CONSTRUCTION PLANS FOR

WATER DISTRIBUTION SYSTEM IMPROVEMENTS

TO SERVE

SERENDIPITY ESTATES ADDITION

THE CITY OF ANDOVER, KANSAS

BUTLER COUNTY, KANSAS

APPROVED AS NOTED
BY CITY ENGINEER OF WICHITA,
BY WICHITA WATER & SEWER DEPARTMENT,
& BY WICHITA FIRE DEPARTMENT

Water Mains (Pub Wks) _____

Water Mains (W & S) _____

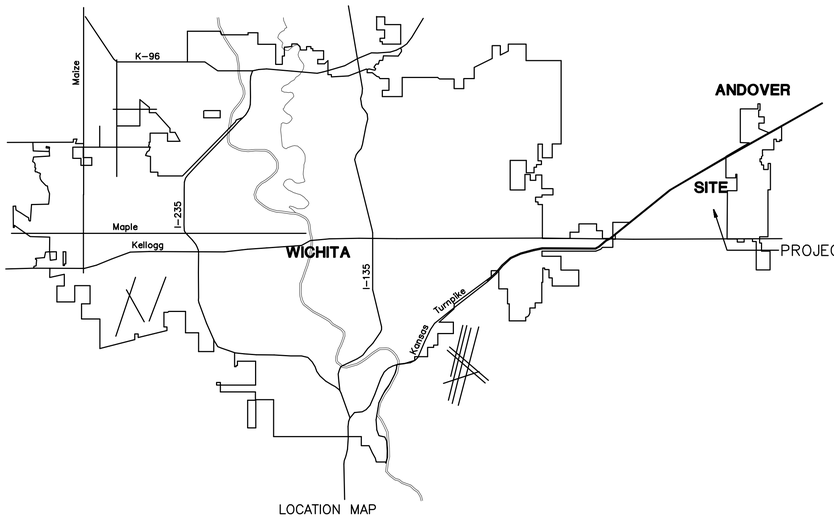
NOTE TO CONTRACTORS

Public Property

Inspection and testing for the waterline is to be provided by a Licensed Consulting Engineering Firm under contact with the Owner/Developer. Said inspection to be in accordance with the City of Wichita standard construction engineering practices and certified by a Proffesional Engineer Licensed in the state of Kansas. No work shall be performed in dedicated easements or public right-of-way by the Contractor without such inspection nor shall any work be commenced without written authorization by the City Engineer. All Construction and Materials shall comply with the City of Wichita Specifications and Standards (on file and available in the City Engineer's Office).

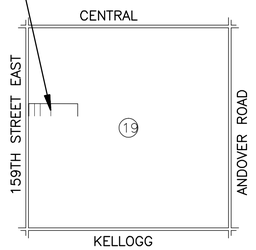
Private Property

Installation and testing for the fire protection line is to be performed by a City of Wichita licensed fire protection contractor in accordance with the fire codes as adopted by the City of Wichita. All materials and construction practices for the fire protection line shall comply with the fire codes as adopted by the City of Wichita (available from the City of Wichita Fire Department). The Contractor shall not commence work without notification and approval of the Wichita Fire Department. Inspection of the fire protection line is to be provided by a licensed Engineering Firm under contract with the Owner/Developer and the Fire Department. The Contractor shall not start work until the project inspector is assigned to the project and present on the site. Any work done without inspection will be required to be uncovered for inspection.



LOCATION MAP

N
No Scale



LOCATION MAP
No Scale

INDEX OF SHEETS

INDEX CODE 607853

CITY OF WICHITA PROJECT NO. 1358-PPW

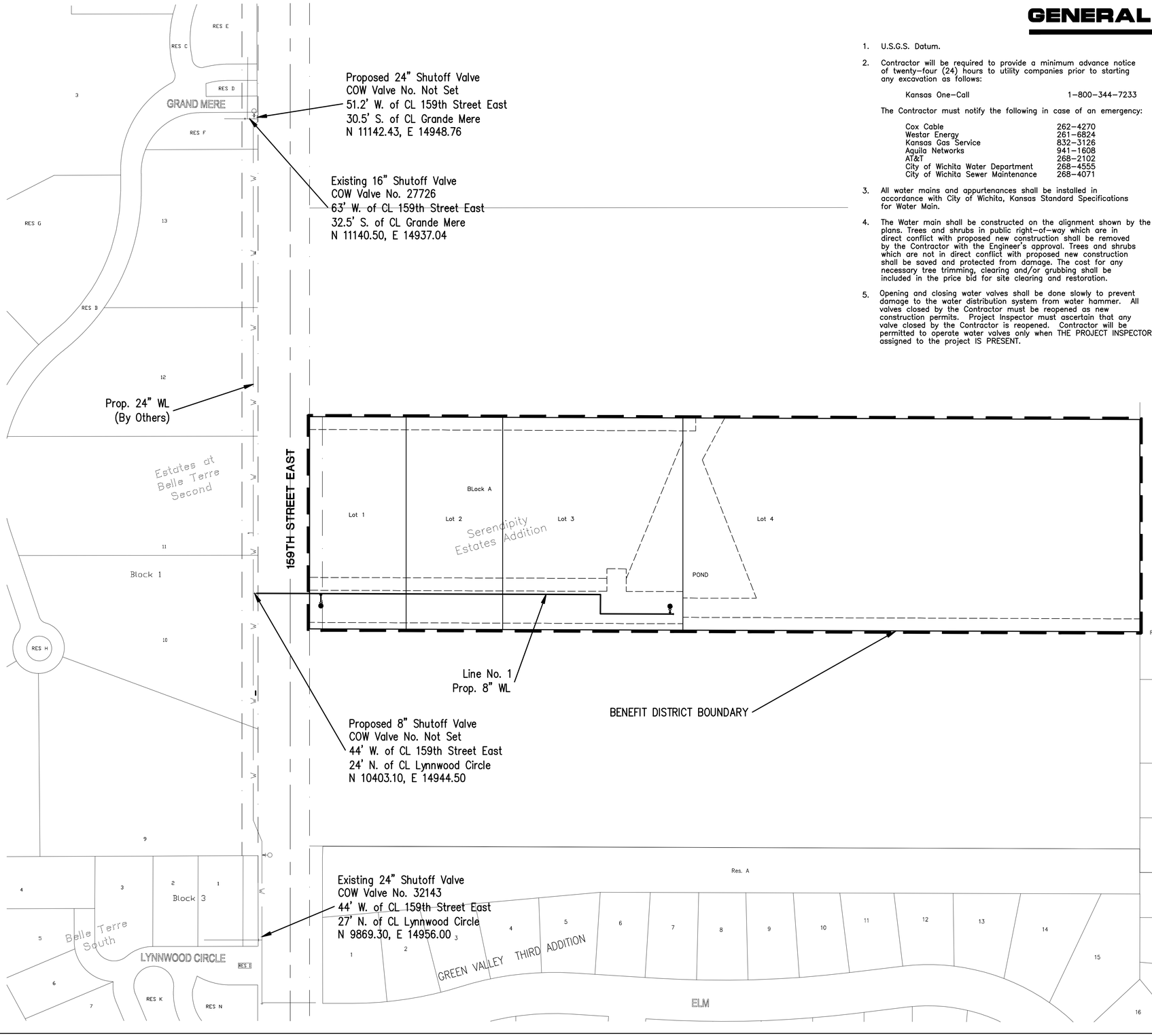
NOVEMBER 2007

PLANS PREPARED BY

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ▪ Wichita, KS 67208-4242
Phone 316/685-4114 ▪ FAX 316/685-4444

JASON P. DICKMAN
LICENSED
18137
KANSAS
PROFESSIONAL ENGINEER

RECORD DRAWING
Contractor: Mies Construction
Inspector: J. Dunn
.pdf by: POE & ASSOCIATES, INC. 5-8-09



GENERAL NOTES:

GRAPHIC SCALE

80 0 40 80 160
(IN FEET)
1 INCH = 80 FT.

1. U.S.G.S. Datum.
2. Contractor will be required to provide a minimum advance notice of twenty-four (24) hours to utility companies prior to starting any excavation as follows:

   Kansas One-Call 1-800-344-7233

   The Contractor must notify the following in case of an emergency:

Cox Cable	262-4270
Westar Energy	261-6824
Kansas Gas Service	832-3126
Aquila Networks	941-1608
AT&T	268-2102
City of Wichita Water Department	268-4555
City of Wichita Sewer Maintenance	268-4071

3. All water mains and appurtenances shall be installed in accordance with City of Wichita, Kansas Standard Specifications for Water Main.
4. The Water main shall be constructed on the alignment shown by the plans. Trees and shrubs in public right-of-way which are in direct conflict with proposed new construction shall be removed by the Contractor with the Engineer's approval. Trees and shrubs which are not in direct conflict with proposed new construction shall be saved and protected from damage. The cost for any necessary tree trimming, clearing and/or grubbing shall be included in the price bid for site clearing and restoration.
5. Opening and closing water valves shall be done slowly to prevent damage to the water distribution system from water hammer. All valves closed by the Contractor must be reopened as new construction permits. Project Inspector must ascertain that any valve closed by the Contractor is reopened. Contractor will be permitted to operate water valves only when THE PROJECT INSPECTOR assigned to the project IS PRESENT.
6. Contractor shall not start work on the project until the Project Inspector is assigned to the project and is present on the site. Any work done without inspection will be required to be uncovered for inspection.
7. The Contractor shall give all property owners and/or tenants of developed property directly abutting the construction of this project a minimum of ten (10) days advance notice prior to start of construction.
8. The Contractor shall be responsible for preserving property irons. The contractor will be required to re-establish any property irons which are damaged or destroyed by his construction operations. Such irons shall be re-established by a licensed land surveyor in accordance with state laws. All costs for this this work shall be subsidiary to site restoration.
9. The contractor shall restore all ditches, swales, road shoulders, entrances, and bank lines to their original slopes and grades except as shown otherwise.
10. No services will be installed as part of this project.
11. Interurban traffic generated outside the project area and local business or residential traffic generated within the project area are to be carried through construction as further promulgated by project special provisions.
12. Rubble from the removal of miscellaneous structures including any trees removed and tree trimmings shall be disposed of on sites provided by the contractor. These sites shall also be approved of by the Engineer as to suitability, appearance, and site location. Locations that, in the opinion of the Engineer, leave an unsightly appearance will not be approved. All disposal sites must be approved by the Kansas Department of Health and Environment. Material either stockpiled or disposed of in a flood plain will require a Kansas State Board of Agriculture permit. Any material dumped in waters of the United States or wetlands is subject to U.S. Corps of Engineers Permitting Regulations. Any material buried or stockpiled beyond approved construction limits may require archaeological investigations unless buried in a previously approved disposal location.

NOTE:
Waterline Valves to be operated by Contractor ONLY if THE PROJECT INSPECTOR is ON SITE.

Contractor to Field Verify Location of all Existing Utilities Prior to Construction.

LEGEND

- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT

RECORD DRAWING
5-8-09

BENCH MARKS

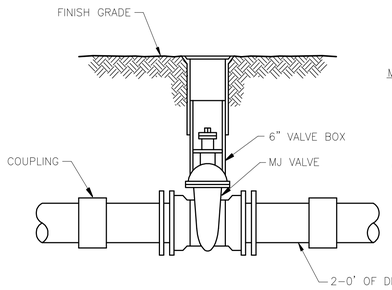
1. BM "C" in Caster Stamped in South Side of Concrete Drive Southeast of Grand Mere, on East Side of 159th Street East. Elevation 1323.63

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
WATERLINE KEY MAP
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj No. 1358-PPW Index Code 6078S3

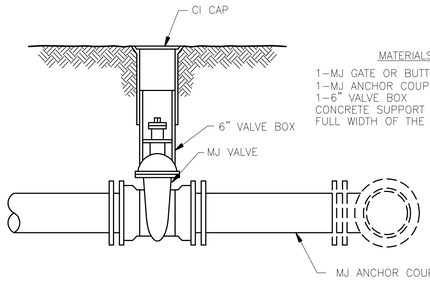
POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
8940 E. Central, Suite 200 • Wichita, KS 67206-4242
Phone 316/685-4114 • FAX 316/685-4444

FINAL
Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007



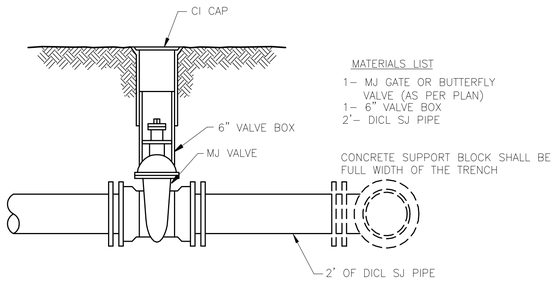
MATERIALS LIST
1-MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1-6" VALVE BOX
2-COUPLINGS
2-SHORT PCS. (DICL SJ PIPE)
CONCRETE SUPPORT BLOCK SHALL BE FULL WIDTH OF THE TRENCH

LINE VALVE ASSEMBLY



MATERIALS LIST
1-MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1-MJ ANCHOR COUPLING (12" OR SMALLER)
1-6" VALVE BOX
CONCRETE SUPPORT BLOCK SHALL BE FULL WIDTH OF THE TRENCH

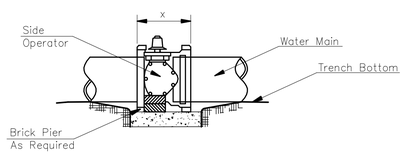
ANCHORED VALVE ASSEMBLY



MATERIALS LIST
1- MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1- 6" VALVE BOX
2'- DICL SJ PIPE

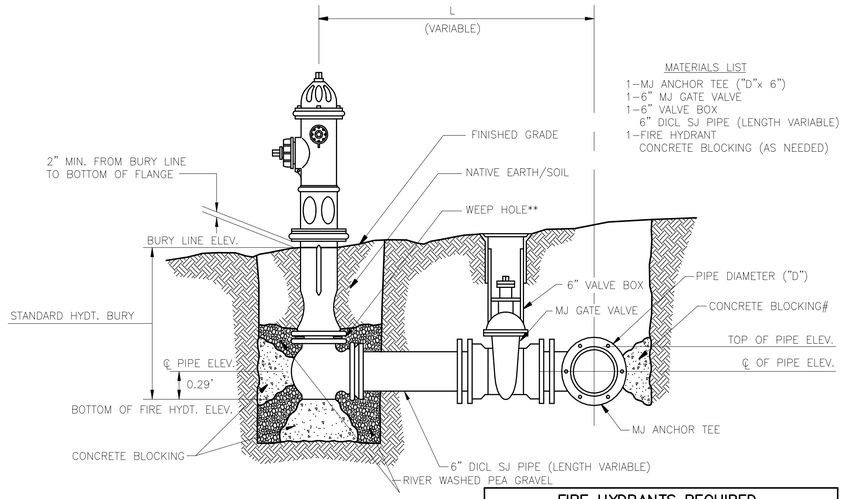
CONCRETE SUPPORT BLOCK SHALL BE FULL WIDTH OF THE TRENCH

VALVE ASSEMBLY



NOTES
1. This detail covers Butterfly Valve installation, inclusive, regardless of type of pipe or joint used. Larger lines to be detailed on plans.
2. 6" Valve Box and Cover required per City of Wichita Std. Specifications.
3. Conc. Support Block to be full width of trench.

CONCRETE SUPPORT BLOCKING FOR BUTTERFLY VALVE INSTALLATION



MATERIALS LIST
1-MJ ANCHOR TEE ("D"x 6")
1-6" MJ GATE VALVE
1-6" VALVE BOX
6" DICL SJ PIPE (LENGTH VARIABLE)
1-FIRE HYDRANT
CONCRETE BLOCKING (AS NEEDED)

** CAUTION! WEEP HOLES TO BE KEPT CLEAR DURING CONSTRUCTION AND BACKFILL. CONCRETE FOR THRUST BLOCKING SHALL NOT OBSTRUCT WEEP HOLES.

CONCRETE THRUST BLOCKING SHALL BE KEPT CLEAR OF BOLTS, NUTS, AND MJ ACCESSORIES.

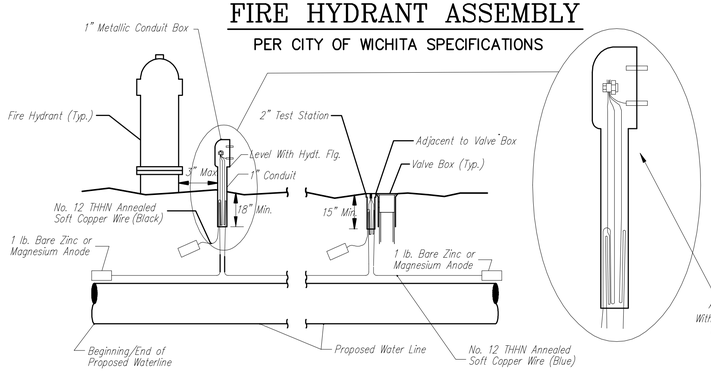
* IF HYDRANT BURY IS IN EXCESS OF 5', CONTRACTOR SHALL USE STANDARD 5' HYDRANT BURY AND HYDRANT BARREL EXTENSIONS AS NECESSARY.

FIRE HYDRANTS REQUIRED

LINE	STATION	BURY LINE ELEVATION	TOP OF PIPE ELEVATION	FIRE HYDRANT BURY REQUIRED*
1	1+00.00	1325.64	1321.81	4.5'
1	6+72.50	1325.33	1320.50	5.5'

FIRE HYDRANT ASSEMBLY

PER CITY OF WICHITA SPECIFICATIONS



TRACER WIRE
Conductive type pipe locator/tracer wire shall be installed to locate all waterline pipe regardless of pipe material. The wire shall extend the entire length of the proposed pipe. The wire shall be taped to the waterline and pulled with the pipe. Split-bolt connectors shall be used at splice locations. Electrical tape shall cover all splices so no bare wire is exposed. Test stations shall be installed adjacent to all fire hydrants along the waterline and at blowoffs or valves near the ends of the waterlines. Any exceptions to the location of test stations shall be approved by the engineer. At each test station, the tracer wire shall be connected to a 1 lb. Zinc or magnesium anode. Anodes shall also be attached to the tracer wire at both the beginning and the end of the proposed waterline. A typical layout of the tracer wire and test station is provided in the above figure.

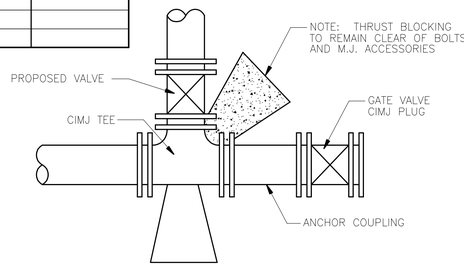
WIRE
The tracer wire shall be Blue No. 12 THHN annealed soft copper wire with thermal plastic insulation. The insulation shall be heat, oil, and gasoline resistant as manufactured by Temple Electric or approved equal. To allow for grade adjustment, a minimum of 12" of excess wire shall be coiled at the bottom of the test station for all wires. The insulation sheathing shall be removed such that 1" bare copper wire is exposed at all points of connection. Contractor shall attach wire being installed with proposed water main to any tracer wire installed with adjacent waterline projects.

TEST STATIONS
The test station for fire hydrant applications shall be a 1 inch galvanized conduit style test station as manufactured by AGRA Industries with a removable solid cover having two leads extending from the face or approved equal. The test station for valve applications shall be 2 inch flush style test station T2PS3B as manufactured by HANDLEY Industries or approved equal. The conduit style shall be attached to a 1 inch rigid galvanized conduit with a minimum length of 36" and plastic end bushing. The flush style shall have the word "WATER" stamped or molded into the lid. All test stations shall be manufactured using molded blue tops or sufficiently coated with blue enamel paint. The tracer wire and the anode wire shall be installed to allow 10 inches of wire within the test station. In concrete environments such as sidewalks or in the downtown area the contractor shall use the flush style test station. The location of all test stations shall be approved by the engineer, recorded, and shown in the as-built drawings.

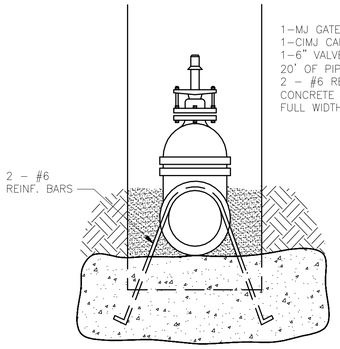
ANODES
The anodes shall be 1 lb. bare zinc or magnesium. The anodes shall be buried at the same elevation as the waterline at each test station. The anodes shall be connected to Black No. 12 THHN annealed soft copper wire which shall be extended to the test station.

TRACER WIRE DETAIL

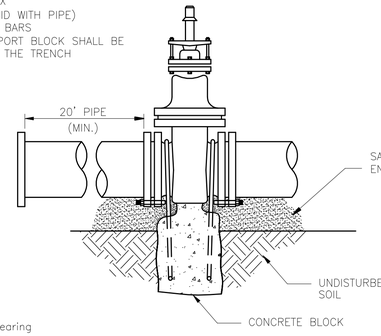
COST IS SUBSIDIARY TO PIPE INSTALLATION



KEY BLOCK DETAIL



MATERIALS LIST
1-MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1-CIMJ CAP WHEN NECESSARY
1-6" VALVE BOX
20' OF PIPE (BID WITH PIPE)
2 - #6 REINF. BARS
CONCRETE SUPPORT BLOCK SHALL BE FULL WIDTH OF THE TRENCH



Notes:
1. Concrete Block at Valve to have sufficient bearing in undisturbed soil to prevent thrust movement as shown in table at right. Field Engineer to determine thrust loading of undisturbed soil and final size of thrust block.

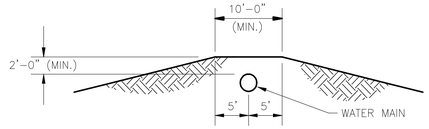
2. The thrust block shall be constructed such that bolts, nuts, and other MJ accessories are kept clear of concrete.

3. All valves at dead ends and at other locations as called out on the plans shall be blocked as shown here.

THRUST AT VALVES

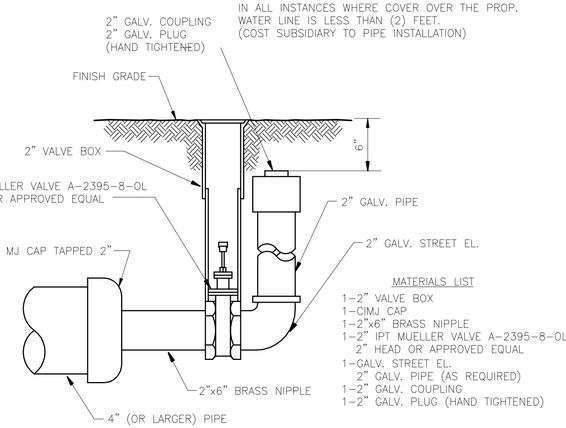
VALVE	THRUST AT 150 #/in²
4"	1809 lbs.
6"	4245 lbs.
8"	7540 lbs.
12"	16965 lbs.

ANCHORED VALVE ASSEMBLY, SPECIAL



PROTECTIVE FILL DETAIL

MINIMUM PROTECTIVE FILL SHALL BE PROVIDED IN ALL INSTANCES WHERE COVER OVER THE PROP. WATER LINE IS LESS THAN (2) FEET. (COST SUBSIDIARY TO PIPE INSTALLATION)



MATERIALS LIST
1-2" VALVE BOX
1-CIMJ CAP
1-2"x6" BRASS NIPPLE
1-2" IPT MUELLER VALVE A-2395-8-OL
2" HEAD OR APPROVED EQUAL
1-GALV. STREET EL.
2" GALV. PIPE (AS REQUIRED)
1-2" GALV. COUPLING
1-2" GALV. PLUG (HAND TIGHTENED)

2" BLOWOFF ASSEMBLY

MUELLER FIRE HYDRANT
MUELLER A-2360 VALVE
502 STANDARD AWWA
PCV C-900 PIPE

RECORD DRAWING
5-8-09

Revised: 6-7-00, MCG

THE CITY OF WICHITA

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202
(316) 268-4501
(316) 268-4114 FAX

STANDARD WATER ASSEMBLY DETAILS

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

PROJECT NUMBER 1358-PPW
OCA NO. 607853
DATE NOV 2007
SHEET 3 OF 15

SERENDIPITY ESTATES ADDITION WATERLINE
STANDARD DETAILS
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj No. 1358-PPW Index Code 607853

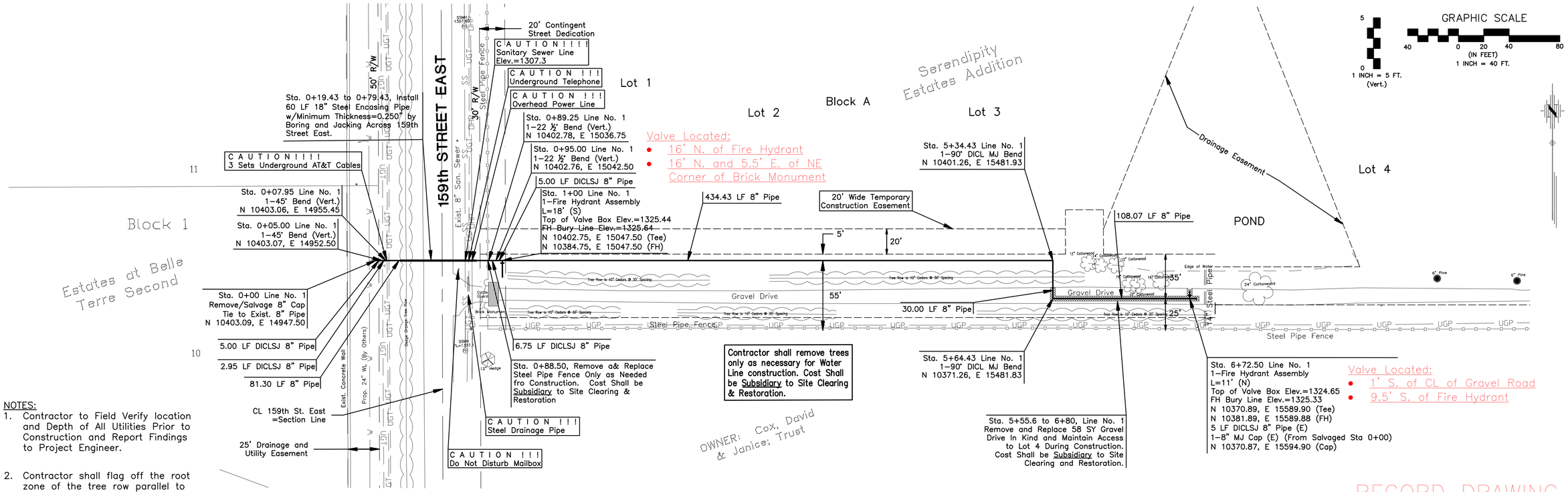
No.	Date	By	Approved	Revision

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
3940 E. Central, Suite 200 • Wichita, KS 67208-4242
Phone 316/685-4114 • FAX 316/685-4444

FINAL

Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

Sheet 3 of 15

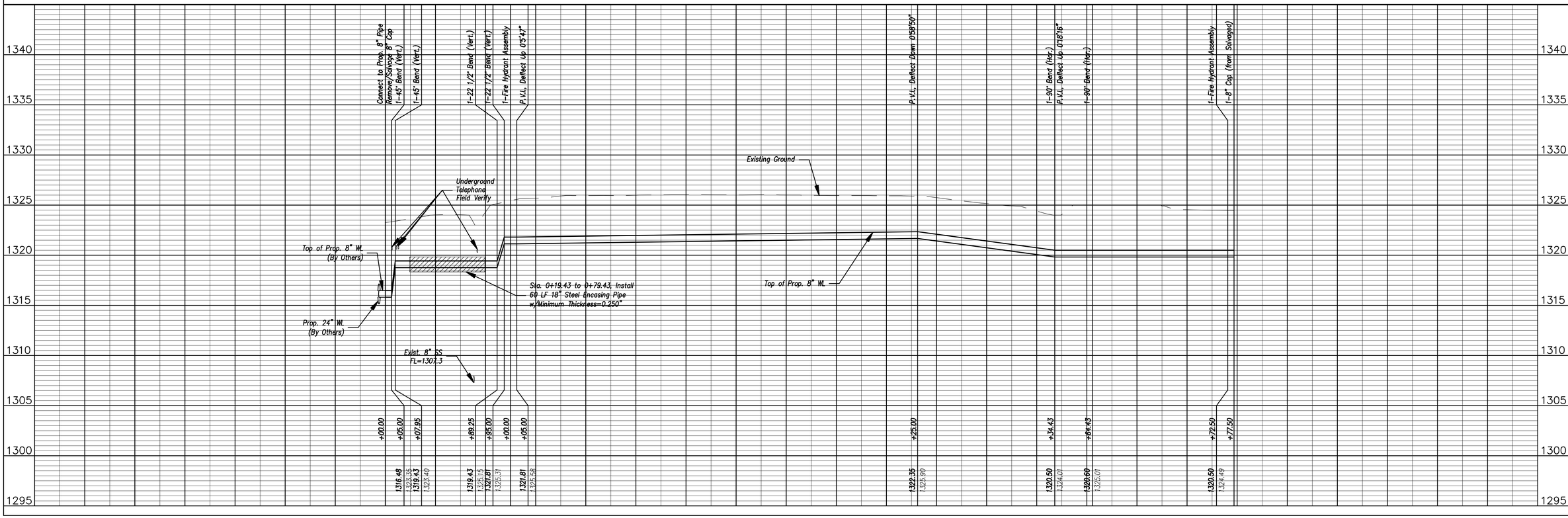


NOTES:

1. Contractor to Field Verify location and Depth of All Utilities Prior to Construction and Report Findings to Project Engineer.
2. Contractor shall flag off the root zone of the tree row parallel to the waterline, and no construction equipment is allowed on the root zone.

LINE NO. 1

RECORD DRAWING
5-8-09



SERENDIPITY ESTATES ADDITION WATERLINE
WATERLINE NO. 1
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. – CITY ENGINEER
C.O.W. Proj. No. 1358-PPW Index Code 607853

No.	Date	By	Approved	Revision

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
9340 E. Central, Suite 200 ■ Wichita, KS 67206-4242
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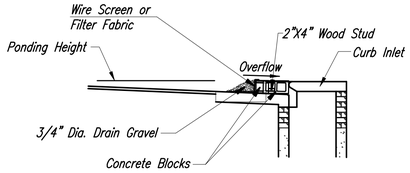
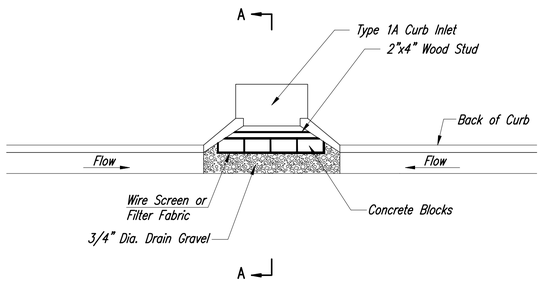


SECTION A–A



CURB INLET GRAVEL FILTERS
(INLET PROTECTION–RESIDENTIAL STREETS ONLY)

NOTE: Other types of curb inlet protection may be approved by the city so long as equal protection is provided.

A gravel inlet filter shall be installed at sump locations on residential streets. This type of protection is not to be used on arterial or collector streets at any time that it would pose an undue traffic hazard.

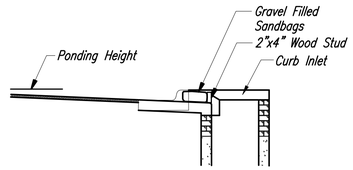
Instructions for Installing:

STEP 1: Place concrete blocks around the inlet as shown on drawing. Insert 2x4 board as shown.
STEP 2: Wrap 1/2" mesh wire screen around the concrete blocks.
STEP 3: Place 1" to 1–1/2" diameter rock around the blocks and wire screen. Be sure the rock extends down from the top of the concrete block.
STEP 4: To prevent damage to vehicles, signs warning drivers about the structures may be necessary. An alternative installation is the use of gravel bags supported by a 2"x4" board to prevent collapsing.

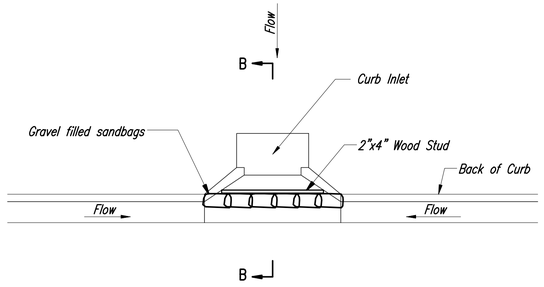
Use of rock with diameters smaller than 1" in the bag may result in clogging of pores and reduce the amount of water flowing into an inlet.

Maintenance:

All curb inlet gravel filters shall be inspected and repaired after each runoff event. Sediment deposits are to be removed once material is within 8 cm (3 inches) of the top of any block. Periodically, the gravel shall be raked to increase infiltration and filtering of runoff waters. Accumulated sediment is to be removed immediately from roads and streets.

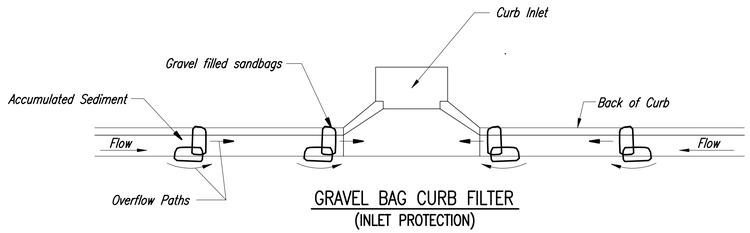


SECTION B–B



CURB INLET SANDBAG FILTERS
(INLET PROTECTION)

NOTE: Other types of curb inlet protection may be approved by the City so long as equal protection is provided.



GRAVEL BAG CURB FILTER
(INLET PROTECTION)

NOTE: Place two or more sets of bags in a manner that results in maximum support. The flow line bag must be lower than top of curb.

CURB SEDIMENT TRAPS

When inlets are located on streets having a grade (i.e., sump conditions do not exist), installing gravel (or sand) bags in the gutter flow line to create small sediment traps can be considered. Gravel bags are recommended over sand bags to allow for drainage.

If the spacing between bags becomes too large, little sediment may be trapped. Spacing of bags should be completed using the table or graph that illustrates placement distances based upon street slope. When installed in the gutter, bag tops must be lower than the sidewalk.

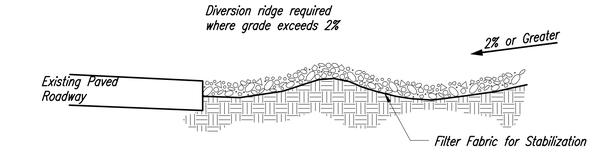
Spacing:

Gravel bags are to be placed according to street grades using the following table or graph that appears below.

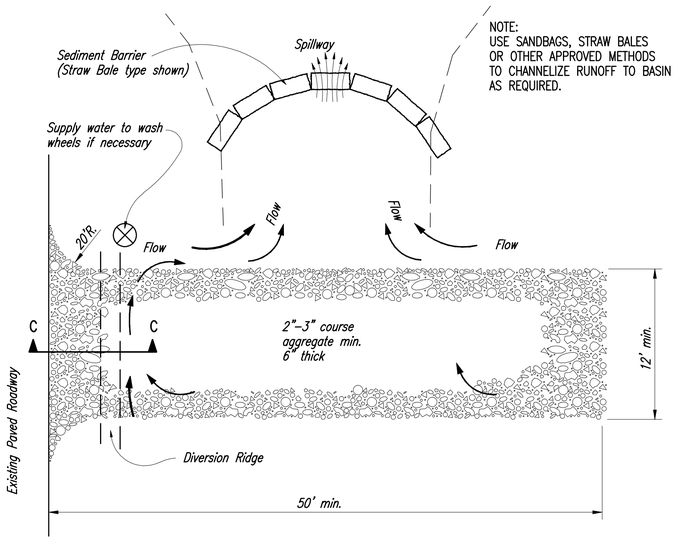
GRADE (%)	SPACING (FEET)
0.5	75
1.0	45
2.0	18
3.0	12
4.0	9
5.0	6

Maintenance:

Collected sediment shall be removed after every runoff event. Bags that are destroyed by vehicular traffic or through natural deterioration are to be immediately replaced.



SECTION C–C



STABILIZED CONSTRUCTION ENTRANCE

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.

RECORD DRAWING
5–8–09

CITY OF WICHITA

SOIL EROSION BMPs

CURB INLET PROTECTION AND CONSTRUCTION ENTRANCE

SCOTT LINDEBAK, P.E.
STORM WATER ENGINEER

PROJECT NUMBER	OCA NO.
1358–PPW	607853
DATE: NOV 2007	SHEET 5 OF 15

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
EROSION CONTROL BMP'S
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. – CITY ENGINEER
C.O.W. Proj No. 1358–PPW Index Code 607853

POE & ASSOCIATES, INC.
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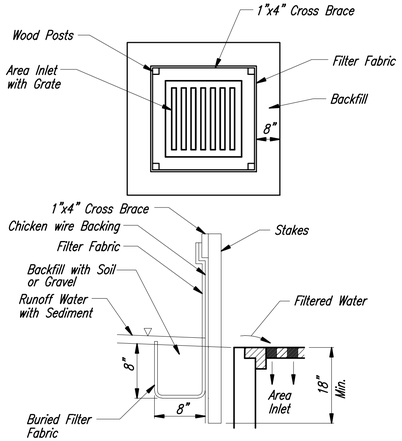
3940 E. Central, Suite 200 ▪ Wichita, KS 67208-4242
Phone 316/685-4114 ▪ FAX 316/685-4444

FINAL
Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

Sheet 5 of 15



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 another post(s) between them.
Connect the tops of all the posts with a wooden frame made of 1" by 4" boards. Use nails or screws for fastening.
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 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.

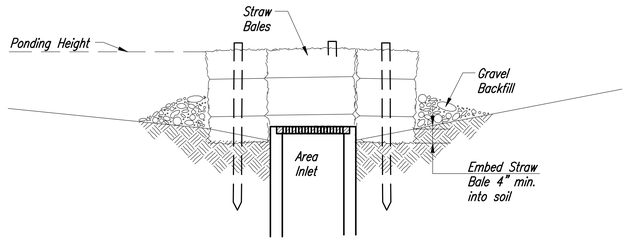
List of common placement/installation mistakes to avoid:

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.

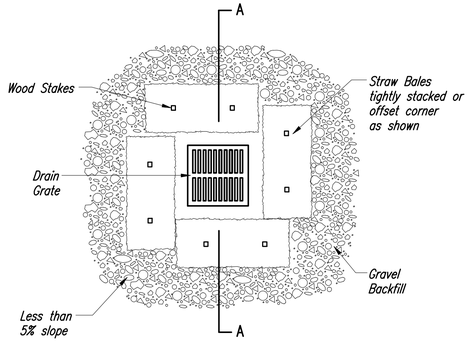
Inspection and Maintenance:

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?



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.

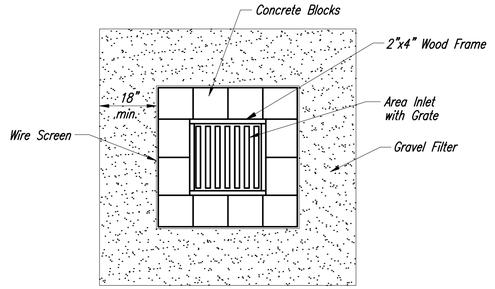
List of common placement installation mistakes to avoid:

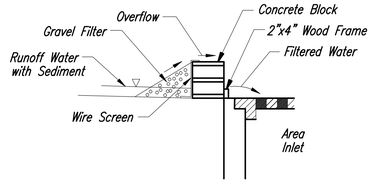
Bales should be placed directly against the perimeter of the area inlet. This allows overtopping water to flow directly into the inlet instead of onto nearby soil causing scour.
Bale area inlet barriers must be dug into the ground. Bales at ground level do not work because they allow water to flow under the barrier.

Inspection and Maintenance:

Bale area inlet barriers should be inspected every 7 days and within 24 hours of a rainfall 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?





CONCRETE BLOCK FILTER FOR AREA INLETS
(INLET PROTECTION)

Gravel barriers provide little filtering of large inflow waters. However, when installed correctly and maintained, they can effectively treat low runoff flows.

Placement of gravel filters around area drains must be completed in a manner that will not cause local flooding.

Gravel filters can be used if the immediate and adjacent area to the area drain consists of soil or pavement.

Only gravel filters are to be installed on top of the pavement.

Instructions for Installing:

STEP 1: Place concrete blocks around the grate. The blocks can be stacked one or two high and should be supported by a 2"x4" board.
STEP 2: Wrap 1/2" mesh wire screen around the concrete blocks.
STEP 3: Place 1" to 1-1/2" diameter rock around the blocks and wire screen. Be sure the rock extends down from the top of the concrete block.
STEP 4: To prevent damage to vehicles, signs warning drivers about the structures may be necessary.

An alternative method is use of gravel bags that are supported to prevent collapsing.

Use of rock having diameters smaller than 1" may result in clogging of pores and reduce the amount of water flowing into an inlet.

Maintenance:

All gravel filters installed around area drains should be inspected and repaired after each runoff event. Sediment should be removed when material is within 3" of the top of any block. Periodically, the gravel should be raked to increase infiltration and filtering of runoff waters. Accumulated sediment is to be removed immediately from roads and streets after every runoff event.

RECORD DRAWING
5-8-09

CITY OF WICHITA

SOIL EROSION BMPs

AREA INLET BARRIERS

SCOTT LINDEBAK, P.E.
STORM WATER ENGINEER

PROJECT NUMBER: 1358-PPW
OCA NO.: 607853
DATE: NOV 2007
SHEET 6 OF 15

FINAL
Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

Sheet 6 of 15

No. | Date | By | Approved | Revision

SERENDIPITY ESTATES ADDITION WATERLINE
EROSION CONTROL BMP'S
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
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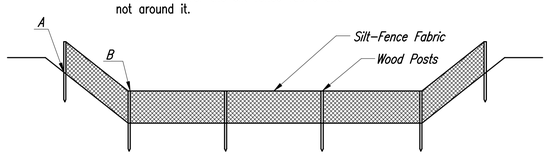
NOTE: Point A must be higher than Point B so that water flows over the silt fence fabric and not around it.



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 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 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.

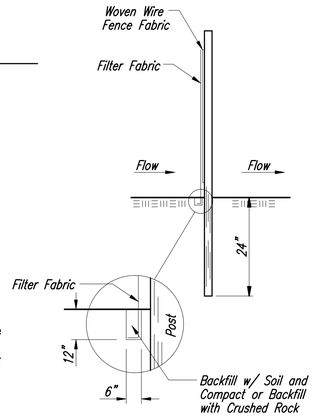
List of common placement/installation mistakes to avoid:

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 check 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:

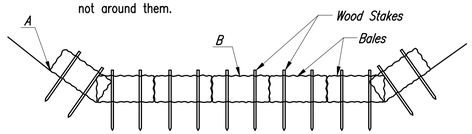
Silt fence ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

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

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 serve 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".

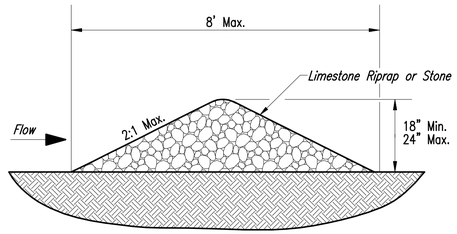
List of common placement/installation mistakes to avoid:

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.

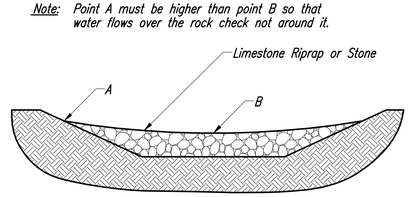
Inspection and Maintenance:

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?



DETAIL OF ROCK DITCH CHECK INSTALLATION



INSTALLATION OF ROCK DITCH CHECKS

ROCK DITCH CHECKS

Purpose & Design

Rock ditch checks operate by intercepting and ponding sediment-laden run-off. Ponding the water dissipates the energy of any incoming flow and allows a large portion of the suspended sediment to settle out. Water exits the ditch check by flowing over its crest. Rock ditch checks are ideal for ditches that will eventually have a riprap lining. Upon completion of the project, the rock ditch checks can be spread out to form the riprap channel lining.

Material Specification:

Stone used for rock ditch checks shall be free from soapstone, shale, shalelike, or other easily disintegrated material. Stone used may be irregular in shape and shall be approximately 6" to 9" in width, 12" in length and a minimum weight per stone of 50 lbs. Precast concrete blocks and concrete from old structures may not be used. The stone shall be placed ungrouted.

Placement:

Rock ditch checks shall be placed perpendicular to the flowline of the ditch.

Rock ditches must be designed so that water can flow over them, not around them.
The ditch checks should extend far enough so that the ground level at the ends of the check is higher than the low point on the crest of the check.

Proper installation method:

Using Limestone or Rock as listed above, construct a rock ditch check perpendicular to the ditch flowline.
The ditch check should be 18" to 24" high and have side slopes no steeper than 2:1. The rock ditch check must be constructed so that water can flow over the top and not around the ends (i.e., the ground level at the ends of the check must be higher than the low point on the crest of the check).

List of common placement/installation mistakes to avoid:

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 low point on the crest of the check

Inspection and Maintenance:

Rock ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 0.5 inches or more. The following is a list of questions that should be addressed during each inspection.

Does the water flow around the ditch check?
This is usually caused by insufficient ditch check length. If this occurs extend the check a sufficient length so that the ground level at th ends of the check is higher than the low point on the crest of the check.

Have high-velocity flows displaced any stones from the check?
Sometimes high-velocity flows can carry away portions of a rock ditch check after a large rainstorm, inspect the rock ditch check for any displaced stones. If a large portion of a rock ditch check has washed away, fill in the void with new stone immediately.

Does sediment need to be removed from behind the ditch check?
Sediment accumulated behind the ditch check should be removed when it reaches one-half of the original exposed height of the rock ditch check. Allowing too much sediment to accumulate behind a ditch check drastically reduces its effectiveness. One high-intensity rainfall can dislodge That is why it is extremely important to inspect ditch checks within 24 hours of a large rainfall.

RECORD DRAWING
5-8-09

CITY OF WICHITA

SOIL EROSION BMPs

DITCH CHECK DETAILS

SCOTT LINDEBAK, P.E.
STORM WATER ENGINEER

PROJECT NUMBER	OCA NO.
1358-PPW	607853

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NOV 2007	

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CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
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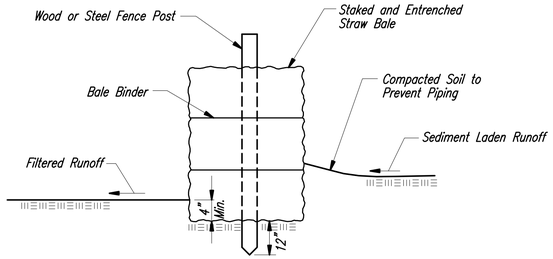
FINAL

Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

Sheet 7 of 15



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 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, 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.

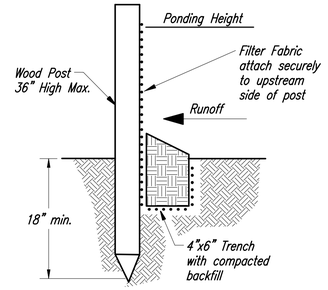
List of common placement/installation mistakes to avoid:

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?



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?

RECORD DRAWING
5-8-09

No.	Date	By	Approved	Revision
1				
2				
3				
4				

SERENDIPITY ESTATES ADDITION WATERLINE
EROSION CONTROL BMP'S
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj No. 1358-PPW Index Code 607853

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
8340 E. Central, Suite 200 ■ Wichita, KS 67208-4242
Phone 316/685-4114 ■ FAX 316/685-4444

FINAL
Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

CITY OF WICHITA

SOIL EROSION BMPs

BARRIER DETAILS

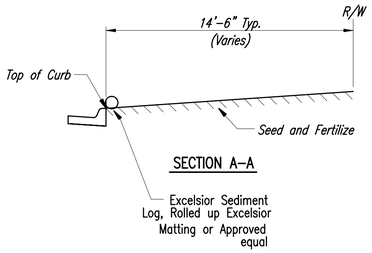
SCOTT LINDEBAK, P.E.
STORM WATER ENGINEER

PROJECT NUMBER	OCA NO.
1358-PPW	607853

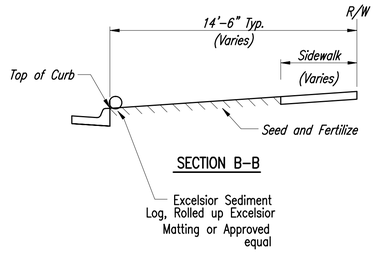
DATE: NOV 2007

SHEET 8 OF 15

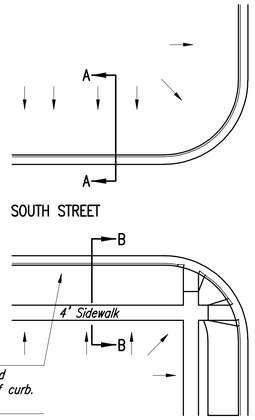
Sheet 8 of 15



SECTION A-A



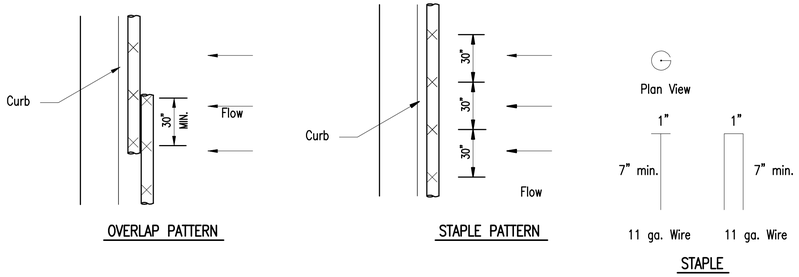
SECTION B-B



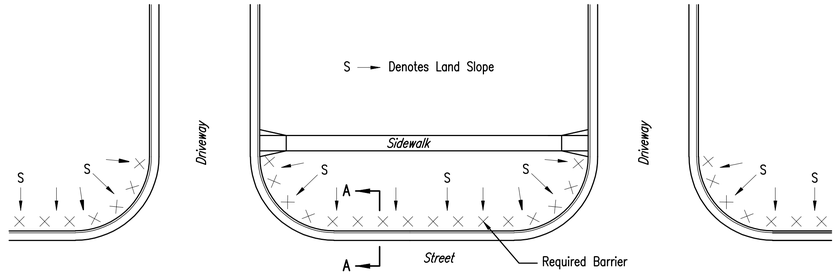
NOTES:

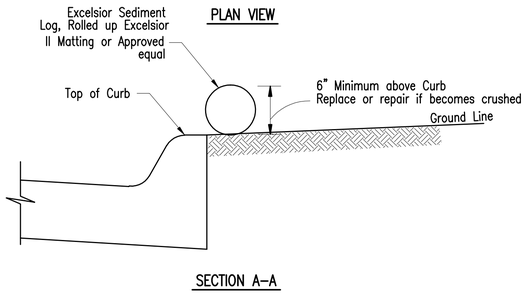
1. EXCELSIOR LOG/ROLL TO BE INSTALLED WHEN SOD IS NOT SPECIFIED ON PROJECT.
2. AFTER INSTALLATION OF LOG/ROLL, AT LOCATIONS WHERE CONCENTRATED FLOW CARRIES SEDIMENT OVER THE CURB AND INTO THE GUTTER, SUPPLEMENTAL EROSION CONTROL DEVICES WILL BE INSTALLED BY THE CONTRACTOR AS NEEDED, TO FIX THE PROBLEM.

BACK OF CURB PROTECTION DETAIL



DETAILS FOR SEDIMENT LOG/ROLL





SECTION A-A

NOTES:

1. Barriers must be placed back of curb along street and up the driveway sufficiently to catch all sediment from the yard.
2. Anchor to ground every 30" with a 7" min. long staple.
3. Remove accumulated sediment when within 2 inches of top of device.
4. Replace/repair all broken/damaged sediment logs/rolls to maintain effectiveness of device.
5. Sediment logs/rolls can be driven over for access to the site. They need to be picked up and put back down after they have been compacted by any traffic to maintain effectiveness of BMP. Replace as needed per original design.

SEDIMENT LOG BARRIERS

NOTES:
FOLDED Excelsior matting will not be accepted.

RECORD DRAWING
5-8-09

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
EROSION CONTROL BMP'S
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj. No. 1358-PPW Index Code 607853

POE & ASSOCIATES, INC.
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Phone 316/685-4114 ▪ FAX 316/685-4444

FINAL

Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

CITY OF WICHITA

SOIL EROSION BMPs

BACK OF CURB SEDIMENT BARRIER DETAILS

SCOTT LINDEBAK, P.E.
STORM WATER ENGINEER

PROJECT NUMBER	OCA NO.
1358-PPW	607853

DATE: NOV 2007

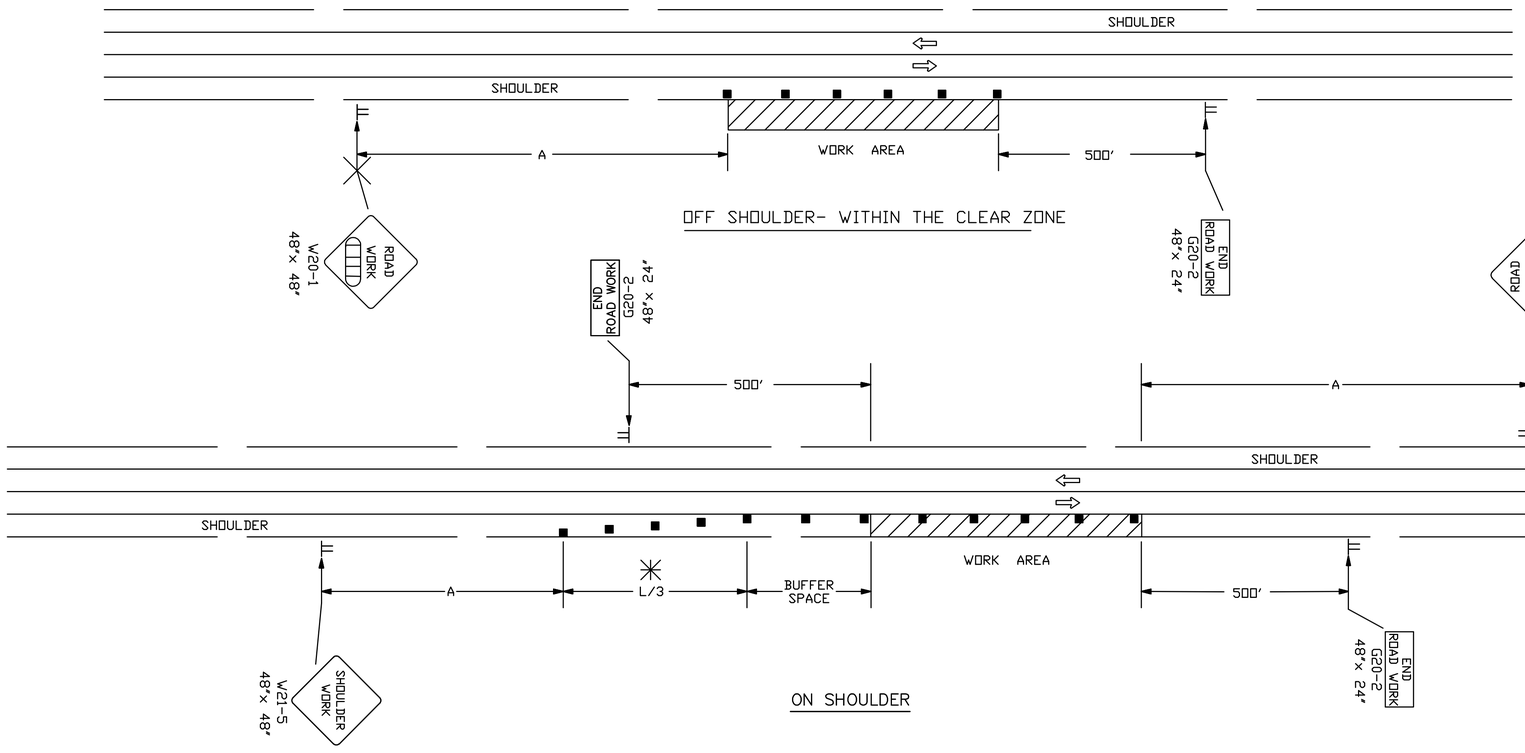
SHEET 9 OF 15

Sheet 9 of 15

REFER TO STD. TE710 FOR ADDITIONAL INFORMATION ON TRAFFIC CONTROL SIGNS AND SIGN SPACING.
REFER TO STD. TE702 FOR INFORMATION ON TAPERS AND CHANNELIZING DEVICES.
REFER TO STD. TE700 FOR LENGTH OF BUFFER SPACE.

NOTE: NO TRAFFIC CONTROL IS REQUIRED IF THE WORK AREA IS LOCATED OUTSIDE OF THE CLEAR ZONE.

FOR OPERATIONS OF 60 MINUTES OR LESS, ALL SIGNS AND CHANNELIZING DEVICES MAY BE ELIMINATED IF A VEHICLE WITH AN ACTIVATED FLASHING OR REVOLVING YELLOW LIGHT IS USED.



WHEN CONCRETE SAFETY BARRIER IS USED, CHANNELIZING DEVICES ARE NOT NEEDED ALONG THE TANGENT BARRIER SECTION.

□ Channelizing Device
AHEAD, 1500 FT OR 1 MILE

✳ OMIT TAPER IF PAVED SHOULDER IS LESS THAN 8' WIDE.

RECORD DRAWING
5-8-09

NO.	DATE	REVISIONS	BY	APP'D
3	12-29-05	UPDATED END ROAD WORK SIGN DESIGNATION	M.B.	A.A.A.
2	11-19-03	CHANGED BORDER	B.H.	S.A.B.
1	9-26-02	REMOVED G20-1 SIGNS	M.H.	S.A.B.

KANSAS DEPARTMENT OF TRANSPORTATION
TYPICAL TRAFFIC CONTROL
WORK ON OR NEAR THE SHOULDER
UNDIVIDED HIGHWAY (2 OR 4 LANE)

TE720 9/1/00

FHWA APPROVAL	12-29-05	APP'D Michael P. McKenna	
DESIGNED L.E.R.	DETAILED B.A.H.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
TRAFFIC CONTROL DETAILS
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj. No. 1358-PPW Index Code 607853

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FINAL
Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

1. MUTCD COMPLIANCE:

ALL TRAFFIC CONTROL DEVICES AND THEIR INSTALLATION AND MAINTENANCE SHALL COMPLY WITH THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS. WHENEVER THE TRAFFIC CONTROL STANDARDS CONFLICT WITH THE MANUAL, THE STANDARDS SHALL GOVERN.

2. DESIGN SPEED:

THOSE ITEMS DELEGATED TO TRAFFIC CONTROL SHOULD BE DESIGNED AND INSTALLED USING THE POSTED/LEGAL SPEED OF THE ROADWAY PRIOR TO WORK STARTING.

3. CLEAR ZONE:

ALL CONSTRUCTION EQUIPMENT (INCLUDING VEHICLES), MATERIALS, AND DEBRIS SHALL BE STORED OUT OF THE CLEAR ZONE. WHERE THIS CANNOT BE ACHIEVED, THE CONTRACTOR SHALL PLACE APPROPRIATE SIGNS, OBJECT IDENTIFIERS, AND/OR BARRICADES AS DESIGNATED BY THE ENGINEER. TRAFFIC CONTROL DEVICES NEEDED FOR THIS CONDITION SHALL BE CONSIDERED SUBSIDIARY TO OTHER BID ITEMS.

4. MINIMUM LANE WIDTHS:

LANE WIDTHS SHALL BE A MINIMUM OF 11' (MEASURED BETWEEN CENTERLINES OF PAVEMENT MARKINGS) OR AS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER. A LANE WIDTH LESS THAN 11' MAY REQUIRE RESTRICTED ROADWAY WIDTH SIGNING.

5. FLAGGER:

A MINIMUM OF ONE FLAGGER SHALL BE STATIONED WITHIN EACH MULTI-LANE ROADWAY WORK AREA WHERE WORK IS IN A CLOSED LANE ADJACENT TO TRAFFIC AND NOT SEPERATED BY CONCRETE SAFETY BARRIER.

6. PAVEMENT MARKING:

ALL CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED OR MASKED. WHEN THE WORK WILL OCCUPY A LOCATION MORE THAN THREE DAYS, ALL TRANSITION TAPERS, CROSSOVERS, AND EDGE LINES ALONG CHANNELIZING DEVICES SHALL BE MARKED WITH SOLID 4" WIDE PAVEMENT MARKING.

7. FIRST MODULE OF IBS:

THE FIRST MODULE OF EACH INERTIAL BARRIER SYSTEM (IBS) SHALL HAVE A MINIMUM OF 2 SQ. FT. OF FLOURESCENT ORANGE PRISMATIC GRADE RETROREFLECTIVE SHEETING FACING TRAFFIC. EITHER A VERTICAL RECTANGLE OR DIAMOND SHAPE MAY BE USED.

8. PEDESTRIAN / BICYCLE SAFETY:

WORK ZONE SIGNS SHALL NOT INHIBIT PEDESTRIAN AND BICYCLE TRAFFIC ON SIDEWALKS OR OTHER AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE USE.

CONSIDERATION SHOULD BE MADE TO SEPERATE PEDESTRIAN AND BICYCLE MOVEMENTS FROM BOTH WORK SITE ACTIVITY AND MOTOR VEHICLE TRAFFIC. UNLESS A REASONABLE SAFE ROUTE THAT DOES NOT INVOLVE CROSSING THE ROADWAY CAN BE PROVIDED. PEDESTRIANS AND BICYCLISTS SHOULD BE APPROPRIATELY DIRECTED WITH ADVANCE SIGNING THAT ENCOURAGES THEM TO CROSS TO THE OPPOSITE SIDE OF THE ROADWAY. IN URBAN AND SUBURBAN AREAS WITH HIGH MOTOR VEHICLE TRAFFIC VOLUMES, THESE SIGNS SHOULD BE PLACED AT INTERSECTIONS (RATHER THAN MID-BLOCK LOCATIONS) SO THAT PEDESTRIANS AND BICYCLISTS ARE NOT CONFRONTED WITH MID-BLOCK WORK SITES THAT WILL INDUCE THEM TO ATTEMPT SKIRTING THE WORK SITE OR MAKING A MID-BLOCK CROSSING.

9. CHANGED STOP CONDITIONS:

ATTACH TWO FLAGS AND A RED TYPE B HIGH INTENSITY WARNING LIGHT TO ANY STOP SIGN THAT CREATES A NEW STOP CONDITION OR MOVES THE STOP CONDITION TO A NEW LOCATION. LEAVE FLAGS AND LIGHTS IN PLACE FOR AT LEAST THE FIRST 30 DAYS. INSTALL W3-1a (SYMBOLIC STOP AHEAD) SIGN IN ADVANCE OF STOP SIGN IF STOP SIGN IS NOT VISIBLE FOR A MINIMUM OF DISTANCE 'A' (SEE CHART ON TE710) OR IF STOP CONDITION IS MOVED TO LESS THAN DISTANCE 'A' FROM AN EXISTING STOP AHEAD SIGN.

10. LUMP SUM BIDDING:

WHEN TRAFFIC CONTROL IS BID LUMP SUM, ADDITIONAL DEVICES WILL BE PAID FOR AS EXTRA WORK.

11. NIGHT TIME LIGHTING:

WHEN NIGHTTIME WORK IS REQUIRED, FLOODLIGHTS SHOULD BE USED TO ILLUMINATE FLAGGER STATIONS, EQUIPMENT CROSSINGS, AND OTHER AREAS WHERE EXISTING LIGHT IS NOT ADEQUATE FOR THE WORK TO BE PERFORMED SAFELY.

IN NO CASE SHALL FLOODLIGHTS BE PERMITTED TO CREATE A DISABLING GLARE FOR THE DRIVER. THE ADEQUACY OF THE FLOODLIGHT PLACEMENT AND ELIMINATION OF POTENTIAL GLARE SHOULD BE CHECKED BY DRIVING THROUGH THE PROJECT.

12. NCHRP REPORT 350 CRASHWORTHY REQUIREMENTS:

TRAFFIC CONTROL DEVICES SHALL MEET THE EVALUATION CRITERIA IN NCHRP REPORT 350 AS SUPPLEMENTED BY FHWA MEMORANDUM "IDENTIFYING ACCEPTABLE HIGHWAY SAFETY FEATURES," DATED JULY 25, 1997. AVAILABLE ON THE INTERNET AT http://safety.fhwa.dot.gov/fourthlevel/pro_res_road_nchrp350.htm.

THE CONTRACTOR SHALL:

1) PROVIDE TO THE ENGINEER A COPY OF THE MANUFACTURER'S SELF-CERTIFICATION THAT ANY CATEGORY 1 (i.e. - PLASTIC TRIMLINE CONES, TUBULAR MARKERS, DRUMS WITHOUT ATTACHMENTS) AND CATEGORY 2 (i.e. - PORTABLE SIGN STANDS (WITH SIGNS), TYPE II AND III BARRICADES, AND VERTICAL PANELS) DEVICES USED ON THE PROJECT ARE NCHRP REPORT 350 COMPLIANT.

2) PROVIDE TO THE ENGINEER, UPON REQUEST, A COPY OF THE ENTIRE FHWA NCHRP REPORT 350 ACCEPTANCE LETTER (WZ-xxx) FOR ANY CATEGORY 2 DEVICE (i.e. - PORTABLE SIGN STANDS (WITH SIGNS), TYPE II AND III BARRICADES, AND VERTICAL PANELS) USED ON THE PROJECT. WORK ZONE FHWA NCHRP REPORT 350 ACCEPTANCE LETTERS (WZ-xxx) ARE AVAILABLE ON THE INTERNET AT http://safety.fhwa.dot.gov/fourthlevel/hardware/listing.cfm?code=workzone.

3) CERTIFY THAT THE TRUCK MOUNTED ATTENUATORS (TMA'S) (WHICH ARE DEFINED AS CATEGORY 3 DEVICES BY THE FHWA MEMORANDUM) WERE PURCHASED PRIOR TO OCTOBER 1, 1998, AND INCLUDE A COPY OF THE ENTIRE FHWA ACCEPTANCE LETTER STATING THAT THE TMA'S ARE NCHRP REPORT 230 COMPLIANT; OR IF THE DEVICES WERE PURCHASED AFTER OCTOBER 1, 1998, INCLUDE A COPY OF THE ENTIRE FHWA'S ACCEPTANCE LETTER STATING THAT THE TMA'S ARE NCHRP REPORT 350 COMPLIANT.

ALL CATEGORY 1 & 2 DEVICES USED ON PROJECTS LET AFTER JANUARY 1, 2002 SHALL BE NCHRP REPORT 350 COMPLIANT. TMA'S PURCHASED PRIOR TO OCTOBER 1, 1998, MAY BE USED UNTIL THE END OF THEIR SERVICEABLE LIVES.

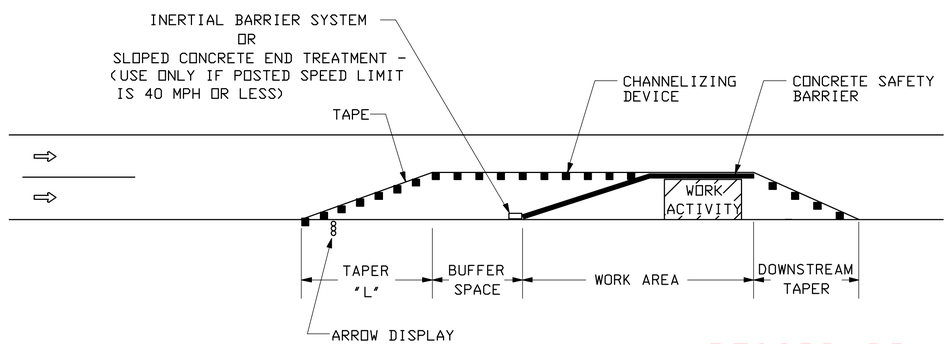
BUFFER SPACE:

SPEED (MPH)*	20	25	30	35	40	45	50	55	60	65	70
LENGTH (ft)	115	155	200	250	305	360	425	495	570	645	730

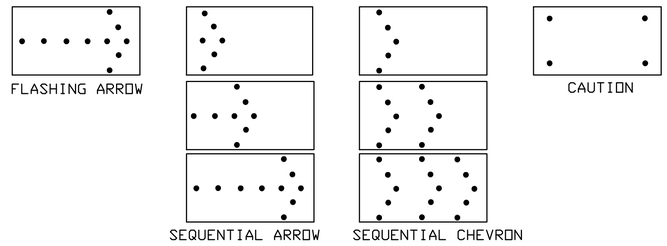
NEITHER WORK ACTIVITY NOR STORAGE OF EQUIPMENT, VEHICLES, OR MATERIAL SHOULD OCCUR IN THE BUFFER SPACE. WHEN A PROTECTION VEHICLE IS PLACED IN ADVANCE OF THE WORK SPACE, ONLY THE SPACE UPSTREAM OF THE VEHICLE CONSTITUTES THE BUFFER SPACE.

* POSTED SPEED PRIOR TO WORK STARTING

IF TEMPORARY CONCRETE SAFETY BARRIER IS USED TO SEPERATE APPROACHING TRAFFIC FROM THE WORK ACTIVITY, THE BARRIER SHALL BE CONSIDERED PART OF THE WORK AREA. A FULL LANE WIDTH SHOULD BE AVAILABLE THROUGHOUT THEN LENGTH OF THE BUFFER SPACE. FOR EXAMPLE:



ARROW DISPLAYS



ARROW DISPLAY ELEMENTS SHALL BE CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL-RATED LAMP VOLTAGE. FULL LAMP VOLTAGE SHOULD BE USED FOR DAY AND DIMMED MODE SHALL BE USED FOR NIGHT. AN ARROW DISPLAY IN THE CAUTION MODE SHALL BE USED ONLY FOR SHOULDER WORK OR ROADSIDE WORK NEAR THE SHOULDER.

RECORD DRAWING
5-8-09

NO.	DATE	REVISIONS	BY	APP'D
3	12-29-05	MODIFIED BUFFER SPACE TABLE	B.H.	A.A.A.
2	2-1-05	MODIFIED NOTE #2, 8, 10	B.H.	A.A.A.
1	11-19-03	CHANGED BORDER	B.H.	S.A.B.

KANSAS DEPARTMENT OF TRANSPORTATION

GENERAL TRAFFIC CONTROL

TE700 9/1/00

FHWA APPROVAL 12-29-05		APP'D Anthony A. Alrobaire	
DESIGNED B.A.H.	DETAILED B.A.H.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
TRAFFIC CONTROL DETAILS
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj. No. 1358-PPW Index Code 607853

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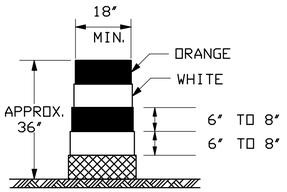
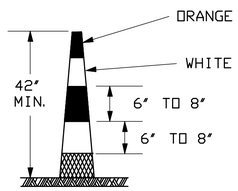
FINAL
Designed By: J. Dickmon & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

Sheet
11 of 15



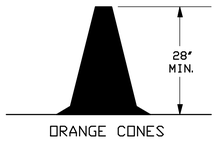
DRUM



TRIM LINE
CHANNELIZER

DRUMS AND TRIM LINE CHANNELIZERS SHALL BE RETROREFLECTORIZED FULL CIRCUMFERENCE WITH AT LEAST TWO ORANGE AND TWO WHITE 6″ TO 8″ WIDE STRIPES. ADDITIONAL STRIPES MAY BE NON-REFLECTIVE. IF THERE ARE NON-REFLECTIVE SPACES BETWEEN ADJACENT STRIPES, THEY SHALL BE NO MORE THAN 2″ WIDE.

ALL RETROREFLECTIVE STRIPES ON DRUMS SHALL BE TYPE III HIGH PERFORMANCE SHEETING. THE WHITE STRIPES ON TRIM LINE CHANNELIZERS SHALL BE TYPE III HIGH PERFORMANCE SHEETING. PROJECTS LET AFTER JANUARY 1, 2002 WILL REQUIRE THAT THE ORANGE STRIPES ON ALL TRIM LINE CHANNELIZERS BE FLOURESCENT ORANGE PRISMATIC GRADE SHEETING.



ORANGE CONES

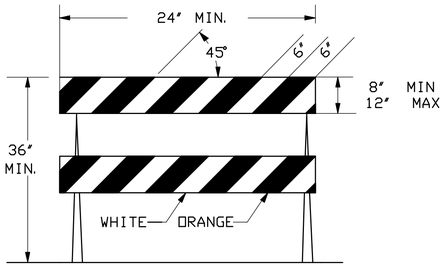
CONES MAY BE USED AS CHANNELIZING DEVICES FOR DAYTIME OPERATIONS ONLY. THEY WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE SUBSIDIARY TO OTHER TRAFFIC CONTROL BID ITEMS. THE ENGINEER MAY REQUIRE THAT CONES BE SUPPLEMENTED BY OTHER TRAFFIC CONTROL DEVICES IN CERTAIN SITUATIONS.

ITEM	LOCATION	CROSS-OVERS	DIVERSIONS	TANGENTS	TAPERS	RAMPS	HEAD TO HEAD	OBJECT IDENTIFIER	
PORTABLE									
	DRUMS	YES	YES	YES	YES	YES	(1)	YES	
	TRIM LINES	YES	YES	YES	YES	YES	(1)	YES	
	VERTICAL PANELS	(2)	(2)	(2)	(2)	(2)	(1, 2)	YES	
	DIRECTION INDICATOR BARRICADE	NO	NO	NO	YES	NO	NO	NO	
	TYPE II BARRICADE	(2)	(2)	(2)	(2)	NO	NO	YES	
FIXED									
	TUBULAR MARKERS	(3)	(3)	(3)	NO	(3)	YES	NO	
	VERTICAL PANELS	(3)	(3)	(3)	(3)	(3)	(3)	YES	

(1) Not allowed on centerline delineation along freeways or expressways.

(2) Slashes must slope down toward direction traffic is to pass.

(3) May be used upon the approval of the Engineer.

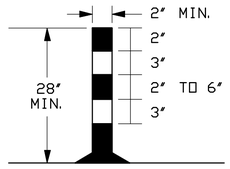


TYPE II BARRICADE

FOR RAILS LESS THAN 36″ LONG, 4″ WIDE STRIPES MAY BE USED.

THE ENTIRE AREA OF BARRICADE RAILS, BOTH FRONT AND BACK, SHALL BE FULLY REFLECTORIZED WITH TYPE III HIGH PERFORMANCE RETROREFLECTIVE SHEETING.

THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.



TUBULAR MARKERS

TAPER FORMULAS:

L = WS FOR SPEEDS OF 45 MPH OR MORE

$L = WS^2/60$ FOR SPEEDS OF 40 MPH OR LESS

WHERE: L = MINIMUM LENGTH OF TAPER IN FEET
S = NUMERICAL VALUE OF POSTED SPEED PRIOR TO WORK STARTING IN MPH
W = WIDTH OF OFFSET IN FEET

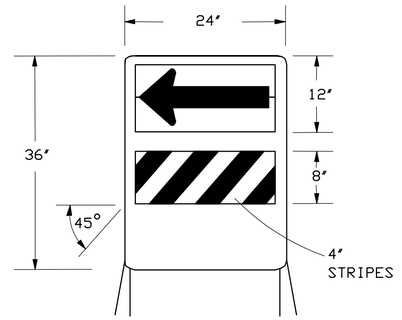
CHANNELIZER PLACEMENT:

(A) THE SPACING BETWEEN DEVICES IN THE TAPER SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO THE POSTED SPEED LIMIT IN MPH PRIOR TO WORK STARTING.

(B) THE SPACING BETWEEN DEVICES IN THE WORK ZONE SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO TWO TIMES THE POSTED SPEED LIMIT IN MPH PRIOR TO WORK STARTING.

(C) CHANNELIZING DEVICES SHALL BE PLACED FOR OPTIMUM VISABILITY, NORMALLY AT RIGHT ANGLES TO THE TRAFFIC FLOW.

(D) CHANNELIZING DEVICES PLACED ALONG SHOULDER EDGES OR IN DROPOFFS SHALL HAVE A MINIMUM OF 24″ FROM THE TOP OF THE CHANNELIZING DEVICE TO THE TOP OF THE PAVEMENT.

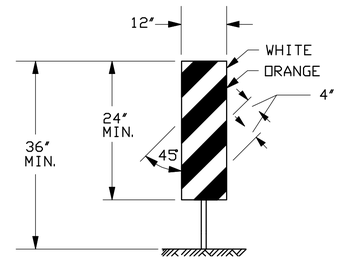


DIRECTION INDICATOR BARRICADE

THE ARROW PANEL SHALL BE BLACK ON FLUORESCENT ORANGE PRISMATIC GRADE SHEETING. THE STRIPES SHALL BE ORANGE AND WHITE TYPE III HIGH PERFORMANCE RETROREFLECTIVE SHEETING SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.

THE DIRECTION INDICATOR BARRICADE SHALL BE USED IN SERIES TO DIRECT THE MOTORIST INTO THE INTENDED LANE OF TRAVEL.

THE ARROW PANEL SHOULD NOT BE VISIBLE TO OPPOSING TRAFFIC.



VERTICAL PANEL

THE ENTIRE AREA OF VERTICAL PANELS, BOTH FRONT AND BACK, SHALL BE FULLY REFLECTORIZED WITH TYPE III HIGH PERFORMANCE RETROREFLECTIVE SHEETING. THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.

NO.	DATE	REVISIONS	BY	APP'D
3	11-19-03	CHANGED BORDER	B.H.	S.A.B.
2	9-26-02	MODIFIED NOTES	M.H.	S.A.B.
1	11-13-01	REVISED CHANNELIZING DEVICE MATRIX	J.H.	S.A.B.

KANSAS DEPARTMENT OF TRANSPORTATION

CHANNELIZING DEVICES

TE702 9/1/00

FHWA APPROVAL	11-26-03	APP'D Michael P. McKenna	
DESIGNED L.E.R.	DETAILED B.A.H.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

RECORD DRAWING
5-8-09

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
TRAFFIC CONTROL DETAILS
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj No. 1358-PPW Index Code 607853

POE & ASSOCIATES, INC.
CONSULTING ENGINEERS
5940 E. Central, Suite 200 ▪ Wichita, KS 67208-4242
Phone 316/685-4114 ▪ FAX 316/685-4444

FINAL
Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

GENERAL NOTES

1. MAINTENANCE:

THE CONTRACTOR SHALL MAINTAIN ALL SIGNS AND DEVICES IN AN UPRIGHT POSITION. THE CONTRACTOR SHALL CLEAN OR REPLACE ANY DAMAGED OR ILLEGIBLE SIGN OR DEVICE AS DIRECTED BY THE ENGINEER.

2. EXISTING SIGNS:

IF EXISTING SIGNS THAT ARE TO REMAIN (WHETHER DENOTED ON THE PLANS OR NOT) INTERFERE WITH CONSTRUCTION WORK, THE CONTRACTOR SHALL REMOVE, STORE, AND RESET THE SIGNS. THIS SHALL BE SUBSIDIARY TO OTHER TRAFFIC CONTROL BID ITEMS. SIGNING DAMAGED BY THE CONTRACTOR SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

3. CONFLICTING SIGNS AND SIGNS NOT IN USE:

SIGNS THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN OR DO NOT APPLY TO THE TRAFFIC OPERATIONS SHALL BE IMMEDIATELY REMOVED, TURNED SO NOT VISIBLE TO TRAFFIC FROM ANY DIRECTION, OR COMPLETELY COVERED WITH ADEQUATE OPAQUE WATERPROOF MATERIAL. TAPE SHALL NOT BE APPLIED TO THE FACE OF THE SIGN.

4. TEMPORARY AND POST MOUNTED SIGNS:

TRAFFIC CONTROL SIGNS THAT ARE ANTICIPATED TO REMAIN IN PLACE FOR 3 DAYS OR LESS ARE CONSIDERED "TEMPORARY." TEMPORARY SIGNS SHALL BE MOUNTED ON AN APPROVED SUPPORT AT A MINIMUM HEIGHT OF 12". TRAFFIC CONTROL SIGNS IN PLACE FOR OVER 3 DAYS ARE REQUIRED TO BE MOUNTED ON APPROVED POSTS. A MINIMUM OF 42" OF THE APPROVED POST MUST BE BELOW THE GROUND SURFACE WITH ADEQUATE BACKFILL AND COMPACTION. ALL POSTS SHALL EXTEND NO GREATER THAN 6" ABOVE THE SIGN.

WHEN THE SIGN LENGTH IS EQUAL TO OR GREATER THAN 9', THREE OR MORE WOOD POSTS MAY BE USED WITH A MINIMUM OR 4' BETWEEN THE CENTERLINE OF EACH POST. ALL SIGNS LESS THAN 9' IN LENGTH SHALL USE A MAXIMUM OF TWO WOOD POSTS.

5. SHEETING:

ALL ORANGE SIGNS SHALL BE RETROREFLECTORIZED WITH FLOURESCENT ORANGE PRISMATIC GRADE SHEETING. ALL OTHER SIGNS SHALL BE RETROREFLECTORIZED WITH TYPE III HIGH PERFORMANCE SHEETING OF STANDARD COLORS.

6. ROLL-UP SIGNS:

ROLL-UP SIGNS MAY BE USED FOR TEMPORARY WARNING SIGNS. THEY MUST BE FLOURESCENT ORANGE PRISMATIC GRADE RETROREFLECTIVE SIGNS OF OPAQUE MATERIAL. MESH SIGNS ARE NOT ALLOWED.

7. SIGNS INVOLVING SPEEDS:

THE W3-5 (SPEED LIMIT ⊗ AHEAD) SHOULD BE USED ONLY IF THE ENGINEER DETERMINES THAT A REDUCED SPEED IS REQUIRED ON THE PROJECT.

THE KM4-20 (WORK ZONE) PLAQUE SHALL BE PLACED ABOVE ALL SPEED LIMIT SIGNS, (R2-1), EXISTING AND TEMPORARY.

FOR SPEEDS OF 30 MPH OR LESS, THE W1-1(TURN) OR W1-3(REVERSE TURN) SHOULD BE USED. FOR SPEEDS OF 35 MPH OR MORE, THE W1-2(CURVE) OR W1-4(REVERSE CURVE) SHOULD BE USED. THE W13-1(MPH) IS TO BE ELIMINATED IF THE ADVISORY SPEED IS WITHIN 5 MPH OF THE SPEED LIMIT.

8. SIGNS CONTROLLING WORK AREA:

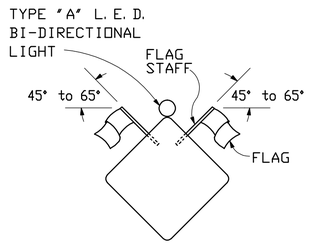
THE G20-2A(END ROAD WORK) SHOULD BE PLACED 500' FROM THE END OF THE ACTUAL WORK AREA, NOT NECESSARILY AT THE EXTREME LIMITS OF THE PROJECT.

WHERE TWO WORK AREAS ARE LESS THAN 1 MILE APART IN RURAL AREAS OR 1/4 MILE APART IN URBAN AREAS, THE G20-2(END ROAD WORK) FOR THE FIRST WORK AREA AND THE W20-1(ROAD WORK) FOR THE SECOND WORK AREA SHOULD BE ELIMINATED.

9. WARNING LIGHTS ON SIGNS:

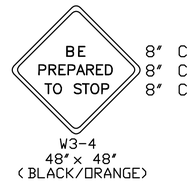
TYPE "A" L. E. D. BI-DIRECTIONAL LOW INTENSITY FLASHING WARNING LIGHTS SHOULD BE USED ON ALL CONSTRUCTION WARNING ACTION SIGNS AND SHALL NOT BE USED ON SIGNS MOUNTED LESS THAN 5' HIGH ON TEMPORARY SUPPORTS. ON ALL OTHER CONSTRUCTION WARNING SIGNS, TYPE "A" L. E. D. LOW INTENSITY LIGHTS ARE TO BE USED AS DIRECTED BY THE ENGINEER. THE TYPE "B" HIGH INTENSITY LIGHT MAY BE USED UNTIL THE END OF ITS SERVICEABLE LIFE TO REPLACE A TYPE "A" L. E. D. LIGHT.

TYPE "A" L. E. D. LIGHTS SHALL BE MAINTAINED SO AS TO BE CAPABLE OF BEING VISIBLE ON A CLEAR NIGHT FROM A DISTANCE OF 3000 FT. IF A TYPE "A" LIGHT HAS A SEPARATE BATTERY CASE, THE BATTERY CASE SHALL BE MOUNTED NO HIGHER THAN 12" ABOVE THE GROUND AND MOUNTED BEHIND THE SIGN POST. FOR A TYPE "A" LIGHT, WHERE THE LENS IS MOUNTED TO THE TOP OF THE BATTERY CASE, THE TYPE "A" LIGHT (LENS AND BATTERY) SHALL BE MOUNTED AT THE TOP OF THE SIGN.



TWO (2) 18" x 18" FLOURESCENT RED-ORANGE FLAGS SHALL BE ATTACHED IN THE POSITION SHOWN ON THE W20-2(DETOUR), W1-1(TURN), W1-2(CURVE), W1-3(REVERSE TURN), W1-4(REVERSE CURVE), W3-3(SIGNAL AHEAD), W4-2(LANE REDUCTION), W20-4(ONE LANE ROAD), W20-5(LANE CLOSED), W20-7A(FLAGGER), AND W3-4 (BE PREPARED TO STOP) SIGNS AND ANY OTHER ACTION SIGNS AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER. THE FLAGS AND STAFFS ARE TO BE ATTACHED IN SUCH A MANNER THAT THE SIGN WILL NOT BE OBSCURED. THE FLAGS MAY BE EITHER A CLOTH OR VINYL MATERIAL. THE FLAGS SHALL BE SUBSIDIARY TO THE CONSTRUCTION SIGN BID ITEMS.

SIGN LAYOUT INFORMATION



LETTER SIZES FOR BLACK ON ORANGE "DESTINATION" SIGNS

STD. SIZE	EXPWY/FREEWAY
6" C	10" D

WORK ZONE	STD. SIZE	EXPWY/FREEWAY
KM4-20 (BLACK/ORANGE)	3" C 24" x 6"	6" C 48" x 12"

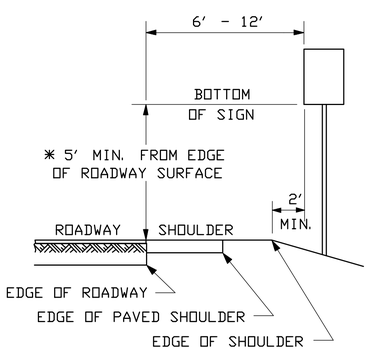
NOTE:
TEXT DIMENSIONS ARE IN INCHES.
BORDER IS BLACK NON-REFLECTIVE.

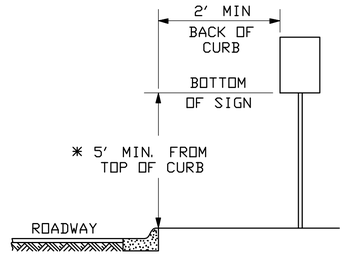
ADVANCE WARNING SIGN SPACING (IN FEET):

	A	B	C
URBAN (40 MPH OR LOWER)	100	100	100
URBAN (45 MPH OR HIGHER)	350	350	350
RURAL (55 MPH OR LOWER)	500	500	500
RURAL (60 MPH OR HIGHER)	750	750	750
EXPRESSWAY/FREEWAY	1000	1500	2640

THE SPACING BETWEEN ANY SIGNS MAY BE ADJUSTED AS APPROVED BY THE ENGINEER IN ORDER TO MAXIMIZE VISIBILITY.

THE SPACING BETWEEN SIGNS SHALL BE NO LESS THAN 100', UNLESS DIRECTED BY THE ENGINEER.





* NOTE:

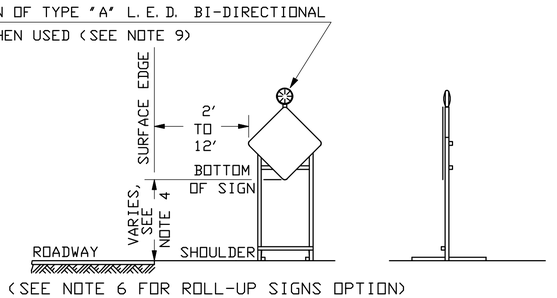
A. IN BUSINESS, COMMERCIAL, AND RESIDENTIAL DISTRICTS, THE DISTANCE BETWEEN THE BOTTOM OF THE SIGN AND THE TOP OF THE NEAR EDGE OF THE TRAVEL WAY SHALL BE AT LEAST 7'.

B. LARGE SIGNS HAVING AN AREA EXCEEDING 54 SQUARE FEET THAT ARE INSTALLED ON MULTIPLE BREAKAWAY POSTS SHALL BE MOUNTED A MINIMUM OF 7' ABOVE THE GROUND.

C. THE HEIGHT TO THE BOTTOM OF THE SECONDARY SIGN MOUNTED BELOW ANOTHER SIGN MAY BE 1' LESS THAN THE APPROPRIATE HEIGHT SPECIFIED ABOVE.

HEIGHT AND LATERAL DIMENSIONS FOR POST MOUNTED SIGNS (SIGNS LEFT IN PLACE OVER 3 DAYS)

POSITION OF TYPE "A" L. E. D. BI-DIRECTIONAL LIGHT WHEN USED (SEE NOTE 9)



(SEE NOTE 6 FOR ROLL-UP SIGNS OPTION)

HEIGHT AND LATERAL DIMENSIONS FOR SIGNS MOUNTED ON SKIDS OR OTHER PORTABLE SUPPORTS

RECORD DRAWING
5-8-09

NO.	DATE	REVISIONS	BY	APP'D
3	12-29-05	MODIFIED FLAGS, M4-20 & SIGN LAYOUT INFO	M.B.	A.A.A.
2	2-1-05	MODIFIED NOTE #9	B.H.	A.A.A.
1	11-19-03	CHANGED BORDER	B.H.	S.A.B.

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGNS

TE710 9/1/00

FHWA APPROVAL	12-29-05	APP'D Anthony A. Alrobaire	
DESIGNED B.A.H.	DETAILED B.A.H.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

FINAL

Designed By: J. Dickman & J. Ubert
Drawn By: M. Tucker
Poe Job No.: 1906A
Date: November 2007

Sheet 13 of 15

SERENDIPITY ESTATES ADDITION WATERLINE
TRAFFIC CONTROL DETAILS
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj No. 1358-PPW Index Code 607853

POE & ASSOCIATES, INC.
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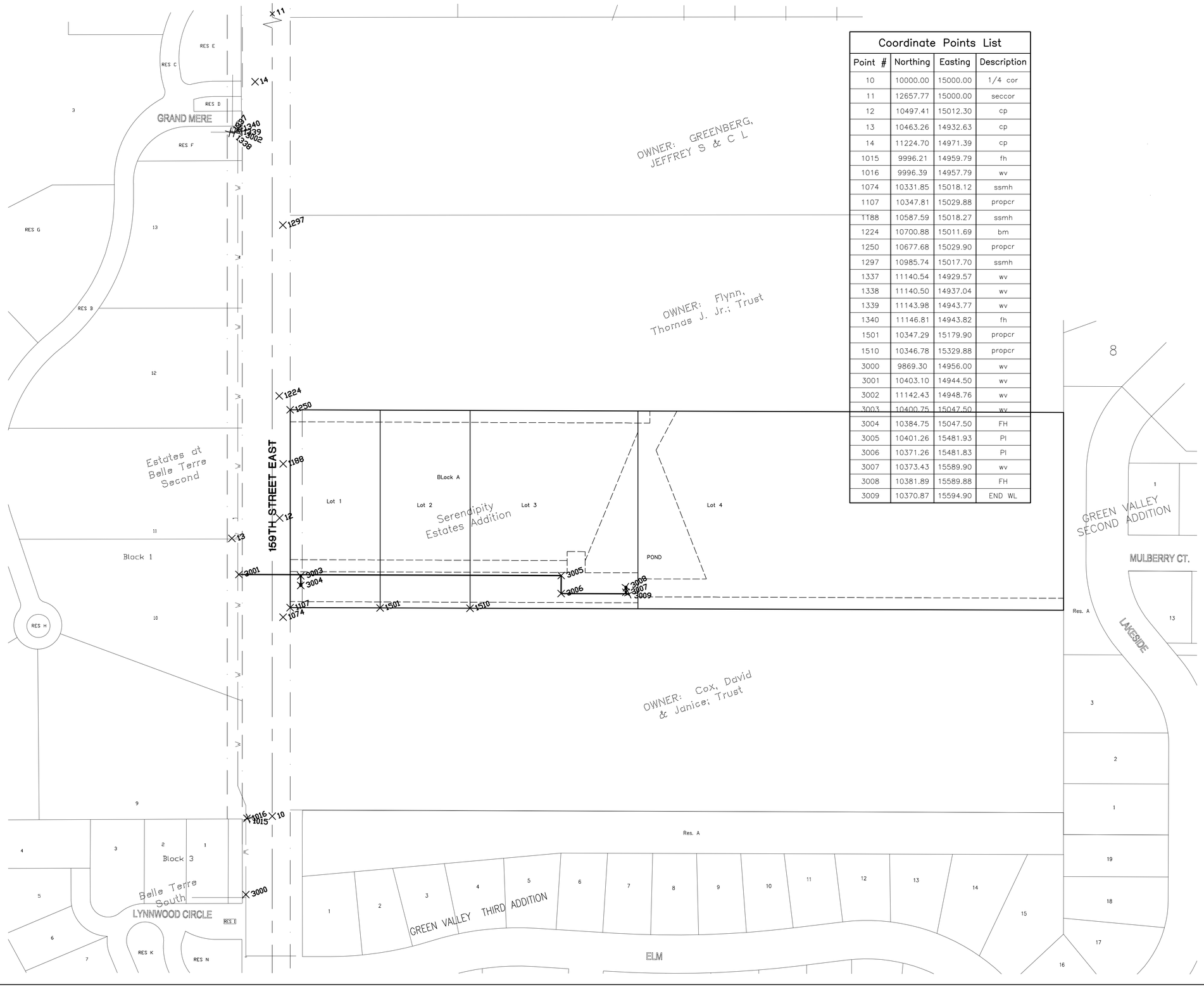
Phone 316/685-4114 ▪ FAX 316/685-4444

No.	Date	By	Approved	Revision



Coordinate Points List

Point #	Northing	Easting	Description
10	10000.00	15000.00	1/4 cor
11	12657.77	15000.00	seccor
12	10497.41	15012.30	cp
13	10463.26	14932.63	cp
14	11224.70	14971.39	cp
1015	9996.21	14959.79	fh
1016	9996.39	14957.79	wv
1074	10331.85	15018.12	ssmh
1107	10347.81	15029.88	propcr
1188	10587.59	15018.27	ssmh
1224	10700.88	15011.69	bm
1250	10677.68	15029.90	propcr
1297	10985.74	15017.70	ssmh
1337	11140.54	14929.57	wv
1338	11140.50	14937.04	wv
1339	11143.98	14943.77	wv
1340	11146.81	14943.82	fh
1501	10347.29	15179.90	propcr
1510	10346.78	15329.88	propcr
3000	9869.30	14956.00	wv
3001	10403.10	14944.50	wv
3002	11142.43	14948.76	wv
3003	10400.75	15047.50	wv
3004	10384.75	15047.50	FH
3005	10401.26	15481.93	PI
3006	10371.26	15481.83	PI
3007	10373.43	15589.90	wv
3008	10381.89	15589.88	FH
3009	10370.87	15594.90	END WL

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)

1 INCH = 80 FT.

NOTE:
Contractor to Field Verify Location of all Existing Utilities Prior to Construction.

LEGEND

- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT

RECORD DRAWING
5-8-09

BENCH MARKS

1. BM "C" in Caster Stamped in South Side of Concrete Drive Southeast of Grand Mere, on East Side of 159th Street East. Elevation 1323.63

No.	Date	By	Approved	Revision

SERENDIPITY ESTATES ADDITION WATERLINE
COORDINATE POINTS LIST
CITY OF ANDOVER, KANSAS
JAMES M. THOMPSON, P.E. - CITY ENGINEER
C.O.W. Proj No. 1358-PPW Index Code 607853

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