



**TOWN OF HAYMARKET PLANNING COMMISSION**  
**REGULAR MEETING**  
**~ AGENDA ~**

Emily Kyriazi, Town Planner  
<http://www.townofhaymarket.org/>

15000 Washington Street, Suite 100  
Haymarket, VA 20169

Tuesday, February 22, 2022

7:00 PM

Council Chambers

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**I. Call to Order**

**II. Pledge of Allegiance**

**III. Citizens' Time**

**IV. Minute Approval**

1. Planning Commission - Regular Meeting - Jan 18, 2022 7:00 PM

**V. Agenda Items**

1. Site Plan Review - Robinson Paradise
2. Comprehensive Plan Discussion

**VI. Old Business**

**VII. New Business**

**VIII. Architectural Review Board Update**

**IX. Town Council Update**

**X. Adjournment**



# TOWN OF HAYMARKET PLANNING COMMISSION

## REGULAR MEETING ~ MINUTES ~

Emily Kyriazi, Town Planner  
<http://www.townofhaymarket.org/>

15000 Washington Street, Suite 100  
Haymarket, VA 20169

Tuesday, January 18, 2022

7:00 PM

Council Chambers

A Regular Meeting of the Planning Commission of the Town of Haymarket, VA, was held this evening in the Council Chambers, commencing at 7:00 PM.

Chairman Alexander Beyene called the meeting to order.

### I. Call To Order

Chairman Matt Caudle: Present, Councilman Bob Weir: Present, Commissioner Robert Hallet: Present, Chairman Alexander Beyene: Present, Robert Chrisman: Present.

### II. Pledge of Allegiance

Chairman Alexander Beyene invited everyone to stand for the Pledge of Allegiance.

### III. Citizens Time

There were no citizen's present at this evening's meeting.

### IV. Minute Approval

1. Planning Commission - Regular Meeting - Nov 15, 2021 7:00 PM

**Commissioner Caudle moved to accept the Planning Commission minutes from the November 15, 2021 meeting. Commissioner Hallet seconded the motion. The motion carried.**

<b>RESULT:</b>	<b>ACCEPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Matt Caudle, Chairman
<b>SECONDER:</b>	Robert Hallet, Commissioner
<b>AYES:</b>	Caudle, Weir, Hallet, Beyene, Chrisman

### V. Agenda Items

#### 1. Comp Plan Discussion

Town Planner Emily Kyriazi opened the discussion on the Comprehensive Plan asking for feedback, updates, survey questions, and information on how to collect the data. The Planning Commission continued the discussion on which questions to ask, collate and if the questions can be included in the Town's quarterly newsletter. Mrs. Kyriazi suggested that she would send out a draft survey by the end of the week, with the Planning Commission to give final edits and then approval by midweek. A small discussion continued amongst the Planning Commission on the needs, costs, and benefits of the survey.

#### 2. John Marshall Village Addition 1 Mile Review Discussion

Town Planner Emily Kyriazi stated that a rezoning application was submitted to the county from Van Metre for an additional piece of property that wasn't included in the original plan for rezoning to place additional homes on the site; they would like to add 16 to 18 2 over 2's. Mrs. Kyriazi opened up the projector to show the area that is in question. The Planning Commission continued with a small discussion. Mrs. Kyriazi asked the Commission if they had any comments or concerns to pass on to the county. Councilman Weir suggested to give the comments that were given of John Marshall Commons rezoning to the county.

### VI. Old Business

Town Planner Emily Kyriazi gave updates on Crossroads Village Center site stating that they are coming back to the Town Council with a traffic impact analysis study that was requested by Council at their November 2021 meeting. She also noted that the site plans are coming in for Robinson Village.

Minutes Acceptance: Minutes of Jan 18, 2022 7:00 PM (Minute Approval)

### VII. New Business

Town Planner Emily Kyriazi shared that there are no new updates.

### VIII. ARB Updates

Commissioner Hallet gave a brief update. He stated that Lidl submitted a material/color change which was approved.

### IX. Town Council Updates

Councilman Weir gave a brief Town Council update. He stated that Chris Coon has moved on to Louisa County and Mrs. Kyriazi is the acting Town Manager. The Town has added a new position of part-time Events Planner. The Town purchased a new maintenance pickup truck. He also noted that the Council adopted a new design/build policy for the sidewalk in front of the park. A small discussion ensued.

### X. Adjournment

**With no further business before the Planning Commission, Councilman Weir moved to adjourn with a seconded by Commissioner Chrisman. The motion carried.**

#### 1. Motion to Adjourn

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Bob Weir, Councilman
<b>SECONDER:</b>	Robert Chrisman
<b>AYES:</b>	Caudle, Weir, Hallet, Beyene, Chrisman

Submitted:

Approved:

\_\_\_\_\_  
Kim Henry, Clerk of the Council

\_\_\_\_\_  
Alexander Beyene, Chairman

Minutes Acceptance: Minutes of Jan 18, 2022 7:00 PM (Minute Approval)



Revised 9/2017

VDOT GENERAL NOTES

- 1. VDOT Approved Exceptions/Waivers (must be incorporated in the plan):
• Access Management - Date of Approval:
• SSAR- Date of Approval:
• Design Waiver - Date of Approval:
• Other Date of Approval:
2. SSAR Connectivity Summary (provide a check mark where applicable or write N/A):
• Connections in multiple directions (first connection must be to a VDOT maintained road, the second connection may either be to a VDOT road or to a stub out)
• Stub out connection (the prop. right of way terminates at parcel abutting the development and consists of a short segment that is intended to serve current and future development; the applicant must verify that connection with a future street is feasible)
3. All work on this project shall conform to the current editions of and latest revisions to the Virginia Department of Transportation (VDOT) Road and Bridge Specifications and Standards, the Virginia Erosion and Sediment Control Regulations, and any other applicable state, federal or local regulations. In case of a discrepancy or conflict between the Standards or Specifications and Regulations, the most stringent shall govern.
4. Methods and materials used shall conform to current county/town and VDOT standards and specifications.
5. All utilities, including all poles, are to be relocated at the developer's expense, prior to construction.
6. Open cutting of paved or surface treated roads is not permitted. All utilities which will be placed under existing streets are to be bored or jacked. Any exceptions, due to extenuating circumstances, are to be addressed at the permit stage.
7. Any type of reverse curb (spill curb, CG-6R, etc.) and transition to these curbs shall not be used within the public right of way.
8. The developer is responsible for any damage to existing roads and utilities which occur as a result of project construction within or contiguous to existing right of way limits.
9. A smooth grade shall be maintained from the centerline of the existing road to the proposed edge of pavement to preclude the forming of false gutters and/or the ponding of any water in the roadway.
10. Standard guardrails and/or handrails shall be installed at hazardous locations as designated during field review by the county/town inspector or VDOT.
11. The developer is responsible for all traffic control. The developer shall submit a signing, striping and/or signalization plan to the VDOT Land Development Section prior to permit application. The developer shall not commence construction of any pavement course without an approved striping plan.
12. Pavement design shall be provided in accordance with the Pavement Design Guide for Subdivision and Secondary Roads in Virginia. For primary roads and interstate highways where truck traffic exceeds 5%, pavement design shall be provided in accordance with AASHTO guidelines. Typical pavement sections shall depict the top 6" of the subgrade immediately under the pavement structure compacted to 100% of the theoretical maximum dry density.
13. Asphalt pavement widening shall conform to VDOT Standard WP-2.
14. All right of way dedicated to public use shall be clear and unencumbered.
15. Flowers, shrubs, trees, and irrigation shall not be placed within State maintained right of way limits without an approved set of plans and an approved planting agreement. No irrigation (sprinkler) systems, brick columns, end walls, and/or brick mailboxes will be constructed or installed within State maintained right of way limits without a permit. Any of the above items found in the right of way without a permit will be removed, and all costs of the removal will be borne by the owner and/or developer.
16. The county/town shall obtain a permit for all sidewalks/crosswalks within the right of way that do not qualify for VDOT maintenance.
17. Traffic control devices or advisory signs, such as multiway stops, speed limits, Watch for Children, Pedestrian Traffic, etc., shall not be installed unless specifically shown on these plans or a VDOT approved plan revision. Speed study certified by professional engineer shall be submitted for VDOT approval prior to the street acceptance for any road to be posted other than the statutory speed limit. Should unapproved signs be noted at the time of VDOT inspection, the road acceptance process shall be terminated immediately and not recommenced until a determination is made regarding the approval of any additional signs. Immediate removal of such signs shall not negate the need for the submission of a revision.
18. During construction, the maintenance of traffic shall conform to the requirements in the most recent version of the Virginia Work Area Protection Manual and the MUTCD.
19. Maintenance Of Traffic Plan shall be submitted with VDOT permit application.

LOT TABULATION

Table with columns: LOT #, AREA (SF), OPEN SPACE AREA (SF), COVERAGE (SF, %), FRONTAGE LENGTH (FT). Rows 1-20.

GENERAL NOTES:

- 1. THE PROJECT SITE CONSIST OF 22 EXISTING PARCELS THAT TOTAL UP TO 6.5349 ACRES. THEY ARE LOCATED AT THE FOLLOWING PRINCE WILLIAM COUNTY GEOGRAPHIC PARCEL IDENTIFICATION NUMBERS (PIN) AND ADDRESSES AND ARE ALL ZONED PLANNED MIXED RES.
LOT 1 7298-01-6445 14963 WALTER ROBINSON LN
LOT 2 7298-01-5551 14967 WALTER ROBINSON LN
LOT 3 7298-01-4658 14973 WALTER ROBINSON LN
LOT 4 7298-01-3864 14979 WALTER ROBINSON LN
LOT 5 7298-01-3070 14997 WALTER ROBINSON LN
LOT 6 7298-01-2475 15001 WALTER ROBINSON LN
LOT 7 7298-01-1779 15005 WALTER ROBINSON LN
LOT 8 7298-01-1267 15017 WALTER ROBINSON LN
LOT 9 7298-01-0471 15021 WALTER ROBINSON LN
LOT 10 7298-01-0983 15029 WALTER ROBINSON LN
LOT 11 7298-01-0286 15013 WALTER ROBINSON LN
LOT 12 7298-01-9576 15025 WALTER ROBINSON LN
LOT 13 7298-01-9096 15033 WALTER ROBINSON LN
LOT 14 7298-02-9505 15032 WALTER ROBINSON LN
LOT 15 7298-02-0708 15022 WALTER ROBINSON LN
LOT 16 7298-02-1502 15012 WALTER ROBINSON LN
LOT 17 7298-01-2197 15008 WALTER ROBINSON LN
LOT 18 7298-01-4678 14980 WALTER ROBINSON LN
LOT 19 7298-01-5373 14976 WALTER ROBINSON LN
LOT 20 7298-01-5989 14972 WALTER ROBINSON LN
PARCEL "A" 7298-01-8583 15029 WALTER ROBINSON LN
PARCEL "B" 7298-01-3481 15000 WALTER ROBINSON LN
2. THESE PROPERTIES ARE IN THE NAME OF D.B. MANAGEMENT, INC., PROFIT SHARING PLAN AS RECORDED IN INSTRUMENT NUMBER 200807310072966 AND CHARLES EDWARD ROBINSON, JR. AS RECORDED IN INSTRUMENT NUMBER 201804090024002 AMONG THE LAND RECORDS OF PRINCE WILLIAM COUNTY, VIRGINIA.
3. BOUNDARY INFORMATION AS SHOWN HEREON IS BASED ON DEEDS AND PLATS OF RECORD AS BEST FIT TO A CURRENT FIELD RUN SURVEY COMPLETED BY THIS FIRM ON JANUARY 27, 2021.
4. THE HORIZONTAL DATUM AS REFERENCED HEREON WAS ESTABLISHED BY GPS CONTROL METHODS PERFORMED BY THIS FIRM IN JANUARY, 2004. THE HORIZONTAL DATUM IS REFERENCED TO VIRGINIA STATE GRID, NORTH ZONE, NAD83 (2011) AND IS REFERENCED IN U.S. SURVEY FEET.
5. THESE PROPERTIES AS SHOWN HEREON ARE NOT IN A 100-YEAR FLOODPLAIN. THEY LIE IN ZONE "X" (UN-SHADED) AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP FOR PRINCE WILLIAM COUNTY, VIRGINIA, AND INCORPORATED AREAS, COMMUNITY-PANEL NUMBER 5115300059 D, EFFECTIVE DATE JANUARY 5, 1995.
6. UTILITIES WERE LOCATED BY BOWMAN CONSULTING GROUP AT THE TIME OF THIS SURVEY BASED ON OBSERVED EVIDENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION AND FOR ANY DAMAGES THAT MAY OCCUR DUE TO HIS FAILURE TO LOCATE AND PROTECT THESE UNDERGROUND FACILITIES.
7. THERE ARE NO KNOWN GRAVE SITES OR HISTORICAL SITES ON THIS PROPERTY. IF DURING THE COURSE OF CONSTRUCTION ANY GRAVE SITE IS ENCOUNTERED, THE CONTRACTOR SHALL CEASE WORK IN THAT AREA AND IMMEDIATELY NOTIFY THE PROPER AUTHORITY, TOWN OF HAYMARKET, AND/OR THE ENGINEER.
8. SEDIMENT AND EROSION CONTROL IS TO BE PROVIDED IN ACCORDANCE WITH THE LATEST EDITION OF THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK".
9. ALL CONSTRUCTION METHODS AND MATERIALS USED SHALL CONFORM TO CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS.
10. THE DEVELOPER IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS AND UTILITIES WHICH OCCUR AS A RESULT OF PROJECT CONSTRUCTION WITHIN OR CONTIGUOUS TO EXISTING RIGHT OF WAY.
11. A 4" (MIN) LAYER OF STONE IS REQUIRED BENEATH THE CURB AND GUTTER.
12. SUBBASE DEPTH FOR SUBGRADE IS BASED ON AN ASSUMED CBR VALUE OF 10. SOILS TESTS OF SUBGRADE MUST BE SUBMITTED FOR ACTUAL DETERMINATION OF SUBBASE THICKNESS PRIOR TO CONSTRUCTION.
13. A SMOOTH GRADE SHALL BE MAINTAINED FROM CENTERLINE OF EXISTING ROAD TO PROPOSED CURB AND GUTTER TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/OR THE PONDING OF ANY WATER IN THE ROADWAY.
14. CONTROLLED FILLS MUST BE COMPACTED TO 95% AS DETERMINED BY METHOD "A" PER STANDARD PROCTOR AASHTO T-99 OR ASTM D-698. DENSITY MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
15. ALL BASE, SUBBASE AND SUBGRADE MATERIALS SHALL BE COMPACTED TO 95% OF THEORETICAL MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99 METHOD "A" WITH 20% OF OPTIMUM MOISTURE FOR THE FULL WIDTH OF ANY DEDICATED RIGHT OF WAY, COMMERCIAL AREAS, PARKING LOTS, PRIVATE STREETS, PARKING BAYS, CURB AND GUTTER, AND SIDEWALKS ADJACENT TO STREETS AND PARKING LOTS, UNLESS OTHERWISE NOTED.
16. D.I.P. WATER MAIN TO BE CLASS 52.
17. A SEPARATE PERMIT IS REQUIRED FOR SIGNS AND STRIPING PER SECTION 52-15.3 OF THE TOWN OF HAYMARKET ZONING ORDINANCE.
18. THE DIMENSIONS AND LOCATION OF ALL SIGNS ARE SUBJECT TO REVIEW AND APPROVAL UPON APPLICATION FOR SIGN PERMITS IN ACCORDANCE WITH SECTION 52-15.10.b OF THE TOWN OF HAYMARKET ZONING ORDINANCE.
19. THE APPLICANT MUST OBTAIN ALL APPLICABLE FEDERAL, STATE AND LOCAL PERMITS.
20. PRIOR TO ISSUING A PERMIT THAT ALLOWS ANY TYPE OF LAND DISTURBANCE, RELATED TO A FINAL SITE AND SUBDIVISION PLAN ALL WETLAND PERMITS REQUIRED BY FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS SHALL BE OBTAINED AND EVIDENCE OF SUCH SUBMITTED TO THE TOWN OF HAYMARKET.
21. THIS PLAN COMPLIES WITH THE NEW PRINCE WILLIAM COUNTY SERVICE AUTHORITY UTILITY STANDARDS MANUAL, WHICH WENT INTO EFFECT ON APRIL 3, 2021. ALL UTILITY PERMITS ISSUED AFTER THIS DATE MUST COMPLY WITH THE CONSTRUCTION CRITERIA IN THE NEW MANUAL, INCLUDING ANY REVISIONS WHICH HAVE BEEN ISSUED.

LAND CONSERVATION NOTES

PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

DURING CONSTRUCTION OF THE PROJECT, SOIL STOCK PILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT, IN THE OPINION OF THE LOCAL PROGRAM ADMINISTRATOR OR HIS DESIGNATED AGENT, IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.

SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.

WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.

ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.

BEORE NEWLY CONSTRUCTED STORM WATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.

WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NON-ERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THE STRUCTURES IF ARMORED BY NON-ERODIBLE COVER MATERIALS.

WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY STREAM CROSSING CONSTRUCTED OF NON-ERODIBLE MATERIAL SHALL BE PROVIDED.

ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE ADHERED TO.

THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN A WATERCOURSE IS COMPLETED.

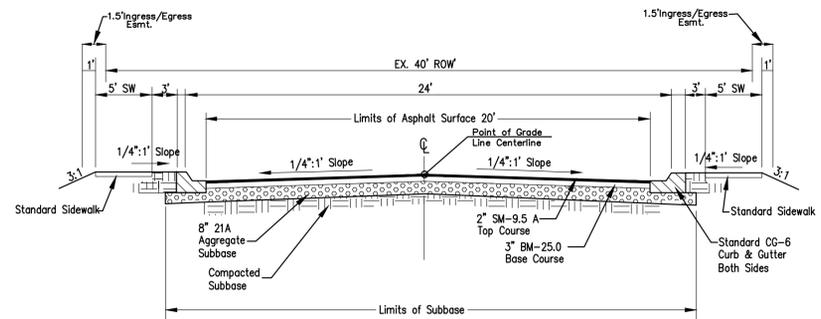
UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:

- A NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
B EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
C EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
D RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS.
E APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.

WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS PROVISION SHALL APPLY TO INDIVIDUAL SUBDIVISION LOTS AS WELL AS TO LARGER LAND DISTURBING ACTIVITIES.

ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL PROGRAM ADMINISTRATOR. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

REFER TO SHEET 25 FOR EROSION & SEDIMENT CONTROL NARRATIVE.



TYPICAL SECTION FOR WALTER ROBINSON LANE NOT TO SCALE

NOTE: CBR TEST SHALL BE PERFORMED PRIOR TO DETERMINATION OF FINAL SUBGRADE ELEVATION. SUBBASE DEPTH IS BASED ON A CBR VALUE OF 10 UNLESS OTHERWISE NOTED. SOIL TESTS OF SUBGRADE MUST BE SUBMITTED FOR ACTUAL DETERMINATION OF REQUIRED SUBBASE THICKNESS PRIOR TO CONSTRUCTION. ALL SUBGRADE SHALL BE COMPACTED TO A MINIMUM 95% DENSITY AT 20% OF OPTIMUM MOISTURE CONTENT PER AASHTO-T99 METHOD.

LEGEND

- EXISTING INTERMEDIATE CONTOUR 142
EXISTING INDEX CONTOUR 140
PROPOSED CONTOUR 140
EXISTING EDGE OF PAVEMENT EX. E/P
PROPOSED EDGE OF PAVEMENT PROP. E/P
EXISTING CURB AND GUTTER EX. C & G
PROPOSED CURB AND GUTTER CG-6
EXISTING STORM SEWER EX. 375 mm (15") RCP
PROPOSED STORM SEWER PROP. 375 mm (15") RCP
EXISTING SANITARY SEWER
PROPOSED SANITARY SEWER
PROPERTY LINE
EASEMENT LINE
CENTERLINE
LIMITS OF CLEARING AND GRADING
EXISTING SPOT ELEVATION 42.50
PROPOSED SPOT ELEVATION 42.50
EXISTING TREE 15" OAK
PROPOSED TREE OAK
FENCELINE
EXISTING UTILITY POLE
PROPOSED UTILITY POLE
EXISTING WATERLINE W/ TEE
PROPOSED WATERLINE W/ TEE
PROPOSED FIRE HYDRANT
EXISTING WATER VALVE
PROPOSED WATER VALVE
PROPOSED WATER METER
PROPOSED REDUCER
PROPOSED SIGN
TEST PIT LOCATION
VEHICLES PER DAY COUNT
PROPOSED STREET LIGHT
PROPOSED STREET NAME SIGN
SANITARY MANHOLE IDENTIFIER
STORM DRAIN STRUCTURE IDENTIFIER

EXISTING EASEMENTS LEGEND

- EX. 30' BUFFER INSTR. #200512160214953 & 200512160214954
EX. BLANKET UTILITY EASEMENT FOR SANITARY SEWER AND WATERLINE INSTR. #12160214953 & 12160214954
EX. BLANKET PRIVATE UTILITY EASEMENT FOR SANITARY SEWER AND WATERLINE INSTR. #12160214953 & 12160214954
EX. INGRESS/EGRESS EASEMENT FOR THE BENEFIT OF PIN #7298-02-2118 INSTR. #12160214953 & 12160214954 TO BE VACATED
EX. SIGN EASEMENT INSTR. #12160214953 & 12160214954
EX. STORM DRAIN EASEMENT INSTR. #12160214953 & 12160214954
EX. PERMANENT CONSERVATION AREA FOR BMP INSTR. #12160214953 & 12160214954
EX. STORMWATER MANAGEMENT EASEMENT INSTR. #12160214953 & 12160214954
EX. 18" INGRESS/EGRESS EASEMENT D.B. 223, PG. 408 PORTION VACATED BY INSTR. #200512160214956
EX. 25" INGRESS/EGRESS EASEMENT D.B. 1537, PG. 1005

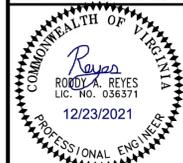
PROPOSED EASEMENTS LEGEND

- IE DENOTES INGRESS/EGRESS EASEMENT
SD DENOTES STORM DRAIN EASEMENT
SWM DENOTES STORMWATER MANAGEMENT EASEMENT
ALL EASEMENTS ARE PERMANENT UNLESS SPECIFICALLY NOTES AS TEMPORARY.

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GENERAL NOTES
FINAL SUBDIVISION PLAN
ROBINSON'S PARADISE
TOWN OF HAYMARKET
VIRGINIA

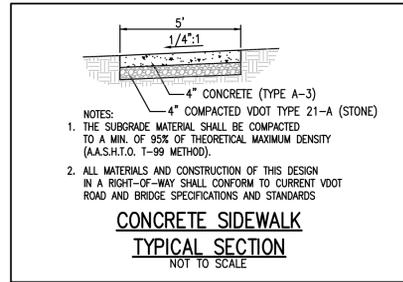
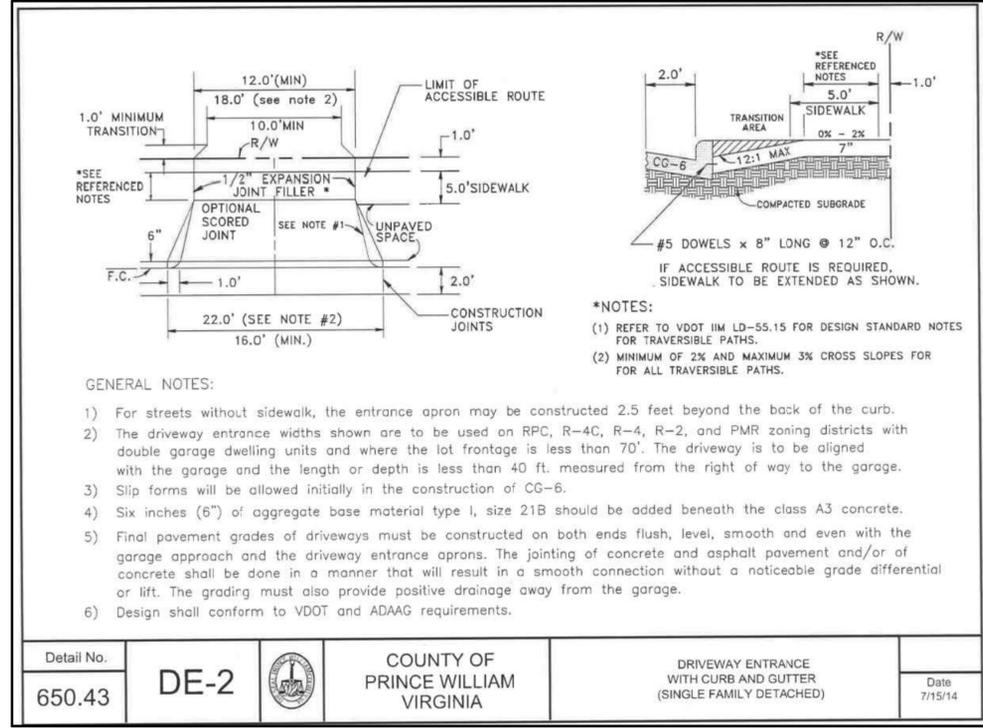
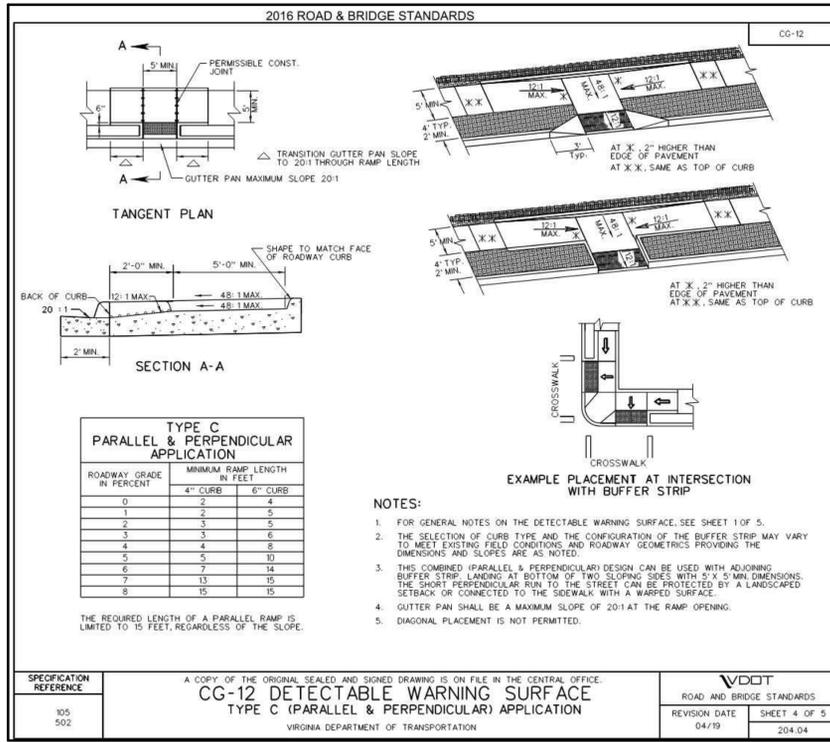
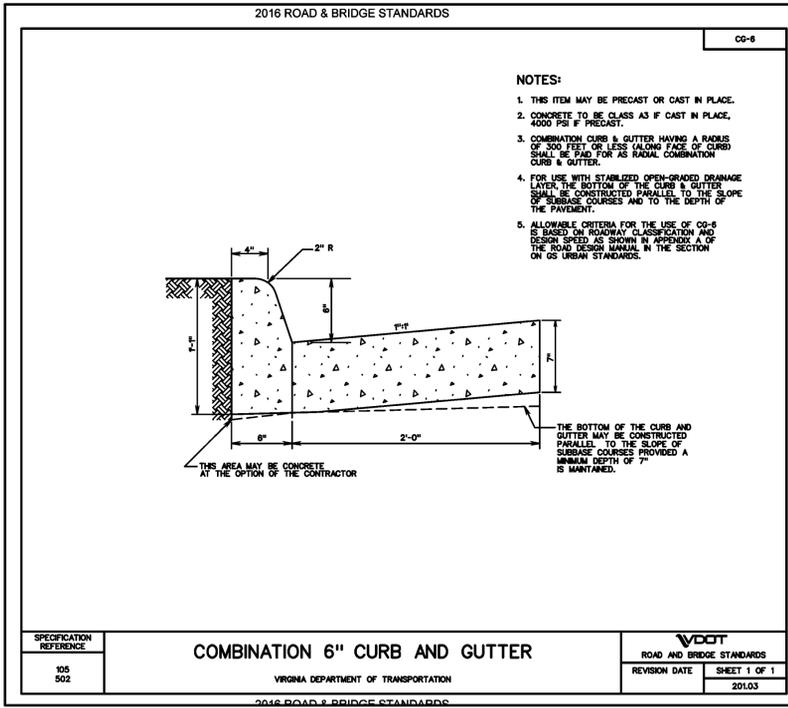
PROJECT NO
COUNTY PROJECT NUMBER



PLAN STATUS
03/10/21 1st. SUBMISSION
07/13/21 1st. DEQ. SUBMISSION
10/18/21 2nd. SUBMISSION
12/23/21 3rd. SUBMISSION

DATE DESCRIPTION
MFC MFC RAR
DESIGN DRAWN CHKD
SCALE H: V:
JOB No. 140175-01-001
DATE : 12/23/21
FILE No.

SHEET 02 OF 28



**Bowman**

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GENERAL NOTES & DETAILS

FINAL SUBDIVISION PLAN

ROBINSON'S PARADISE

TOWN OF HAYMARKET

VIRGINIA

PROJECT NO. COUNTY PROJECT NUMBER

COMBINE HEALTH OF VIRGINIA

RODOLFO A. REYES  
L.C. NO. 036571  
12/23/2021  
PROFESSIONAL ENGINEER

PLAN STATUS	
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ. SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION
DATE	DESCRIPTION
MFC	MFC RAR
DESIGN	DRAWN CHKD
SCALE	H: V:
JOB No.	140175-01-001
DATE :	12/23/21
FILE No.	

SHEET **03** OF **28**

**GENERAL PLAN INFORMATION**

Project Plan Name: ROBINSON'S PARADISE  
 Prince William County Plan Number: N/A  
 Engineering Firm: BOWMAN

Project Location: TOWN OF HAYMARKET

**SERVICE AREA INFORMATION**

Pressure Zone: Haymarket  
 High Hydraulic Grade Line (ft): 535  
 Low Hydraulic Grade Line (ft): 515

Sewer Shied: Little Bull Run  
 Local Facility Charge: Little Bull Run  
 Master Plan Utility Adjustment Applicable: No

**PROJECT METRICS**

**WATER MAIN**

Size	Length	Material
8-inch		
12-inch	2085	DIP
6-inch	415	DIP
4-inch	158	DIP
<b>Total Length</b>	<b>2658</b>	<b>Feet</b>

**GRAVITY SANITARY SEWER MAIN**

Size	Length	Material
8-inch	0	
10-inch	0	
12-inch	0	
16-inch	0	
<b>Total Length</b>	<b>0</b>	<b>Feet</b>

**LOW PRESSURE FORCE MAIN**

Size	Length	Material
1.5-inch	0	
2-inch	650	SCH 40 PVC
2.5-inch	0	
3-inch	1060	SCH 40 PVC
<b>Total Length</b>	<b>1710</b>	<b>Feet</b>

**PUMP STATION FORCE MAIN**

Size	Length	Material
4-inch	0	
6-inch	0	
8-inch	0	
12-inch	0	
<b>Total Length</b>	<b>0</b>	<b>Feet</b>

Total Number of 4-inch or 6-inch proposed valves: 5 Each  
 Total Number of 8-inch or 12-inch proposed valves: 7 Each  
 Total Number of 16-inch or 24-inch proposed valves: 0 Each

Total Number of Proposed Manholes: 0 Each  
 Total Number of Proposed Fire Hydrants: 4 Each  
 Total Number of Proposed Residential Meter Cocks to be Installed: 22 Each  
 Total Number of 5/8" x 3/4" Residential Meters to be Certified: 22 Each

**HYDRAULIC SUMMARY**

Maximum static water pressure in the proposed water system: 77.44 psi  
 Minimum static water pressure in the proposed water system: 64.46 psi  
*Information above is provided from the hydraulic model with applied maximum day water demands.*

**FIRE FLOW SUMMARY**

Available Fire Flow: 1500 gpm  
 Lowest Residual Pressure during a fire flow scenario: 48.37 psi  
*Information above is provided from the hydraulic model with applied maximum day and fire flow water demands.*

Are residential fire sprinkler systems proposed? No

**DELIVERY PRESSURE SUMMARY**

High Hydraulic Grade Line: 535 feet  
 Lowest Finished Floor Elevation proposed within the development: 352.4 feet  
 Estimated highest static pressure at the finished floor elevation: 79 psi

Low Hydraulic Grade Line: 515 feet  
 Highest Finished Floor Elevation proposed within the development: 368.5 feet  
 Estimated lowest static pressure at the finished floor elevation: 64 psi

*Estimates are made with an assumed high and low hydraulic grade line and do not take into account the effects of friction loss or water booster pumps in the water system. Actual pressures may vary and delivery pressure are not guaranteed.*

**International Residential Code P2903.3** Minimum static pressure (as determined by the local water authority) at the building entrance for either public or private water service shall be 40 psi (276 kPa).

**International Residential Code P2903.3.1** Maximum pressure. Maximum static pressure shall be 80 psi (551 kPa). When main pressure exceeds 80 psi (551 kPa), an approved pressure-reducing valve conforming to ASSE 1003 shall be installed on the domestic water branch main or riser at the connection to the water-service pipe.

*Note: The professional engineer is responsible to account for the effects of friction loss on the delivery pressure at the finished floor elevation from the service line, meter, and other plumbing appurtenances. The Service Authority requires calculations to size the private service lines when delivery pressures are 45 psi or less and the service line is in excess of 70 feet.*

<sup>1</sup>The hydraulic design and all finished floor elevations comply with the applicable plumbing code for pressure without a water booster pump or pressure reducing device.

<sup>2</sup>The use of private water booster pumps and/or pressure reducing devices are required for the following lots to comply with applicable plumbing code for pressure.

Lot # or Building ID	Dev #	High Hydraulic Grade Line (ft)	Low Hydraulic Grade Line (ft)	Estimated High Pres. (psi)	Estimated Low Pres. (psi)	Private Water Booster P. Needed	Pres. Red. Device Needed
		535	515			-	-
		535	515			-	-

**AWWA WATER DEMAND ESTIMATE AND METER SIZING USING FIXTURE VALUES**  
 (Based on AWWA M22 Manual, Second Edition)

Building Identifier: \_\_\_\_\_  
 Multi-Dwelling Residential or Non-Residential: High Demand (e.g. Non-Residential)

Maximum static water pressure at the meter location: 60 psi  
*(Obtained from hydraulic study at the meter location)*

Fixture or Appliance	Fixture Value (at 60 psi)	Number of Fixtures	Subtotal Fixture Value
Toilet (tank)	4	0	0
Toilet (flush valve)	35	0	0
Urinal (wall or stall)	16	0	0
Urinal (flush valve)	35	0	0
Bidet	2	0	0
Shower (single head)	2.5	0	0
Sink / Faucet (Lavatory)	1.5	0	0
Kitchen Sink	2.2	0	0
Utility Sink	4	0	0
Dishwasher	2	0	0
Bathub	8	0	0
Clothes Washer	6	0	0
Hose Connections (with 50 ft of hose)			
1/2 in.	5	0	0
5/8 in.	9	0	0
3/4 in.	12	0	0
Miscellaneous			
Bedpan washers	10	0	0
Drinking fountains	2	0	0
Dental units	2	0	0
Combined Fixture Value			0
Demand (gpm) from AWWA Curve			0.0
Pressure Adjustment Factor			1
Adjusted demand (gpm)			0
Irrigation Demand (gpm) that will occur simultaneously with normal water use			0
Water demand for equipment will occur simultaneously with normal water use			0
Total estimated peak flow			0
Required AWWA Meter Size			5/8-Inch Positive Displacement Meter

- GENERAL NOTES**
- Methods and materials used in the construction of water mains, sanitary sewer mains, force mains and appurtenances shall be in conformance with the current Prince William County Service Authority (Service Authority) Utility Standards Manual (USM) and the Virginia Department of Health Regulations.
  - Acceptance of these plans by the Service Authority will in no way relieve the owner from complying with the methods, policies or requirements stated in the Service Authority's USM.
  - Service Authority has Local Review Authority for water mains up to and including 18-inch and sanitary sewer mains up to and including 24-inch. Utilities outside the Service Authority's Local Review Authority, including low pressure force mains systems, are subject to the review, approval and permitting process of either the Virginia Department of Health Office of Drinking Water or Department of Environmental Quality. It is the Professional Engineer's responsibility to submit all necessary applications and plans and to secure all applicable plan approvals and permits from the different governing authorities.
  - Trees, fences, monuments, signs, entrance features, sheds, decks, overhanging canopies, or permanent structures shall not be placed in easements dedicated to the Service Authority without written permission from the Service Authority.
  - The contractor shall notify the Service Authority Inspection Manager at least two (2) business days, but not more than ten (10) business days, prior to the commencement of demolition, excavation or blasting in areas with underground water mains, sanitary sewer mains, and/or force mains.
  - All subdivision will require an address listing approved by the Prince William County Mapping Office. The address listing must be presented to the Service Authority at the time the utility permit is issued. Forms are available at the Service Authority. (Fax copies are not acceptable.)
  - Low pressure sewer force main systems are subject to the review and requirements of the Virginia Department of Environmental Quality.
  - The developer is responsible for all costs associated with damages to or relocation of water mains, sanitary sewer mains, force mains or service lines caused by the construction of this project.
  - The contractor shall coordinate all relocation of water mains, sanitary sewer mains and/or force mains with the Service Authority's Field Inspector. Water or sanitary sewer system shutdowns will not be executed without the prior approval of the Service Authority Field Inspector. The Field Inspector shall require the contractor to submit a relocation work plan for Service Authority acceptance prior to the commencement of the relocation work. The work plan will detail how the work will be done and the manpower, materials, and equipment that will be at the site to perform the work.
  - The Service Authority does not guarantee the availability or construction of utilities that are proposed by another entity even if those utilities are shown as existing in this plan set. If needed utilities shown as existing are not available or do not exist, it is the developer's responsibility to acquiring the necessary rights and permits to install on-site and off-site water and sanitary sewer utilities to provide the desired service.
  - Existing unused water service lines shall be exposed at the connection point on the water main and shall be cut and terminated (e.g. crimped) as directed by the Service Authority Field Inspector.
  - Existing unused laterals or sanitary service lines shall be cut and capped at the connection point to the sanitary sewer main or force main as directed by the Service Authority Field Inspector.
  - When an existing water service line, lateral, of sanitary service line will be reused as part of a new development, the Service Authority shall inspect the existing service line to insure that it is acceptable and meets current Service Authority material specifications. Any defects or out-of-date materials shall be repaired or replaced to the satisfaction of the Service Authority to ensure the service line is water tight before the existing service line is placed back in service.

**PIPE TOTALS FOR FEE CALCULATIONS**

Pipe Quantity Summary	Total Project Quantities Proposed By This Plan	Quantities Previously Approved & Permitted by Plan #	Net Increase
WATER MAIN INSPECTION	2658		
WATER MAIN AS-BUILT	2658		
SANITARY SEWER / FORCE MAIN INSP.	1710		
SANITARY SEWER/FORCE MAIN AS-BUILT	1710		
TV SANITARY SEWER MAIN INSPECTION	0		
Minimum water main inspection fee applies for water quantities less than 100 feet:			No
Minimum sanitary sewer / force main inspection fee applies for quantities less than 100 linear feet:			No
Minimum as-built fee applies when total as-built cost are less than \$1000.00:			No

*Notes: THIS PLAN DOES NOT INCLUDE THE DESIGN OF INDIVIDUAL SANITARY PUMP SYSTEM FOR EACH LOT. THE PUMP WILL BE DESIGNED-BUILT BY THE CONTRACTOR AND SHALL BE SUBMITTED SEPARATELY FOR REVIEW DURING THE BUILDING PERMIT STAGE.*

**METER SCHEDULES**

**MULTI-DWELLING METER SCHEDULE**

Building Identifier	Building Address	Meter Use	Account Type	Number of Dwelling Units	<sup>1</sup> Peak Demand (GPM)	<sup>2&amp;3</sup> ERU Purchase	Meter Size	Meter Type	(Reserved for Future Use)	(Reserved for Future Use)	<sup>4</sup> Non-Binding Estimated Availability Fee
						#N/A					
						#N/A					
						#N/A					
						#N/A					
						#N/A					
						#N/A					
						#N/A					
						#N/A					
						#N/A					

**NOTES:**

- A future unit list and meter sizing calculations shall be provided in the plan set for each proposed meter in accordance with the current AWWA M22 standard.
- The number of ERU's for a multi-family building is 80% of the total number of dwelling units associated with the meter and is rounded up to the next full unit.
- For water only accounts, the minimum purchased number of ERU units must match the allocation with the meter size as defined in Table VI: Availability Fees of the Customer Handbook.
- The Availability Fee is not the total fee due. New connections may be subject to the following fees: meter, meter installation, sewer and/or water inspection, application and Local Facility charges. See the Customer Handbook for additional information.

**NON-RESIDENTIAL METER SCHEDULE**

Building Identifier	Building Address	Meter Use	Account Type	<sup>1</sup> Est. Max Month Consumption (Gallons)	<sup>2</sup> Peak Demand (GPM)	<sup>3</sup> ERU Purchase	Meter Size	Meter Type	(Reserved for Future Use)	(Reserved for Future Use)	<sup>4</sup> Non-Binding Estimated Availability Fee

**NOTES:**

- For meters 2-inch and larger the maximum month water consumption shall be reported. The purchased number of ERU's shall be based on the estimated maximum month consumption, but shall not be less than the allocated number of ERU's.
- For meters smaller than 2-inch, the maximum month water consumption does not need to be reported.
- A future unit list and meter sizing calculations shall be provided in the plan set for each proposed meter in accordance with the current AWWA M22 standard.
- For all meters the minimum purchased number of ERU units must match the allocation with the meter size as defined in Table VI: Availability Fees of the Customer Handbook.
- The Availability Fee is not the total fee due. New connections may be subject to the following fees: meter, meter installation, sewer and/or water inspection, application and Local Facility charges. See the Customer Handbook for additional information.

**DATA CENTER METER SCHEDULE**

Building Identifier	Building Address	Meter Use	Account Type	<sup>1</sup> Est. Max Month Consumption (GPD)	<sup>2</sup> Peak Demand (GPM)	<sup>3</sup> ERU Purchase	Meter Size	Meter Type	Meter Manufacturer	Flow Rate (gpm)	<sup>4</sup> Non-Binding Estimated Availability Fee
										Minimum Maximum	

**NOTES:**

- For sewer only meters and 2-inch meters and larger, the purchased number of ERU's shall be based on the estimated maximum month consumption, but shall not be less than the allocated number of ERU's associated with the meter size.
- A future unit list and meter sizing calculations shall be provided in the plan set for each proposed meter in accordance with the current AWWA M22 standard.
- For all meters the minimum purchased number of ERU units must match the allocation with the meter size as defined in Table VI: Availability Fees of the Customer Handbook.
- The Availability Fee is not the total fee due. New connections may be subject to the following fees: meter, meter installation, sewer and/or water inspection, application and Local Facility charges. See the Customer Handbook for additional information.

**THRUST RESTRAINT ASSUMPTIONS FOR CALCULATIONS**

The profile shall call out the station restraint is to start and the station restraint is end for each fitting, reducer, and dead end.

Pipe Material: DIP - POLYWRAP<sup>2</sup>

Soil Type: (Other) \_\_\_\_\_

Safety Factor: (1.5 to 1 is typical) 1.5 to 1<sup>1</sup>

Trench Type: (Type 4 is typical for the Service Authority backfill requirements) Type 3<sup>3</sup>

Test Pressure: (100 psi plus them max static pressure, but no less than 200 psi) 200 psi

**DESIGNATION OF THE RESPONSIBLE PARTY & AS-BUILT RELEASE OF PLANS**

The undersigned Engineer and/or firm, on behalf of itself and its successors, does hereby assume full liability and responsibility for the accuracy of the calculations, selections made, or information presented in this information sheet and agrees to hold harmless the Service Authority from any claim.

The undersigned Engineer and/or firm agrees that the Prince William County Service Authority shall have the right to use these plans and electronic files for the preparation of as-built records, as necessary. The Engineer and/or firm further agrees that the right to use the plans and electronic files shall be provided without cost to the Service Authority.

Signature: Roddy A. Reyes  
 RODDY A. REYES  
 (Type or Print)

Engineer's Seal & Signature

**Service Authority**  
 Prince William County

**Water & Sanitary Sewer Information Sheet**  
 Sheet effective as of September 1, 2019

**PROJECT NO**  
**COUNTY PROJECT NUMBER**

**COMBINE HEALTH OF VIRGINIA**  
 RODDY A. REYES  
 LIC. NO. 036371  
 12/23/2021  
 PROFESSIONAL ENGINEER

**PLAN STATUS**

03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

**DATE**    **DESCRIPTION**

DRG DESIGN	DRG DRAWN	RAR
SCALE H: V:		CHKD
JOB No. 140175-01-001		
DATE : 12/23/21		
FILE No.		

SHEET 1 OF 1

SHEET 04 OF 28

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PWCSA SHEET

FINAL SUBDIVISION PLAN  
 ROBINSON'S PARADISE

VIRGINIA

TOWN OF HAYMARKET

Attachment: 3rd Submission Set (5437 - Site Plan Review - Robinson Paradise)

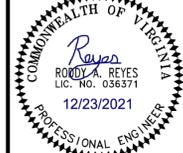
Packet Pg. 7

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VIRGINIA

EXISTING CONDITIONS  
 FINAL SUBDIVISION PLAN  
 ROBINSON'S PARADISE

PROJECT NO  
 COUNTY PROJECT NUMBER



PLAN STATUS

03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

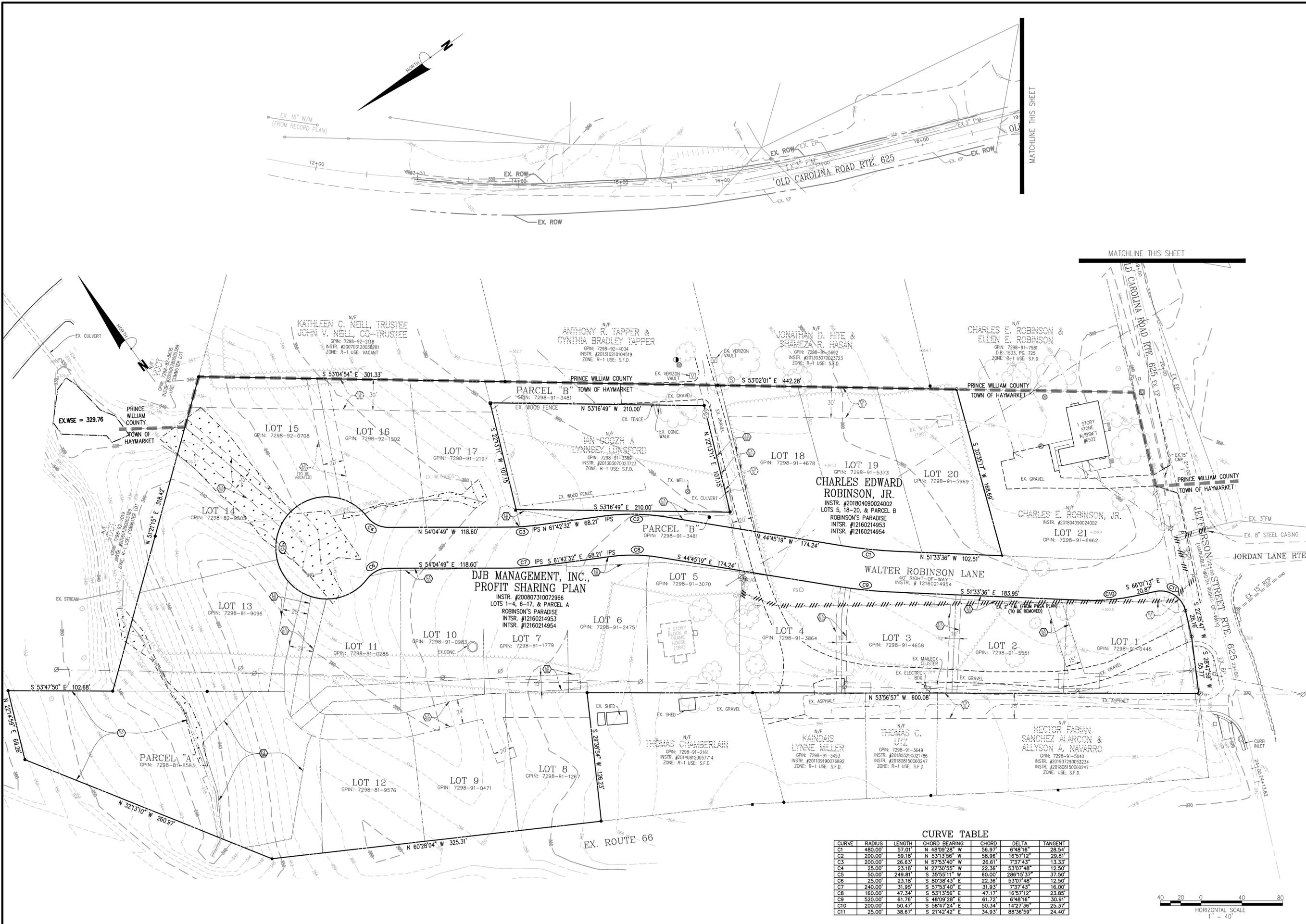
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	CHKD
	RAR

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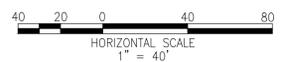
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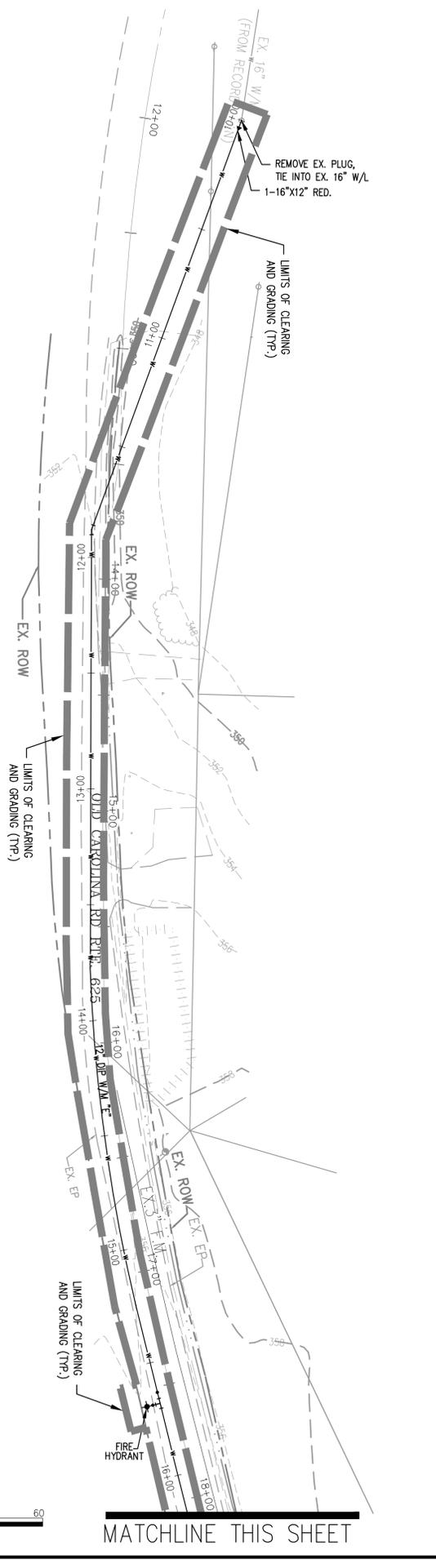
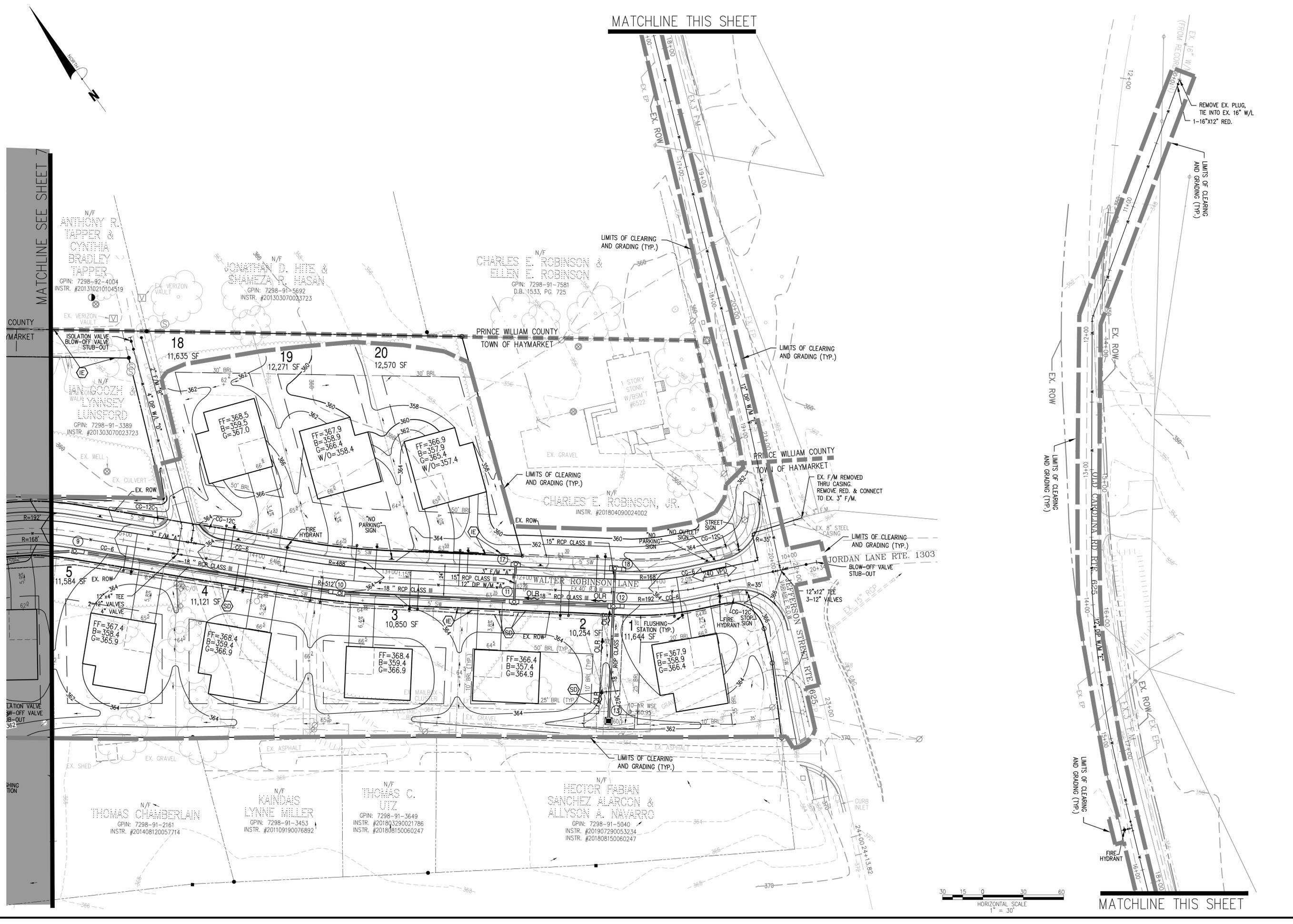


CURVE TABLE

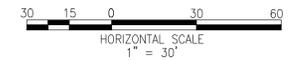
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C1	480.00'	57.01'	N 48°09'28" W	56.97'	6°48'16"	28.54'
C2	200.00'	59.18'	N 53°13'56" W	58.96'	16°57'12"	29.81'
C3	200.00'	26.63'	N 57°53'40" W	26.61'	7°37'43"	13.33'
C4	25.00'	23.18'	N 27°30'55" W	22.36'	53°07'48"	12.50'
C5	50.00'	249.81'	S 35°55'11" W	60.00'	286°15'37"	37.50'
C6	25.00'	23.18'	S 80°38'43" E	22.36'	53°07'48"	12.50'
C7	240.00'	31.95'	S 57°53'40" E	31.93'	73°37'43"	16.00'
C8	160.00'	47.34'	S 53°13'56" E	47.17'	16°57'12"	23.85'
C9	520.00'	61.76'	S 48°09'28" E	61.72'	6°48'16"	30.91'
C10	200.00'	50.47'	S 58°47'24" E	50.34'	14°27'36"	25.37'
C11	25.00'	38.67'	S 21°42'42" E	34.93'	88°36'59"	24.40'



MATCHLINE THIS SHEET



MATCHLINE THIS SHEET



MATCHLINE SEE SHEET 7

COUNTY MARKET

SHING TION

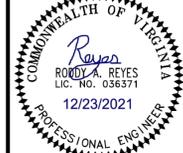
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GRADING PLAN  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**

PROJECT NO  
 COUNTY PROJECT NUMBER



PLAN STATUS	
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

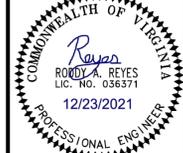
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JOB No. 140175-01-001	
DATE : 12/23/21	
FILE No.	

SHEET 06 OF 28

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GRADING PLAN  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
 TOWN OF HAYMARKET  
 VIRGINIA

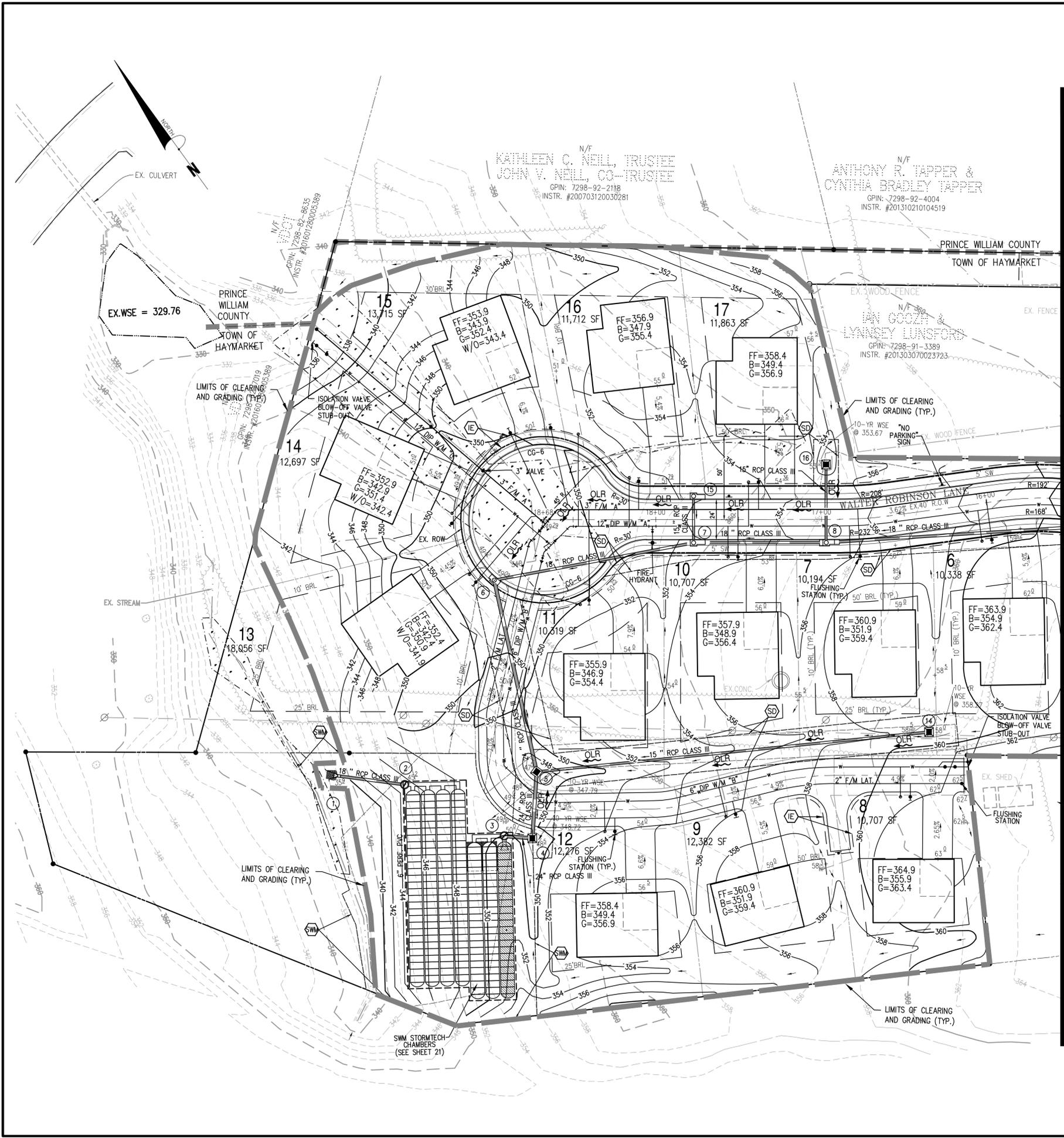
PROJECT NO  
 COUNTY PROJECT NUMBER



PLAN STATUS

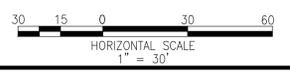
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07/13/21	1st. DEQ. SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
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DATE :	12/23/21
FILE No.	

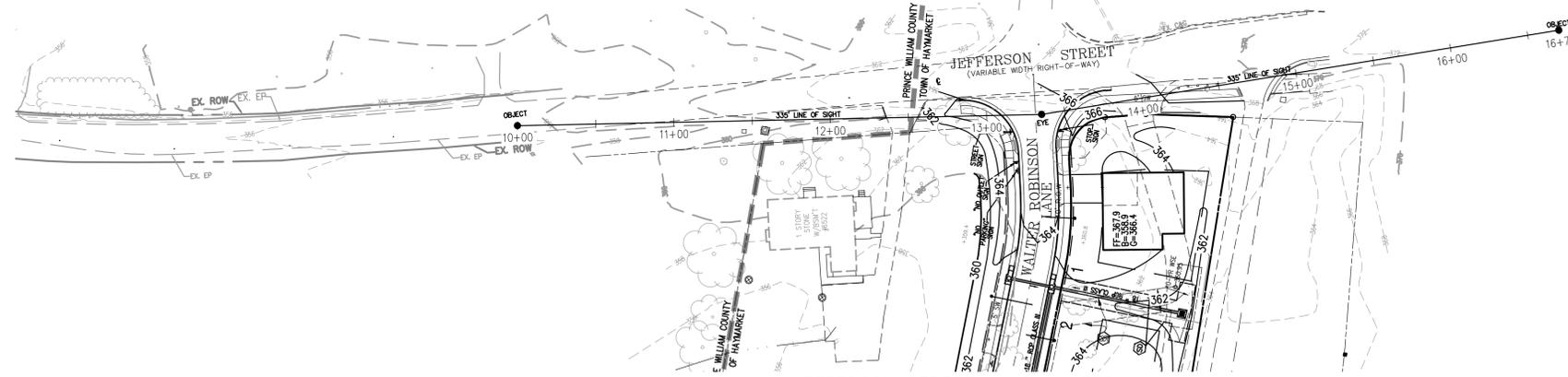


MATCHLINE SEE SHEET 6

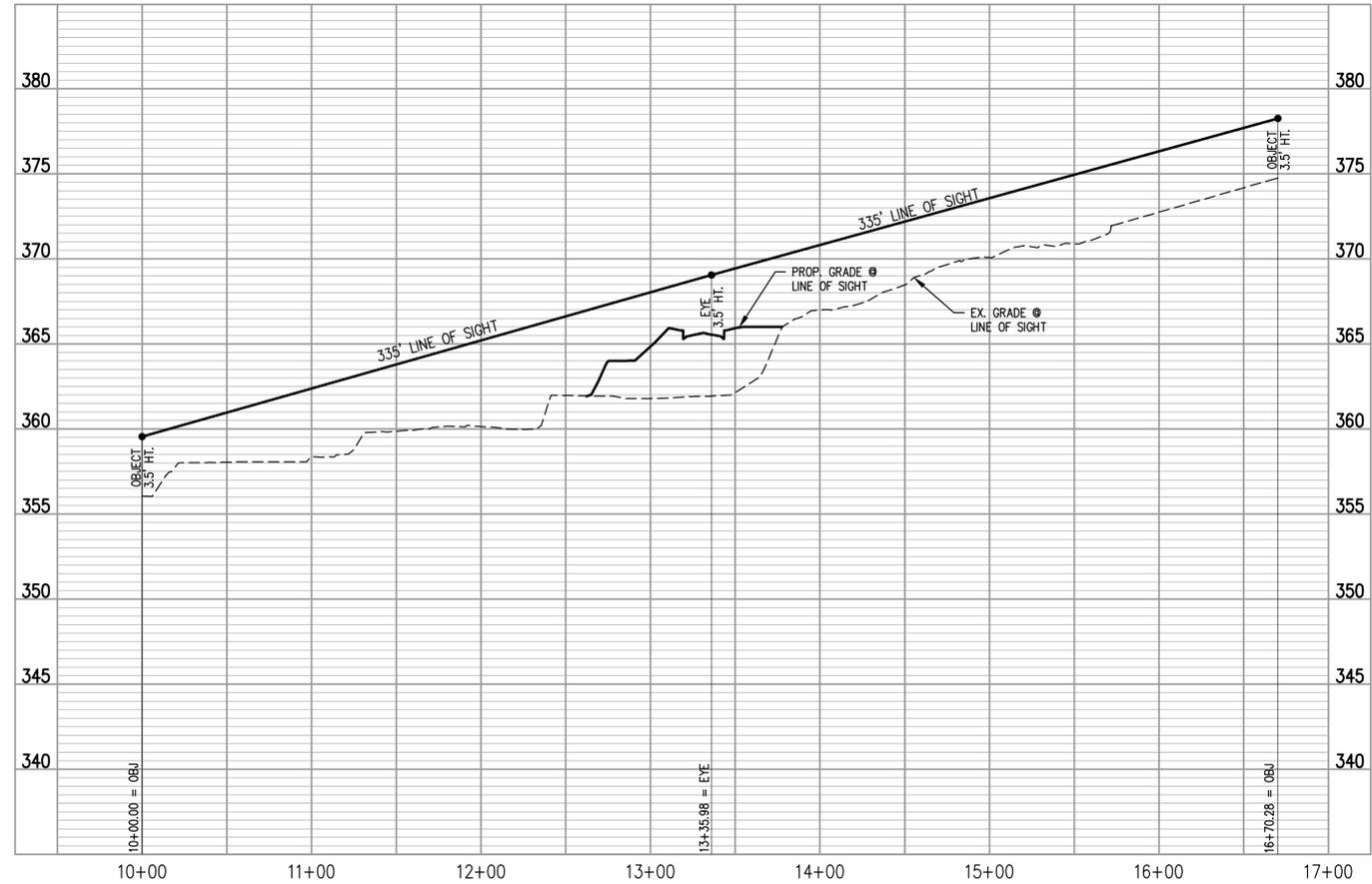
**NOTE:**  
 WATER LINE STUB-OUTS ARE PER APPROVED PLAN.



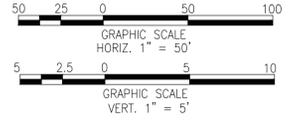




**JEFFERSON STREET AND WALTER ROBINSON LANE PLAN VIEW**  
 POSTED SPEED 30 MPH  
 HORIZONTAL SCALE 1"=50'



**JEFFERSON STREET PROFILE VIEW**  
 POSTED SPEED 30MPH  
 HORIZONTAL SCALE 1"=50'  
 VERTICAL SCALE 1"= 5'



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SIGHT DISTANCE PROFILE  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
 TOWN OF HAYMARKET  
 VIRGINIA

PROJECT NO. \_\_\_\_\_  
 COUNTY PROJECT NUMBER \_\_\_\_\_

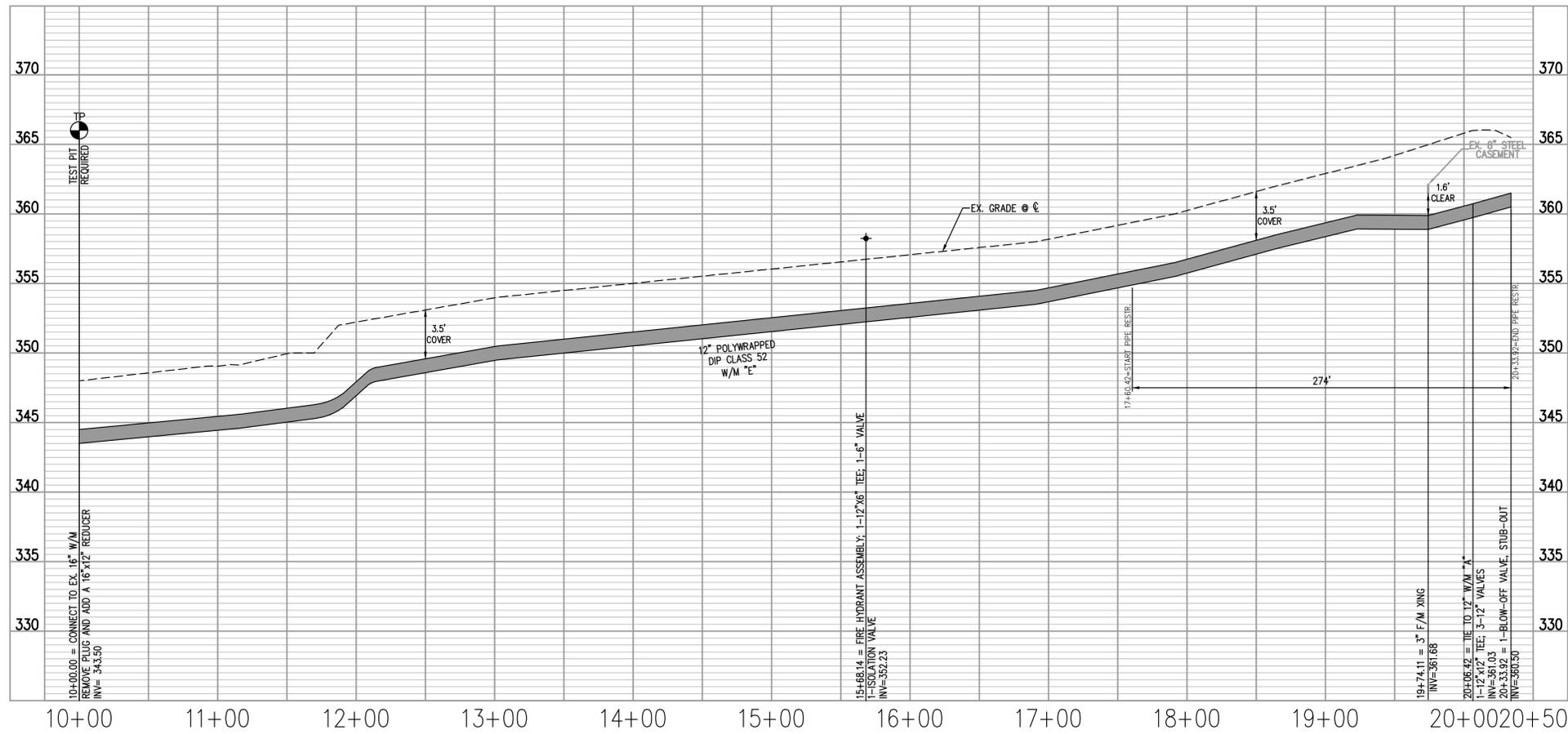
COMMONWEALTH OF VIRGINIA  
 RODY A. REYES  
 Lic. No. 036371  
 12/23/2021  
 PROFESSIONAL ENGINEER

PLAN STATUS	
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
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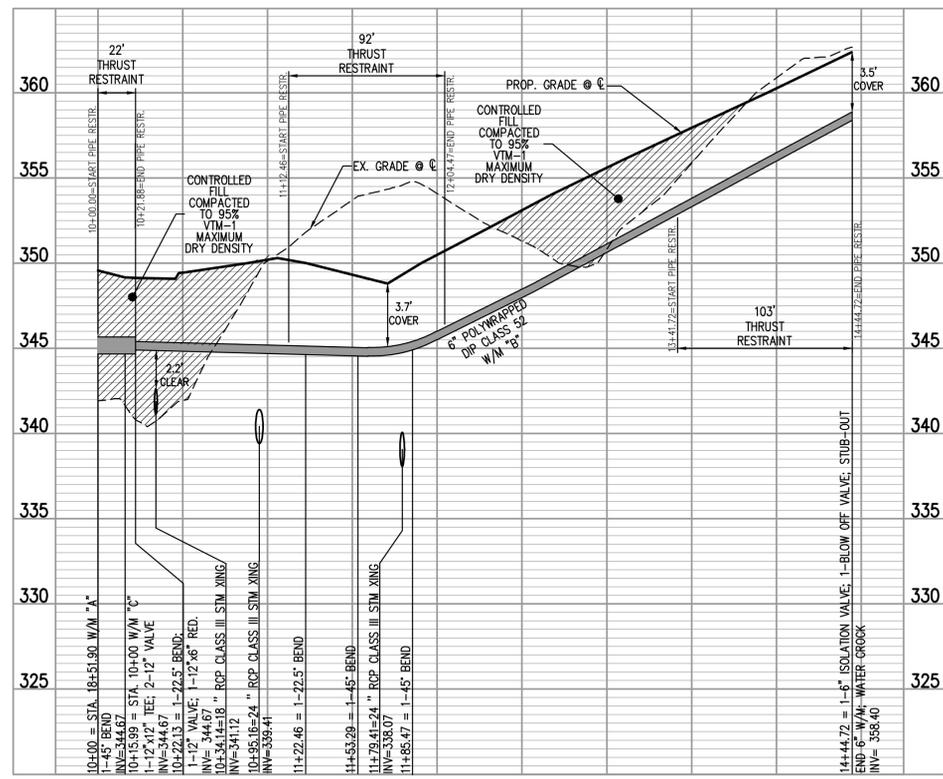
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	RAR CHKD

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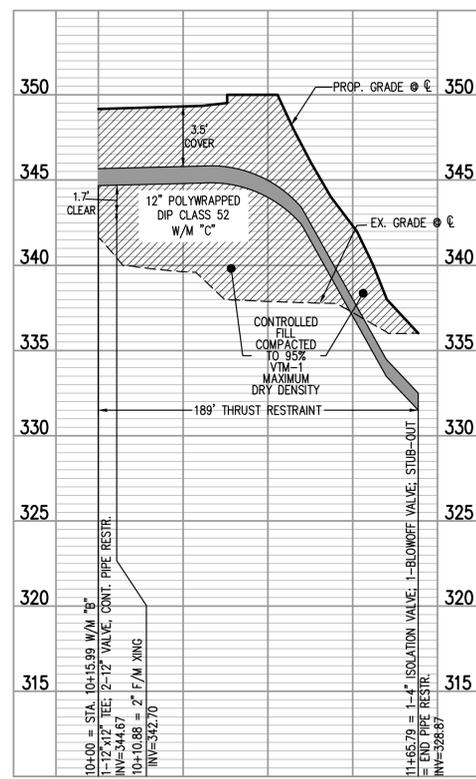
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 DATE : 12/23/21  
 FILE No. \_\_\_\_\_



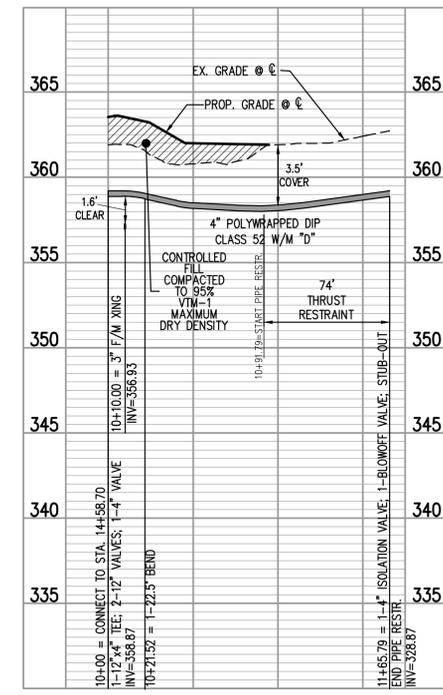
WATER LINE "E" PROFILE



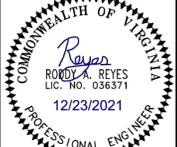
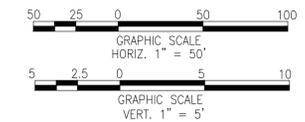
WATER LINE "B" PROFILE



WATER LINE "C" PROFILE



WATER LINE "D" PROFILE



DATE	DESCRIPTION
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION	MFC	RAR
		DESIGN	DRAWN
			CHKD

SCALE: H: 1"=50'  
V: 1"=5'

JOB No. 140175-01-001  
DATE: 12/23/21  
FILE No.

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VIRGINIA

WATER DETAILS  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
 TOWN OF HAYMARKET

PROJECT NO.  
 COUNTY PROJECT NUMBER



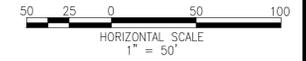
PLAN STATUS	
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
MFC	MFC RAR
DESIGN	DRAWN CHKD

SCALE: H: N.T.S.  
 V:  
 JOB No. 140175-01-001

DATE: 12/23/21  
 FILE No.

SHEET **12** OF **28**



### BUTTRESSES FOR 45° HORIZONTAL BEND

W-19  
REV-2018

SOIL PROPERTIES	SIZE	Concrete Block Dimensions At 150 PSI Pressure				Add To Dimension D For Each Add 50 PSI Pressure Up To 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to Q of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF SOFT SILTY CLAY OR BETTER	3"	6"	1'-0"	6"	7"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.875 X D X E	CONC. BLOCK AREA = 0.75 X D X E	CONC. BLOCK AREA = 0.625 X D X E
	4"	6"	1'-0"	6"	7"	2"				
	6"	8"	1'-2"	6"	8"	2"				
	8"	1'-0"	1'-4"	8"	8"	4"				
	10"	1'-3"	1'-6"	8"	10"	4"				
	12"	1'-6"	1'-8"	1'-0"	1'-0"	6"				
	16"	2'-0"	2'-0"	1'-0"	1'-3"	6"				
	20"	2'-6"	2'-6"	1'-0"	1'-6"	9"				
	24"	3'-0"	3'-0"	1'-0"	1'-6"	9"				
	30"	4'-0"	3'-6"	1'-4"	1'-9"	1'-0"				
CS = 0 @ 15° LOOSE SILTY SAND	3"	1'-0"	1'-6"	6"	9"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.5 X D X E	CONC. BLOCK AREA = 0.375 X D X E	CONC. BLOCK AREA = 0.25 X D X E
	4"	1'-6"	2'-0"	6"	9"	2"				
	6"	2'-0"	2'-0"	6"	1'-0"	2"				
	8"	3'-4"	2'-0"	8"	1'-0"	4"				
	10"	4'-2"	2'-3"	8"	1'-0"	4"				
	12"	4'-8"	2'-9"	1'-0"	1'-6"	6"				
	16"	5'-9"	3'-6"	1'-0"	1'-6"	6"				
	20"	7'-10"	4'-0"	1'-0"	2'-0"	9"				
	24"	9'-10"	5'-0"	1'-6"	2'-0"	9"				
	30"	11'-8"	6'-0"	2'-0"	2'-0"	1'-0"				

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA. DIMENSION F & G SHALL REMAIN SAME. DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.

NOTES:  
 1. FC = 3,000 PSI AT 28 DAYS.  
 2. CS = SOIL COHESION IN PSF AND β = ANGLE OF INTERNAL FRICTION.  
 3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUB-GRADE.  
 4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR, AND WHEN JOINT RESTRAINT IS INADEQUATE OR INFEASIBLE.

### BUTTRESSES FOR 22½° HORIZONTAL BEND

W-18  
REV-2018

SOIL PROPERTIES	SIZE	CONCRETE BLOCK DIMENSIONS AT 150 PSI PRESSURE				ADD TO DIMENSION D FOR EACH ADD 50 PSI PRESSURE UP TO 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to Q of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF SOFT SILTY CLAY OR BETTER	3"	6"	1'-0"	6"	7"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.875 X D X E	CONC. BLOCK AREA = 0.75 X D X E	CONC. BLOCK AREA = 0.625 X D X E
	4"	6"	1'-0"	6"	7"	2"				
	6"	8"	1'-2"	6"	8"	2"				
	8"	1'-0"	1'-4"	8"	8"	4"				
	10"	1'-3"	1'-6"	8"	10"	4"				
	12"	1'-6"	1'-8"	1'-0"	1'-0"	6"				
	16"	2'-0"	2'-0"	1'-0"	1'-3"	6"				
	20"	2'-6"	2'-6"	1'-0"	1'-6"	9"				
	24"	3'-0"	3'-0"	1'-0"	1'-6"	9"				
	30"	4'-0"	3'-6"	1'-4"	1'-9"	1'-0"				
CS = 0 @ 15° LOOSE SILTY SAND	3"	1'-0"	1'-6"	6"	9"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.5 X D X E	CONC. BLOCK AREA = 0.375 X D X E	CONC. BLOCK AREA = 0.25 X D X E
	4"	1'-6"	2'-0"	6"	9"	2"				
	6"	2'-0"	2'-0"	6"	1'-0"	2"				
	8"	3'-4"	2'-0"	8"	1'-0"	4"				
	10"	4'-2"	2'-3"	8"	1'-0"	4"				
	12"	4'-8"	2'-9"	1'-0"	1'-6"	6"				
	16"	5'-9"	3'-6"	1'-0"	1'-6"	6"				
	20"	7'-10"	4'-0"	1'-0"	2'-0"	9"				
	24"	9'-10"	5'-0"	1'-6"	2'-0"	9"				
	30"	11'-8"	6'-0"	2'-0"	2'-0"	1'-0"				

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA. DIMENSION F & G SHALL REMAIN SAME. DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.

NOTES:  
 1. FC = 3,000 PSI AT 28 DAYS.  
 2. CS = SOIL COHESION IN PSF AND β = ANGLE OF INTERNAL FRICTION.  
 3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUB-GRADE.  
 4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR, AND WHEN JOINT RESTRAINT IS INADEQUATE OR INFEASIBLE.

### BUTTRESSES FOR TEES, PLUGS, & CAPS

W-21  
REV-2018

REINFORCING FOR 16" & LONGER

CARRY CONCRETE TO UNDISTURBED EARTH OR FIRM SUBGRADE

BUTTRESS FOR PLUGS & CAPS										
SIZE										
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
M	*	*	*	2'-6"	2'-8"	3'-6"	4'-8"	6'-0"	6'-8"	8'-0"
N	*	*	*	1'-6"	2'-2"	2'-6"	3'-4"	4'-0"	5'-0"	6'-8"
O	*	*	*	10"	1'-0"	1'-2"	1'-4"	1'-6"	1'-8"	2'-0"

REINFORCE WITH #6 W

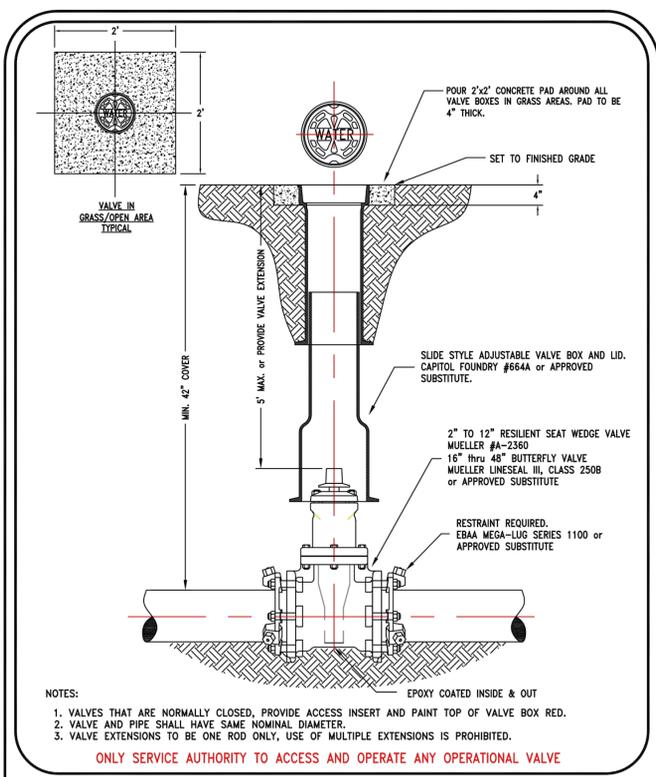
CARRY CONCRETE TO UNDISTURBED EARTH OR FIRM SUBGRADE

SECTION A-A

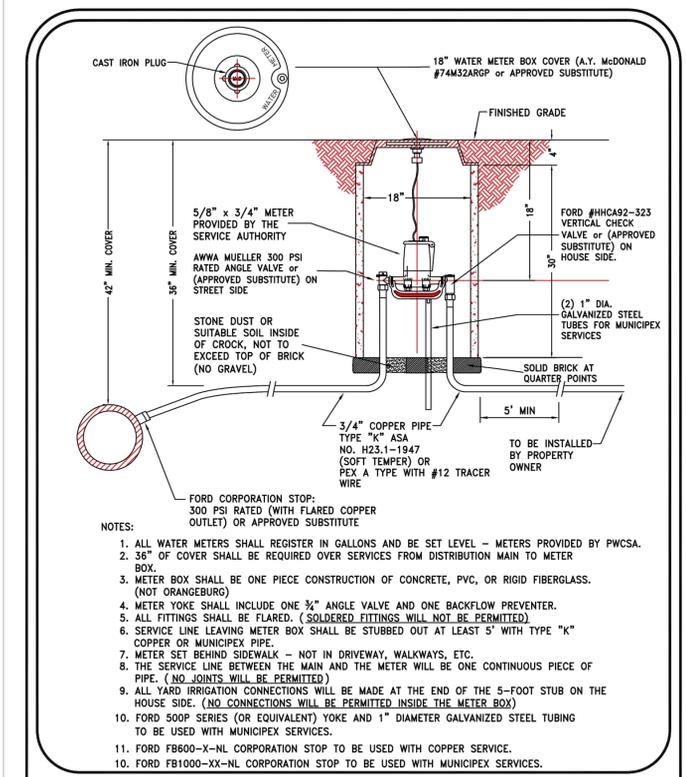
BUTTRESS FOR TEES										
SIZE OF BRANCH										
J	6"	6"	8"	9"	1'-1"	1'-3"	1'-8"	2'-0"	2'-6"	3'-4"
K	6"	8"	10"	1'-3"	1'-4"	1'-9"	2'-4"	3'-0"	3'-4"	4'-0"
L	6"	8"	8"	9"	10"	12"	1'-2"	1'-6"	1'-8"	2'-0"
H	4"	4"	6"	6"	6"	6"	8"	1'-0"	1'-0"	1'-0"

AREA OF BLOCK = 2J X 2K      NOTE: TAPPING ASSEMBLIES & SLEEVES TO BE CONCRETE BLOCKED AS COMPARABLE SIZED TEES

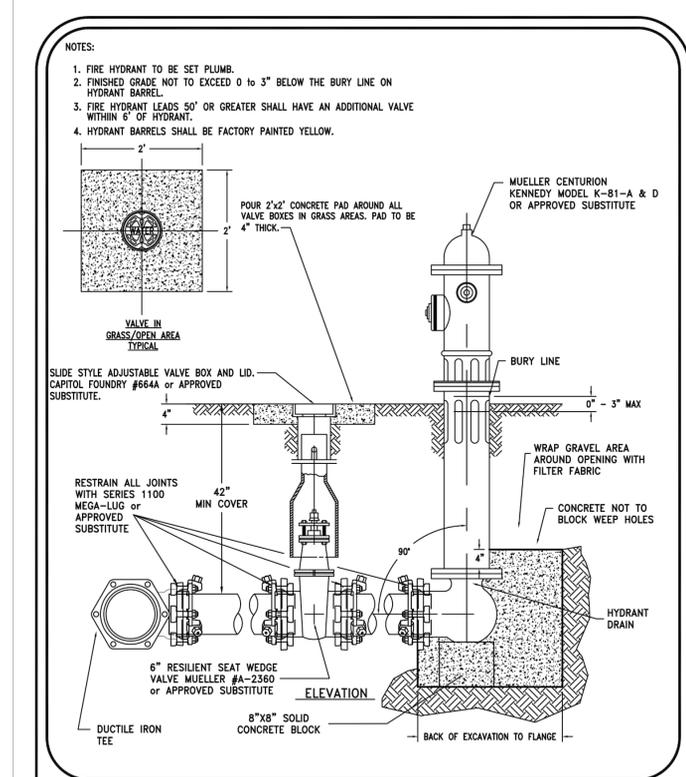
NOTES:  
 1. FC = 3000 PSI AT 28 DAYS.  
 2. THE BUTTRESS DIMENSIONS ARE BASED ON THE WATER PRESSURE OF 150 PSI WHERE THE PRESSURE IS DIFFERENT, THE AREA OF BLOCK SHALL BE PROPORTIONED TO REQUIRED PRESSURE  
 3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUBGRADE  
 4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR.



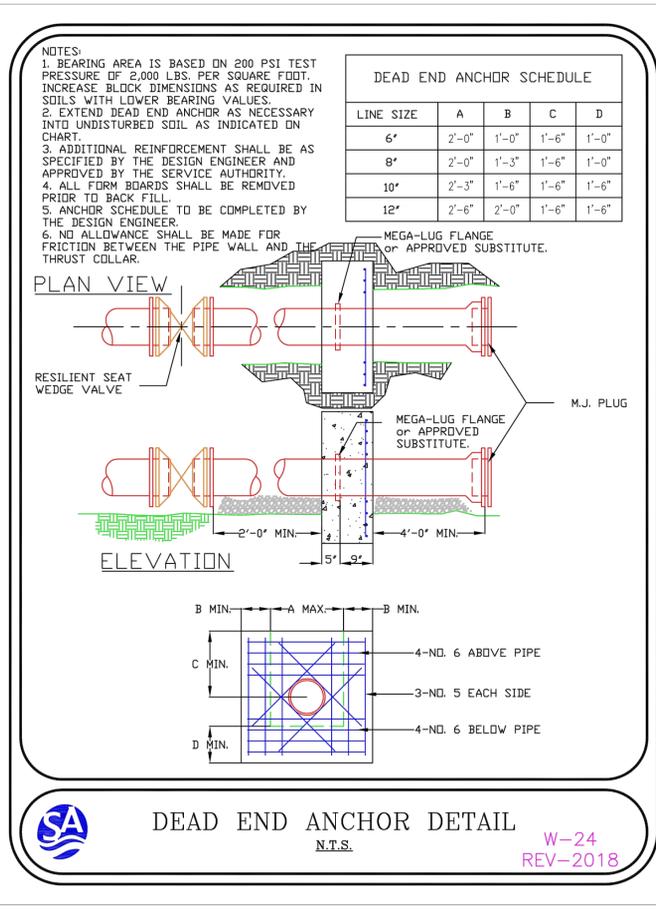
**TYPICAL VALVE AND VALVE BOX**  
N.T.S.  
W-15  
REV-2018



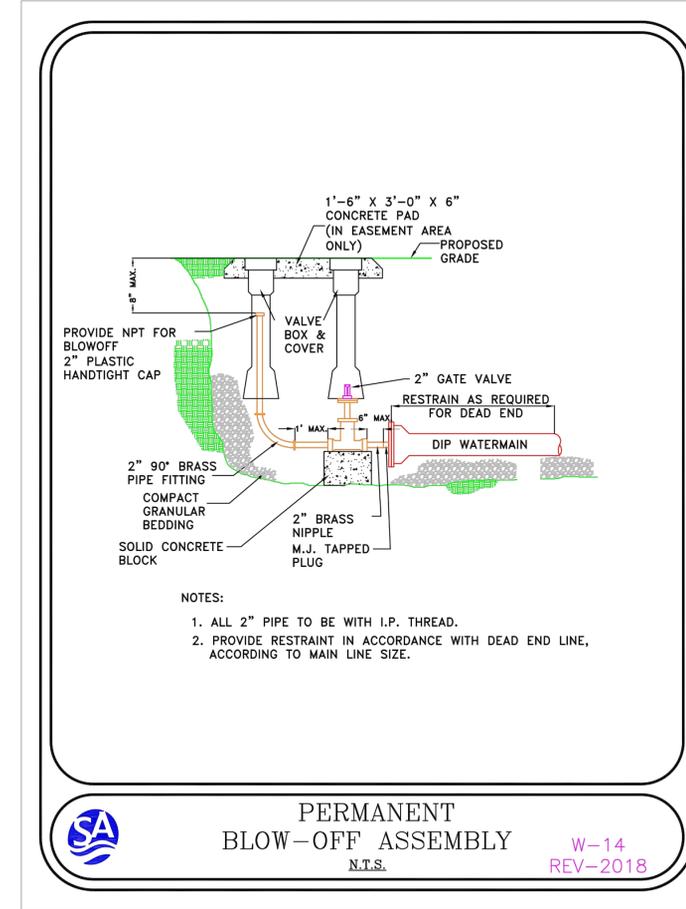
**5/8" X 3/4" RESIDENTIAL METER**  
N.T.S.  
W-1  
REV-2018



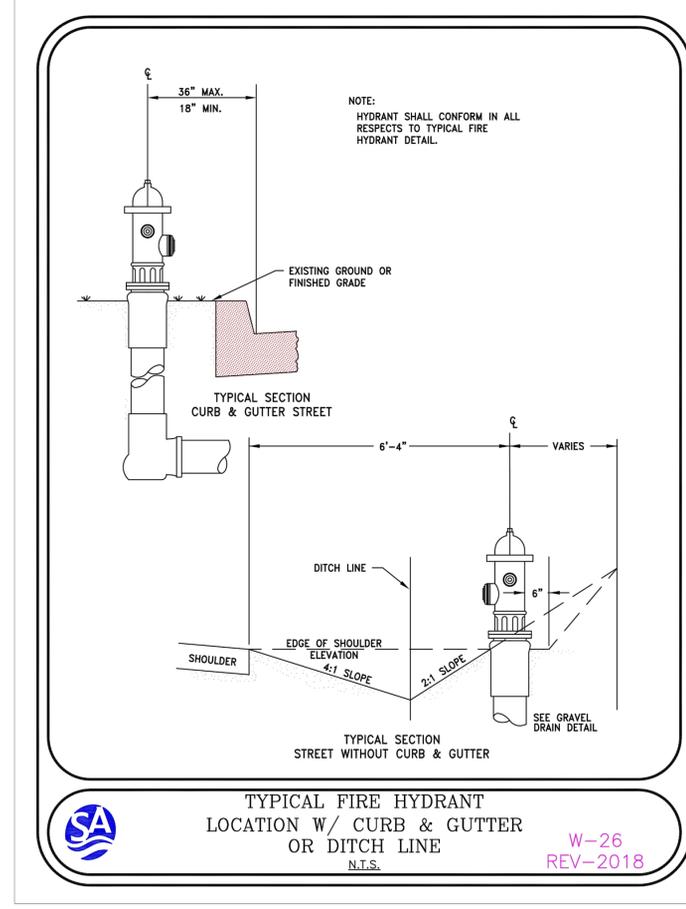
**TYPICAL FIRE HYDRANT**  
N.T.S.  
W-25  
REV-2018



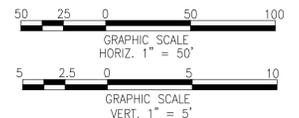
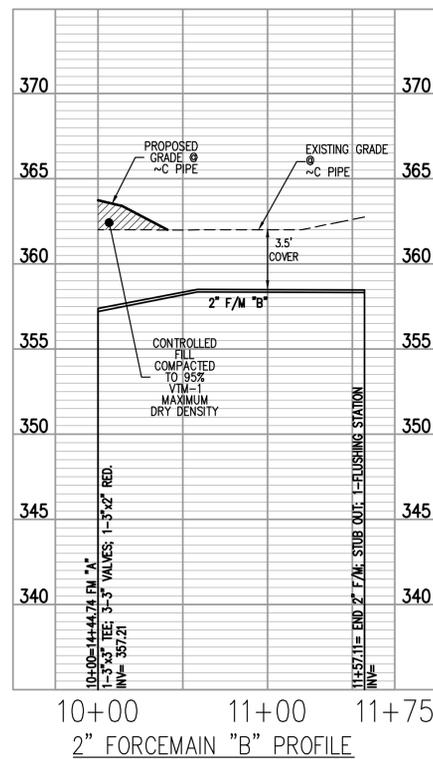
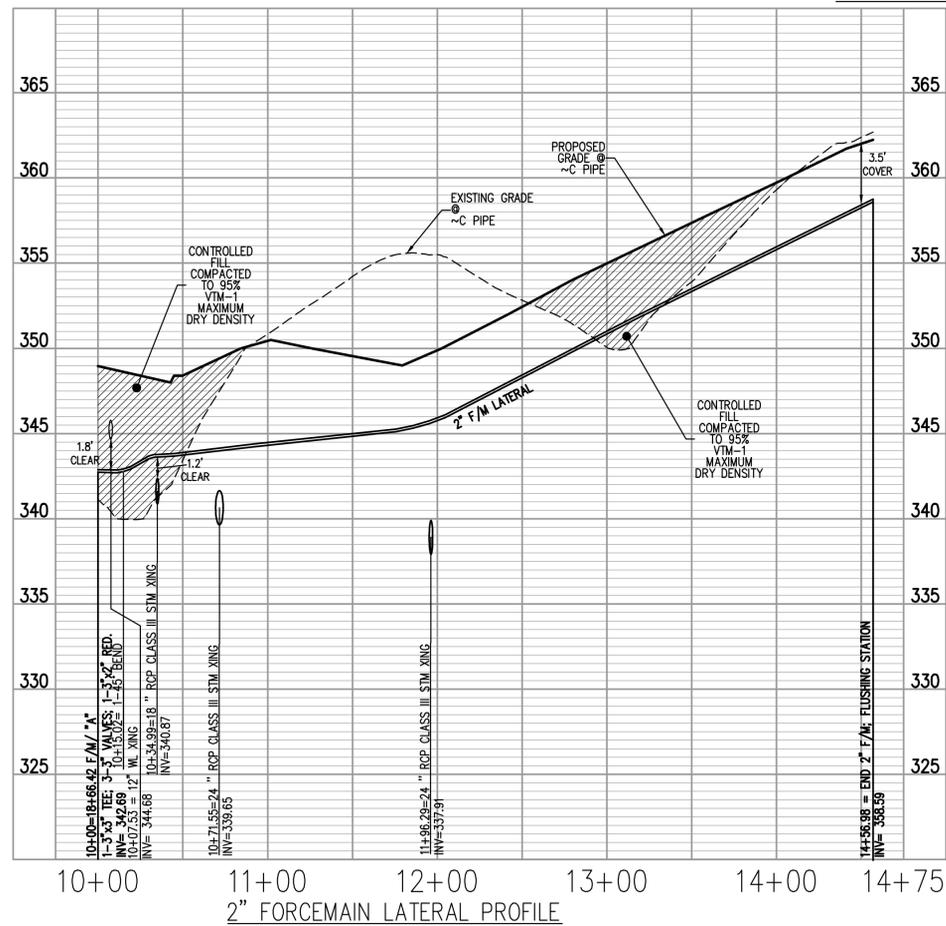
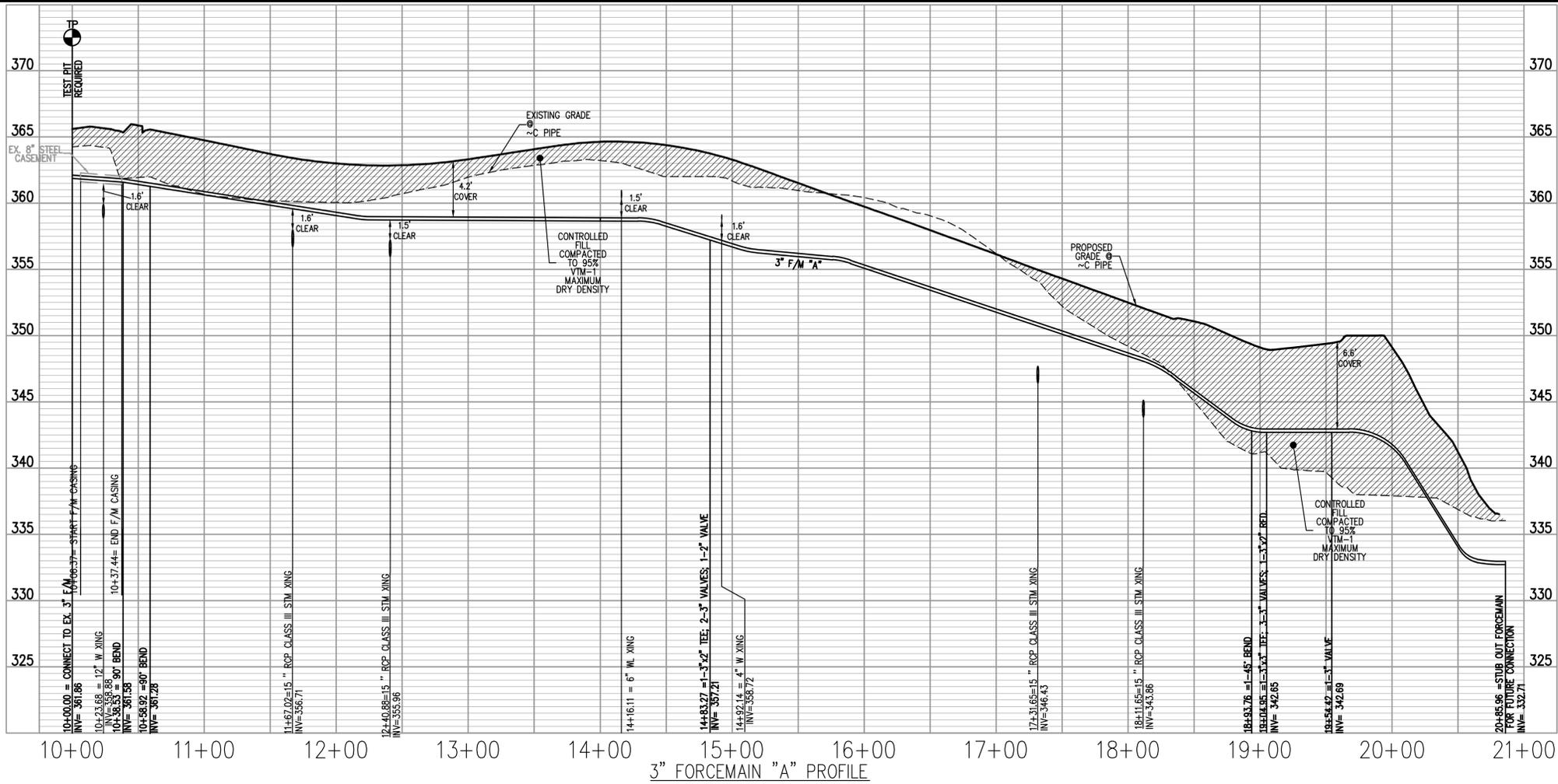
**DEAD END ANCHOR DETAIL**  
N.T.S.  
W-24  
REV-2018



**PERMANENT BLOW-OFF ASSEMBLY**  
N.T.S.  
W-14  
REV-2018



**TYPICAL FIRE HYDRANT LOCATION W/ CURB & GUTTER OR DITCH LINE**  
N.T.S.  
W-26  
REV-2018







### LEGEND

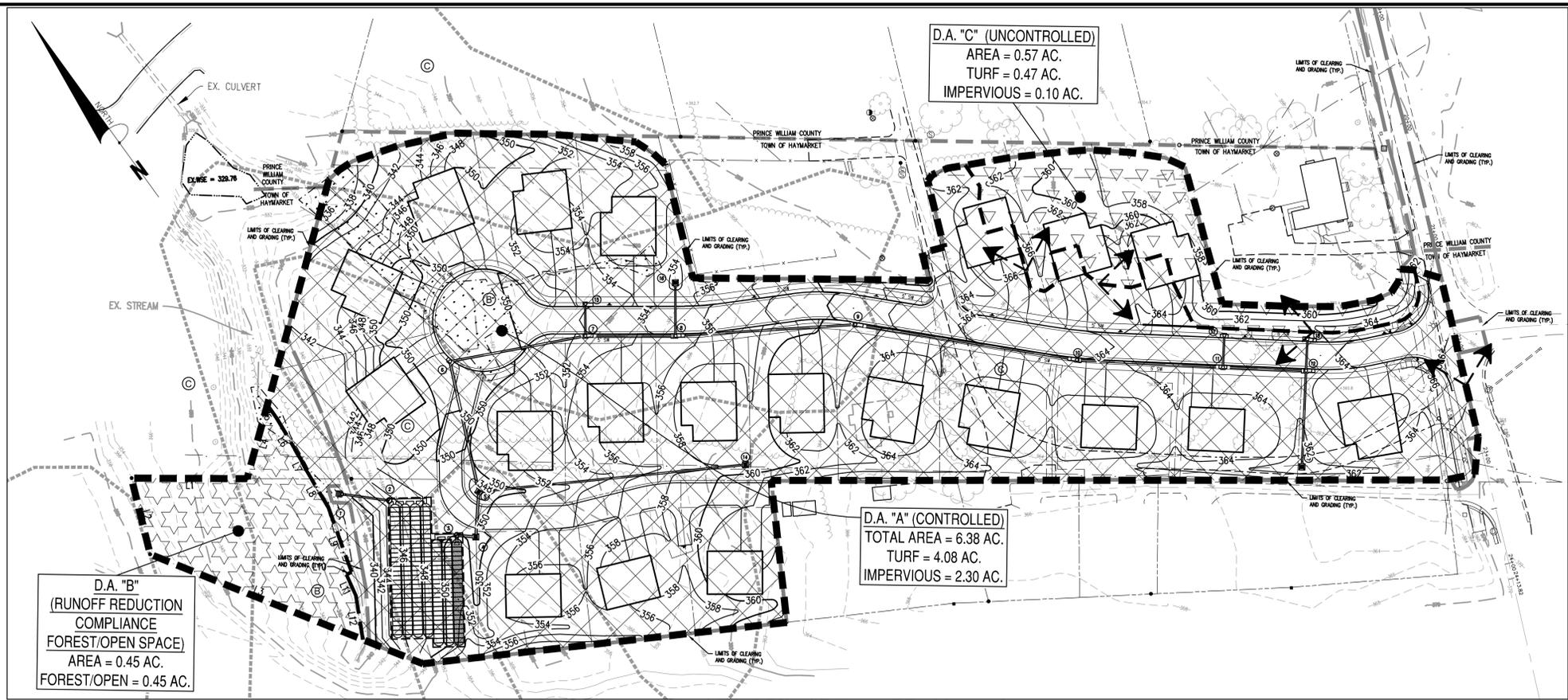
- DENOTES DRAINAGE DIVIDES
- DENOTES DRAINAGE AREA 'A'
- DENOTES DRAINAGE AREA 'B'
- DENOTES DRAINAGE AREA 'C'
- DENOTES HYDROLOGIC SOIL GROUP

### NOTES

1. THE RUNOFF REDUCTION COMPLIANCE FOREST/OPEN SPACE AREA SHOWN HERE SHALL BE MAINTAINED IN A FOREST/OPEN SPACE CONDITION UNTIL SUCH TIME THAT AN AMENDED STORMWATER MANAGEMENT PLAN IS APPROVED BY THE VSMP AUTHORITY.

### RUNOFF REDUCTION COMPLIANCE FOREST/OPEN SPACE METES/BOUNDS TABLE

LINE #	BEARING	DISTANCE
L1	N53°47'50"W	102.68'
L2	S22°14'59"W	69.26'
L3	S32°13'10"E	203.54'
L4	S51°21'06"W	67.70'
L5	N1°03'57"E	14.74'
L6	N5°25'42"E	41.14'
L7	N9°11'03"E	11.55'
L8	N5°12'13"E	37.78'
L9	N16°06'29"E	61.24'
L10	S83°01'16"E	5.09'
L11	N11°44'18"E	20.31'
L12	N26°54'51"E	39.39'



VIRGINIA RUNOFF REDUCTION METHOD MAP  
1"=60' HORIZ. SCALE

DEQ Virginia Runoff Reduction Method New Development Compliance Spreadsheet - Version 3.0

BMP Design Specifications List: 2013 Draft Stds & Specs  
Project Title: Robinson's Paradise  
Date: 4/23/26

[Update Summary Sheet](#)  
[Print Preview](#) [Print](#)

#### Site Land Cover Summary

	A soils	B Soils	C Soils	D Soils	Totals	% of Total
Forest/Open (acres)	0.00	0.27	0.18	0.00	0.45	6
Managed Turf (acres)	0.00	0.86	3.69	0.00	4.55	62
Impervious Cover (acres)	0.00	0.00	2.40	0.00	2.40	32
<b>Total</b>	<b>0.00</b>	<b>1.13</b>	<b>6.17</b>	<b>0.00</b>	<b>7.40</b>	<b>100</b>

#### Site Tv and Land Cover Nutrient Loads

Site Rv	0.44
Treatment Volume (ft <sup>3</sup> )	11,907
TP Load (lb/yr)	7.48
TN Load (lb/yr)	53.52

Total TP Load Reduction Required (lb/yr)	4.45
--	------

#### Site Compliance Summary

Total Runoff Volume Reduction (ft <sup>3</sup> )	0
Total TP Load Reduction Achieved (lb/yr)	2.79
Total TN Load Reduction Achieved (lb/yr)	0.00
Remaining Post Development TP Load (lb/yr)	4.69
Remaining TP Load Reduction (lb/yr) Required	1.65

#### Drainage Area Summary

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	Total
Forest/Open (acres)	0.00	0.45	0.00	0.00	0.00	0.45
Managed Turf (acres)	4.08	0.00	0.47	0.00	0.00	4.55
Impervious Cover (acres)	2.30	0.00	0.10	0.00	0.00	2.40
<b>Total Area (acres)</b>	<b>6.38</b>	<b>0.45</b>	<b>0.57</b>	<b>0.00</b>	<b>0.00</b>	<b>7.40</b>

#### Drainage Area Compliance Summary

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	Total
TP Load Reduced (lb/yr)	2.79	0.00	0.00	0.00	0.00	2.79
TN Load Reduced (lb/yr)	0.00	0.00	0.00	0.00	0.00	0.00

#### Drainage Area A Summary

##### Land Cover Summary

	A Soils	B Soils	C Soils	D Soils	Total	% of Total
Forest/Open (acres)	0.00	0.00	0.00	0.00	0.00	0
Managed Turf (acres)	0.00	0.86	3.22	0.00	4.08	64
Impervious Cover (acres)	0.00	0.00	2.30	0.00	2.30	36
<b>Total</b>	<b>0.00</b>	<b>0.86</b>	<b>5.52</b>	<b>0.00</b>	<b>6.38</b>	<b>100</b>

##### BMP Selections

Practice	Managed Turf Credit Area (acres)	Impervious Cover Credit Area (acres)	BMP Treatment Volume (ft <sup>3</sup> )	TP Load from Upstream Practices (lbs)	Untreated TP Load to Practice (lbs)	TP Removed (lb/yr)	TP Remaining (lb/yr)	Downstream Treatment to be Employed
14.b. Manufactured Treatment Device-Filtering	4.0845	2.3	11,131.00	0.00	6.99	2.79	4.19	

Total Impervious Cover Treated (acres): 2.30  
Total Turf Area Treated (acres): 4.08  
Total TP Load Reduction Achieved in D.A. (lb/yr): 2.79  
Total TN Load Reduction Achieved in D.A. (lb/yr): 0.00

#### Drainage Area B Summary

##### Land Cover Summary

	A Soils	B Soils	C Soils	D Soils	Total	% of Total
Forest/Open (acres)	0.00	0.27	0.18	0.00	0.45	100
Managed Turf (acres)	0.00	0.00	0.00	0.00	0.00	0
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00	0
<b>Total</b>	<b>0.00</b>	<b>0.27</b>	<b>0.18</b>	<b>0.00</b>	<b>0.45</b>	<b>100</b>

##### BMP Selections

Practice	Managed Turf Credit Area (acres)	Impervious Cover Credit Area (acres)	BMP Treatment Volume (ft <sup>3</sup> )	TP Load from Upstream Practices (lbs)	Untreated TP Load to Practice (lbs)	TP Removed (lb/yr)	TP Remaining (lb/yr)	Downstream Treatment to be Employed
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Total Impervious Cover Treated (acres): 0.00  
Total Turf Area Treated (acres): 0.00  
Total TP Load Reduction Achieved in D.A. (lb/yr): 0.00  
Total TN Load Reduction Achieved in D.A. (lb/yr): 0.00

#### Drainage Area C Summary

##### Land Cover Summary

	A Soils	B Soils	C Soils	D Soils	Total	% of Total
Forest/Open (acres)	0.00	0.00	0.00	0.00	0.00	0
Managed Turf (acres)	0.00	0.00	0.47	0.00	0.47	82
Impervious Cover (acres)	0.00	0.00	0.10	0.00	0.10	18
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.57</b>	<b>0.00</b>	<b>0.57</b>	<b>100</b>

##### BMP Selections

Practice	Managed Turf Credit Area (acres)	Impervious Cover Credit Area (acres)	BMP Treatment Volume (ft <sup>3</sup> )	TP Load from Upstream Practices (lbs)	Untreated TP Load to Practice (lbs)	TP Removed (lb/yr)	TP Remaining (lb/yr)	Downstream Treatment to be Employed
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Total Impervious Cover Treated (acres): 0.00  
Total Turf Area Treated (acres): 0.00  
Total TP Load Reduction Achieved in D.A. (lb/yr): 0.00  
Total TN Load Reduction Achieved in D.A. (lb/yr): 0.00

#### Runoff Volume and CN Calculations

Target Rainfall Event (in)	1-year storm	2-year storm	10-year storm
	2.51	3.04	4.67

Drainage Areas	RV & CN	Drainage Area A	Drainage Area B	Drainage Area C	Drainage Area D	Drainage Area E
CN	81	61	78	0	0	0
RR (ft <sup>3</sup> )	0	0	0	0	0	0
1-year return period	RV w RR (ws-in)	0.95	0.20	0.79	0.00	0.00
	RV w RR (ws-in)	0.95	0.20	0.79	0.00	0.00
	CN adjusted	81	61	78	0	0
2-year return period	RV w RR (ws-in)	1.34	0.38	1.16	0.00	0.00
	RV w RR (ws-in)	1.34	0.38	1.16	0.00	0.00
	CN adjusted	81	61	78	0	0
10-year return period	RV w RR (ws-in)	2.70	1.18	2.43	0.00	0.00
	RV w RR (ws-in)	2.70	1.18	2.43	0.00	0.00
	CN adjusted	81	61	78	0	0



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VIRGINIA RUNOFF REDUCTION METHOD MAP  
FINAL SUBDIVISION PLAN  
ROBINSON'S PARADISE  
TOWN OF HAYMARKET

PROJECT NO. [blank]  
COUNTY PROJECT NUMBER [blank]



#### PLAN STATUS

03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
JVC	JVC RAR
DESIGN	DRAWN CHKD
SCALE	H: 1" = 60' V: [blank]
JOB No.	140175-01-001
DATE :	12/23/21
FILE No.	[blank]

Project Name: Robinson's Paradise
Date: 2/9/2021
BMP Design Specifications List: 2013 Draft Stds & Specs

CLEAR ALL (Ctrl+Shift+R)

data input cells
constant values
calculation cells
final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Table with columns: Land Cover (acres), A Soils, B Soils, C Soils, D Soils, Totals. Rows include Forest/Open Space, Managed Turf, and Impervious Cover.

Table with columns: Constants, Annual Rainfall (inches), Target Rainfall Event (inches), Total Phosphorus (TP) EMC (mg/L), Total Nitrogen (TN) EMC (mg/L), Target TP Load (lb/acre/yr), Pj (unitless correction factor).

Table with columns: Runoff Coefficients (Rv), A Soils, B Soils, C Soils, D Soils. Rows include Forest/Open Space, Managed Turf, and Impervious Cover.

Post-Development Requirement for Site Area
TP Load Reduction Required (lb/yr) 4.45

LAND COVER SUMMARY -- POST DEVELOPMENT

Table with columns: Land Cover Summary, Treatment Volume and Nutrient Loads. Rows include Forest/Open Space, Weighted Rv, % Forest, Managed Turf, etc.

Table with columns: Treatment Volume and Nutrient Loads, Treatment Volume (acre-ft), TP Load (lb/yr), TN Load (lb/yr).

Drainage Area A

Table with columns: Drainage Area A Land Cover (acres), A Soils, B Soils, C Soils, D Soils, Totals, Land Cover Rv. Rows include Forest/Open Space, Managed Turf, and Impervious Cover.

Total Phosphorus Available for Removal in D.A. A (lb/yr) 6.99
Post Development Treatment Volume in D.A. A (ft³) 11,131

Table with columns: Practice, Runoff Reduction Credit (%), Managed Turf Credit Area (acres), Impervious Cover Credit Area (acres), Volume from Upstream Practice (ft³), Runoff Reduction (ft³), Remaining Volume (ft³), Total BMP Treatment Volume (ft³), Phosphorus Removal Efficiency (%), Phosphorus Load from Upstream Practices (lb), Untreated Phosphorus Load to Practice (lb), Phosphorus Removed by Practice (lb), Remaining Phosphorus Load (lb), Downstream Practice to be Employed.

TOTAL IMPERVIOUS COVER TREATED (ac) 2.30 AREA CHECK: OK.
TOTAL MANAGED TURF AREA TREATED (ac) 4.08 AREA CHECK: OK.

TOTAL PHOSPHORUS REMOVAL REQUIRED ON SITE (lb/yr) 4.45
TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. A (lb/yr) 6.99
TOTAL PHOSPHORUS REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr) 2.79
TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr) 0.00
TOTAL PHOSPHORUS LOAD REDUCTION ACHIEVED IN D.A. A (lb/yr) 2.79
TOTAL PHOSPHORUS REMAINING AFTER APPLYING BMP LOAD REDUCTIONS IN D.A. A (lb/yr) 4.20

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr) 0.00
NITROGEN REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr) 0.00
TOTAL NITROGEN REMOVED IN D.A. A (lb/yr) 0.00

Drainage Area B

Table with columns: Drainage Area A Land Cover (acres), A Soils, B Soils, C Soils, D Soils, Totals, Land Cover Rv. Rows include Forest/Open Space, Managed Turf, and Impervious Cover.

TOTAL IMPERVIOUS COVER TREATED (ac) 0.00 AREA CHECK: OK.
TOTAL MANAGED TURF AREA TREATED (ac) 0.00 AREA CHECK: OK.

TOTAL PHOSPHORUS REMOVAL REQUIRED ON SITE (lb/yr) 4.45
TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. B (lb/yr) 0.00
TOTAL PHOSPHORUS REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. B (lb/yr) 0.00
TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. B (lb/yr) 0.00
TOTAL PHOSPHORUS LOAD REDUCTION ACHIEVED IN D.A. B (lb/yr) 0.00
TOTAL PHOSPHORUS REMAINING AFTER APPLYING BMP LOAD REDUCTIONS IN D.A. B (lb/yr) 0.00

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. B (lb/yr) 0.00
NITROGEN REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. B (lb/yr) 0.00
TOTAL NITROGEN REMOVED IN D.A. B (lb/yr) 0.00

Drainage Area C

Table with columns: Drainage Area A Land Cover (acres), A Soils, B Soils, C Soils, D Soils, Totals, Land Cover Rv. Rows include Forest/Open Space, Managed Turf, and Impervious Cover.

TOTAL IMPERVIOUS COVER TREATED (ac) 0.00 AREA CHECK: OK.
TOTAL MANAGED TURF AREA TREATED (ac) 0.00 AREA CHECK: OK.

TOTAL PHOSPHORUS REMOVAL REQUIRED ON SITE (lb/yr) 4.45
TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL IN D.A. C (lb/yr) 0.45
TOTAL PHOSPHORUS REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. C (lb/yr) 0.00
TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. C (lb/yr) 0.00
TOTAL PHOSPHORUS LOAD REDUCTION ACHIEVED IN D.A. C (lb/yr) 0.00
TOTAL PHOSPHORUS REMAINING AFTER APPLYING BMP LOAD REDUCTIONS IN D.A. C (lb/yr) 0.45

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES IN D.A. C (lb/yr) 0.00
NITROGEN REMOVED WITHOUT RUNOFF REDUCTION PRACTICES IN D.A. C (lb/yr) 0.00
TOTAL NITROGEN REMOVED IN D.A. C (lb/yr) 0.00

CLEAR BMP AREAS

Site Results (Water Quality Compliance)

Table with columns: Area Checks, D.A. A, D.A. B, D.A. C, D.A. D, D.A. E, AREA CHECK. Rows include Forest/Open Space, Impervious Cover, Managed Turf Area.

Site Treatment Volume (ft³) 11,907

Runoff Reduction Volume and TP By Drainage Area

Table with columns: D.A. A, D.A. B, D.A. C, D.A. D, D.A. E, TOTAL. Rows include Runoff Reduction Volume Achieved, TP Load Available for Removal, TP Load Reduction Achieved, TP Load Remaining.

NITROGEN LOAD REDUCTION ACHIEVED (lb/yr) 0.00

Total Phosphorus
FINAL POST-DEVELOPMENT TP LOAD (lb/yr) 7.48
TP LOAD REDUCTION REQUIRED (lb/yr) 4.45
TP LOAD REDUCTION ACHIEVED (lb/yr) 2.79
TP LOAD REMAINING (lb/yr) 4.69
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr) 1.65

Total Nitrogen (For Information Purposes)
POST-DEVELOPMENT LOAD (lb/yr) 53.52
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr) 0.00
REMAINING POST-DEVELOPMENT NITROGEN LOAD (lb/yr) 53.52

CLEAR BMP AREAS

Total Phosphorus Available for Removal in D.A. B (lb/yr) 0.00
Post Development Treatment Volume in D.A. B (ft³) 0

CLEAR BMP AREAS

Total Phosphorus Available for Removal in D.A. C (lb/yr) 0.45
Post Development Treatment Volume in D.A. C (ft³) 720

Runoff Volume and Curve Number Calculations

Enter design storm rainfall depths (in):

Table with columns: 1-year storm, 2-year storm, 10-year storm. Values: 2.51, 3.04, 4.67.

Use NOAA Atlas 14 (http://hdsc.nws.noaa.gov/hdsc/pfds/)

\*Notes (see below):
[1] The curve numbers and runoff volumes computed in this spreadsheet for each drainage area are limited in their applicability for determining and demonstrating compliance with water quantity requirements.
[2] Runoff Volume (RV) for pre- and post-development drainage areas must be in volumetric units (e.g., acre-feet or cubic feet) when using the Energy Balance Equation.
[3] Adjusted CNs are based on runoff reduction volumes as calculated in D.A. tabs.

Drainage Area Curve Numbers and Runoff Depths\*
Curve numbers (CN, CNadj) and runoff depths (RV\_Developed) are computed with and without reduction practices.

Table with columns: Drainage Area A, A Soils, B Soils, C Soils, D Soils, Total Area (acres), Runoff Reduction Volume (ft³). Rows include Forest/Open Space, Managed Turf, Impervious Cover.

Table with columns: Drainage Area B, A Soils, B Soils, C Soils, D Soils, Total Area (acres), Runoff Reduction Volume (ft³). Rows include Forest/Open Space, Managed Turf, Impervious Cover.

Table with columns: Drainage Area C, A Soils, B Soils, C Soils, D Soils, Total Area (acres), Runoff Reduction Volume (ft³). Rows include Forest/Open Space, Managed Turf, Impervious Cover.



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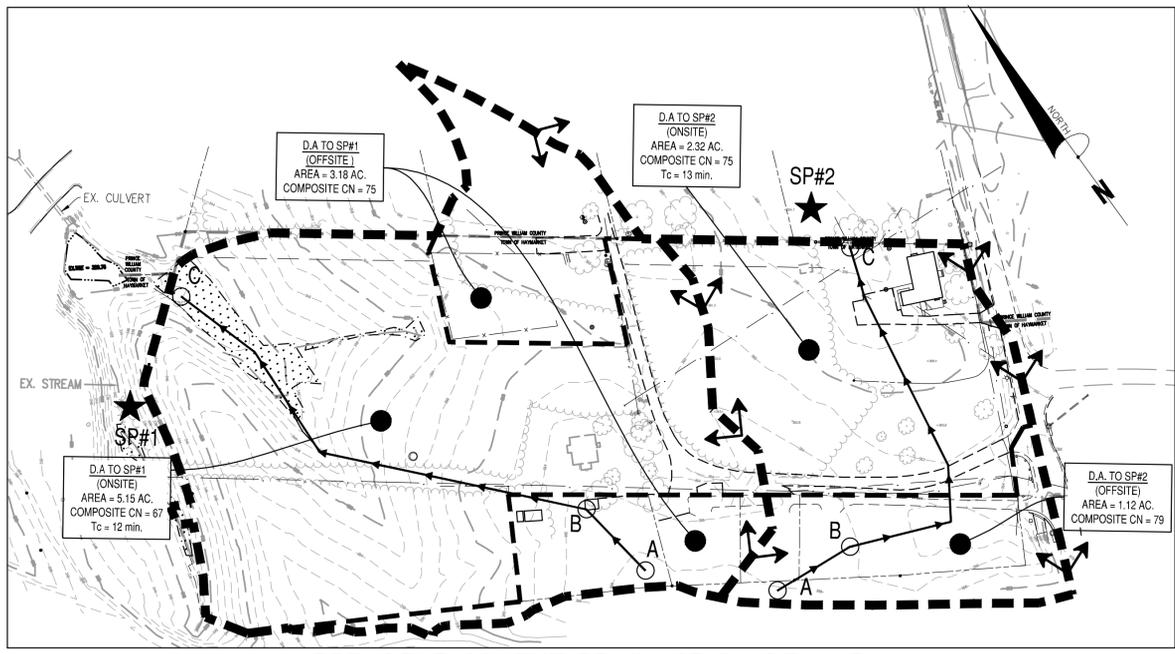
VIRGINIA RUNOFF REDUCTION METHOD COMPUTATIONS
FINAL SUBDIVISION PLAN
ROBINSON'S PARADISE
TOWN OF HAYMARKET
VIRGINIA

PROJECT NO
COUNTY PROJECT NUMBER

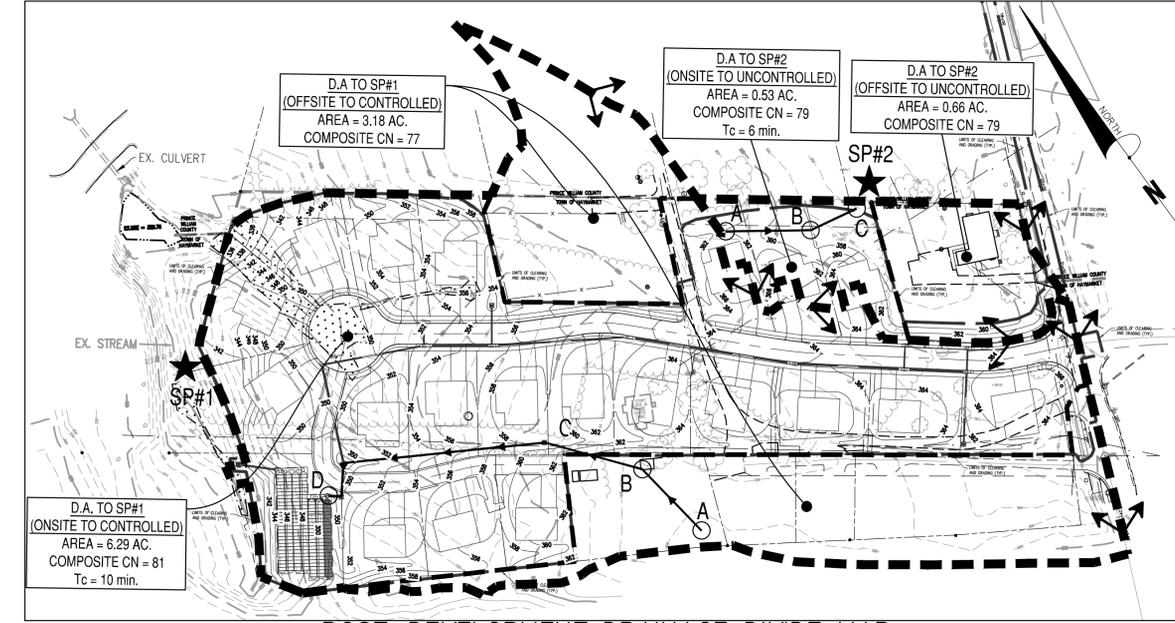


PLAN STATUS
03/10/21 1st. SUBMISSION
07/13/21 1st. DEQ SUBMISSION
10/18/21 2nd. SUBMISSION
12/23/21 3rd. SUBMISSION

DATE DESCRIPTION
JVC JVC RAR
DESIGN DRAWN CHKD
SCALE H: N.I.S. V:
JOB No. 140175-01-001
DATE : 12/23/21
FILE No.



PRE-DEVELOPMENT DRAINAGE DIVIDE MAP  
1"=100' HORIZ. SCALE



POST-DEVELOPMENT DRAINAGE DIVIDE MAP  
1"=100' HORIZ. SCALE

**LEGEND**

- DENOTES DRAINAGE DIVIDES
- (B/D) (C) DENOTES HYDROLOGIC SOIL GROUP
- ★ SP#1 DENOTES DRAINAGE STUDY POINT
- A → B DENOTES TIME OF CONCENTRATION FLOW PATH

**STUDY POINT #1 SWM SUMMARY**

PRE-DEVELOPMENT										FOREST CONDITION		
SUBAREA	AREA (AC)	ACTUAL CN	WOODED CN	1 YR RUNOFF, RV (in)	1 YR RUNOFF VOL. (cuft)	Q(1YR) (cfs)	Q(2YR) (cfs)	Q(10YR) (cfs)	Q(100YR) (cfs)	RV(1YR) forest (in)	RV(1YR) forest (cuft)	Q(1YR) forest (cfs)
SP#1 (on-site)	5.15	67	65	0.36	6740	1.92	3.86	11.43	N/A	0.30	5631	1.66
SP#1 (off-site)	3.18	75	N/A	N/A	N/A	2.82	4.40	10.00		N/A	N/A	N/A
<b>TOTALS</b>	<b>8.33</b>					<b>4.74</b>	<b>8.26</b>	<b>21.43</b>				

**POST-DEVELOPMENT**

SUBAREA	AREA (AC)	ACTUAL CN	ADJ. CN (1YR, 10YR)	1 YR RUNOFF, RV (in)	1 YR RUNOFF VOL. (cu.ft.)	Q(1YR) (cfs)	Q(2YR) (cfs)	Q(10YR) (cfs)	Q(100YR) (cfs)
SP #1 (on-site controlled)	6.29	81	83	1.06	24280	8.49	12.13	24.45	N/A
SP #1 (off-site)	3.18	77	N/A	N/A	N/A	3.28	4.95	10.78	
SP #1 (routed)		N/A	N/A	N/A	N/A	2.19	4.44	17.53	
<b>TOTALS</b>	<b>9.47</b>					<b>2.19</b>	<b>4.44</b>	<b>17.53</b>	<b>0.00</b>

**ENERGY BALANCE EQUATION**

[PRE-DEVELOPED METHOD]  $Q_{1post} \leq Q_{1pre}(RV_{pre} / RV_{post1})^{(IF)}$   
 (IF = 0.8 for sites greater than 1 acre and 0.9 for sites less than 1 acre)  
 OR  
 [FORESTED METHOD]  $Q_{1post} \leq (Q_{1forest} * RV_{forest}) / (RV_{post1})$

SP#	AREA (AC)	Q1pre (cfs)	Q1forest (cfs)	RVpre1 (cu.ft.)	RVforest (cu.ft.)	RVpost1 (cu.ft.)	IF	Q1post Allowed (Pre Devel)	Q1post Allowed (Forest)	Method to Use	Q1post Allowed W/ Off-Site	Q1post PROVIDED (cfs)	E.B. MET
1	6.29	1.92	1.66	6740	5631	24280	0.80	0.43	0.39	Pre Devel	3.25	2.18	Yes

**STUDY POINT #2 SWM SUMMARY**

PRE-DEVELOPMENT						
SUBAREA	AREA (AC)	ACTUAL CN	Q(1YR) (cfs)	Q(2YR) (cfs)	Q(10YR) (cfs)	Q(100YR) (cfs)
SP#2 (on-site)	2.32	75	2.06	3.21	7.29	N/A
SP#2 (off-site)	1.12	79	1.33	1.95	4.08	
<b>TOTALS</b>	<b>3.44</b>		<b>3.39</b>	<b>5.15</b>	<b>11.37</b>	

**POST-DEVELOPMENT**

SUBAREA	AREA (AC)	ACTUAL CN	Q(1YR) (cfs)	Q(2YR) (cfs)	Q(10YR) (cfs)	Q(100YR) (cfs)
SP #2 (on-site sheet)	0.53	79	0.76	1.10	2.24	N/A
SP #2 (off-site)	0.66	79	0.95	1.37	2.80	
<b>TOTALS</b>	<b>1.19</b>		<b>1.71</b>	<b>2.48</b>	<b>5.04</b>	

**STORMWATER MANAGEMENT NARRATIVE**

**SITE CONDITIONS**

THE SITE IS LOCATED SOUTH OF THE BORDER OF PRINCE WILLIAM COUNTY AND THE TOWN OF HAYMARKET AND EAST OF JEFFERSON STREET. THE SITE CONSISTS OF 8.08 ACRES. THE EXISTING CONDITIONS INCLUDE SIX RESIDENTIAL LOTS WITH GRAVEL ROADS AND A WOODED AREA AT THE WESTERN PORTION OF THE SITE. THE POST-DEVELOPED CONDITIONS INCLUDE 21 RESIDENTIAL LOTS WITH PAVED ROADS AND A CONSERVATION AREA AT THE SOUTHWESTERN CORNER OF THE SITE. APPROXIMATELY 7.20 ACRES WILL BE DISTURBED, HOWEVER, 11.77 ACRES AND 10.66 ACRES WERE USED FOR PRE- AND POST-ENERGY BALANCE COMPUTATIONS, AND 7.40 ACRES WERE USED FOR WATER QUALITY COMPUTATIONS (INCLUDING 0.45 ACRES ACRES FROM THE CONSERVATION AREA). THE NATURAL DRAINAGE DIVIDES OF THE SITE WILL BE HONORED. THIS PROJECT CONSISTS OF 2 MAIN DRAINAGE AREAS EVALUATED AS STUDY POINTS 1 AND 2. TO THE LEFT ARE THE PRE- AND POST- DRAINAGE MAPS AND THE VRRM DRAINAGE MAP IS IN SHEET 16.

**COMPUTATIONS**

ALL STORMWATER MANAGEMENT COMPUTATIONS AND CALCULATIONS WERE USED TO SHOW COMPLIANCE WITH THE STORMWATER MANAGEMENT QUANTITY AND QUALITY REGULATIONS. SCS RUNOFF HYDROGRAPHS AND ROUTINGS WERE COMPUTED USING THE HYDRAFLOW HYDROGRAPHS EXTENSION IN AUTOCAD CIVIL 3D. NOAA ATLAS 14 WAS USED TO OBTAIN THE RAINFALL DEPTH DATA FOR SPECIFIC DESIGN STORMS. THE 1-YEAR 24-HOUR (2.51 IN.), THE 2-YEAR 24-HOUR (3.04 IN.), AND THE 10-YEAR 24-HOUR (4.67 IN.) DATA WAS USED. ENERGY BALANCE COMPUTATIONS ARE TO THE TOP, CN AND TC COMPUTATIONS ARE IN SHEET 19, AND HYDROGRAPH REPORTS ARE IN SHEET 20.

**STUDY POINT #1 WATERSHED**

THIS AREA IN ITS PRE-DEVELOPED CONDITIONS CONSISTS OF 8.33 ACRES OF DRAINAGE (5.15 ACRES ONSITE AND 3.18 ACRES OFFSITE) WITH A CN VALUE OF 67. THIS AREA INCREASES TO 9.47 ACRES POST-DEVELOPMENT (6.29 ACRES ONSITE AND 3.18 ACRES OFFSITE) WITH A CN VALUE OF 81. THIS POST-DEVELOPED AREA INCLUDES THE MAJORITY OF ALL 21 RESIDENTIAL LOTS AND THE PAVED ROAD. THIS WATERSHED WILL USE AN UNDERGROUND STORMTECH CHAMBER (DESIGN DETAILS ARE IN SHEETS 21 AND 22) FOR PROPER ROUTING AND TO HELP WITH OUTFALL WATER QUALITY. THIS WATERSHED OUTFALLS INTO AN EXISTING CHANNEL WEST OF THE SITE. THIS CHANNEL FLOWS INTO A LOCALIZED FLOODING AREA AND OVERFLOWS INTO AN EXISTING CULVERT NORTHWEST OF THE SITE.

**STUDY POINT #2 WATERSHED**

THIS AREA IN ITS PRE-DEVELOPED CONDITIONS CONSISTS OF 3.44 ACRES OF DRAINAGE (2.32 ACRES ONSITE AND 1.12 ACRES OFFSITE) WITH A CN VALUE OF 75. THIS VALUE DECREASES TO 1.19 ACRES POST-DEVELOPMENT (0.53 ACRES ONSITE AND 0.66 ACRES OFFSITE) WITH A CN VALUE OF 79. THIS POST-DEVELOPED AREA INCLUDES THE REMAINDER OF THE PORTIONS OF ALL 21 RESIDENTIAL LOTS. SINCE THE POST-FLOW RATES ARE LOWER THAN THE PRE-FLOW RATES, THIS WATSHED WILL REMAIN UNCONTROLLED AND FOLLOW THE EXISTING DRAINAGE PATTERN OF SHEET FLOW TO STUDY POINT #2. THIS MEETS PART D OF 9VAC25-870-66 REQUIREMENTS.

**CHANNEL PROTECTION**

TO SATISFY THE CHANNEL PROTECTION CRITERIA, ANALYSIS OF THE STORMWATER CONVEYANCE SYSTEM WAS PROVIDED TO STUDY POINT 1 AND 2. FOR THIS PROPOSED DEVELOPMENT, CHANNEL PROTECTION IS SATISFIED BY MEETING THE ENERGY BALANCE EQUATION AS SHOWN ABOVE.

**FLOOD PROTECTION**

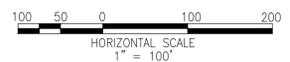
TO SATISFY THE FLOOD PROTECTION CRITERIA, ANALYSIS OF THE STORMWATER CONVEYANCE SYSTEM WAS PROVIDED TO STUDY POINTS 1 AND 2 FOR THIS PROPOSED DEVELOPMENT, FLOOD PROTECTION IS SATISFIED WITH THE POST-DEVELOPMENT 10-YEAR FLOW BEING LESS THAN THE PRE-DEVELOPMENT 10-YEAR FLOW AS SHOWN ABOVE. STUDY POINT #1 EXPERIENCES LOCALIZED FLOODING DUE TO THE EXISTING VDOT CULVERT BACKWATER JUST BELOW THE STUDY POINT. STUDY POINT #2 MEETS PART D OF 9VAC25-870-66 REQUIREMENTS.

**WATER QUALITY**

THE VIRGINIA RUNOFF REDUCTION METHOD HAS BEEN UTILIZED FOR THE DESIGN OF THIS PROJECT FOR A TOTAL SITE AREA OF 7.40 ACRES. THIS INCLUDES THE 0.45 ACRES OF CONSERVATION AREA SOUTHWESTERN CORNER OF THE SITE. PLEASE REFER TO SHEET 5 FOR THE LOCATION OF THE CONSERVATION AREA (DENOTED AS EX. C). THE TOTAL LOAD REDUCTION REQUIRED IS 4.44 LB/YR. THIS PROJECT WILL INCORPORATE THE UNDERGROUND STORMTECH CHAMBER AS MENTIONED IN THE STUDY POINT 1 WATERSHED PARAGRAPH ABOVE. THIS RESULTED IN A TOTAL REDUCTION OF 2.79 LB/YR, WITH A REMAINING 1.65 LB/YR STILL TO BE MET. TO MEET WATER QUALITY COMPLIANCE, 2 WATER QUALITY CREDITS WILL BE PURCHASED.

**CONCLUSION**

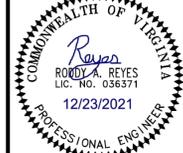
IT IS THE ENGINEER'S OPINION THAT THE CHANNEL PROTECTION, FLOOD PROTECTION, AND WATER QUALITY REQUIREMENTS FOR THE SUBJECT SITE HAVE BEEN MET USING ACCEPTABLE HYDROLOGIC AND HYDRAULIC METHODOLOGIES.



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PRE & POST-DEVELOPMENT DRAINAGE MAP  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
 VIRGINIA  
 TOWN OF HAYMARKET

PROJECT NO  
 COUNTY PROJECT NUMBER



**PLAN STATUS**

03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
JVC	JVC RAR
DESIGN	DRAWN CHKD
SCALE	H: 1" = 100' V:

JOB No. 140175-01-001  
 DATE : 12/23/21  
 FILE No.

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location PRE SP #1 (ONSITE) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Woods, Turf, and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location PRE SP #1 (OFFSITE) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Woods, Turf, and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location PRE SP #2 (ONSITE) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Woods, Turf, and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location PRE SP #2 (OFFSITE) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Turf and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location OST SP #1 ONSITE (CONTROLLED) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Turf and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location ST SP #1 OFFSITE (CONTROLLED) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Turf, Wood, and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location POST SP #2 ONSITE (UNCONT.) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Turf and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 2: Runoff curve number and runoff

Project Robinson Paradise By JOV Date 2/8/21
Location OST SP #2 OFFSITE (UNCONT.) Checked RAR Date
Present Developed

Table with columns: Hydrologic Group, % Impervious, Cover description, CN, Area, Product of CN x Area. Includes rows for Turf and Impervious.

2. Runoff
Frequency (yr)
Rainfall (in), P (24-hour)
Runoff Q (in)

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project Robinson Paradise By JOV Date 2/8/21
Location PRE SP #1 Checked RAR Date
Present Developed
Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segment.

Sheet flow (applicable to Tc only) table with columns: Segment ID, Description, Tc, Tt.

Shallow concentrated flow table with columns: Segment ID, Description, Tc, Tt.

Channel Flow table with columns: Segment ID, Description, Tc, Tt.

Used min 12

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project Robinson Paradise By JOV Date 2/8/21
Location PRE SP #2 Checked RAR Date
Present Developed
Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segment.

Sheet flow (applicable to Tc only) table with columns: Segment ID, Description, Tc, Tt.

Shallow concentrated flow table with columns: Segment ID, Description, Tc, Tt.

Channel Flow table with columns: Segment ID, Description, Tc, Tt.

Used min 13

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project Robinson Paradise By JOV Date 2/8/21
Location POST SP #1 (CONTROLLED) Checked RAR Date
Present Developed
Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segment.

Sheet flow (applicable to Tc only) table with columns: Segment ID, Description, Tc, Tt.

Shallow concentrated flow table with columns: Segment ID, Description, Tc, Tt.

Channel Flow table with columns: Segment ID, Description, Tc, Tt.

Used min 10

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project Robinson Paradise By JOV Date 2/8/21
Location POST SP #2 ONSITE Checked RAR Date
Present Developed
Tc Tt through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segment.

Sheet flow (applicable to Tc only) table with columns: Segment ID, Description, Tc, Tt.

Shallow concentrated flow table with columns: Segment ID, Description, Tc, Tt.

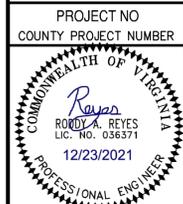
Channel Flow table with columns: Segment ID, Description, Tc, Tt.

Used min 8



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STORMWATER MANAGEMENT COMPUTATIONS
FINAL SUBDIVISION PLAN
ROBINSON'S PARADISE
TOWN OF HAYMARKET
VIRGINIA

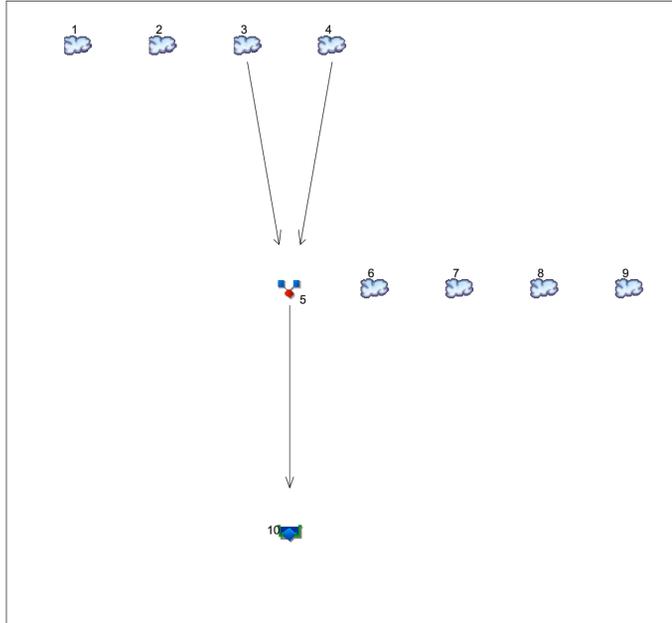


PLAN STATUS table with columns: DATE, DESCRIPTION. Includes submission dates and stages.

Table with columns: DATE, DESCRIPTION. Includes JVC, DESIGN, SCALE, JOB No., DATE, FILE No.

### Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



**Legend**

Hyd. No.	Origin	Description
1	SCS Runoff	PRE SP#1 (ON-SITE)
2	SCS Runoff	PRE SP#1 (OFF-SITE)
3	SCS Runoff	POST SP#1 (ON-SITE CONTROLLED)
4	SCS Runoff	POST SP#1 (OFF-SITE)
5	Combine	POST SP#1 COMBINED
6	SCS Runoff	PRE SP#2 (ON-SITE)
7	SCS Runoff	PRE SP#2 (OFF-SITE)
8	SCS Runoff	POST SP#2 (ON-SITE UNCONT.)
9	SCS Runoff	POST SP#2 (OFF-SITE UNCONT.)
10	Reservoir	SWM CHAMBERS

Project: SWM FINAL.gpw      Tuesday, 03 / 9 / 2021

### Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1,924	2	722	6,949	---	---	---	PRE SP#1 (ON-SITE)
2	SCS Runoff	2,818	2	722	7,814	---	---	---	PRE SP#1 (OFF-SITE)
3	SCS Runoff	8,492	2	722	22,358	---	---	---	POST SP#1 (ON-SITE CONTROLLE
4	SCS Runoff	3,284	2	722	8,888	---	---	---	POST SP#1 (OFF-SITE)
5	Combine	11.78	2	722	31,245	3, 4	---	---	POST SP#1 COMBINED
6	SCS Runoff	2,056	2	722	5,701	---	---	---	PRE SP#2 (ON-SITE)
7	SCS Runoff	1,330	2	722	3,539	---	---	---	PRE SP#2 (OFF-SITE)
8	SCS Runoff	0,760	2	718	1,523	---	---	---	POST SP#2 (ON-SITE UNCONT.)
9	SCS Runoff	0,947	2	718	1,896	---	---	---	POST SP#2 (OFF-SITE UNCONT.)
10	Reservoir	2,064	2	742	31,225	5	338.70	11,243	SWM CHAMBERS

SWM FINAL.gpw      Return Period: 1 Year      Tuesday, 03 / 9 / 2021

### Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	11.43	2	722	30,403	---	---	---	PRE SP#1 (ON-SITE)
2	SCS Runoff	9,996	2	720	26,004	---	---	---	PRE SP#1 (OFF-SITE)
3	SCS Runoff	24.45	2	720	63,473	---	---	---	POST SP#1 (ON-SITE CONTROLLE
4	SCS Runoff	10.78	2	720	27,968	---	---	---	POST SP#1 (OFF-SITE)
5	Combine	35.23	2	720	91,441	3, 4	---	---	POST SP#1 COMBINED
6	SCS Runoff	7,293	2	720	18,972	---	---	---	PRE SP#2 (ON-SITE)
7	SCS Runoff	4,075	2	720	10,565	---	---	---	PRE SP#2 (OFF-SITE)
8	SCS Runoff	2,244	2	716	4,545	---	---	---	POST SP#2 (ON-SITE UNCONT.)
9	SCS Runoff	2,795	2	716	5,660	---	---	---	POST SP#2 (OFF-SITE UNCONT.)
10	Reservoir	17.48	2	730	91,420	5	342.22	28,753	SWM CHAMBERS

SWM FINAL.gpw      Return Period: 10 Year      Tuesday, 03 / 9 / 2021

### Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	---	1,924	3,874	---	---	11.43	---	---	---	PRE SP#1 (ON-SITE)
2	SCS Runoff	---	2,818	4,397	---	---	9.996	---	---	---	PRE SP#1 (OFF-SITE)
3	SCS Runoff	---	8,492	12.13	---	---	24.45	---	---	---	POST SP#1 (ON-SITE CONTROLLE
4	SCS Runoff	---	3,284	4,951	---	---	10.78	---	---	---	POST SP#1 (OFF-SITE)
5	Combine	3, 4	11.78	17.06	---	---	35.23	---	---	---	POST SP#1 COMBINED
6	SCS Runoff	---	2,056	3,208	---	---	7.293	---	---	---	PRE SP#2 (ON-SITE)
7	SCS Runoff	---	1,330	1,946	---	---	4.075	---	---	---	PRE SP#2 (OFF-SITE)
8	SCS Runoff	---	0,760	1,097	---	---	2.244	---	---	---	POST SP#2 (ON-SITE UNCONT.)
9	SCS Runoff	---	0,947	1,366	---	---	2.795	---	---	---	POST SP#2 (OFF-SITE UNCONT.)
10	Reservoir	5	2,064	4,482	---	---	17.48	---	---	---	SWM CHAMBERS

Proj. file: SWM FINAL.gpw      Tuesday, 03 / 9 / 2021

### Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3,874	2	722	11,662	---	---	---	PRE SP#1 (ON-SITE)
2	SCS Runoff	4,397	2	722	11,750	---	---	---	PRE SP#1 (OFF-SITE)
3	SCS Runoff	12.13	2	720	31,653	---	---	---	POST SP#1 (ON-SITE CONTROLLE
4	SCS Runoff	4,951	2	722	13,081	---	---	---	POST SP#1 (OFF-SITE)
5	Combine	17.06	2	722	44,734	3, 4	---	---	POST SP#1 COMBINED
6	SCS Runoff	3,208	2	722	8,572	---	---	---	PRE SP#2 (ON-SITE)
7	SCS Runoff	1,946	2	722	5,106	---	---	---	PRE SP#2 (OFF-SITE)
8	SCS Runoff	1,097	2	718	2,196	---	---	---	POST SP#2 (ON-SITE UNCONT.)
9	SCS Runoff	1,366	2	718	2,735	---	---	---	POST SP#2 (OFF-SITE UNCONT.)
10	Reservoir	4,482	2	734	44,713	5	339.57	16,353	SWM CHAMBERS

SWM FINAL.gpw      Return Period: 2 Year      Tuesday, 03 / 9 / 2021

### Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020      Tuesday, 03 / 9 / 2021

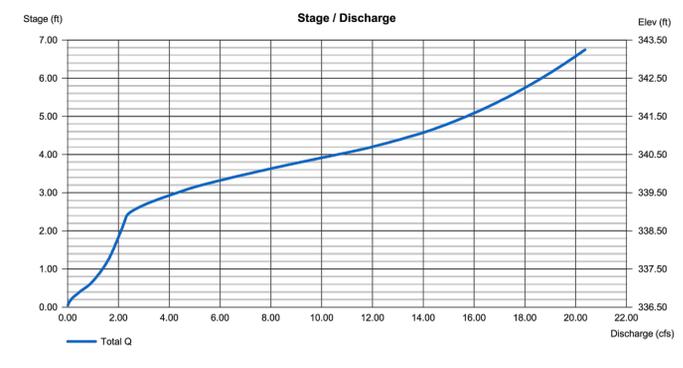
**Pond No. 1 - STORMTECH CHAMBER**

**Pond Data**  
Pond storage is based on user-defined values.

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	336.50	n/a	0	0
0.50	337.00	n/a	1,500	1,500
1.00	337.50	n/a	2,329	3,830
1.50	338.00	n/a	3,129	6,958
2.00	338.50	n/a	3,078	10,037
2.50	339.00	n/a	3,011	13,048
3.00	339.50	n/a	2,925	15,973
3.50	340.00	n/a	2,817	18,790
4.00	340.50	n/a	2,681	21,471
4.50	341.00	n/a	2,509	23,979
5.00	341.50	n/a	2,274	26,253
5.50	342.00	n/a	1,857	28,110
6.00	342.50	n/a	1,335	29,546
6.50	343.00	n/a	1,500	31,146
6.75	343.25	n/a	750	31,896

Culvert / Orifice Structures				Weir Structures			
[A]	[B]	[C]	[PrFrSr]	[A]	[B]	[C]	[D]
Rise (in) = 18.00	8.00	0.00	0.00	Crest Len (ft) = Inactive	1.25	0.00	0.00
Span (in) = 18.00	8.00	0.00	0.00	Crest El. (ft) = 350.00	338.90	0.00	0.00
No. Barrels = 1	1	0	0	Weir Coeff. = 3.33	3.33	3.33	3.33
Invert El. (ft) = 336.25	336.50	0.00	0.00	Weir Type = 1	Rect	---	---
Length (ft) = 43.00	0.00	0.00	0.00	Multi-Stage = Yes	Yes	No	No
Stage (%) = 0.58	0.00	0.00	n/a	Exfil.(in/hr) = 0.000 (by Wet area)			
N-Value = 0.13	0.13	0.13	n/a	TW Elev. (ft) = 0.00			
Orifice Coeff. = 0.60	0.60	0.60	0.60				
Multi-Stage = n/a	Yes	No	No				

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (is).



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STORMWATER MANAGEMENT COMPUTATIONS  
FINAL SUBDIVISION PLAN  
ROBINSON'S PARADISE  
TOWN OF HAYMARKET  
VIRGINIA

PROJECT NO  
COUNTY PROJECT NUMBER

COMBINE HEALTH OF VIRGINIA  
RODOLFO REYES  
L.C. NO. 036371  
12/23/2021  
PROFESSIONAL ENGINEER

DATE	DESCRIPTION
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
JVC	JVC
DESIGN	DRAWN
SCALE	H: N.I.S. V:
JOB No.	140175-01-001
DATE :	12/23/21
FILE No.	

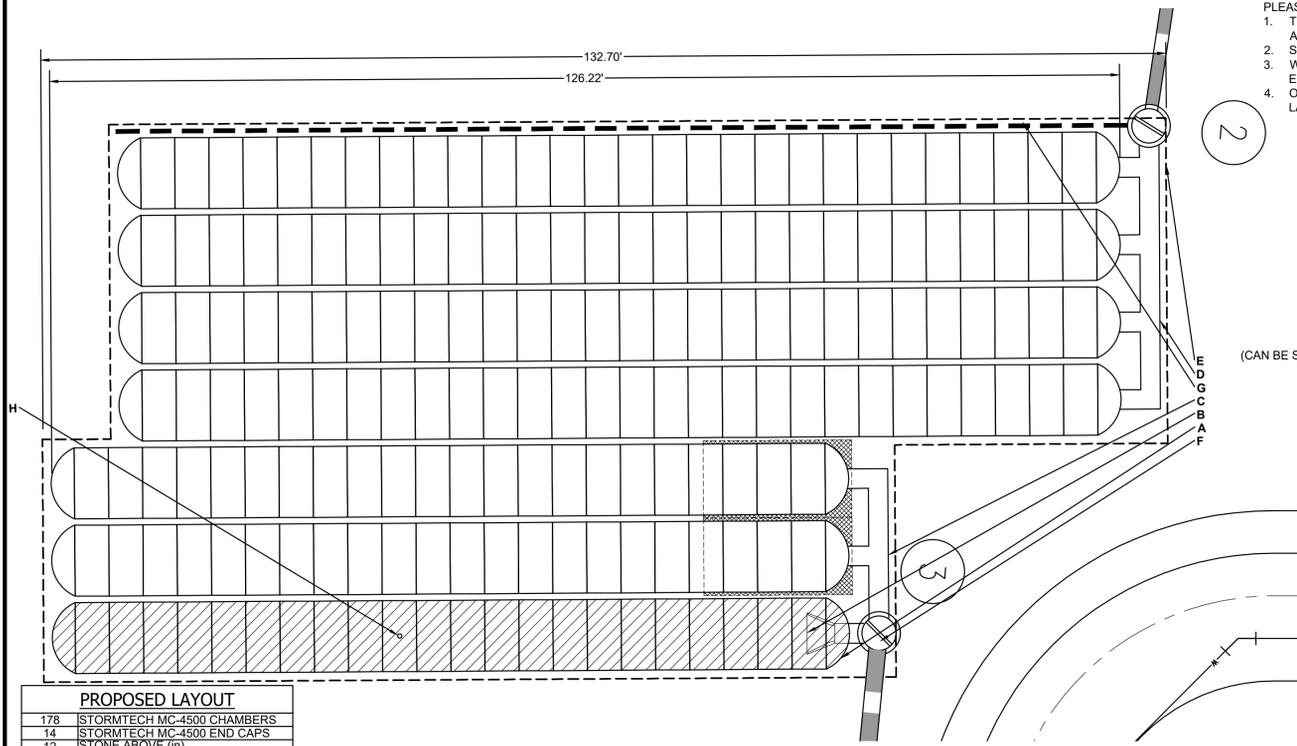
**ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS**

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	<b>FINAL FILL:</b> FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	<b>INITIAL FILL:</b> FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M1451 A-1, A-2.4, A-3  OR AASHTO M431 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.  NO COMPACTION REQUIRED.
B	<b>EMBEDMENT STONE:</b> FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M431 3, 4
A	<b>FOUNDATION STONE:</b> FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M431 3, 4  PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2,3</sup>

PLEASE NOTE:  
 1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".  
 2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.  
 3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.  
 4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

**NOTES:**

- STORMTECH CHAMBERS ARE DESIGNED FOR 1- AND 10-YEAR DESIGN STORMS.



**PROPOSED LAYOUT**

178	STORMTECH MC-4500 CHAMBERS
14	STORMTECH MC-4500 END CAPS
12	STONE ABOVE (in)
9	STONE BELOW (in)
40	STONE VOID
31980	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
7508	SYSTEM AREA (SF)
396.3	SYSTEM PERIMETER (ft)

**STORMTECH CHAMBER**  
 1"=10' HORIZ. SCALE

**PROPOSED ELEVATIONS**

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT UNPAVED):	349.25
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	344.75
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	344.25
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	344.25
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	344.25
TOP OF STONE:	343.25
TOP OF MC-4500 CHAMBER:	342.25
24" x 24" BOTTOM MANIFOLD INVERT:	337.44
24" x 24" BOTTOM MANIFOLD INVERT:	337.44
24" ISOLATOR ROW PLUS INVERT:	337.44
24" BOTTOM CONNECTION INVERT:	337.44
BOTTOM OF MC-4500 CHAMBER:	337.25
UNDERDRAIN INVERT:	336.50
BOTTOM OF STONE:	336.50

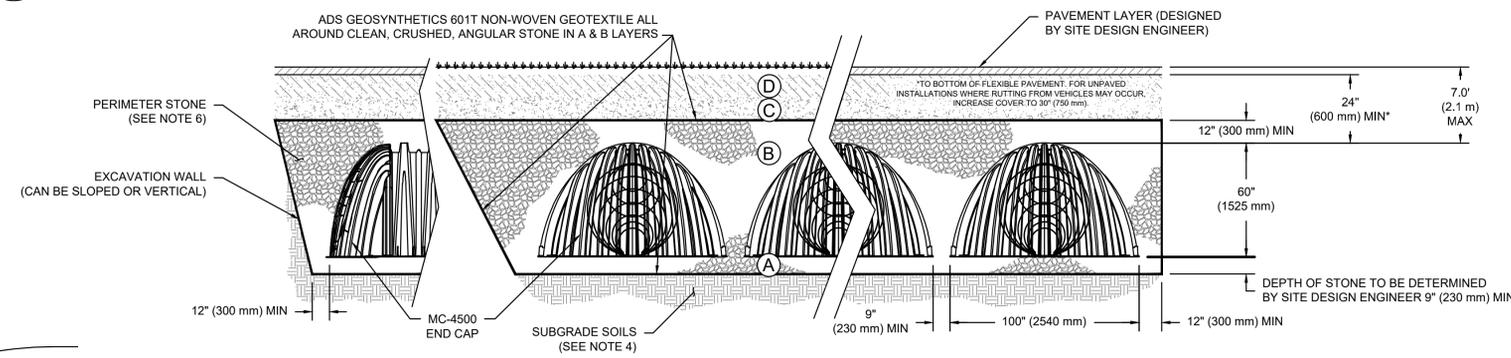
\*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT	MAX FLOW
PREFABRICATED END CAP	A	24" BOTTOM PARTIAL CUT END CAP, PART#: MC4500IEPP24B / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.26"	
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC450024RAMP		
MANIFOLD	C	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
MANIFOLD	D	24" x 24" BOTTOM MANIFOLD, ADS N-12	2.26"	
CONCRETE STRUCTURE	E	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		14.0 CFS OUT
CONCRETE STRUCTURE	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		19.0 CFS IN
W/WEIR				
UNDERDRAIN	G	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
INSPECTION PORT	H	4" SEE DETAIL		

- ISOLATOR ROW PLUS (SEE DETAIL)
- PLACE MINIMUM 17.5% OF ADSP1575 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

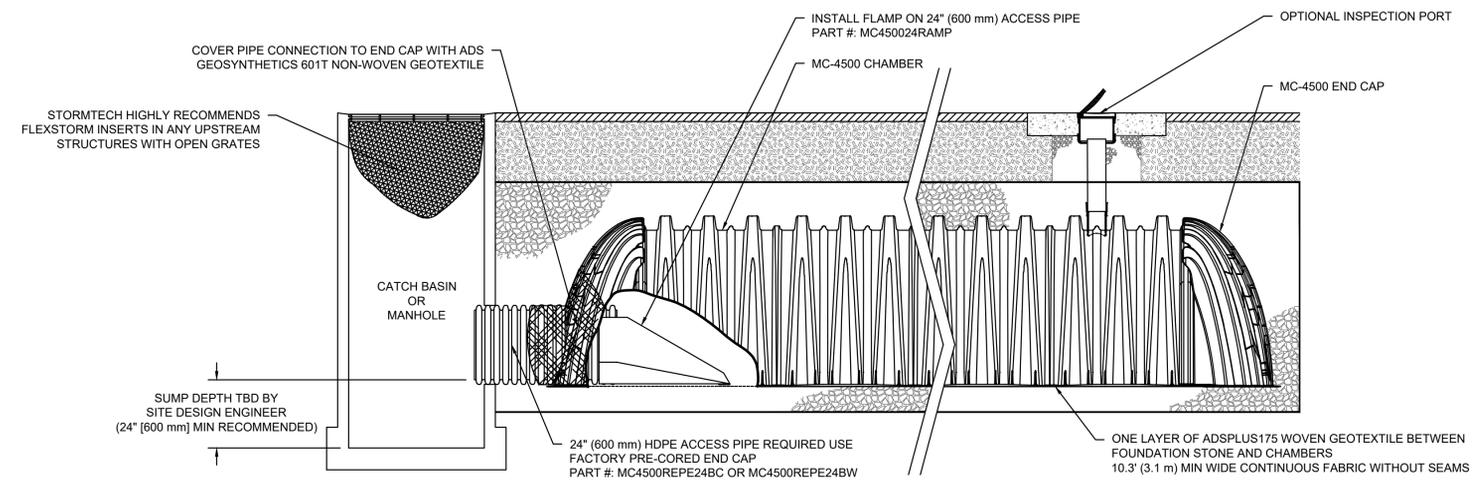
----- BED LIMITS

- NOTES**
- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
  - DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
  - THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
  - THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
  - NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.



**NOTES:**

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
- MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



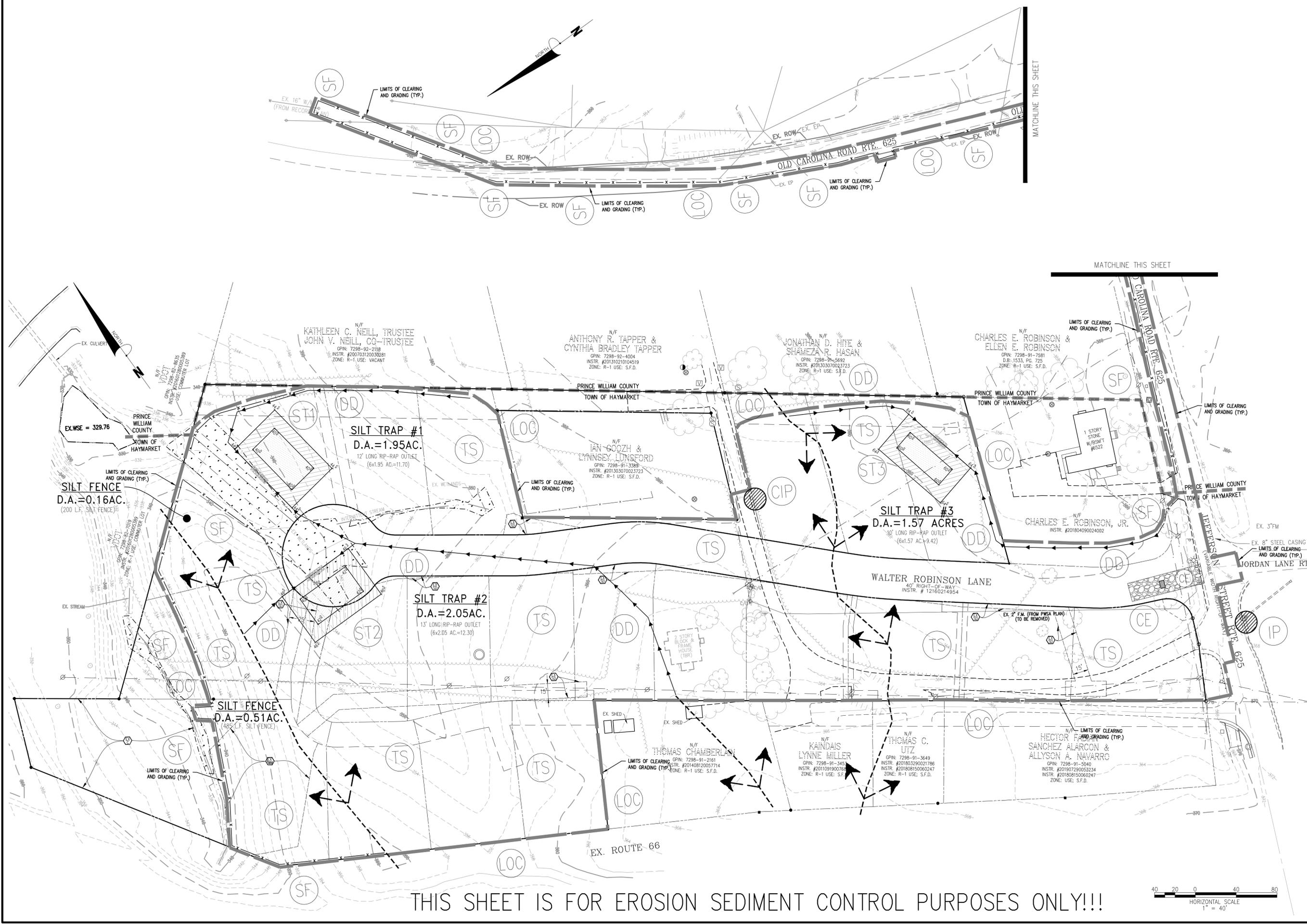
**MC-4500 ISOLATOR ROW PLUS DETAIL**  
 NTS





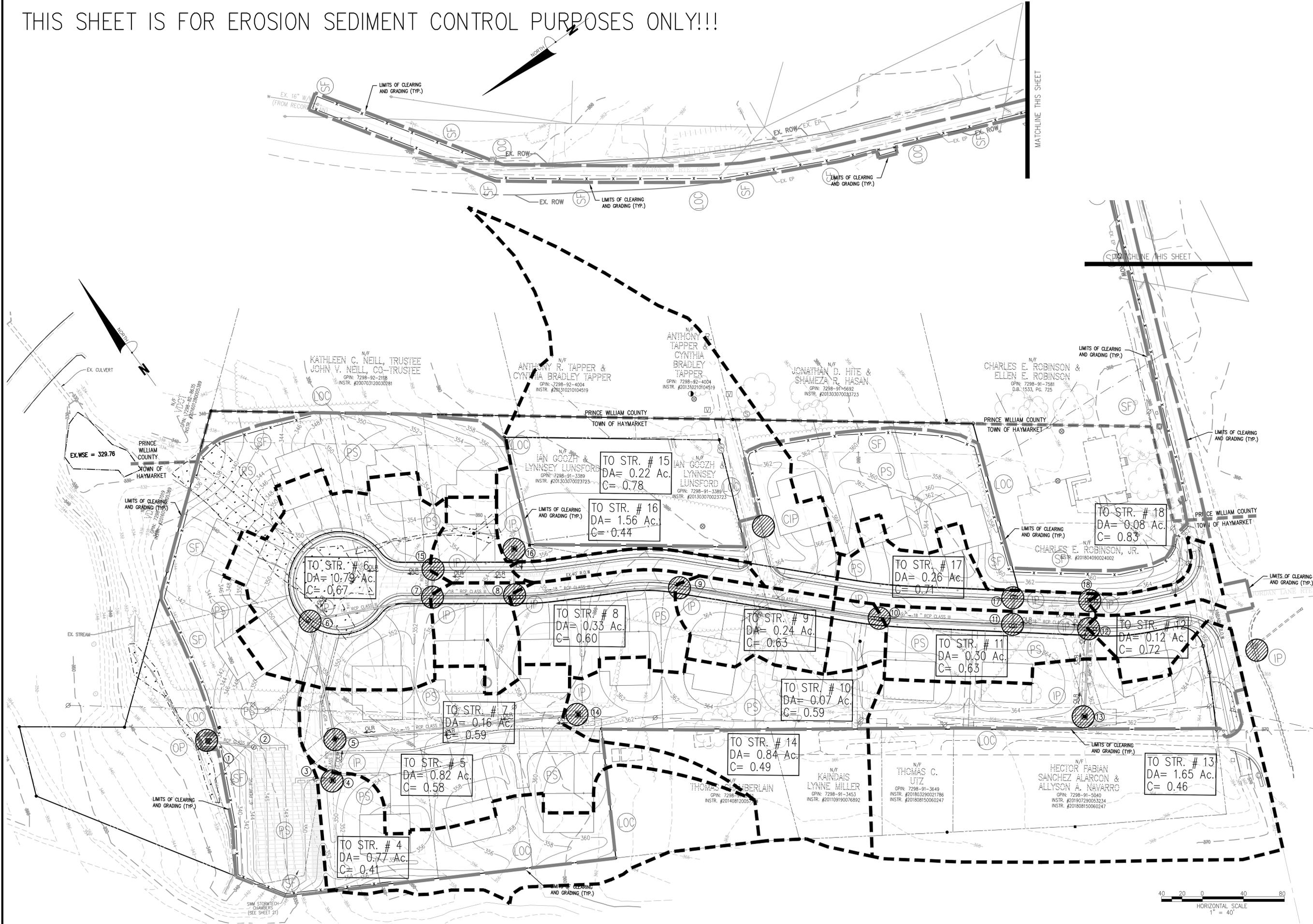
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03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
DRG	DRG RAR
DESIGN	DRAWN CHKD
SCALE	H: 1" = 40' V:
JOB No.	140175-01-001
DATE :	12/23/21
FILE No.	



THIS SHEET IS FOR EROSION SEDIMENT CONTROL PURPOSES ONLY!!!

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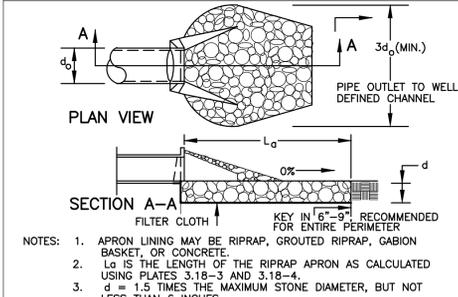
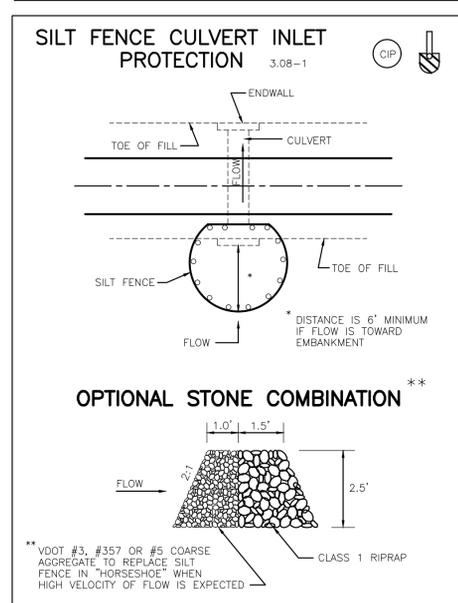
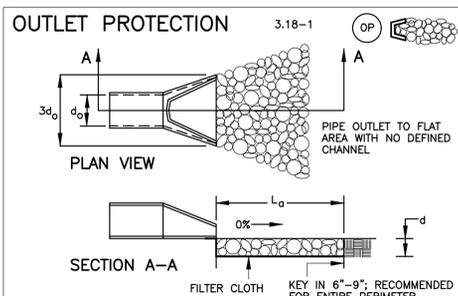
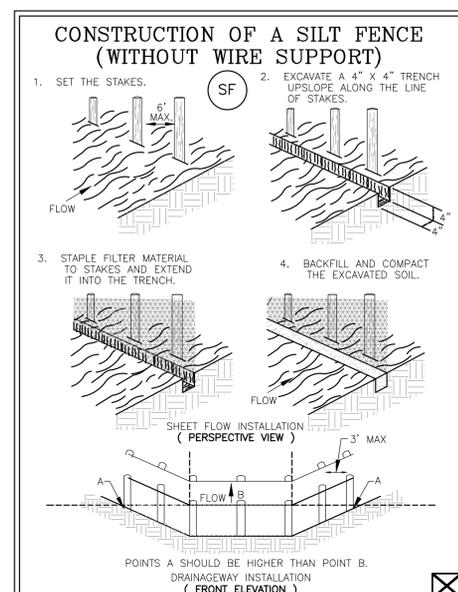
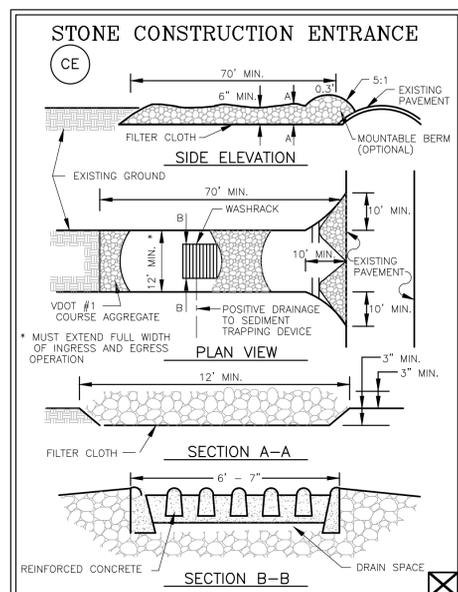
EROSION SEDIMENT CONTROL PHASE II  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
 VIRGINIA  
 TOWN OF HAYMARKET

PROJECT NO. COUNTY PROJECT NUMBER  
  
 Rocio A. REYES  
 L.C. NO. 036571  
 12/23/2021  
 PROFESSIONAL ENGINEER

PLAN STATUS

03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
DRG DESIGN	DRG DRAWN
	RAR CHKD
SCALE H: 1" = 40' V:	
JOB No. 140175-01-001	
DATE : 12/23/21	
FILE No.	



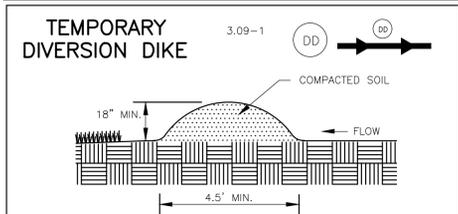
**SITE SPECIFIC SEEDING MIXTURES FOR PIEDMONT AREA**

Minimum Care Lawn	Total Lbs. Per Acre
- Commercial or Residential	175-200 lbs.
- Kentucky 31 or Turf-Type Tall Fescue	95-100%
- Improved Perennial Ryegrass	0-5%
- Kentucky Bluegrass	0-5%
<b>High-Maintenance Lawn</b>	<b>200-250 lbs.</b>
- Kentucky 31 or Turf-Type Tall Fescue	100%
<b>General Slope (3:1 or less)</b>	
- Kentucky 31 Fescue	128 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
<b>Low Maintenance Slope (Steeper than 3:1)</b>	
- Kentucky 31 Fescue	108 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
- Crownvetch **	150 lbs.

\* Use seasonal nurse crop in accordance with seeding dates as stated below:

Seeding Period	Annual Ryegrass	Foxtail Millet	Annual Ryegrass	Winter Ryegrass
February 16th through April				
May 1st through August 15th				
August 16th through October				
November through February 15th				

\*\* Substitute Sericea lespedeza for Crownvetch east of Farmville, Va. (May through September use hulled Sericea, all other periods, use unhulled Sericea). If flatpea is used in lieu of Crownvetch, increase rate to 30 lbs./acre. All legume seed must be properly inoculated. Weeping Lovegrass may be added to any slope or low-maintenance mix during warmer seeding periods; add 10-20 lbs./acre in mixes.



**PERMANENT AND TEMPORARY STABILIZATION**

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO STD. & SPEC. 3.32. PERMANENT SEEDING, OF THE HANDBOOK. EROSION CONTROL BLANKETS WILL BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDING TO PROTECT THE SLOPES FROM RILL AND GULLY EROSION AND TO ALLOW SEED TO GERMINATE PROPERLY. MULCH (STRAW OR FIBER) WILL BE USED ON RELATIVELY FLAT AREAS. IN ALL SEEDING OPERATIONS, SEED, FERTILIZER AND LIME WILL BE APPLIED PRIOR TO MULCHING.

PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADING IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN FOURTEEN (14) DAYS, EXCEPT FOR THAT PORTION OF THE SITE ON WHICH WORK WILL BE CONTINUOUS BEYOND FOURTEEN (14) DAYS. PERMANENT SOIL STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN SIX (6) MONTHS, FOR WINTER STABILIZATION, ANY AREA DENUDED FOR MORE THAN FOURTEEN (14) DAYS AFTER NOVEMBER 1 AND BEFORE MARCH 1 SHALL BE MULCHED AND SEEDING APPROPRIATE TO THE SEASON AND SITE CONDITIONS. PREPARATION OF AREAS FOR PERMANENT STABILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD SPECIFICATION #3.32 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

SEEDING AND SELECTION OF THE SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK STANDARD AND SPECIFICATION 3.32. ROADS AND PARKING AREAS SHALL BE STABILIZED WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES WILL BE REMOVED WITHIN 30 DAYS AFTER ADEQUATE SITE STABILIZATION AND AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, AS AUTHORIZED BY THE PRINCE WILLIAM INSPECTORS. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES WILL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION. WHEN SEDIMENT IS TRANSPORTED ONTO A PAVED ROAD SURFACE, THE ROAD WILL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT WILL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING WILL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. AREAS WHICH ARE NOT TO BE DISTURBED WILL BE CLEARLY MARKED BY FLAGS, SIGNS, ETC. RPA AND FLOODPLAIN LIMITS SHALL BE CLEARLY MARKED IN THE FIELD BY FLAGS, SIGNS, ETC. TREE SAVE AREAS SHALL BE CLEARLY MARKED IN THE FIELD BY ORANGE SAFETY FENCE.

**MAINTENANCE PLAN:**

IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL. THE SILT FENCE BARRIER WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER. THE SEEDING AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEED AS NEEDED. IN THE EVENT OF FAILURE OF ANY E&S MEASURE, DEVELOPER/CONTRACTOR SHALL PROVIDE IMMEDIATE AND COMPLETE REMEDIATION OF ADVERSE IMPACTS ON NATURAL AREAS. REMEDIATION SHALL COMMENCE WITHIN 24 HOURS OF IMPACT AND PROCEED WITHOUT INTERRUPTION UNTIL RESOLVED. DEFICIENCIES OF THE REMEDIATION SHALL BE IDENTIFIED IN WRITING TO ANY AND ALL APPROPRIATE AGENCIES.

**EROSION & SEDIMENT CONTROL NARRATIVE**

**PROJECT DESCRIPTION:** THIS PLAN PROPOSES 20 SINGLE FAMILY LOTS, A SINGLE CUL-DE-SAC ROAD AND SUPPORTING UTILITIES, SWM AND DRAINAGE. APPROXIMATELY 7.20 ACRES WILL BE DISTURBED DURING CONSTRUCTION.

**EXISTING SITE CONDITIONS:** THE EXISTING SITE IS VACANT AND CONSISTS MAINLY OF UNDERGROWTH WITH SOME TREES.

**SLOPES ARE MODERATE AND PRIMARILY DRAIN TO THE NORTH.**

**ADJACENT AREAS:** THE SITE IS BOUNDED BY EXISTING RESIDENTIAL PARCELS TO THE SOUTH, AND NORTH, OLD CAROLINA ROAD TO THE EAST AND VACANT LAND TO THE WEST.

**OFF-SITE AREAS:** N/A

**SOILS:** SEE COVER SHEET FOR SOILS MAP AND DATA.

**CRITICAL AREAS:** N/A

**EROSION AND SEDIMENT CONTROL MEASURES:** SEDIMENT CONTROL WILL BE ACCOMPLISHED THROUGH RAPID STABILIZATION AND BY THE INSTALLATION OF MECHANICAL DEVICES, INCLUDING TEMPORARY GRAVEL CONSTRUCTION ENTRANCE, SILT FENCE, DIVERSION DIKES, OUTLET PROTECTION, SEDIMENT TRAPS AND TEMPORARY SEEDING. ALL SEDIMENT CONTROL MEASURES ARE INTENDED TO PREVENT SEDIMENT FROM ENCRUCHING ONTO ADJACENT PROPERTIES AND INTO CRITICAL AREAS.

**PERMANENT STABILIZATION:** SEE STANDARD EROSION AND SEDIMENT CONTROL NOTES AND INSTALLATION SCHEDULE BELOW.

**STORMWATER RUNOFF CONSIDERATIONS:** THIS PROJECT PROPOSES UNDERGROUND SWM FOR THE INCREASED IMPERVIOUS AREA.

**(TS) TEMPORARY SEEDING PLANT MATERIALS, SEEDING RATES, AND DATES**

SPECIES	SEEDING RATE	NORTH <sup>a</sup>			SOUTH <sup>b</sup>			PLANT CHARACTERISTICS	
		Acres	1000 ft. <sup>2</sup>	3/1 to 4/30	5/1 to 8/15	8/15 to 11/1	2/15 to 4/30		5/1 to *9/1
OATS (Avena sativa)	3 bu. (up to 100 lbs., not less than 50 lbs.)	2 lbs.	X	-	-	X	-	-	Use spring varieties (e.g., Noble).
RYE <sup>d</sup> (Secale cereale)	2 bu. (up to 110 lbs., not less than 50 lbs.)	2.5 lbs.	X	-	X	X	-	X	Use for late fall seedings, winter cover. Tolerates cold and low moisture.
GERMAN MILLET (Setaria italica)	50 lbs.	approx. 1 lb.	-	X	-	-	X	-	Warm-season annual. Dies at first frost. May be added to summer mixes.
ANNUAL RYEGRASS <sup>c</sup> (Lolium multi-florum)	60 lbs.	1 1/2 lbs.	X	-	X	X	-	X	May be added in mixes. Will mow out of most stands.
WEeping LOVEGRASS (Eragrostis curvula)	15 lbs.	5 1/2 ozs.	-	X	-	-	X	-	Warm-season perennial. May bunch. Tolerates hot, dry slopes and acid, infertile soils. May be added to mixes.
KOREAN LESPEDEZA <sup>c</sup> (Lespedeza stipulacea)	25 lbs.	approx. 1 1/2 lbs.	X	X	-	X	X	-	Warm season annual legume. Tolerates acid soils. May be added to mixes.

<sup>a</sup> Northern Piedmont and Mountain region. See Plates 3.22-1 and 3.22-2.

<sup>b</sup> Southern Piedmont and Coastal Plain.

<sup>c</sup> May be used as a cover crop with spring seeding.

<sup>d</sup> May be used as a cover crop with fall seeding.

X May be planted between these dates.

- May not be planted between these dates.

- STRUCTURAL PRACTICES:**
- TEMPORARY CONSTRUCTION ENTRANCE
  - SILT FENCE
  - DIVERSION DIKE
  - OUTLET PROTECTION
  - CULVERT INLET PROTECTION
  - INLET PROTECTION
  - SEDIMENT TRAP
  - TEMPORARY SEEDING
  - PERMANENT SEEDING
- INSTALLATION SCHEDULE:**
- E & S OPERATIONS ARE TO CONTROL EROSION AND SEDIMENT ASSOCIATED WITH THE CONSTRUCTION OF THE SUBSTATION.
- OBTAIN CONSTRUCTION PERMIT AND ATTEND PRE CONSTRUCTION MEETING WITH THE INSPECTOR PRIOR TO STARTING ANY LAND DISTURBING ACTIVITIES.
  - INSTALL STABILIZED CONSTRUCTION ENTRANCE WITH WASH RACK. MUD AND DEBRIS SHALL BE WASHED FROM ALL CONSTRUCTION VEHICLES PRIOR TO LEAVING THE SITE WITH WATER TANKS AND OR A WATER TRUCK.
  - CLEAR AND GRUB ONLY THE AREAS NECESSARY TO INSTALL THE PERMETER CONTROLS AS SHOWN.
  - INSTALL SILT FENCE AND DIVERSION DIKES AS SHOWN ON THE E & S PLAN.
  - CLEAR AND GRUB THE REMAINDER OF THE SITE. APPLY TEMPORARY SEEDING TO ALL DENUDED AREAS AS EARTHWORK OPERATIONS PROGRESS.
  - THE DEVELOPER/DEVELOPER'S REPRESENTATIVE IS RESPONSIBLE FOR THE INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE TOWN OF HAYMARKET.
  - INSTALL THE REMAINING ITEMS OF THE SITE PLAN.
  - BRING SITE TO FINAL GRADE.
  - PERMANENTLY STABILIZE SITE WITH SEEDING. MAINTAIN PERIMETER CONTROLS UNTIL UPSTREAM AREAS ARE FULLY STABILIZED.
  - OBTAIN INSPECTOR'S APPROVAL PRIOR TO SITE STABILIZATION BEFORE REMOVAL OF ANY EROSION CONTROL MEASURES.
  - OBTAIN INSPECTOR'S APPROVAL PRIOR TO THE REMOVAL OF MECHANICAL SEDIMENT CONTROLS.

- SEEDING AND SELECTION OF THE SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK STANDARD AND SPECIFICATION 3.32.**
- THE SITE SHALL BE STABILIZED WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED.
11. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES WILL BE REMOVED WITHIN 30 DAYS AFTER ADEQUATE SITE STABILIZATION AND AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, AS AUTHORIZED BY THE TOWN OF HAYMARKET INSPECTORS. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES WILL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION
12. WHEN SEDIMENT IS TRANSPORTED ONTO A PAVED ROAD SURFACE, THE ROAD WILL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT WILL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING WILL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.

- EROSION & SEDIMENT CONTROL STANDARD NOTES**
- THE OWNER/DEVELOPER MUST NOTIFY THE TOWN OF HAYMARKET AT LEAST 24 HOURS PRIOR TO THE START OF CONSTRUCTION.
  - THE OWNER/DEVELOPER GRANTS THE RIGHT-OF-ENTRY ON TO THIS PROPERTY TO THE DESIGNATED TOWN OF HAYMARKET PERSONNEL FOR THE PURPOSE OF INSPECTING AND MONITORING FOR COMPLIANCE WITH TITLE 10.01, CHAPTER 5, ARTICLE 4 OF THE CODE OF VIRGINIA. EROSION AND SEDIMENT CONTROL LAW AND THE DESIGN AND CONSTRUCTION STANDARDS MANUAL SECTION 750.04 (C).
  - ALL EROSION CONTROL MEASURES SHOWN ON THE APPROVED PLAN MUST BE IN PLACE AND INSPECTED AND APPROVED BY THE TOWN OF HAYMARKET PRIOR TO CLEARING, STRIPPING OF TOPSOIL OR GRADING.
  - A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND PERMIT SHALL BE KEPT ON THE SITE AT ALL TIMES.
  - THE DEVELOPER/DEVELOPER'S REPRESENTATIVE IS RESPONSIBLE FOR THE INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE TOWN OF HAYMARKET.
  - ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL COMPLETE AND ADEQUATE STABILIZATION IS ACHIEVED.
  - ALL EROSION AND SEDIMENT CONTROL PRACTICES MUST BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND EROSION AND SEDIMENT CONTROL REGULATIONS 9VA225-840-40 MINIMUM STANDARDS AND TO THE TOWN OF HAYMARKET DESIGN AND CONSTRUCTION STANDARDS.
  - THE DEVELOPER/DEVELOPER'S REPRESENTATIVE WILL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL PRACTICES AT ALL TIMES.
  - THE DEVELOPER/DEVELOPER'S REPRESENTATIVE SHALL INSPECT ALL EROSION AND SEDIMENT CONTROL MEASURES DAILY AND AFTER EACH SIGNIFICANT RAINFALL. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:
    - SILT FENCE BARRIERS WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER.
    - SEEDING AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEED AS NEEDED.
    - ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES MUST BE MADE IMMEDIATELY AFTER THE INSPECTION.
  - SEDIMENT TRAPPING MEASURES WILL BE INSTALLED AS A FIRST STEP IN GRADING AND WILL BE SEEDING AND MULCHED IMMEDIATELY FOLLOWING INSTALLATION.
  - PERMANENT SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE.

- TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN UNDISTURBED FOR LONGER THAN FOURTEEN (14) DAYS.**
- SEEDING AND SELECTION OF THE SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK STANDARD AND SPECIFICATION 3.32.

- EROSION AND SEDIMENT CONTROL LEGEND**
- |  |                          |  |                       |
|--|--------------------------|--|-----------------------|
|  | SILT FENCE               |  | DIVERSION DIKE        |
|  | DRAINAGE DIVIDES         |  | CONSTRUCTION ENTRANCE |
|  | INLET PROTECTION         |  | SEDIMENT TRAP         |
|  | OUTLET PROTECTION        |  | PERMANENT SEEDING     |
|  | CULVERT INLET PROTECTION |  | TEMPORARY SEEDING     |



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EROSION CONTROL NOTES & NARRATIVE

FINAL SUBDIVISION PLAN

ROBINSON'S PARADISE

TOWN OF HAYMARKET

VIRGINIA

PROJECT NO. COUNTY PROJECT NUMBER

COMBINE HEALTH OF VIRGINIA

RODOLFO A. REYES  
 LIC. NO. 036371  
 12/23/2021  
 PROFESSIONAL ENGINEER

PLAN STATUS

03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION

DATE	DESCRIPTION
DRG DESIGN	DRG DRAWN
	CHKD
SCALE	H: N.T.S
JOB No.	140175-01-001
DATE	12/23/21
FILE No.	

SHEET 25 OF 28

SEDIMENT TRAP SCHEDULE																			
TRAP NO.	AREA (AC.)	STORAGE REQUIRED (CU-FT)		STORAGE PROVIDED (CU-FT)		WET STORAGE	DRY STORAGE	(Ho) HEIGHT OF OUTLET	(H) HEIGHT OF BERM	(W) BERM TOP WIDTH	TRAP BTM. ELEV.	WET STORAGE ELEV.	DRY STORAGE ELEV.	BERM TOP ELEV.	OUTLET WIDTH (FT.)	TRAP BTM. SIZE (FT.)	TRAP TOP SIZE (FT.)		
		WET	DRY	WET	DRY	DEPTH-FT	DEPTH-FT	(FT.)	(FT.)	(FT.)	ELEV.	ELEV.	ELEV.	ELEV.	LENGTH	WIDTH	LENGTH	WIDTH	
1	1.95	3528	3528	4070	4073	2.0	1.5	1.5	2.5	2.5	340.0	342.0	343.5	344.5	11.7	55	30	80	55
2	2.05	3708	3708	4070	4073	2.0	1.5	1.5	2.5	2.5	342.0	344.0	345.5	12.3	55	30	80	55	
3	1.57	2840	2840	2999	3083	2.0	1.5	1.5	2.5	2.5	360.0	362.0	363.5	9.4	55	20	80	45	

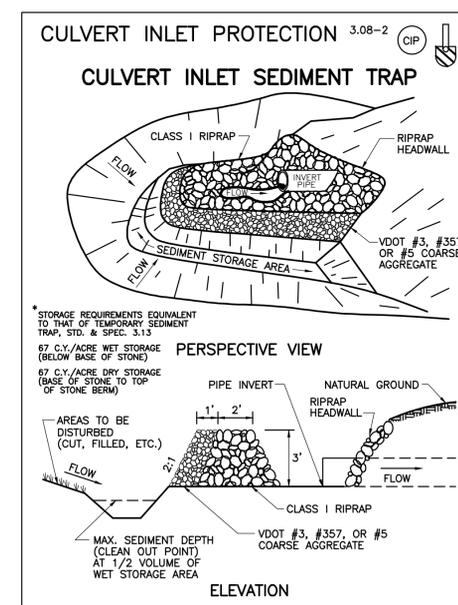
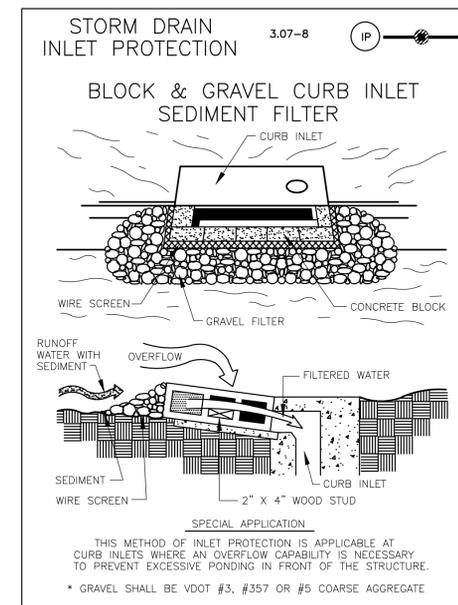
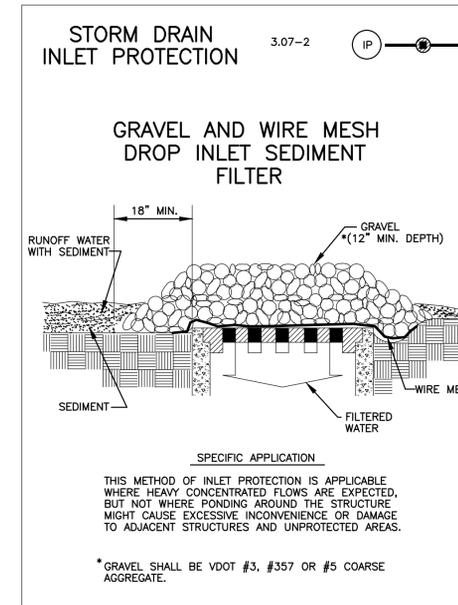
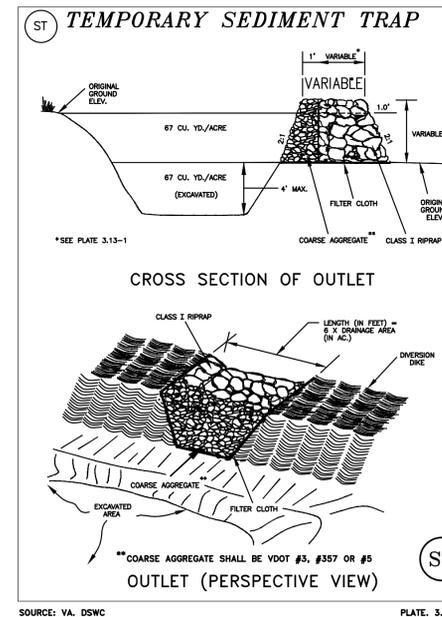
**CHECKLIST**

**FOR EROSION AND SEDIMENT CONTROL PLANS**

- Minimum Standards** - All applicable Minimum Standards must be addressed.
- NARRATIVE**
- Project description** - Briefly describes the nature and purpose of the land-disturbing activity, and the area (acres) to be disturbed.
- Existing site conditions** - A description of the existing topography, vegetation and drainage.
- Adjacent areas** - A description of neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land disturbance.
- Off-site areas** - Describe any off-site land-disturbing activities that will occur (including borrow sites, waste or surplus areas, etc.). Will any other areas be disturbed?
- Soils** - A brief description of the soils on the site giving such information as soil name, mapping unit, erodibility, permeability, depth, texture and soil structure.
- Critical areas** - A description of areas on the site which have potentially serious erosion problems (e.g., steep slopes, channels, wet weather/underground springs, etc.).
- Erosion and sediment control measures** - A description of the methods which will be used to control erosion and sedimentation on the site. (Controls should meet the specifications in Chapter 3.)
- Permanent stabilization** - A brief description, including specifications, of how the site will be stabilized after construction is completed.
- Stormwater runoff considerations** - Will the development site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describe the strategy to control stormwater runoff.
- Calculations** - Detailed calculations for the design of temporary sediment basins, permanent stormwater detention basins, diversions, channels, etc. Include calculations for pre- and post-development runoff.

**SITE PLAN**

- Vicinity map** - A small map locating the site in relation to the surrounding area. Include any landmarks which might assist in locating the site.
- Indicate north** - The direction of north in relation to the site.
- Limits of clearing and grading** - Areas which are to be cleared and graded.
- Existing contours** - The existing contours of the site.
- Final contours** - Changes to the existing contours, including final drainage patterns.
- Existing vegetation** - The existing tree lines, grassed areas, or unique vegetation.
- Soils** - The boundaries of different soil types.
- Existing drainage patterns** - The dividing lines and the direction of flow for the different drainage areas. Include the size (acreage) of each drainage area.
- Critical erosion areas** - Areas with potentially serious erosion problems. (See Chapter 6 for criteria.)
- Site Development** - Show all improvements such as buildings, parking lots, access roads, utility construction, etc.
- Location of practices** - The locations of erosion and sediment controls and stormwater management practices used on the site. Use the standard symbols and abbreviations in Chapter 3 of this handbook.
- Off-site areas** - Identify any off-site land-disturbing activities (e.g., borrow sites, waste areas, etc.). Show location of erosion controls. (Is there sufficient information to assure adequate protection and stabilization?)
- Detail drawings** - Any structural practices used that are not referenced to the E&S handbook or local handbooks should be explained and illustrated with detail drawings.
- Maintenance** - A schedule of regular inspections and repair of erosion and sediment control structures should be set forth.



EROSION AND SEDIMENT CONTROL LEGEND					
	(SF)	SILT FENCE		(DD)	DIVERSION DIKE
	(DV)	DRAINAGE DIVIDES		(CE)	CONSTRUCTION ENTRANCE
	(IP)	INLET PROTECTION		(ST)	SEDIMENT TRAP
	(OP)	OUTLET PROTECTION		(PS)	PERMANENT SEEDING
	(CIP)	CULVERT INLET PROTECTION		(TS)	TEMPORARY SEEDING

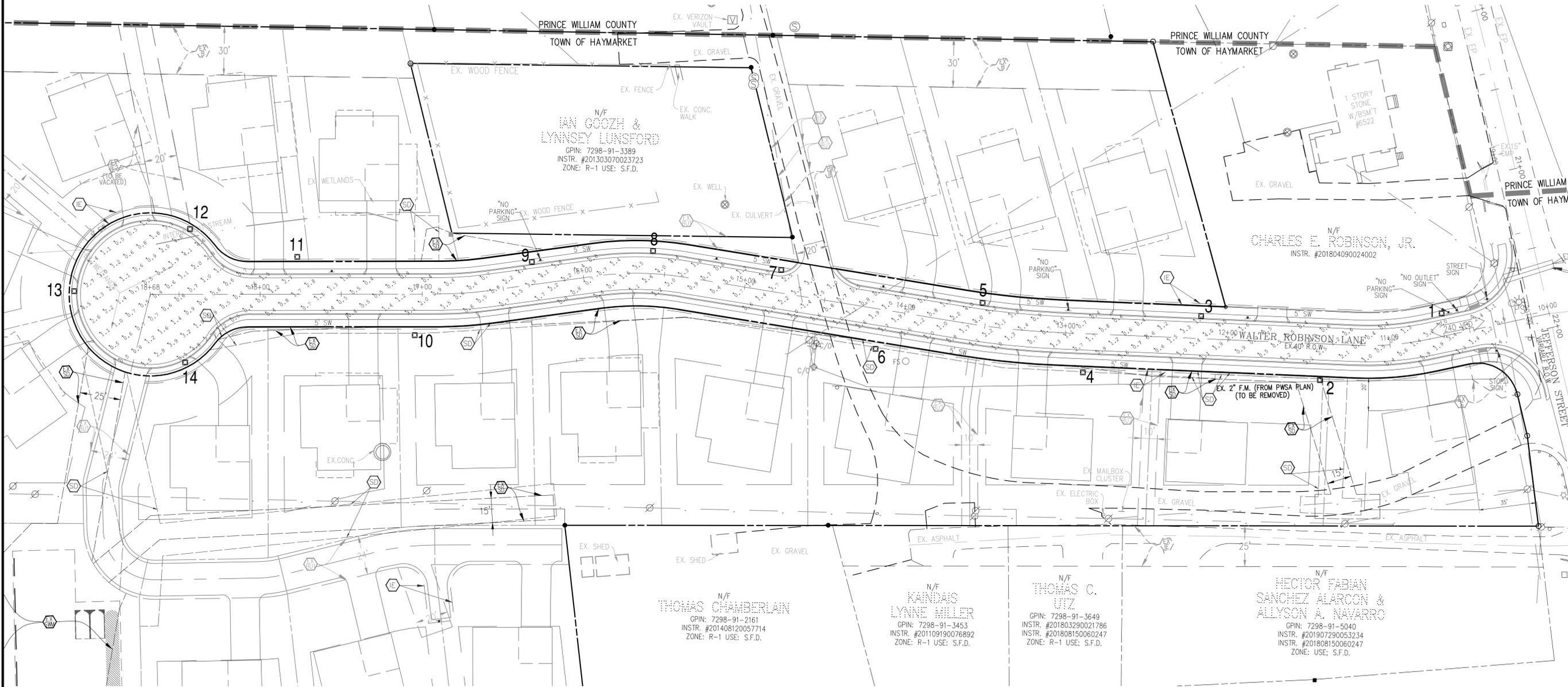
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EROSION CONTROL DETAILS  
 FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
 TOWN OF HAYMARKET  
 VIRGINIA

PROJECT NO	COUNTY PROJECT NUMBER
PLAN STATUS	
03/10/21	1st. SUBMISSION
07/13/21	1st. DEQ SUBMISSION
10/18/21	2nd. SUBMISSION
12/23/21	3rd. SUBMISSION
DATE	DESCRIPTION
DRG DESIGN	DRG DRAWN
SCALE	H: N.T.S
JOB No.	140175-01-001
DATE :	12/23/21
FILE No.	
SHEET	26 OF 28

THIS PLAN IS FOR PHOTOMETRIC PURPOSES ONLY!!

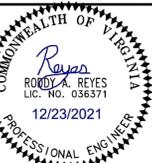


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LIGHTING AND PHOTOMETRIC PLAN  
FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
TOWN OF HAYMARKET  
VIRGINIA

PROJECT NO  
COUNTY PROJECT NUMBER



PLAN STATUS

Table with 2 columns: Date, Description. Rows: 03/10/21 1st. SUBMISSION, 07/13/21 1st. DEQ SUBMISSION, 10/18/21 2nd. SUBMISSION, 12/23/21 3rd. SUBMISSION

DATE DESCRIPTION

DESIGN DRAWN RAR  
SCALE H: 1"=30'  
V: N/A

JOB No. 140175-01-001

DATE : 12/23/21

FILE No.

SHEET 27A OF 28

Packet Pg. 30

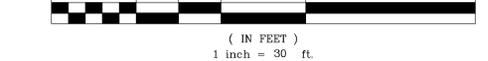
GENERAL PHOTOMETRIC NOTES:

- 1. ILLUMINATION LEVELS HAVE BEEN CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS UTILIZING CURRENT INDUSTRY STANDARD LAMP RATING IN ACCORDANCE WITH THE ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS.
2. ACTUAL ILLUMINATION LEVELS MAY VARY FROM THE PREDICTED RESULTS SHOWN IN THIS PLAN DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS AND OTHER FIELD CONDITIONS.
3. THE POINT-BY-POINT ILLUMINATION CALCULATION GRID USES A 10 FOOT BY FOOT MATRIX.
4. SEE ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
5. LIGHTING PLAN PREPARED BY BOWMAN CONSULTING GROUP.
6. ALL LIGHTING SHALL BE THE WASHINGTON STEEL STYLE (FLUTED) POST WITH THE WASHINGTON 118 GLOBE (ACORN STYLE).
7. ALL POLES AND FIXTURES TO HAVE A "HANOVER FOREST GREEN" FINISH. POLE TOP FIXTURE SELECTED.
8. MOUNTING HEIGHT: 15'

MAINTENANCE NOTES:

- 1. INSPECTION OF ALL LAMPS TO BE PERFORMED AT LEAST MONTHLY DURING HOURS OF DARKNESS TO LOOK FOR DIRTY OR BROKEN LENSES, FAILED LAMPS OR THOSE NOT PERFORMING TO SPECIFIED STANDARDS, TREE LIMBS BLOCKING LIGHT PATHS, AND EVIDENCE OF VANDALISM.
2. FAILED LAMPS, ELECTRICAL COMPONENTS, PHOTOCELLS, AND VANDALIZED OR DAMAGED LUMINAIRES TO BE REPLACED WITHIN 5 DAYS.
3. LUMINAIRES TO BE CLEANED ANNUALLY, OR AS NEEDED.
4. ALL TREES AND SHRUBBERY WILL BE PRUNED AS NEEDED, SO AS NOT TO BLOCK LIGHT PATHS.
5. SECURITY LIGHTING: LIGHTING LEVELS SHALL BE REDUCED TO SECURITY LIGHTING LEVELS WITHIN THIRTY (30) MINUTES AFTER THE CLOSE OF BUSINESS OR THE END OF THE BUSINESS ACTIVITIES INVOLVING THE PUBLIC. SECURITY LIGHTING LEVELS SHALL BE ACHIEVED BY EXTINGUISHING AT LEAST FIFTY (50) PERCENT OF THE TOTAL NUMBER OF LIGHTS, BY DIMMING LIGHTING LEVELS TO NO MORE THAN FIFTY (50) PERCENT OF THE LEVELS USED DURING BUSINESS OR ACTIVITY HOURS OR NO LESS THAN ONE FOOTCANDLE, OR SOME COMBINATION THEREOF BUSINESS OR ACTIVITY HOURS ARE DEFINED BY ANY TIME WHEN THE BUSINESS IS OPEN TO THE PUBLIC.

GRAPHIC SCALE



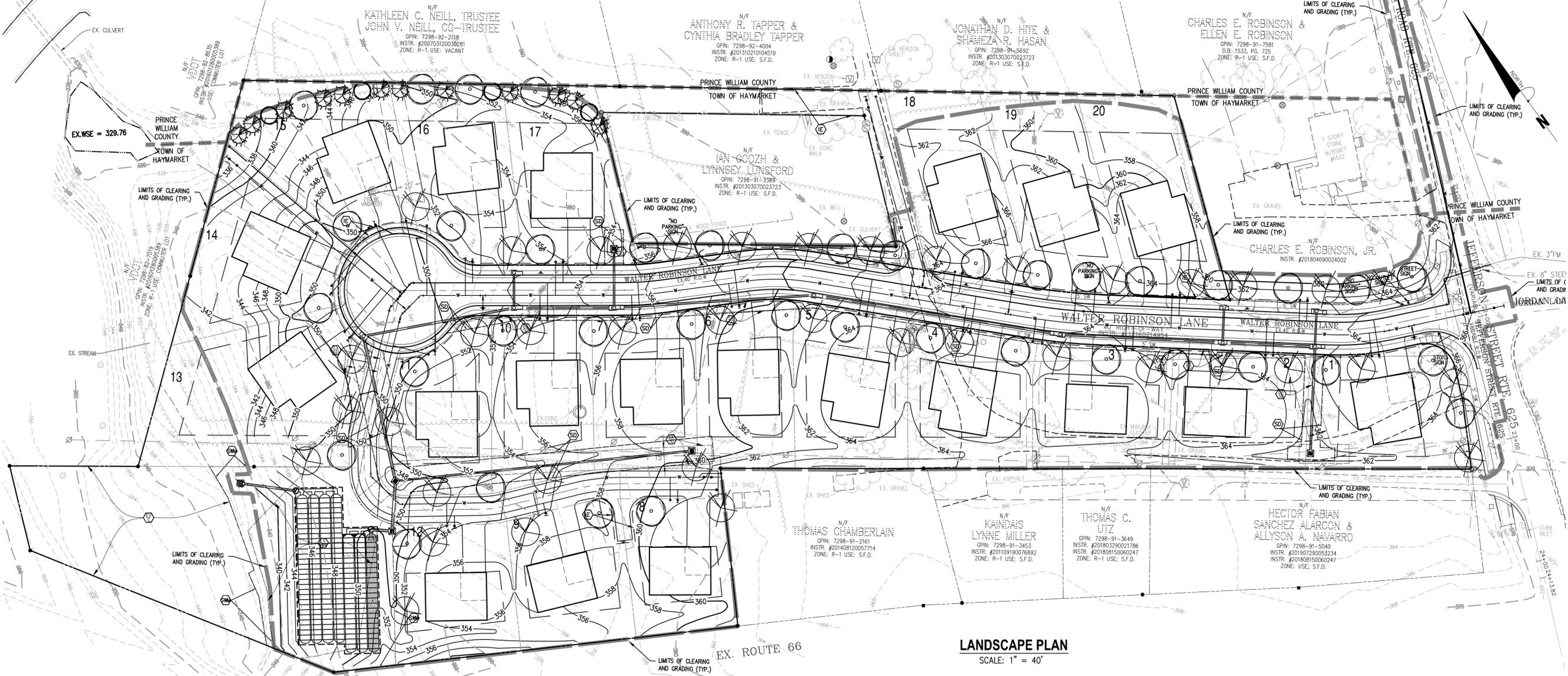
Luminaire Schedule table with columns: Symbol, Qty, Label, Arrangement, Total Lamp Lumens, LLF, Description. Row 1: 14, 0100wb2ar3x06040xxh, SINGLE, N.A., 1.000, K118-B2AR (SST) -III-60 (SSL) -1042

Calculation Summary table with columns: Label, CalcType, Units, Avg, Max, Min, Avg/Min, Max/Min. Row 1: Walter Robinson Lane, Illuminance, Fc, 1.47, 4.8, 0.4, 3.68, 12.00

King Luminaire section including product specifications for the K118 Washington - LED luminaire, a photograph of the luminaire, and technical details like 'PHOTO MOUNTING' and 'LUMINAIRE CONSTRUCTION'.

Fixture Options section showing various luminaire models (K118, K104, K106, K108, K109, K110, K111, K112, K113, K114, K115, K116, K117, K118, K119, K120, K121, K122, K123, K124, K125, K126, K127, K128, K129, K130, K131, K132, K133, K134, K135, K136, K137, K138, K139, K140, K141, K142, K143, K144, K145, K146, K147, K148, K149, K150) and technical specifications for the K118 Washington - LED luminaire.

Technical specifications and notes for the luminaire, including 'PHOTOMETRICS', 'WARRANTY', and 'MISCELLANEOUS' information.



**LANDSCAPE PLAN**  
SCALE: 1" = 40'

**LANDSCAPE PLAN LEGEND**

- LITTLELEAF LINDEN
- RED MAPLE
- WHITE PINE
- EASTERN RED CEDAR

- LANDSCAPE NOTES:**
- SEE GUIDELINES FOR THE PLANTING AND MAINTENANCE OF MATERIALS AS OUTLINED IN THE CURRENT VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
  - PLANT MATERIAL IS PER THE TOWN OF HAYMARKET APPROVED PLANT LIST. SUBSTITUTIONS ARE ALLOWED ONLY WITH THE APPROVAL OF THE TOWN ZONING ADMINISTRATOR.
  - TREE PLANTING WITHIN EXISTING OR PROPOSED EASEMENTS IS NOT PERMITTED.
  - NO BUFFERS HAVE BEEN PROVIDED OR ARE REQUIRED.
  - THE MAINTENANCE AND REPLACEMENT OF ALL LANDSCAPING SHALL BE THE RESPONSIBILITY OF THE INDIVIDUAL PROPERTY OWNERS.
  - NO TREE SAVE AREAS ARE PROPOSED.

**STREET TREES:**  
REQUIRED: ONE STREET TREE FOR EVERY 25 FEET OF STREET FRONTAGE. PLANTINGS SHALL BE AT EVEN INTERVALS WHEREVER POSSIBLE.

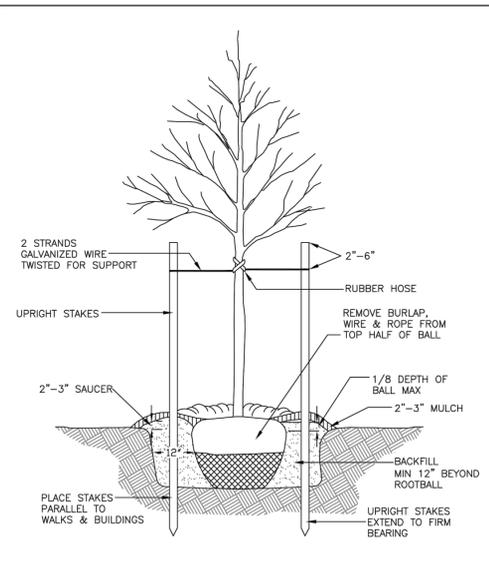
FRONTAGE 1,800 FEET 1,800 / 25 = 72 STREET TREES

PROVIDED: 59 STREET TREES

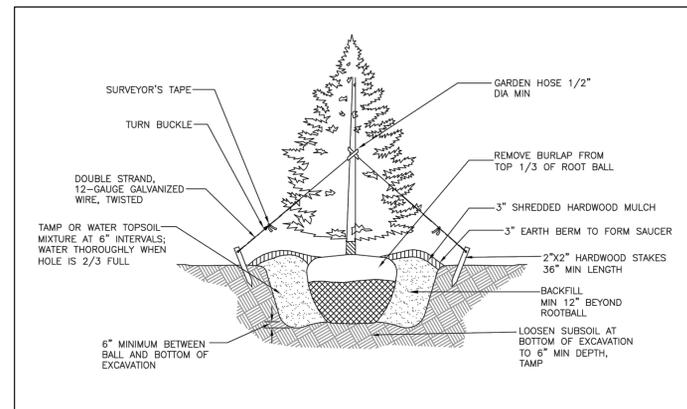
TREE PLANTING WITHIN EXISTING OR PROPOSED EASEMENTS IS NOT PERMITTED.

STREET TREES ALONG THE RIGHT OF WAY MAY BE ADJUSTED FOR DRIVEWAYS, STORM SEWER, SANITARY SEWER, SEWER LATERALS AND WATER METERS.

PLANTING SCHEDULE					
LARGE SHADE TREES					
KEY	QTY.	SIZE	BOTANICAL NAME	COMMON NAME	REMARKS
TC	39	3" Cal.	TILIA CORDATA	LITTLELEAF LINDEN	B&B, 12'-15' HT., STREET & BUFFER AREAS
PA	39	3" Cal.	ACER RUBRUM	RED MAPLE	B&B, 12'-15' HT., STREET & BUFFER AREAS
MEDIUM SHADE TREES					
KEY	QTY.	SIZE	BOTANICAL NAME	COMMON NAME	REMARKS
	0				
EVERGREENS					
KEY	QTY.	SIZE	BOTANICAL NAME	COMMON NAME	REMARKS
PV	12	7' - 8'	PINUS STROBUS	WHITE PINE	B&B, BUFFER AREA
PS	4	7' - 8'	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	B&B, BUFFER AREA
ORNAMENTAL TREES & SHRUBS					
KEY	QTY.	SIZE	BOTANICAL NAME	COMMON NAME	REMARKS
	0				
TOTAL LARGE SHADE TREES:					= 78
TOTAL MEDIUM SHADE TREES:					= 0
TOTAL EVERGREENS:					= 16
TOTAL ORNAMENTAL TREES & SHRUBS:					= 0
TOTAL NUMBER OF PLANT UNITS:					94

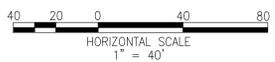


**TYPICAL DECIDUOUS TREE PLANTING DETAIL**  
NOT TO SCALE



**TYPICAL EVERGREEN TREE PLANTING DETAIL**  
NOT TO SCALE

THIS SHEET IS FOR LANDSCAPING PURPOSES ONLY!!!

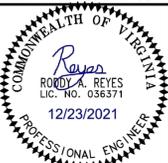


**Bowman**

Bowman Consulting Group, Ltd.  
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Manassas, VA 20110  
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Fax: (703) 530-8475  
www.bowmanconsulting.com  
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LANDSCAPE PLAN  
FINAL SUBDIVISION PLAN  
**ROBINSON'S PARADISE**  
TOWN OF HAYMARKET  
VIRGINIA

PROJECT NO  
COUNTY PROJECT NUMBER



PLAN STATUS  
03/10/21 1st. SUBMISSION  
07/13/21 1st. DEQ SUBMISSION  
10/18/21 2nd. SUBMISSION  
12/23/21 3rd. SUBMISSION

DATE	DESCRIPTION
DRG DESIGN	DRG DRAWN
	RAR CHKD
SCALE	H: 1" = 40'
	V:
JOB No.	140175-01-001
DATE :	12/23/21
FILE No.	

SHEET 27 OF 28

EFFECTIVE DATE: MAY, 2019

COUNTY OF PRINCE WILLIAM  
DEPARTMENTS OF TRANSPORTATION / PUBLIC WORKS  
UNIT PRICE LISTS  
FOR  
PERFORMANCE BONDS, LANDSCAPING ESCROWS, AND SILTATION & EROSION CONTROL ESCROWS

PROJECT NAME: Robinson's Paradise  
P.W.C. FILE #: N/A DATE PREPARED: 3/10/2021

NOTE: This form is to be used to estimate performance bond, landscaping escrow and soil erosion escrow prices posted with Prince William County. These prices do not include items that are to be bonded separately with the Virginia Department of Transportation.

**1. MOBILIZATION/DEMobilIZATION OF CONSTRUCTION EQUIPMENT**

QUANTITY	COST
Mobilization/Demobilization ( @ Lump Sum \$15,000.00 (min.)	\$ 15,000.00

**2. STORM DRAINAGE**

**A. STRUCTURES**

QUANTITY	COST
DI-1 @ 3970 EA	\$ -
DI-3 @ 4500 EA	\$ -
DI-4 @ 5500 EA	\$ -
DI-5 @ 1300 EA	\$ -
MH-1 @ 3000 EA	\$ -
MH-2 @ 3500 EA	\$ -
JB-1 @ 6000 EA	\$ -
5 DI-7 @ 4000 EA	\$ 20,000.00
DI-12 @ 3500 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ 65,000.00</b>

**B. CONCRETE PIPE**

QUANTITY	COST
12" @ \$ 40 LF	\$ -
36" @ 45 LF	\$ 16,605.00
85" 18" @ 50 LF	\$ 42,550.00
21" @ 55 LF	\$ -
175 24" @ 60 LF	\$ 10,500.00
27" @ 65 LF	\$ -
30" @ 75 LF	\$ -
33" @ 110 LF	\$ -
<b>SUB-TOTAL</b>	<b>\$ 69,655.00</b>

**C. END WALLS**

QUANTITY	COST
12" @ \$ 900 EA	\$ -
15" @ 1100 EA	\$ -
18" @ 1300 EA	\$ -
21" @ 1500 EA	\$ -
24" @ 1700 EA	\$ -
27" @ 1900 EA	\$ -
30" @ 2100 EA	\$ -
33" @ 2300 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**D. END SECTIONS ES-1**

QUANTITY	COST
12" @ \$ 550 EA	\$ -
15" @ 580 EA	\$ -
18" @ 700 EA	\$ 700.00
21" @ 875 EA	\$ -
24" @ 900 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**E. CORRUGATED METAL PIPE**

QUANTITY	COST
12" @ \$ 30 LF	\$ -
15" @ 35 LF	\$ -
18" @ 45 LF	\$ -
24" @ 55 LF	\$ -
30" @ 65 LF	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**F. END SECTIONS ES-2**

QUANTITY	COST
15" @ \$ 400 EA	\$ -
18" @ 420 EA	\$ -
24" @ 480 EA	\$ -
30" @ 650 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**G. ADN-12 (HDPE)**

QUANTITY	COST
12" @ \$ 35 EA	\$ -
15" @ 45 EA	\$ -
18" @ 65 EA	\$ -
24" @ 75 EA	\$ -
30" @ 85 EA	\$ -
36" @ 95 EA	\$ -
42" @ 105 EA	\$ -
48" @ 125 EA	\$ -
60" @ 165 EA	\$ -
End Section	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**H. STORMWATER MANAGEMENT/BMP FACILITIES (See note #5)**

QUANTITY	COST
1 Underground Chamber Facility @ \$ 50,000 EA	\$ 50,000.00
Embankment (Fill Material)** @ 36 CY	\$ -
Sediment Removal/Regrading for Bond Release @	\$ -
<b>STORM DRAINAGE PIPE (RCP, CMP, PVC, Riser)</b>	
72" Riser @ \$ 7,000 EA	\$ -
48" RCP @ 150 LF	\$ -
<b>STORM DRAINAGE STRUCTURES (DI-7, MH-1, MH-2, etc.)</b>	
Gravel Filter System @ \$ - EA	\$ -
Drainage Blanket @ - EA	\$ -
Weir Wall @ 10,000 EA	\$ -
Concrete Cradle @ 75 LF	\$ -
End Wall w/ Wing Walls @ 8,000 EA	\$ -
End Section @ - EA	\$ -
Trash Rack (\$300 per 12'0" increments) 102 @	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**C. SUBBASE AND BASE COURSE ITEMS**

QUANTITY	COST
Subbase & Base Course Aggregate (21A/21B) Per Inch Depth @ 2.50 SY	\$ 54,000.00
Bituminous Concrete Per Inch Depth @ 5.50 SY	\$ 60,500.00
Reinforced Concrete Pavement Per Inch Depth @ 15.50 SY	\$ -
Gravel Shoulders (4" Depth) @ 8.50 SY	\$ -
Underdrains: UD-1 @ 16.00 LF	\$ -
UD-2 @ 18.00 LF	\$ -
UD-3 @ 19.00 LF	\$ -
UD-4 @ 21.00 LF	\$ -
Soil Cement Stabilization (4%) (6" Depth) @ 105 EA	\$ -
Line Stabilization (10%) (6" Depth) @ 15.00 SY	\$ -
Cement Treated Aggregate Per Inch Depth @ 4.00 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ 122,600.00</b>

**D. ENTRANCES AND PIPE STEMS**

QUANTITY	COST
21 DE-1 @ 7.00 SF	\$ 147.00
DE-2 @ 9.00 SF	\$ 18.00
DE-3 @ 113.00 T	\$ -
DE-4 @ 26.00 T	\$ -
PP-1 (1 lot) @ 19.00 LF	\$ -
PP-1 (2 - 5 lots) @ 37.00 LF	\$ -
PP-2 (1 lot) @ 19.00 LF	\$ -
PP-2 (2 - 5 lots) @ 390.00 LF	\$ -
CG-9D or equal - 30" width @ 15.00 SY	\$ -
CG-9D or equal - 40" width @ 15.00 SY	\$ -
CG-10A or equal - 30" width @ 15.00 SY	\$ -
CG-10A or equal - 40" width @ 15.00 SY	\$ -
CG-11 @ 400	\$ -
Concrete Entrance Valley Gutter @ 400	\$ -
Pipestem Driveway - 10' (1 lot) @ 400	\$ -
Pipestem Driveway - 18' (2 - 5 lots) @ 400	\$ -
<b>SUB-TOTAL</b>	<b>\$ 54,200.00</b>

**E. MISCELLANEOUS CONSTRUCTION ITEMS**

QUANTITY	COST
2080 Sidewalk (5" Width) @ \$ 34 LF	\$ 70,720.00
20 LF @ 20 LF	\$ -
25 LF @ 39,000.00	\$ -
2100 EA @ 2100 EA	\$ -
9.00 SF @ 9.00 SF	\$ 4,000.00
70 SY @ 70 SY	\$ -
19 SY @ 19 SY	\$ -
19 SY @ 19 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ 67,800.00</b>

**CONSTRUCTION WITHIN RIGHT-OF-WAY AND/OR EASEMENTS**

**A. SITE WORK**

QUANTITY	COST
7.20 Clear & Grub @ \$ 11,860 AC	\$ 85,392.00
Excavation @ 26.00 CY	\$ -
Embankment** (cut and fill) @ 10.00 CY	\$ -
Rock Excavation @ 64.00 CY	\$ -
Slope Stabilization - Hydroseeding (3:1 or flatter) - \$1,000 min. @ 1.00 SY	\$ -
Slope Stab. - Jute Mesh, Matting, Blankets, etc. (Between 2:1 to 3:1) - \$200 min. @ 6.00 SY	\$ -
Slope Stab. - Sod (Between 2:1 to 3:1) - \$200 min. @ 8.00 SY	\$ -
Steep Slopes (Grading and Stabilization with Jute Mesh, Netting, Blankets, etc.) @ 17.00 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ 85,392.00</b>

**B. SUBGRADE, SUBBASE AND BASE COURSE ITEMS**

QUANTITY	COST
2700 Subgrade preparation @ \$ 3.00 SY	\$ 8,100.00
21600 Subbase & Base Course Aggregate (21A/21B) Per Inch Depth @ 2.50 SY	\$ 54,000.00
11000 Bituminous Concrete Per Inch Depth @ 5.50 SY	\$ 60,500.00
Reinforced Concrete Pavement Per Inch Depth @ 15.50 SY	\$ -
Gravel Shoulders (4" Depth) @ 8.50 SY	\$ -
Underdrains: UD-1 @ 16.00 LF	\$ -
UD-2 @ 18.00 LF	\$ -
UD-3 @ 19.00 LF	\$ -
UD-4 @ 21.00 LF	\$ -
Soil Cement Stabilization (4%) (6" Depth) @ 105 EA	\$ -
Line Stabilization (10%) (6" Depth) @ 15.00 SY	\$ -
Cement Treated Aggregate Per Inch Depth @ 4.00 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ 122,600.00</b>

**CONSTRUCTION WITHIN RIGHT-OF-WAY/EASEMENTS SUB-TOTAL**

QUANTITY	COST
20 SF @ 20 SF	\$ -
38 SF @ 38 SF	\$ -
43 SF @ 43 SF	\$ -
60 SF @ 60 SF	\$ -
25 CY @ 25 CY	\$ -
15 SF @ 15 SF	\$ -
35 LF @ 35 LF	\$ -
2,686 EA @ 2,686 EA	\$ -
1,000 EA @ 1,000 EA	\$ -
38 SF @ 38 SF	\$ -
43 SF @ 43 SF	\$ -
60 SF @ 60 SF	\$ -
25 CY @ 25 CY	\$ -
389 EA @ 389 EA	\$ -
410 EA @ 410 EA	\$ 410.00
382 EA @ 382 EA	\$ 382.00
42 EA @ 42 EA	\$ -
17,284 EA @ 17,284 EA	\$ -
640 EA @ 640 EA	\$ -
305 EA @ 305 EA	\$ -
64 EA @ 64 EA	\$ -
102 LF @ 102 LF	\$ -
1.75 LF @ 1.75 LF	\$ -
6.00 SF @ 6.00 SF	\$ -
1,500 EA @ 1,500 EA	\$ -
10,000 EA @ 10,000 EA	\$ -
15,000 EA @ 15,000 EA	\$ 15,000.00
1,500 EA @ 1,500 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ 129,512.00</b>

**CONSTRUCTION WITHIN RIGHT-OF-WAY/EASEMENTS SUB-TOTAL**

QUANTITY	COST
2700 Subgrade preparation @ \$ 3.00 SY	\$ 8,100.00
21600 Subbase & Base Course Aggregate (21A/21B) Per Inch Depth @ 2.50 SY	\$ 54,000.00
11000 Bituminous Concrete Per Inch Depth @ 5.50 SY	\$ 60,500.00
Reinforced Concrete Pavement Per Inch Depth @ 15.50 SY	\$ -
Gravel Shoulders (4" Depth) @ 8.50 SY	\$ -
Underdrains: UD-1 @ 16.00 LF	\$ -
UD-2 @ 18.00 LF	\$ -
UD-3 @ 19.00 LF	\$ -
UD-4 @ 21.00 LF	\$ -
Soil Cement Stabilization (4%) (6" Depth) @ 105 EA	\$ -
Line Stabilization (10%) (6" Depth) @ 15.00 SY	\$ -
Cement Treated Aggregate Per Inch Depth @ 4.00 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ 122,600.00</b>

**4. SANITARY SEWER & WATER LINE CONSTRUCTION**

**A. WATER MAIN**

QUANTITY	COST
3.00 SY @ 3.00 SY	\$ -
2.50 SY @ 2.50 SY	\$ -
5.50 SY @ 5.50 SY	\$ -
15.50 SY @ 15.50 SY	\$ -
8.50 SY @ 8.50 SY	\$ -
16.00 LF @ 16.00 LF	\$ -
18.00 LF @ 18.00 LF	\$ -
19.00 LF @ 19.00 LF	\$ -
21.00 LF @ 21.00 LF	\$ -
20.00 SY @ 20.00 SY	\$ -
15.00 SY @ 15.00 SY	\$ -
4.00 SY @ 4.00 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**B. SANITARY SEWER PIPE LINE**

QUANTITY	COST
1750 1.5" thru 4" LPPM (Low Pressure Force Main System) @ \$ 30 LF	\$ 52,500.00
8" PVC @ 70 LF	\$ -
8" DIP @ 80 LF	\$ -
10" PVC @ 85 LF	\$ -
10" DIP @ 90 LF	\$ -
12" PVC @ 145 LF	\$ -
24" PVC @ 226 LF	\$ -
24" DIP @ 236 LF	\$ -
4" Dia. Sanitary Sewer Manhole @ 10,000 EA	\$ -
5" Dia. Sanitary Sewer Manhole @ 10,000 EA	\$ -
Street Manhole Frame & Cover Assembly (including chimney seal) @ 1,000 EA	\$ -
Essential Manhole Frame & Cover Assembly (including rain bowl & chimney seal) @ 1,000 EA	\$ -
Abandonment of Manhole @ 250 VF	\$ -
4" PVC Lateral (including clean-out stack) @ 40 LF	\$ -
4" DIP Lateral (including clean-out stack) @ 50 LF	\$ -
6" PVC Lateral (including clean-out stack) @ 60 LF	\$ -
6" DIP Lateral (including clean-out stack) @ 65 LF	\$ -
LPPM Flushing Station @ 22	\$ 55,000.00
1 Sewerage Air Release/Vacuum @ 1,500 EA	\$ 3,500.00
Stream Crossing @ 50,000 EA	\$ -
Grease Trap (500 gal. Minimum) @ 4,500 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ 111,000.00</b>

**SANITARY SEWER & WATER LINE CONSTRUCTION SUB-TOTAL**

QUANTITY	COST
34 LF @ \$ 34 LF	\$ 70,720.00
20 LF @ 20 LF	\$ -
25 LF @ 39,000.00	\$ -
2100 EA @ 2100 EA	\$ -
9.00 SF @ 9.00 SF	\$ 4,000.00
70 SY @ 70 SY	\$ -
19 SY @ 19 SY	\$ -
19 SY @ 19 SY	\$ -
<b>SUB-TOTAL</b>	<b>\$ 67,800.00</b>

**TOTAL CONSTRUCTION COST**

QUANTITY	COST
1,119,074.00	\$ 1,119,074.00

**5. MISCELLANEOUS COST**

QUANTITY	COST
Administrative Cost - 10% of the total construction cost, not to exceed \$50,000 @ \$ 50,000.00	\$ 50,000.00
Inflation Cost - Compounded annually at 3.0% per year of the total Construction Cost @ \$ 33,572.22	\$ 33,572.22
<b>TOTAL PERFORMANCE BOND AMOUNT</b>	<b>\$ 1,202,646.22</b>

**6. LANDSCAPING ESCROW**

**A. DECIDUOUS TREES**

QUANTITY	COST
80 EA @ \$ 80 EA	\$ -
165 EA @ 165 EA	\$ -
165 EA @ 165 EA	\$ -
250 EA @ 250 EA	\$ -
450 EA @ 450 EA	\$ 35,100.00
<b>SUB-TOTAL</b>	<b>\$ 35,100.00</b>

**B. EVERGREEN TREES**

QUANTITY	COST
100 EA @ \$ 100 EA	\$ -
125 EA @ 125 EA	\$ -
175 EA @ 175 EA	\$ -
300 EA @ 300 EA	\$ 4,800.00
400 EA @ 400 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ 4,800.00</b>

**C. SHRUBS**

QUANTITY	COST
45 EA @ \$ 45 EA	\$ -
55 EA @ 55 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ -</b>

**D. GRASSES**

QUANTITY	COST
150 EA @ \$ 150 EA	\$ 15,000.00
150 EA @ 150 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ 15,000.00</b>

**7. SILTATION AND EROSION CONTROL ESCROWS**

QUANTITY	COST
1344 Diversion Dike @ \$ 6 LF	\$ 8,064.00
1 Cleaning out SWM Facilities, Silt Traps, and Silt Basins @ 20,000 LS	\$ 20,000.00
1 Lump Sum (Min. \$20,000 or actual estimate provided by engineer to the satisfaction of the plan reviewer) @	\$ -
2476 Silt Fence @ \$ 6.00 LF	\$ 14,856.00
20 LF @ 20 LF	\$ -
7.50 SY @ 7.50 SY	\$ -
0.70 SY @ 0.70 SY	\$ 61,600.00
15 SY @ 15 SY	\$ -
25 TN @ 25 TN	\$ -
150 EA @ 150 EA	\$ 2,550.00
165 EA @ 165 EA	\$ -
1,000 EA @ 1,000 EA	\$ 1,000.00
2,000 EA @ 2,000 EA	\$ 2,000.00
10,500 SF @ 10,500 SF	\$ -
2,500 SF @ 2,500 SF	\$ 7,500.00
1,500 EA @ 1,500 EA	\$ -
7,500 EA @ 7,500 EA	\$ -
<b>SUB-TOTAL</b>	<b>\$ 398,215.00</b>

**TEMPORARY SEDIMENT TRAP**

QUANTITY	COST
1 Temporary Sediment Trap (Drainage area up to 1 Ac) @ \$ 500 EA	\$ -
1 Temporary Sediment Trap (Drainage area up to 1.2 Ac) @ 1,000 EA	\$ 1,000.00
2 Temporary Sediment Trap (Drainage area up to 2.3 Ac) @ 2,000 EA	\$ 4,000.00
<b>SUB-TOTAL</b>	<b>\$ 5,000.00</b>

**TOTAL COST**

QUANTITY	COST
123,070.00	\$ 123,070.00
12,307.00	\$ 12,307.00
135,377.00	\$ 135,377.00
<b>TOTAL SILTATION &amp; EROSION ESCROW AMOUNT</b>	<b>\$ 135,377.00</b>

Minimum acceptable amount for Siltation and Erosion Control Escrow is \$1,000.00

I hereby certify that the above is my best estimate of the quantities and current cost of bondable improvements, landscaping items, and Siltation & Erosion Control Escrow in this subdivision or site plan.

PREPARED BY: *Royce* (540) 371-0208  
NAME (print): Royce REYES  
COMPANY OR FIRM: Bowman Consulting Group, Ltd.

**NOTES:**

- For items identified with \*\* the quantity for the embankment material is the net difference of total fill material needed and cut material available at the project site, if excavated or cut material is suitable for embankment.
- The excavation and embankment costs include the necessary grading, spreading and/or compaction of soil in accordance with County and State Standards and Specifications.
- For some of the items on pages 3 & 4 of this form, the unit prices are not provided. Please refer to the appropriate section of this form to determine the applicable unit prices for those items, if necessary.
- The unit cost for each of the items in the Unit Price Lists is the installation cost which includes factors such as excavation, bedding, backfilling, compaction, form work, etc.
- Inflation has been calculated based on Northern Virginia Consumer Price Index of the Washington, D.C., area provided by the Bureau of Labor and Statistics.
- Whoever certifies the site development plans must also certify the total cost of the bonded items, landscaping escrow and siltation and erosion control escrow and must sign on "Preparer's Signature" on page 10 of this form.

**REPLACEMENT / REPAIR ITEMS**

(To be used only for performance bond reduction / extension requests)

QUANTITY	COST
Relocate utility poles - \$6,500 Min. @ \$ 6,500 EA	\$ -
Remove basketball pole(s) from the right-of-way @ 250 EA	\$ -
Remove fence from the right-of-way @ 125 EA	\$ -
Remove trees, shrubs, landscaping from the right-of-way @ Lump Sum	\$ -
Cut out and patch pavement and base @ 15 SY	\$ -
Replace curb and gutter @ 25 LF	\$ -
Replace sidewalk - 4" width @ 20 LF	\$ -
Re-establish ditch line (Min. \$500) @ 5 LF	\$ -
Place additional stone on shoulders per inch depth @ 1.50 SY	\$ -
Relocate / reset mailboxes @ 150 EA	\$ -
Straighten out bent ends of driveway entrance pipes @ 100 EA	\$ -
Remove and replace entrance pipe @ 35 LF	\$ -
Lower / raise entrance pipe within the right-of-way @ 300 EA	\$ -
Clean out driveway entrance pipes (Min. \$200) @ 100 EA	\$ -
Readjust manhole tops @ 300 EA	\$ -
Remove form material (Min. \$100) @ 100 EA	\$ -
Install missing steps in storm drainage structures @ 100 EA	\$ -
Parge storm drainage structures @ 200 EA	\$ -

## Emily Kyriazi

---

**From:** Robert Chrisman <rhchrisman@aol.com>  
**Sent:** Friday, January 21, 2022 9:00 PM  
**To:** Emily Kyriazi; Bob Weir; Matt Caudle; Robert Hallet; Alexander Beyene  
**Cc:** Bob Chrisman  
**Subject:** Survey

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Emily and Planning Commission members,

Per your request, I reviewed the survey questions, and I offer the below comments. I am happy to meet next week to review them in person and in greater length, if you like. Thanks for the opportunity to weigh in.

bob.

1. The attachment you sent me contained a list of twenty questions. Is there an introductory paragraph that will accompany the survey questions that will tell the reader the purpose of the survey and instructions for completing the survey? If so, I would offer that I should review this introductory page, along with the survey questions, to ensure consistency in messaging. For instance, it is important that the introductory page identify the purpose of the survey or what the survey is supporting, how the results will be analyzed and reported to the Mayor and Town Council, and how the results will be addressed by the Mayor and Town Council.

2. As I have stated in the last two Planning Commission meetings, I believe it is imperative that the purpose and/or goal of the survey be clearly communicated to the members of the Planning Commission, as we develop this survey. It is like going on a vacation. One must have a purpose or goal in mind when picking and then traveling to a vacation destination. Otherwise, one risks missing out on some great adventures at the vacation destination. Likewise, with the Planning Commission, without an identified purpose or goal in mind for the survey, then we risk wasting constituent's time, taxpayer's money, and losing credibility with the Town's residents. Thus, I ask you what is it that the Mayor and Town Council want to know and why? We can then tailor our questions better to meet their needs.

3. The survey's paragraph structuring is problematic. As written, there are six parts to the survey, with each part focused on a different, substantive topic. Each of the six topics, alone, could constitute a meaningful survey, but it is doable to have six separate topics in a survey, provided the survey is of sufficient length and is administered in person, which is not the method that the Planning Commission wants to utilize. Thus, I suggest deleting the paragraph structure, and here is why:

- Appearance of subject hopping: The goal or purpose of the survey may not be clear to the reader based on the titles of each Part since they are different and substantive, in and of themselves. However, if in the introductory paragraph, it is explained that the survey is a "generalized" survey to gauge constituent's general thoughts on a wide-range of topics of interest to the Mayor and Town Council, then you might be able to get away with asking questions regarding multiple topics in twenty questions. Tough to do, though.

- Appearance of it being too long: When the reader opens the survey and sees "Part I," followed by a series of questions, the reader may ask himself/herself, "how many parts are there to this survey?" At that point, you have lost the reader's interest, and he/she is likely to toss it out, or put a half-hearted effort into the survey.

- Lack of weight placed in each Part: The six Parts do not contain the same number or type of questions. Part I, for instance, contains eight questions, while Part II contains three questions, Part III contains two questions, Part IV has one question, Part

V has three questions, and Part VI has one question. This scattering of questions among the six Parts is very inconsistent, and you are actually telling the reader what you are most interested in knowing. Asking eight questions in Part I and one question in Part VI, for instance, tells the reader that you really care mostly about the topic of Part I and far less about Part VI. Yet, to the reader, Part VI may be the topic of most importance while Part I the least of his/her interests; consequentially, your survey results may not reflect the constituent's thoughts. Therefore, if you want to stick with using Part I, Part II, etc...then I would suggest you include an equal number of questions in each Part. But, as I stated above, it is better to delete the paragraphs.

- The Topics of each Part may not be tapping into your constituent's interests: The six topics you introduce in each of the Parts provide a pretty broad sweep of interests; yet, by limiting the survey to those six Parts, you run the risk of not including a topic that your constituents are very much interested in addressing. This could result in the reading feeling as though the survey doesn't even touch on his/her concerns.

4. Below, you will find my comments after review of each question: As a general comment, each question should be directly tied to what it means for the residents to be living within the business district of Haymarket, from their perspective. It doesn't matter, for instance, what a resident of Dominion Valley or Piedmont thinks about Haymarket because your chosen demographic is only the residents living within the town limits.

- #1: This is a foundational question, the results of which would be used to determine the weight given to each respondent's answers. Theoretically, the answers provided by a Haymarket resident who has lived in Haymarket for ten years, for instance, should be given more weight than a resident who has lived in Haymarket for one year. If this is not the intent of this question, and the intent is to simply know how long residents have been living in Haymarket, then that information can be obtained from the Federal Census.

- #2: I would rephrase this question to read: Primary reason for living within the Haymarket Business District. It is very different to move and live within the Town's business limits verses moving to the larger area called "Haymarket" that includes such gated communities as Dominion Valley and Piedmont. Plus, the choices from which to select in this question should be focused on living within the town limits. Maybe something like: "living within an incorporated small town," and/or "proximity to I-66 and commuter lots," and/or "own or work in a business in the town limits." The choices of "Rural Character" and "Small town atmosphere" seem moot at this point since the town has neither a rural feel or look, and a "small town" doesn't generally have the massive traffic congestion and large scale chain stores within and around the immediate area of the town limits.

- #3: The problem with this question is the Mayor and Town Council will not learn the "why" behind the respondent's answer. For instance, if 70% of the answers are "not satisfied," then what good is that bit of data without knowing why the 70% are not satisfied. So, this makes the question useless.

- #4: This may not be the right time to ask this question because walking in town has been hampered by the hotel's construction, as well as, by weather conditions. If, however, you want to gauge the "walkability" of the town, then I would suggest changing the question to read: "what enhancements would you suggest to make the Town limits a more walkable town?" Then, provide choices like: "More sidewalks" or "reduce traffic congestion" or "Slow traffic flow," or "Bring in more interesting shops and restaurants within the town limits." Again, this may not be the time to ask this particular question because of the hotel construction and the weather.

- #5: This is another question that does not provide any information upon which the Mayor and Town Council can act, because, as with Question #3, we won't learn the reason why they are or are not informed. It might be better to ask: "What is/are the best means of communication to keep you informed of Town news and activities?" Then, list choices like "Facebook," "Instagram," and "Town website."

- #6: This is another question that does not provide any information upon which the Mayor and Town Council can act. It might be better to ask: "What Town events do you attend?" Then, list choices of the various town events such as summer concerts, Haymarket Day, etc...

- #7 and #8: These are redundant questions because "primary issues" that would be identified in question #7 would also likely be the same in #8. And, the Mayor and Town Council already know that traffic, over-development, and the town losing its

rural, small town charm are significant issues, and are issues that cannot be reversed at this point, so why ask these two questions. Instead, I would ask the following: "Prioritize what you would like the Town Government to address as immediate needs." Then, list five to seven initiatives such as: "add left turn arrow signals at the downtown traffic light," "build sidewalks along both sides of Jefferson Street from the intersection of Rt 55 to the entrance of Longstreet Commons development," "build sidewalks along Jefferson Street from the intersection of Rt 55 all the way to the railroad tracks," "widen Jefferson Street at Payne Street," "demolish the abandoned, boarded up buildings," and "landscape the common areas with Crepe Myrtles at the intersection of Rt 55 and Rt 15 by the Sheetz.

- #9: Like the other closed ended questions such as #3, the problem with this question is the Mayor and Town Council will not learn the "why" behind the respondent's answer. For instance, if 70% of the answers are "Police Department," then what good is that bit of data for the Police Chief without knowing why the 70% say his department needs improvement. Plus, this is a question that really needs to be asked in a more in-depth, separate survey, or in a more personal forum, because this question addresses the core functions of the Town Government, so the Mayor and Town Council should focus special attention on this area.

- #10: See #9 above. And, in these times of post George Floyd and the nationwide focus on policing and police reform, this is a question that really needs to be addressed in a more personalized method. I would remove this question.

- #11: See #10 above. The residents that populate the neighborhoods within the Haymarket town limits are pretty demographically mixed. Therefore, there will likely be varying definitions of what is a "safe neighborhood" and whether or not they feel the police are keeping them safe from crime. As with question #9 and #10, this question also deserves a more in-depth survey or personalized means of asking this question.

- #12: This question may very likely come off to the respondents as being a politically driven question designed to support the current Mayor and Town Council members in upcoming elections. You are essentially asking the respondents to state whether or not they like the current Mayor and members of the Town Council better than the previous administration of Mayor Leake and his Town Council members. Why, because it was Mayor Leake who ushered in the major development that is currently taking place in Haymarket, i.e. the new hotel, the Van Metre development, and the Lidl development; all of which, have been controversial. I would delete this question. Keep this survey politics free.

- #13: See #12 above.

- #14: Up to this point in the survey, all the questions have been multiple choice, so why is this question one that requires the respondent to write an answer? Plus, the Mayor and Town Council have a fairly good idea what road improvements need to be done within the town limits, so it doesn't make much sense to ask this question. Also, if the Mayor and Town Council want to discuss road improvements, it would be more appropriate for them to seek professional advice from either an outside contractor who specializes in civil engineering or ask VDOT for an assessment.

- #15: I would change this question to read as: "Prioritize what you would like the Town Government to address in terms of creating new economic development." Then, list the choices as "Retail shops," "Restaurants," "entertainment," "office space," and "service industry."

- #16: This is another question that requires a respondent to write answers, instead of being multiple choice. Besides, I think my suggestion in question #15 above negates this question.

- #17: This question needs some clarification. What is the definition of "shops" for the purpose of this question? Does "shop" mean retail stores, or restaurants, or businesses, or some combination of two or three of these? But, even with that clarification, this is one of those questions that provides data that begs more questions, rather than being useful information. How will the Mayor and Town Council use this information? If the majority of the respondents say "Yes," then what does that mean? It doesn't give any direction in which the Mayor and Town Council can go to make improvements. Likewise, if the majority of the respondents say "no," then what can the Mayor and Town Council do with that answer? They can't kick out the current businesses. Besides all this being said, the Mayor and Town Council can fairly easily determine what businesses within the town limits are serving the needs of the community by the fact that they are still in

business. For instance, it is pretty clear that Piedmont Tire and Auto is serving the needs of the community by the fact that their parking lot and their bays are continually full of cars needing service and repairs.

- #18: Two points about this question. One, the question needs clarification as to what is meant by "recreational opportunities." Does "recreational opportunities" mean outdoor activities like hiking and biking trails, campsites, RV parks or playgrounds, tennis courts, civic center or something else? Or, does "recreational opportunities" mean business opportunities to open recreational activities? Second, this is another question that is close ended and does not provide any context to the respondent's answers. Thus, there is no real data to act upon.