

LOCATION MAP

**PRINCIPLES & STANDARDS:**

- All excavations, grading, or filling shall have a finished grade not to exceed a 3:1 slope (33 %). Steeper grades may be approved by the designated official if the excavation is through rock or the excavation or the fill is adequately protected (a designed head wall or toe wall may be required). Retaining walls that exceed a height of four (4) feet shall require the construction of safety guards as identified in the appropriate section(s) of the adopted BOCA Codes and must be approved by the Building Department. Permanent safety guards will be constructed in accordance with the appropriate section(s) of the adopted BOCA Codes.
- Sediment and erosion control plans for sites that exceed 20,000 square feet of grading shall provide for sediment or debris basins, silt traps or filters, staked straw bales or other approved measures to remove sediment from run-off waters. The design to be approved by the Designated Official. Temporary siltation control measures (structural) shall be maintained until vegetative cover is established at a sufficient density to provide erosion control on the site.
- Where natural vegetation is removed during grading, vegetation shall be reestablished in such a density as to prevent erosion. Permanent type grasses shall be established as soon as possible during the next seeding period after grading has been completed.
- When grading operations are completed or suspended for more than 30 days permanent grass must be established at sufficient density to provide erosion control on the site. Between permanent grass seeding periods, temporary cover shall be provided according to the City Engineer's recommendations. All finished grades (areas not to be disturbed by future improvement) in excess of 20% slopes (5:1) shall be mulched and tacked at the rate of 100 pounds per 1,000 square feet when seeded.
- Provisions shall be made to accommodate the increased runoff caused by changed soils and surface conditions during and after grading. Unvegetated open channels shall be designed so that gradients result in velocities of 2 fps (feet per second) or less. Open channels with velocities more than 2 fps and less than 5 fps shall be established in permanent vegetation by use of commercial erosion control blankets or lined with rock rip rap or concrete or other suitable materials as approved by the City Engineer. Detention basins, diversions, or other appropriate structures shall be constructed to prevent velocities above 5 fps.
- The adjoining ground to development sites (lots) shall be provided with protection from accelerated and increased surface water, silt from erosion, and any other consequence of erosion. Run-off water from developed areas (parking lots, paved sites and buildings) above the grade to be developed shall be directed to diversions, detention basins, concrete gutters and/or underground outlet systems. Sufficiently anchored straw bales may be temporarily substituted with the approval of the City Engineer.
- Development along natural watercourses shall have residential lot lines, commercial or industrial improvements, parking areas or driveways set back a minimum of 25 feet from the top of the existing stream bank. The watercourse shall be maintained and made the responsibility of the subdivision trustees or in the case of a site plan by the property owner. Permanent vegetation should be left intact. Variances will include designed stream bank erosion control measures and shall be approved by the City Engineer, FEMA and U.S. Army Corps of Engineers guidelines shall be followed where applicable regarding site development areas designated as flood plains and wetlands.
- All lots shall be seeded and mulched at the minimum rates defined in Appendix A or sodded before an occupancy permit shall be issued except that a temporary occupancy permit may be issued by the Building Department in cases of undue hardship because of unfavorable ground conditions.

**VEGETATIVE ESTABLISHMENT  
For Urban Development Sites  
APPENDIX A**

- Seeding Rates:
- Permanent:  
Tall Fescue - 30 lbs./ac.  
Smooth Brome - 20 lbs./ac.  
Combined Fescue @ 15 lbs./ac. and Brome @ 10 lbs./ac.
- Temporary:  
Wheat or Rye - 150 lbs./ac. (3.5 lbs. per square foot)  
Oats - 120 lbs./ac. (2.75 lbs. per square foot)
- Seeding Periods:  
Fescue or Brome - March 1 to June 1  
Wheat or Rye - August 1 to October 1  
Oats - March 15 to November 1
- Mulch Rates:  
100 lbs. per 1,000 sq. feet (4,356 lbs. per acre)
- Fertilizer Rates:  
Nitrogen 30 lbs./ac.  
Phosphate 30 lbs./ac.  
Potassium 30 lbs./ac.  
Lime 600 lbs./ac. ENM\*
- \* ENM = effective neutralizing material as per State evaluation of quarried rock.

**A SET OF CONSTRUCTION PLANS FOR**

**NISC**

**A TRACT OF LAND BEING PART OF U.S. SURVEY 1782 TOWNSHIP 47 NORTH,  
RANGE 2 EAST OF THE PRINCIPAL MERIDIAN, ST. CHARLES COUNTY, MISSOURI**

**LEGAL DESCRIPTION**

A TRACT OF LAND BEING PART OF U.S. SURVEY 1782, TOWNSHIP 47 NORTH, RANGE 2 EAST OF THE FIFTH PRINCIPAL MERIDIAN, ST. CHARLES COUNTY, MISSOURI BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF "THE ESTATES OF LAKE SAINT LOUIS", A SUBDIVISION ACCORDING TO THE PLAT THEREOF RECORDED IN PLAT BOOK 31, PAGE 238 OF THE ST. CHARLES COUNTY RECORDS, SAID POINT BEING ALSO IN THE WEST LINE OF "BALLANTRAE, PLAT 2" A SUBDIVISION ACCORDING TO THE PLAT THEREOF RECORDED IN PLAT BOOK 34, PAGES 270-273 OF SAID RECORDS; THENCE ALONG SAID WEST LINE OF "BALLANTRAE PLAT 2", SOUTH 00 DEGREES 30 MINUTES 10 SECONDS WEST 1000.00 FEET TO THE NORTH LINE OF LOT 3 OF "LAKE SAINT LOUIS CENTER PLAT ONE", AS RECORDED IN PLAT BOOK 36, PAGE 386 OF SAID RECORDS; THENCE ALONG THE SAID NORTH LINE OF LOT 3, NORTH 89 DEGREES 29 MINUTES 49 SECONDS WEST 1229.11 FEET; THENCE ALONG THE EAST LINE OF COMMON GROUND AS RECORDED IN SAID "LAKE SAINT LOUIS CENTER PLAT ONE", NORTH 00 DEGREES 00 MINUTES 00 SECONDS EAST 1138.78 FEET TO THE SOUTHEAST LINE OF ADJUSTED PARCEL A OF "LAKE SAINT LOUIS PLAT 189" AS RECORDED IN PLAT BOOK 32, PAGE 107 OF SAID RECORDS; THENCE ALONG SAID SOUTHEAST LINE OF ADJUSTED PARCEL A, NORTH 50 DEGREES 39 MINUTES 55 SECONDS EAST 649.43 FEET TO THE SOUTHWEST LINE OF AFORESAID "THE ESTATES OF LAKE SAINT LOUIS"; THENCE ALONG SAID SOUTHWEST LINE, SOUTH 52 DEGREES 39 MINUTES 19 SECONDS EAST 925.21 FEET TO THE POINT OF BEGINNING, CONTAINING 37.000 ACRES.

**GENERAL NOTES:**

- Underground utilities have been plotted from available information and there-fore locations shall be considered approximate only. The verifications of the location of all underground utilities, either shown or not shown on these plans, shall be the responsibility of the contractor and shall be located prior to any grading or construction improvements.
- Gas, water and other underground utilities shall not conflict with the depth or horizontal location of existing or proposed sanitary and storm sewers, including building laterals.
- All existing site improvements disturbed, damaged or destroyed shall be repaired or replaced to closely match pre construction conditions.
- All fill, including places under proposed storm and sanitary sewer lines and paved areas within and off the road right-of-way shall be compacted to 90% of maximum density as determined by the "Standard Proctor Test (ASTM-D-698). All tests shall be verified by a Soils Engineer concurrent with grading and back filling operations. The compacted fill shall be free of rutting and shall be non-yielding and non-pumping during proof rolling and compaction. All trench backfills in paved areas shall be granular fill.
- The contractor shall prevent all storm, surface water, mud and construction debris from entering the existing sanitary sewer system.
- All sanitary sewer flowlines and tops built without elevations furnished by the engineer will be the responsibility of the sewer contractor.
- Easements shall be provided for all public sanitary sewers, storm sewers and utilities on the record plat. See record plat (if required) for location and size of easement.
- All construction and materials shall conform to the current construction standards of the City of Lake St. Louis.
- The City of Lake St. Louis shall be notified at least 48 hours prior to start of construction for coordination and inspection.
- All sanitary sewer building connections have been designed so that the minimum vertical distances from the low point of the basement to the flowline of a sanitary sewer at the corresponding building connection is not less than the diameter of the pipe plus the vertical distance of 2-1/2 feet. (unless otherwise noted)
- All sanitary sewer manholes shall be waterproofed on the exterior in accordance Missouri Dept. Of Natural Resources specifications 10 CSR-8.120(7)(E).
- All PVC sanitary sewer pipe is to be SDR-35 or equal with "clean" 1/2 inch to 1 inch granular stone bedding uniformly graded. This bedding shall extend from 4 inches below the pipe to springline of pipe, immediate back fill over pipe shall consist of same size "clean" or "minus" stone from springline of pipe to 6 inches above the top pipe. (Note: All P.V.C. Force Main shall be C-900, Class 200 P.V.C.)
- All sanitary and storm sewer trench backfills shall be water jetted. Granular back fill will be used under pavement areas.
- All pipes shall have positive drainage through manholes. No flat base structures are allowed.
- Brick shall not be used on sanitary sewer manholes.
- All PVC sanitary sewer pipe shall meet the following standards. A.S.T.M. D-3034 SDR-35 with wall thickness compression joint A.S.T.M. D-3212. An appropriate rubber seal waterstop as approved by the sewer district shall be installed between P.V.C. pipe and masonry structures. (Note: All P.V.C. Force Main shall be C-900, Class 200 P.V.C.)
- All sanitary and storm sewers shall meet all specifications and installation requirements of the local governing authority.
- Storm sewers 18 inch diameter and smaller shall be A.S.T.M. C-14 unless other-wise shown on the plans.
- Storm sewers 21 inch diameter and larger shall be A.S.T.M. C-76, Class II minimum, unless otherwise shown on the plans.
- All storm sewer pipe in the right-of-way shall be reinforced concrete pipe (A.S.T.M. C-76, Class III minimum).
- All storm sewer pipe shall be "O-ring" pipe.
- All water lines shall be laid at least 10 feet horizontally from any sanitary sewer, or manhole. Whenever water lines must cross sanitary sewers, laterals or storm drains the water line shall be laid at such an elevation that the bottom of the water line is 18 inches above the top of the drain or sewer. A full length of water pipe shall be centered over the sewer line to be crossed so that the joints will be equally distant from the sewer and as remote therefrom as possible. This vertical separation shall be maintained for that portion of the water line located within 10 feet, horizontally, of any sewer or drain it crosses.
- All water lines shall be C-900 Class 200 P.V.C.
- The grading yardage shown on these drawings is an approximation only, and not for bidding purposes. The contractor shall verify quantities prior to construction.
- All sanitary sewer laterals shall be a minimum of 6 inches in diameter.
- Seeding should occur as soon as grading is complete. Do not wait to seed the whole development at once at end of project.
- Inspection of erosion control should occur following every rain on a periodic basis throughout construction.
- Topsoil should be stockpiled and reused. Proper erosion control of these stockpiles should include seeding and staking and other means of sediment control such as siltation fence and straw bales.
- All temporary erosion and sediment control practices are to be removed at the end of the project.
- Sediments removed from basins must be removed and allowed to be air dried before being used as fill on-site.

**GRADING NOTES:**

- A Geotechnical Engineer shall be employed by the owner and be on site during grading operations. All soils tests shall be verified by the Geotechnical Engineer concurrent with the grading and back filling operations.
- The grading contractor shall perform a complete grading and compaction operation as shown on the plans, stated in these notes, or reasonably implied there from, all in accordance with the plans and notes as interpreted by the Geotechnical Engineer.
- The Contractor shall notify the Soils Engineer at least two days in advance of the start of the grading operation.
- All areas shall be allowed to drain. All low points shall be provided with temporary ditches.
- A sediment control plan that includes monitored and maintained sediment control basins and/or straw bales should be implemented as soon as possible. No graded area is to be allowed to remain bare over the winter without being seeded and mulched. Care should be exercised to prevent soil from damaging adjacent property and siltling up existing downstream storm drainage system.
- Any existing trash and debris currently on this property must be removed and disposed of off-site.
- Soft soil in the bottom and banks of any existing or former pond sites or tributaries should be removed, spread out and permitted to dry sufficiently to be used as fill. None of this material should be placed in proposed right-of-way locations or on storm sewer locations.
- Site preparation includes the clearance of all stumps, trees, bushes, shrubs, and weeds; the grubbing and removal of roots and other surface obstructions from the site; and the demolition and removal of any man-made structures. The unsuitable material shall be properly disposed of off-site. Topsoil and grass in the fill areas shall be thoroughly disc'd prior to the placement of any fill. The Soils Engineer shall approve the discing operation.
- Compaction equipment shall consist of tamping rollers, pneumatic-tired rollers, vibratory roller, or high speed impact type drum rollers acceptable to the Soils Engineer. The roller shall be designed so as to avoid the creation of a layered fill without proper blending of successive fill layers.
- The Soils Engineer shall observe and test the placement of the fill to verify that specifications are met. A series of fill density tests will be determined on each lift of fill. Interim reports showing fill quality will be made to the Owner at regular intervals.
- The Soils Engineer shall notify the Contractor of rejection of a lift of fill or portion thereof. The Contractor shall rework the rejected portion of fill and obtain notification from the Soils Engineer of its acceptance prior to the placement of additional fill.
- All areas to receive fill shall be scarified to a depth of not less than 6 inches and then compacted in accordance with the specifications given below. Natural slopes steeper than 1 vertical to 5 horizontal to receive fill shall have horizontal benches, cut into the slopes before the placement of any fill. The width and height to be determined by the Soils Engineer. The fill shall be loosely placed in horizontal layers not exceeding 8 inches in thickness and compacted in accordance with the specifications given below. The Soils Engineer shall be responsible for determining the acceptability of soils placed. Any unacceptable soils placed shall be removed at the Contractor's expense.
- The sequence of operation in the fill areas will be fill, compact, verify acceptable soil density, and repetition of the sequence. The acceptable moisture contents during the filling operation are those at which satisfactory dry densities can be obtained. The acceptable moisture contents during the filling operation in the remaining areas are from 2 to 8 percent above the optimum moisture control.
- The surface of the fill shall be finished so that it will not impound water. If at the end of a days work it would appear that there may be rain prior to the next working day, the surface shall be finished smooth. If the surface has been finished smooth for any reason, it shall be scarified before proceeding with the placement of succeeding lifts. Fill shall not be placed on frozen ground, nor shall filling operations continue when the temperature is such as to permit the layer under placement to freeze.
- All siltation control devices shall be inspected by the contractor after any rain of 1/2" or more with any appreciable accumulation of mud to be removed and siltation measures repaired where necessary.
- No slope shall be steeper than 3(Horizontal):1(Vertical). All slopes shall be sodded or seeded and mulched.
- Fill and back fill shall be compacted to the criteria specified in the following table:

CATEGORY	MINIMUM PERCENT COMPACTION %
Fill in building areas below footings	95 %
Fill under slabs, walks, and pavement	95 %
Fill other than building areas	90 %
Natural sub grade	90 %
Pavement sub grade	90 %
Pavement base course	90 %

Measured as a percent of the maximum dry density as determined by Standard Proctor Test (ASTM-D-698). Moisture content must be within 2 percent below or 4 percent above optimum moisture content if fill is deeper than 10 feet.

18. Any contaminated soil encountered during excavation shall be hauled and placed as directed by the owners environmental engineering representative.

**U.S.G.S BENCHMARKS**

REFERENCE BENCHMARK ELEVATION 526.16 NVD029 (USGS) DATUM  
CHISELED SQUARE ON THE SOUTHEAST WINGWALL OF THE LAKE SAINT LOUIS  
BOULEVARD BRIDGE OVER THE SPILLWAY OF LAKE SAINT LOUIS

SITE BENCHMARK ELEVATION 537.65  
OLD IRON ROD AT THE NORTHWEST PROPERTY CORNER.

**STANDARD SYMBOLS & ABBREVIATIONS**

TREE OR BUSH	○
LIGHT POLE	☆
SANITARY SEWER & MANHOLE	—○—
STORM SEWER & INLET	—○—
MAILBOX	□
ELECTRIC LINE	—E—
GAS LINE	—G—
WATER LINE	—W—
TELEPHONE LINE	—T—
CABLE TV LINE	—CATV—
OVERHEAD WIRE	—OHW—
UTILITY POLE	○
UTILITY POLE W/ DOWN GUY	○
FIRE HYDRANT	⊕
WATER VALVE	⊕
WATER METER	⊕
GAS VALVE	⊕
ROAD SIGN	⊕
TELEPHONE PEDESTAL	⊕
FENCE	—X—

**DEVELOPMENT NOTES:**

- Area of tract: 37.0 Acres
- Existing Zoning: BUSINESS PARK
- Proposed Use: OFFICE SPACE
- Area of Buildings: 119,805 SQ. FT.
- The required height and building setbacks are as follows:
 

Minimum Front Yard:	50 Feet
Minimum Side Yard:	15 Feet
Minimum Rear Yard:	30 Feet
Maximum Building Height:	70 Feet
- The required parking setbacks are as follows:
 

Minimum Front Yard:	25 Feet
Minimum Side Yard:	10 Feet
Minimum Rear Yard:	10 Feet
- Parking Calculations: Spaces Required = 1/250 sq.ft. office space = 540 spaces  
Spaces Provided = 401 INCLUDING 9 HANDICAP SPACES
- Loading Calculations: Required = 2 - Spaces Provided = 2
- According to the flood insurance rate map of the City of Lake St. Louis, Missouri (Community Panel Number 290865-0220-E dated August 2, 1996), this property lies within zone X. Zone X is defined as an area of minimum flood hazard.
- Property is served by the following utility companies:
 

Cuivre River Electric	1-800-392-3709
Centurytel Telephone Company	636-332-7199
St. Charles Gas Company	636-946-8937
St. Charles County Public Water Supply District #2	636-561-3737
- Site Coverage Calculations:
 

Building -	55,387.86 s.f.
Pavement -	1,322,519.99 s.f.
	2,331,822.15 s.f.
- Lighting shown by others.

**SHEET INDEX**

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SHEET C9	SEDIMENT EROSION CONTROL PLAN
SHEET C10	SEDIMENT EROSION DETAILS
SHEET C11	SEDIMENT EROSION DETAILS
SHEET C12	OFFSITE WATER PLAN



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No.	Date	Description
02-13-04		FND/STRU STEEL Pkg
3-17-04		LAKE ST. LOUIS COMMENTS/STORM
4-23-04		ENTRANCE CHANGES/PVMT
4-26-04		FIRE SIZE/LOCATION
5-5-04		ELEV. CHANGES PER ARCH.

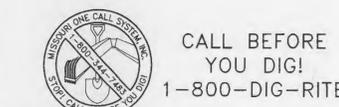
Project Number: **03-880-02**

Sheet Title:  
**Cover Sheet**

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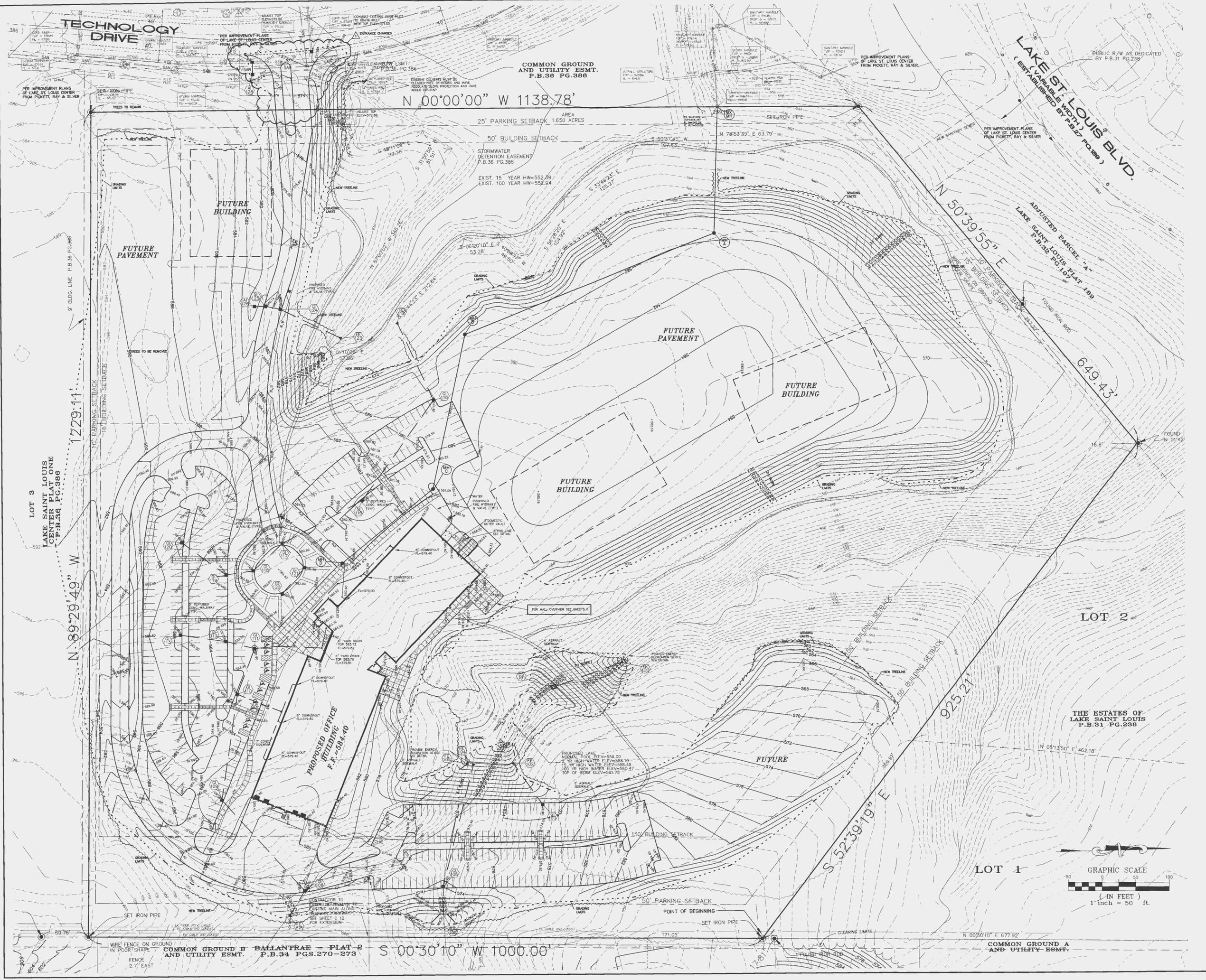
**C1**

Sheet Number: 1 Of 12



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No.	Date	Description
	02-13-04	FND/STRU STEEL PKG
	3-17-04	LAKE ST. LOUIS COMMENTS/STORM
	4-23-04	ENTRANCE CHANGES/PWMT
	4-26-04	FIRE SIZE/LOCATION
	5-5-04	ELEV. CHANGES PER ARCH.

Project Number: 03-880.02

Sheet Title:

Grading Plan

**C3**

Sheet Number: 3 Of 12



LOT 1

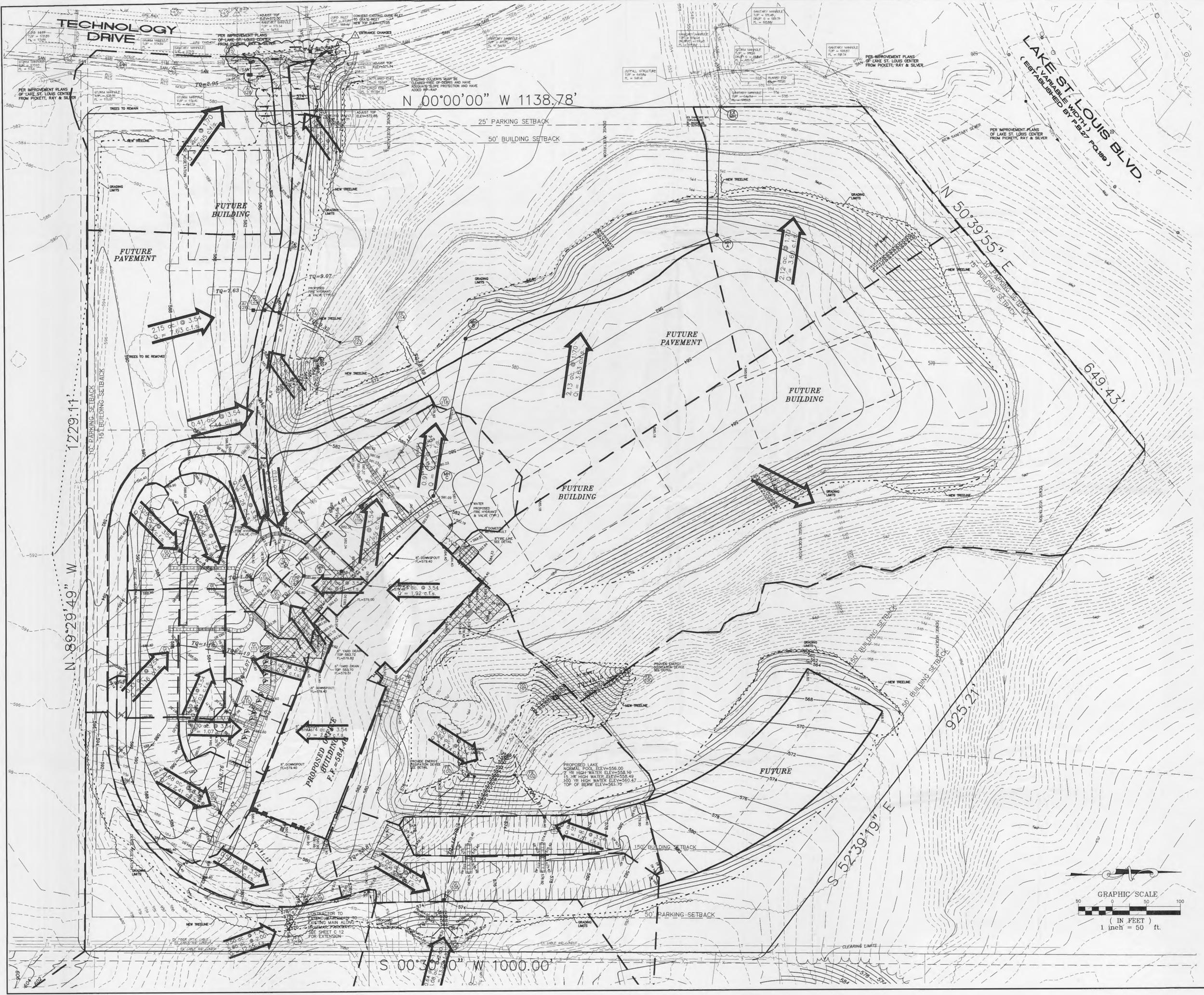
LOT 2

THE ESTATES OF LAKE SAINT LOUIS  
P.B.31 PG.238

COMMON GROUND AND UTILITY ESMT.  
P.B.36 PG.386

COMMON GROUND H BALLANTRAE - PLAT 2  
AND UTILITY ESMT. P.B.34 PGS.270-273

COMMON GROUND A  
AND UTILITY ESMT.



**THIS SHEET FOR DRAINAGE PURPOSES ONLY, NOT FOR USE AS CONSTRUCTION PLANS**

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No	Date	Description
02.13.04		FND/STRU STEEL PKG
3-17-04		LAKE ST. LOUIS COMMENTS/STORM
4-23-04		ENTRANCE CHANGES/P/WT
4-26-04		FIRE SIZE/LOCATION
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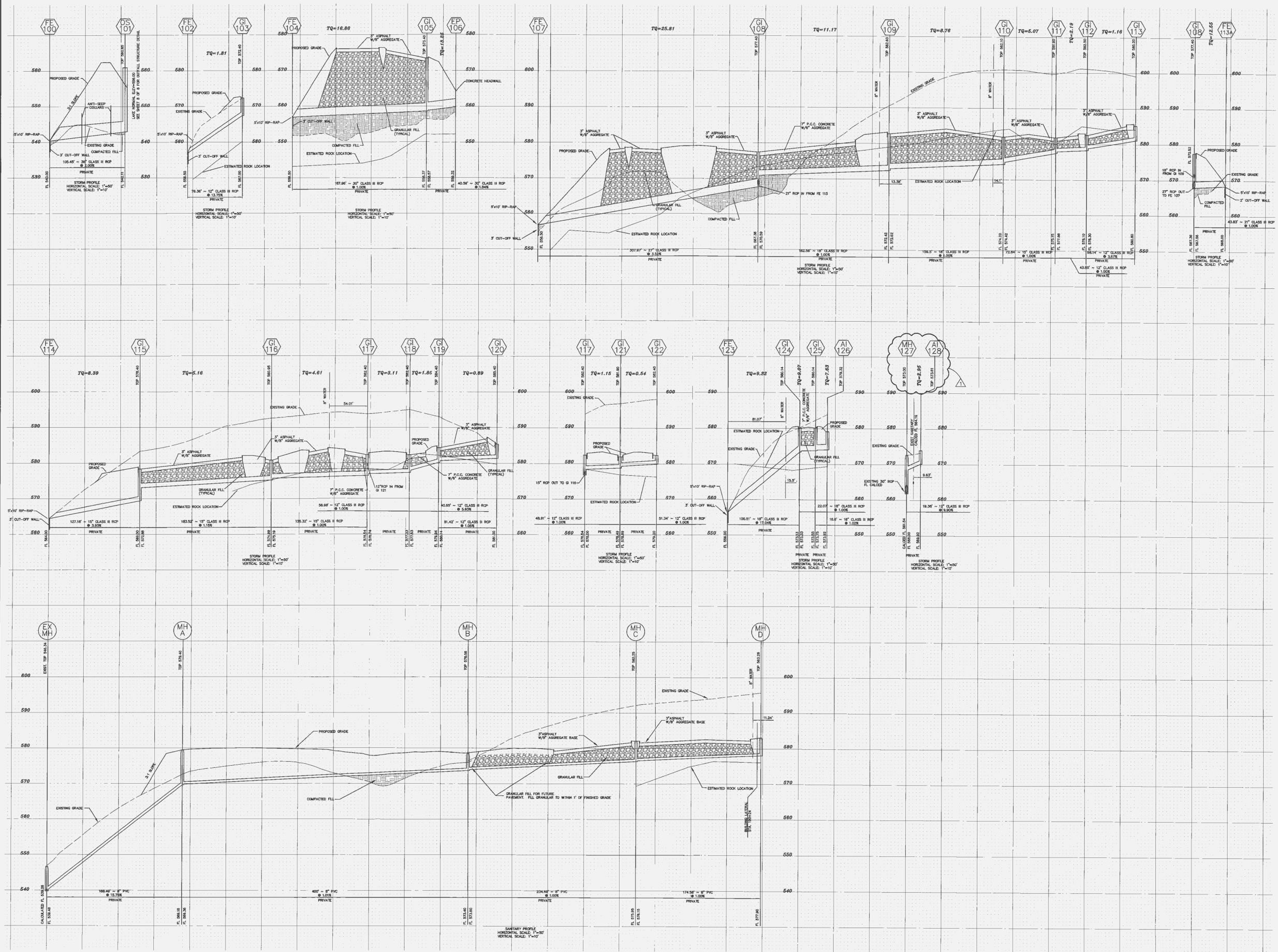
Project Number: **03-880-02**

Sheet Title:  
**Drainage Area Map**

**C4**

Sheet Number: **4** Of **12**





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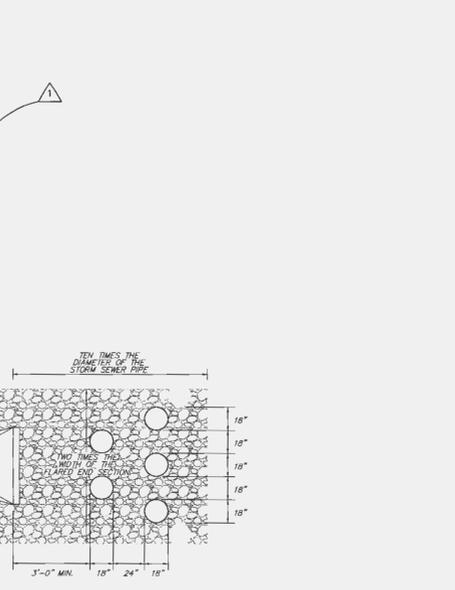
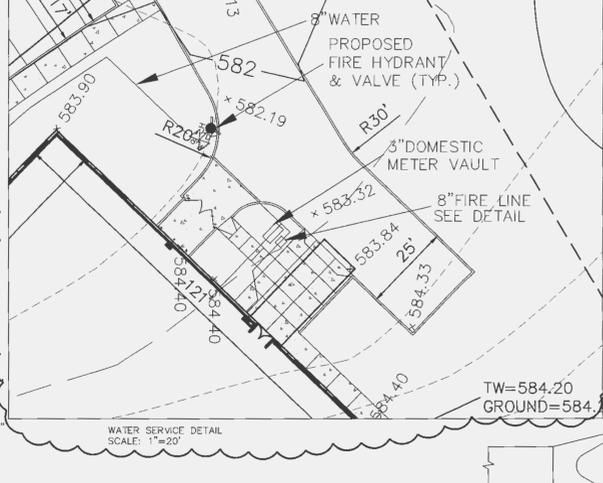
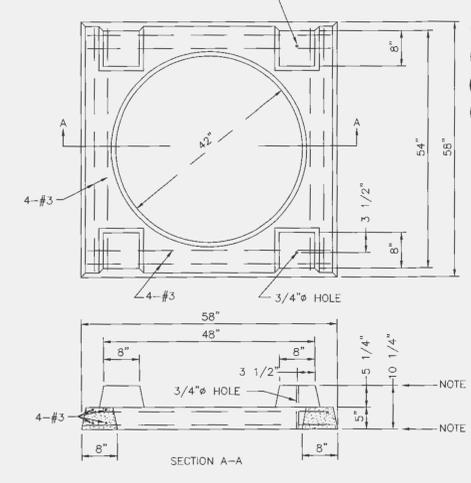
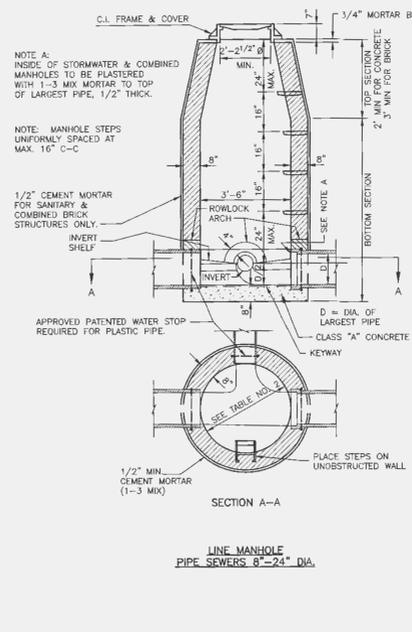
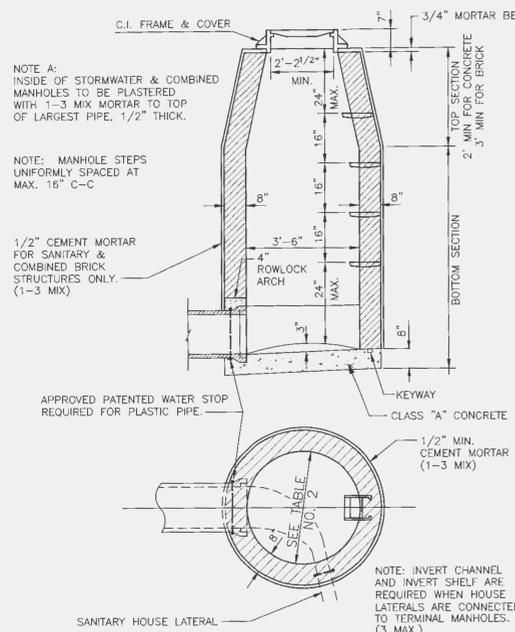
No.	Date	Description
02.13.04		FND/STRU STEEL PKG
3-17-04		LAKE ST. LOUIS COMMENTS/STORM
4-23-04		ENTRANCE CHANGES/PVMT
4-26-04		FIRE SIZE/LOCATION
5-5-04		ELEV. CHANGES PER ARCH.

Project Number: 03-680.02

Sheet Title:  
Profile Sheet

**C5**

Sheet Number: 5 Of 12



ROUND PIPE				HORIZONTAL ELLIPTICAL PIPE			
Inside Diameter of Pipe (Inches)	Payline Width of Trench (Inches)	Payline Width of Trench (Feet)	Pay-volumes (cu. ft. per ft. of Pipe)	Inside Diameter of Pipe (Inches)	Payline Width of Trench (Inches)	Payline Width of Trench (Feet)	Pay-volumes (cu. ft. per ft. of Pipe)
4	28	2.33	3.20				
6	28	2.33	3.46				
8	28	2.33	3.70				
10	28	2.33	3.86				
12	28	2.33	3.98				
15	32	2.67	4.89				
18	35	2.92	5.63	14 X 23	41	3.42	5.94
21	39	3.25	6.51				
24	42	3.50	7.39	19 X 30	49	4.08	7.68
27	45	3.75	8.18	22 X 34	53	4.42	8.61
30	49	4.08	9.30	24 X 38	58	4.83	9.70
33	53	4.42	10.53	27 X 42	62	5.17	10.71
36	56	4.67	11.43	29 X 45	66	5.50	11.72
39	60	5.00	12.43	32 X 49	71	5.92	13.14
42	63	5.25	13.38	34 X 53	75	6.25	14.05
48	70	5.83	15.67	38 X 60	83	6.92	16.18
54	77	6.42	18.15	43 X 68	92	7.67	18.81
60	84	7.00	20.73	48 X 76	101	8.42	21.59
66	91	7.58	23.45	53 X 83	109	9.08	24.35
72	98	8.17	26.37	58 X 91	118	9.83	27.45
78	105	8.75	29.39	63 X 98	126	10.50	30.50
84	112	9.33	32.57	68 X 106	135	11.25	33.91
90	119	9.92	35.90	72 X 113	143	11.92	36.99
96	126	10.50	39.37	77 X 121	152	12.67	40.69
102	133	11.08	42.99	82 X 128	160	13.33	44.45
108	140	11.67	46.75	87 X 136	168	14.00	47.79
114	147	12.25	50.66	92 X 143	176	14.67	51.70
120	154	12.83	54.72	97 X 151	185	15.42	56.01
126	161	13.42	58.92	102 X 158	193	16.18	60.84
132	168	14.00	63.27	106 X 166	202	16.83	66.49
144	182	15.17	72.40	116 X 180	218	18.17	73.59

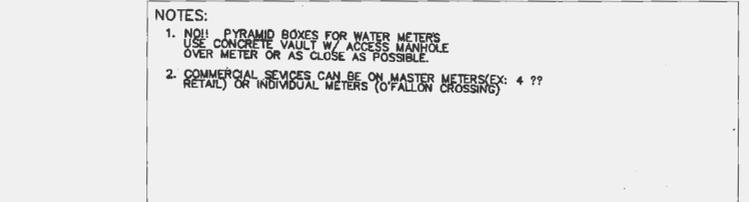
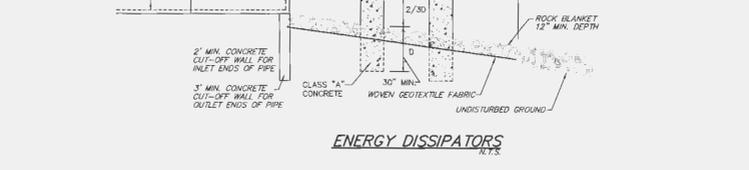
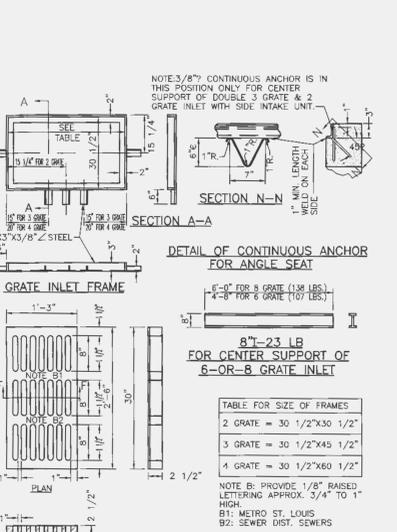
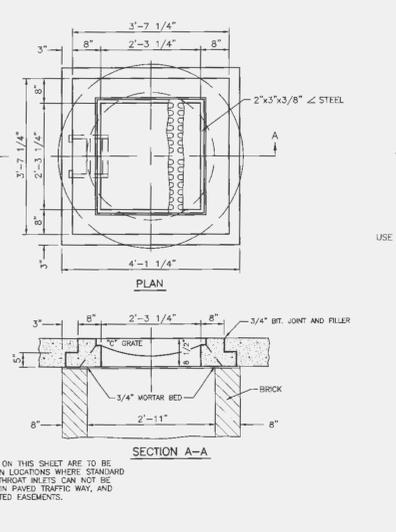
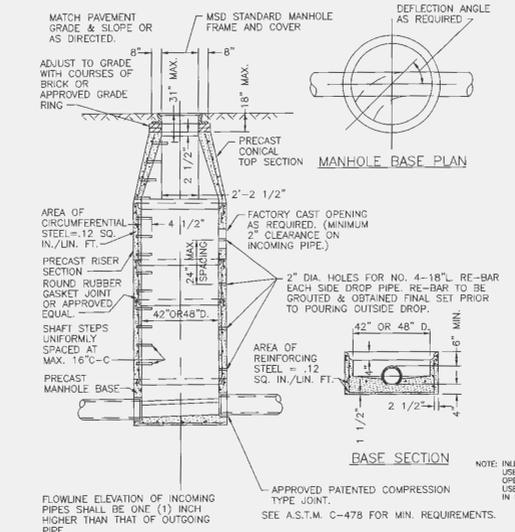
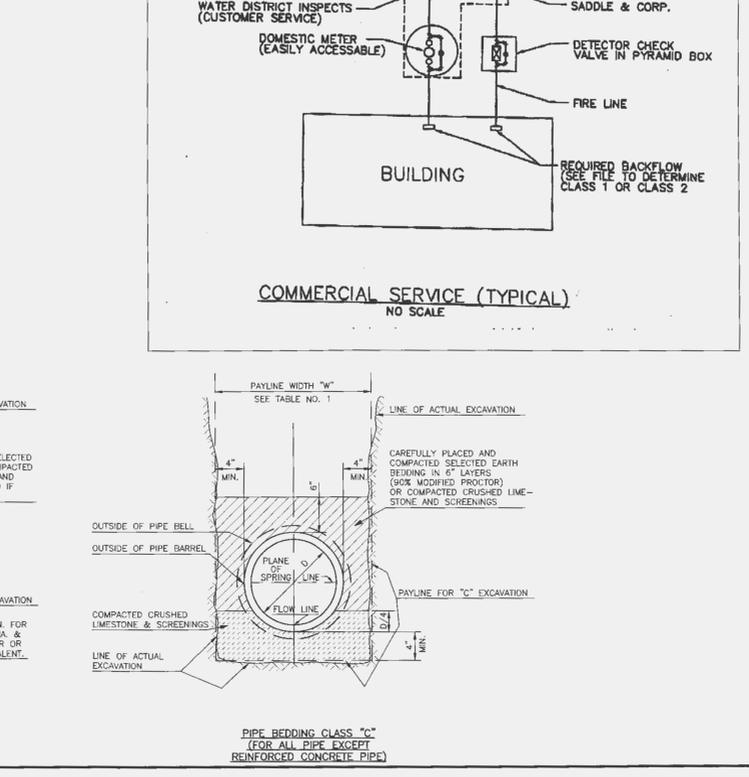
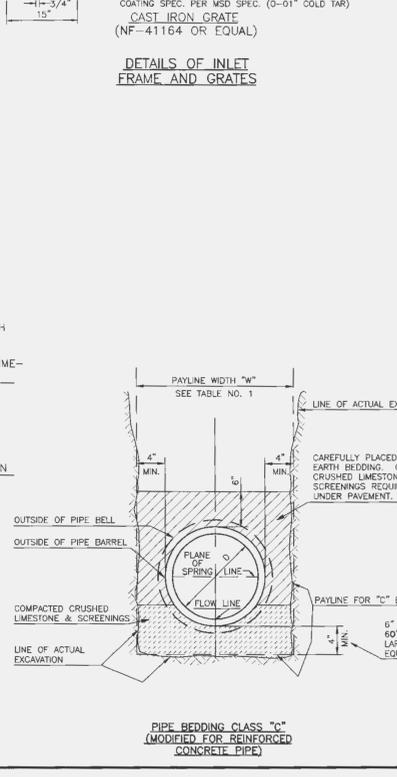
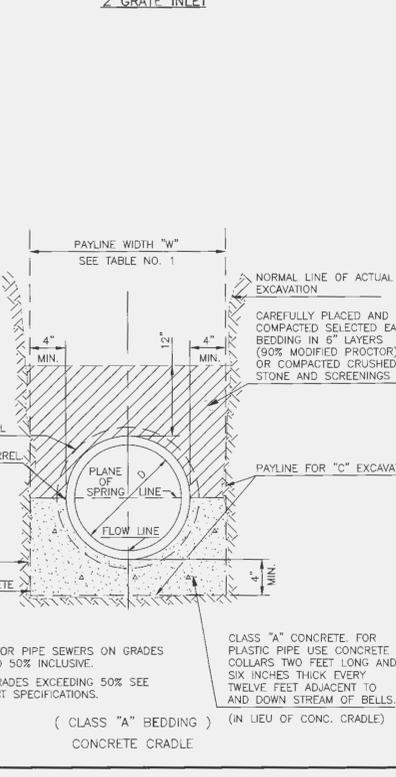
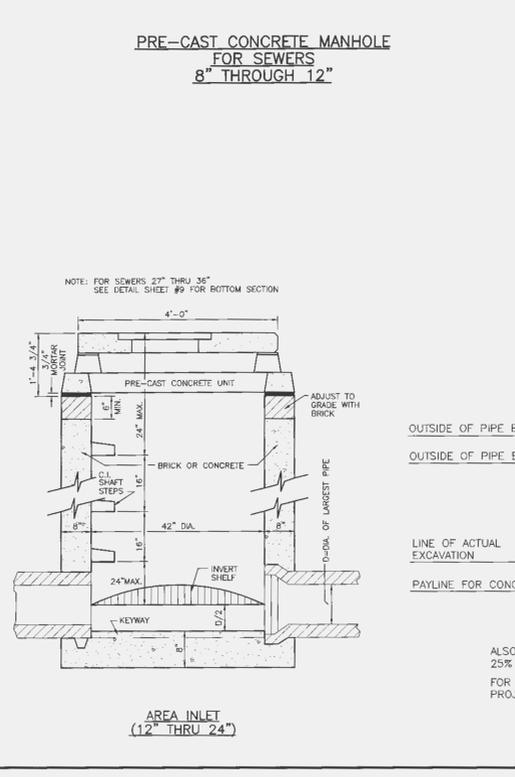
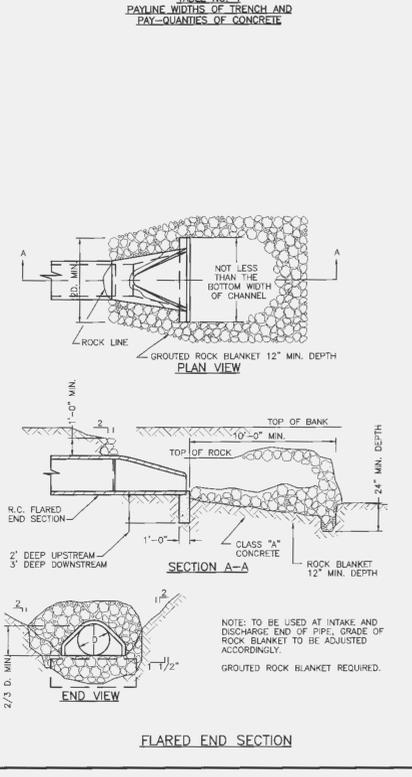
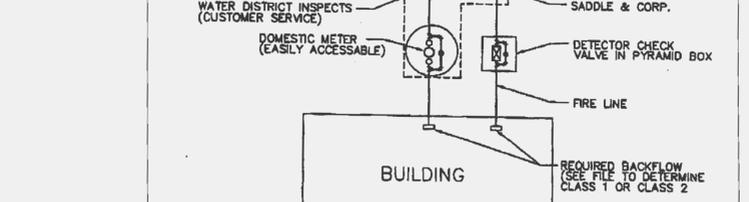


TABLE FOR SIZE OF FRAMES
2 GRATE = 30 1/2"x30 1/2"
3 GRATE = 30 1/2"x45 1/2"
4 GRATE = 30 1/2"x60 1/2"



**NISC**  
Technology Boulevard  
Lake St. Louis, Missouri 63367

ARCHITECT:  
  
1910 PINE  
ST. LOUIS MO 63103  
314 231 3838  
FAX 314 231 9801

GENERAL CONTRACTOR:  
PARCO  
1401 SCARLETT SPRINGS PLACE, SUITE 200  
OFallon, MO 63308  
TEL: (636) 961-9900  
FAX: (636) 961-9901

CIVIL ENGINEER:  
B&K ENGINEERING CO. INC.  
1928 CLAYBANK DRIVE  
ST. PETERS, MISSOURI 63376  
TEL: (636) 928-5622  
FAX: (636) 928-1118

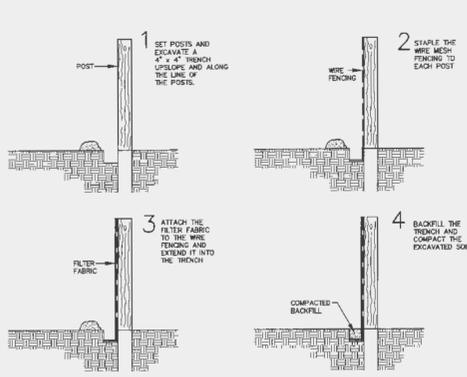
STRUCTURAL ENGINEER:  
MERRILL GAMBERRY ENGINEERING INC.  
740 GRAND ROAD, SUITE 304  
ST. LOUIS, MISSOURI 63144  
TEL: (314) 991-7910  
FAX: (314) 991-4887

MEDICAL & PLUMBING ENGINEER:  
JONKILL  
4508 NORTH TRIM NORTH  
EARTH CITY, MISSOURI 63045  
TEL: (636) 261-0100  
FAX: (636) 261-5803

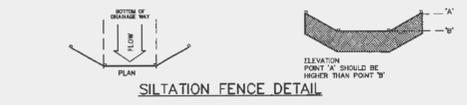
FIRE PROTECTION ENGINEER:  
BI STATE FIRE PROTECTION  
2015 HUNTER LANE  
ST. CHARLES, MISSOURI 63301  
TEL: (636) 928-0100  
FAX: (636) 946-6172

ELECTRICAL ENGINEER:  
S&C-ELECTRIC  
1521 LAMAR MISSOURI ROAD  
ST. LOUIS, MISSOURI 63106  
TEL: (636) 362-2000  
FAX: (636) 680-0501

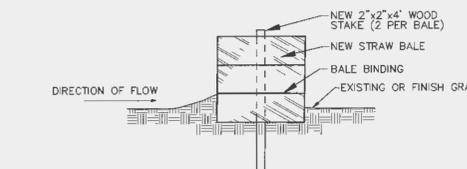
No. Date Description  
**02.13.04 FND/STRU STEEL PKG**  
3-17-04 LAKE ST. LOUIS COMMENTS/STORM  
4-23-04 ENTRANCE CHANGES/PVMT  
4-26-04 FIRE SIZE/LOCATION  
5-5-04 ELEV. CHANGES PER ARCH.  
Project Number: **03-880.02**  
Sheet Title:  
**Detail Sheet**  
Sheet Number: **6** Of **12**



1. FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.  
 2. SHOULD THE FABRIC BECOME DAMAGED OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USEFUL LIFE AND THE BARRIER STILL BE NECESSARY, THE FABRIC SHALL BE REPLACED PROPERLY.  
 3. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY HALF THE HEIGHT OF THE BARRIER.  
 4. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEED.

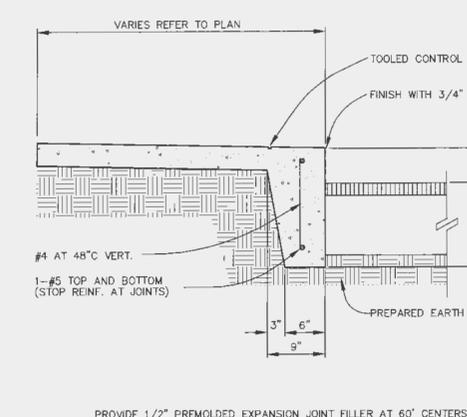


**SILTATION FENCE DETAIL**  
NOT TO SCALE

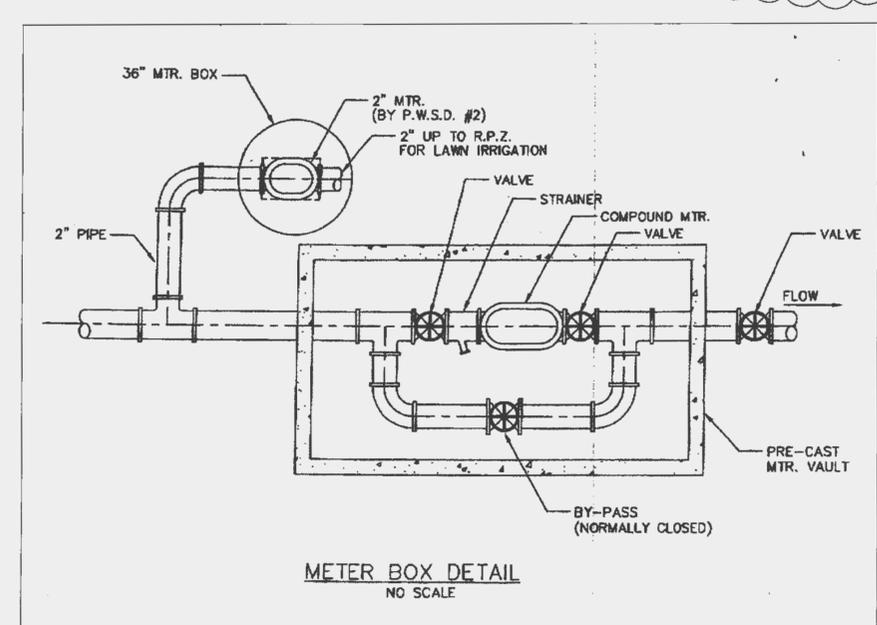


**NOTES:**  
 1. STRAW BALES, NOT HAY BALES SHALL BE USED.  
 2. BUTT ENDS OF BALES TIGHTLY TOGETHER.  
 3. INSTALL BALES WITH BINDING AROUND SIDES, NOT TOP AND BOTTOM.  
 4. FILL ANY GAP BETWEEN BALES BY WEDGING LOOSE STRAW BETWEEN THEM.

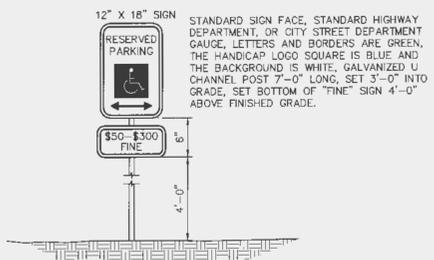
**SEDIMENT BARRIER**  
NOT TO SCALE



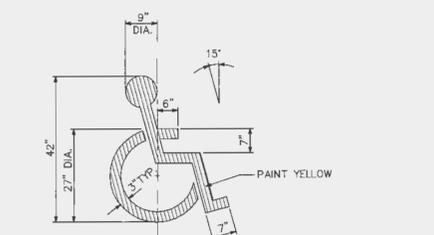
**TURNDOWN CONCRETE WALK**  
NOT TO SCALE



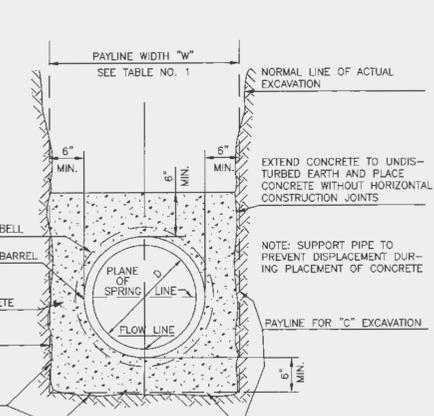
**METER BOX DETAIL**  
NO SCALE



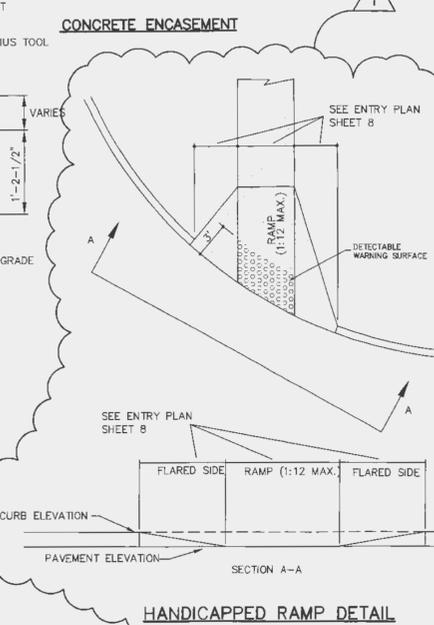
**HANDICAP PARKING SIGN**  
NOT TO SCALE



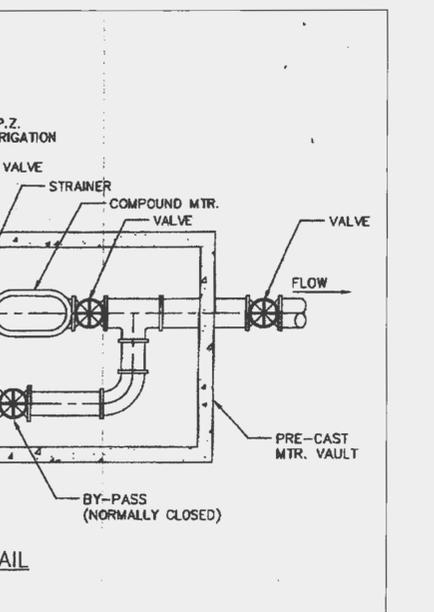
**PAINTED HANDICAPPED PARKING SYMBOL**  
NOT TO SCALE



**CONCRETE ENCASEMENT**  
NOT TO SCALE



**HANDICAPPED RAMP DETAIL**  
NOT TO SCALE



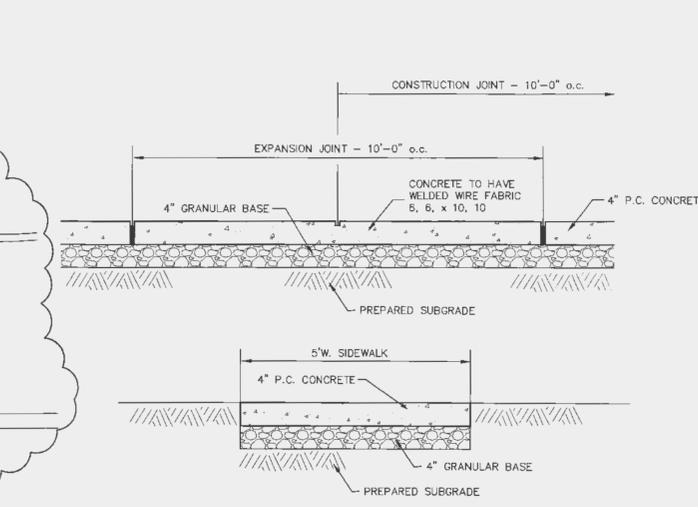
**PIPE BOLLARD DETAIL**  
NOT TO SCALE

## INSTALLATION OF WATER MAINS

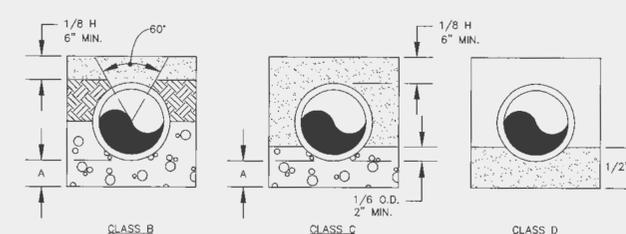
"ALWAYS KEEP THE WATER MAIN ON EASEMENT"

- Water main should be located 6' behind the curb, as not to interfere with other utility locations.
- All water mains should be 8 inches in diameter, the last 300' can be 6" diameter pipe. The pipe should have a Minimum Pressure Rating (PR) of 200 or SDR-21. All water mains of PVC materials shall be certified by NSF (National Sanitation Foundation) and listed in NSF Standard 61 (certified drinking water system components). Missouri DNR requires that any product which comes in contact with drinking water be listed in NSF Standard 61. If the pipe is NSF certified, it will have a stamp on the pipe that says "NSF-pw".
- Fire hydrants must be Mueller Steamer Centurion and painted yellow in color and all valves must be Mueller mechanical joint resilient wedge gate valve.
- All fire hydrants are to have valves flanged to the tee and (with a total length of 38" or less) hydrant swivel anchored to the valve. Clean 1" rock should be used to backfill above the weep holes of the fire hydrant.
- The contractor shall place all fire hydrants between 1.5 (1-1/2) feet and three feet (3') from the street curb (measured from the edge of the fire hydrant).
- These water bands (45 degree, 22-1/2 degree, 11-1/4 degree), are to be made with mechanical joint fittings using mega lugs. Ninety degree (90°) bends are not allowed. The first slip joint, up and down stream after fittings, should be restrained per pipe manufacturer specs.
- Tees, 4-ways, etc. shall have concrete blocking. Concrete not to be on nuts or bolts.
- Rocky soils shall require bedding 6" under and 6" over water pipe.
- Concrete encasement require; to DNR Specification, when crossing storm or sanitary sewers. Sanitary: vertical is 18", horizontal is 10" - Storm: vertical is 12", horizontal is 3".
- Must use appropriate sized casings when crossing streets.
- Must attach coated solid core, 12 gauge tracer wire, taped to the top of the pipe. All wire must run up the outside of the valve box and come up inside the valve box under the water lid.
- Use 3M waterproof splice kits for all splicing of tracer wire.
- Any project with over 1500' of pipe should use the 2500' role of tracer wire to eliminate splicing.
- Coliform samples should be collected every 1,200'.
- Final Pressure Test: The water main must be pumped up to 125 PSI and maintain this pressure for one hour without any drop in pressure.
- Gas, water, and other underground utilities shall not conflict with the depth or horizontal location of existing and proposed sanitary and storm sewers including house laterals.
- All waterline construction shall conform to current City of Lake St. Louis and Public Water District #2 Standards and Specifications.
- The contractor shall place the "steamer" outlet of the fire hydrant toward the street.
- Backfill no debris larger than 6" in diameter.
- All creek crossings will require ductile iron pipe. If less than 3' of cover, concrete encasement with rip-rap required.
- Hydrant distances: 600'/300' - Residential/Commercial pending.
- Easements shall be provided for water mains, and all utilities on the record plat. See record plat for location size, and width of easements.
- The St. Charles Public Water District #2 shall be notified at least 48 hours prior to construction of water mains for coordination and inspections.
- All open mains should be properly capped when the main is unattended for more than 4 hours. Duct tape the end closed so it is visually seen.
- All bore casings, except service lines, shall have a casing spacer every 10'.
- All service lines under the streets are to have a 2" PVC casing installed, at a minimum of 30" depth.

NOTE: 24 HOUR NOTICE REQUIRED ON ALL INSPECTIONS



**CONCRETE SIDEWALK DETAIL**  
NOT TO SCALE



**LEGEND**  
 I.D. - NOMINAL PIPE SIZE  
 O.D. - OUTSIDE DIAMETER OF PIPE  
 H - COVER ABOVE TOP OF PIPE  
 A - EMBEDMENT BELOW PIPE (SEE TABLE)

**TABLE OF EMBEDMENT DEPTHS, BELOW PIPE**

I.D.	A MIN. SOIL	A MIN. ROCK
27" & SMALLER	3"	6"

CLASS B  
CLASS C  
CLASS D  
FLAT BOTTOM TRENCH WITH BELL HOLES AND HAND PLACED EMBEDMENT

GRANULAR BEDDING SHALL BE CRUSHED ROCK OR PEA GRAVEL WITH NOT LESS THAN 95% PASSING 1/2" (85% PASSING 3/4" FOR 30" AND LARGER PIPE) AND NOT LESS THAN 95% RETAINED ON A #4; TO BE PLACED IN NOT MORE THAN 6" LAYERS AND COMPACTED BY SLICING WITH A SHOVEL OR VIBRATOR.

COMPACTED BACKFILL SHALL BE FINELY DIVIDED JOB EXCAVATED MATERIAL FREE FROM DEBRIS, ORGANIC MATERIAL AND STONES, PLACED IN UNIFORM LAYERS NOT MORE THAN 6" THICK, COMPACTED TO 95% MAXIMUM DENSITY AS DETERMINED BY A.S.T. D698, OR GRADED AGGREGATE. GRANULAR BACKFILL MATERIAL MAY BE SUBSTITUTED FOR ALL OR PART OF COMPACTED BACKFILL.

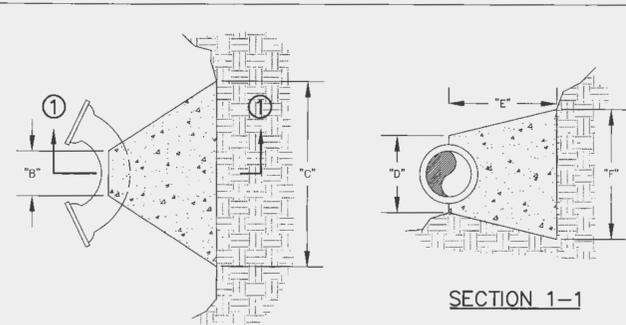
TAMPED BACKFILL SHALL BE FINELY DIVIDED JOB EXCAVATED MATERIAL FREE FROM DEBRIS, ORGANIC MATERIAL AND STONES, HAND PLACED IN UNIFORM LAYERS NOT MORE THAN 8" THICK AND TAMPED AROUND CONDUIT PIPE. GRANULAR BACKFILL MATERIAL MAY BE SUBSTITUTED FOR ALL OR PART OF TAMPED BACKFILL.

TRENCH BACKFILL SHALL BE AS REQUIRED IN THE "LAYING AND BACKFILL" SECTION OF THE DETAILED SPECIFICATIONS.

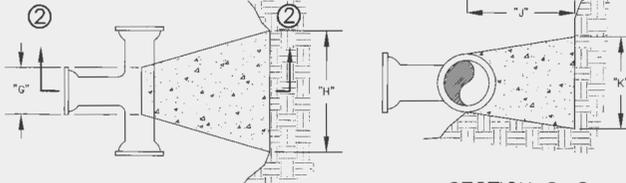
EMBEDMENT THE TYPE OF EMBEDMENT TO BE USED SHALL BE AS SPECIFIED IN THE PLANS AND SPECIFICATIONS.

TRACER WIRE REQUIRED ON ALL WATER MAINS

## WATER MAIN EMBEDMENT



**SECTION 1-1**



**SECTION 2-2**

BENDS	"B"	"C"	"D"	"E"	"F"
6"-11 1/4"	8"	15"	12"	24"	10"
6"-22 1/2"	8"	19"	12"	24"	13"
6"-45"	8"	30"	12"	24"	14"
6"-90"	8"	30"	12"	24"	27"
8"-11 1/4"	8"	20"	12"	24"	10"
8"-22 1/2"	8"	22"	12"	24"	17"
8"-45"	8"	30"	12"	24"	24"
8"-90"	8"	38"	12"	24"	36"
12"-11 1/4"	8"	30"	12"	24"	15"
12"-22 1/2"	8"	35"	12"	24"	25"
12"-45"	8"	40"	12"	24"	40"
12"-90"	8"	60"	12"	24"	52"

TEES	"C"	"H"	"J"	"K"
6"x6"x6"	12"	24"	24"	18"
8"x8"x8"	12"	24"	24"	18"
8"x8"x8"	12"	24"	24"	24"
12"x12"x6"	12"	24"	24"	18"
12"x12"x8"	12"	24"	24"	24"
12"x12"x12"	12"	36"	24"	36"

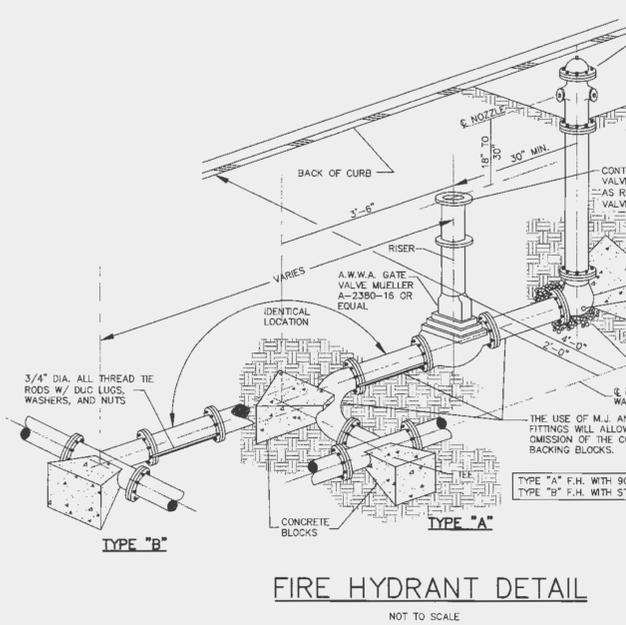
CUBIC FEET OF CONCRETE REQUIRED	BEND	11 1/4"	22 1/2"	45"	90"
6"	1.7	2.4	3.5	5.5	
8"	2.1	3.1	5.0	8.5	
12"	3.7	5.9	9.7	17.5	

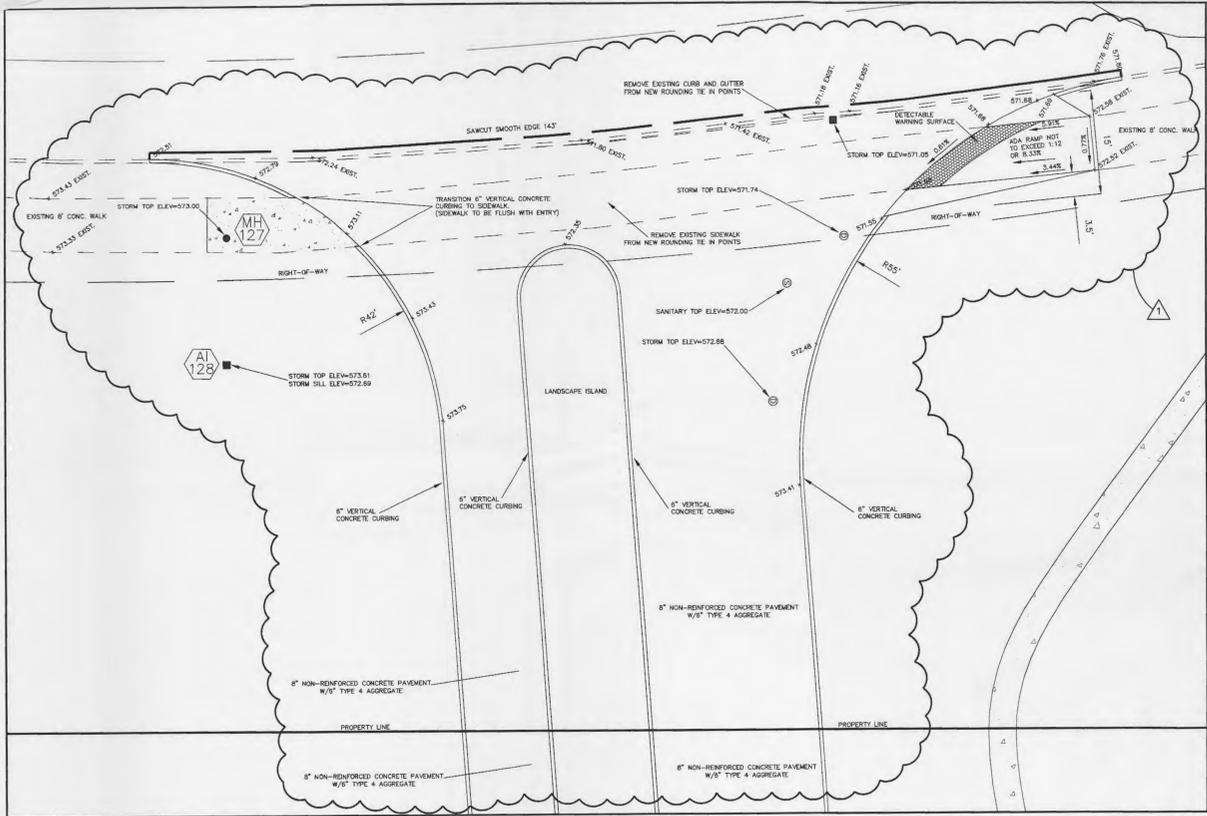
TEE X	6"	8"	12"	PLUG
1. 2" & 4" FITTINGS EQUIVALENT TO 6" FITTINGS.	40	~	~	4.0
2. TAPPING SLEEVES TO HAVE BACKING BLOCKS SAME SIZE AS REQUIRED FOR TEES.	40	5.0	~	5.0
	40	5.5	10.5	10.5

## BACKING BLOCKS

NOT TO SCALE



**FIRE HYDRANT DETAIL**  
NOT TO SCALE



ENTRANCE DETAIL

SCALE: 1"=10'

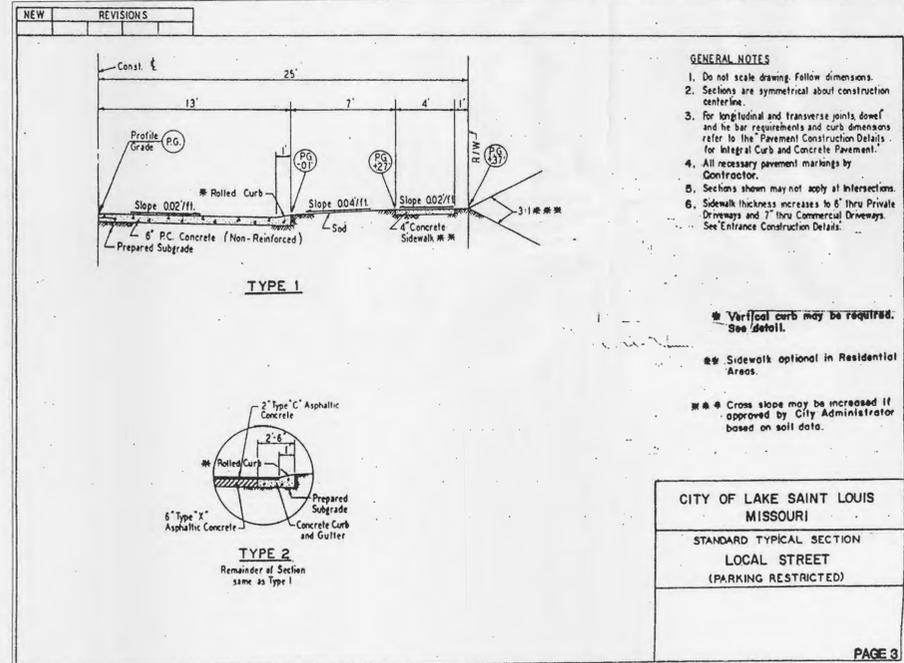
NOTE: ALL SPOTS TO TOP OF PAVEMENT.

MAX PROJECT NAME: NISC  
 MAX PROJECT NO.: 01-11548  
 DESIGN DATE: 4-12-04  
 DESIGNED BY: BMR  
 12 YEAR HYDROLOGIC

SUBMITTED: 4-12-04 FILENAME: 11548

USER STR	LOW STR	L	DIA	UPPER FL LN	LOWER FL LN	PS	UPPER ST EL	DEPTH HY GR	UPPER HY EL	LOWER HY EL	HYDR GRADE	FR HEAD	VEL HEAD	VEL LOSS	LOSS LOSS	LOSS LOSS	TURN LOSS	CURVE LOSS	STR LOSS	INT. CAP	DR LOSS	PT LOSS	Q	TQ	PT/PC CAP	REMARKS	
OS101	FL100	105	36	542.11	540.00	2.01	560.65	0.84	559.81	558.49	-0.00540	0.57	6.96	0.75	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.22	94.55	1	HW=558.49
G1103	FE102	76	12	567.00	556.50	13.75	572.40	5.16	567.24*	558.49	-0.00260	0.20	2.30	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.81	13.21	2	HW=558.49
FE106	GI105	41	30	559.32	558.57	1.85	563.04	1.82	561.22	561.07	-0.00100	0.04	2.70	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.25	55.76	3	HW=558.49
FE104	GI105	188	30	556.37	556.50	0.99	573.00	13.53	559.47*	558.49	-0.00170	0.32	3.43	0.18	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.86	40.91	4	HW=558.49
FE113A	GI108	44	21	568.00	567.56	1.00	569.75	-0.25	570.00	569.31	-0.00630	0.27	5.22	0.42	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.55	15.88	5	
GI112	GI111	44	12	578.10	577.66	1.00	587.78	8.83	578.95	578.66	-0.00380	0.17	2.79	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.19	3.56	6	
GI111	GI110	73	15	575.15	574.42	1.00	582.57	5.54	577.03	578.36	-0.00620	0.45	4.13	0.27	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.07	6.46	7	
GI110	GI109	180	18	574.22	572.62	1.00	581.40	5.14	576.26	574.76	-0.00710	1.11	4.96	0.38	0.32	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.76	10.50	8	
GI109	GI108	183	18	572.42	570.59	1.00	582.20	7.44	574.76	572.09	-0.01130	2.06	6.32	0.62	0.45	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.17	10.52	9	HW=558.49
GI108	FE107	308	27	567.26	556.50	3.53	577.00	8.38	569.44*	558.49	-0.00690	2.14	6.49	0.65	0.43	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.81	58.16	10	HW=558.49
GI122	GI121	51	12	579.20	578.69	1.00	582.00	2.29	579.71	579.69	-0.00020	0.01	0.69	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	3.56	11	
GI121	GI119	49	12	578.49	578.00	1.00	582.00	2.92	579.08	579.00	-0.00100	0.05	2.48	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	3.54	12	
GI120	GI119	81	12	581.00	580.14	1.00	585.00	3.66	581.34*	581.14	-0.00260	0.05	1.13	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	3.66	13	
GI119	GI118	41	12	579.94	577.53	3.89	584.00	3.74	580.26*	578.53	-0.00270	0.11	2.36	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.85	8.69	14	
GI118	FE107	59	12	577.33	576.74	1.00	582.00	3.58	578.44	577.74	-0.00760	0.43	3.98	0.24	0.21	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.11	3.56	15	
GI117	GI116	135	15	576.58	575.18	1.00	582.00	4.62	577.38	576.44	-0.00510	0.69	3.76	0.22	0.13	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.61	6.49	16	
GI116	GI115	184	15	574.99	572.88	1.15	580.50	4.76	575.79*	574.13	-0.00640	1.17	4.20	0.27	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.16	6.92	17	
GI115	FE114	127	15	569.00	564.00	3.93	578.00	8.28	569.73*	565.25	-0.00690	2.13	6.84	0.73	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39	12.81	18	HW=565.25
GI125	GI125	17	18	573.92	573.75	1.00	578.92	3.29	575.63	575.25	-0.00530	0.09	4.32	0.29	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.63	10.50	19	
GI124	GI124	22	18	573.55	573.33	1.01	578.74	4.58	575.16	574.83	-0.00750	0.16	5.13	0.41	0.37	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.27	10.57	20	
GI124	FE123	101	18	573.13	556.00	16.96	579.74	6.13	573.61*	557.50	-0.00790	0.80	5.27	0.43	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.32	43.26	21	HW=557.50
MI128	MI127	19	12	569.92	568.00	9.91	573.92	3.64	570.28*	567.00	-0.00690	0.13	3.76	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.95	11.21	22	HW=567.00

\* INDICATES CRITICAL DEPTH

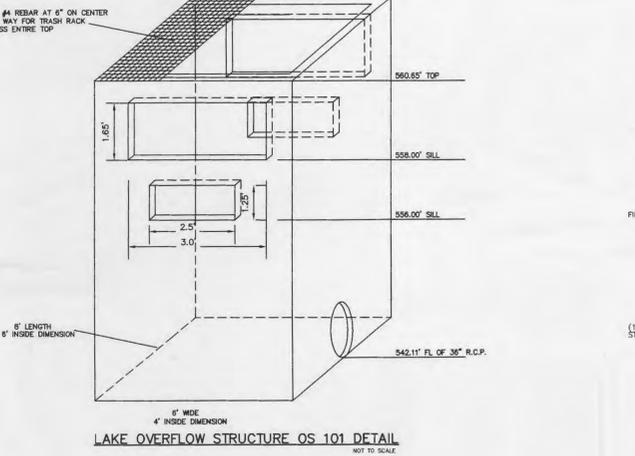


- GENERAL NOTES**
- Do not scale drawing. Follow dimensions.
  - Sections are symmetrical about construction centerline.
  - For longitudinal and transverse joints, dowel and bar requirements and curb dimensions refer to the Pavement Construction Details for Integral Curb and Concrete Pavement.
  - All necessary pavement markings by Contractor.
  - Sections shown may not apply at intersections.
  - Sidewalk thickness increases to 8" thru Private Driveways and 7" thru Commercial Driveways. See Entrance Construction Details.
- Vertical curb may be required. See detail.
  - Sidewalk optional in Residential Areas.
  - Cross slope may be increased if approved by City Administrator based on soil data.

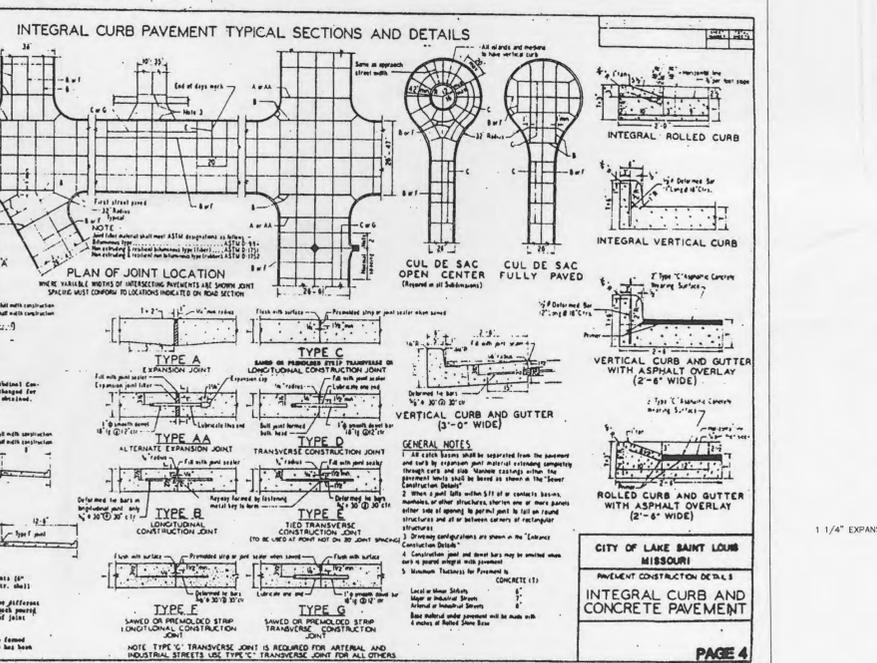
CITY OF LAKE SAINT LOUIS  
 MISSOURI  
 STANDARD TYPICAL SECTION  
 LOCAL STREET  
 (PARKING RESTRICTED)



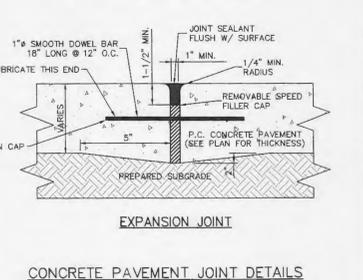
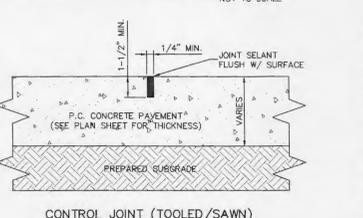
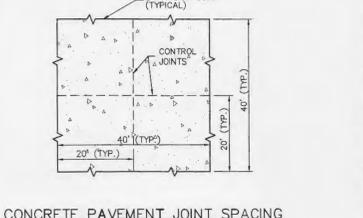
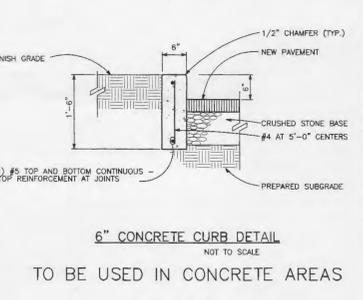
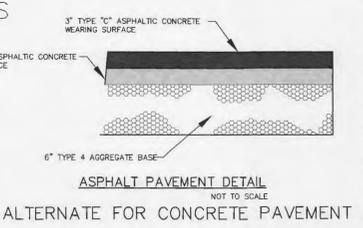
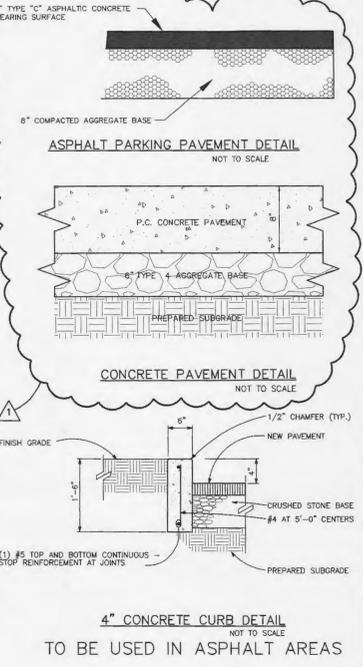
RETAINING OVERVIEW WALL DESIGN BY OTHERS  
 SCALE: 1"=30'



LAKE OVERFLOW STRUCTURE OS 101 DETAIL



CITY OF LAKE SAINT LOUIS  
 MISSOURI  
 PAVEMENT CONSTRUCTION DETAILS  
 INTEGRAL CURB AND CONCRETE PAVEMENT



CONCRETE PAVEMENT JOINT DETAILS

**NISC**  
 Technology Boulevard  
 Lake St. Louis, Missouri 63367

ARCHITECT:  
**ARCTURIS**  
 1910 PINE  
 ST LOUIS MO 63103  
 314 231 3838  
 FAX 314 231 9801

GENERAL CONTRACTOR:  
**PARC**  
 1001 ECKHARTS SPRINGS PLACE, SUITE 200  
 CHELSEA, MO 63309  
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 FAX: (314) 967-9001

CIVIL ENGINEER:  
**SAK ENGINEERING CO. INC.**  
 1505 CLOVERLEAF DRIVE  
 ST. PETERS, MISSOURI 63376  
 TEL: (314) 967-5555  
 FAX: (314) 967-1719

STRUCTURAL ENGINEER:  
**MANEY FLAMBERG ENGINEERING INC.**  
 4008 ROBERT TOWN NORTH  
 EARTH CITY, MISSOURI 63011  
 TEL: (314) 967-7200  
 FAX: (314) 967-4887

MECHANICAL & PLUMBING ENGINEER:  
**JAMES**  
 4008 ROBERT TOWN NORTH  
 EARTH CITY, MISSOURI 63011  
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 FAX: (314) 967-4887

PILE PROTECTION ENGINEER:  
**BASELINE PILE PROTECTION**  
 201 HICKORY LANE  
 ST. CHARLES, MISSOURI 63031  
 TEL: (314) 946-0011  
 FAX: (314) 946-0112

ELECTRICAL ENGINEER:  
**SACHS ELECTRIC**  
 1527 JAMES WILSON ROAD  
 ST. LOUIS, MISSOURI 63028  
 TEL: (314) 963-0000  
 FAX: (314) 963-0051

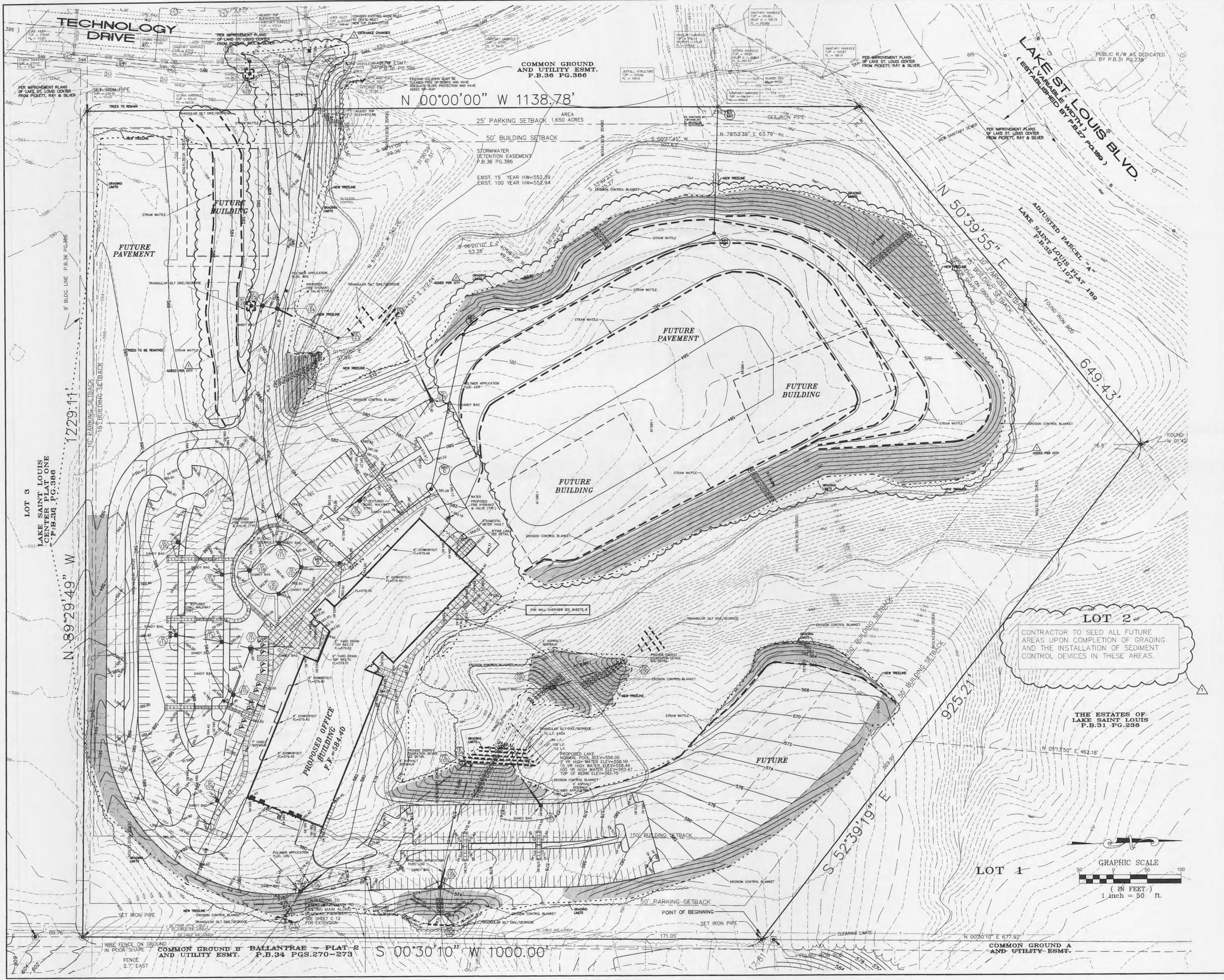
No.	Date	Description
02.13.04	FND/STRU STEEL PKG	
3-17-04	LAKE ST. LOUIS COMMENTS/STORM	
4-23-04	ENTRANCE CHANGES/PVMT	
4-26-04	FIRE SIZE/LOCATION	
5-5-04	ELEV. CHANGES PER ARCH.	

Project Number: 03-880.02

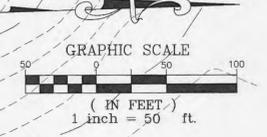
Sheet Title: Detail Sheet

Sheet Number: 8 OF 12

**C8**



**LOT 2**  
 CONTRACTOR TO SEED ALL FUTURE AREAS UPON COMPLETION OF GRADING AND THE INSTALLATION OF SEDIMENT CONTROL DEVICES IN THESE AREAS.



**NISC**  
 Technology Boulevard  
 Lake St. Louis, Missouri 63367

ARCHITECT:  
**ARCTURIS**  
 1910 PINE  
 ST LOUIS MO 63103  
 314 231 3638  
 FAX 314 231 9801

GENERAL CONTRACTOR:  
 PARC  
 1071 BOONWALK SPRINGS PLACE, SUITE 200  
 CRYSTAL SPRING, MO 63046  
 TEL: (636) 951 6000  
 FAX: (636) 951 6001

CHALLENGER:  
 BAY ENGINEERING CO. INC.  
 1550 CLOVERLEAF DRIVE  
 ST. PETERS, MISSOURI 63376  
 TEL: (636) 598 6000  
 FAX: (636) 598 1718

STRUCTURAL ENGINEER:  
 MANLEY & GEMERY ENGINEERS INC.  
 745 CROMBIE ROAD, SUITE 204  
 ST. LOUIS, MISSOURI 63141  
 TEL: (314) 916 7700  
 FAX: (314) 961 4287

MECHANICAL & PLUMBING ENGINEER:  
 JAMPELL  
 4808 RIDGER TRAIL NORTH  
 EARTH CITY, MISSOURI 63045  
 TEL: (314) 214 0100  
 FAX: (314) 291 2803

FIRE PROTECTION ENGINEER:  
 BASSETT FIRE PROTECTION  
 281 HUGHES LANE  
 ST. CHARLES, MISSOURI 63001  
 TEL: (636) 946 0011  
 FAX: (636) 946 5172

ELECTRICAL ENGINEER:  
 SACHS ELECTRIC  
 1072 LARK WILSON ROAD  
 ST. LOUIS, MISSOURI 63038  
 TEL: (636) 332 2000  
 FAX: (636) 465 0251

No.	Date	Description
02-13-04	FND/STRU STEEL PKG	
△	4-23-04	ENTRANCE CHANGES/PVMT
△	4-26-04	FIRE SIZE/LOCATION
△	5-5-04	ELEV. CHANGES PER ARCH.
Project Number: <b>03-880.02</b>		
Sheet Title: <b>Sediment Erosion Control Plan</b>		
<b>C9</b>		
Sheet Number: <b>9</b> Of <b>12</b>		

BAK # 01-115484

**Product Introduction**



**Storm Drain System Clarification**

Vol. # 1 Jan. 03

The use of flocculants to clarify waste water and polish potable water is well established. Four distinct steps **MUST** be taken to achieve the desired performance.

**Step 1: Polymer Selection**  
Site specific soil lithology and water chemistries require a match in polymer chemistry to render the desired water quality and polymer use efficiency [low cost]. Simple bench testing provides the needed match determination. Free testing is available via Applied Polymer Systems, Inc. (APS) or its distribution network.

**Step 2: Polymer Introduction**  
The introduction of APS Floc Logs, a semi-hydrolyzed form of polyacrylamides (PAMs), allows simple, passive polymer introduction into a storm drain system. Many types of Floc Logs are available to meet site specific soil and water chemical needs. Approximately shoebox in size with a hemp rope extension, they are routinely placed on the bottom of designated manhole or catch basin exit pipes. Storm water passing the Floc Logs dissolves the polymer. The number of Floc Logs used is dependent on a designated flow rate. Typically, an application rate of one Floc Log per 60-70 gpm discharge is sufficient [-7 Floc Logs per cfs]. The Project Engineer should determine the locations for Floc Log placement, based upon pipe system layout, contributory flow rates and effectiveness of the polymer/soil match.

**Step 3: Floc Formation**  
Floc forms as the suspended solids attach to the charge sites on the polymer chains. To achieve attachment, the storm water and polymer must mix as they travel down the pipes. Typically, mechanical or active mixing is not needed. The time required to achieve proper floc formation and, therefore, ensuring water clarity, is dependent on the effectiveness of the chemical match between the soil and selected polymer. The bench testing mentioned previously provides a good approximation of the required mix time.

**Step 4: Settling Time**  
Once the floc has formed, it must have an opportunity to settle out. A quiescent water body, such as a sediment basin fore bay, typically provides a sufficiently low energy environment for floc settlement.

**Floc Log Placement Procedures**

Floc Logs are typically placed within the exit pipes of manholes or catch basins. The provided hemp rope or a poly rope extension, secured to the access ladder, prevents down-gradient movement during flows. When more than one Floc Log is used at a location, securing ropes should be cut carefully to length to allow the Floc Logs to lay along the pipe length, without bunching, i.e.,

Visit us at [www.aspent.com](http://www.aspent.com)



each Floc Log should have a different rope length with a length differential greater than the length of a Floc Log. Do not tie one Floc Log to another. For pipes 24" or greater in diameter, two Floc Logs may be secured side-by-side by the same poly rope extension. At locations with more than one longitudinal placement, secure the most down-gradient Floc Log or pair first, then proceed up-gradient as needed.

**Other Considerations**

Water leaving the fore bay or sediment basin should be decanted from the surface, allowing the cleanest water to move to sensitive, down-gradient water bodies. Once polymer is introduced into the system, all downstream soil surfaces that can contribute eroded soils or colloids to the drain system or basin(s) must be protected from erosive stresses. Upon initial use, typically during or immediately after the first runoff-generating rainfall, an inspection of the exiting storm water quality is needed. The initial flush may be somewhat turbid due to soil resident in the pipes following installation. With continued flow, the exiting water may continue to appear turbid as a result of the floc flowing within the storm water. Once the flow velocity is reduced in the fore bay or sediment basin, the floc settles, producing a 'clean' water column. 'Tweaking' of the system should be anticipated to optimize performance. Floc deposition within the pipes is possible during the final stages of flow from a storm event. However, the floc will have a low bulk unit weight and will readily re-suspend during the first flush of the next runoff event. Therefore, pipe clogging or blockage is not a concern when using APS PAM's for storm water clarification. Floc re-suspension within the fore bay or sediment basin is possible only with very high energy regimes. With properly sized and maintained bays or basins, any re-suspended floc will 'migrate' only a short distance down-gradient prior to settling back out of the water column. Clean bay or basin decant will continue. Floc settled into a fore bay or basin bottom is not likely to degrade into polymer residue and very fine soil particles, enabling a re-suspension of colloids. Polymer breakdown (floc degradation) occurs by bacteriological decay or sunlight degradation, neither of which is likely during construction, even if the eroded and transported soils have a high organic content. Once the floc is removed from the bay or basin bottom, which typically subjects the polymer to both sunlight and bacteria, polymer breakdown will occur rapidly (months), assuring that polymer bioaccumulation does not occur.

**Maintenance Schedule**

Once properly functioning, maintenance requirements become minimal. As mentioned, flowing water dissolves the polymer. Sufficient Floc Log numbers must be maintained at the appropriate locations to provide adequate floc development, as can be determined by: 1. Reviewing the Floc Log size and number at the various placement points, or 2. Reviewing the storm water quality at the outfall into the fore bay or sediment basin. Such inspection should occur during or after each rain event or every 2 weeks, whichever is the shorter duration. Cleanout of collected sediments and floc from the fore bay or sediment basin should be conducted, as needed, to ensure that adequate storm water detention or retention is maintained. Floc Log longevity is dependent on total flow of water through the storm drain system. For typical, temperate zone rainfall durations, intensities and frequencies, Floc Logs should last 4-6 months. With excessive sand movement within the pipes, shortened longevity should be anticipated.

**Additional Support**

Please contact your A. S. P. Enterprises Sales Representative for further information regarding the use of APS Floc Logs and other polyacrylamides.

\*Information in this case study provided by Price & Company, Inc.

**Corporate Office:** 275 Northwest Blvd., Fenton, MO 63026 (636)343-4357 (800)869-5600 (636)343-4723-fax  
**Regional Offices:** 109 N.W. Victoria Drive Lee's Summit, MO 64086 (816)554-1191 (800)519-2304 (816)554-2262-fax  
9840 S. 140th St. Suite 5 & 6 Omaha, NE 68138 (402)861-8579 (877)678-8027 (402)861-8592-fax

**Earth Saver™**, the inventor of the Rice Straw Wattle, has the only absolutely natural wattle in the industry. The newest test results are in... and the findings are phenomenal!

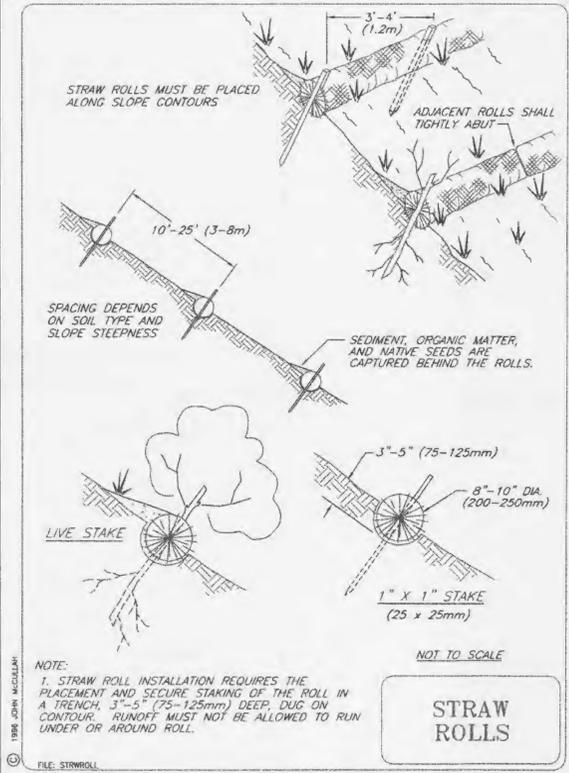
San Diego State University's Soil Erosion Research Laboratory conducted in-depth testing on Earth Saver Rice Straw Wattles. Scientists found that the Earth Saver Wattle dramatically reduces runoff water velocities... by 30 percent for the 9" diameter wattles, and by 78 percent for the new 20" wattles. In fact, the 20" wattle has proved to reduce sediment delivery by 88% after three consecutive rainfall events. The laboratory's Rainfall Simulation Testing also demonstrated that Earth Saver Wattles reduce runoff water velocities and release water at a steady rate. Wherever bare soil is exposed to erosion, Earth Saver Rice Straw Wattles can be an important part of a comprehensive Best Management Practices system for soil stabilization, sediment retention and vegetation establishment.

**Earth Saver Rice Straw Wattles — the industry standard.**

- 9" x 28', 12" x 10' and new 20" x 8' straw wattles
- 20" straw wattles replace silt fence barriers in sod/vegetation ponds
- Photodegradable, biodegradable and biotrip nettings
- Available certified 100 percent weed free
- Easy shipping and storage on interlocked pallets
- Large inventory of raw and finished product

Check out our redesigned... and more information on Earth Saver products... including the new, versatile 20" wattle... [www.earth-saver.com](http://www.earth-saver.com)

General Number: 1-800-...



**NISC**  
Technology Boulevard  
Lake St. Louis, Missouri 63367

ARCHITECT:  
**ARCTURIS**  
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ST. LOUIS MO 63103  
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GENERAL CONTRACTOR:  
RANK  
1001 SCARDINAW SPRING PLACE, SUITE 200  
SPRINGFIELD, MO 65806  
TEL: (636) 461-6000  
FAX: (636) 461-6501

CIVIL ENGINEER:  
BAK ENGINEERING CO. INC.  
1050 CLOVERLEAF DRIVE  
ST. PETERS, MISSOURI 63376  
TEL: (636) 528-5252  
FAX: (636) 528-1718

STRUCTURAL ENGINEER:  
MARVAL CRUMBERRY ENGINEERING INC.  
140 GRAND ROAD, SUITE 804  
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FAX: (314) 997-4287

MECHANICAL & PLUMBING ENGINEER:  
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4008 RIDER TRAIL NORTH  
EARTH CITY, MISSOURI 63045  
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FAX: (314) 291-2803

FIRE PROTECTION ENGINEER:  
BILBATERE FIRE PROTECTION  
201 HUGHES LANE  
ST. CHARLES, MISSOURI 63301  
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FAX: (636) 946-0172

ELECTRICAL ENGINEER:  
BACHS ELECTRIC  
1577 LARK WALKER ROAD  
ST. LOUIS, MISSOURI 63026  
TEL: (636) 332-2000  
FAX: (636) 332-0001

**Product Description MIRAFI**  
Engineered Solutions for an Innovative World

**product Dandy Bag® and Dandy Bag® II**  
Flat Grate and Mountable Curb Inlet Protection

U.S. Patent No. 5,725,782, 6,010,622, and other patents pending

**DANDY BAG®**  
The patented Dandy Bag® is designed for use with flat grates (including round) and mountable curbs to filter sediment-laden stormwater. The suspended solids are allowed to settle out of the slowed flow and are captured by the Dandy Bag® prior to entering the inlet.

**FEATURES AND BENEFITS**

- Unique patented design keeps silt, sediment, and debris out of storm systems
- Reduces or eliminates the need to flush or clean inlets
- Fabricated from a highly recognizable orange monofilament geotextile (Filterweave® 402)
- Standard sizes to fit any inlet (including round)
- Easy to install, maintain, inspect, and re-use

**INSTALLATION AND MAINTENANCE GUIDELINES**

- Installation: The empty Dandy Bag® should be placed over the grate as the grate stands on end. If using optional oil absorbents, place absorbent pillow in pouch on the bottom (below-grate side) of the unit. Attach absorbent pillow to tether loop. Tuck the enclosure flap inside to completely enclose the grate. Holding the lifting devices (do not rely on lifting devices to support the entire weight of the grate), place the grate into its frame.
- Maintenance: Remove all accumulated sediment and debris from surface and vicinity of unit after each storm event. Remove the sediment that has accumulated within the containment area of this Dandy Bag® as needed. If using optional oil absorbents, remove and replace absorbent pillow when near saturation.

**DANDY BAG® II**  
The patented Dandy Bag® II is designed with a larger containment area for use with flat grates (including round) and mountable curbs to filter sediment-laden stormwater. The suspended solids are allowed to settle out of the slowed flow and are captured by the Dandy Bag® II prior to entering the inlet.

**FEATURES AND BENEFITS**

- Adjustable pre-filter on top of unit
- 2ft containment area is very manageable
- Fabricated from a highly recognizable orange monofilament geotextile (Filterweave® 402)
- Available in four standard sizes to fit a variety of inlets
- Available with optional oil absorbents
- Available with patented curb blocking technology

**INSTALLATION AND MAINTENANCE GUIDELINES**

- Installation: Remove the grate from catch basin. If using optional oil absorbents, place absorbent pillow in unit on the bottom (below-grade side) of the unit. Stand the grate on end. Move the top lifting straps out of the way and place the grate into the Dandy Bag® II so that the grate is below the top straps and above the lower straps. Holding the lifting devices, insert the grate into the inlet.
- Maintenance: Remove all accumulated sediment and debris from surface and vicinity of unit after each storm event. After each storm event and at regular intervals, look into the Dandy Bag® II. If the containment area is full of sediment, the unit must be emptied. To empty unit, lift the unit out of the inlet using the lifting straps and remove the grate. If using optional oil absorbents, replace absorbent pillow when near saturation.



**A.S.P. ENTERPRISES, INC.**  
275 Northwest Blvd.  
Fenton, MO 63026



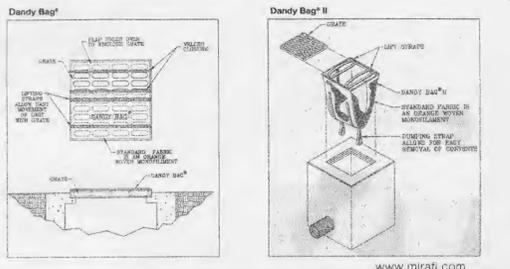
**Technical Data MIRAFI**  
Engineered Solutions for an Innovative World

**product Dandy Bag® and Dandy Bag® II**  
Flat Grate and Mountable Curb Inlet Protection

U.S. Patent No. 5,725,782, 6,010,622, and other patents pending

**Technical Data for Filterweave® 402 Geotextile**

PROPERTY	TEST METHOD	UNITS	MIN.	MAX.
Load Tenile Strength	ASTM D 4952	KN (lbf)	782 (175) x 0.89 (200)	
Grab Tenile Elongation	ASTM D 4952	%	24 x 170	
Tensile Strength	ASTM D 4952	KN (lbf)	0.44 (100)	
Mullen Burst Strength	ASTM D 3783	kPa (psi)	9.97 (145)	
Trapezoid Tear Strength	ASTM D 4533	KN (lbf)	0.51 (115) x 0.33 (75)	
Percent Open Area (POA)	COE 22 (28-96)	%	10	
Apparent Opening Size (AOS)	ASTM D 4751	mm (U.S. Std. Sieve)	0.425 (40)	
Permeability	ASTM D 4491	sec	2-14	
Permeability	ASTM D 4491	cm/sec	0.142	
Water Flow Rate	ASTM D 4491	liters/min (gallons/min)	5007 (149)	
UV Radiation Resistance	ASTM D 6355	%	70	
Color			Orange	



**FINANCIAL SERVICES**  
Complete technical information is available from Ten Cate Nicolau and its sales representatives. Service provided throughout the United States. For more information on products, please call or write to the address below.

**WARRANTY**  
The manufacturer warrants that the products are made of quality materials and will perform as described in the literature. For more information on warranties, please call or write to the address below.

**COMPANY OFFICE**  
1000 North 10th Street, Fenton, MO 63026  
(636) 343-4357 • (800) 869-5600 • Fax: (636) 343-4723

**www.mirafi.com**

**GeoRidge®**

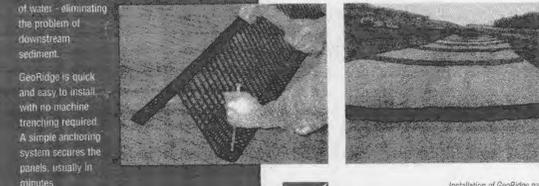
**Go with the flow**

Durable, low cost GeoRidge® berms are designed to provide effective erosion and sediment control. GeoRidge is portable, lightweight, stackable, and proven to be an effective energy dissipater. Isn't it time you replaced those traditional sodden straw bales with GeoRidge?

**The GeoRidge® System**

GeoRidge is a permeable plastic berm designed for erosion and sediment control. The berms are constructed of a UV stabilized HDPE and designed to replace traditional straw bale ditch berms. GeoRidge is manufactured using a fully automated process to ensure the highest quality and consistency.

GeoRidge Anchors are galvanized spikes used to secure the GeoRidge panels on both the upstream and downstream sides.



GeoRidge is quick and easy to install with no machine trenching required. A simple anchoring system secures the panels, usually in minutes.

**About Nilox**  
Nilox provides unique solutions in geosynthetic, erosion control and reclamation technology — for over 25 years.



As water flows through the GeoRidge berm, its velocity and energy are reduced. As a result, silt and sediment are deposited upstream of the berm acting in sediment control.

New vegetation growing on the downstream side of the GeoRidge. Note the significant sediment that has prevented from flowing downstream.

**GeoRidge Advantages**

- Constructed of a UV stabilized HDPE
- Lightweight - about 1 kg (2.2 lbs.)
- Reusable
- Portable and stackable - 500 GeoRidge can easily fit on a pickup truck
- Quick and easy installation
- No machine trenching required
- Simple anchoring system
- Minimum maintenance
- Collects sediment and debris
- Reduces rather than blocks flow velocities
- Open structure allows revegetation
- Complements the performance of erosion control blankets

**GeoRidge Applications**

- Roadside ditches
- Streambeds
- Stormwater channels
- Hillside ditches
- Slopes
- Golf courses
- Nurseries
- Developments
- Construction sites
- Irrigation

**Recommended Options**

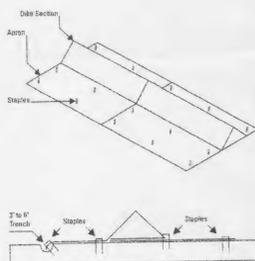
Erosion Control Blankets are recommended directly under the GeoRidge panels. These blankets prevent undermining of the panels and encourage the earliest possible vegetation growth.



## Triangular Silt Dike™ Barrier Installation

Made with lightweight and durable materials, Triangular Silt Dike™ barrier weighs just 7-9 lbs. per seven foot section and installs in minutes with U-shaped wire staples.

The flexibility of the barrier allows it to be installed on rough and rocky terrain while the protective aprons on both sides of the barrier helps prevent erosion and failure of the structure.



1-800-290-8473

www.tri-silt-dike.com

Manufactured by:

**TRIANGULAR**



US Patent No. 5,605,416  
Triangular Silt Dike and the logo are trademarks of the Triangular Silt Dike Co., Inc.



## TRIANGULAR



The better solution to bale barrier, silt fence and rock check dams!



## Triangular Silt Dike™ Barrier

Designed as an easy installed, economical solution to bale checks, silt fence, and rock check dams the Triangular Silt Dike™ barrier is a positive solution to many construction site drainage & erosion problems.

### Applications

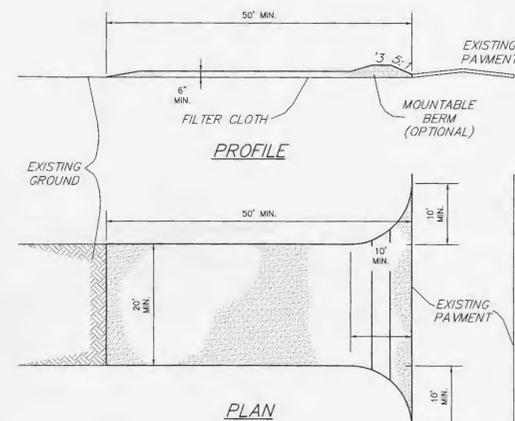
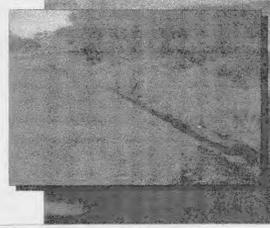
- Ditch Check Dams
- Diversion Dikes
- Drop Inlet Protection
- Temporary Ditch Liner
- Stream & Pond Protection

### Advantages

- Effective
- Fast & Easy Installation
- Conforms to Curves and Rough Terrain
- Lightweight & Durable
- Re-usable

Distributor / Dealer:

A.S.P. ENTERPRISES, INC.  
275 Northwest Blvd.  
Fenton, MO 63026



### CONSTRUCTION SPECIFICATIONS

1. Stone Size – Use 2" stone, or reclaimed or recycled concrete equivalent.
2. Length – As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness – Not less than six (6) inches.
4. Width – Twenty (20) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Filter Cloth – Will be placed over the entire area prior to placing of stone. Filter will not be required on a single family residence lot.
6. Surface Water – All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance – The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanup of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing – Wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Periodic inspection and needed maintenance shall be provided after each rain.

STABILIZED CONSTRUCTION ENTRANCE/WASHDOWN AREA  
NOT TO SCALE

## Product Description MIRAFI

Engineered Solutions for an Innovative World

### product Mirafi® Silt Fence Prefabricated Silt Fence Structures for Sediment Control

Mirafi® Construction Products offers a wide range of woven geotextiles for sediment control applications. These fabrics are cost-effective elements which improve and enhance modern construction techniques in a variety of civil engineering applications.

#### PRODUCT DESCRIPTION

Mirafi® Silt Fence structures, specially developed for supporting posts, are designed for efficient control of sediment run-off from construction sites. This sediment, left unchecked, can clog and pollute native waterways and damage natural areas. Controlling the run-off (an increasing environmental concern) is advantageous to owners, contractors and engineers who face the economic costs associated with site sediment loss. Installed correctly in the field, the

sedimentation control fabric in silt fence structures functions as a filter and a run-off flow velocity check. Fine-grained sediment is trapped by the fabric while storm water run-off may pass through the fabric at a moderate rate.

#### FEATURES AND BENEFITS

Mirafi® Silt Fence is prefabricated with posts and is ready for immediate installation upon delivery to your site. The prefabricated system has a number of unique features and advantages:

- Complete prefabricated system incorporating Mirafi® 100X woven fabric
- 3.2cm (1-1/4") nominal square hardwood posts
- Available in 2.5m (8.3ft) and 3.0m (10.0ft) post spacings

Mirafi® "Envirofence" is recommended for use as sediment control when additional strength and support are required. Envirofence features include:

- Complete pre-fabricated system incorporating Mirafi® 100X woven fabric
  - 3.2cm (1-1/4") nominal square hardwood posts
  - Additional plastic net backing for reinforced support
  - Available in 2.5m (8.3ft) post spacings
- Mirafi® Silt Fence Fabrics  
Mirafi® also provides you with an assortment of UV stabilized, non-fabricated sediment control fabrics in a choice of lengths. Each fabric is designed to meet the specifications and regulations for sedimentation control required by local governmental agencies.



Mirafi® Silt Fence used in erosion control application.



Mirafi® prefabricated Silt Fence.



Ten Cate Nicolson

## Technical Data MIRAFI

Engineered Solutions for an Innovative World

### product Mirafi® Silt Fence Prefabricated Silt Fence Structures for Sediment Control

#### Mirafi® Silt Fence Technical Data (All values are minimum average roll values)

PROPERTY	TEST METHOD	UNITS	SILT FENCE (100X)	ENVIROFENCE (100X)
Grab Tensile Strength (machine direction)	ASTM D 4852	N (lbs)	350 (110)	350 (110)
Grab Tensile Strength (cross machine direction)	ASTM D 4852	N (lbs)	350 (110)	350 (110)
Grab Tensile Elongation	ASTM D 4852	%	15 (15)	15 (15)
Maximum Burst Strength	ASTM D 3776	kPa (psi)	2000 (300)	2000 (300)
Proposed Tear Strength	ASTM D 4852	N (lbs)	250 (55)	250 (55)
Permeability	ASTM D 4491	sec	0.10	0.10
Water Flow Rate	ASTM D 4491	liters/min (gallons/min)	475 (10)	475 (10)
Ultimate Stability	ASTM D 4555	%	70	70

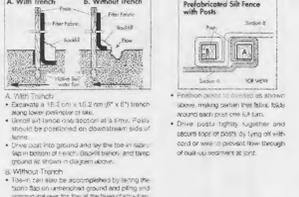
\* Envirofence working strength is enhanced further by the incorporation of a polymeric mesh providing a tensile strength of 140 lb/ft (typical) in both machine and cross machine directions.

#### Mirafi® Silt Fence Packaging

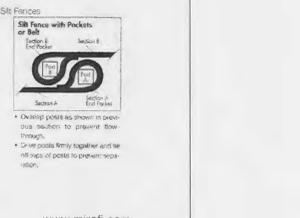
SILT FENCE TYPE	LENGTH (m/ft)	FABRIC WIDTH (m/ft)	POST LENGTH (m/ft)	POST SPACING (m/ft)	SHIPPING WEIGHT (kg/lbs)
Mirafi® Silt Fence	30.5 (100)	0.9 (3)	1.22 (4)	2.5 (8.3)	23 (50)
Mirafi® Envirofence	30.5 (100)	0.9 (3)	1.22 (4)	2.5 (8.3)	25 (55)
100X (Fabric Only)	100.8 (330)	0.9 (3)	---	---	1496
100X (Fabric Only)	100.8 (330)	0.9 (3)	---	---	1720

#### Mirafi® Silt Fence Installation Guidelines

See In Methods



**A. With Trench**  
• Excavate a 15.2cm x 15.2cm (6" x 6") trench along lower exterior of dike.  
• Install and tamp rock (300mm x 30mm). Pockets should be combined on (downstream) side of dike.  
• Drive post into ground and lay the top of fabric on top of rock (downstream) and tamp ground to firm in dike above.  
**B. Without Trench**  
• Dikeys can also be accomplished by laying the fabric flat on immediate ground and driving and tamping rock over the top of the dike structure.



**C. With Pockets or Ball**  
• Installation points are drilled to 100mm (4") depth, making certain that balls settle around each post on U.S. side.  
• Drive post into ground, stagger posts and secure top of dike by tamping with rock or sand to prevent flow through of dike structure.  
• Can be easily firmly installed and be self-healing of posts to prevent separation.

**TECHNICAL SERVICES**  
Complete technical assistance is available from Ten Cate Nicolson and its local representatives. Complete technical assistance during design and construction stages as well as after project completion.

**WARNING**  
The data herein represents the product as manufactured. For application or installation to this product, contact Ten Cate Nicolson.

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Ten Cate Nicolson

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FAX: (636) 561-9001

CIVIL ENGINEER:  
DAVE ENGINEERING CO. INC.  
100 CLOVERDALE DRIVE  
ST. PETERS, MISSOURI 63076  
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FAX: (636) 628-1118

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FAX: (314) 997-4997

MECHANICAL & PLUMBING ENGINEER:  
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408 FREDERICK NORTH  
EARTH CITY, MISSOURI 63045  
TEL: (314) 581-0100  
FAX: (314) 591-2833

FIRE PROTECTION ENGINEER:  
BASTIEN FIRE PROTECTION  
241 HUNTERS LANE  
ST. CHARLES, MISSOURI 63021  
TEL: (636) 944-9111  
FAX: (636) 946-6172

ELECTRICAL ENGINEER:  
BACH ELECTRIC  
1377 Large Wilshire Road  
ST. LOUIS, MISSOURI 63005  
TEL: (636) 838-2000  
FAX: (636) 838-0051

No. Date Description

02.13.04 FND/STRU STEEL PKG

4-23-04 ENTRANCE CHANGES/PVMT

4-26-04 FIRE SIZE/LOCATION

5-5-04 ELEV. CHANGES PER ARCH.

Project Number: 03-880.02

Sheet Title:

Sediment Control Details

**C11**

Sheet Number: 1101 12

