

#### GRADING AND STORM DRAINAGE GENERAL NOTES:

1. THE PROJECT PROPERTY IS IN FEMA DEFINED ZONE "UNSHADED X" (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON FLOOD INSURANCE RATE MAP PANEL 51161C0158G, PANEL 158 OF 310, EFFECTIVE DATE SEPTEMBER 28, 2007. THIS DETERMINATION IS BASED ON SAID MAP AND HAS NOT BEEN VERIFIED BY ACTUAL FIELD ELEVATIONS.
2. CONTOUR INTERVAL SHOWN IS TWO (2) FOOT.
3. THE WORK OF THE PROJECT INVOLVES LAND DISTURBANCES OF MORE THAN ONE (1) ACRE. THE COUNTY OF ROANOKE AND VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (VDEQ) SHALL REQUIRE THE WORK BE PERMITTED IN ACCORDANCE WITH THE PROVISIONS OF GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES-AUTHORIZATION TO DISCHARGE UNDER THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) AND THE VIRGINIA STORMWATER MANAGEMENT ACT. THE OWNER/DEVELOPER HAS APPLIED FOR COVERAGE UNDER THE "VSMP GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES (VAR10)." EVIDENCE OF COVERAGE UNDER THE "VSMP GENERAL PERMIT" MUST BE PROVIDED TO ROANOKE COUNTY PRIOR TO BEGINNING ANY LAND DISTURBANCE ON THE PROPERTY. A COPY OF THE "VSMP GENERAL PERMIT" AND THE "STORMWATER POLLUTION PREVENTION PLAN (SWPPP)" MUST BE KEPT ON THE JOB SITE AT ALL TIMES AND THE "VSMP GENERAL PERMIT COVERAGE LETTER" MUST BE POSTED AT THE PROJECT SITE.
4. UPON COMPLETION OF THE STORM DRAINAGE SYSTEM, THE CONTRACTOR SHALL FURNISH TO THE OWNER AND ROANOKE COUNTY A FIELD SURVEYED FINAL CORRECT SET OF AS-BUILT PLANS OF THE NEWLY CONSTRUCTED STORM DRAIN AND/OR STORMWATER MANAGEMENT FACILITIES. AS-BUILT PLANS SHALL BE PROVIDED IN THE STATE PLANE VIRGINIA SOUTH COORDINATE SYSTEM, NAD 1983, FIPS 4502 FEET, US SURVEY FEET, DATUM NA 83, IN THE FORM OF 1 PAPER COPY AND 1 DIGITAL AUTOCAD FILE.

#### STEP: SLOPE REQUIREMENTS:

1. SLOPES THAT EXCEED THIRTY-THREE AND ONE-THIRD (33.3) PERCENT SHALL CONFORM TO THE REQUIREMENTS OF CHAPTER 8.1 OF THE CODE OF ROANOKE COUNTY.
2. CUT SLOPES OR FILL SLOPES SHOWN HEREON SHALL NOT BE GREATER THAN 2:1 HORIZONTAL: VERTICAL).
3. THERE ARE NO PROPOSED 2:1 (HORIZONTAL: VERTICAL) CUT SLOPES AND FILL SLOPES THAT ARE GREATER THAN TWENTY-FIVE VERTICAL FEET IN HEIGHT.

#### GRADING / STORM DRAINAGE PLAN KEYNOTES:

1. NEW STORM DRAIN SYSTEM. REFER TO STORM DRAINAGE DETAILS, GENERAL NOTES, AND PROFILES SHOWN ON SHEET C-10 AND C-10A FOR STRUCTURE AND STORM DRAINAGE LINE INFORMATION.
2. GRADING OF NEW STREET (SHOWN CONTOURS) IS BASED ON PROFILES (SHOWN ON SHEETS C-5) AND TYPICAL SECTION (SHOWN ON SHEET C-11). SEE NOTES ON SHEET D-2 REGARDING FUTURE LOT GRADES.
3. NEW SANITARY SEWER LINE AND WATER LINE SHOWN FOR INFORMATION AND COORDINATION PURPOSES ONLY. CONTRACTOR SHALL CONFIRM LOCATION & INVERT OF EXISTING AND NEW UTILITY LINES PRIOR TO INSTALLATION OF STORM DRAINAGE. REFER TO SHEETS C-4 FOR ADDITIONAL INFORMATION.
4. WATER QUALITY STRUCTURE/BMP NO. 1 & NO. 2. REFER TO DETAILS, SECTIONS, AND ENLARGED PLAN VIEW ON SHEET C-12 AND "STORMWATER MANAGEMENT NOTES / NARRATIVE" THIS SHEET FOR ADDITIONAL INFORMATION. B.M.P. TO REMAIN "OFF-LINE" UNTIL UPSTREAM AREAS HAVE BEEN STABILIZED. REFER TO NOTE 2 ON DIVERSION STRUCTURE DETAIL ON SHEET C-12 FOR ADDITIONAL INFORMATION.
5. WATER QUALITY BMP NO. 3. REFER TO SECTIONS, ENLARGED PLAN, AND SEQUENCE OF CONSTRUCTION ON SHEET C-12A AND "STORMWATER MANAGEMENT NOTES / NARRATIVE" THIS SHEET FOR ADDITIONAL INFORMATION.
6. NEW DITCH. REFER TO SHEET C-10 & C-10A FOR PROFILE, TYPICAL SECTION AND DESIGN DATA.
7. FUTURE STORM DRAINAGE SYSTEM AND OUTFALL CHANNEL TO BE CONSTRUCTED IN PHASE IIB AND IIC OF DEVELOPMENT. SHOWN FOR INFORMATION ONLY. REFER TO PLANS APPROVED (IN 2002 AND 2007) FOR VILLAGE AT TINKER CREEK FOR PROFILES AND ADDITIONAL INFORMATION.
8. POTENTIAL AREA OF KARST GEOLOGY AS DEFINED BY ENCLOSED EXISTING "1060" CONTOUR. REFER TO "KARST GEOLOGY NOTES" ON THIS SHEET FOR ADDITIONAL INFORMATION. ALSO REFER TO LETTER OF RECOMMENDATIONS PREPARED BY GEOTECHNICS, INC. FOR ADDITIONAL INFORMATION.

#### STORMWATER MANAGEMENT NOTES / NARRATIVE:

1. THE STORMWATER BMP / POLLUTANT REMOVAL MEASURE PROPOSED FOR THIS PROJECT ARE:
  - A. BMP NO. 1: A MANUFACTURED BMP - THE "JELLYFISH STORMWATER FILTER" AS MANUFACTURED BY CONTECH ENGINEERING SOLUTIONS, LLC. REFER TO SHEET C-12 FOR DETAILS, SECTIONS, AND ADDITIONAL LAYOUT INFORMATION.
  - B. BMP NO. 2: A MANUFACTURED BMP - THE "INLINE CDS" AS MANUFACTURED BY CONTECH ENGINEERING SOLUTIONS, LLC. THE CDS UNIT (CONTINUOUS DEFLECTIVE SEPARATION) IS A HYDRODYNAMIC SEPARATOR. REFER TO SHEET C-12 FOR DETAILS AND SECTIONS, AND SHEET C-12 ADDITIONAL LAYOUT INFORMATION.
  - C. BMP NO. 3: A BIOTRETENTION SYSTEM IN ACCORDANCE WITH VIRGINIA DCR STORMWATER DESIGN SPECIFICATION NO. 9 USING LEVEL 1 DESIGN CRITERIA. REFER TO SHEET C-12 AND C-12A FOR DETAILS AND SECTIONS.
2. THE TOTAL POLLUTANT LOAD (TP) REDUCTION REQUIRED FOR THE WORK OF THIS PROJECT IS 2.03 LBS/YEAR AS DETERMINED BY THE "VIRGINIA RUNOFF REDUCTION METHOD (VRRM) WORKSHEET." THE TOTAL POLLUTANT LOAD (TP) REDUCTION PROVIDED BY THE BMP SYSTEMS SHOWN ON THIS PROJECT IS 2.11 LBS/YEAR. SEE THE "STORMWATER SITE STATISTICS" AND "EXISTING/NEW BMP INFORMATION" TABLES SHOWN ON THIS SHEET FOR ADDITIONAL INFORMATION.
3. PEAK RUN-OFF REDUCTION STORMWATER MANAGEMENT IS PROVIDED BY AN EXISTING DETENTION BASIN / WET BASIN LOCATED WITHIN THE DEVELOPMENT. UNDER A SEPTEMBER 2013 EVALUATION OF THE SWM DETENTION BASIN, MATTERN & CRAIG CONSULTING ENGINEERS & SURVEYORS DETERMINED THE BASIN WAS CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED PLANS AND THAT AT KEY ELEVATIONS THE BASIN PROVIDED VOLUMES UP TO 18-PERCENT GREATER THAN REQUIRED DESIGN: ORIGINAL DESIGN VOLUME REQUIRED AT ELEVATION 1062 = 80,660 CF / PROVIDED DESIGN VOLUME AT ELEVATION 1062 = 94,310 CF. OF THE ORIGINAL SWM BASIN WAS DESIGN TO ACCOMMODATE THE RUN-OFF FROM THIS PHASE OF THE DEVELOPMENT AND WAS DESIGNED TO REDUCE THE POST-DEVELOPED 25-YEAR PEAK RUN-OFF TO A PRE-DEVELOPED 10-YEAR PEAK RUN-OFF AND THE POST-DEVELOPED 10-YEAR PEAK RUN-OFF TO A PRE-DEVELOPED 2-YEAR PEAK RUN-OFF. THE POINT OF ANALYSIS WAS THE POINT OF DISCHARGE IN TO TINKER CREEK. BASED ON THIS INFORMATION THE DETENTION BASIN IS DEEMED SUFFICIENT TO PROVIDE THE REQUIRED PEAK RUN-OFF REDUCTION REQUIRED AND MEET THE REQUIREMENTS OF MS-19.

#### KARST GEOLOGY NOTES:

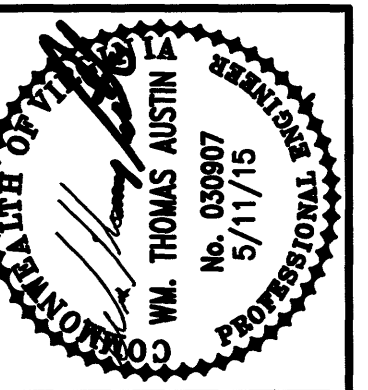
A PORTION OF THE PROJECT AREA IS IDENTIFIED AS A POTENTIAL KARST AREA BY THE ROANOKE COUNTY GIS AND THE FEATURES OF THE TOPOGRAPHIC MAPPING. THE POTENTIAL KARST AREA IS LOCATED ALONG THE NORTHERN PROPERTY LINE (AS SHOWN HEREON) AND APPEARS TO CROSS OVER ONTO THE ADJOINING PROPERTY LOCATED TO THE NORTH. A REVIEW OF THE IDENTIFIED AREA BY A PROFESSIONAL ENGINEER HAS REVEALED NO ACTIVE SINK HOLES AND NO AREAS OF PONDING WATER IN THE LOCALIZED DEPRESSION. IN ORDER TO OFF-SET CONCERNS REGARDING THE KARST AREA, THE DEVELOPER HAS IDENTIFIED THE KARST AREA AS A "NO-BUILD" AREA - RESTRICTING THE CONSTRUCTION OF STRUCTURES IN THIS AREA. IN ADDITION, THE CONSTRUCTION OF THE STORM DRAINAGE LINE FROM SD# 408 TO SD# 399 IS INTENDED TO COLLECT SURFACE RUN-OFF INTO THE KARST AREA AND CONVEY IT TO A SUITABLE OUTFALL - THUS ELIMINATING THE POTENTIAL FOR PONDING WATER. OTHER MEASURES, SUCH AS WATER-TIGHT JOINTS FOR ALL STORM DRAINAGE PIPING, ARE INCORPORATED INTO THE DESIGN.

BENCHMARK TABLE			
	①	②	
NORTHING (1)	3649192.515	3648991.439	
EASTING (1)	11064885.026	11064823.583	
ELEVATION (2)	1079.88	1093.62	
DESCRIPTION	PI/PK IN STUMP	PI/IRC	

(1) VIRGINIA STATE PLANE COORDINATE SYSTEM - FROM PLAT INST. #201000283  
(2) NGVD88

STORMWATER SITE STATISTICS		
	EXISTING	PROPOSED
TOTAL DISTURBED AREA (AC) (NOTE 1)	0.00	4.46
TOTAL SITE AREA (AC)	3.35	3.35
IMPERVIOUS AREA (AC)	0.10	1.12
MANAGED TURF AREA (AC)	3.25	2.23
OPEN SPACE / FORREST AREA (AC)	0.00	0.00
RIGHT-OF-WAY DISTURBANCE (SF)	0.00	0.00
NOTES:		
1.) INCLUDES AREA OFF-SITE FOR OUTFALL PIPE AND CHANNEL		

NEW BMP INFORMATION			
	BMP NO. 1	BMP NO. 2	BMP NO. 3
BMP TYPE:	Manufactured / Proprietary BMP: "Jellyfish Filter"	Manufactured / Proprietary BMP: "CDS"	Bioretention Filter
LEVEL OF TREATMENT (LEVEL 1 OR LEVEL 2):	N/A	N/A	LEVEL 1
TECHNICAL REQUIREMENTS MET (PART IIB OR IIC):	YES - IIB	YES - IIB	YES - IIB
TOTAL AREA TREATED (AC):	5.90	5.90	0.99
IMPERVIOUS AREA TREATED BY BMP (AC):	1.39	1.39	0.33
MANAGED TURF AREA TREATED BY BMP (AC):	4.51	4.51	0.66
OPEN SPACE / FORREST AREA TREATED BY BMP (AC):	0	0	0
SURFACE AREA OF BMP (AC):	N/A	N/A	0.0215
STORAGE / TREATMENT VOLUME OF BMP (AC-FT):	N/A	N/A	0.0371
MAXIMUM AVERAGE DEPTH (FT):	N/A	N/A	0.83
QUALITY, QUANTITY, OR BOTH?:	QUALITY	QUALITY	BOTH
TMDL ADDRESSED? (PHOSPHOROUS, BACTERIA, SEDIMENT, ETC):	NO	NO	NO
LATITUDE (DECIMAL DEGREES XX.XXXX):	37.3367 N	37.3367 N	37.3369 N
LONGITUDE (DECIMAL DEGREES XX.XXXX):	79.9383 W	79.9383 W	79.9383 W
NAME OF RECEIVING WATER:	TINKER CREEK	TINKER CREEK	TINKER CREEK
HYDROLOGIC UNIT CODE (ALPHANUMERIC CODE RU14, ETC):	RU11	RU11	RU11



Revisions	Date	Comments
1	7/17/15	1ST REVIEW
2	9/4/15	APPROVED SET

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Designed By: RWA  
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THE VILLAGE AT TINKER CREEK - PHASE IIIA  
**GRADING & STORM DRAINAGE PLAN**  
ROANOKE COUNTY, VIRGINIA

Vertical Scale:  
N/A

Horizontal Scale:  
1" = 50'

Commission Number:  
1966-P3

Sheet No.:

**C-9**