phase 1 Drainage Plan and Report.

Cornejo Materials, Inc. is mining the site under a lease from the City of Wichita to create the proposed lake. Currently the site activities including mass grading operations and construction of drainage ways are covered under the mining permits held by Cornejo Materials, Inc. However, before placement of fill behind the Arkansas River Levee additional review and permitting will be required by the City. See Arkansas River Levee section. All other applicable permitting will need to be acquired through the appropriate governmental agencies prior to additional construction activities that are not related to the mining operations.

Arkansas River Levee

A meeting with the City Stormwater Engineer, Scott Lindebak, on June 13, 2012 was arranged to discuss the issues related to placement of fill behind the Arkansas River Levee. The following items relate to the direction from the City at this meeting:

1. Excavation or removal of soil below existing ground elevation is not allowed within 250' of the levee toe. Therefore, mining or other excavation to be left permanently is not permitted within 250' of the levee. Structures with footings below the existing ground elevation in this area will also need to be permitted prior to construction.

2. Trees or deep rooted plantings will not be allowed within the flood control right of way. Native grass would be acceptable in this area.

3. Depending on the amount of fill placed behind the levee, toe drains may not be needed. Preliminarily, it appears that enough fill will be placed behind the level to eliminate the existing toe drains. However, an analysis of the reconfigured levee will be required to determine if toe drains can be eliminated. Otherwise existing toe drains will need to be extended to daylight underneath the placement fill.

4. Prior to placement of fill, permit approval will be needed from the City and U.S. Army Corps of Engineers (COE). The permit will require the following items:

    a. Completion of the Section 208 application for a modification to the COE flood control project

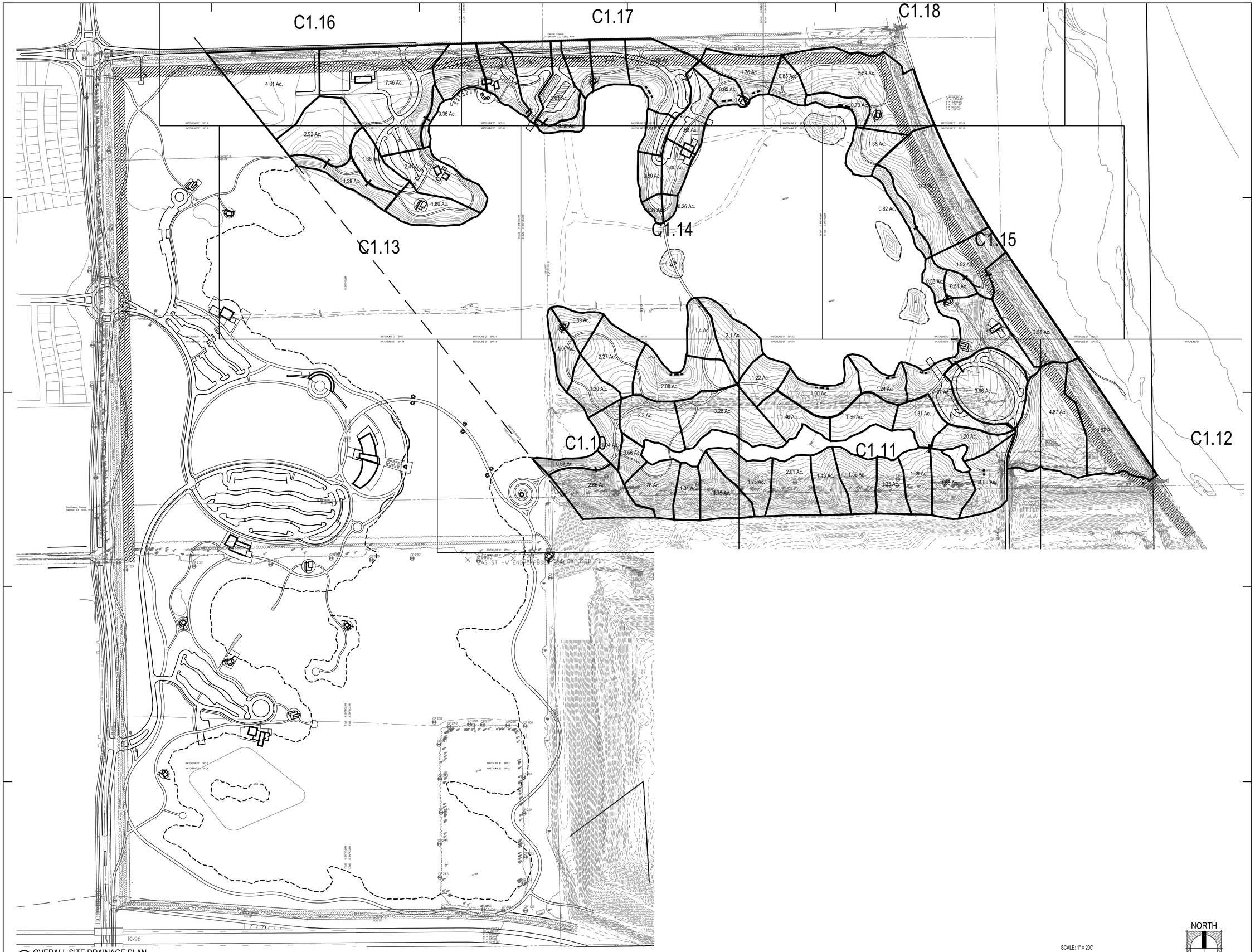
    b. Copy of the plans including a pdf copy.

5. If it is determined to be a minor modification to the levee by the City and COE then it will typically take 3 months for approval. A major modification review process would take approximately 1 year.

6. The levee can be built up or raised if needed.

7. The runoff over the levee into the Arkansas River will need to be limited. The majority of the runoff is planned to be captured in a swale behind the levee and routed to the CPLP Lake.

It was determined that getting the permit from the Amy Corps of Engineers at this time could be premature based on the time frame of grading in this area.



1 OVERALL SITE DRAINAGE PLAN
1" = 200'

SCALE: 1" = 200'
0 200' 400' 600'

NORTH

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Contact: Mike Schoonover
Topeka, KS 66614
785-272-2456 tel.
785-272-2464 fax

LANDSCAPE ARCHITECT
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402-390-0103 tel.
402-390-7312 fax

PRELIMINARY - NOT FOR CONSTRUCTION

Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: November 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Overall Site Draining Plan

C1.0

LEGEND

Outlet Pipe

Outlet Weir

(14) Pipe ID #

Drainage Arrow

DT Detention/Ponding Area

SCALE IN FEET
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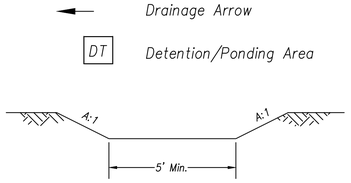

TYPICAL CHANNEL SECTION
A= See Sheet

1.06 Ac.
2.27 Ac.
1.30 Ac.
2.08 Ac.
3.28 Ac.
2.3 Ac.
1.04 Ac.
0.66 Ac.
0.67 Ac.
2.66 Ac.
1.76 Ac.
1.04 Ac.
1.75 Ac.

102
DT
101
DT
1331.56
1327
BUILDING
Gravel
Gravel
24" STORM PIPE
ROW OF TREES
South 1/4 Corner
Section 27, T26S, R1W
BM
MATCH LINE SHEET C 1.11

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785-272-2426 tel
785-272-2427 fax

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402-392-0103 tel
402-392-0141 fax

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Drainage Plan

C1.10

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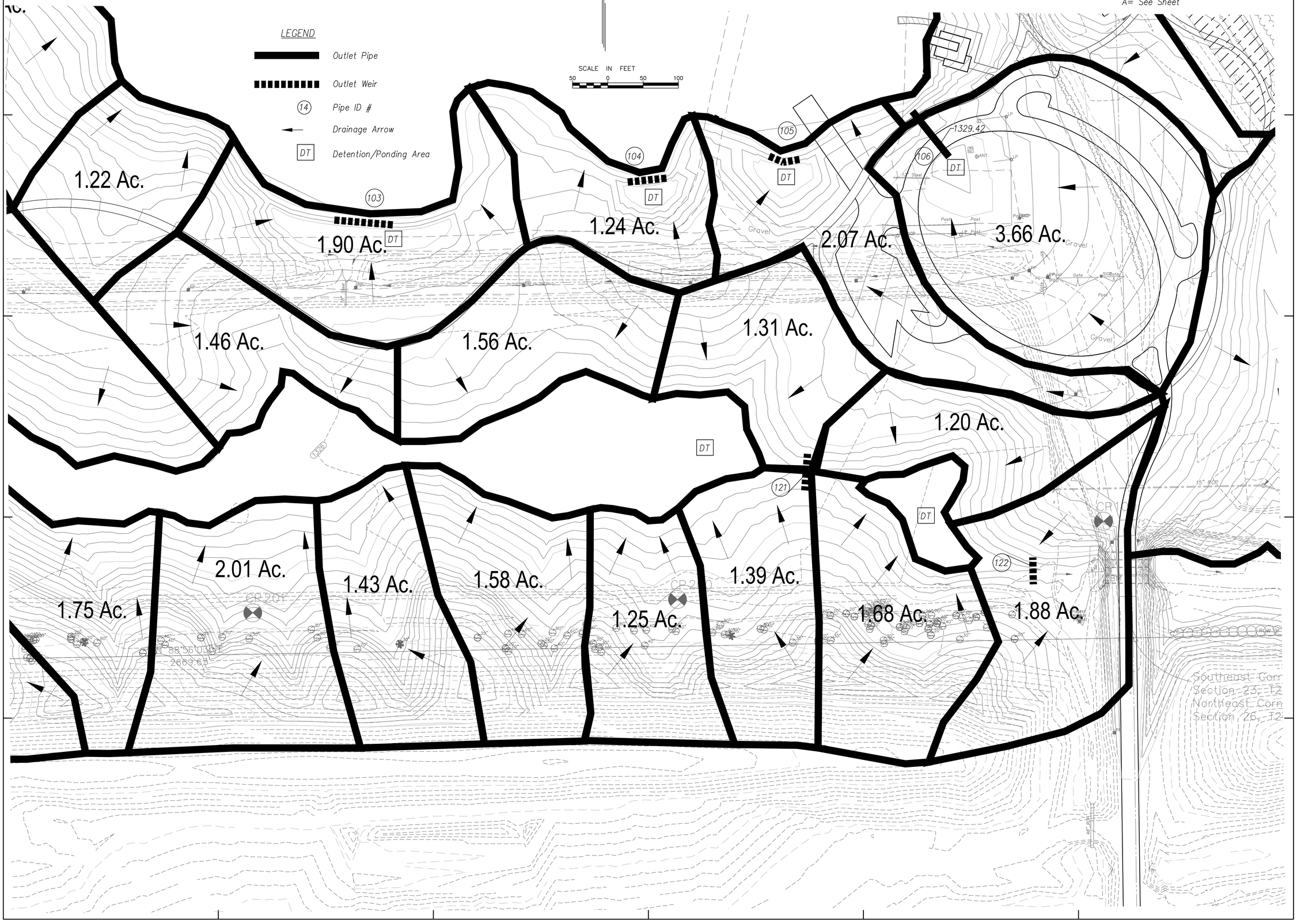
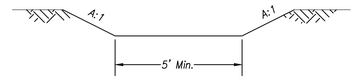
MATCH LINE SHEET C 1.14





TYPICAL CHANNEL SECTION
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608-897-8641 tel.
608-897-8690 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
200 W. Douglas, Suite 520
Topeka, KS 66603
785-272-4799 tel.
785-272-4797 fax

LANDSCAPE ARCHITECT
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Omaha, NE 68102
402-330-0133 tel.
402-330-0135 fax

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Wichita, Kansas

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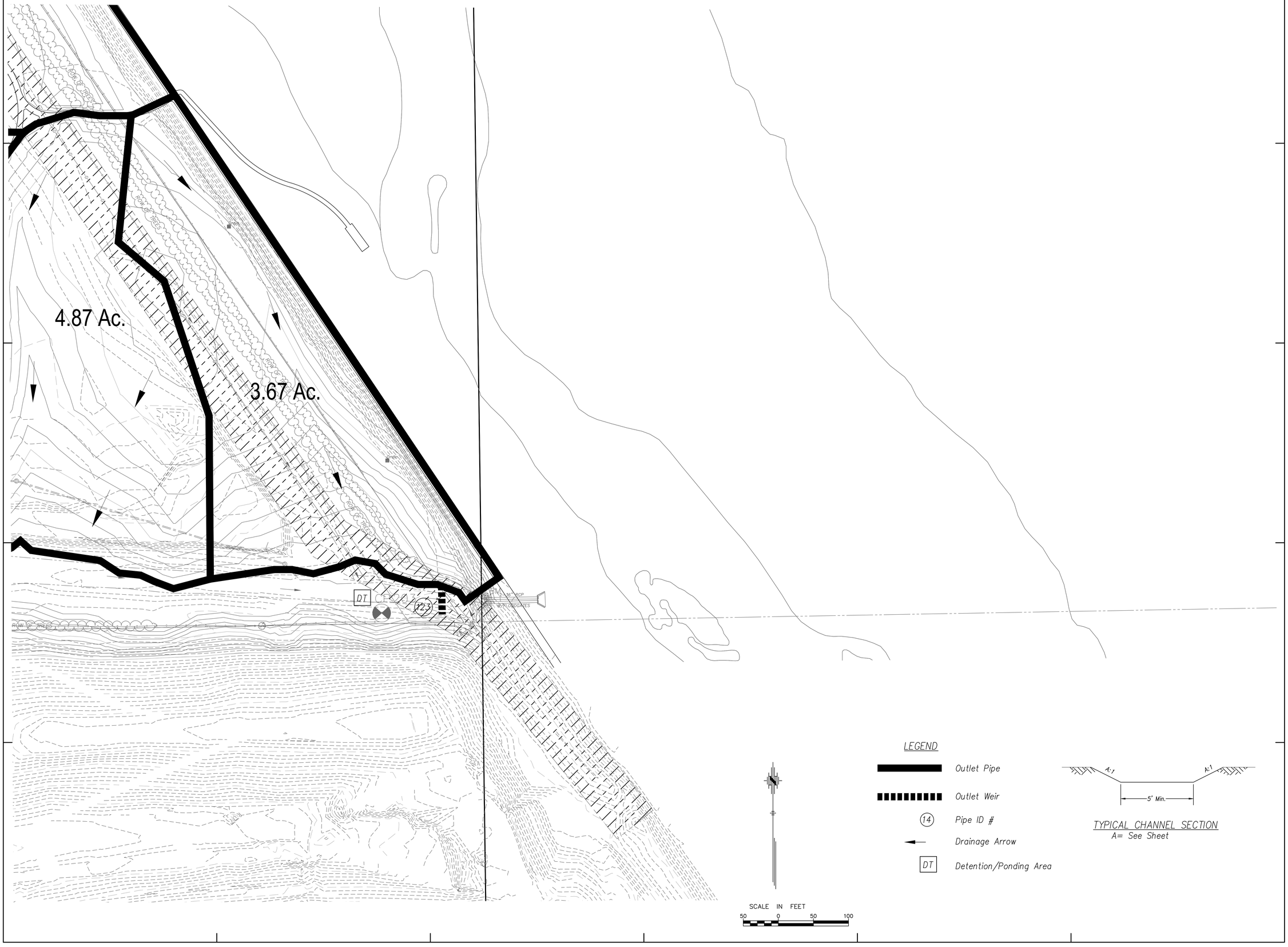
Drainage Plan

C1.11



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Applied Ecological Services
Jason Hartman, Project Manager
P.O. Box 226
Brodhead, WI 53520
608-897-8641 tel.
608-897-8690 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
Jessica Neil, P.E., Project Engineer
Topeka, KS 66614
785-272-4799 tel.
785-272-4797 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
625 Farnam Street, Suite 100
Omaha, NE 68102
402-392-0103 tel.
402-392-0111 fax

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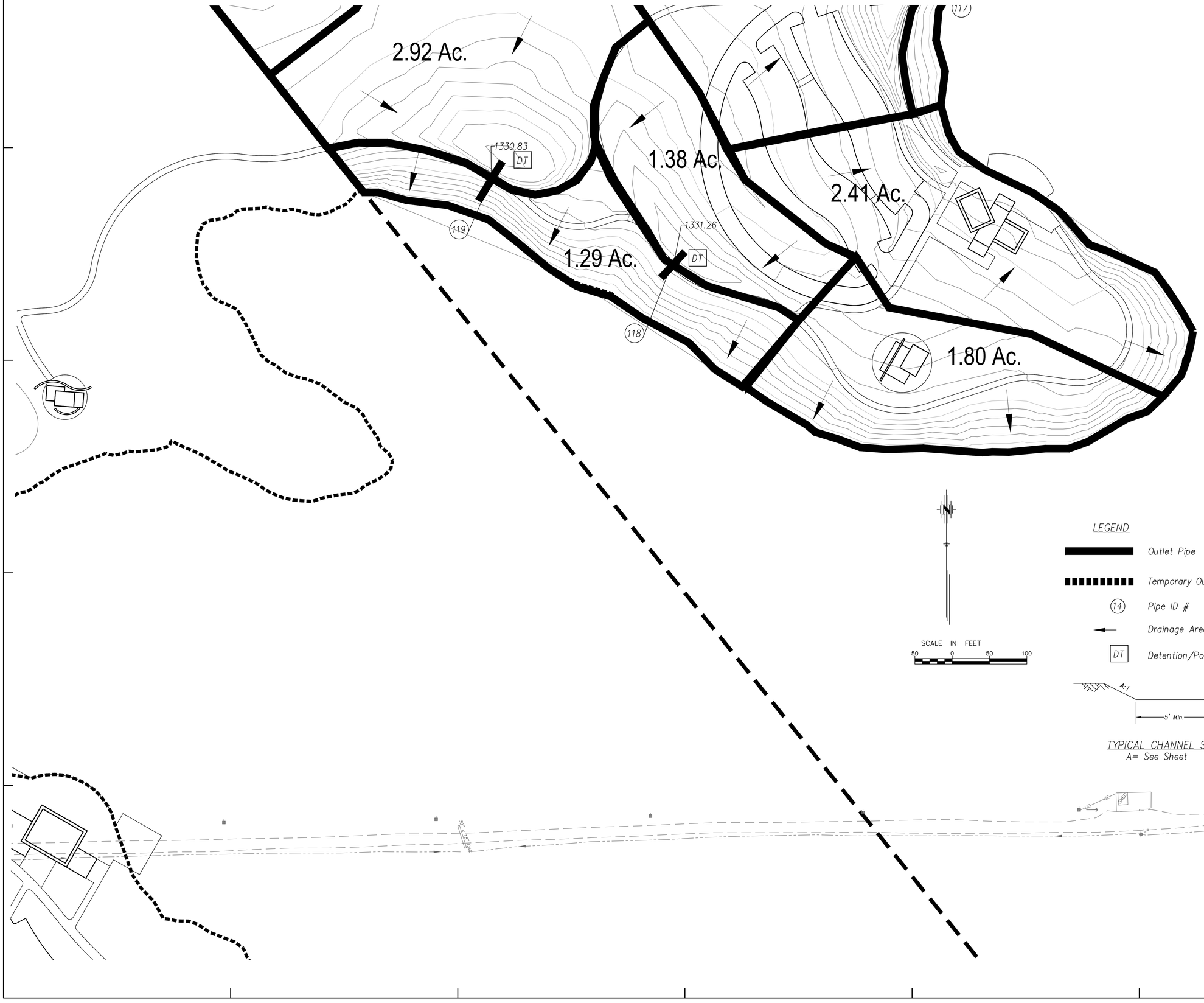
Drainage Plan

C1.12



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CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
200 West Douglas, Suite 230
Topeka, KS 66603
785-272-4799 tel.
785-272-4797 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
6000 Dodge Street, Suite 100
Omaha, NE 68182
402-393-0155 tel.
402-393-8747 fax

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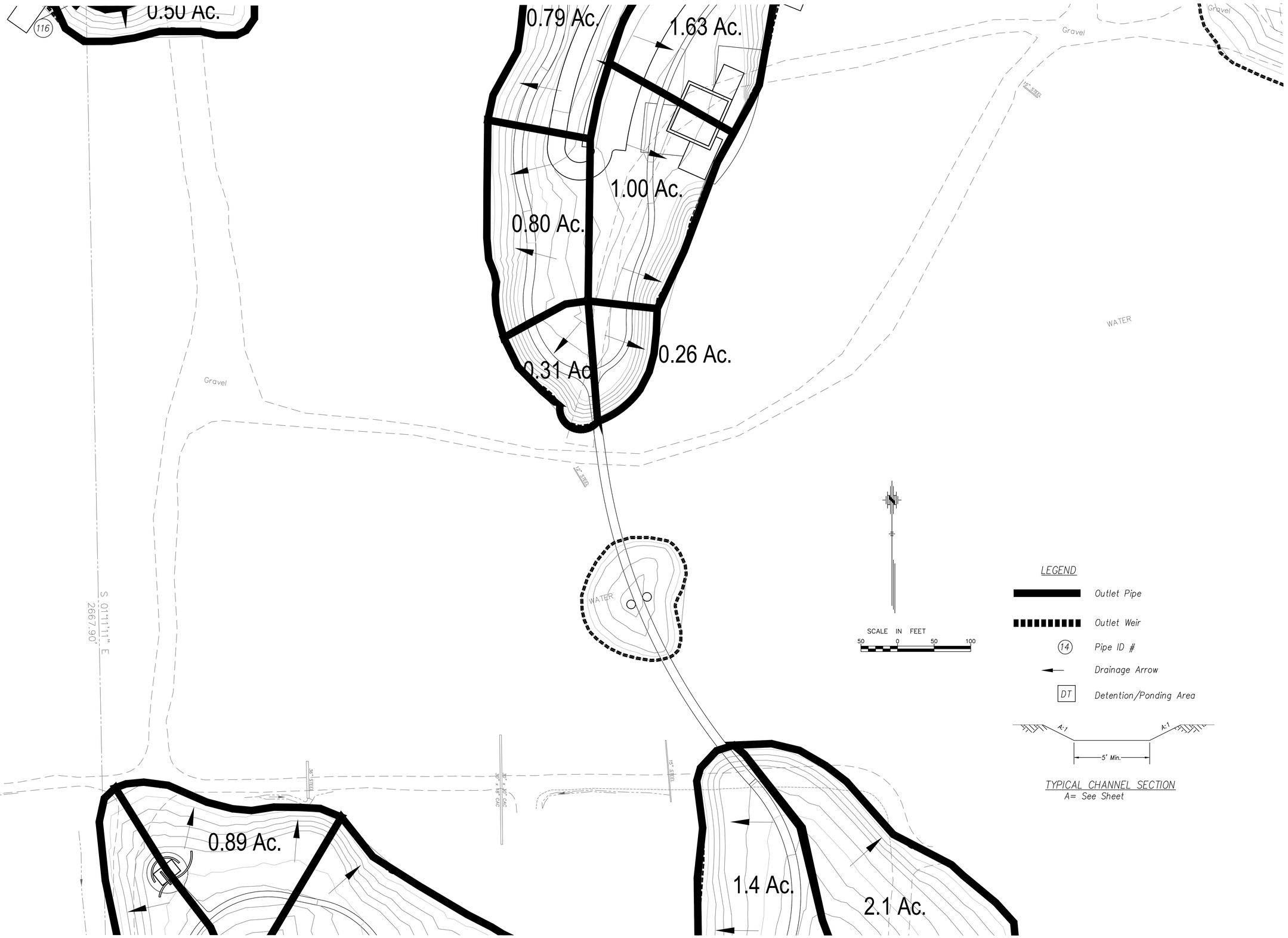
Drainage Plan

C1.13



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608-637-8846 fax

CIVIL ENGINEER
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Mike Hoferer, Project Engineer
Topeka, KS 66614
785-272-4799 tel.
785-272-4796 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
9000 Indian Creek Parkway, Suite 100
Overland Park, KS 66210
Omaha, NE 68102
402-392-0103 tel.
402-392-0141 fax

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Cook, Flatt & Strobel Engineers
200 West Douglas, Suite 230
Topeka, KS 66603
785-272-4436 tel.
785-272-4537 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
1502 Capitol Avenue, Suite 100
Omaha, NE 68102
402-392-0103 tel.
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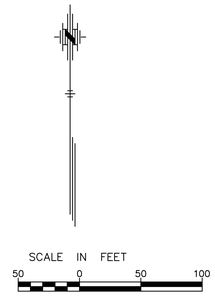
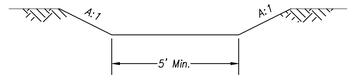
C1.15

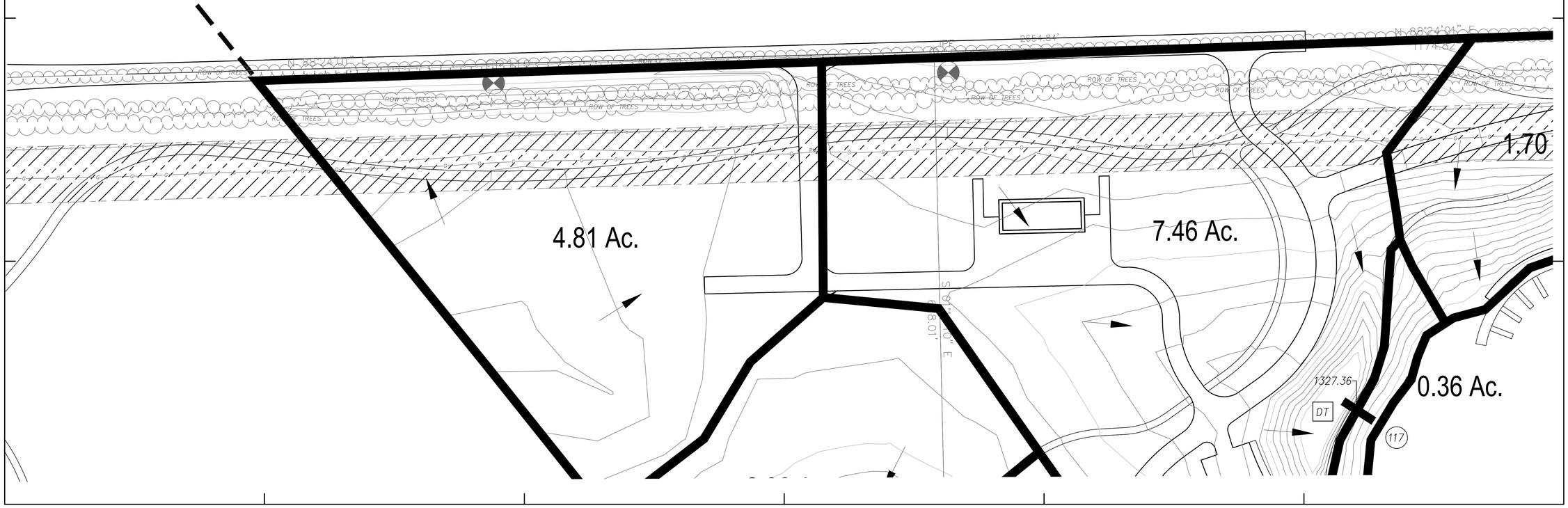


LEGEND

- Outlet Pipe
- Outlet Weir
- (14) Pipe ID #
- Drainage Arrow
- DT Detention/Ponding Area



TYPICAL CHANNEL SECTION
A= See Sheet



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Topeka, KS 66614
785-272-4709 tel.
785-272-4720 fax

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Omaha, NE 68102
402-330-0133 tel.
402-330-4131 fax

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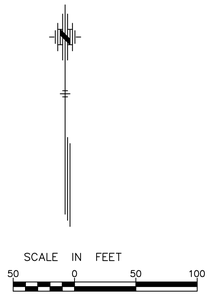

LEGEND

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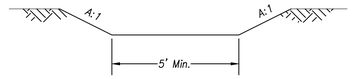

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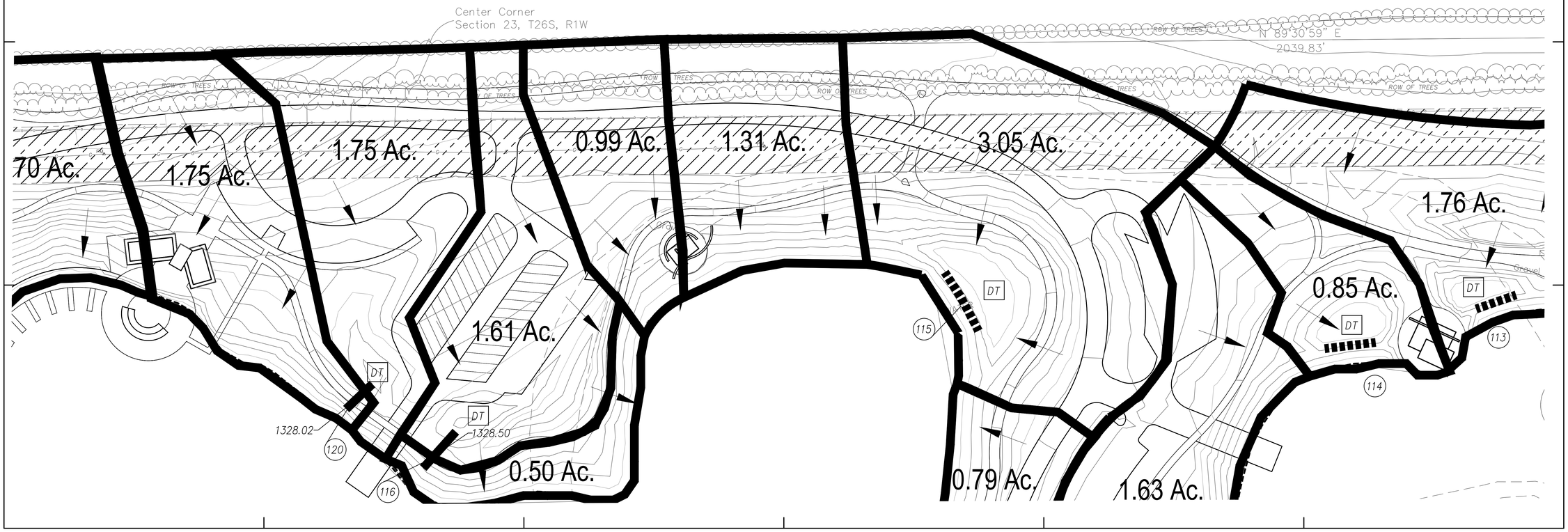

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Applied Ecological Services
Jason Tesar & Jeff Cebulski
PO Box 256
Brodhead, WI 53520
608-897-8641 tel.
608-897-8690 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
Jake Hershey, PE
2600 SW Woodside Drive
Topeka, KS 66614
785-272-4799 tel.
785-272-4796 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
1512 Jackson Street, Suite 100
Omaha, NE 68102
402-330-0133 tel.
402-330-4131 fax

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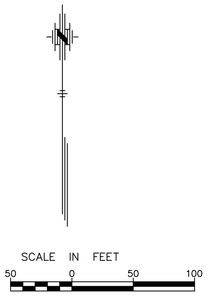

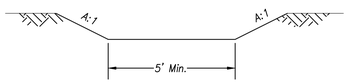

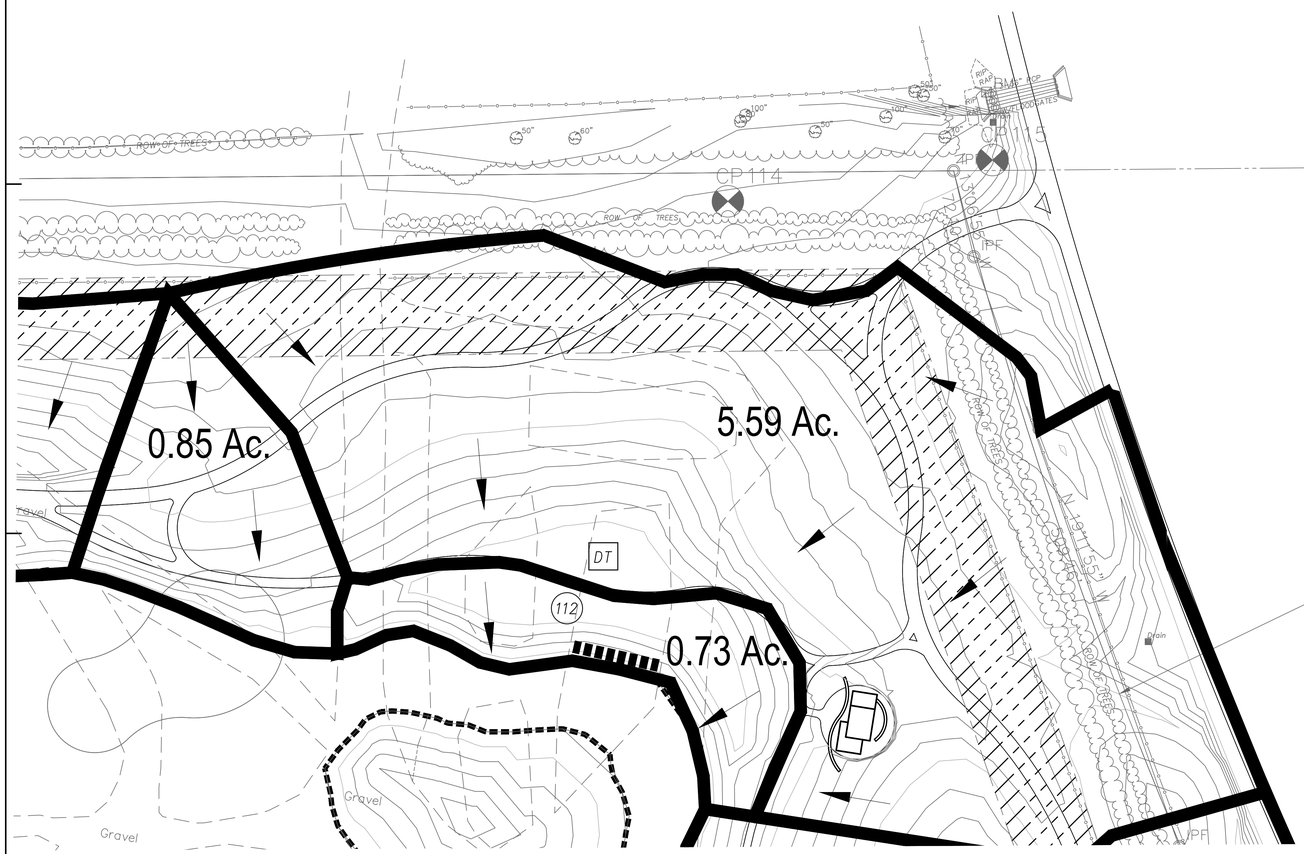

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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

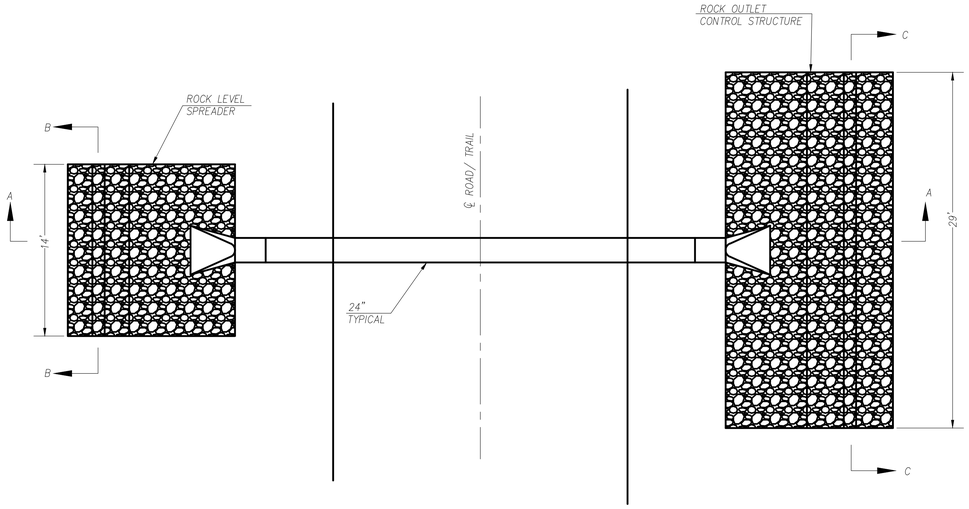
City of Wichita
Wichita, Kansas

Revision Schedule

Rev.	Date	Description

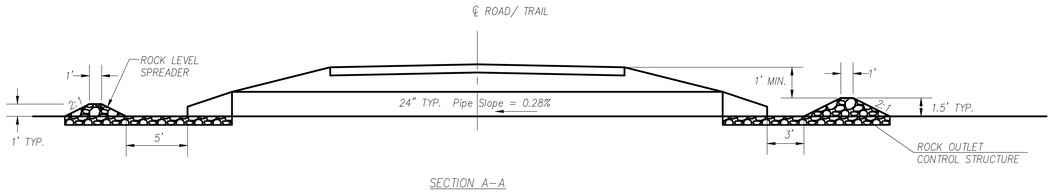
ISSUED: **November 30, 2012**
PROJECT NO: **28258.02**
PROJECT FILE: **Const. Documents**

Drainage Plan

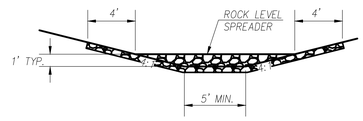


TYPICAL TREATMENT POND OUTLET WITH PIPE

NOTE:
1. ANCHOR RIPRAP LEVEL ROCK SPREADER AND ROCK OUTLET STRUCTURE 2' (MIN) BELOW CHANNEL SECTION.
2. SEE KDOT SPECIFICATIONS FOR AGGREGATE DITCH LINING D(50)=6".
3. PIPE NO. 19 & 23 IS 30".



SECTION A–A



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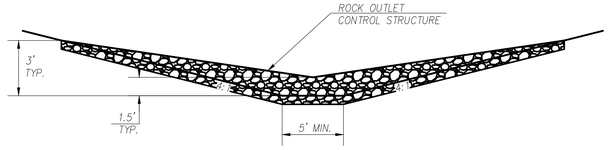

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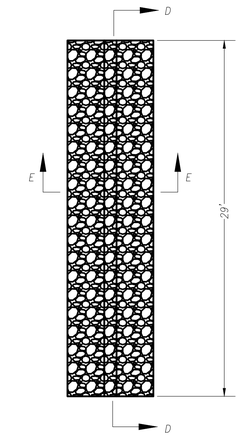
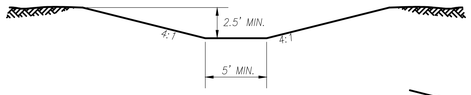
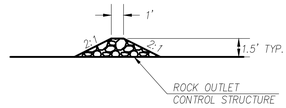


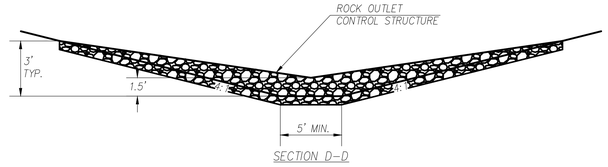
TYPICAL TREATMENT POND OUTLET WEIR



TYPICAL GRASS LINED CHANNEL



SECTION E–E



SECTION D–D

DRAINAGE CHART

D.A. No.	Area (ac.)	Time (min.)	C(10) (cf)	Eq. A (10) (CxA)	I (10) (in./hr.)	Q (10) (cfs)	C(100) (cf)	Eq. A (100) (CxA)	I (100) (in./hr.)	Q (100) (cfs)	FL. Elev. US. (ft)	FL. Elev. DS. (ft)	Top of Trail/Rd. (ft)	Pipe Length (ft)	Pipe Size (in)	Capacity (cfs)
101	2.66	10	0.32	0.85	6.09	5.2	0.45	1.20	7.37	8.8	1327.56	1327.44	1331.56	44	24	19.0
102	2.08	10	0.32	0.67	6.09	4.1	0.45	0.94	7.37	6.9					Outlet weir	
103	1.90	10	0.32	0.61	6.09	3.7	0.45	0.86	7.37	6.3					Outlet weir	
104	1.24	10	0.32	0.40	6.09	2.4	0.45	0.56	6.53	3.6					Outlet weir	
105	2.07	15	0.32	0.66	5.22	3.5	0.45	0.93	7.37	6.9					Outlet weir	
106	3.66	15	0.32	1.17	5.22	6.1	0.45	1.65	7.37	12.1	1325.42	1325.30	1329.42	44	24	19.0
109	5.48	22	0.32	1.75	4.32	7.6	0.45	2.47	7.37	18.2	1325.42	1325.30	1329.42	44	24	19.0
110	3.56	20	0.32	1.14	4.60	5.2	0.45	1.60	7.37	11.8	1333.19	1333.07	1337.19	44	24	19.0
111	5.64	20	0.32	1.80	4.60	8.3	0.45	2.54	7.37	18.7	1324.00	1323.88	1328.00	44	24	19.0
112	5.59	15	0.32	1.79	5.22	9.3	0.45	2.52	7.37	18.5					Outlet weir	
113	1.76	15	0.32	0.56	5.22	2.9	0.45	0.79	7.37	5.8					Outlet weir	
114	0.85	10	0.32	0.27	6.09	1.7	0.45	0.38	7.37	2.8					Outlet weir	
115	3.05	15	0.32	0.98	5.22	5.1	0.45	1.37	7.37	10.1					Outlet weir	
116	1.61	15	0.32	0.52	5.22	2.7	0.45	0.72	7.37	5.3	1324.59	1324.47	1328.59	44	24	19.0
117	7.46	20	0.32	2.39	4.60	11.0	0.45	3.36	6.53	21.9	1323.50	1323.38	1328.00	44	24	19.0
118	1.38	10	0.32	0.44	6.09	2.7	0.45	0.62	8.54	5.3	1327.26	1327.14	1331.26	44	24	19.0
119	2.92	10	0.32	0.93	6.09	5.7	0.45	1.31	6.53	8.6	1326.83	1326.71	1330.83	44	24	19.0
120	1.75	10	0.32	0.56	6.09	3.4	0.45	0.79	6.53	5.1	1324.02	1323.90	1328.02	44	24	19.0
121	25.53	35	0.32	8.17	6.09	49.8	0.45	11.49	6.53	75.0					Outlet weir	
122	30.29	20	0.32	9.69	4.60	44.6	0.45	13.63	6.53	89.0					Outlet weir	
123	36.83	25	0.32	11.79	4.15	48.9	0.45	16.57	6.53	108.2					Outlet weir	

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Topeka, KS 66614
785-272-4799 tel.
785-272-4796 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
9000 Regency Parkway Suite 100
Omaha, NE 68102
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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

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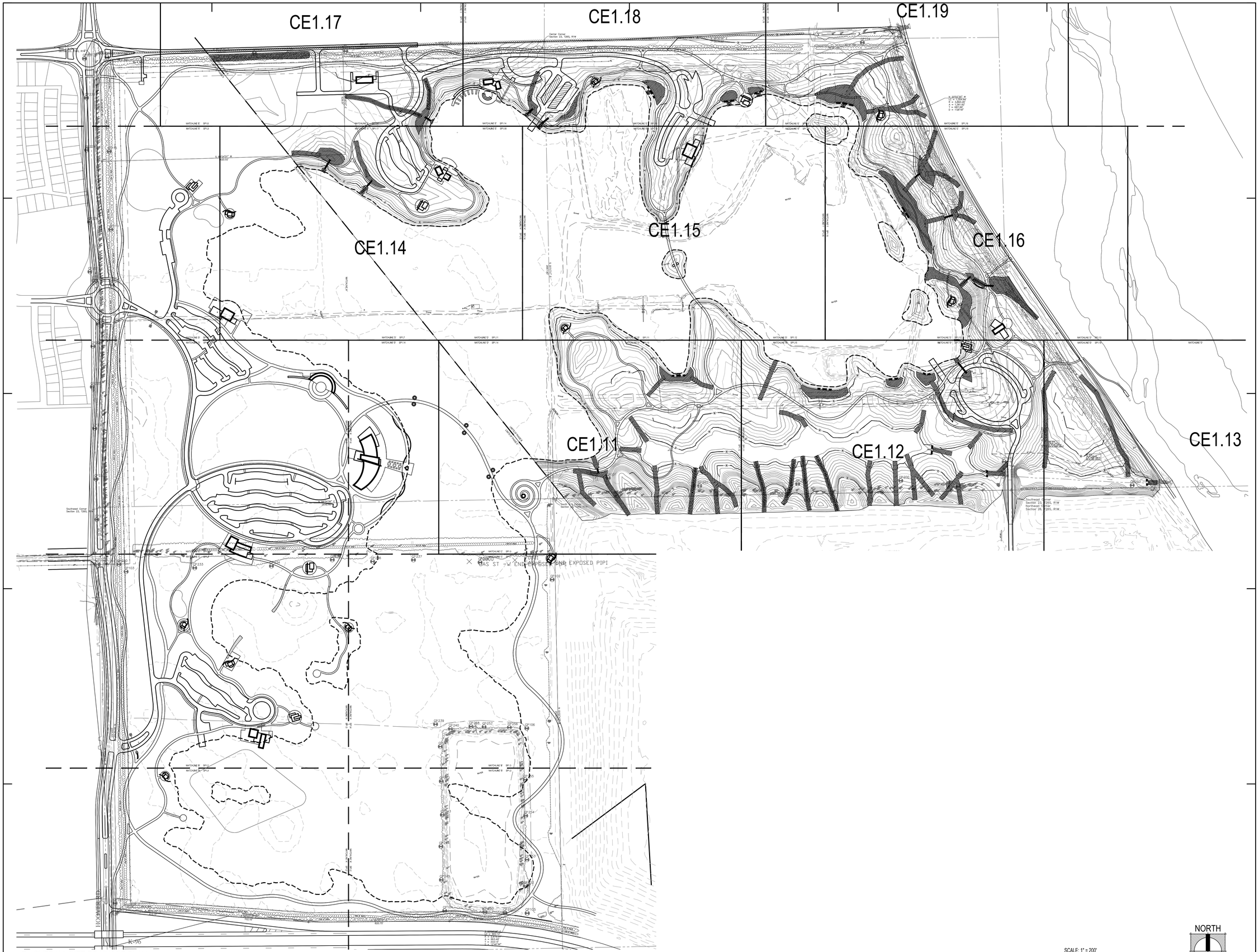
C1.19



1 OVERALL SITE DRAINAGE PLAN
1" = 200'

SCALE: 1" = 200'
0 200' 400' 600'

NORTH

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Cook, Flatt & Strobel Engineers
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Topeka, KS 66603
785-272-4799 tel.
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LANDSCAPE ARCHITECT
RDG Planning & Design
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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

City of Wichita
Wichita, Kansas

Revision Schedule
Rev Date Description

ISSUED: Nov. 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Overall Erosion Control Plan

CE1.0

TYPICAL CHANNEL SECTION
A= See Sheet

SCALE IN FEET
50 0 50 100

LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal

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608-897-8690 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
Jason Fehr & Jeff Rosenau
Drive
Topeka, KS 66614
785-272-4799 tel.
785-272-4796 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
Jason Haase & Jeff Mabe Suite 100
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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.11"

City of Wichita
Wichita, Kansas

Revision Schedule		
Rev	Date	Description

ISSUED: Nov. 30, 2012
PROJECT NO: 20258.02
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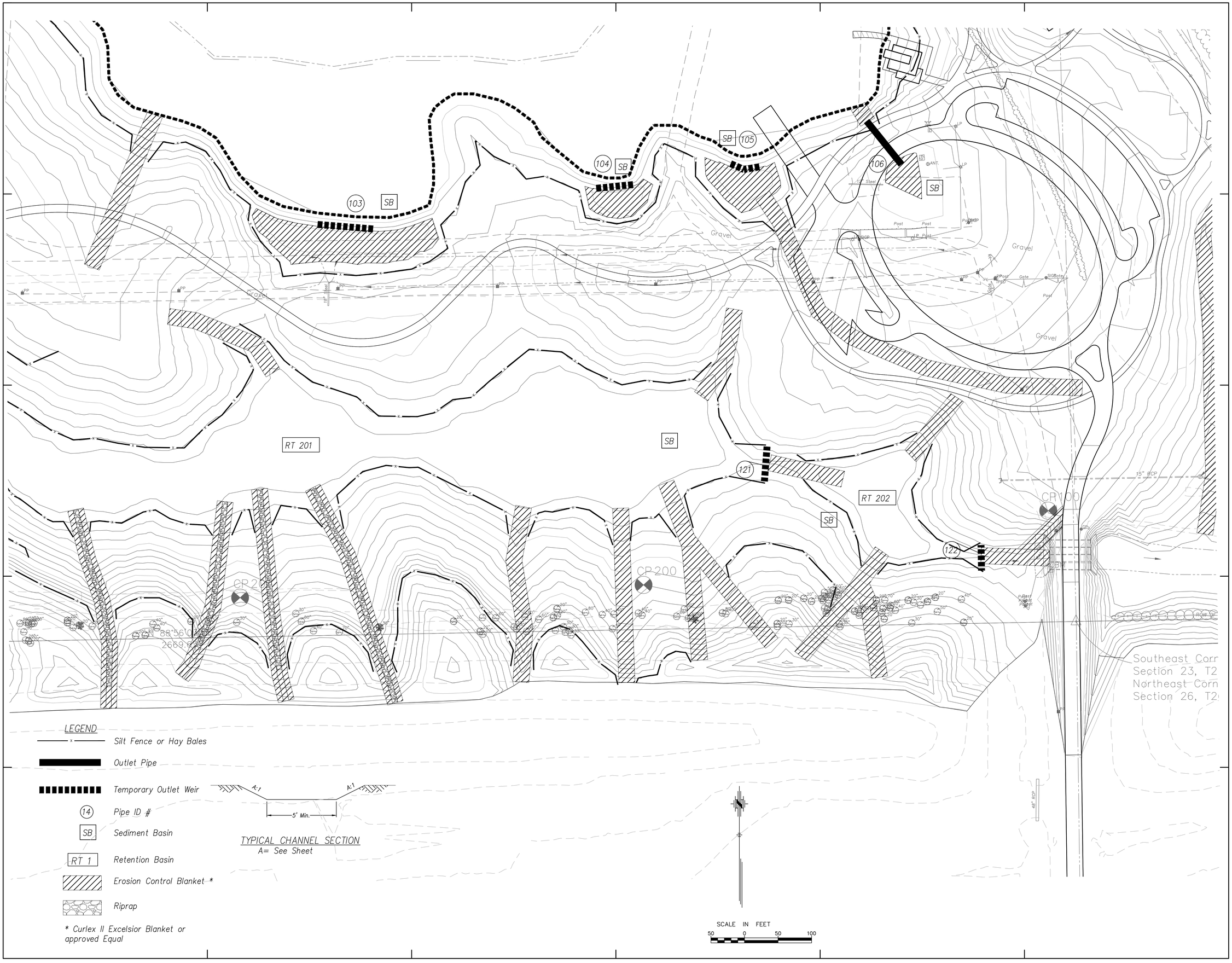
Erosion Control
Map Area 1.11

CE1.11



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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.12"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: Nov. 30, 2012
PROJECT NO: 20258.02
PROJECT FILE: Const. Documents

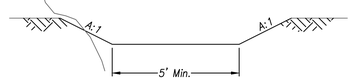
Erosion Control Map Area 1.12

CE1.12

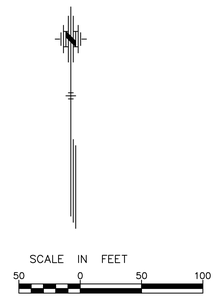
LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION
A= See Sheet



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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.13"

City of Wichita
Wichita, Kansas

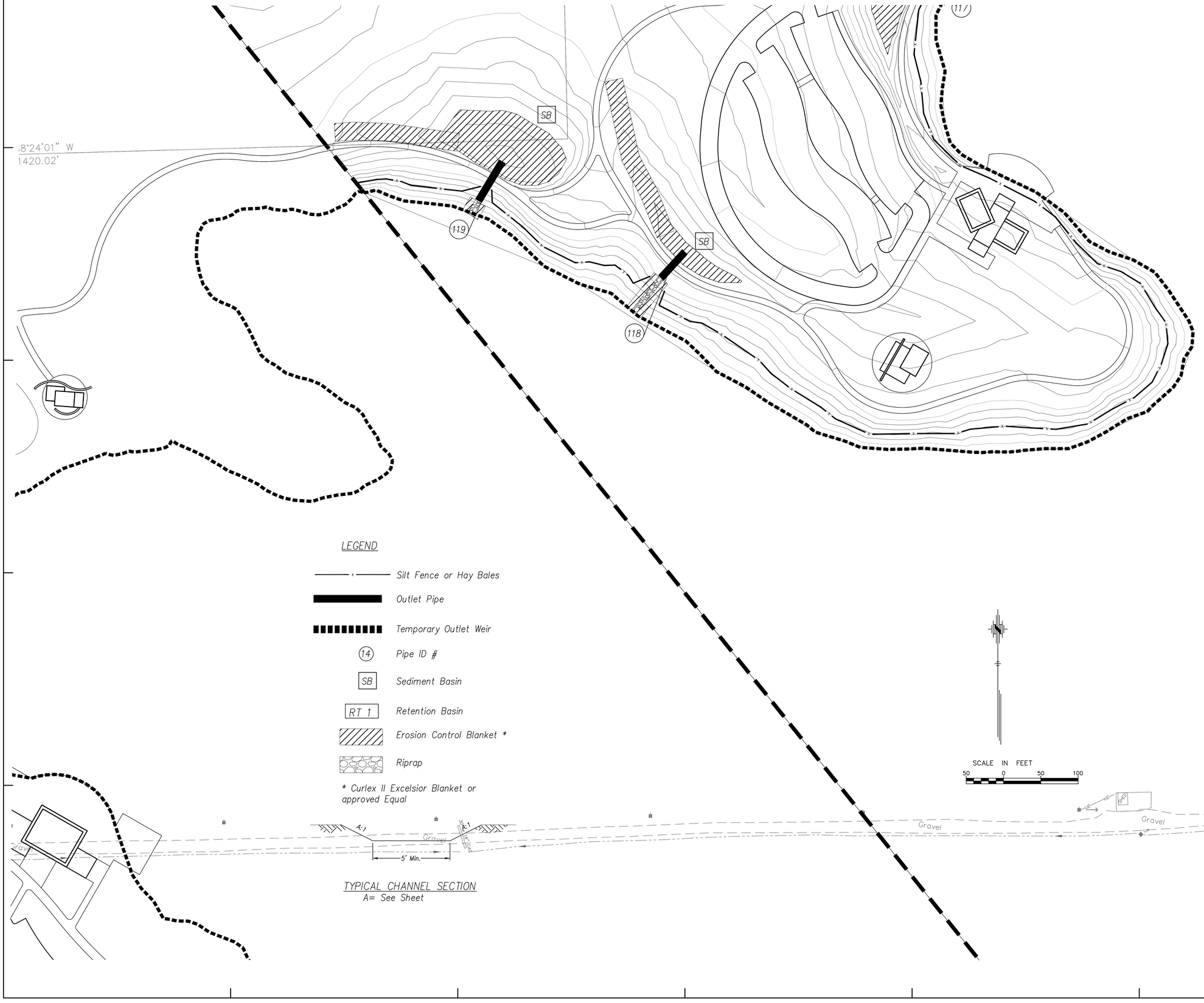
Revision Schedule

Rev	Date	Description

ISSUED: Nov. 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Erosion Control Map Area 1.13

CE1.13



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785-272-4799 tel
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LANDSCAPE ARCHITECT
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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.14"

City of Wichita
Wichita, Kansas

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ISSUED: Nov. 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Erosion Control Map Area 1.14

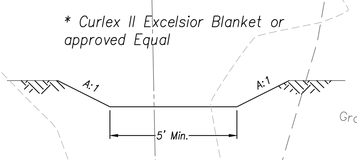
CE1.14

LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal

SCALE IN FEET
50 0 50 100



TYPICAL CHANNEL SECTION
A= See Sheet

Gravel
Gravel
Gravel
WATER
WATER
S 01°11'11" E
2667.90'
12" STEEL
15" STEEL
30" x 30" CMC
30" x 30" CMC
15" STEEL

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Steve Flatt, Project Manager
Topeka, KS 66614
785-272-4156 tel.
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Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.15"

City of Wichita
Wichita, Kansas

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Erosion Control
Map Area 1.15

CE1.15

Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.11"

City of Wichita
Wichita, Kansas

Rev	Date	Description

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Erosion Control Map Area 1.16

CE1.16

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Olsson Associates
2550 SW Wanamaker Drive
Topeka, KS 66614
785-272-4726 fax
785-272-4722 tel

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LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap
- * Curlex II Excelsior Blanket or approved Equal

TYPICAL CHANNEL SECTION
A= See Sheet

SCALE IN FEET
50 0 50 100

ARKANSAS RIVER

WATER

Gravel

Grass

ROW OF TREES

IPF

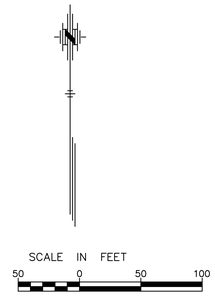
N 0°35'35" W
2641.07'

S 22°28'55" W
1240.57'

N 16°40'55" W
506.74'

(109) (110) (111)

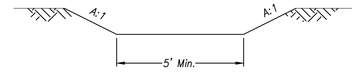
SB



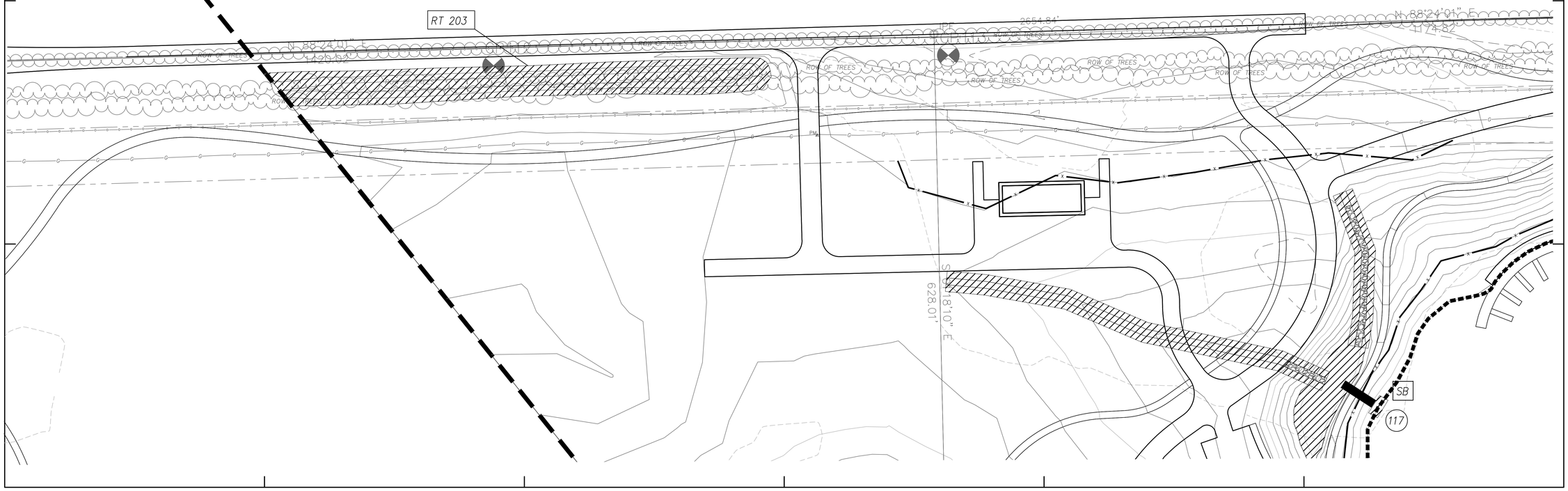
LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION
A= See Sheet



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CIVIL ENGINEER
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Jason Hartman, PE
Topeka, KS 66614
785-272-4799 tel.
785-272-4796 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
9000 Flint Street, Suite 100
Omaha, NE 68102
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402-330-4131 fax

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EROSION CONTROL MAP AREA "1.17"

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Erosion Control Map Area 1.17

CE1.17

SCALE IN FEET
50 0 50 100

LEGEND

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- Temporary Outlet Weir
- (14) Pipe ID #
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- Erosion Control Blanket *
- Riprap

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TYPICAL CHANNEL SECTION

A= See Sheet

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ENVIRONMENTAL
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Jason Hartman, Project Manager
608-637-8841 tel.
608-637-8846 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
Jason Hoffman, Project Engineer
Topeka, KS 66614
785-272-4799 tel.
785-272-4554 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
8600 Indian Hills Drive, Suite 100
Omaha, NE 68102
402-330-0133 tel.
402-330-4131 fax

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EROSION CONTROL MAP AREA "1.18"

City of Wichita
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ISSUED: Nov. 30, 2012
PROJECT NO: 20258.02
PROJECT FILE: Const. Documents

Erosion Control Map Area 1.18

CE1.18

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RETENTION BASINS ANALYSIS

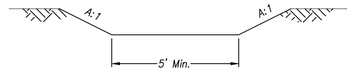
ID	Bottom Elev. (ft)	Overflow Elev. (ft)	Depth (ft)	Exist Soil Type	Conduct. (in/hr)	Retention Time (hr)	Soil ID
RT201	1326	1328	2.0	Sandy Loam	1.02	24	6330
RT202	1325.5	1327	1.5	Silt Loam	0.27	67	5977
RT203	1332	1335	3.0	Sandy Loam	1.02	35	6330

SCALE IN FEET
50 0 50 100

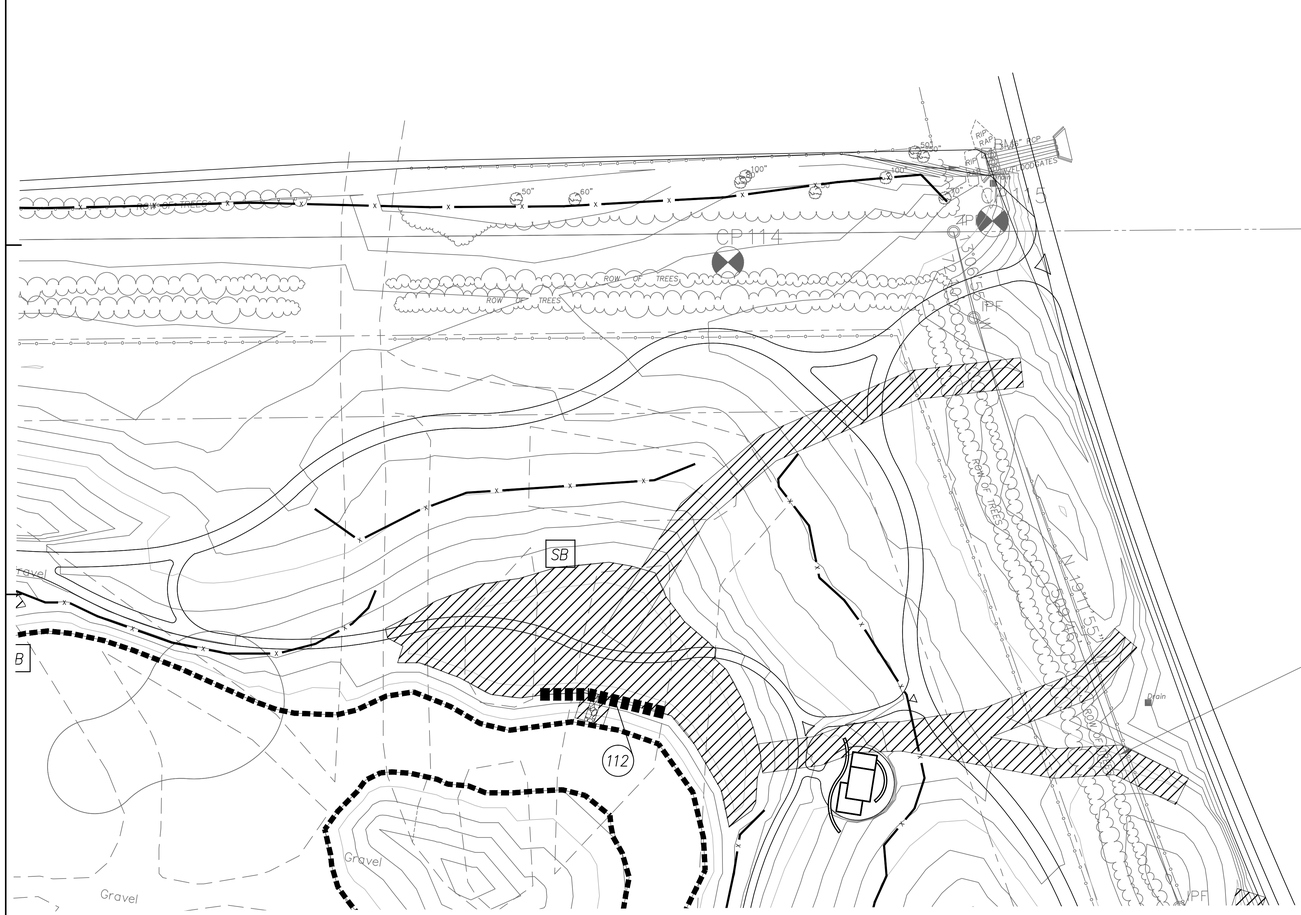
LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION
A= See Sheet



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www.rdgusa.com • Omaha NE • Des Moines IA

ENVIRONMENTAL
Applied Ecological Services
Jason Hartman, PO Box 226
Brodhead, WI 53520
608-897-8641 tel.
608-897-8690 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
3321 SW 6th Avenue Drive
Topeka, KS 66604
785-272-4799 tel.
785-272-4723 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
1512 Jackson Street, Suite 100
Omaha, NE 68102
402-392-0103 tel.
402-392-0141 fax

PRELIMINARY, NOT FOR CONSTRUCTION

Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL MAP AREA "1.19"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: Nov. 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Erosion Control Map Area 1.19

CE1.19

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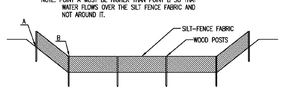
NOTE: POINT A MUST BE HIGHER THAN POINT B SO THAT WATER FLOWS OVER THE SILT FENCE FABRIC AND NOT AROUND IT.



ELEVATION

SILT FENCE DITCH CHECKS
(STREAM PROTECTION)

MATERIAL SPECIFICATION:

SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
SILT FENCE FABRIC SHOULD BE ATTACHED TO THE WOODEN POSTS WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

PLACEMENT:

PLACE SILT FENCE IN DITCHES WHERE IT IS UNLIKELY THAT IT WILL BE OVERTOPPED.
WATER SHOULD FLOW THROUGH A SILT FENCE DITCH CHECK, NOT OVER IT. SILT FENCE DITCH CHECKS OFTEN FAIL WHEN OVERTOPPED.
SILT FENCE DITCH CHECKS SHOULD BE PLACED PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
THE SILT FENCE SHOULD EXTEND FAR ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE FENCE IS HIGHER THAN THE TOP OF THE LOW POINT OF THE FENCE. THIS PREVENTS WATER FROM FLOWING AROUND THE CHECK.
SILT FENCE DITCH CHECKS SHOULD NOT BE PLACED IN DITCHES WHERE HIGH FLOWS ARE EXPECTED. ROCK CHECKS SHOULD BE USED INSTEAD.
SILT FENCE SHOULD BE PLACED IN DITCHES WITH SLOPES OF 6% OR LESS. FOR SLOPES STEEPER THAN 6%, ROCK CHECKS SHOULD BE USED.

THE FOLLOWING TABLE PROVIDES CHECK SPACING FOR A GIVEN DITCH GRADE:

DITCH CHECK DITCH GRADE (%)	SPACING CHECK SPACING (FEET)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH PERPENDICULAR TO THE DITCH FLOWLINE THAT IS AT LEAST 12" DEEP BY 6" WIDE. EXTEND THE TRENCH IN A STRAIGHT LINE ALONG THE ENTIRE LENGTH OF THE PROPOSED DITCH CHECK. PLACE THE SOIL ON THE UPSTREAM SIDE OF THE TRENCH FOR LATER USE.
ROLL OUT A CONTINUOUS LENGTH OF SILT FENCE FABRIC ON THE DOWNSTREAM SIDE OF THE TRENCH. PLACE THE EDGE OF THE FABRIC IN THE TRENCH STARTING AT THE TOP UPSTREAM EDGE OF THE TRENCH. LINE TWO SIDES OF THE TRENCH WITH THE FABRIC AS SHOWN ON DETAIL. BACKFILL OVER THE FABRIC IN THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT FENCE FABRIC SHOULD REMAIN EXPOSED.
LAY THE EXPOSED SILT FENCE ON THE UPSTREAM SIDE OF THE TRENCH TO CLEAR AN AREA FOR DRIVING IN THE POSTS. JUST DOWNSTREAM OF THE TRENCH, DRIVE POSTS INTO THE GROUND TO A DEPTH OF AT LEAST 24". PLACE POSTS NO MORE THAN 4' APART.
ATTACH THE SILT FENCE TO THE ANCHORED POST WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

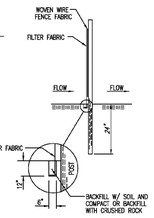
LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WATER SHOULD FLOW THROUGH A SILT FENCE DITCH CHECK--NOT OVER IT. PLACE SILT FENCE IN DITCHES WHERE IT IS UNLIKELY THAT IT WILL BE OVERTOPPED. SILT FENCE INSTALLATIONS QUICKLY DETERIORATE WHEN WATER OVERTOPS THEM.
DO NOT PLACE SILT FENCE POSTS ON THE UPSTREAM SIDE OF THE SILT FENCE FABRIC. IN THIS CONFIGURATION, THE FORCE OF THE WATER IS NOT RESTRICTED BY THE POSTS, BUT ONLY BY THE STAPLES (WIRE, ZIP TIES, NAILS, ETC.). THE SILT FENCE WILL RIP AND FAIL.
DO NOT PLACE A SILT FENCE DITCH DIRECTLY IN FRONT OF A CULVERT OUTLET. IT WILL NOT STAND UP TO THE CONCENTRATED FLOW.
DO NOT PLACE SILT FENCE DITCH CHECKS IN DITCHES THAT WILL LIKELY EXPERIENCE HIGH FLOWS. THEY WILL NOT STAND UP TO CONCENTRATED FLOW.
FOLLOW PRESCRIBED DITCH CHECK SPACING GUIDELINES. IF SPACING GUIDELINES ARE EXCEEDED, EROSION WILL OCCUR BETWEEN THE DITCH CHECKS.
DO NOT ALLOW WATER TO FLOW AROUND THE DITCH CHECK. MAKE SURE THAT THE DITCH CHECK IS LONG ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE FENCE IS HIGHER THAN THE LOW POINT ON THE TOP OF THE FENCE.
DO NOT PLACE SILT FENCE DITCH CHECKS IN CHANNELS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE CHECK IS NOT ANCHORED SUFFICIENTLY, IT WILL WASH OUT.

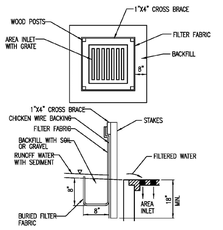
INSPECTION AND MAINTENANCE:

SILT FENCE DITCH CHECKS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW AROUND THE DITCH CHECK?
DOES WATER FLOW UNDER THE DITCH CHECK?
DOES THE SILT FENCE SAG EXCESSIVELY?
HAS THE SILT FENCE TORN OR BECOME DETACHED FROM THE POSTS?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE DITCH CHECK?



ANCHOR TRENCH DETAIL.



SILT FENCE BARRIERS FOR AREA INLETS
(INLET PROTECTION)

MATERIAL SPECIFICATION:

SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE WIRE OR POLYMERIC MESH BACKING USED TO HELP SUPPORT THE SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
THE MATERIAL USED TO FRAME THE TOPS OF THE POSTS SHOULD BE 1" BY 4" BOARDS.
SILT FENCE FABRIC AND SUPPORT BACKING SHOULD BE ATTACHED TO THE WOODEN POSTS AND FRAME WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

PLACEMENT:

PLACE A SILT FENCE DROP INLET BARRIER IN A LOCATION WHERE IT IS UNLIKELY TO BE OVERTOPPED. WATER SHOULD FLOW THROUGH SILT FENCE, NOT OVER IT. SILT FENCE BARRIERS FOR AREA INLETS OFTEN FAIL WHEN REPEATEDLY OVERTOPPED.
WHEN USED AS A BARRIER FOR AREA INLETS, SILT FENCE FABRIC AND POSTS MUST BE SUPPORTED AT THE TOP BY A WOODEN FRAME.
WHEN A SILT FENCE BARRIER FOR AREA INLETS IS LOCATED NEAR AN INLET THAT HAS STEEP APPROACH SLOPES, THE STORAGE CAPACITY BEHIND THE BARRIER IS DRASTICALLY REDUCED. TIMELY REMOVAL OF SEDIMENT MUST OCCUR FOR A BARRIER TO OPERATE PROPERLY IN THIS LOCATION.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH AROUND THE PERIMETER OF THE AREA INLET THAT IS AT LEAST 8" DEEP BY 8" WIDE. DRIVE POSTS TO A DEPTH OF AT LEAST 18" AROUND THE PERIMETER OF THE AREA INLET.
THE DISTANCE BETWEEN POSTS SHOULD BE 4' OR LESS. IF THE DISTANCE BETWEEN TWO ADJACENT CORNER POSTS IS MORE THAN 4', ADD ADDITIONAL POSTS AS NEEDED TO EVENLY SPACE THEM.
CONNECT THE TOPS OF ALL THE POSTS WITH A WOODEN FRAME MADE OF 1" BY 4" BOARDS. USE NAILS OR SCREWS FOR FASTPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT FENCE FABRIC SHOULD REMAIN EXPOSED.
ATTACH THE WIRE OR POLYMERIC-MESH BACKING TO THE OUTSIDE OF THE POST/FRAME STRUCTURE WITH STAPLES, WIRE, ZIP TIES, OR NAILS.
ROLL OUT A CONTINUOUS LENGTH OF SILT FENCE FABRIC LONG ENOUGH TO WRAP AROUND THE PERIMETER OF THE AREA INLET. ADD MORE LENGTH FOR OVERLAPPING THE FABRIC JOINT. PLACE THE EDGE OF THE FABRIC IN THE TRENCH, STARTING AT THE OUTSIDE EDGE OF THE TRENCH. LINE ALL THREE SIDES OF THE TRENCH WITH THE FABRIC. BACKFILL OVER THE FABRIC IN THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT FENCE FABRIC SHOULD REMAIN EXPOSED.
ATTACH THE SILT FENCE TO THE OUTSIDE OF THE POST/FRAME STRUCTURE WITH STAPLES, WIRE, ZIP TIES, OR NAILS. THE JOINT SHOULD BE OVERLAPPED TO THE NEXT POST.

NOTE: WHEN A SILT FENCE BARRIER FOR AREA INLET IS PLACED IN A SHALLOW MESWAN DITCH, MAKE SURE THAT THE TOP OF THE BARRIER IS NOT HIGHER THAN THE PAVED ROAD. IN THIS CONFIGURATION, WATER MAY SPREAD ONTO THE ROADWAY CAUSING A HAZARDOUS CONDITION.

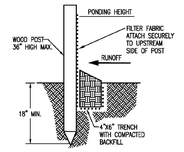
LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WATER SHOULD FLOW THROUGH A SILT FENCE BARRIER FOR AREA INLET--NOT OVER IT. PLACE A SILT FENCE BARRIER FOR AREA INLET IN A LOCATION WHERE IT IS UNLIKELY TO BE OVERTOPPED. SILT FENCE BARRIER FOR AREA INLETS OFTEN FAIL WHEN REPEATEDLY OVERTOPPED.
DO NOT PLACE POSTS ON THE OUTSIDE OF THE SILT FENCE BARRIER FOR AREA INLET. IN THIS CONFIGURATION, THE FORCE OF THE WATER IS NOT RESISTED BY THE POSTS, BUT ONLY BY THE STAPLES (WIRE, ZIP TIES, NAILS, ETC.). THE SILT FENCE WILL RIP AND FAIL.
DO NOT INSTALL SILT FENCE BARRIER FOR AREA INLETS WITHOUT FRAMING THE TOP OF THE POSTS. THE CORNER POSTS AROUND AREA INLETS ARE STRESSED IN TWO DIRECTIONS WHEREAS A NORMAL SILT FENCE IS ONLY STRESSED IN ONE DIRECTION. THIS ADDED STRESS REQUIRES MORE SUPPORT.

INSPECTION AND MAINTENANCE:

SILT FENCE BARRIER FOR AREA INLETS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW UNDER THE SILT FENCE?
DOES THE SILT FENCE SAG EXCESSIVELY?
HAS THE SILT FENCE TORN OR BECOME DETACHED FROM THE POSTS?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE AREA INLET BARRIER?



SILT FENCE BARRIERS

MATERIAL SPECIFICATION:

SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
SILT FENCE FABRIC SHOULD BE ATTACHED TO THE WOODEN POSTS WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

PLACEMENT:

A SLOPE BARRIER SHOULD BE USED AT THE TOE OF A SLOPE WHEN A DITCH DOES NOT EXIST. THE SLOPE BARRIER SHOULD BE PLACED ON NEARLY LEVEL GROUND 5' TO 10' AWAY FROM THE TOE OF A SLOPE. THE BARRIER IS PLACED AWAY FROM THE TOE OF THE SLOPE TO PROVIDE ADEQUATE STORAGE FOR SETTLING OUT SEDIMENT.
WHEN PRACTICABLE, SILT FENCE SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW.
SILT FENCE SLOPE BARRIERS CAN ALSO BE PLACED ALONG RIGHT-OF-WAY FENCE LINES TO KEEP SEDIMENT FROM CROSSING ONTO ADJACENT PROPERTY. WHEN PLACED IN THIS MANNER, THE SLOPE BARRIER WILL NOT LIKELY FOLLOW CONTOURS.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH THE LENGTH OF THE PLANNED SLOPE BARRIER THAT IS 6" DEEP BY 4" WIDE.
MAKE SURE THAT THE TRENCH IS EXCAVATED ALONG A SINGLE CONTOUR. WHEN PRACTICABLE, SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. PLACE THE SOIL ON THE UPSLOPE SIDE OF THE TRENCH FOR LATER USE.
ROLL OUT A CONTINUOUS LENGTH OF SILT FENCE FABRIC ON THE DOWNSLOPE SIDE OF THE TRENCH. PLACE THE EDGE OF THE FABRIC IN THE TRENCH STARTING AT THE TOP UPSLOPE EDGE. LINE ALL THREE SIDES OF THE TRENCH WITH THE FABRIC. BACKFILL OVER THE FABRIC IN THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT-FENCE FABRIC SHOULD REMAIN EXPOSED.
LAY THE EXPOSED SILT FENCE UPSLOPE OF THE TRENCH TO CLEAR AN AREA FOR DRIVING IN THE POSTS. JUST DOWNSLOPE OF THE TRENCH, DRIVE POSTS INTO THE GROUND TO A DEPTH OF AT LEAST 18". PLACE POSTS NO MORE THAN 4' APART.
ATTACH THE SILT FENCE TO THE ANCHORED POST WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WHEN PRACTICABLE, DO NOT PLACE SILT FENCE SLOPE BARRIERS ACROSS CONTOURS. SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. WHEN THE FLOW CONCENTRATES, IT OVERTOPS THE BARRIER AND THE SILT FENCE SLOPE BARRIER QUICKLY DETERIORATES.
DO NOT PLACE SILT-FENCE POSTS ON THE UPSLOPE SIDE OF THE SILT FENCE FABRIC. IN THIS CONFIGURATION, THE FORCE OF THE WATER IS NOT RESTRICTED BY THE POSTS, BUT ONLY BY THE STAPLES (WIRE, ZIP TIES, NAILS, ETC.). THE SILT FENCE WILL RIP AND FAIL.
DO NOT PLACE SILT FENCE SLOPE BARRIERS IN AREAS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE BARRIER IS NOT SUFFICIENTLY ANCHORED, IT WILL WASH OUT.
SILT FENCE SLOPE BARRIERS MUST BE DUG INTO THE GROUND--SILT FENCE AT GROUND LEVEL DOES NOT WORK BECAUSE WATER WILL FLOW UNDERNEATH.

INSPECTION AND MAINTENANCE:

SILT FENCE SLOPE BARRIERS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

ARE THERE ANY POINTS ALONG THE SLOPE BARRIER WHERE WATER IS CONCENTRATING?
DOES WATER FLOW UNDER THE SLOPE BARRIER?
DO THE SILT FENCES SAG EXCESSIVELY?
HAS THE SILT FENCE TORN OR BECOME DETACHED FROM THE POSTS?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE SLOPE BARRIER?

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

SILT FENCE DITCH CHECK AND BARRIER DETAILS

CITY ENGINEER: JAMES L. ARMOUR, P.E., L.S.

PROJECT NUMBER	DCA NUMBER	DATE
—	—	11/2010

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

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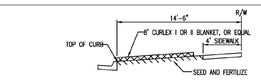

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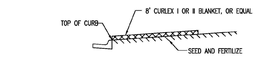

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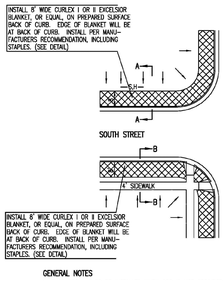
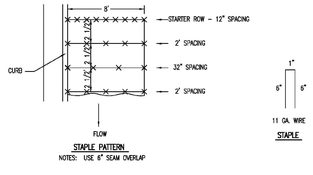


GENERAL NOTES

1. EXCELSIOR MAT TO BE INSTALLED WHEN SOD IS NOT SPECIFIED ON PROJECT.
2. EXCELSIOR BLANKET TO BE INSTALLED OVER SEED AND FERTILIZER, AS SPECIFIED IN THE PROJECT SPECIFICATIONS.
3. AFTER INSTALLATION OF EXCELSIOR BLANKET, AT LOCATIONS WHERE CONCENTRATED FLOW CARRIES SEDIMENT OVER THE CURB AND INTO THE GUTTER, SUPPLEMENTAL EROSION CONTROL DEVICES WILL BE INSTALLED BY THE CONTRACTOR AS NEEDED, TO FIX THE PROBLEM.

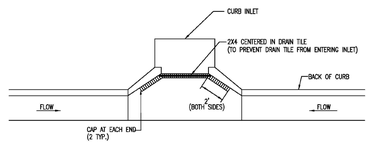
BACK OF CURB PROTECTION DETAIL



STAPLE PATTERN
NOTES: USE 6" SEAM OVERLAP

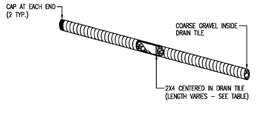
STAPLE

DETAILS FOR CURLEX I OR II BLANKETS

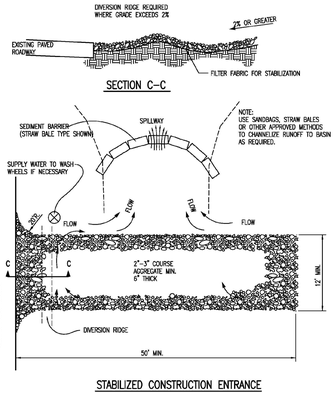


NOTE:
PLACE 4" PERFORATED PVC PIPE, FILLED WITH 1/2"-1" DIA. GRAVEL, IN FRONT OF CURB INLET AS SHOWN.

2X4 LENGTH	INLET TYPE	INLET OPENING
5'-6"	1-A	5'-0"
10'-6"	1-A	10'-0"
15'-6"	1-A	15'-0"



CURB INLET PROTECTION
4" PERFORATED PIPE W/ GRAVEL



STABILIZED CONSTRUCTION ENTRANCE

GENERAL NOTES

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN, AS SHOWN ABOVE.
4. DRIVE ENTRANCES ONTO RESIDENTIAL LOTS WILL NOT BE REQUIRED TO HAVE THE SEDIMENT BARRIER SHOWN, BUT WHEEL WASHING MAY BE REQUIRED IF STABILIZED ENTRANCE IS NOT SUFFICIENT TO KEEP MUD FROM BEING TRACKED ONTO ADJACENT STREET. ENTRANCE SHALL EXTEND FROM BACK OF CURB TO DWELLING.

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

BACK OF CURB PROTECTION, CURB INLET PROTECTION AND CONSTRUCTION ENTRANCE

CITY ENGINEER: JAMES L. ARMOUR, P.E., L.S.

PROJECT NUMBER	DCA NUMBER	DATE
—	—	11/2010

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

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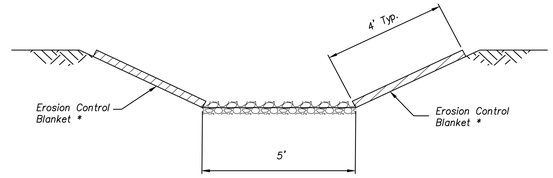
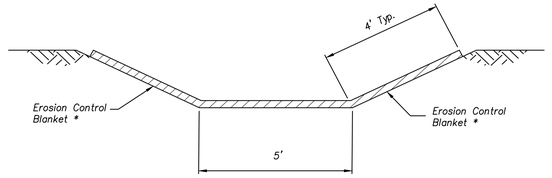


TYPICAL RIPRAP LINED CHANNEL

Riprap Depth = 2' Min.
See KDOT Specification for Aggregate ditch lining D(50)=6"



TYPICAL EROSION CONTROL BLANKET LINED CHANNEL

** Curlex II Excelsior Blanket or approved Equal*

RDG... PLANNING ● DESIGN
www.rdgusa.com • Omaha NE • Des Moines IA

ENVIRONMENTAL
Applied Ecological Services
1209 Orange Center Road, Suite 206
Orange City, IA 51041
605-697-8641 tel.
605-697-8645 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
420 S. 18th Street, Suite 200
Fairfield, IA 52556
515-472-4196 tel.
515-472-4197 fax

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RDG Planning & Design
1512 Jackson Street, Suite 100
Omaha, NE 68102
402-330-2135 tel.
402-330-2136 fax

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PRELIMINARY, NOT FOR CONSTRUCTION

Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two

EROSION CONTROL DETAILS

City of Wichita
Wichita, Kansas

Revision Schedule

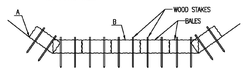
Rev	Date	Description

ISSUED: Nov. 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Erosion Control Details

CE2.0

NOTE: POINT A MUST BE HIGHER THAN POINT B SO THAT WATER FLOWS OVER THE BALES AND NOT AROUND THEM.



STRAW BALE DITCH CHECKS

MATERIAL SPECIFICATION:

BALE DITCH CHECKS MAY BE CONSTRUCTED OF WHEAT STRAW, OAT STRAW, PRAIRIE HAY, OR BROMEGRASS HAY THAT IS FREE OF WEEDS DECLARED NOXIOUS BY THE KANSAS STATE BOARD OF AGRICULTURE.
THE STAKES USED TO ANCHOR THE BALES SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
OPTIONAL: THE DOWNSTREAM SCOUR APRON SHOULD BE CONSTRUCTED OF A DOUBLE-NETTED STRAW EROSION-CONTROL BLANKET AT LEAST 6' WIDE.
OPTIONAL: THE METAL LANDSCAPE STAPLES USED TO ANCHOR THE EROSION-CONTROL BLANKET SHOULD BE AT LEAST 8" LONG.

PLACEMENT:

BALE DITCH CHECKS SHOULD BE PLACED PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
THE DITCH CHECK SHOULD EXTEND FAR ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE CHECK IS HIGHER THAN THE TOP OF THE LOWEST CENTER BALE. THIS PREVENTS WATER FROM FLOWING AROUND THE CHECK.
STRAW BALE DITCH CHECKS SHOULD NOT BE PLACED IN DITCHES WHERE HIGH FLOWS ARE EXPECTED. ROCK CHECKS SHOULD BE USED INSTEAD.
BALES SHOULD BE PLACED IN DITCHES WITH SLOPES OF 6% OR LESS. FOR SLOPES STEEPER THAN 6%, ROCK CHECKS SHOULD BE USED.
THE FOLLOWING TABLE PROVIDES CHECK SPACING FOR A GIVEN DITCH GRADE:

DITCH CHECK SPACING

DITCH GRADE (%)	CHECK SPACING (FEET)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH PERPENDICULAR TO THE DITCH FLOWLINE THAT IS 4" DEEP AND A BALE'S WIDTH WIDE. EXTEND THE TRENCH IN A STRAIGHT LINE ALONG THE ENTIRE LENGTH OF THE PROPOSED DITCH CHECK. PLACE THE SOIL ON THE UPSTREAM SIDE OF THE TRENCH--IT WILL BE USED LATER.
OPTIONAL: ON THE DOWNSTREAM SIDE OF THE TRENCH, ROLL OUT A LENGTH OF EROSION-CONTROL BLANKET (SCOUR APRON) EQUAL TO THE LENGTH OF THE TRENCH. PLACE THE UPSTREAM EDGE OF THE EROSION-CONTROL BLANKET ALONG THE BOTTOM UPSTREAM EDGE OF THE TRENCH. THE EROSION CONTROL BLANKET SHOULD BE ANCHORED IN THE TRENCH WITH ONE ROW OF 8" LANDSCAPE STAPLES PLACED ON 18" CENTERS. THE REMAINDER OF THE EROSION-CONTROL BLANKET (THE PORTION THAT IS NOT LYING IN THE TRENCH) WILL SLOPE AS THE DOWNSTREAM SCOUR APRON. THIS SECTION OF THE BLANKET SHOULD BE ANCHORED TO THE GROUND WITH 8" LANDSCAPE STAPLES PLACED AROUND THE PERIMETER OF THE BLANKET ON 18" CENTERS. THE REMAINDER OF THE BLANKET SHOULD BE ANCHORED USING TWO EVENLY SPACED ROWS OF 8" LANDSCAPE STAPLES ON 18" CENTERS PLACED PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
PLACE THE BALES IN THE TRENCH, MAKING SURE THAT THEY ARE BUTTED TIGHTLY. TWO STAKES SHOULD BE DRIVEN THROUGH EACH BALE ALONG THE CENTERLINE OF THE DITCH CHECK, APPROXIMATELY 6" TO 8" IN FROM THE BALE ENDS. STAKES SHOULD BE DRIVEN AT LEAST 12" INTO THE GROUND.
ONCE ALL THE BALES HAVE BEEN INSTALLED AND ANCHORED, PLACE THE EXCAVATED SOIL AGAINST THE UPSTREAM SIDE OF THE CHECK AND COMPACT IT. THE COMPACTED SOIL SHOULD BE NO MORE THAN 3" TO 4" DEEP AND EXTEND UPSTREAM NO MORE THAN 24".

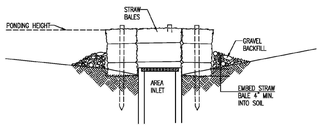
LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

DO NOT PLACE A BALE DITCH CHECK DIRECTLY IN FRONT OF A CULVERT OUTLET. IT WILL NOT STAND UP TO THE CONCENTRATED FLOW.
DO NOT PLACE BALE DITCH CHECKS IN DITCHES THAT WILL LIKELY EXPERIENCE HIGH FLOWS. THEY WILL NOT STAND UP TO CONCENTRATED FLOW.
FOLLOW PRESCRIBED DITCH-CHECK SPACING GUIDELINES. IF SPACING GUIDELINES ARE EXCEEDED, EROSION WILL OCCUR BETWEEN THE DITCH CHECKS.
DO NOT ALLOW WATER TO FLOW AROUND THE DITCH CHECK. MAKE SURE THAT THE DITCH CHECK IS LONG ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE CHECK IS HIGHER THAN THE TOP OF THE LOWEST CENTER BALE.
DO NOT PLACE BALE DITCH CHECKS IN CHANNELS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE CHECK IS NOT ANCHORED SUFFICIENTLY, IT WILL WASH OUT.
BALE DITCH CHECKS MUST BE DUG INTO THE GROUND. BALES AT GROUND LEVEL DO NOT WORK BECAUSE THEY ALLOW WATER TO FLOW UNDER THE CHECK.

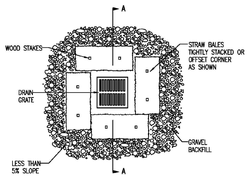
INSPECTION AND MAINTENANCE:

BALE DITCH CHECKS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW AROUND THE DITCH CHECK?
DOES WATER FLOW UNDER THE DITCH CHECK?
DOES WATER FLOW THROUGH SPACES BETWEEN ABUTTING BALES?
ARE ANY BALES AND/OR SCOUR APRONS (OPTIONAL) DISLODGED?
ARE BALES DECOMPOSING DUE TO AGE AND/OR WATER DAMAGE?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE DITCH CHECK?



SECTION A-A



STRAW BALE BARRIERS FOR AREA INLETS
(INLET PROTECTION)

MATERIAL SPECIFICATION:

BALE AREA INLET BARRIERS SHOULD BE CONSTRUCTED OF WHEAT STRAW, OAT STRAW, PRAIRIE HAY, OR BROMEGRASS HAY THAT IS FREE OF WEEDS DECLARED NOXIOUS BY THE KANSAS STATE BOARD OF AGRICULTURE.
THE STAKES USED TO ANCHOR THE BALES SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
TWINE SHOULD BE USED TO BIND BALES. THE USE OF WIRE BINDING IS PROHIBITED BECAUSE IT DOES NOT BIODEGRADE READILY.

PLACEMENT:

BALE AREA INLET BARRIERS SHOULD BE PLACED DIRECTLY AROUND THE PERIMETER OF A DROP INLET. WHEN A BALE AREA INLET BARRIER IS LOCATED NEAR AN INLET THAT HAS STEEP APPROACH SLOPES, THE STORAGE CAPACITY BEHIND THE BARRIER IS DRASTICALLY REDUCED. TIMELY REMOVAL OF SEDIMENT MUST OCCUR FOR A BARRIER TO OPERATE PROPERLY IN THIS LOCATION.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH AROUND THE PERIMETER OF THE AREA INLET THAT IS AT LEAST 4" DEEP BY A BALE'S WIDTH WIDE.
PLACE THE BALES IN THE TRENCH, MAKING SURE THAT THEY ARE BUTTED TIGHTLY. SOME BALES MAY NEED TO BE SHORTENED TO FIT INTO THE TRENCH AROUND THE AREA INLET. TWO STAKES SHOULD BE DRIVEN THROUGH EACH BALE, APPROXIMATELY 6" TO 8" IN FROM THE BALE ENDS.
STAKES SHOULD BE DRIVEN AT LEAST 12" INTO THE GROUND.
ONCE ALL THE BALES HAVE BEEN INSTALLED AND ANCHORED, PLACE THE EXCAVATED SOIL AGAINST THE RECEIVING SIDE OF THE BARRIER AND COMPACT IT. THE COMPACTED SOIL SHOULD BE NO MORE THAN 3" TO 4" DEEP.
NOTE: WHEN A BALE AREA INLET BARRIER IS PLACED IN A SHALLOW MEDIAN DITCH, MAKE SURE THAT THE TOP OF THE BARRIER IS NOT HIGHER THAN THE PAVED ROAD. IN THIS CONFIGURATION, WATER MAY SPREAD ONTO THE ROADWAY CAUSING A HAZARDOUS CONDITION.

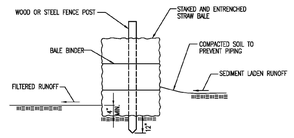
LIST OF COMMON PLACEMENT INSTALLATION MISTAKES TO AVOID:

BALES SHOULD BE PLACED DIRECTLY AGAINST THE PERIMETER OF THE AREA INLET. THIS ALLOWS OVERTOPPING WATER TO FLOW DIRECTLY INTO THE INLET INSTEAD OF ONTO NEARBY SOIL CAUSING SCOUR.
BALE AREA INLET BARRIERS MUST BE DUG INTO THE GROUND. BALES AT GROUND LEVEL DO NOT WORK BECAUSE THEY ALLOW WATER TO FLOW UNDER THE BARRIER.

INSPECTION AND MAINTENANCE:

BALE AREA INLET BARRIERS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW UNDER THE AREA INLET BARRIER?
DOES WATER FLOW THROUGH SPACES BETWEEN ABUTTING BALES?
ARE ANY BALES DISLODGED?
ARE BALES DECOMPOSING DUE TO AGE AND/OR WATER DAMAGE?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE AREA INLET BARRIER?



STRAW BALE BARRIERS

MATERIAL SPECIFICATION:

BALE SLOPE BARRIERS MAY BE CONSTRUCTED OF WHEAT STRAW, OAT STRAW, PRAIRIE HAY, OR BROMEGRASS HAY THAT IS FREE OF WEEDS DECLARED NOXIOUS BY THE KANSAS STATE BOARD OF AGRICULTURE.
THE STAKES USED TO ANCHOR THE BALES SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
TWINE SHOULD BE USED TO BIND BALES. THE USE OF WIRE BINDING IS PROHIBITED BECAUSE IT DOES NOT BIODEGRADE READILY.

PLACEMENT:

A SLOPE BARRIER SHOULD BE USED AT THE TOE OF A SLOPE WHEN A DITCH DOES NOT EXIST. THE SLOPE BARRIER SHOULD BE PLACED ON NEARLY LEVEL GROUND 5' TO 15' AWAY FROM THE TOE OF A SLOPE. THE BARRIER IS PLACED AWAY FROM THE TOE OF THE SLOPE TO PROVIDE ADEQUATE STORAGE FOR SETTLING OUT SEDIMENT.
WHEN PRACTICABLE, BALE SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW.
BALE SLOPE BARRIERS CAN ALSO BE PLACED ALONG RIGHT-OF-WAY FENCE LINES TO KEEP SEDIMENT FROM CROSSING ONTO ADJACENT PROPERTY. WHEN PLACED IN THIS MANNER, THE SLOPE BARRIER WILL NOT LIKELY FOLLOW CONTOURS.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH THE LENGTH OF THE PLANNED SLOPE BARRIER THAT IS 4" DEEP AND A BALE'S WIDTH WIDE. MAKE SURE THAT THE TRENCH IS EXCAVATED ALONG A SINGLE CONTOUR. WHEN PRACTICABLE, SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. PLACE THE SOIL ON THE UPSLOPE SIDE OF THE TRENCH FOR LATER USE.
PLACE THE BALES IN THE TRENCH, MAKING SURE THAT THEY ARE BUTTED TIGHTLY. TWO STAKES SHOULD BE DRIVEN THROUGH EACH BALE ALONG THE CENTERLINE OF THE DITCH CHECK, APPROXIMATELY 6" TO 8" IN FROM THE BALE ENDS. STAKES SHOULD BE DRIVEN AT LEAST 12" INTO THE GROUND.
ONCE ALL THE BALES HAVE BEEN INSTALLED AND ANCHORED, PLACE THE EXCAVATED SOIL AGAINST THE UPSLOPE SIDE OF THE CHECK AND COMPACT IT. THE COMPACTED SOIL SHOULD BE NO MORE THAN 3" TO 4" DEEP.

LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WHEN PRACTICAL, DO NOT PLACE BALE SLOPE BARRIERS ACROSS CONTOURS. SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. CONCENTRATED FLOW OVER A SLOPE BARRIER CREATES A SCOUR HOLE ON THE DOWNSLOPE SIDE OF THE BARRIER. THE SCOUR HOLE EVENTUALLY UNDERMINES THE BALES AND THE BARRIER FAILS.
DO NOT PLACE BALE SLOPE BARRIERS IN AREAS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE BARRIER IS NOT ANCHORED SUFFICIENTLY, IT WILL WASH OUT.
BALE SLOPE BARRIERS MUST BE DUG INTO THE GROUND. BALES AT GROUND LEVEL DO NOT WORK BECAUSE THEY ALLOW WATER TO FLOW UNDER THE BARRIER.

INSPECTION AND MAINTENANCE:

BALE SLOPE BARRIERS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

ARE THERE ANY POINTS ALONG THE SLOPE BARRIER WHERE WATER IS CONCENTRATING?
DOES WATER FLOW UNDER THE SLOPE BARRIER?
DOES WATER FLOW THROUGH SPACES BETWEEN ABUTTING BALES?
ARE ANY BALES DISLODGED?
ARE BALES DECOMPOSING DUE TO AGE AND/OR WATER DAMAGE?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE SLOPE BARRIER?

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

STRAW BALE DITCH CHECK AND BARRIER DETAILS

CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

PROJECT NUMBER	DCA NUMBER	DATE
——-———	———	11/2010

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN | DRAWN | SHEET _ of _

SW-503

All areas to be seeded to temporary or perennial cover within 14 days of final grading.

Final grading to be completed September 1- May 15. If final grading is completed December 1 – May 31 seed within 14 days with native seed according to restoration plan with appropriate cover crop (see table below). If final grading is completed September 1 – November 30 seed within 14 days with winter wheat cover crop, and seed with native seed according to restoration plan December 1 – 31.

	Jan.	Feb.	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Final grading	x	x	x	x	x	No final grading			X	X	X	x
Native seeding per restoration plan with annual rye (*Lolium multiflorum)* cover crop (cover crop 25 lbs/acre)	x	x	x									x
Native seeding per restoration plan with oat crop (*Avina sativa*) (cover crop 25 lbs/acre)				x	x							
Temporary seeding with winter wheat (*Triticum aestivum*) cover crop (25 lbs/acre), native seeding to follow in December per restoration plan									x	x	x	

If restoration seeding not possible within 12 months due to projected seed source or management availability seed with perennial cover crop mixture of 50% Canada Wild Rye (*Elymus canadensis*), 25% Western Wheatgrass (*Pascopyrum smithii*), 25% Sand Bluestem (*Andropogon hallii*), and appropriate temporary cover crop (see table below).

	Jan.	Feb.	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Final grading	x	x	x	x	x	No final grading			X	X	X	x
Perennial cover crop seeding with annual rye (*Lolium multiflorum)* cover crop (cover crop 25 lbs/acre)	x	x	x									x
Perennial cover crop seeding with oat crop (*Avina sativa*) (cover crop 25 lbs/acre)				x	x							
Temporary seeding with winter wheat (*Triticum aestivum*) cover crop (25 lbs/acre), perennial cover crop seeding to follow in December									x	x	x	

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608-897-8641 fax

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Cook, Flatt & Strobel Engineers
Topeka, KS 66604 534 South Kansas Avenue
785-272-4799 tel.
785-272-4799 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
Omaha, NE 68102 1604 Howard Street Suite 100
402.393.0103 tel.
402.393.0747 fax

PRELIMINARY, NOT FOR CONSTRUCTION

Kingsbury Park: Mass Grading, Drainage, & Restoration: Phase Two
EROSION CONTROL DETAILS
City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: Nov. 30, 2012
PROJECT NO: 28258.02
PROJECT FILE: Const. Documents

Erosion Control Details

CE2.1

CE0.0

EROSION CONTROL INDEX MAP

ISSUED: November 30, 2012
PROJECT NO: 20256.01
PROJECT FILE: Const. Documents

Rev | Erosion Schedule | Date | Description

Kingsbury Park: Site Layout: Phase One

EROSION CONTROL INDEX MAP

City of Wichita
Wichita, Kansas

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RDG Planning & Design
900 Farnam on the Mall, Suite 100
Omaha, NE. 68102
402-392-0133 tel.
402-392-0413 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
2930 SW Woodside Drive
Topeka, KS 666614
785-272-4706 tel.
785-272-4736 fax

ENVIRONMENTAL
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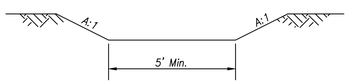
SCALE IN FEET
50 0 50 100

LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION
A= See Sheet

1332.75
1334.39
1334.33
16
15
14
24
SB
RT 1
ROW OF TREES

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2930 SW Wanamaker Drive
Topeka, KS 66614-5039
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785-272-4710 fax

LANDSCAPE ARCHITECT
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402-390-0141 fax

PRELIMINARY - NOT FOR CONSTRUCTION

Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "1"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: November 30, 2012
PROJECT NO: 20258.01
PROJECT FILE: Const. Documents

EROSION CONTROL MAP AREA 1

CE1

LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal

SCALE IN FEET
50 0 50 100

TYPICAL CHANNEL SECTION
A= See Sheet

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2930 SW Wanamaker Drive
Topeka, KS 66614
785-272-4709 tel
785-272-4720 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
800 Fairfield Ave NW, Suite 100
Minneapolis, MN 55401
402-390-0133 tel
402-390-0473 fax

PRELIMINARY - NOT FOR CONSTRUCTION

Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "2"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: November 30, 2012
PROJECT NO: 28258.01
PROJECT FILE: Const. Documents

EROSION CONTROL MAP AREA 2

CE2

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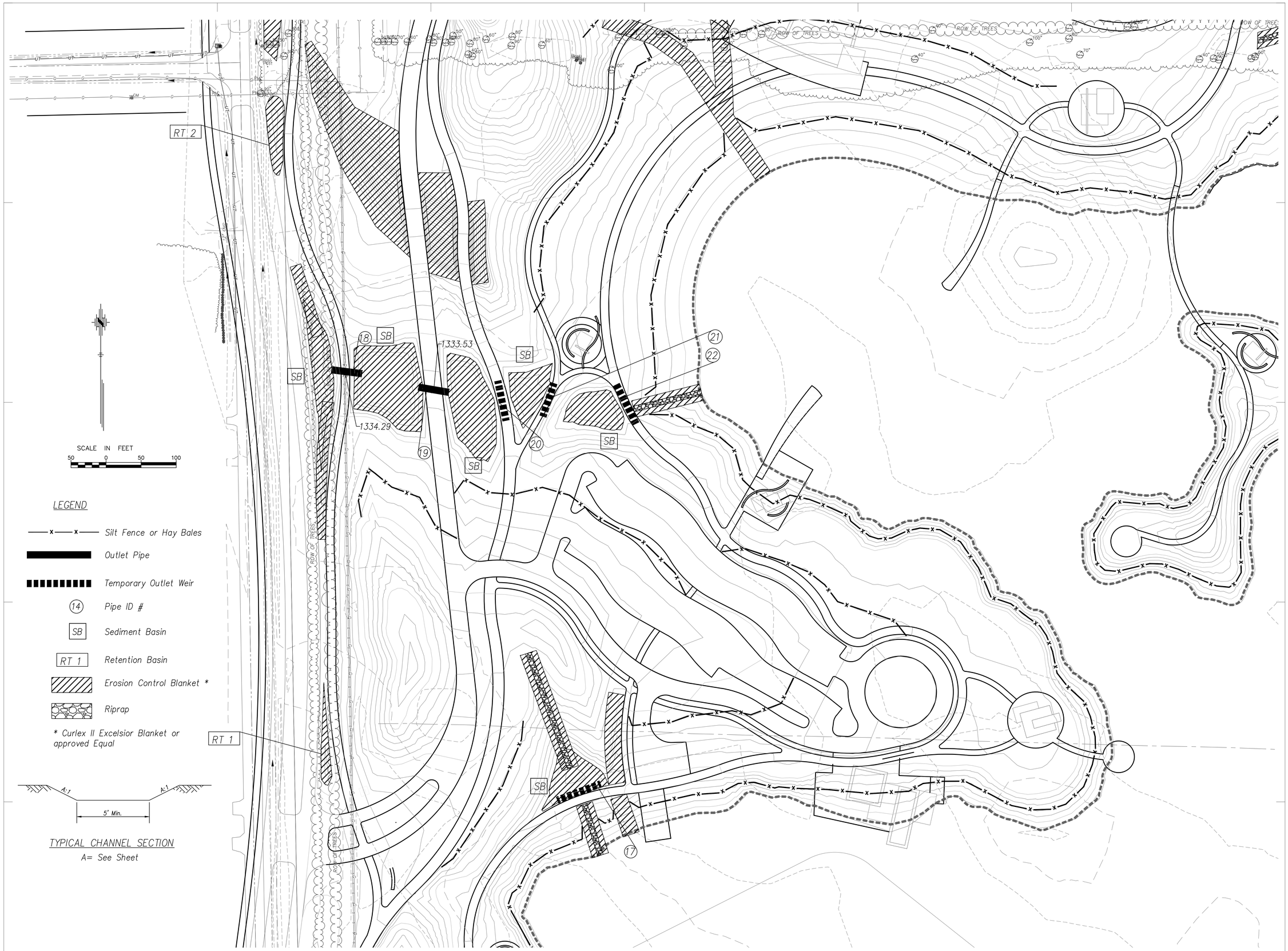

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608-897-8641 tel
608-897-8486 fax

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Cook, Flatt & Strobel Engineers
2930 SW Wanamaker Drive
Topeka, KS 66614-5039
785-272-4709 tel
785-272-4720 fax

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Des Moines, IA 50309
515-288-2138 tel
515-244-1613 fax

PRELIMINARY - NOT FOR CONSTRUCTION

Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "3"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

ISSUED: November 30, 2012
PROJECT NO: 28258.01
PROJECT FILE: Const. Documents

EROSION CONTROL MAP AREA 3

CE3

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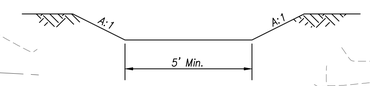
SCALE IN FEET
50 0 50 100

LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION
A= See Sheet

1342.63
1341.66
1342.75
1341.24

PRELIMINARY - NOT FOR CONSTRUCTION

Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "4"

City of Wichita
Wichita, Kansas

Revision Schedule
Rev Date Description

ISSUED: November 30, 2012
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PROJECT FILE: Const. Documents

EROSION CONTROL MAP AREA 4

CE4

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608-897-8648 fax

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Cook, Flatt & Strobel Engineers
2930 SW Woodside Drive
Topeka, KS 66614-4040
785-272-4709 tel
785-272-4754 fax

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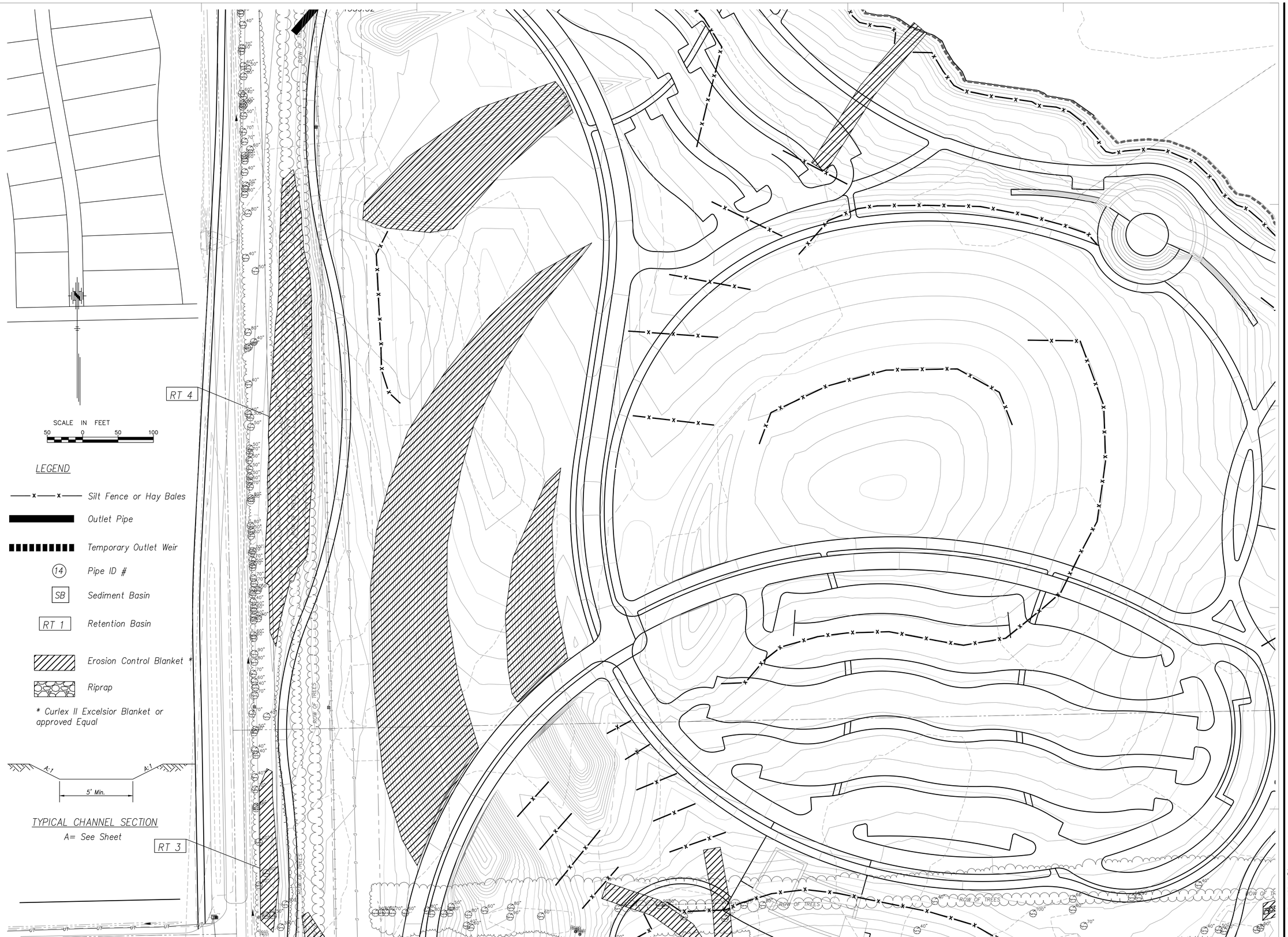
800 Pierce on the Park, Suite 100
Omaha, NE 68102
402-390-0328 tel
402-390-0391 fax



Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "5"

City of Wichita
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608-897-8486 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
2930 SW Woodside Drive
Topeka, KS 66614
785-272-4706 tel.
785-272-4736 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
900 Farnam on the Mall, Suite 100
Omaha, NE. 68102
402-392-0133 tel.
402-392-0413 fax

PRELIMINARY - NOT FOR CONSTRUCTION

Revision Schedule

Rev	Date	Description

ISSUED: **November 30, 2012**

PROJECT NO: **28258.01**

PROJECT FILE: **Const. Documents**

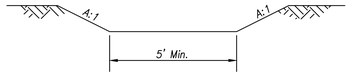
EROSION
CONTROL
MAP
AREA 5

CE5

LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION

A= See Sheet

SCALE IN FEET

50 0 50 100

1336.04

1332.97

1333.00

SB

RT 1

1A

1

2

ROW OF TREES

ROW OF TREES

BUILDING

CP

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1750 Creek Road, PO Box 256
Brodhead, WI 53520
608-897-8641 tel
608-897-8486 fax

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Cook, Flatt & Strobel Engineers
2930 SW Woodside Drive
Topeka, KS 66614-4040
785-272-4709 tel
785-272-4720 fax

LANDSCAPE ARCHITECT
RDG Planning & Design
800 Pierce on the Park, Suite 100
Omaha, NE 68102
402-390-0133 tel
402-390-0141 fax

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Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "6"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

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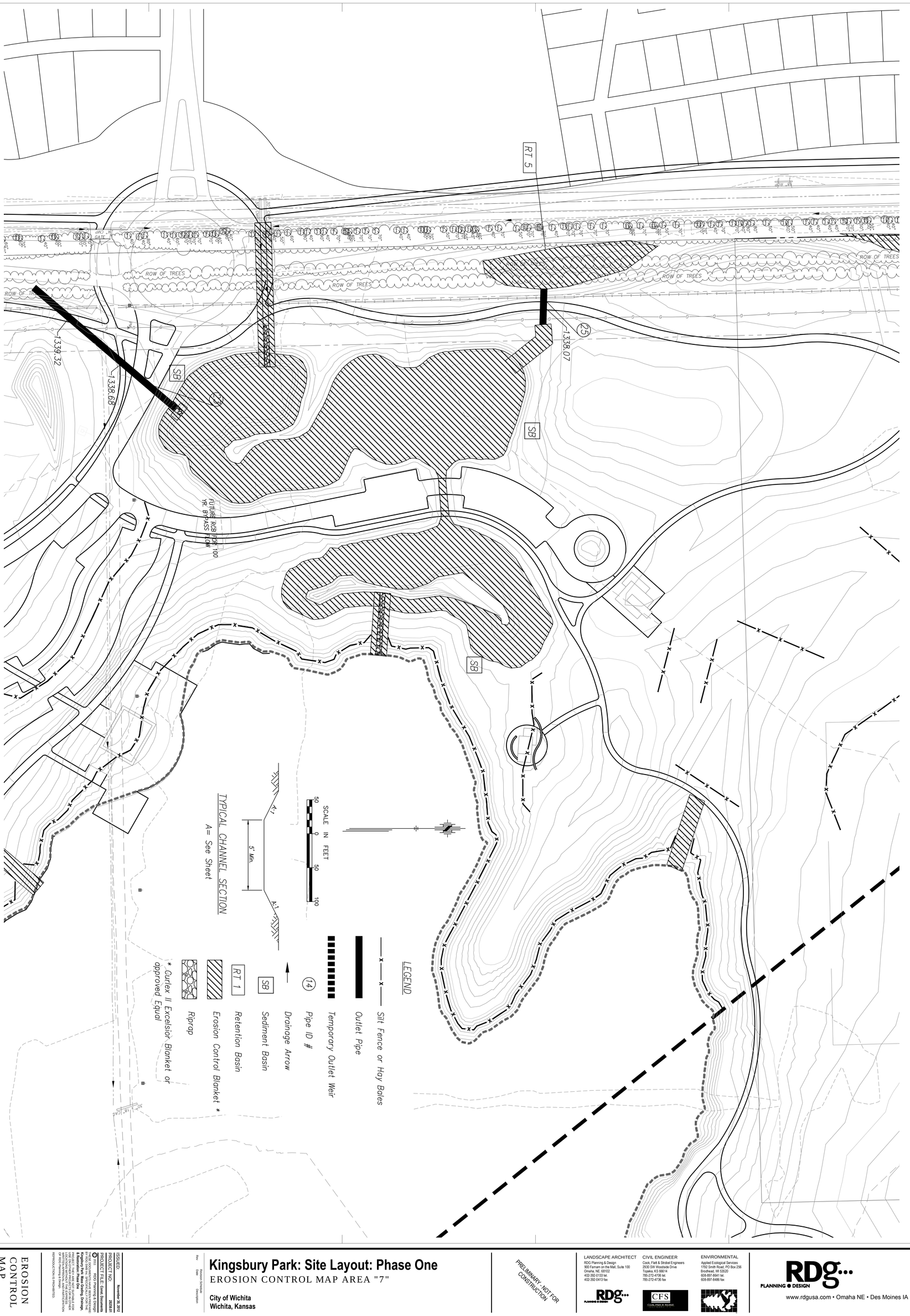
EROSION CONTROL MAP AREA 6

CE6



Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "7"

City of Wichita
Wichita, Kansas

PRELIMINARY - NOT FOR CONSTRUCTION

LANDSCAPE ARCHITECT
RDG Planning & Design
900 Farnam on the Mall, Suite 100
Omaha, NE. 68102
402-392-0133 tel.
402-392-0413 fax

CIVIL ENGINEER
Cook, Flatt & Strobel Engineers
2930 SW Woodside Drive
Topeka, KS 66614
785-272-4706 tel.
785-272-4736 fax

ENVIRONMENTAL
Applied Ecological Services
1792 Smith Road, PO Box 256
Brodhead, WI 53520
608-897-8641 tel.
608-897-8486 fax

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EROSION CONTROL MAP AREA 7

CE7

ISSUED: November 30, 2012
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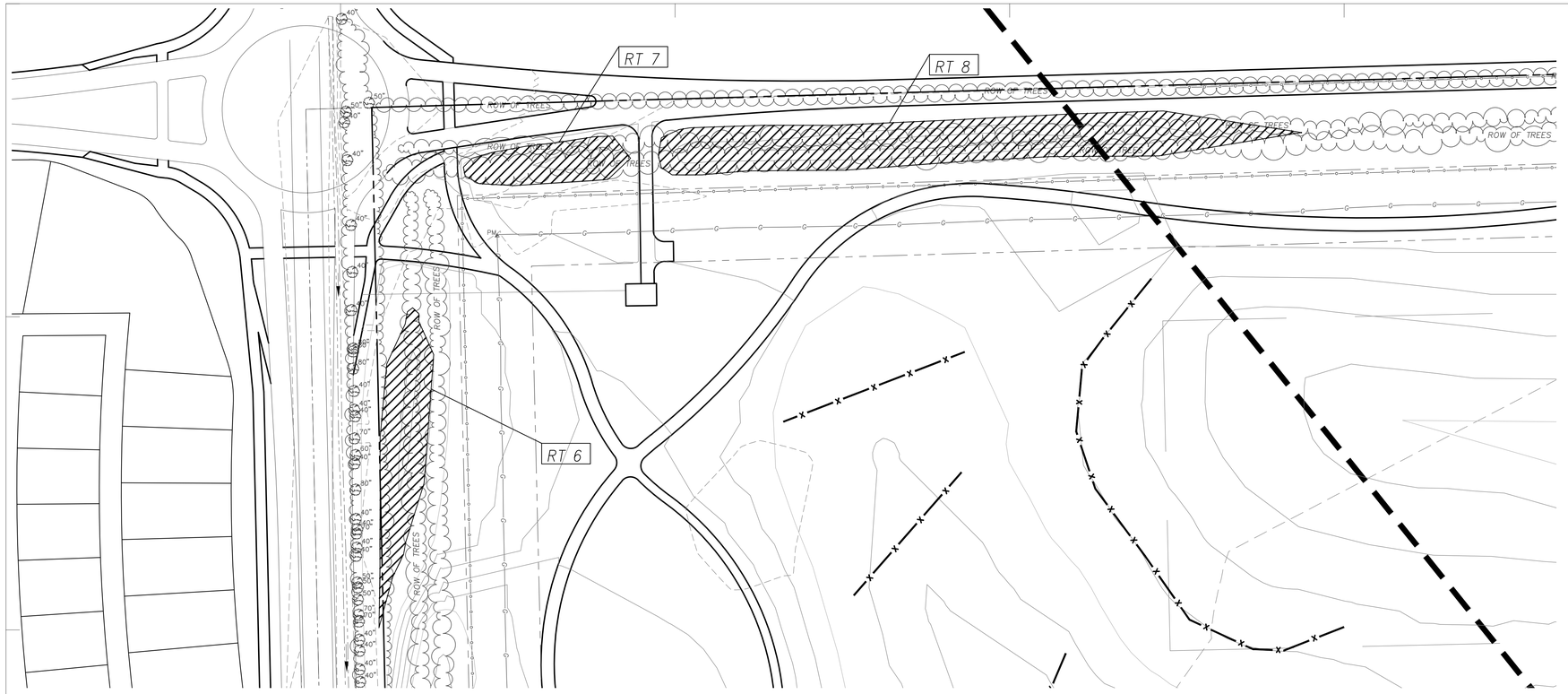
PROJECT FILE: Const. Documents

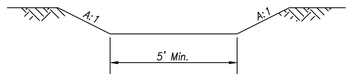
Rev	Revision Schedule Date	Description



LEGEND

- Silt Fence or Hay Bales
- Outlet Pipe
- Temporary Outlet Weir
- (14) Pipe ID #
- SB Sediment Basin
- RT 1 Retention Basin
- Erosion Control Blanket *
- Riprap

* Curlex II Excelsior Blanket or approved Equal



TYPICAL CHANNEL SECTION

A= See Sheet

SCALE IN FEET

50 0 50 100

RETENTION BASINS ANALYSIS

ID No	Bottom Elev. (ft)	Overflow Elev. (ft)	Depth (ft)	Exist Soil Type	Conduct. (in/hr)	Retention Time (hr)	Soil ID
RT1	1333	1335	2	Sandy Loam	1.02	24	6224
RT2	1333	1335	2	Loamy Sand	2.41	10	5928
RT3	1334	1335	1	Loamy Sand	2.41	5	5928
RT4	1332	1335	3	Sandy Loam	1.02	35	6330
RT5	1334	1336	2	Sandy Loam	1.02	24	6330
RT6	1333	1336	3	Sandy Loam	1.02	35	6330
RT7	1334	1336	2	Sandy Loam	1.02	24	6330
RT8	1333	1336	3	Sandy Loam	1.02	35	6330

PIPE CULVERT SUMMARY

D.A. No.	Area (ac.)	Time (min.)	C(10) (cf)	Eq. A (10) (CxA)	I (10) (in./hr.)	Q (10) (cfs)	C(100) (cf)	Eq. A (100) (CxA)	I (100) (in./hr.)	Q (100) (cfs)	FL. Elev. US. (ft)	FL. Elev. DS. (ft)	Top of Trail/Rd. (ft)	Pipe Length (ft)	Pipe Size (in)	Capacity (cfs)
24	0.70	10	0.32	0.22	6.09	1.4	0.45	0.45	7.37	2.3	1328.76	1328.64	1331.56	44	24	19.0
25	2.50	10	0.32	0.80	6.09	4.9	0.45	0.45	7.37	8.3	1336.00	1335.88	1340.00	44	24	19.0

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Applied Ecological Services
1750 Creek Road, PO Box 256
Brodhead, WI 53520
608-897-8641 tel
608-897-8648 fax

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Cook, Flatt & Strobel Engineers
2930 SW Wanamaker Drive
Topeka, KS 66614-5039
785-272-2709 tel
785-272-2710 fax

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RDG Planning & Design
800 Pierce on the Mall, Suite 100
Des Moines, IA 50309
515-288-2138 tel
515-244-1411 fax

PRELIMINARY - NOT FOR CONSTRUCTION

Kingsbury Park: Site Layout: Phase One

EROSION CONTROL MAP AREA "8"

City of Wichita
Wichita, Kansas

Revision Schedule

Rev	Date	Description

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EROSION CONTROL MAP AREA 8

CE8