

METRICIAN OF  
D.B. 933, PG. 499  
PLAT D.B. 533, PG. 263

PROPERTY OF  
**NORFOLK SOUTHERN CORP.**  
TAX NO. 1410103  
D.B. 651, PG. 7

AD BUILT  
Hall  
6-17-09

#### UTILITY NOTES:

1. WHILE CERTAIN UTILITIES ARE SHOWN, OTHER UNDERGROUND UTILITIES MAY BE ENCOUNTERED DURING CONSTRUCTION. PARKER DESIGN GROUP DOES NOT WARRANT LOCATION OR DEPTH OF ANY UTILITIES SHOWN. THE CONTRACTOR SHALL COORDINATE WITH "MISS UTILITY" PRIOR TO CONSTRUCTION AND ALL UTILITY DEPARTMENTS TO DETERMINE IF THE ENCOUNTERED UTILITY IS PUBLIC OR PRIVATE AND TAKE PROPER AND ADEQUATE METHODS TO PROTECT, IF NECESSARY.
2. WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE GOVERNING AUTHORITIES FOR UTILITY INSTALLATIONS. ALL NEW UTILITIES SHALL BE INSTALLED UNDERGROUND.
3. REFERENCE IS DIRECTED TO THE COVER FOR GENERAL WATER AND SANITARY SEWER NOTES.
4. THE CONTRACTOR SHALL INVESTIGATE EXISTING SEWER MAINS TO VERIFY THE SIZE, LOCATION AND DEPTH OF EACH UTILITY. THE LOCATIONS SHOWN FOR ALL UTILITIES ARE APPROXIMATE AND BASED UPON AVAILABLE WVA GIS RECORDS, VDOT RECORDS, OR THE BOUNDARY SURVEY OF 2002.

#### SITE SPECIFIC FILTERRA NOTES:

1. THE FILTERRA UNIT PROPOSED IS BEING CONSTRUCTED ADJACENT TO EXISTING PAVEMENT. THE CONTRACTOR SHALL CONSTRUCT VDOT CG-2 CURB FROM EXISTING CURB TO THE FILTERRA STRUCTURE. THE THROAT OF THE FILTERRA STRUCTURE SHALL BE PLACED IN THE FIELD, MATCHING EXISTING PAVEMENT, AND DEPRESSING THE INLET BY 2 INCHES.
2. RUNOFF THAT BYPASSES THE FILTERRA STRUCTURE WILL CONTINUE TO FLOW ON PAVEMENT AND LEAVE THE PAVEMENT AS IT CURRENTLY DOES. THE FILTERRA STRUCTURE SHALL NOT BE PLACED AT THE SUMP AREA OF THE PAVEMENT, BUT SHALL BE PLACED AS SHOWN ON THE PLAN. ELEVATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND ARE BASED UPON VISUAL FIELD INSPECTION, AND ROANOKE CITY AERIAL TOPOGRAPHY.
3. SEE OTHER SHEETS FOR GENERAL AND SPECIFIC DETAILS PERTAINING TO THE FILTERRA STRUCTURE.

#### GENERAL DRAINAGE AND OPERATION NOTES:

1. THE TANK CONTAINMENT AREA IS DESIGNED TO FUNCTION IN THE FOLLOWING MANNER:
  - A CONTAINMENT WALL IS CONSTRUCTED TO WITHSTAND THE LARGEST TANK (8,000 GALLONS) PLUS THE 25-YEAR, 24-HR STORM EVENT. NO MANIFOLDS BETWEEN TANKS ARE PLANNED.
  - WITHIN THE CONCRETE SLAB, TWO STRUCTURES SHALL BE INSTALLED TO COLLECT RUNOFF FROM THE CONCRETE SLAB. BOTH STRUCTURES WILL BE CONTROLLED BY GATE VALVES. THE GATE VALVES SHALL BE CLOSED DURING NORMAL OPERATIONS.
  - WHEN A STORM EVENT OCCURS, THE CONCRETE SLAB WILL COLLECT AND STORE RUNOFF THAT FALLS WITHIN THE CONTAINMENT AREA. A SITE REPRESENTATIVE SHALL INSPECT AND TEST THE WATER COLLECTED WITHIN THE CONTAINMENT AREA. SEE SPILL PREVENTION PLAN FOR SPECIFICS.
  - IF THE WATER IS CLEAR AND FREE OF OILS, THE GATE VALVE FOR THE STORM SEWER SYSTEM SHALL BE OPENED, AND ALLOW THE WATER TO DRAIN TO THE DEPRESSED AREA ADJACENT TO AERIAL WAY DRIVE. ONCE ALL WATER IS REMOVED FROM THE CONTAINMENT AREA, THE GATE VALVE SHALL BE CLOSED AND LOCKED.
  - IF OILS ARE PRESENT WITHIN THE WATER, THE AREA SHALL BE CLEANED BY USE OF VACUUM TRUCK OR OTHER MEASURES AS SPECIFIED IN THE SPILL PREVENTION PLAN FOR THE FACILITY. THE REMAINING WATER SHALL BE SENT TO THE OIL/WATER SEPARATOR BY OPENING THE GATE VALVE TOWARD THE OIL/WATER SEPARATOR. ONCE ALL WATER IS REMOVED FROM THE CONTAINMENT AREA, THE GATE VALVE SHALL BE CLOSED AND LOCKED.
2. A STRUCTURE SHALL BE INSTALLED WITHIN THE CONCRETE SLAB OF THE TRUCK FILLING AREA. ALL RUNOFF FROM THIS STRUCTURE IS DIRECTED TO THE OIL/WATER SEPARATOR.
3. THE PROPOSED PIPE FOR THE TANK CONTAINMENT SYSTEM IS C900 PVC PIPE (WATERLINE PIPE) TO ALLOW FOR THE INSTALLATION OF THE GATE VALVES AND PRESSURES ASSOCIATED WITH THE APPROXIMATE 4-FOOT OF HEAD UPSTREAM OF THE GATE VALVES.

| Tank Containment Area Calculation |                |            |                                 |                            |                            |                                 |                             |                                  |  |
|-----------------------------------|----------------|------------|---------------------------------|----------------------------|----------------------------|---------------------------------|-----------------------------|----------------------------------|--|
|                                   |                | L (ft)     | W (ft)                          | Perim.                     | Concrete Floor Elev.       |                                 |                             |                                  |  |
| Overall Concrete Dimensions:      |                | 100        | 60                              |                            | 980.38                     |                                 |                             |                                  |  |
| Initial Containment Volume (cf):  |                | 6000       |                                 |                            | Drain Top Elev.            |                                 |                             |                                  |  |
| Number of 8K Tanks:               |                | 13         |                                 |                            |                            |                                 |                             |                                  |  |
| Number of 3K Tanks:               |                | 7          |                                 |                            |                            |                                 |                             |                                  |  |
|                                   |                | Depth (ft) | Initial Containment Volume (cf) | Reduction Per 8K Tank (cf) | Reduction Per 3K Tank (cf) | Total Reduction from Tanks (cf) | Net Containment Volume (cf) | Net Containment Volume (gallons) |  |
| Datum Elevation                   | From Perimeter | Depth (ft) | Initial Containment Volume (cf) | Reduction Per 8K Tank (cf) | Reduction Per 3K Tank (cf) | Total Reduction from Tanks (cf) | Net Containment Volume (cf) | Net Containment Volume (gallons) |  |
| 979.75                            |                | 0          | 0                               | 0.0                        | 0.0                        | 0.0                             | 0                           | 0                                |  |
| 980.00                            |                | 0.25       | 298                             | 0.0                        | 0.0                        | 0.0                             | 298                         | 2230                             |  |
| 980.38                            | 0.00           | 0.63       | 985                             | 19.2                       | 13.5                       | 343.8                           | 641                         | 4797                             |  |
| 990.49                            | 0.10           | 0.73       | 1595                            | 27.1                       | 18.1                       | 465.8                           | 1099                        | 8222                             |  |
| 980.58                            | 0.20           | 0.83       | 2185                            | 35.9                       | 25.2                       | 642.7                           | 1642                        | 11637                            |  |
| 980.68                            | 0.30           | 0.93       | 2785                            | 45.4                       | 31.8                       | 812.6                           | 1973                        | 14755                            |  |
| 980.78                            | 0.40           | 1.03       | 3385                            | 55.5                       | 38.9                       | 993.9                           | 2391                        | 17885                            |  |
| 980.88                            | 0.50           | 1.13       | 3985                            | 66.3                       | 46.3                       | 1185.0                          | 2789                        | 20935                            |  |
| 980.98                            | 0.60           | 1.23       | 4585                            | 77.6                       | 54.2                       | 1387.8                          | 3197                        | 23915                            |  |
| 981.08                            | 0.70           | 1.33       | 5185                            | 89.4                       | 62.3                       | 1598.7                          | 3599                        | 26929                            |  |
| 981.21                            | 0.83           | 1.46       | 5965                            | 105.5                      | 73.3                       | 1885.1                          | 4080                        | 30518                            |  |

| EVALUATION OF 25-Yr, 24-Hr Storm   |  |        |                    |                        |  |            |  |         |  |
|--|--|--------|--------------------|------------------------|--|------------|--|---------|--|
| 1. Determine the rainfall amount (inches) of the 1-year storm (Appendix 4B)                        |  |        |                    |                        |  |            |  |         |  |
| 25-year rainfall =   |  | 6.0    | inches             |                        |  |            |  |         |  |
| average c =  |  | 0.90   |                    |                        |  |            |  |         |  |
| Corresponding RCN =  |  | 98     |                    |                        |  |            |  |         |  |
| 1-year depth of runoff =   |  | 5.72   | (From Appendix 4C) |                        |  |            |  |         |  |
| Area to BMP =  |  | 0.1377 | acres              | =>                     |  | 6,000      |  | sq. ft. |  |
| 2. Determine Storm Volume  |  |        |                    |                        |  |            |  |         |  |
| Vst 25   |  | 2,860  | cf                 |                        |  |            |  |         |  |
| List Largest Tank  |  | 8,000  | gallons            | =>                     |  | 1,070      |  | cu. ft. |  |
| 3. Combine and Calculate Required Storage Volume:  |  |        |                    |                        |  | 3,929      |  | cu. ft. |  |
| 5. Establish detention elevation using lower & upper stage-storage elevations & available volumes. |  |        |                    |                        |  |            |  |         |  |
| Lower Elevation =  |  | 981.08 |                    | Lower Storage Volume = |  | 3,586      |  | cf      |  |
| Upper Elevation =  |  | 981.20 |                    | Upper Storage Volume = |  | 4,080      |  | cf      |  |
| 6. Interpolate the storage elevation to obtain required storage volume.                            |  |        |                    |                        |  |            |  |         |  |
| Detention Volume Elevation =   |  | 981.16 |                    | Detention WQ Vol =     |  | 3,929      |  | cf      |  |
| 7. Establish top of detention storage  |  | 981.20 |                    | 10                     |  | -inch wall |  |         |  |
| 8. Calculate Freeboard above required storage  |  |        |                    | 0.04                   |  | Feet       |  |         |  |

| EVALUATION OF 25-Yr, 24-Hr Storm (Loading Area)  |  |        |                    |                        |  |       |  |         |  |
|--|--|--------|--------------------|------------------------|--|-------|--|---------|--|
| 1. Determine the rainfall amount (inches) of the 1-year storm (Appendix 4B)                        |  |        |                    |                        |  |       |  |         |  |
| 25-year rainfall =   |  | 6.0    | inches             |                        |  |       |  |         |  |
| Average c =  |  | 0.90   |                    |                        |  |       |  |         |  |
| Corresponding RCN =  |  | 98     |                    |                        |  |       |  |         |  |
| 1-year depth of runoff =   |  | 5.72   | (From Appendix 4C) |                        |  |       |  |         |  |
| Area to BMP =  |  | 0.0349 | acres              | =>                     |  | 1,520 |  | sq. ft. |  |
| 2. Determine Storm Volume  |  |        |                    |                        |  |       |  |         |  |
| Vst 25   |  | 724    | cf                 |                        |  | 294   |  | cu. ft. |  |
| Failure Exposure   |  | 2,200  | gallons            | =>                     |  |       |  |         |  |
| Combine and Calculate Required Storage Volume:   |  |        |                    |                        |  | 1,019 |  | cu. ft. |  |
| 5. Establish detention elevation using lower & upper stage-storage elevations & available volumes. |  |        |                    |                        |  |       |  |         |  |
| Lower Elevation =  |  | 980.88 |                    | Lower Storage Volume = |  | 910   |  | cf      |  |
| Upper Elevation =  |  | 980.98 |                    | Upper Storage Volume = |  | 1,042 |  | cf      |  |
| 6. Interpolate the storage elevation to obtain required storage volume.                            |  |        |                    |                        |  |       |  |         |  |
| Detention Volume Elevation =   |  | 980.96 |                    | Detention WQ Vol =     |  | 1,019 |  | cf      |  |
| Establish top of detention storage   |  | 980.98 | 7 - inch wall      |                        |  |       |  |         |  |
| Calculate Freeboard above required storage   |  |        | 0.02 Feet          |                        |  |       |  |         |  |

| Tank Loading Area                |                |            |                                 |                            |                            |                                 |                             |                                  |  |
|----------------------------------|----------------|------------|---------------------------------|----------------------------|----------------------------|---------------------------------|-----------------------------|----------------------------------|--|
|                                  |                | L (ft)     | W (ft)                          | Perim.                     | Concrete Floor Elev.       |                                 |                             |                                  |  |
| Overall Concrete Dimensions:     |                | 66         | 20                              |                            | 980.38                     |                                 |                             |                                  |  |
| Initial Containment Volume (cf): |                | 1320       |                                 |                            | Drain Top Elev.            |                                 |                             |                                  |  |
|                                  |                |            |                                 |                            |                            |                                 |                             |                                  |  |
| Datum Elevation                  | From Perimeter | Depth (ft) | Initial Containment Volume (cf) | Reduction Per 8K Tank (cf) | Reduction Per 3K Tank (cf) | Total Reduction from Tanks (cf) | Net Containment Volume (cf) | Net Containment Volume (gallons) |  |
| 980.00                           |                | 0          | 0                               | 0.0                        | 0.0                        | 0.0                             | 0                           | 0                                |  |
| 980.38                           | 0.00           | 0.36       | 250                             | 0.0                        | 0.0                        | 0.0                             | 250                         | 1870                             |  |
| 980.48                           | 0.10           | 0.46       | 382                             | 0.0                        | 0.0                        | 0.0                             | 382                         | 2857                             |  |
| 980.58                           | 0.20           | 0.56       | 514                             | 0.0                        | 0.0                        | 0.0                             | 514                         | 3845                             |  |
| 980.68                           | 0.30           | 0.66       | 646                             | 0.0                        | 0.0                        | 0.0                             | 646                         | 4832                             |  |
| 980.78                           | 0.40           | 0.76       | 778                             | 0.0                        | 0.0                        | 0.0                             | 778                         | 5820                             |  |
| 980.88                           | 0.50           | 0.86       | 910                             | 0.0                        | 0.0                        | 0.0                             | 910                         | 6807                             |  |
| 980.98                           | 0.60           | 0.96       | 1042                            | 0.0                        | 0.0                        | 0.0                             | 1042                        | 7795                             |  |

#### DRAINAGE SUMMARY

1. FILTERRA STRUCTURE  
SEE OTHER SHEETS FOR ALL INFORMATION PERTAINING TO THE STRUCTURE
2. 6" OUTLET  
INV OUT = 976.00
3. 90.1 LF 6" C900 PVC PIPE @ 1.3% SLOPE  
INV AT GATE VALVE = 977.17  
INV OUT = 976.00
4. 6" GATE VALVE WITH FRAME & COVER  
CONCRETE SLAB ELEVATION = 981.0  
6" INV = 977.17  
PROVIDE STEM TO ALLOW ACCESS TO GATE VALVE ABOVE WATER ELEVATION OF 981.7
5. 44.4 LF 6" C900 PVC PIPE @ 1.3% SLOPE  
INV IN = 977.75  
INV AT GATE VALVE = 977.17
6. HANSON 22"x22" SQUARE INLET  
TOP = 979.75  
6" INV OUT = 977.75

#### DRAINAGE SUMMARY

5. 6" OUTLET  
INV OUT = 975.92
6. 49.1 LF 6" C900 PVC PIPE @ 1.0% SLOPE  
INV AT CLEANOUT = 976.41  
INV OUT = 975.92
7. 6" TRAFFIC BEARING CLEANOUT (45° HORIZ. BEND)  
TOP = 976.41  
6" INV = 976.41
8. 23.3 LF 6" C900 PVC PIPE @ 1.0% SLOPE  
INV LEAVING OIL/WATER SEP. = 976.64  
INV AT CLEANOUT = 976.41
9. HIGHLAND TANK OIL/WATER SEPARATOR OUTLET  
WITH ACCESS PORT.  
TOP = 980.14  
6" INV OUT = 976.64
10. HIGHLAND TANK OIL/WATER SEPARATOR  
14 LF  
HIGHLAND TANK TO REVIEW PLANS AND APPROVE OIL/WATER SEPARATOR PRIOR TO ORDERING AND INSTALLATION.

#### DRAINAGE SUMMARY

8. HIGHLAND TANK OIL/WATER SEPARATOR INLET  
WITH ACCESS PORT  
TOP = 980.30  
6" INV = 976.89
9. 5.2 LF 6" C900 PVC PIPE @ 1.0% SLOPE  
INV AT GATE VALVE = 976.94  
INV OUT = 976.89
10. 6" GATE VALVE WITH FRAME & COVER  
CONCRETE SLAB ELEVATION = 980.38  
6" INV = 976.94  
PROVIDE STEM TO ALLOW ACCESS TO GATE VALVE ABOVE WATER ELEVATION OF 981.00
11. 15.7 LF 6" C900 PVC PIPE @ 1.0% SLOPE  
INV IN = 977.10  
INV AT GATE VALVE = 976.94
12. HANSON 22"x22" SQUARE INLET  
TOP = 980.00  
6" INV IN = 977.20  
6" INV OUT = 977.10
13. 54.8 LF 6" C900 PVC PIPE @ 1.0% SLOPE  
INV IN = 977.75  
INV OUT = 977.20
14. HANSON 22"x22" SQUARE INLET  
TOP = 979.75  
6" INV OUT = 977.75

#### SANITARY SEWER LATERAL NOTES AND DESIGN:

THIS PROJECT NO LONGER CONNECTS TO THE EXISTING SANITARY SEWER MAIN. THE OIL/WATER SEPARATOR NOW DISCHARGES TO THE SURFACE.

#### FIRE HYDRANT NOTES AND DESIGN:

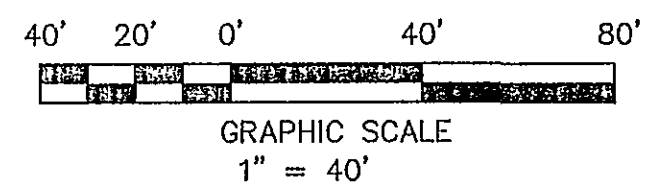
1. UNDER A SEPARATE REVIEW, THE CITY OF ROANOKE APPROVED A CHEMICAL FIRE SUPPRESSION SYSTEM UNDER PERMIT NO. F080025 FOR BUILDING IMPROVEMENTS. THE SITE IMPROVEMENTS TO GET THE FIRE LINE TO THE BUILDING IS BEING REVIEWED UNDER THIS PLAN.
2. THIS PROJECT SHALL COORDINATE WITH THE INSTALLATION OF THE PUBLIC FIRE VAULT, PUBLIC FIRE HYDRANT, AND PRIVATE FIRE LINE.
3. THE PROPOSED FIRE HYDRANT SHALL BE INSTALLED
4. THE MOST REMOTE POINT OF THE TANK CONTAINMENT AREA SHALL BE NO MORE THAN 250' FROM THE FIRE HYDRANT. AS SHOWN ON THE PLANS, THE HYDRANT IS 245' FROM THE MOST REMOTE POINT WHEN MEASURED AROUND THE WALL PERIMETER.

#### WATERLINE CONNECTION AND INSTALLATION NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH THE WESTERN VIRGINIA WATER AUTHORITY (WVWA) FOR THE CONNECTION OF THE NEW 8-INCH LINE WITH THE EXISTING 8-INCH LINE. THE WVWA SHALL MAKE THE ACTUAL CONNECTION TO THE EXISTING (SEE "O" FOR CONNECTION). A WET TAP CONNECTION IS PLANNED AND SHALL INCLUDE AN 8-INCH GATE VALVE, "1". A STREET OPENING PERMIT IS REQUIRED. THE CONTRACTOR ANTICIPATES THAT THE CONNECTION CAN BE MADE WITHOUT CUTTING THE PAVEMENT OR CURB; HOWEVER, SHOULD THE CURB BE DAMAGED, THE CONTRACTOR SHALL REPLACE THE CURB FROM JOINT TO JOINT AS NEW INSTALLATION. THE 8-INCH LINE FROM CONNECTION TO FIRE VAULT SHALL BE A PUBLIC LINE AND IS LOCATED WITHIN THE RIGHT OF WAY. THE FIRE HYDRANT SHALL BE A PUBLIC FIRE HYDRANT.

LIST OF PLANNED ITEMS AS NUMBERED WITHIN THE DRAWING:

- "O" WET TAP (PERFORMED BY THE WVWA)
- "1" 8-INCH GATE VALVE (PART OF WET TAP)
- "2" 8"x8"x6" TEE (6" GOING TO FIRE HYDRANT)
- "3" PUBLIC FIRE HYDRANT PER WVWA DETAIL "W-18"
- "4" PUBLIC FIRE VAULT PER CLEARFLOW DETAIL
- "5" POST INDICATOR VALVE (PIV) PER REQUIREMENTS
- "6" FIRE DEPARTMENT CONNECTION (FDC)
- "7" 8-INCH CLASS 350 DUCTILE IRON PRIVATE WATER LINE
- "8" LARGE RADIUS BEND
- "9" 8-INCH 90° BEND WITH THRUST BLOCK PER WVWA DETAIL "W/19"



**parker**  
DESIGN GROUP  
ENGINEERS • SURVEYORS • PLANNERS • LANDSCAPE ARCHITECTS

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PAUL J. BROWN  
Lic. No. 036148  
4-16-2009  
PROFESSIONAL ENGINEER

**Comprehensive Site Plan for  
Tank Containment Expansion  
for PM Properties, Inc.**  
3643 Aerial Way Drive, S.W.; Tax # 5220602  
City of Roanoke, VA

REVISIONS:

|                                      |            |
|--------------------------------------|------------|
| Address City Comments                | 02-11-2009 |
| Address City, SPCCC, & WVWA Comments | 03-28-2009 |
| Address Comments on Fire Line        | 04-16-2009 |

DESIGNED BY: PJB  
DRAWN BY: MFW  
CHECKED BY: PJB  
SCALE: 1" = 40'  
DATE: December 17, 2008  
SHEET TITLE:

Utility  
Plan

**C04**  
04 OF 08  
PROJECT NUMBER:  
08-0323-01

APPROVED  
APR 27 2009