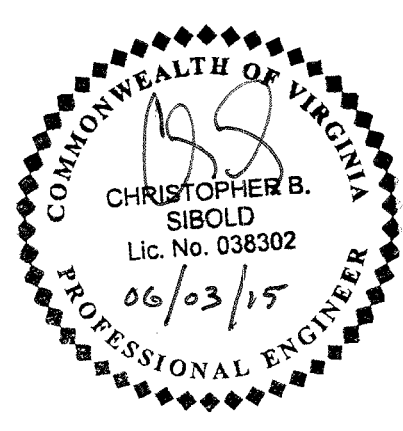


BRISTOL AT WESTWOOD PLAN OF DEVELOPMENT

1311 WESTWOOD AVENUE, RICHMOND, VIRGINIA 23227
CITY OF RICHMOND, VIRGINIA



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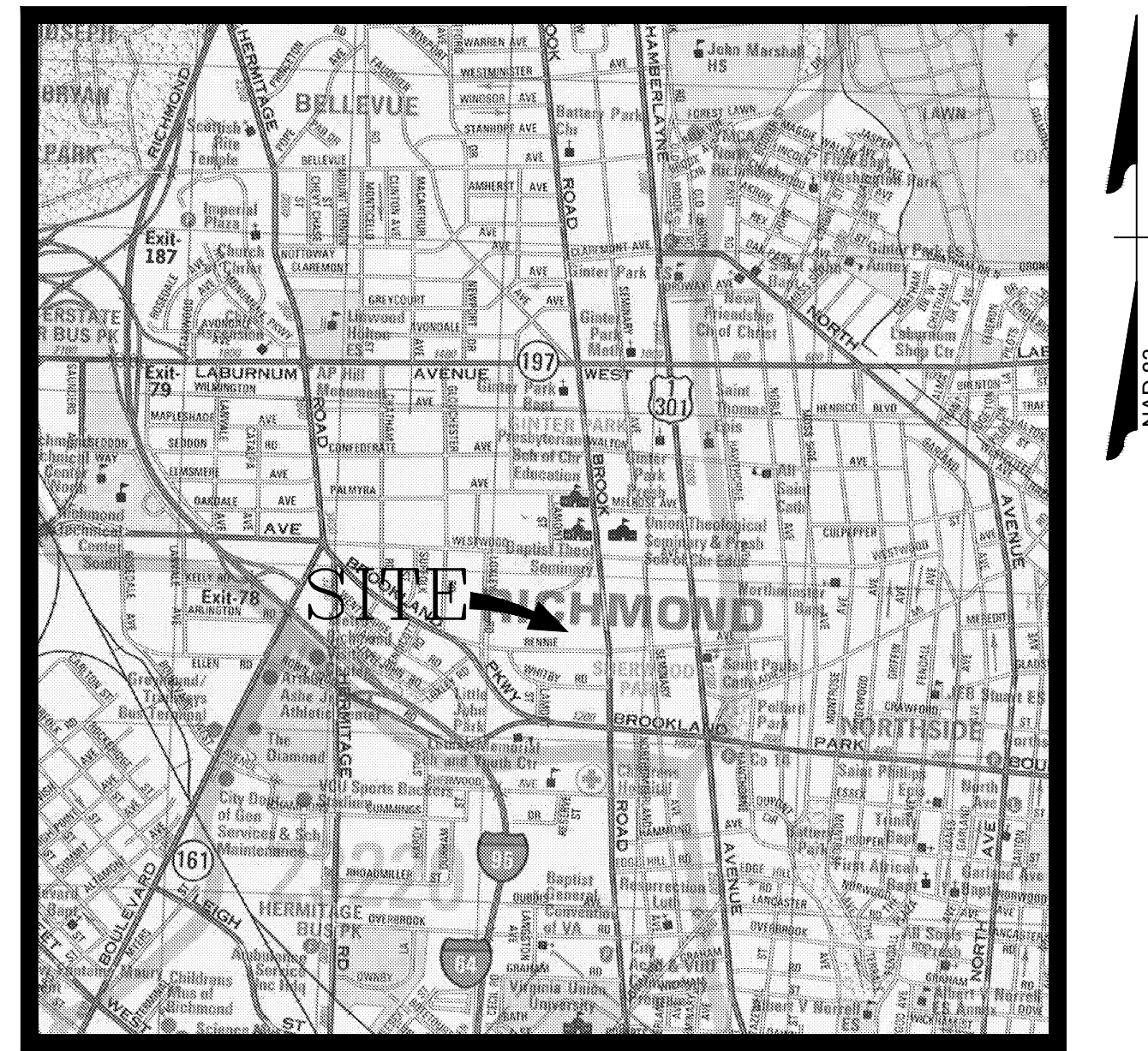
SCALE
AS NOTED

TIMMONS GROUP
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

COVER SHEET

JOB NO.
36144
SHEET NO.
C0.00

| Sheet Number | Sheet Title |
|--------------|--|
| C0.00 | COVER SHEET |
| C1.00 | OVERALL KEY PLAN |
| C1.10 | GIS PARCEL MAP |
| C1.20 | GENERAL NOTES & DETAILS |
| C2.01 | EXISTING CONDITIONS PLAN |
| C2.02 | EXISTING CONDITIONS PLAN |
| C2.11 | DEMOLITION PLAN |
| C2.12 | DEMOLITION PLAN |
| C2.21 | PHASE I EROSION AND SEDIMENT CONTROL PLAN |
| C2.22 | PHASE I EROSION AND SEDIMENT CONTROL PLAN |
| C2.31 | PHASE II EROSION AND SEDIMENT CONTROL PLAN |
| C2.32 | PHASE II EROSION AND SEDIMENT CONTROL PLAN |
| C2.40 | EROSION AND SEDIMENT CONTROL NOTES AND DETAILS |
| C2.41 | EROSION AND SEDIMENT CONTROL NOTES AND DETAILS |
| C2.42 | EROSION AND SEDIMENT CONTROL NOTES AND DETAILS |
| C3.01 | SITE LAYOUT PLAN |
| C3.02 | SITE LAYOUT PLAN |
| C3.03 | FIRE LANE SIGNAGE AND STRIPING PLAN |
| C3.10 | ADA PARKING DETAILS |
| C3.20 | SITE NOTES & DETAILS |
| C4.01 | UTILITY PLAN |
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| C4.10 | SANITARY SEWER PROFILES |
| C4.11 | SANITARY SEWER PROFILES |
| C4.20 | WATERLINE PROFILES |
| C4.21 | WATERLINE PROFILES |
| C4.30 | UTILITY NOTES & DETAILS |
| C4.31 | UTILITY NOTES & DETAILS |
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| C4.41 | UTILITY CALCULATIONS |
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| C5.01 | GRADING AND DRAINAGE PLAN |
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| C6.01 | PRE-DEVELOPED STORMWATER MANAGEMENT PLAN |
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| L1.0 | OVERALL LANDSCAPE PLAN |
| L1.1 | DETAIL LANDSCAPE PLAN |
| L1.2 | DETAIL LANDSCAPE PLAN |
| L1.3 | DETAIL LANDSCAPE PLAN |
| L1.4 | DETAIL LANDSCAPE PLAN |
| L2.0 | LANDSCAPE NOTES AND DETAILS |
| L3.0 | LUMEN PLAN |



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VICINITY MAP
SCALE: 1" = 2,000'

JUNE 3, 2015

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PROJECT SUMMARY

ADDRESS: 1311 WESTWOOD AVENUE
RICHMOND, VIRGINIA 23227

PARCEL ID: N0001230001

ZONING: R-53 RESIDENTIAL (MULTI-FAMILY)

DISTRICT: NORTH SIDE

EXISTING USE: RESIDENTIAL FOR SEMINARY STUDENTS

SITE AREA: 33.84 ACRES

AREA OF DISTURBANCE: 14.74 ACRES

PROPOSED USE: RESIDENTIAL APARTMENTS

EXISTING CONDITIONS: CITY OF RICHMOND UTILITY MAPS, CITY OF RICHMOND GIS

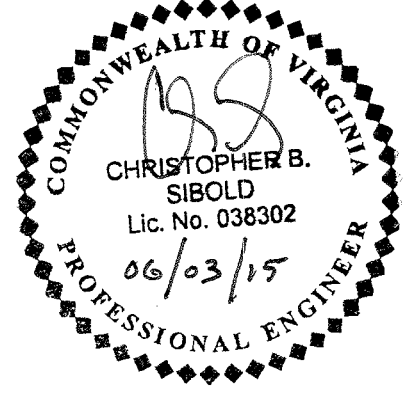
TOPOGRAPHIC SURVEY: NAD 83, NAVD 88

REQUIRED PERMITS: LAND DISTURBANCE, BUILDING, UTILITIES, WORK IN STREETS

BUILDING: REFER TO C1.00

PARKING SPACES REQUIRED: 424 SPACES

PARKING SPACES PROVIDED: 517 SPACES (INCLUDING 94 GARAGE SPACES AND 20 ADA)



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| 06/03/2015 | |

DRAWN BY
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DESIGNED BY
R. SATMARIA

CHECKED BY
C. SIBOLD

SCALE
1" = 50'

TIMMONS GROUP

BRISTOL AT WESTWOOD

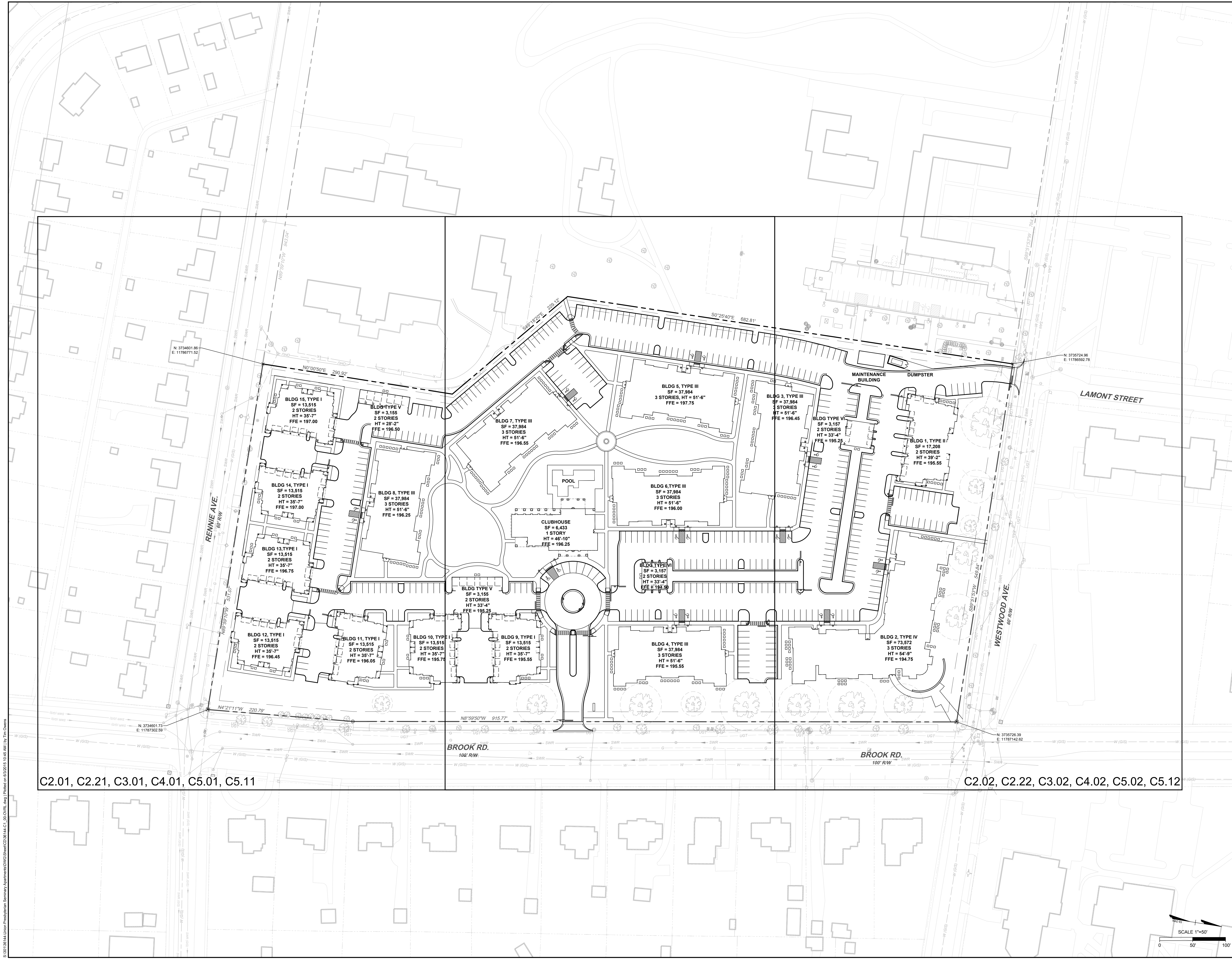
CITY OF RICHMOND, VA

OVERALL KEY PLAN

JOB NO.
36144

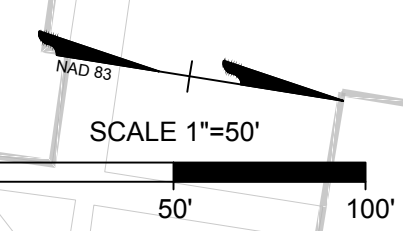
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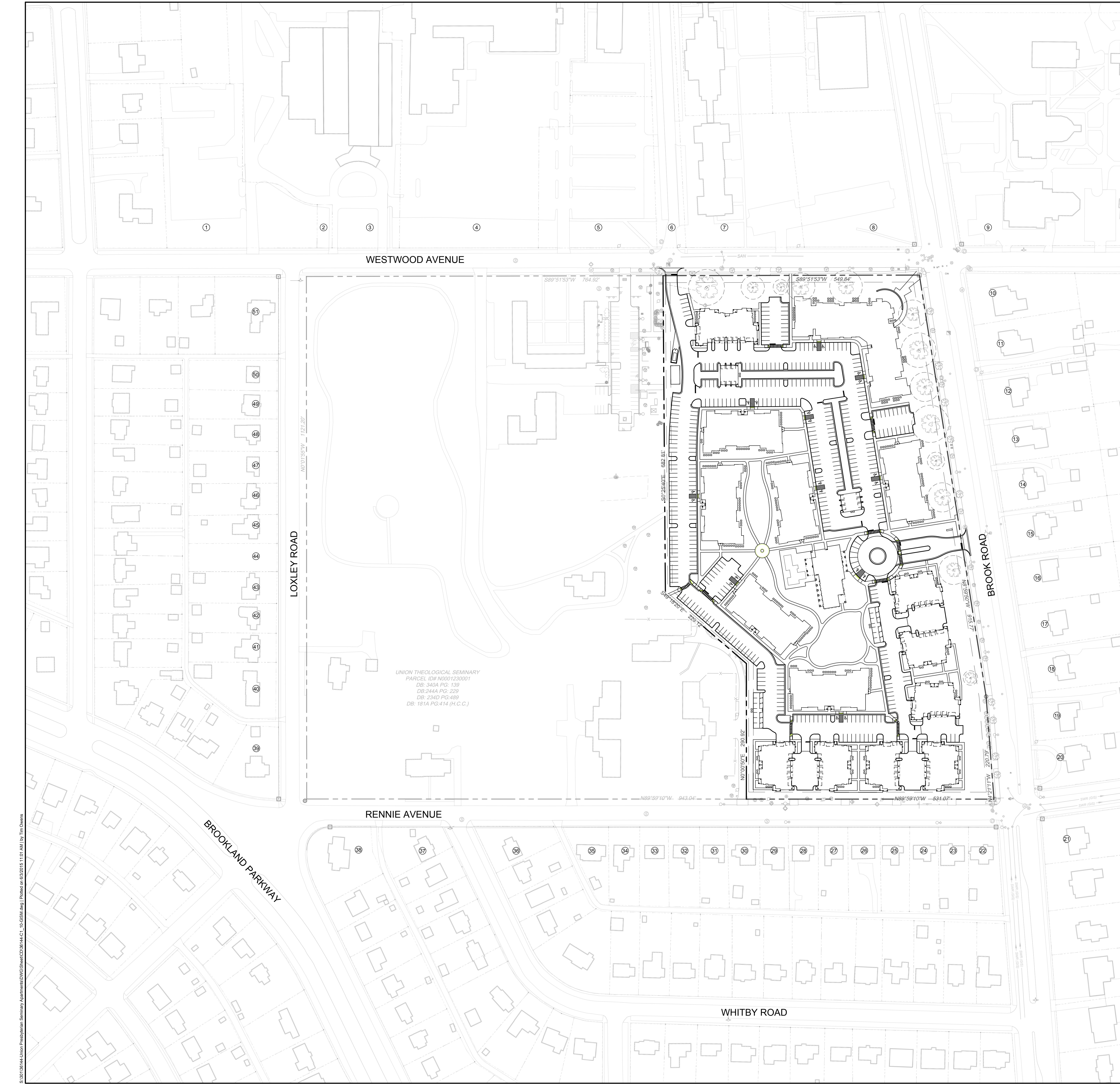


C2.01, C2.21, C3.01, C4.01, C5.01, C5.11

C2.02, C2.22, C3.02, C4.02, C5.02, C5.12



S:\2015\144 Union Presbyterian Seminary Apartments\DWG\Sheet\C2.01-C1.00\KeyPlan.dwg Plotted on 6/30/15 10:45 AM by Tim Owens



UNION THEOLOGICAL SEMINARY
 PARCEL ID # N0001230001
 DB: 340A PG: 139
 DB: 244A PG: 229
 DB: 234D PG: 489
 DB: 181A PG: 114 (H.C.C.)

- 1 OWNER: GPCV LLC C/O TED UKROP
 ADDRESS: 1402 WESTWOK AVENUE
 PARCEL ID # N0001330085
 ZONING: I-INSTITUTIONAL
 ACREAGE: 0.240
- 2 OWNER: GPCV LLC C/O TED UKROP
 ADDRESS: 1380 WESTWOK AVENUE
 PARCEL ID # N0001330086
 ZONING: I-INSTITUTIONAL
 ACREAGE: 0.0991
- 3 OWNER: GINTER PLACE CONDOMINIUM
 UNIT OWNERS ASSOCIATION
 ADDRESS: 1350 WESTWOK AVENUE
 PARCEL ID # N0001330015
 ZONING: I-INSTITUTIONAL
 ACREAGE: 4.41
- 4 OWNER: 1300 WESTWOOD AVENUE LLC
 ADDRESS: 1300 WESTWOOD AVENUE
 PARCEL ID # N0001330012
 ZONING: I-INSTITUTIONAL
 ACREAGE: 5.89
- 5 OWNER: 1300 WESTWOOD AVENUE LLC
 ADDRESS: 3401 LAMONT STREET
 PARCEL ID # N0001330011
 ZONING: I-INSTITUTIONAL
 ACREAGE: 1.74
- 6 OWNER: VERITAS SCHOOL PROPERTIES LLC
 ADDRESS: 1251 PALMYRA AVE
 PARCEL ID # N0001336005
 ZONING: R-53-RESIDENTIAL (MULTI FAMILY)
 ACREAGE: 0.788
- 7 OWNER: VERITAS SCHOOL PROPERTIES LLC
 ADDRESS: 3400 BROOK ROAD
 PARCEL ID # N0001336001
 ZONING: R-53-RESIDENTIAL (MULTI FAMILY)
 ACREAGE: 1.92
- 8 OWNER: VERITAS SCHOOL PROPERTIES LLC
 ADDRESS: 1200 WESTWOOD AVE
 PARCEL ID # N0001336002
 ZONING: R-53-RESIDENTIAL (MULTI FAMILY)
 ACREAGE: 1.47
- 9 OWNER: UNION THEOLOGICAL SEMINARY VA
 ADDRESS: 3410 CHAMBERLAYNE AVE.
 PARCEL ID # N0001338001
 ZONING: R-53-RESIDENTIAL (MULTI FAMILY)
 ACREAGE: 11.856
- 10 OWNER: SOCIA, TIMOTHY AND STEPHANIE
 ADDRESS: 3221 BROOK ROAD
 PARCEL ID # N0001231021
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.513
- 11 OWNER: LORIA, ROGER M. & WINIFRED B.
 ADDRESS: 3219 BROOK ROAD
 PARCEL ID # N0001231020
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.521
- 12 OWNER: STEVENS, BRUCE B. AND WILLIAM T.
 VANFELT III
 ADDRESS: 3217 BROOK ROAD
 PARCEL ID # N0001231019
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.515
- 13 OWNER: SAUNDERS, JENNIFER N. & CHARLES L.
 ADDRESS: 3215 BROOK ROAD
 PARCEL ID # N0001231018
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.514
- 14 OWNER: POWERS, CATHERINE A.
 ADDRESS: 3213 BROOK ROAD
 PARCEL ID # N0001231017
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.51
- 15 OWNER: MORGAN, JOSEPH H. & KAREN A.
 ADDRESS: 3211 BROOK ROAD
 PARCEL ID # N0001231016
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.508
- 16 OWNER: WESTBROOK, JOHN S. JR & EDWINA W.
 ADDRESS: 3209 BROOK ROAD
 PARCEL ID # N0001231015
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.508
- 17 OWNER: VA, HUAN N.
 ADDRESS: 3207 BROOK ROAD
 PARCEL ID # N0001231014
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.505
- 18 OWNER: BYNUM, PATRICK R. JR & GAYLE H.
 ADDRESS: 3205 BROOK ROAD
 PARCEL ID # N0001231013
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.504
- 19 OWNER: EDDS, JONATHAN DAVID &
 MIRANDA MASSOUD
 ADDRESS: 3203 1/2 BROOK ROAD
 PARCEL ID # N0001231012
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.502
- 20 OWNER: GALLAGHER, JEFFREY M. &
 HOWARD, CATHERINE W.
 ADDRESS: 3201 BROOK ROAD
 PARCEL ID # N0001231011
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.502
- 21 OWNER: FENDER, MATTHEW D. & REBECCA A.
 ADDRESS: 3015 BROOK ROAD
 PARCEL ID # N0001026017
 ZONING: R-1-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.588
- 22 OWNER: SMITH, HOWARD M. & MITRAPORN
 T. & PHILIP A.
 ADDRESS: 1201 RENNIE AVENUE
 PARCEL ID # N000115023
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.288
- 23 OWNER: COTTEN, ESTHER A. & KATHLEEN E.
 ADDRESS: 1203 RENNIE AVENUE
 PARCEL ID # N000115021
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.271
- 24 OWNER: JAMES, BEVERLEY E. & THOMAS H.
 ADDRESS: 1205 RENNIE AVENUE
 PARCEL ID # N000115022
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.268
- 25 OWNER: ERHARDT, JOSEPH M. & EFFIE J.
 ADDRESS: 1207 RENNIE AVENUE
 PARCEL ID # N000115023
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.268
- 26 OWNER: SHRESTHA, CHANDRA M. & SUMITRA
 ADDRESS: 1209 RENNIE AVENUE
 PARCEL ID # N000115024
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.263
- 27 OWNER: GARTNER, JASON R.
 ADDRESS: 1211 RENNIE AVENUE
 PARCEL ID # N000115025
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.261
- 28 OWNER: SWINSON, GINA E.
 ADDRESS: 1213 RENNIE AVENUE
 PARCEL ID # N000115026
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.258
- 29 OWNER: PATRICIA, STORY V.
 ADDRESS: 1215 RENNIE AVENUE
 PARCEL ID # N000115027
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.256
- 30 OWNER: BOUTON, LAWRENCE ANDREW &
 SWEZEY, MARY M.
 ADDRESS: 1217 RENNIE AVENUE
 PARCEL ID # N000115028
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.253
- 31 OWNER: FRIEDMAN, HELEN VR TRUSTEE
 O/T FRIEDMAN TRUST
 ADDRESS: 1219 RENNIE AVENUE
 PARCEL ID # N000115029
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.248
- 32 OWNER: GRACE, KATHERINE
 ADDRESS: 1221 RENNIE AVENUE
 PARCEL ID # N000115030
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.240
- 33 OWNER: FRIEDMAN RONALD J. TRUSTEE
 RONALD J. FRIEDMAN TRUST
 ADDRESS: 1223 RENNIE AVENUE
 PARCEL ID # N000115031
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.245
- 34 OWNER: FRIEDMAN HELEN V R TRUSTEE
 O/T FRIEDMAN TRUST
 ADDRESS: 1225 RENNIE AVENUE
 PARCEL ID # N000115032
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.243
- 35 OWNER: DEWILDE, CHRISTINE T. &
 DAVEY, STEPHEN L. E.
 ADDRESS: 1227 RENNIE AVENUE
 PARCEL ID # N000115033
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.227
- 36 OWNER: CAMPBELL, BENJAMIN P. & ANN H.
 ADDRESS: 1310 WHITBY ROAD
 PARCEL ID # N0001115001
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.259
- 37 OWNER: SLATER, CHRISTOPHER L. &
 SPIVEY ANDREA G.
 ADDRESS: 1319 WHITBY ROAD
 PARCEL ID # N0001114025
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.265
- 38 OWNER: BERRY, ROSE BECKSTOFFER
 ADDRESS: 1326 BROOKLAND PARKWAY
 PARCEL ID # N0001114002
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.448
- 39 OWNER: MOESER, JOHN V. & SHARON G.
 ADDRESS: 1400 BROOKLAND PARKWAY
 PARCEL ID # N0001226019
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.372
- 40 OWNER: HUBBARD, JOHN A. & KRISTIN A.
 ADDRESS: 3304 LOXLEY ROAD
 PARCEL ID # N0001226018
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.403
- 41 OWNER: EGGLESTON, RUTH H.
 ADDRESS: 3306 LOXLEY ROAD
 PARCEL ID # N0001226017
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 42 OWNER: HOLLANDER, TAYLOR F. &
 HOLLY J. BLAKE
 ADDRESS: 3308 LOXLEY ROAD
 PARCEL ID # N0001226016
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 43 OWNER: ANTRIM, PHOEBE FINLEY
 ADDRESS: 3310 LOXLEY ROAD
 PARCEL ID # N0001226015
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 44 OWNER: ANTRIM, PHOEBE FINLEY
 ADDRESS: 3312 LOXLEY ROAD
 PARCEL ID # N0001226014
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 45 OWNER: EDWARDS, SHERRY L. & ANDREA L. KATZ
 ADDRESS: 3314 LOXLEY ROAD
 PARCEL ID # N0001226013
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 46 OWNER: KOSTELNY, DALE L. & ELIZABETH S.
 ADDRESS: 3316 LOXLEY ROAD
 PARCEL ID # N0001226012
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 47 OWNER: LORCH, ALEXANDER H. III & JOLENE M.
 ADDRESS: 3318 LOXLEY ROAD
 PARCEL ID # N0001226011
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 48 OWNER: SCHUTT, WILLIAM F. & EUGENIA H.
 ADDRESS: 3320 LOXLEY ROAD
 PARCEL ID # N0001226010
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 49 OWNER: WETZEL, KATHERINE E.
 ADDRESS: 3322 LOXLEY ROAD
 PARCEL ID # N0001226009
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 50 OWNER: FREEMAN, EDWARD B. III & CASEY S.
 ADDRESS: 3324 LOXLEY ROAD
 PARCEL ID # N0001226008
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.281
- 51 OWNER: PRINCE, DAVID O. & DORIS J.
 ADDRESS: 1401 WESTWOOD AVENUE
 PARCEL ID # N0001226006
 ZONING: R-3-RESIDENTIAL (SINGLE FAMILY)
 ACREAGE: 0.496

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DRAWN BY
J. CHAPMAN

DESIGNED BY
R. SATMARIA

CHECKED BY
C. SIBOLD

SCALE
1" = 80'

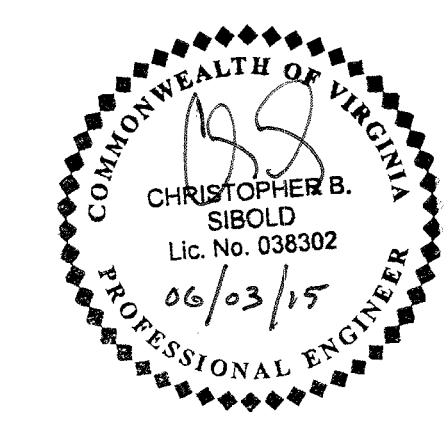
JOB NO.
36144

SHEET NO.
C1.10

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

GIS PARCEL MAP



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| 06/03/2015 | |

| |
|----------------------------|
| DRAWN BY C. SIBOLD |
| DESIGNED BY R. SATMARIA |
| CHECKED BY J. CHAPMAN |
| SCALE 1" = 30' |

TIMMONS GROUP
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA
GENERAL NOTES & DETAILS

JOB NO.
36144

SHEET NO.
C1.20

GEOTECHNICAL NOTES

- ALL CONTROLLED FILL ZONES ARE TO BE MONITORED BY A FULL TIME GEOTECHNICAL ENGINEERING SERVICE FIRM.
- ENGINEERED FILLS SHALL BE PROPERLY PLACED ACCORDING TO THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER.
- ALL SUMMARY REPORTS FROM THE GEOTECHNICAL ENGINEER REPRESENTING THE PROJECT MUST STATE HIS PROFESSIONAL OPINION ON THE SATISFACTORILY COMPLETED PHASES OF CONSTRUCTION, SUCH AS: SLOPE CUTS, SUBDRAINAGE SYSTEMS, PREPARATION OF SUBGRADES AND COMPACTION OF EARTH FILLS
- NO FILLS SHALL HAVE ZONES THAT EXCEED TWO (2) FEET IN ELEVATION WITHOUT CONDUCTING COMPACTION TEST AND OBTAINING RESULTS 95% OR GREATER.
- THE GEOTECHNICAL ENGINEER MUST SUBMIT A DETAILED ANALYSIS, ITEMIZING THE FIELD DENSITY TEST RESULTS. THIS REPORT SHALL BE ACCOMPANIED WITH A COPY OF THE SITE PLAN SHEET AND INDICATE THE TEST LOCATIONS & ELEVATIONS. THE GEOTECHNICAL ENGINEER MUST PROVIDE ENOUGH DESIGNATED TESTING IN ALL FILL ZONES TO ADEQUATELY EXAMINE & CERTIFY THE INTEGRITY OF THE FILL.
- THE GEOTECHNICAL ENGINEER MUST SUBMIT A CERTIFIED BUILDING PAD REPORT FOR EACH FILL PAD LOCATION. THIS REPORT SHALL PROFILE THE FILL MATERIAL PLACEMENT AND PROVIDE THE COMPACTION TEST RESULTS. ALL REPORTS WILL BE ACCOMPANIED BY THE SITE PLAN, INDICATING THE TEST LOCATIONS & ELEVATIONS
- NO BUILDING PADS IN FILL ZONES WILL HAVE A STRATUM EXCEEDING TWO (2) FEET IN ELEVATION WITHOUT TEST VERIFYING DENSITY.

THESE GEOTECHNICAL NOTES SHALL IN NO WAY LESSEN THE REQUIREMENTS OF THE SUBMITTED SOILS REPORT.

PAVEMENT SECTION

- ALTERNATE EQUIVALENT PAVEMENT SECTIONS MAY BE SUBSTITUTED FOR THE PAVEMENT DESIGN WHEN PROPER METHODS OF SUBGRADE SOIL ANALYSIS ARE CONDUCTED AND WITH THE APPROVAL OF THE ENGINEER.
- CBR SAMPLING OF THE SUBGRADE SOILS FOR THE FINAL PAVEMENT DESIGN MUST BE COORDINATED BY THE OWNER, THROUGH THE GEOTECHNICAL ENGINEER AND VERIFIED BY THE ASSIGNED SITE INSPECTOR DURING THE CONSTRUCTION PHASE.
- TEST FOR THE FINAL PAVEMENT DESIGN SHALL BE CONDUCTED ON AN APPROVED REVEAL OF THE SUBGRADE. THESE TESTS SHALL BE MADE AT EACH INTERSECTION, CHANGES IN SUBGRADE SOILS, AND AT A MAXIMUM SPACING OF 500'. A MINIMUM OF TWO (2) CBR SAMPLES WILL BE REQUIRED FOR ANY CUL-DE-SAC OR DEAD END STREET LESS THAN 500' IN LENGTH
- TEST SPACING AND METHODS MUST FOLLOW THE APPROVED GUIDELINES SET FORTH AND/OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
- THE FINAL ALTERNATIVE EQUIVALENT PAVEMENT DESIGN MUST BE SUBMITTED FOR APPROVAL BY DIRECTOR. THE SUBMISSION WILL BE ACCOMPANIED BY THE GEOTECHNICAL REPORT AND DESIGNED BY AN ENGINEER.

CONSTRUCTION NOTES

- THIS PROJECT TO BE CONSTRUCTED IN ACCORDANCE WITH THE MOST RECENT CITY OF RICHMOND RIGHT OF WAY EXCAVATION AND RESTORATION MANUAL AND VDOT ROAD AND BRIDGE SPECIFICATIONS AND ROAD DESIGN & STANDARDS INCLUDING ALL SUBSEQUENT REVISIONS.
- CONTRACTOR SHALL CALL "MISS UTILITY" 48 HOURS PRIOR TO THE START OF EXCAVATION. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES SHOWN ON PLANS IN AREAS OF CONSTRUCTION PRIOR TO STARTING WORK. CONTACT THE ENGINEER IMMEDIATELY IF LOCATION OR ELEVATION IS DIFFERENT FROM THAT SHOWN ON THE PLAN. IF THERE APPEARS TO BE A CONFLICT, AND UPON DISCOVERY OF ANY UTILITY NOT SHOWN ON PLAN, TO MISS THE UTILITY CALL "MISS UTILITY" OF CENTRAL VIRGINIA: 1-800-552-7001 (TOLL FREE).
- CONTRACTOR SHALL ACQUIRE ANY AND ALL NECESSARY CONSTRUCTION PERMITS, AND FURNISH COPIES TO THE CITY.
- ALL DIMENSIONS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.
- THE MINIMUM CLEAR COVER OVER WATER PIPES SHALL BE 3.5 FEET.
- SEWER PIPES SHALL BE PVC.
- MANHOLE TOPS ARE BASED ON FINAL GRADES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF PROPER TOP ELEVATIONS BEFORE CONSTRUCTION OF MANHOLES.
- THE ENGINEER WILL CERTIFY THAT THE GRADES ARE WITHIN 6" OF SUBGRADE BEFORE WATER LINE CONSTRUCTION CAN BEGIN.
- FIRE HYDRANT PUMP CONNECTIONS SHALL FACE IN DIRECTION OF ARROW OR STREET.
- UNDERGROUND WIRING FOR LIGHTING AND SIGNS ARE COVERED BY DETAILS TO BE PROVIDED BY THE ELECTRICAL ENGINEER.
- ALL UTILITY LINES SUCH AS ELECTRIC, TELEPHONE, CATV, OR OTHER SIMILAR LINES SHALL BE INSTALLED UNDERGROUND. THIS SHALL APPLY TO LINES SERVING INDIVIDUAL SITES AS WELL AS TO UTILITY LINES NECESSARY WITHIN PROJECT.
- CROSS CONNECTION CONTROL AND BACK FLOW PREVENTION SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL PLUMBING CODE.
- IT IS THE PLUMBER'S RESPONSIBILITY TO INSTALL UTILITY SERVICE BEYOND THE WATER METER.
- ALL SEWER SERVICES ARE TO BE 8" WITH A MINIMUM SLOPE OF 1/4" PER FOOT.
- IN ACCORDANCE WITH HANDICAP ACCESSIBILITY REQUIREMENTS, ALL APPLICABLE CODES AND REQUIREMENTS FOR ACCESSIBILITY FOR DISABLED PERSONS SHALL BE STRICTLY COMPLIED WITH.

SEWER

- 8" SAN --- EX SANITARY SEWER
- 8" SAN --- SANITARY SEWER
- N 7605 80
E 9378 25 --- SANITARY MANHOLE NUMBER W/ COORDINATE LOCATION
- ⊙ --- EX SANITARY MANHOLE
- ⊙ --- SANITARY MANHOLE
- ⊙ --- EX CLEAN OUT
- ⊙ --- CLEAN OUT

WATER

- 8" W --- EX WATER LINE
- 8" W --- WATER LINE
- ⊕ --- EX WATER VALVE
- ⊕ --- WATER VALVE
- ⊕ --- POST INDICATOR VALVE
- ⊕ --- EX WATER METER
- ⊕ --- EX WATER MANHOLE
- ⊕ --- EX WATER SPIGOT
- ⊕ --- WATER METER
- ⊕ --- EX FIRE HYDRANT
- ⊕ --- FIRE HYDRANT
- ⊕ --- WATER LINE REDUCER
- 8" W --- EX WATER LINE PLUG
- 8" W --- WATER LINE PLUG
- ⊕ --- WATER LINE CROSS
- ⊕ --- WATER LINE TEE
- ⊕ --- FIRE DEPT CONNECTION
- ⊕ --- WATER SPIGOT
- ⊕ --- EX WELL CASING

NATURAL GAS

- ⊕ --- EX GAS METER
- ⊕ --- EX GAS VALVE
- EX GAS LINE
- G --- GAS LINE
- ⊕ --- GAS DRIP
- ⊕ --- GAS TEST

LEGEND

MISCELLANEOUS UTILITIES

- ⊕ --- EX LIGHT POLE
- ⊕ --- LIGHT POLES
- ⊕ --- EX UTILITY POLE
- ⊕ --- UTILITY POLE
- ⊕ --- EX GUY ANCHOR
- ⊕ --- EX ELECTRIC MANHOLE
- ⊕ --- EX ELECTRIC PEDESTAL
- ⊕ --- EX ELECTRIC METER
- ⊕ --- EX OVERHEAD ELECTRIC
- ⊕ --- OVERHEAD ELECTRIC
- ⊕ --- EX UNDERGROUND ELECT LINE
- ⊕ --- UNDERGROUND ELECTRIC LINE
- ⊕ --- EX TELEPHONE PEDESTAL
- ⊕ --- EX TELEPHONE MANHOLE
- ⊕ --- EX OVERHEAD TELEPHONE LINE
- ⊕ --- OVERHEAD TELEPHONE LINE
- ⊕ --- EX UNDERGROUND TELEPHONE LINE
- ⊕ --- UNDERGROUND TELEPHONE LINE
- ⊕ --- EX OVERHEAD FIBER OPTIC LINE
- ⊕ --- OVERHEAD FIBER OPTIC LINE
- ⊕ --- EX UNDERGROUND FIBER OPTIC LINE
- ⊕ --- UNDERGROUND FIBER OPTIC LINE
- ⊕ --- EX CABLE TV PEDISTAL
- ⊕ --- EX OVERHEAD CABLE TV LINE
- ⊕ --- OCATV --- OVERHEAD CABLE TV LINE
- ⊕ --- UCATV --- UNDERGROUND CABLE TV LINE
- ⊕ --- UG PIC --- COMBINED POWER/CATV
- ⊕ --- UG P/T/C --- COMBINED POWER, TELE, CATV
- ⊕ --- UG P/T --- COMBINED POWER, TELEPHONE
- ⊕ --- UG T/C --- COMBINED TELEPHONE, CATV

SITE

- ⊕ --- EX STORM SEWER
- ⊕ --- STORM SEWER
- ⊕ --- EX DROP INLET
- ⊕ --- DROP INLET & STRUCTURE NUMBER
- ⊕ --- EX STORM SEWER MANHOLE
- ⊕ --- STORM SEWER MANHOLE
- ⊕ --- EX ROOF DRAIN DOWNSPOUT
- ⊕ --- ROOF DRAIN DOWNSPOUT
- ⊕ --- EX CURB
- ⊕ --- CURB
- ⊕ --- EX CURB & GUTTER
- ⊕ --- CURB & CUTTER
- ⊕ --- PROPERTY LINE
- ⊕ --- H&B CONTROL POINT
- ⊕ --- APPROX BORING LOCATION
- ⊕ --- LIMITS OF CONSTRUCTION
- ⊕ --- EX TREE LINE
- ⊕ --- CLEARING LIMITS
- ⊕ --- RPA
- ⊕ --- RMA
- ⊕ --- 100 YEAR FLOODPLAIN
- ⊕ --- EX SHRUB
- ⊕ --- EX TREE
- ⊕ --- EX FENCE
- ⊕ --- FENCE
- ⊕ --- EX CONTOUR
- ⊕ --- CONTOUR
- ⊕ --- SPOT ELEVATION
- ⊕ --- C/L SWALE
- ⊕ --- EX SIGN
- ⊕ --- SIGN
- ⊕ --- BOLLARD
- ⊕ --- PROPERTY CORNER
- ⊕ --- PROPERTY MONUMENT

PAVEMENT / TRENCH NOTES:

- PAVEMENT RESTORATION WIDTH VARIES DEPENDING ON EXISTING PAVEMENT AGE AND CONDITION AND MAY BE AS WIDE AS 4 TIMES THE TRENCH WIDTH ON BOTH SIDES. REFER TO "DEPARTMENT OF PUBLIC WORKS: TRENCH CUT RESTORATION" GUIDELINES.
- SELECT FILL PIPE BACKFILL (VDOT #21A) REQUIRED IN RIGHT-OF-WAY COMPACTED TO 95% OF MAXIMUM DENSITY AS SHOWN.
- ALL OTHER PIPE BACKFILL MATERIAL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY

UTILITY NOTES

- ALL WORK IN THE RIGHT-OF-WAY IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE MOST RECENT CITY OF RICHMOND STANDARDS FOR EXCAVATION AND RESTORATION.
- CONTRACTOR SHALL NOTIFY THE DPU INSPECTOR A MINIMUM OF 48 HOURS PRIOR TO THE START OF WORK.
- ALL UTILITY INSTALLATIONS IN THE RIGHT OF WAY AND EASEMENT SHALL BE CONSTRUCTED IN ACCORDANCE TO THE MOST RECENT CITY OF RICHMOND DEPARTMENT OF PUBLIC UTILITIES WATER AND SEWER DESIGN GUIDELINES.
- ALL UTILITY INSTALLATIONS ON SITE SHALL BE CONSTRUCTED IN STRICT ACCORDANCE WITH THE 2009 IPC.
- DUCTILE IRON AND COPPER WATER SERVICES WILL BE EXTENDED TO THE PROPERTY LINE. PLASTIC WATER PIPE IS NOT ACCEPTABLE IN THE CITY RIGHT OF WAY
- IF AN EXISTING WATER METERS OR SERVICE LATERALS ARE FOUND DPU WILL ABANDONED THE EXISTING WATER SERVICE PER CITY OF RICHMOND GUIDELINES. CONTACT DPU TO COORDINATE ABANDONMENT
- IF EXISTING ABANDONED SEWER LATERALS ARE FOUND CUT THE LINE AT THE PROPERTY LINE AND PLUG.
- CONTRACTOR IS TO REMOVE ANY PIPING FOUND ON SITE. CONTACT MISS UTILITY FOR UTILITY DESIGNATION PRIOR TO THE START OF ANY EXCAVATION.
- COORDINATE THE REMOVAL OF GAS LINES AND GAS METERS WITH THE CITY OF RICHMOND DPU.
- BACKFLOW PREVENTION FOR BOTH FIRE AND DOMESTIC SHALL BE INSTALLED PER CITY OF RICHMOND CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM REQUIREMENTS AND SHALL BE PROVIDED INSIDE THE BUILDING.
- MAINTAIN A 10' HORIZONTAL CLEARANCE BETWEEN SANITARY AND WATER SERVICE PER THE HEALTH CODE.
- THIS DEVELOPMENT WILL NOT INCREASE STORMWATER RUNOFF TO THE CITY'S COMBINED SEWER SYSTEM.
- COORDINATE THE STORM AND SANITARY INVERTS AT THE BUILDING WITH THE GENERAL CONTRACTOR AND PLUMBING ENGINEER.
- CONTRACTOR MUST MAINTAIN GOOD EROSION CONTROL AND FLUSHING PROCEDURES.
- CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO ANY EXISTING UTILITIES OR OTHER CITY PROPERTY THAT IS DAMAGED DURING CONSTRUCTION.
- ALL EXISTING UTILITIES MAY NOT BE SHOWN. VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. CALL MISS UTILITY OF VIRGINIA, NOTIFY ENGINEER IMMEDIATELY IF THERE IS A CONFLICT.
- APPROPRIATE PIPE CLASS FOR ALL UTILITIES SHALL BE PER CITY OF RICHMOND STANDARDS.
- A BACKWATER VALVE IS REQUIRED ON THE SANITARY LATERAL IF THE RIM ELEVATION OF THE MANHOLE UPSTREAM OF THE NEW CONNECTION IS HIGHER THAN ANY UNPROTECTED FIXTURE ELEVATIONS WITHIN THE BUILDING.
- THE SIZE OF THE DETECTOR CHECK NEEDS TO BE VERIFIED. COORDINATE THE FIRE DETECTOR CHECK AND FIRE SERVICE SIZE WITH THE OWNER/GC AND FIRE SPRINKLER CONTRACTOR.
- WATER METER TOPS AND SANITARY CLEANOUT TOPS NEED TO MEET AND BE FLUSH WITH FINAL FINISHED GRADES.
- COORDINATE STREET LIGHT AND STREET LIGHT CONDUIT REMOVAL AND RELOCATIONS WITH CITY DPU. CONFIRM THE STATUS OF THE EXISTING STREETLIGHT CONDUIT WITHIN THE 8TH STREET CONNECTOR AND WHETHER OR NOT IT NEEDS TO BE RELOCATED OR IF IT CAN BE REMOVED.
- COORDINATE FIRE HYDRANT RELOCATIONS WITH CITY DPU.

PAVEMENT LEGEND

- EXISTING CONCRETE
- EXISTING ASPHALT
- EXISTING GRAVEL
- EXISTING PLAYGROUND



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J. CHAPMAN

DESIGNED BY
R. SATMARIA

CHECKED BY
C. SIBOLD

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

EXISTING CONDITIONS PLAN

SCALE 1" = 30'

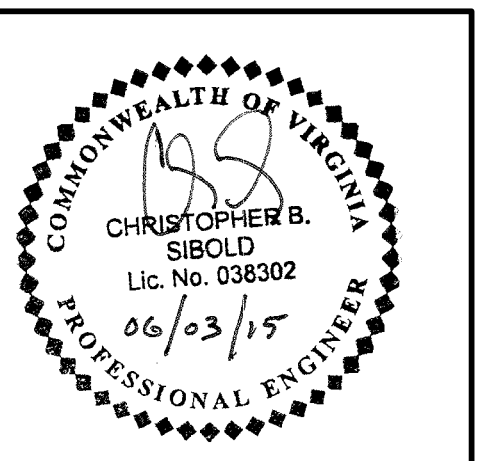
JOB NO.
36144

SHEET NO.
C2.01

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PAVEMENT LEGEND

- EXISTING CONCRETE
- EXISTING ASPHALT
- EXISTING GRAVEL
- EXISTING PLAYGROUND



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| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SIBOLD |
| SCALE | 1" = 30' |

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BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

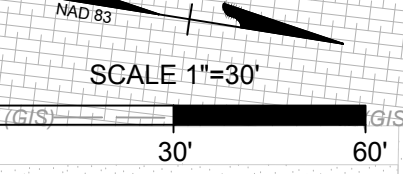
EXISTING CONDITIONS PLAN

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| SHEET NO. | C2.02 |



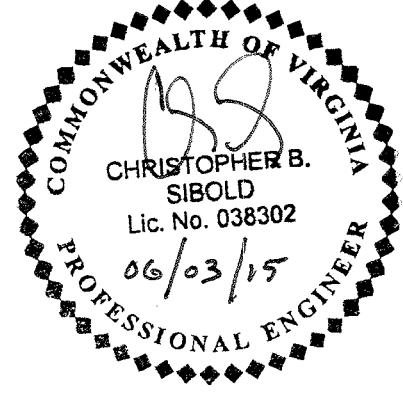
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 PARCEL ID# N001230001
 DB: 340A PG. 139
 DB: 344A PG. 220
 DB: 234D PG. 489
 DB: 181A PG. 414 (H.C.C.)

MATCHLINE DRAWING C2.01



S:\2015\44-Bristol at Westwood\Drawings\Drawings\DWG\Site\Site\H.C.C.\H.C.C._SITE_COND_PLAN.dwg Plot Date: 05/20/2015 10:58 AM by Tim Owens

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CHECKED BY
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SCALE
1" = 30'

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

DEMOLITION PLAN

| |
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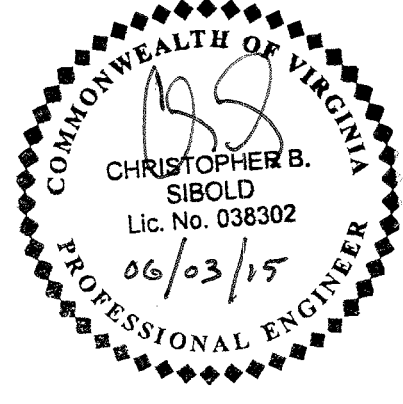
- DEMOLITION PLAN NOTES:**
1. A PRE-CONSTRUCTION MEETING IS MANDATORY BEFORE ANY WORK IS DONE AT THE SITE. CONTACT THE ENGINEER AND INSPECTOR.
 2. THE CONTRACTOR MUST VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. NOTIFY "MISS UTILITY" AT 1-800-552-7001 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITIES. ALSO NOTIFY THE ENGINEER IF THERE IS A CONFLICT.
 3. CONTRACTOR TO COORDINATE WORK AROUND EXISTING UTILITIES WITH THE CORRESPONDING UTILITY COMPANIES.
 4. ANY EXISTING GAS, SANITARY SEWER, AND WATER LATERALS TO BE ABANDONED SHALL BE DONE IN ACCORDANCE WITH CITY'S STANDARD SPECIFICATIONS.
 5. COORDINATE WITH THE EROSION AND SEDIMENT CONTROL PLAN FOR INSTALLATION OF STONE FOR CONSTRUCTION ACCESS AND A TEMPORARY TOPSOIL STOCKPILE.
 6. IMPLEMENT PHASE I EROSION CONTROL MEASURES PRIOR TO THE START OF DEMOLITION.
 7. COORDINATE ADJUSTMENTS, REMOVALS / RELOCATIONS OF EXISTING UTILITIES WITH THE APPROPRIATE PROVIDER.
 8. CONTRACTOR TO MAINTAIN SAFE ACCESS FOR ADJACENT PROPERTY OWNERS.

- DEMOLITION LEGEND**
- AREA TO BE DEMOLISHED
 - TO BE DEMOLISHED

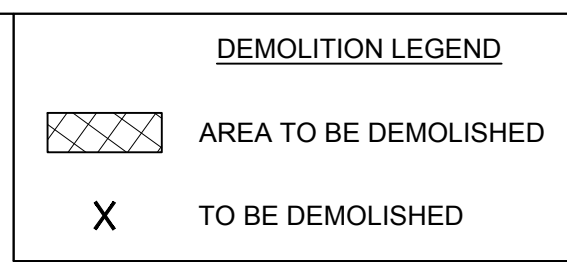


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PARCEL ID# N0001230001
DB: 340A PG: 139
DB: 344A PG: 229
DB: 234D PG: 489
DB: 181A PG: 414 (H.C.C.)

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- DEMOLITION PLAN NOTES:**
1. A PRE-CONSTRUCTION MEETING IS MANDATORY BEFORE ANY WORK IS DONE AT THE SITE. CONTACT THE ENGINEER AND INSPECTOR.
 2. THE CONTRACTOR MUST VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. NOTIFY "MISS UTILITY" AT 1-800-552-7001 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITIES. ALSO NOTIFY THE ENGINEER IF THERE IS A CONFLICT.
 3. CONTRACTOR TO COORDINATE WORK AROUND EXISTING UTILITIES WITH THE CORRESPONDING UTILITY COMPANIES.
 4. ANY EXISTING GAS, SANITARY SEWER, AND WATER LATERALS TO BE ABANDONED SHALL BE DONE IN ACCORDANCE WITH CITY'S STANDARD SPECIFICATIONS.
 5. COORDINATE WITH THE EROSION AND SEDIMENT CONTROL PLAN FOR INSTALLATION OF STONE FOR CONSTRUCTION ACCESS AN TEMPORARY TOPSOIL STOCKPILE.
 6. IMPLEMENT PHASE I EROSION CONTROL MEASURES PRIOR TO THE START OF DEMOLITION.
 7. COORDINATE ADJUSTMENTS, REMOVALS / RELOCATIONS OF EXISTING UTILITIES WITH THE APPROPRIATE PROVIDER.
 8. CONTRACTOR TO MAINTAIN SAFE ACCESS FOR ADJACENT PROPERTY OWNERS.



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| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SIBOLD |
| SCALE | 1" = 30' |

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
DEMOLITION PLAN

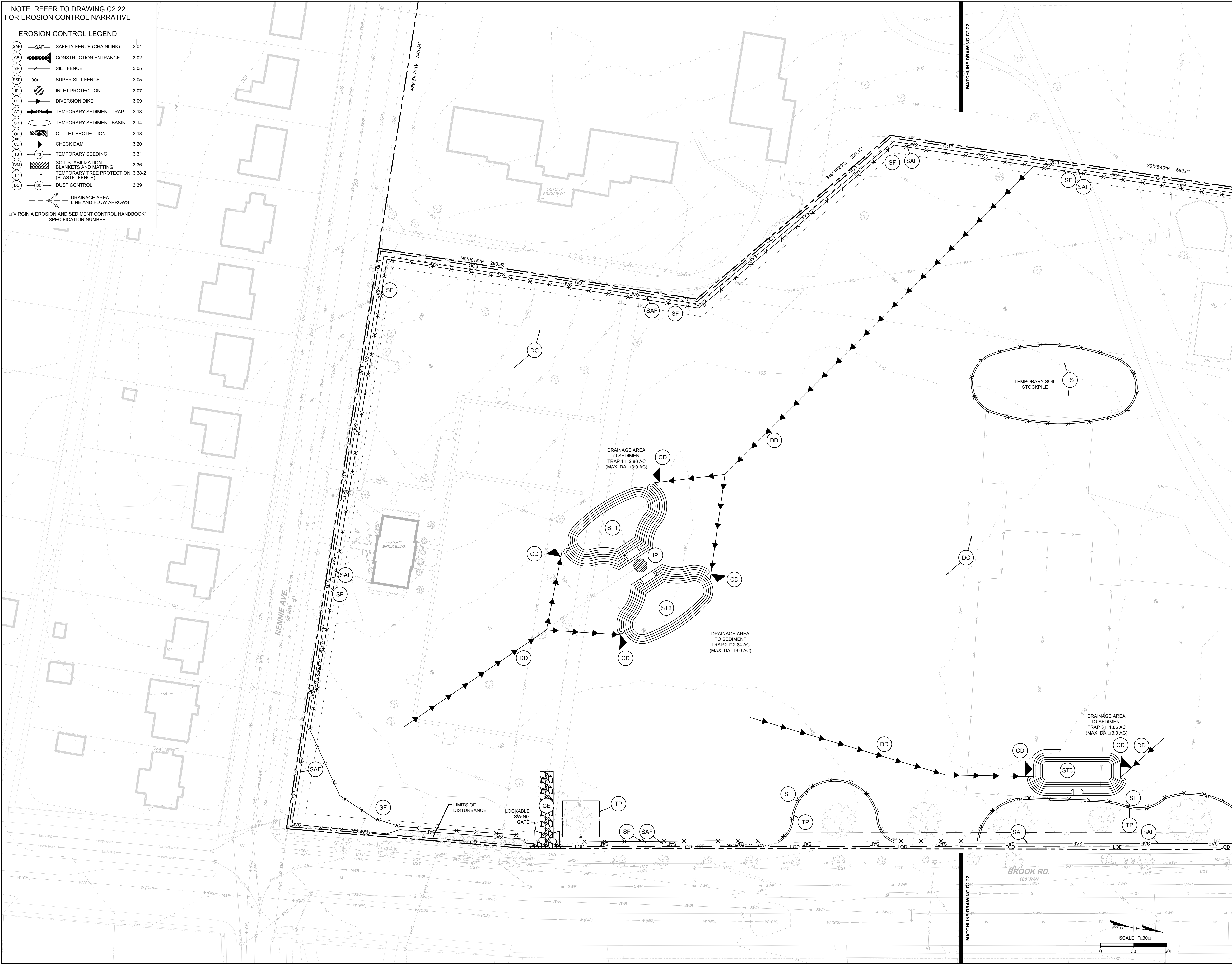
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NOTE: REFER TO DRAWING C2.22 FOR EROSION CONTROL NARRATIVE

| EROSION CONTROL LEGEND | | |
|---|---|--------|
| (SAF) | SAFETY FENCE (CHAINLINK) | 3.01 |
| (CE) | CONSTRUCTION ENTRANCE | 3.02 |
| (SF) | SILT FENCE | 3.05 |
| (SSF) | SUPER SILT FENCE | 3.05 |
| (IP) | INLET PROTECTION | 3.07 |
| (DD) | DIVERSION DIKE | 3.09 |
| (ST) | TEMPORARY SEDIMENT TRAP | 3.13 |
| (SB) | TEMPORARY SEDIMENT BASIN | 3.14 |
| (OP) | OUTLET PROTECTION | 3.18 |
| (CD) | CHECK DAM | 3.20 |
| (TS) | TEMPORARY SEEDING | 3.31 |
| (BM) | SOIL STABILIZATION BLANKETS AND MATTING | 3.36 |
| (TP) | TEMPORARY TREE PROTECTION (PLASTIC FENCE) | 3.38-2 |
| (DC) | DUST CONTROL | 3.39 |
| DRAINAGE AREA LINE AND FLOW ARROWS | | |
| "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK" SPECIFICATION NUMBER | | |



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C. SIBOLD

SCALE
1" = 30'

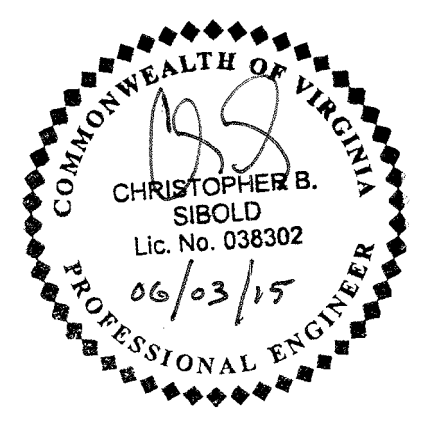
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BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

PHASE I EROSION AND SEDIMENT CONTROL PLAN

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| SHEET NO. | C2.21 |



EROSION CONTROL NARRATIVE

PHASE I

1. A LAND DISTURBANCE PERMIT IS REQUIRED PRIOR TO STARTING CONSTRUCTION. A PRE-CONSTRUCTION MEETING IS MANDATORY BEFORE ANY WORK IS COMPLETED ON SITE. ARRANGE A MEETING WITH THE OWNER, ARCHITECT, ENGINEER AND CITY OF RICHMOND INSPECTOR. THE MEETING MUST TAKE PLACE 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE. INSTALL A WASH RACK WITH CONSTRUCTION ENTRANCE. WASH MUD AND DEBRIS FROM ALL CONSTRUCTION EQUIPMENT AND VEHICLES PRIOR TO LEAVING THE SITE. IF A PUBLIC WATER SUPPLY IS NOT AVAILABLE THEN WATER TRUCKS MUST BE USED FOR THE WASH RACK. MAINTAIN POSITIVE DRAINAGE AWAY FROM THE WASH RACK TO EROSION CONTROL MEASURES.
NOTE: INSTALL ALL EROSION CONTROL MEASURES IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND CONSTRUCTION DOCUMENTS.
NOTE: THE LOCAL INSPECTOR HAS THE AUTHORITY TO ADD OR DELETE EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IN THE FIELD AS SITE CONDITIONS WARRANT.
3. INSTALL PERIMETER EROSION CONTROL MEASURES.
NOTE: CLEAR AND DISTURB ONLY THE MINIMUM AREA NECESSARY FOR THE INSTALLATION OF THE PHASE I EROSION AND SEDIMENT CONTROL DEVICES. DO NOT PERFORM ANY ADDITIONAL CLEARING UNTIL ALL INDICATED PHASE I EROSION AND SEDIMENT CONTROL DEVICES ARE IN PLACE, OPERATIONAL AND APPROVED BY THE CITY OF RICHMOND INSPECTOR.
4. INSTALL TEMPORARY SEDIMENT TRAPS.
5. ONCE PHASE I EROSION CONTROL MEASURES ARE IN PLACE, OPERATIONAL AND APPROVED BY THE CITY OF RICHMOND ENVIRONMENTAL INSPECTOR CLEAR & GRUB THE SITE TO THE LIMITS OF CLEARING. STRIP TOPSOIL AND STOCKPILE. STABILIZE ALL STOCKPILES WITH TEMPORARY SEEDING AND A PERIMETER OF SILT FENCE.
NOTE: ALL SILT FENCE SHALL BE INSPECTED AT THE END OF EACH WORKING DAY.

CITY OF RICHMOND
EROSION AND SEDIMENT CONTROL GUIDELINES

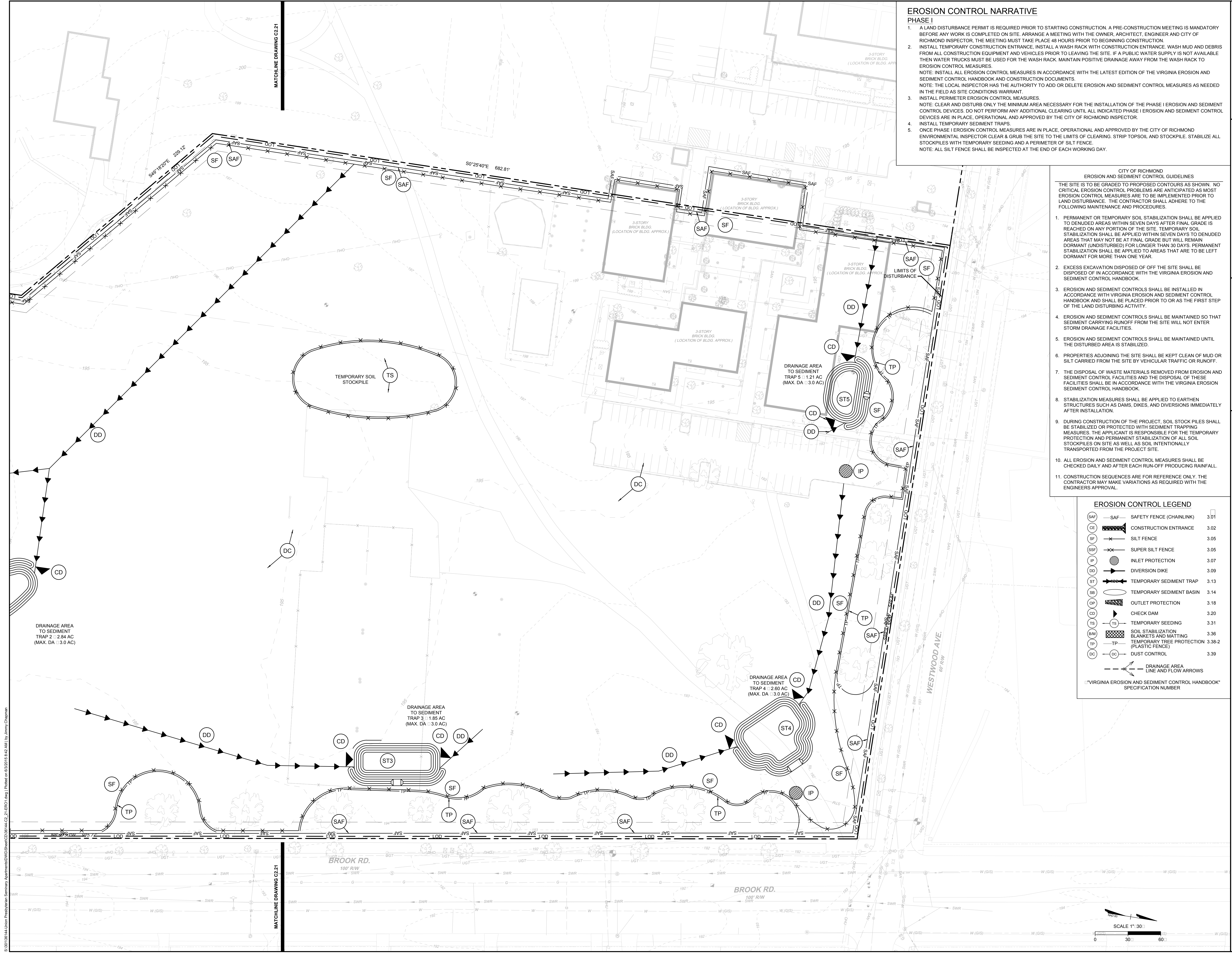
THE SITE IS TO BE GRADED TO PROPOSED CONTOURS AS SHOWN. NO CRITICAL EROSION CONTROL PROBLEMS ARE ANTICIPATED AS MOST EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED PRIOR TO LAND DISTURBANCE. THE CONTRACTOR SHALL ADHERE TO THE FOLLOWING MAINTENANCE AND PROCEDURES.

1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED 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 DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 90 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
2. EXCESS EXCAVATION DISPOSED OFF THE SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
3. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED IN ACCORDANCE WITH VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND SHALL BE PLACED PRIOR TO OR AS THE FIRST STEP OF THE LAND DISTURBING ACTIVITY.
4. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED SO THAT SEDIMENT CARRYING RUNOFF FROM THE SITE WILL NOT ENTER STORM DRAINAGE FACILITIES.
5. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED UNTIL THE DISTURBED AREA IS STABILIZED.
6. PROPERTIES ADJOINING THE SITE SHALL BE KEPT CLEAN OF MUD OR SILT CARRIED FROM THE SITE BY VEHICULAR TRAFFIC OR RUNOFF.
7. THE DISPOSAL OF WASTE MATERIALS REMOVED FROM EROSION AND SEDIMENT CONTROL FACILITIES AND THE DISPOSAL OF THESE FACILITIES SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION SEDIMENT CONTROL HANDBOOK.
8. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
9. 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.
10. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED DAILY AND AFTER EACH RUN-OFF PRODUCING RAINFALL.
11. CONSTRUCTION SEQUENCES ARE FOR REFERENCE ONLY. THE CONTRACTOR MAY MAKE VARIATIONS AS REQUIRED WITH THE ENGINEERS APPROVAL.

EROSION CONTROL LEGEND

| | | |
|-----|---|--------|
| SAF | SAFETY FENCE (CHAINLINK) | 3.01 |
| CE | CONSTRUCTION ENTRANCE | 3.02 |
| SF | SILT FENCE | 3.05 |
| SSF | SUPER SILT FENCE | 3.05 |
| IP | INLET PROTECTION | 3.07 |
| DD | DIVERSION DIKE | 3.09 |
| ST | TEMPORARY SEDIMENT TRAP | 3.13 |
| SB | TEMPORARY SEDIMENT BASIN | 3.14 |
| OP | OUTLET PROTECTION | 3.18 |
| CD | CHECK DAM | 3.20 |
| TS | TEMPORARY SEEDING | 3.31 |
| BM | SOIL STABILIZATION BLANKETS AND MATTING | 3.36 |
| TP | TEMPORARY TREE PROTECTION (PLASTIC FENCE) | 3.38-2 |
| DC | DUST CONTROL | 3.39 |
| | DRAINAGE AREA LINE AND FLOW ARROWS | |

VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER



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| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SIBOLD |

SCALE
1" = 30'

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

PHASE I EROSION AND SEDIMENT CONTROL PLAN

JOB NO.
36144

SHEET NO.
C2.22

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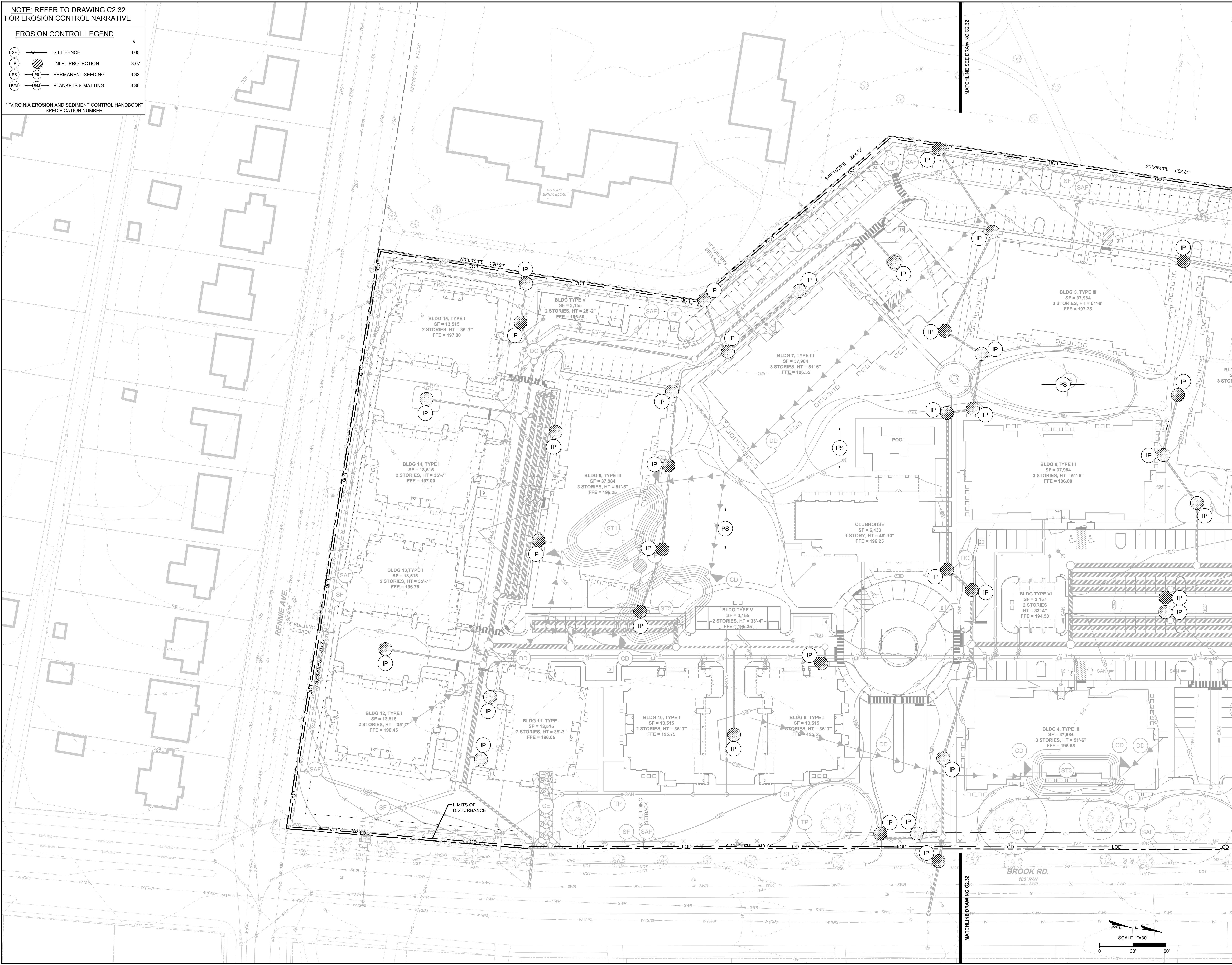
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NOTE: REFER TO DRAWING C2.32 FOR EROSION CONTROL NARRATIVE

EROSION CONTROL LEGEND

| | | |
|--|--------------------|------|
| | SILT FENCE | 3.05 |
| | INLET PROTECTION | 3.07 |
| | PERMANENT SEEDING | 3.32 |
| | BLANKETS & MATTING | 3.36 |

**"VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK" SPECIFICATION NUMBER



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 CHECKED BY C. SIBOLD

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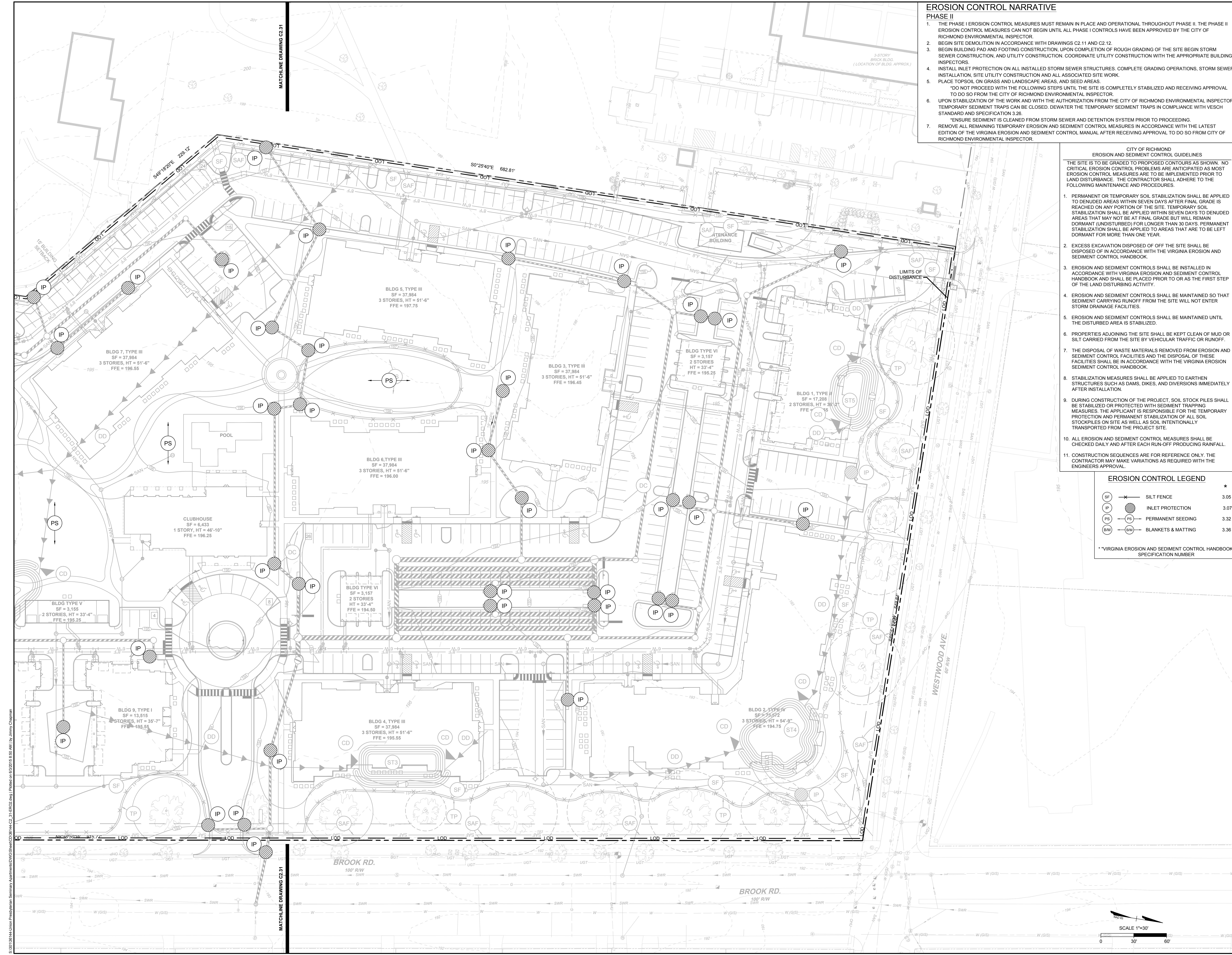
BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

PHASE II EROSION AND SEDIMENT CONTROL PLAN

SCALE 1" = 30'

JOB NO. 36144
 SHEET NO. C2.31

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EROSION CONTROL NARRATIVE

PHASE II

1. THE PHASE I EROSION CONTROL MEASURES MUST REMAIN IN PLACE AND OPERATIONAL THROUGHOUT PHASE II. THE PHASE II EROSION CONTROL MEASURES CAN NOT BEGIN UNTIL ALL PHASE I CONTROLS HAVE BEEN APPROVED BY THE CITY OF RICHMOND ENVIRONMENTAL INSPECTOR.
2. BEGIN SITE DEMOLITION IN ACCORDANCE WITH DRAWINGS C2.11 AND C2.12.
3. BEGIN BUILDING PAD AND FOOTING CONSTRUCTION, UPON COMPLETION OF ROUGH GRADING OF THE SITE BEGIN STORM SEWER CONSTRUCTION, AND UTILITY CONSTRUCTION. COORDINATE UTILITY CONSTRUCTION WITH THE APPROPRIATE BUILDING INSPECTORS.
4. INSTALL INLET PROTECTION ON ALL INSTALLED STORM SEWER STRUCTURES. COMPLETE GRADING OPERATIONS, STORM SEWER INSTALLATION, SITE UTILITY CONSTRUCTION AND ALL ASSOCIATED SITE WORK.
5. PLACE TOPSOIL ON GRASS AND LANDSCAPE AREAS, AND SEED AREAS.
 *DO NOT PROCEED WITH THE FOLLOWING STEPS UNTIL THE SITE IS COMPLETELY STABILIZED AND RECEIVING APPROVAL TO DO SO FROM THE CITY OF RICHMOND ENVIRONMENTAL INSPECTOR.
6. UPON STABILIZATION OF THE WORK AND WITH THE AUTHORIZATION FROM THE CITY OF RICHMOND ENVIRONMENTAL INSPECTOR TEMPORARY SEDIMENT TRAPS CAN BE CLOSED. DEWATER THE TEMPORARY SEDIMENT TRAPS IN COMPLIANCE WITH VESCH STANDARD AND SPECIFICATION 3.26.
 *ENSURE SEDIMENT IS CLEANED FROM STORM SEWER AND DETENTION SYSTEM PRIOR TO PROCEEDING.
7. REMOVE ALL REMAINING TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL MANUAL AFTER RECEIVING APPROVAL TO DO SO FROM CITY OF RICHMOND ENVIRONMENTAL INSPECTOR.

CITY OF RICHMOND
 EROSION AND SEDIMENT CONTROL GUIDELINES

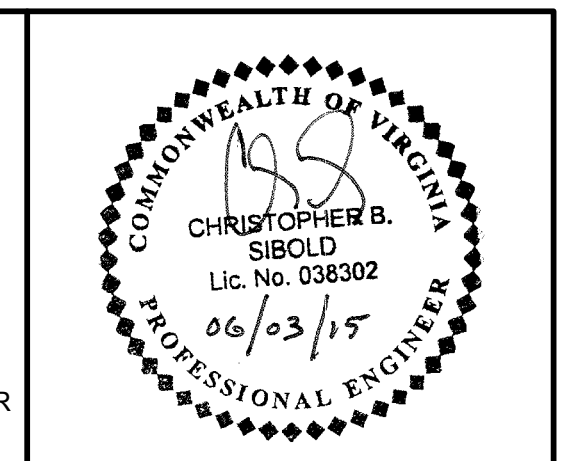
THE SITE IS TO BE GRADED TO PROPOSED CONTOURS AS SHOWN. NO CRITICAL EROSION CONTROL PROBLEMS ARE ANTICIPATED AS MOST EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED PRIOR TO LAND DISTURBANCE. THE CONTRACTOR SHALL ADHERE TO THE FOLLOWING MAINTENANCE AND PROCEDURES:

1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED 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 DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
2. EXCESS EXCAVATION DISPOSED OF OFF THE SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
3. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED IN ACCORDANCE WITH VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND SHALL BE PLACED PRIOR TO OR AS THE FIRST STEP OF THE LAND DISTURBING ACTIVITY.
4. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED SO THAT SEDIMENT CARRYING RUNOFF FROM THE SITE WILL NOT ENTER STORM DRAINAGE FACILITIES.
5. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED UNTIL THE DISTURBED AREA IS STABILIZED.
6. PROPERTIES ADJOINING THE SITE SHALL BE KEPT CLEAN OF MUD OR SILT CARRIED FROM THE SITE BY VEHICULAR TRAFFIC OR RUNOFF.
7. THE DISPOSAL OF WASTE MATERIALS REMOVED FROM EROSION AND SEDIMENT CONTROL FACILITIES AND THE DISPOSAL OF THESE FACILITIES SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION SEDIMENT CONTROL HANDBOOK.
8. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
9. 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.
10. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED DAILY AND AFTER EACH RUN-OFF PRODUCING RAINFALL.
11. CONSTRUCTION SEQUENCES ARE FOR REFERENCE ONLY. THE CONTRACTOR MAY MAKE VARIATIONS AS REQUIRED WITH THE ENGINEERS APPROVAL.

EROSION CONTROL LEGEND

| | | |
|------|--------------------|------|
| (SF) | SILT FENCE | 3.05 |
| (IP) | INLET PROTECTION | 3.07 |
| (PS) | PERMANENT SEEDING | 3.32 |
| (SM) | BLANKETS & MATTING | 3.36 |

* VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER



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| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SIBOLD |

| | |
|-------|----------|
| SCALE | 1" = 30' |
|-------|----------|

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BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

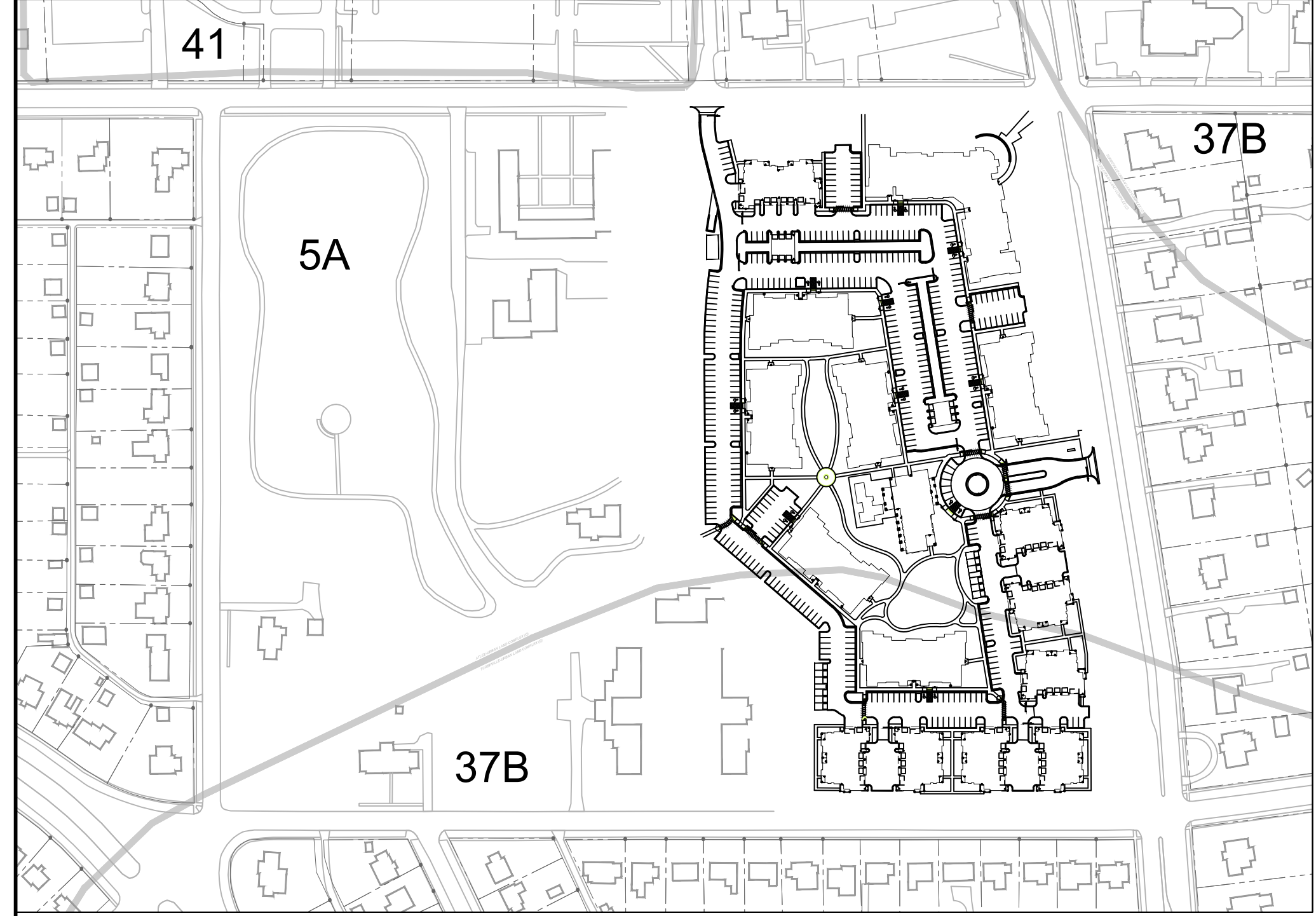
PHASE II EROSION AND SEDIMENT CONTROL PLAN

| | |
|-----------|-------|
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| SHEET NO. | C2.32 |

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| SOILS SUMMARY | | | | |
|---------------|------------------|---------|-------|-------------------------------|
| MAPPING UNIT | HYDROLOGIC GROUP | K VALUE | SLOPE | MAPPING UNIT NAME |
| 5A | C | 0.49 | 0-4% | ATLEE-URBAN LAND COMPLEX |
| 37B | B | 0.32 | 2-6% | TURBEVILLE-URBAN LAND COMPLEX |
| 41 | | | | URBAN LAND |



SOILS MAP
SCALE: 1" = 200'

| EROSION & SEDIMENT CONTROL - QUANTITIES* | |
|--|------------|
| PHASE I | |
| Construction Entrance | 1 EA |
| Safety Fence | 3,600 L.F. |
| Silt Fence | 6,000 L.F. |
| Inlet Protection | 4 EA |
| Diversion Dike | 1,750 L.F. |
| Temporary Sediment Trap | 5 EA |
| Rock Check Dams | 11 EA |
| Temporary Seeding | 6 AC |
| Tree Protection | 1,350 L.F. |
| Dust Control | 14.74 AC |
| PHASE II | |
| Inlet Protection | 48 EA |
| Permanent Seeding | 6 AC |

*QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION
This project is located in the City of Richmond on parcels currently owned by Union Presbyterian Seminary. The purpose of this project is to develop the eastern portion of their property for use as a housing complex consisting of apartments, carriage homes, a clubhouse, and corresponding parking. This site will require imported fill to achieve desired elevations. The total disturbed area with this project is 14.74± acres.

EXISTING SITE CONDITIONS
The site currently supports Union Presbyterian Seminary with several buildings, fields, tennis courts, and parking spread out across the site. The eastern portion of the site will become the new project area for the housing complex. There is a high in the center of the overall property that sheets flows water mostly to the west away from our project site toward the portion of the property to remain under Union Presbyterian Seminary, or to the east onto our project site. The stormwater from our project site currently starts as sheet flow then makes it way into storm structures located on Westwood Avenue, Brook Road, and Rennie Avenue.

ADJACENT SITE
The site is bound to the west, south, and east by single family residential housing. On the northern border of the site there are some commercial buildings and a large parking lot. The western portion of the property will remain under Union Presbyterian Seminary and will not be disturbed with the construction of this project. Drainage for these areas currently travels to storm structures and inlets along Westwood Avenue, Brook Road, and Rennie Avenue.

OFF-SITE AREAS
Offsite areas to be disturbed include right of way for utility trenching for utility service connections.

SOILS
Refer to this sheet for Soils Map and Soils Characteristics.

CRITICAL EROSION AREAS
Early establishment and proper maintenance of perimeter controls will provide sedimentation control and prevent erosion sediment from entering the sewer system. Stabilize and maintain all diversions, ditches, traps and cutoff slopes throughout project construction to control erosion. Fill slopes of 3:1 or greater are critical in nature and must be stabilized properly and immediately following construction.

STORMWATER RUN-OFF CONSIDERATIONS
The site stormwater will be conveyed to storm structures via sheet flow, mostly in the proposed parking lots. Stormwater on the project site will be held in one of two storm detention systems. Stormwater will leave the site connecting into existing storm drainage pipes along Brook Road. Refer to drawings C6.01 & C6.02 for storm drainage.

CALCULATIONS
Refer to drawings C6.01 & C6.02 and C6.10 - C6.13 for calculations.

EROSION AND SEDIMENT CONTROL MEASURES
Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook. The minimum standards of the VESCH shall be adhered to unless otherwise waived or approved by a variance by local authorities having jurisdiction.

STRUCTURAL PRACTICES

- Safety Fence - 3.01**
A protective barrier installed to prevent access to the construction site.
- Temporary Construction Entrance - 3.02**
A temporary construction entrance shall be provided at the location indicated on the plans. It is imperative that this measure be maintained throughout construction.
- Silt Fence Barrier - 3.05**
Silt fence sediment barriers shall be installed downslope of areas with minimal grades to filter sediment-laden runoff from sheet flow as indicated.
- Super Silt Fence Barrier - 3.05**
Silt fence sediment barriers shall be installed downslope of areas with minimal grades to filter sediment-laden runoff from sheet flow as indicated.
- Storm Drain Inlet Protection - 3.07**
Stone filters shall be placed at the inlet of all drainage structures as indicated.
- Storm Drain Drop Inlet Protection - 3.07-1**
Silt fence filters shall be placed at the inlet of all drop inlet drainage structures as indicated.
- Culvert Inlet Protection - 3.08**
Silt fence sediment filter located at the inlet to storm sewer culverts as indicated.
- Temporary Diversion Dike - 3.09**
A temporary ridge of compacted soil constructed to divert sediment-laden runoff from a disturbed area to a sediment-trapping facility.
- Temporary Fill Diversion - 3.10**
A channel with a supporting ridge of soil on the lower side, constructed along the top of an active earth fill.
- Temporary Sediment Trap - 3.13**
A temporary ponding area used to detain sediment-laden runoff from small disturbed areas long enough to allow the majority of the sediment to settle out.
- Temporary Sediment Basin - 3.14**
A temporary barrier or dam with a controlled stormwater release structure to detain sediment-laden runoff from disturbed areas in "wet" and "dry" storage long enough for the majority of the sediment to settle out.
- Outlet Protection - 3.18**
Place riprap outlet protection at the discharge end of all storm sewer pipes and from the sediment basins to prevent erosion and scouring at the end of the pipes and to slow the velocity of the stormwater discharge to prevent downstream erosion.
- Rock Check Dams - 3.20**
Small temporary stone dams constructed across a swale or drainage ditch.
- Tree Protection - 3.38**
Protection of desirable trees from mechanical and other injury during land disturbing and construction activity.
- Soil Stabilization Blankets & Matting - 3.36**
The installation of a protective blanket or soil stabilization mat on a prepared planting of a steep slope, channel, or shoreline.
- Tree Protection - 3.38**
Protection of desirable trees from mechanical and other injury during land disturbing and construction activity.
- Dust Control - 3.39**
Reduce surface and air movement of dust during land disturbing, demolition and construction activities.

VEGETATIVE PRACTICES

- Topsoiling (Temporary Stockpile) - 3.30**
Topsoil shall be stripped from areas to be graded and stockpiled for later spreading. Stockpile locations shall be located onsite and shall be stabilized with temporary silt fence and vegetation.
- Temporary Seeding - 3.31**
All denuded areas which will be left dormant for more than 30 days shall be seeded with fast germinating temporary vegetation immediately following grading of those areas. Selection of the seed mixture shall depend on the time of year it is applied.
- Permanent Seeding - 3.32**
The establishment of perennial vegetative cover on disturbed areas by planting seed.
- Mulching - 3.35**
Application of plant residues or other suitable materials to the soil surface.

MANAGEMENT STRATEGIES

- Provide sediment trapping measures as a first step in grading and seed and mulch immediately following installation.
- Provide temporary seeding or other stabilization immediately after grading.
- Isolate trenching for utilities and drainage from downstream conveyances in order to minimize perimeter controls.
- All erosion and sediment control practices shall be maintained until they are no longer required to comply with the contract documents or state law.

PERMANENT STABILIZATION

All non-paved areas disturbed by construction shall be stabilized with permanent seeding immediately following final grading. Topsoil shall be placed to a depth of 6" & seeding shall be in accordance with Silt & Spec. 3.32, PERMANENT SEEDING. Imported topsoil shall be obtained from a site with an approved ESC plan. Seed type shall be as specified for "Minimum Care Lawns" and "General Slopes" in the Handbook. Mulch (straw or fiber) in accordance with Silt & Spec. 3.35, shall be used on all seeded surfaces. Erosion control blankets will be installed over fill slopes which have been brought to final grade and have been seeded to protect the slopes from fill & gully erosion and to allow the seed to germinate properly. In all seeding operations seed, fertilizer and lime shall be applied per recommendations of the soil test prior to mulching.

MAINTENANCE (Refer to "Minimum Standards" for additional information).

- The contractor is responsible for the maintenance of all erosion control measures on site. All erosion and sediment control measures shall be checked daily and after each run-off producing rainfall. The following items shall be checked in particular:
- Silt fence after every storm event to ensure effective operation and remove sediment when the level of sediment deposition reaches half way to the top of the barrier.
 - Provide periodic top dressing of construction entrances with additional stone and repair or clean out any of the structures used to trap sediment.
 - Check gravel inlet protection for sediment buildup which will prevent drainage. If the gravel is clogged by sediment, remove and clean, or replace.
 - Check the seeding areas to ensure that a stand of grass is maintained. Fertilize and reseed as needed.

MAINTENANCE OF SLOPES

When it is clear that plants have not germinated on an area or have died, these areas must be reseeded immediately to prevent erosion damage. However, it is extremely important to determine for what reason germination did not take place and make any corrective action necessary prior to reseeding the area.

All mulches and soil coverings should be inspected periodically (particularly after rainstorms) to check for erosion. Where erosion is observed in mulched areas, additional mulch should be applied. Nets and mats should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install netting or matting as necessary after repairing damage to the slope or ditch. Inspections should take place up until grasses are firmly established. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

All soil stabilization blankets and matting should be inspected periodically following installation, particularly after rainstorms to check for erosion and undermining. Any dislocation or failure should be repaired immediately. If washouts or breakage occurs, reinstall the material after repairing damage to the slope or ditch. Continue to monitor these areas until which time they become permanently stabilized; at that time an annual inspection should be adequate.

GENERAL EROSION AND SEDIMENT CONTROL NOTES

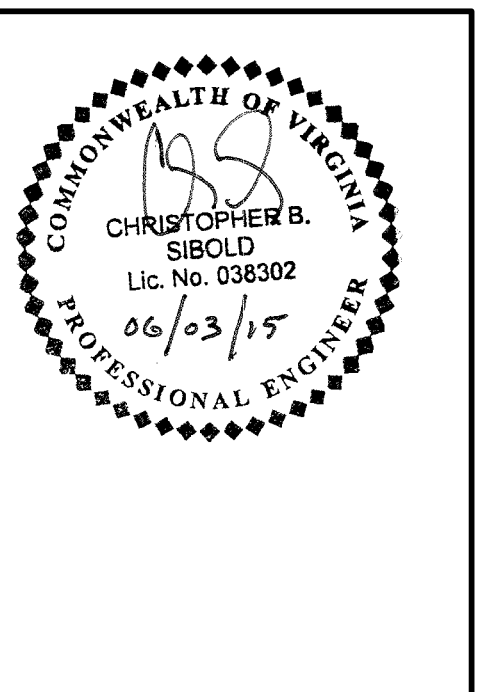
- ES-1: Unless otherwise indicated, construct and maintain all vegetative and structural erosion and sediment control practices according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations 9 VAC 25-840-40
- ES-2: Local authorities having jurisdiction will make a continuing review and evaluation of the methods and effectiveness of the erosion control plan.
- ES-3: Place all erosion and sediment control measures prior to or as the first step in clearing, grading, or land disturbance.
- ES-4: Maintain a copy of the approved erosion and sediment control plan on the site at all times.
- ES-5: Prior to commencing land-disturbing activities in areas other than indicated on these plans (including, but not limited to, offsite borrow or waste area), submit a supplementary erosion control plan to the Architect/Engineer for review and acceptance.
- ES-6: Provide additional erosion control measures necessary to prevent erosion and sedimentation as determined by the local authority field manager.
- ES-7: All disturbed areas shall drain to approved sediment control measures at all times during land-disturbing activities and during site development.
- ES-8: During dewatering operations, pump water into an approved filtering device.
- ES-9: Inspect all erosion control measures daily and after each runoff-producing rainfall event. Make any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices immediately.

EROSION AND SEDIMENT MINIMUM STANDARDS

- MS-1: Permanent or temporary soil stabilization shall be applied to denuded 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 denuded 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.
- MS-2: During construction of the project, soil stock piles and borrow areas 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 borrow areas and soil intentionally transported from the project site.
- MS-3: A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.
- MS-4: Sediment basins and traps, perimeter dikes, 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.
- MS-5: Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.
- MS-6: Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.
 - a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.
 - b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.

MINIMUM STANDARDS (continued)

- MS-7: 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.
- MS-8: Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.
- MS-9: Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.
- MS-10: 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.
- MS-11: Before newly constructed stormwater conveyance channels or pipes 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.
- MS-12: 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. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.
- MS-13: When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.
- MS-14: All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.
- MS-15: The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.
 - 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. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
 - e. Reestablishment shall be accomplished in accordance with this chapter.
 - f. Applicable safety requirements shall be complied with.
- MS-17: Where construction vehicle access routes intersect paved or 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 paved or public road surface, the road surface 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 development lots as well as to larger land-disturbing activities.
- MS-18: 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 VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
- MS-19: Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria:
 - A. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.
 - B. Adequacy of all channels and pipes shall be verified in the following manner:
 - (1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or
 - (2) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks; and
 - (3) All previously constructed man-made channels shall be analyzed by the use of a ten-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
 - (4) Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to verify that stormwater will be contained within the pipe or system.
 - C. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:
 - (1) Improve the channel to a condition where a ten-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel bed or banks; or
 - (2) Improve the pipe or pipe system to a condition where the ten-year storm is contained within the appurtenances; or
 - (3) Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a ten-year storm to increase when runoff outfalls into a man-made channel; or
 - (4) Provide a combination of channel improvement, stormwater detention or other measures which are satisfactory to the VESCP authority to prevent downstream erosion.



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SCALE AS NOTED

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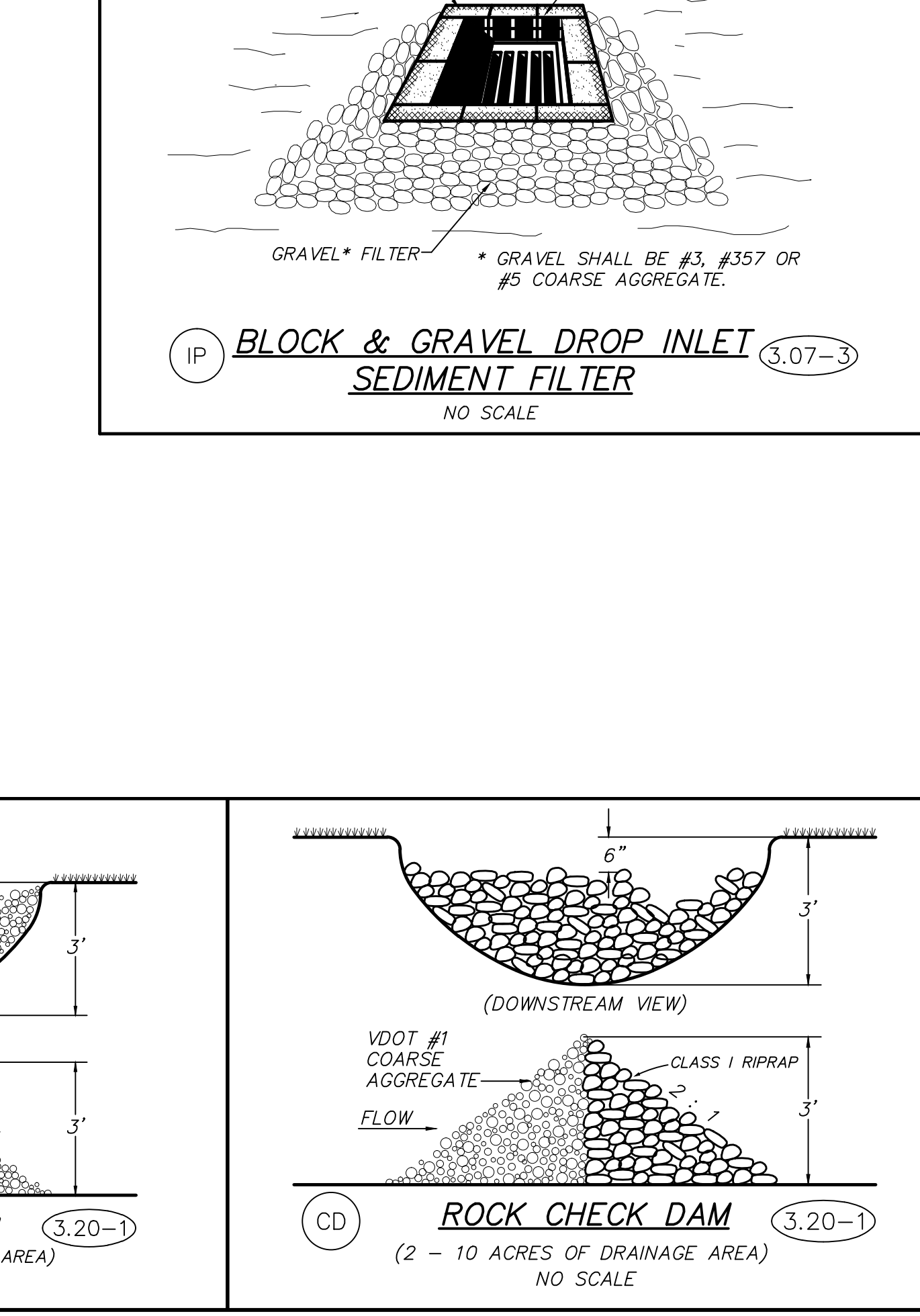
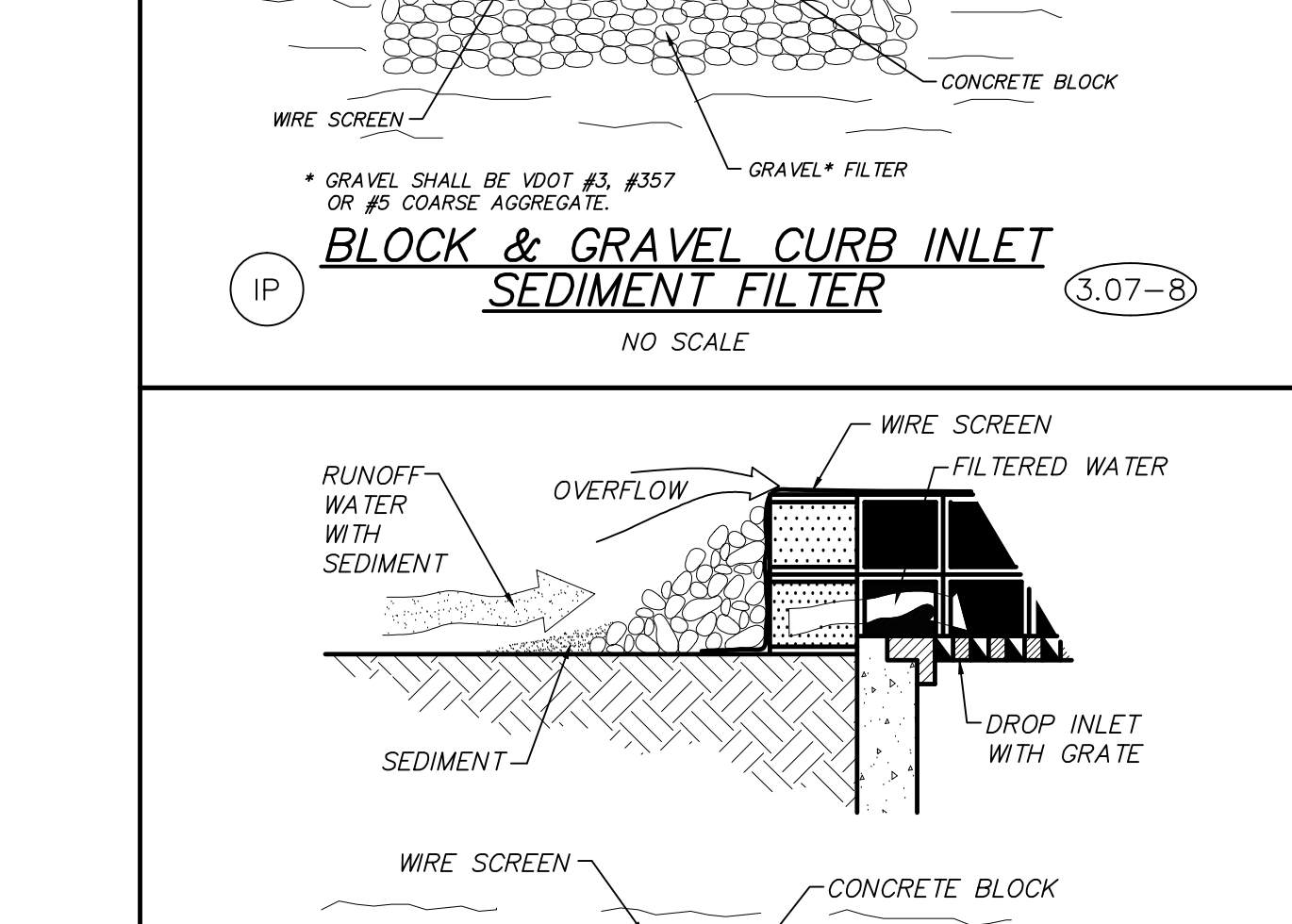
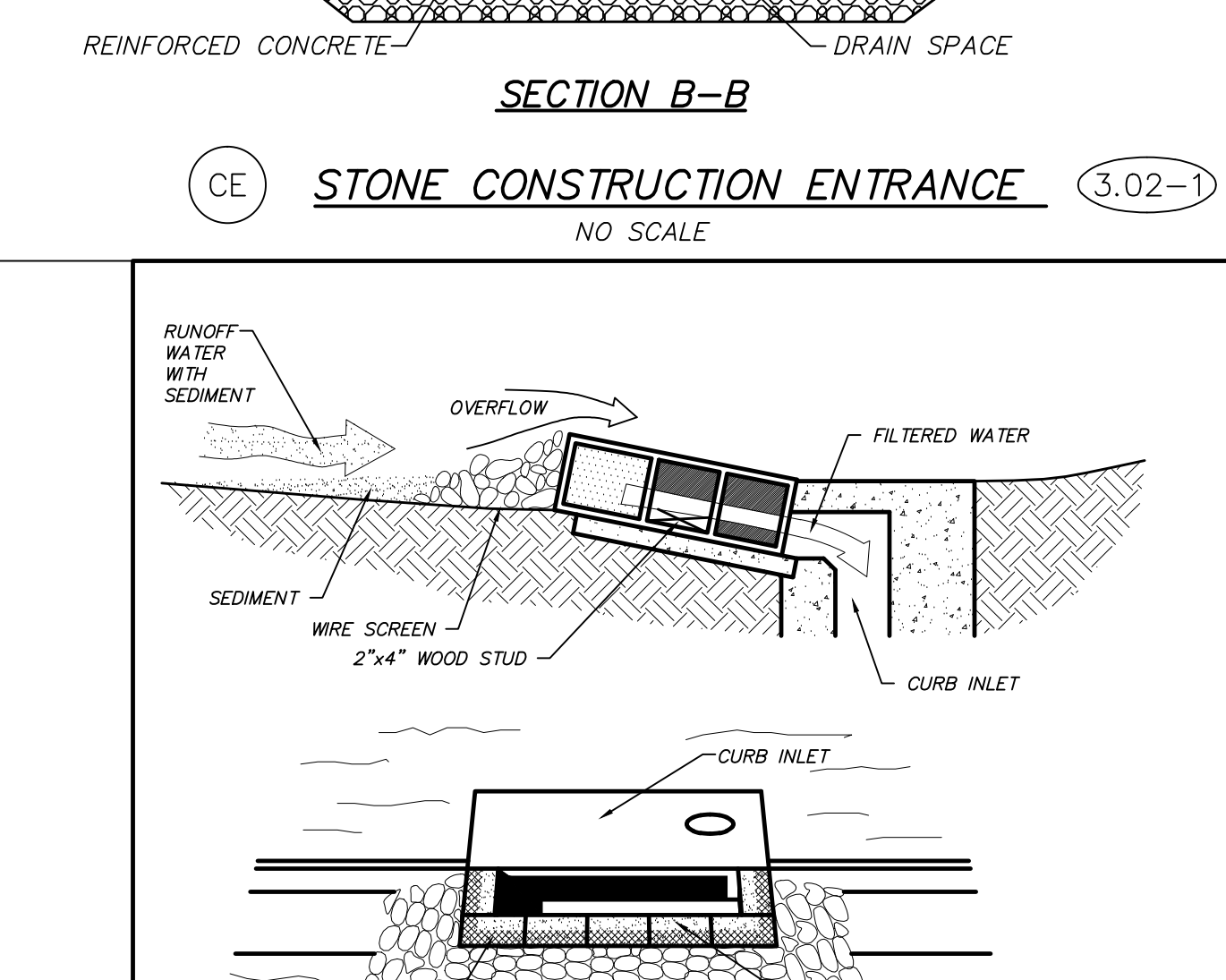
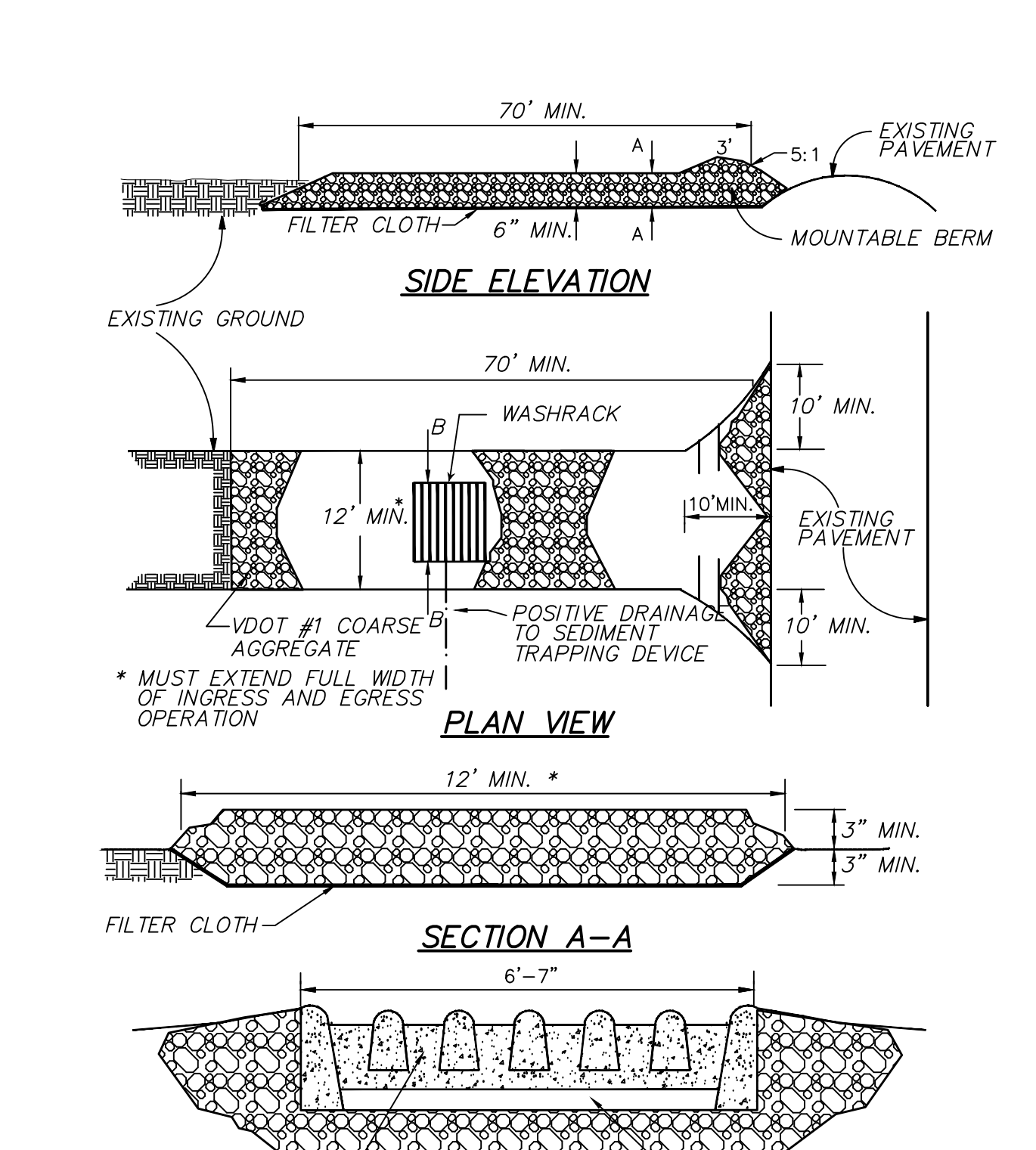
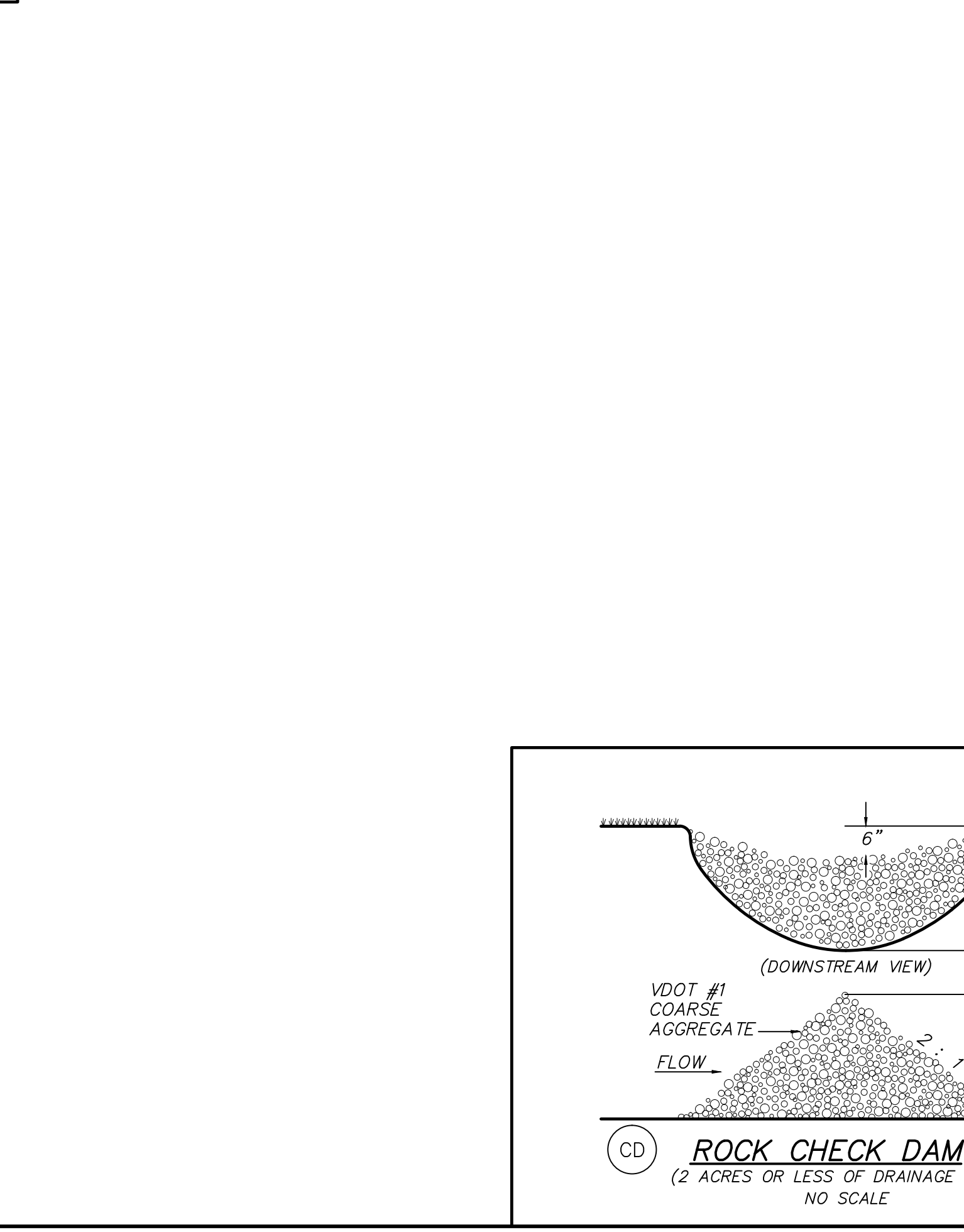
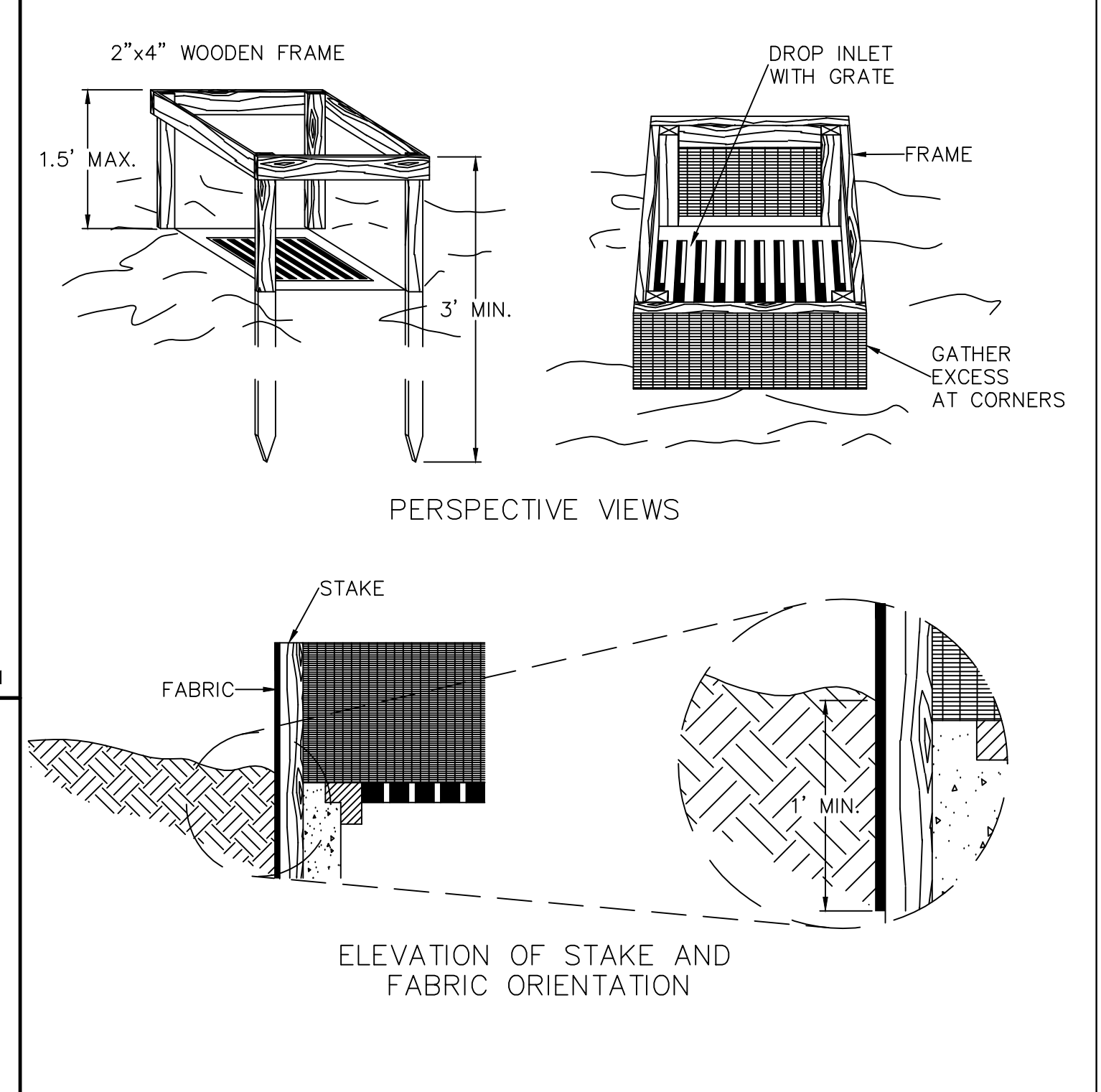
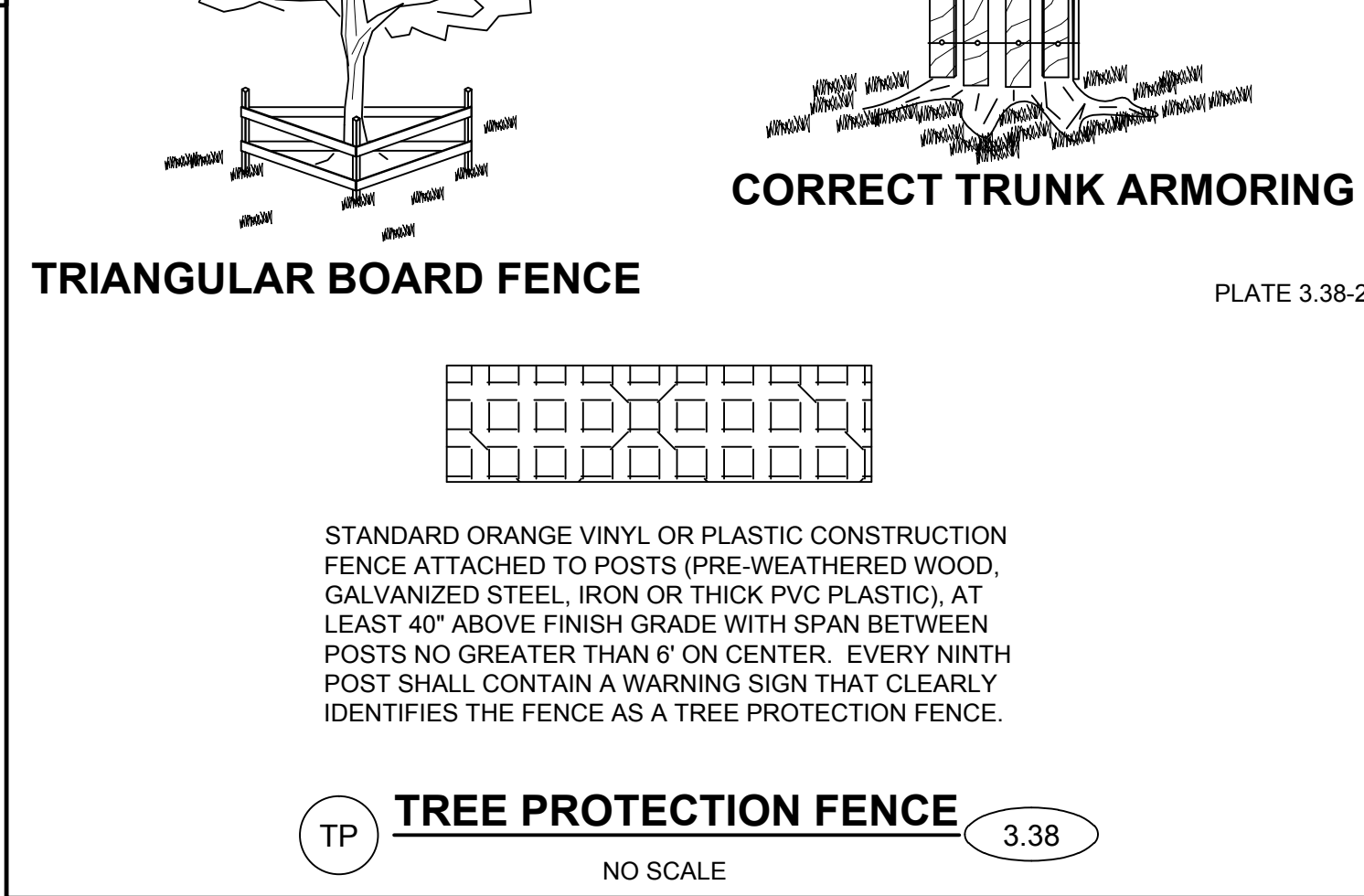
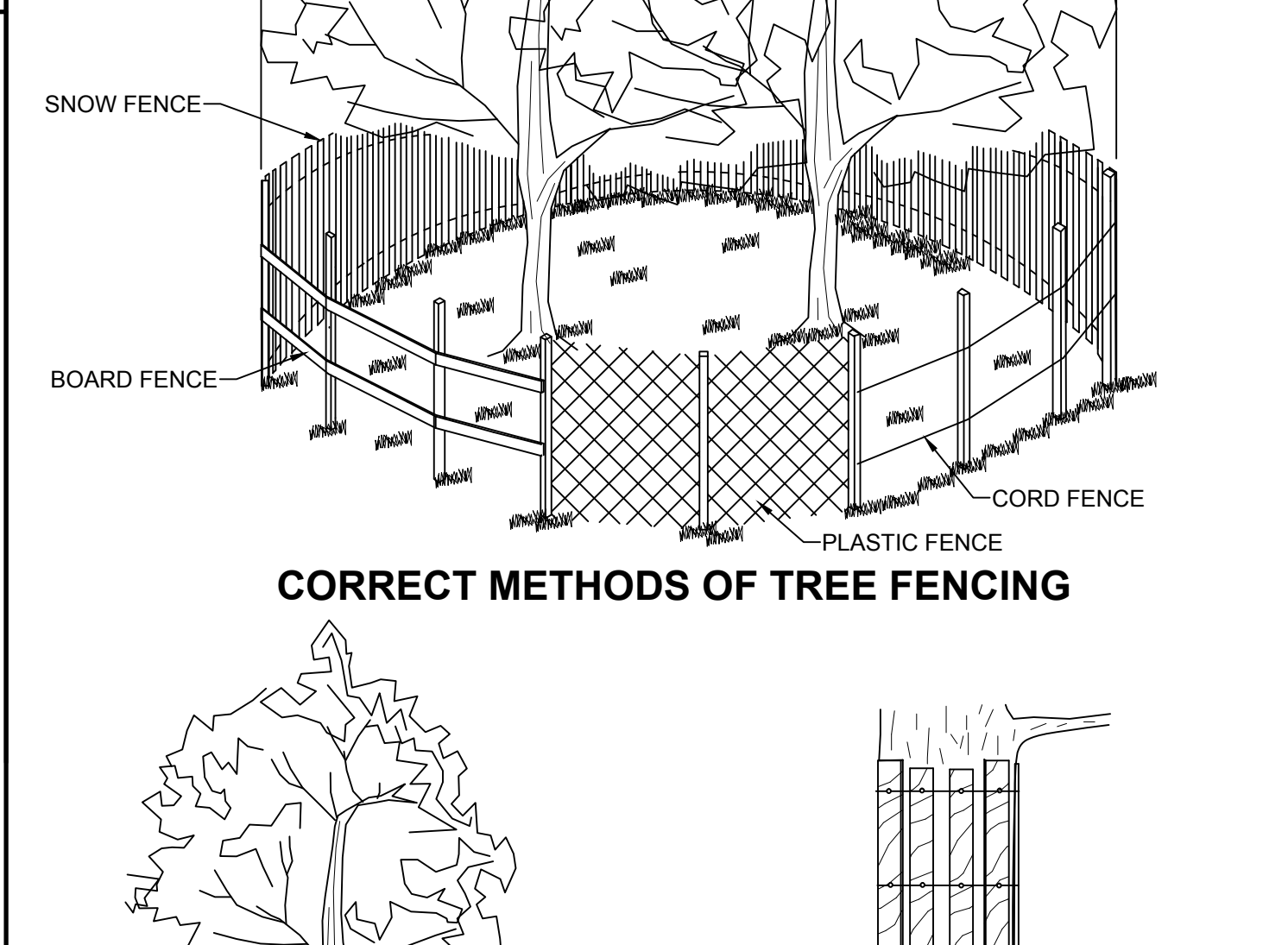
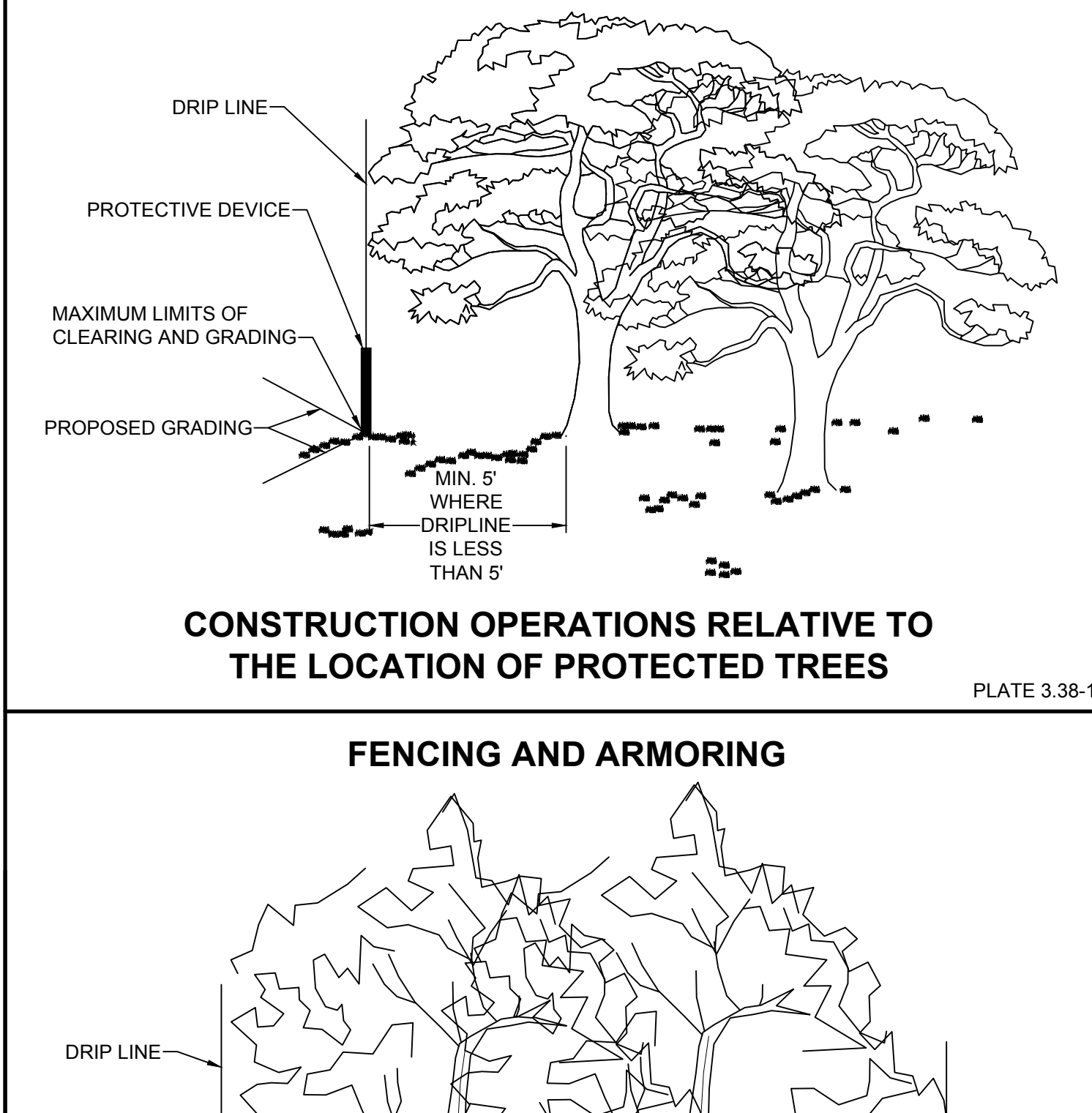
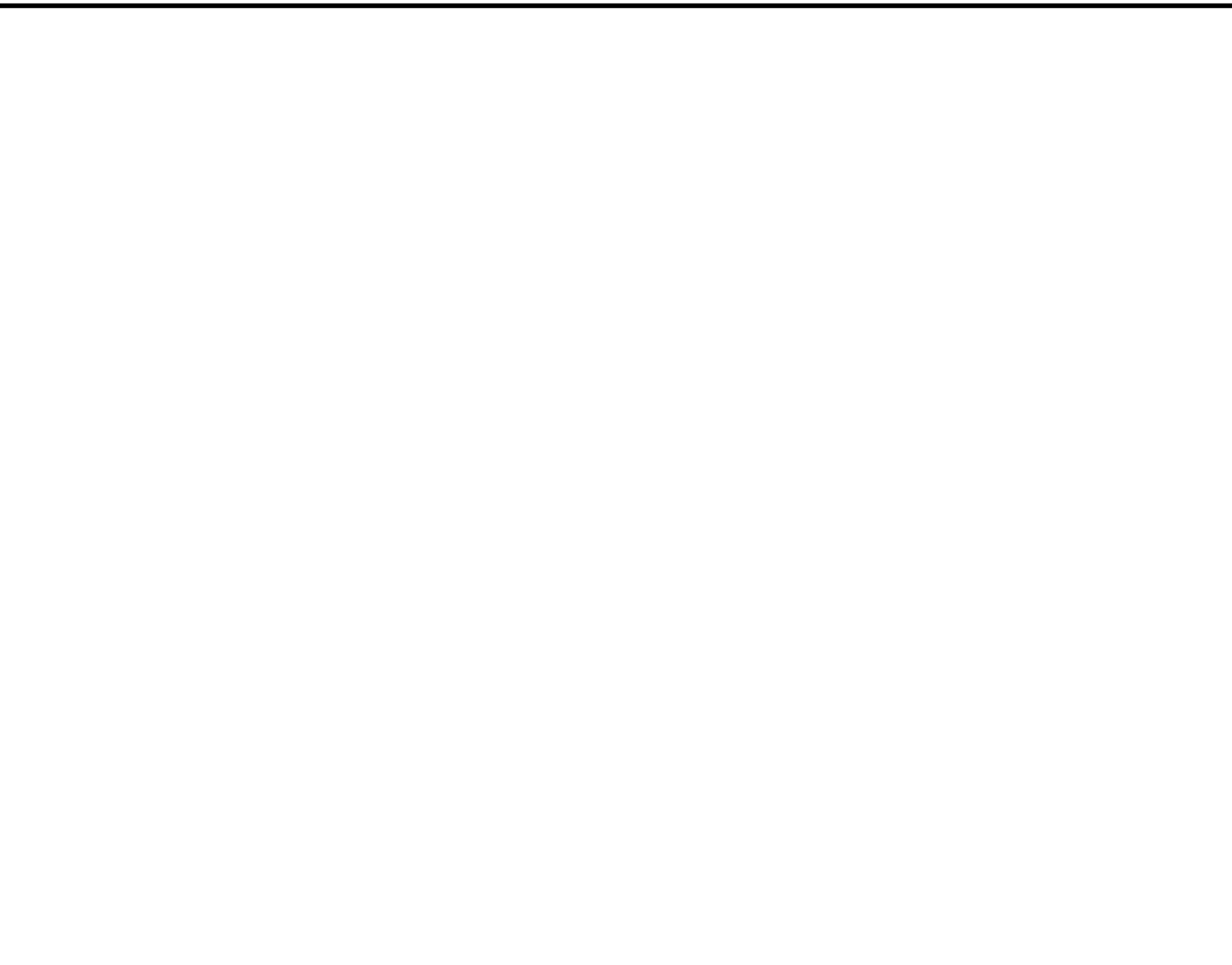
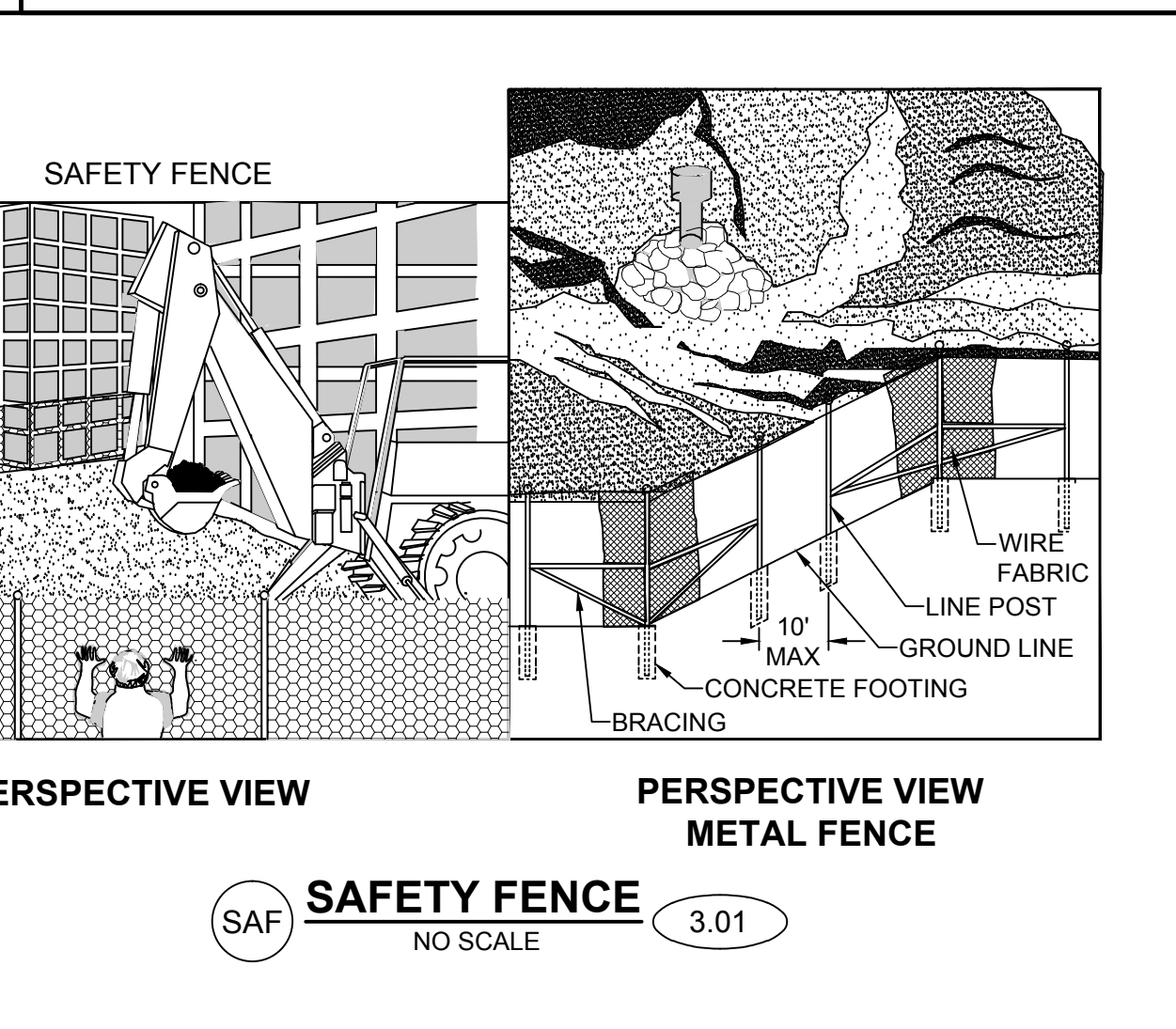
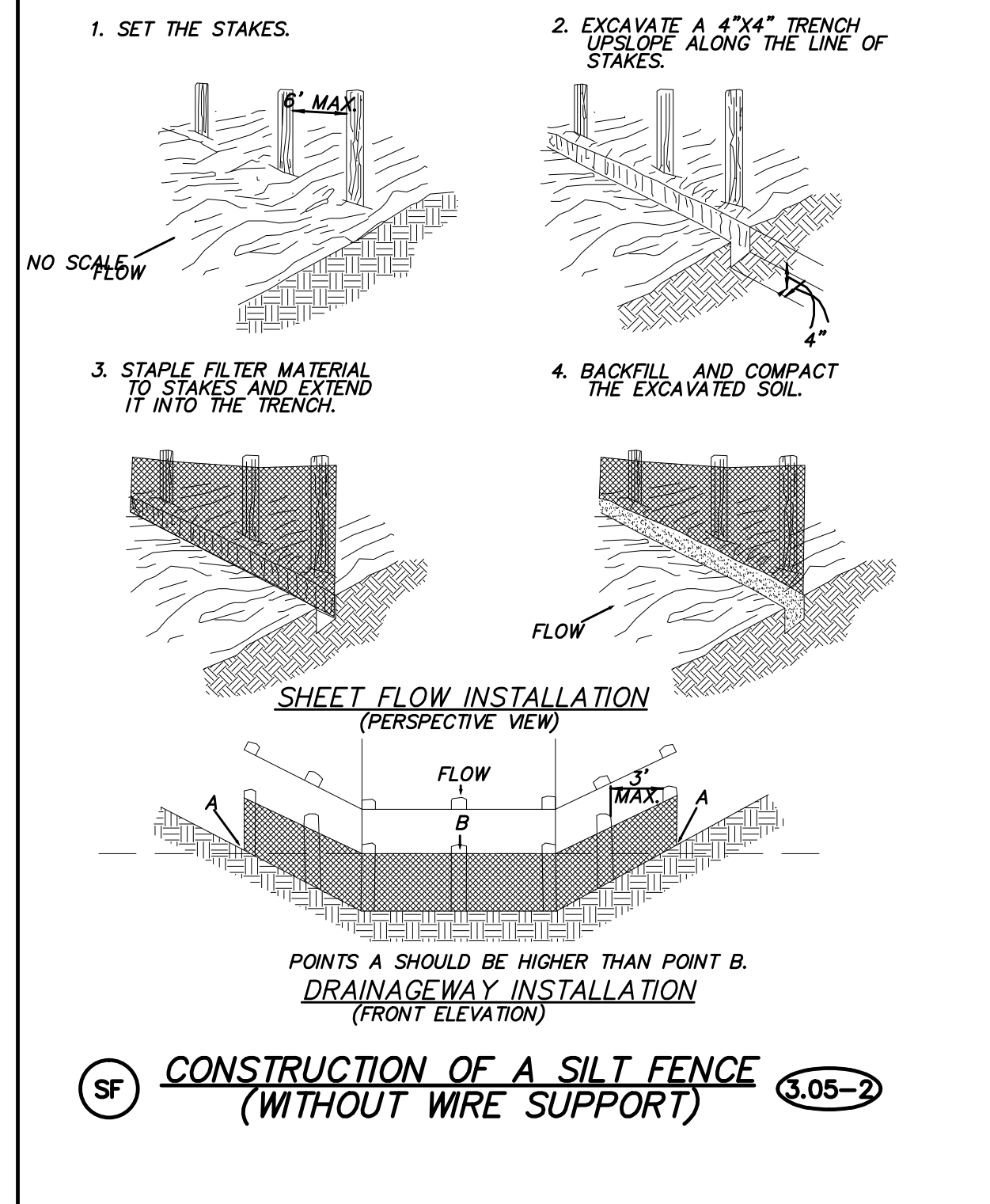
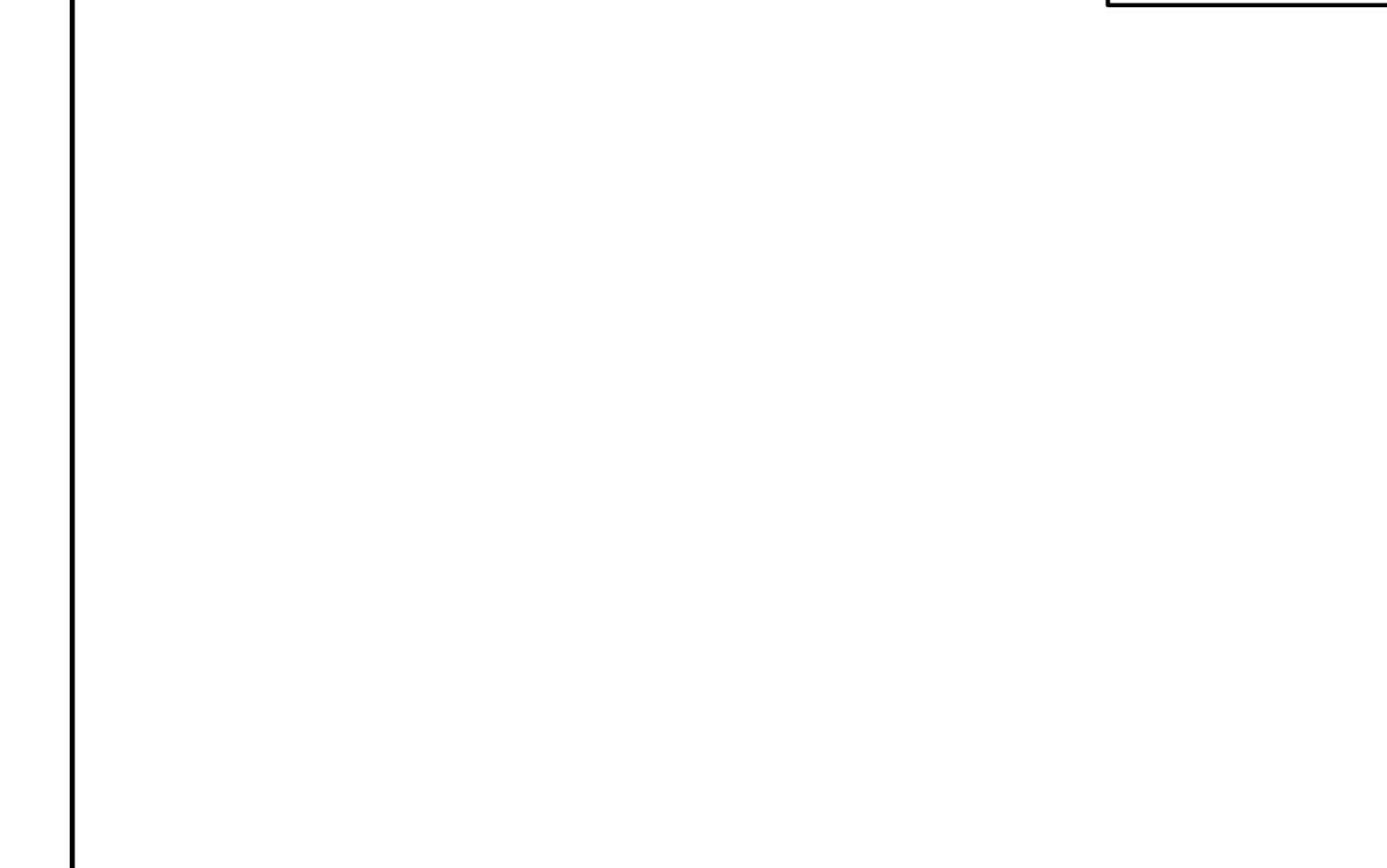
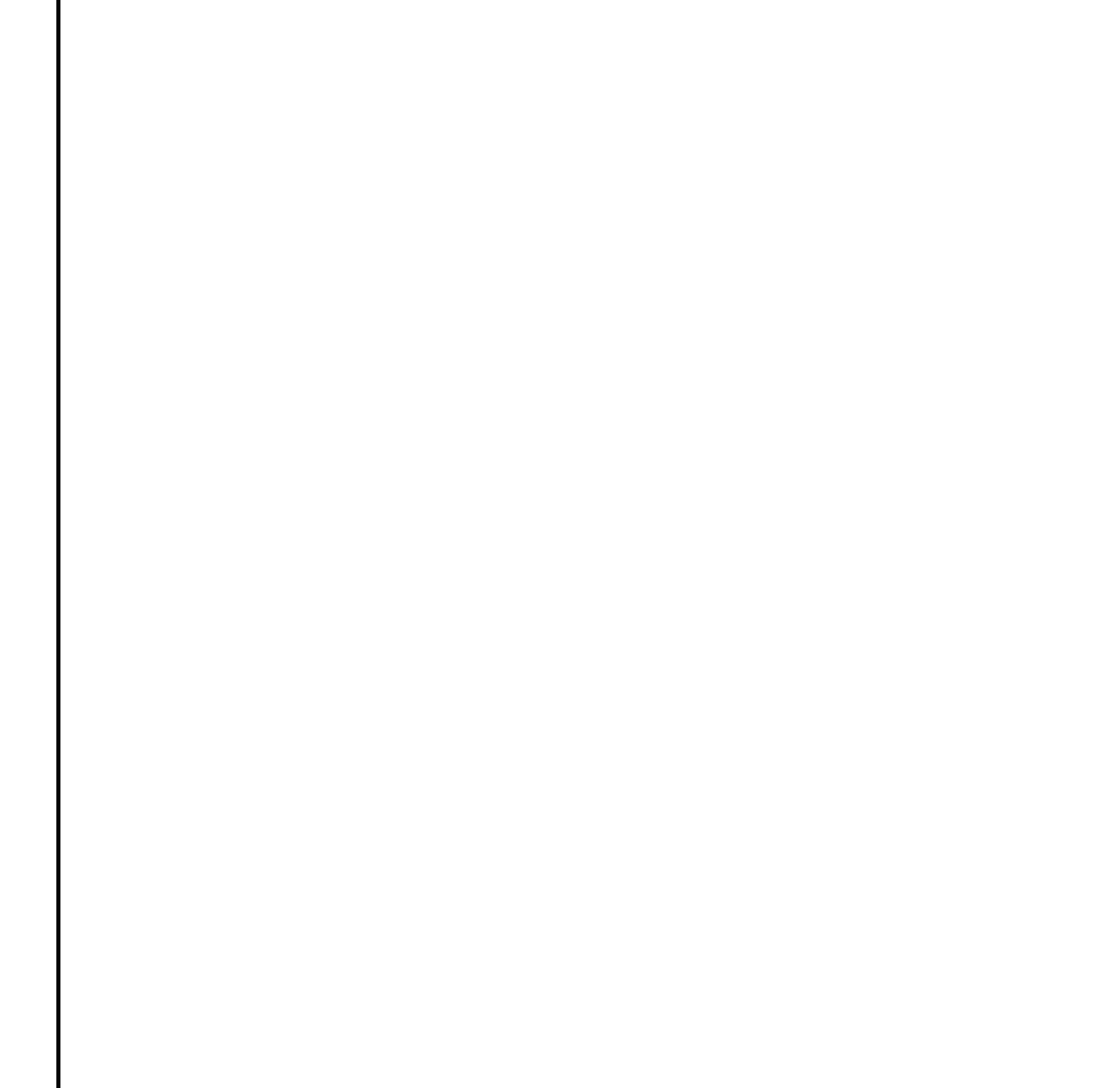
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

JOB NO. 36144
SHEET NO. C2.40

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TIMMONS GROUP
 BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

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CHECKED BY
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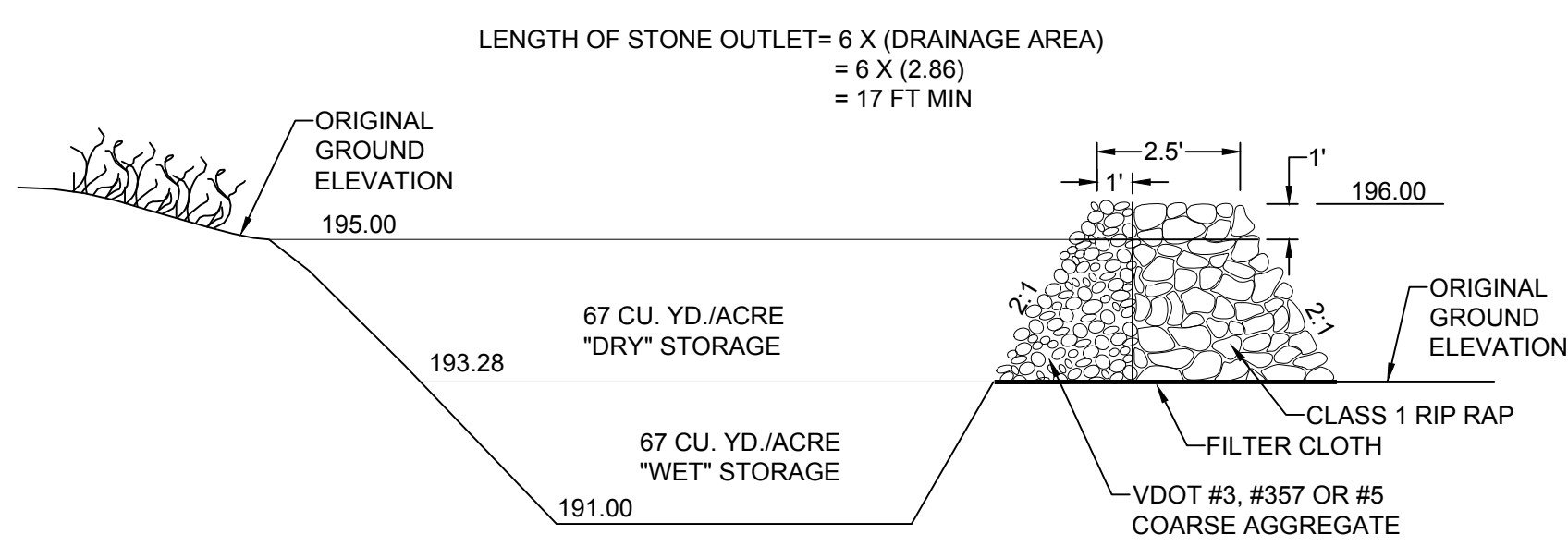
SCALE
 AS NOTED

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 36144

SHEET NO.
 C2.41

COMMISSIONER OF PROFESSIONAL ENGINEERS
 CHRISTOPHER B. SIBOLD
 Lic. No. 036302
 06/03/15

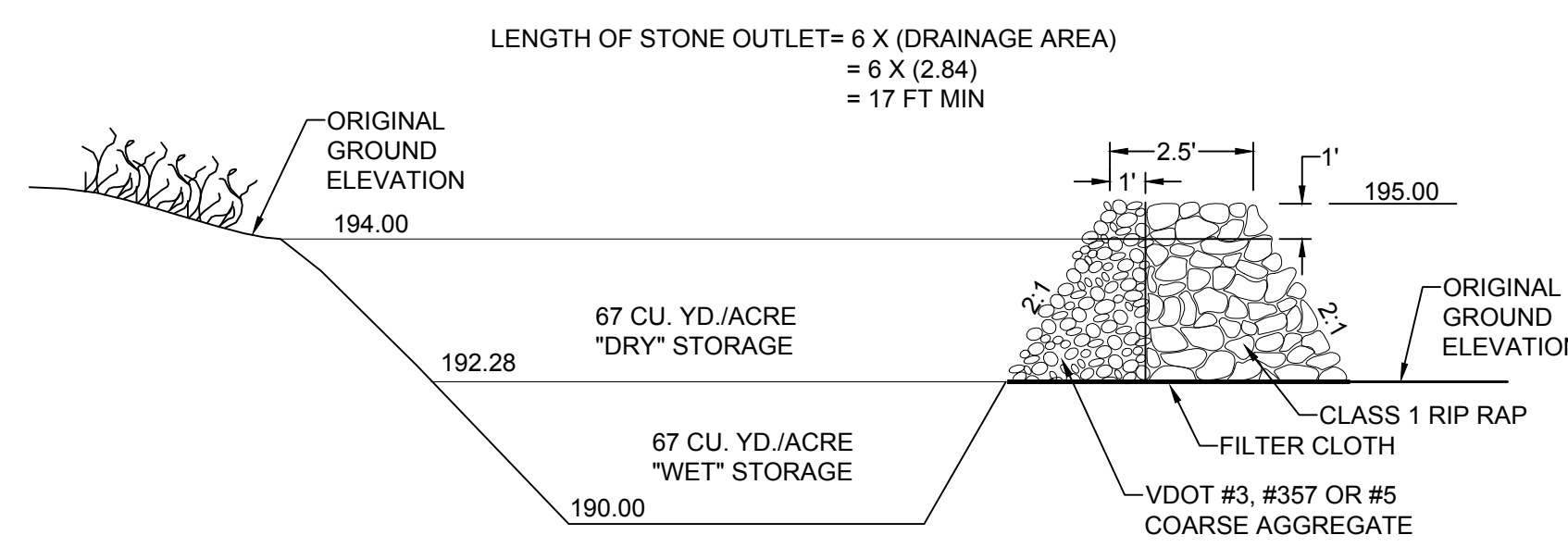
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Area: 2.86 Acres
Dry/Wet Volumes: 67 cu yds/ Acre x 2.86 Acres = 192.6 cu yds
Total Volume: 134 cu yds/ Acre x 2.86 Acres = 383.2 cu yds

| Elevation (feet) | Area (sq. ft.) | A1+A2+√(A1xA2) (sq. ft.) | Volume (cu. ft.) | Volume Sum (cu. ft.) | Volume Sum (cu. yd.) |
|------------------|----------------|--------------------------|------------------|----------------------|----------------------|
| 191 | 1,849 | 0 | 0 | 0 | 0 |
| 192 | 2,217 | 6,091 | 2,030 | 2,030 | 75 |
| 193 | 2,610 | 7,233 | 2,411 | 4,441 | 164 |
| 194 | 3,029 | 8,451 | 2,817 | 7,258 | 269 |
| 195 | 3,474 | 9,747 | 3,249 | 10,507 | 389 |

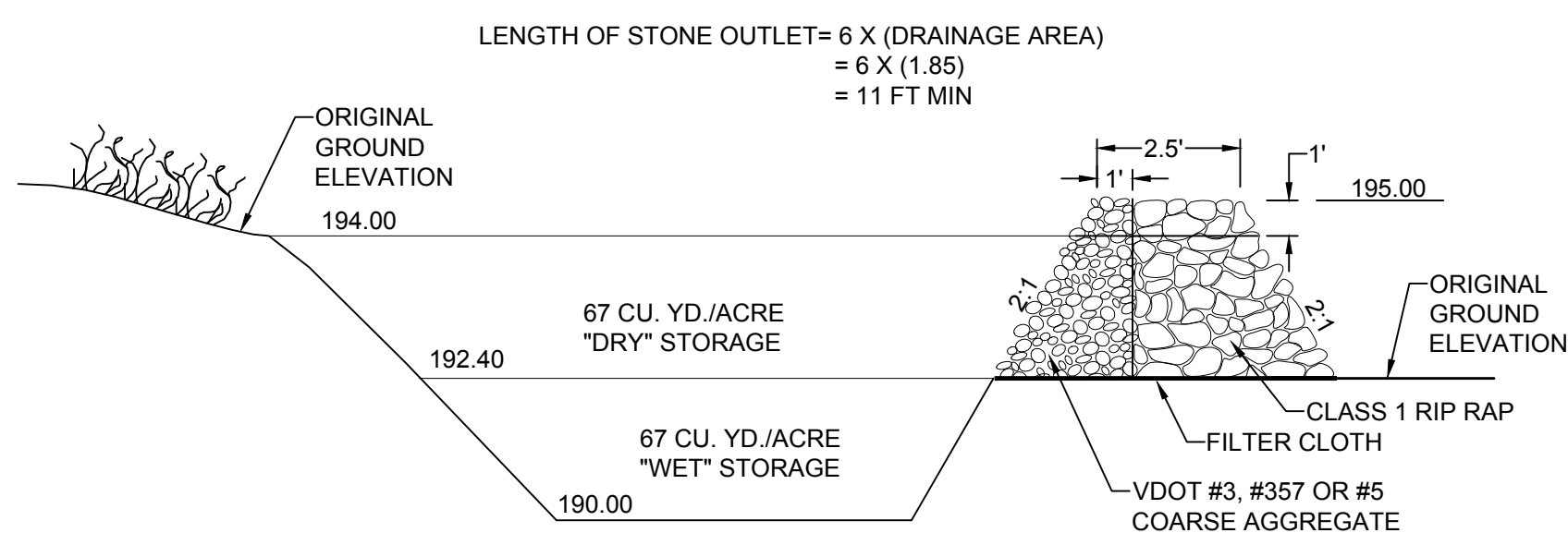
ST TEMPORARY SEDIMENT TRAP #1
NO SCALE 3.13-2



Area: 2.84 Acres
Dry/Wet Volumes: 67 cu yds/ Acre x 2.84 Acres = 190.3 cu yds
Total Volume: 134 cu yds/ Acre x 2.84 Acres = 380.6 cu yds

| Elevation (feet) | Area (sq. ft.) | A1+A2+√(A1xA2) (sq. ft.) | Volume (cu. ft.) | Volume Sum (cu. ft.) | Volume Sum (cu. yd.) |
|------------------|----------------|--------------------------|------------------|----------------------|----------------------|
| 190 | 1,849 | 0 | 0 | 0 | 0 |
| 191 | 2,217 | 6,091 | 2,030 | 2,030 | 75 |
| 192 | 2,610 | 7,233 | 2,411 | 4,441 | 164 |
| 193 | 3,029 | 8,451 | 2,817 | 7,258 | 269 |
| 194 | 3,474 | 9,747 | 3,249 | 10,507 | 389 |

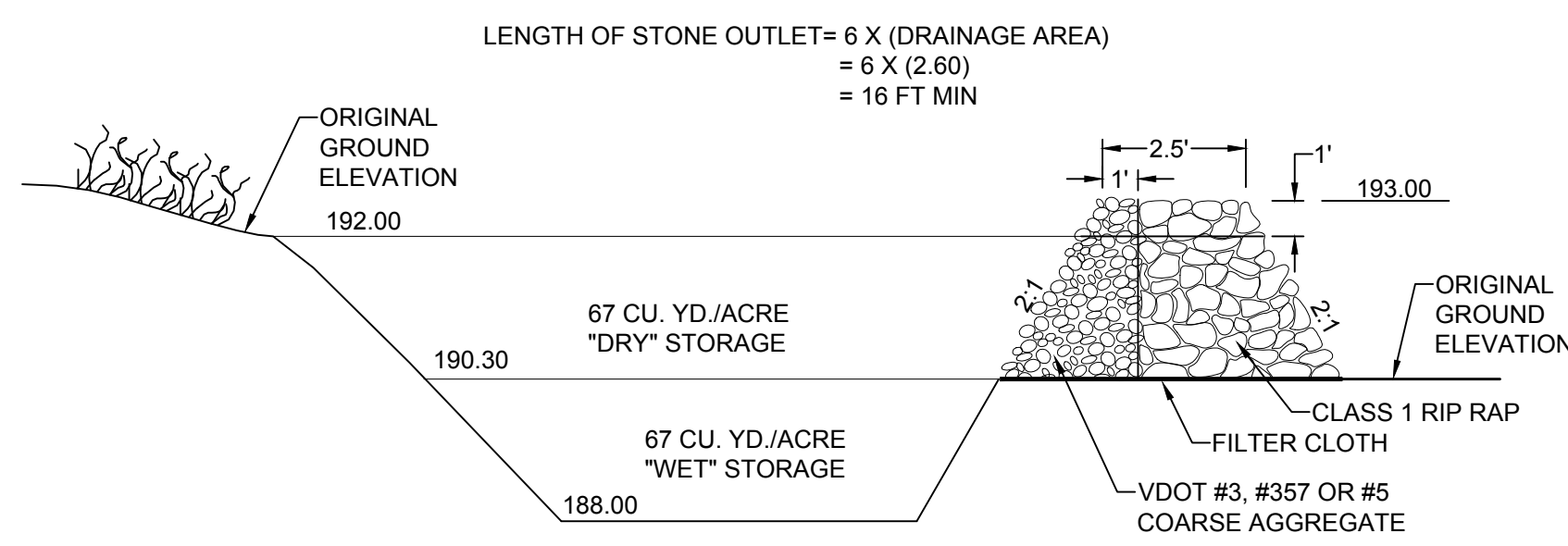
ST TEMPORARY SEDIMENT TRAP #2
NO SCALE 3.13-2



Area: 1.85 Acres
Dry/Wet Volumes: 67 cu yds/ Acre x 1.85 Acres = 123.9 cu yds
Total Volume: 134 cu yds/ Acre x 1.85 Acres = 247.9 cu yds

| Elevation (feet) | Area (sq. ft.) | A1+A2+√(A1xA2) (sq. ft.) | Volume (cu. ft.) | Volume Sum (cu. ft.) | Volume Sum (cu. yd.) |
|------------------|----------------|--------------------------|------------------|----------------------|----------------------|
| 190 | 1,023 | 0 | 0 | 0 | 0 |
| 191 | 1,339 | 3,533 | 1,178 | 1,178 | 44 |
| 192 | 1,681 | 4,521 | 1,507 | 2,685 | 99 |
| 193 | 2,047 | 5,583 | 1,861 | 4,546 | 168 |
| 194 | 2,439 | 6,721 | 2,240 | 6,786 | 251 |

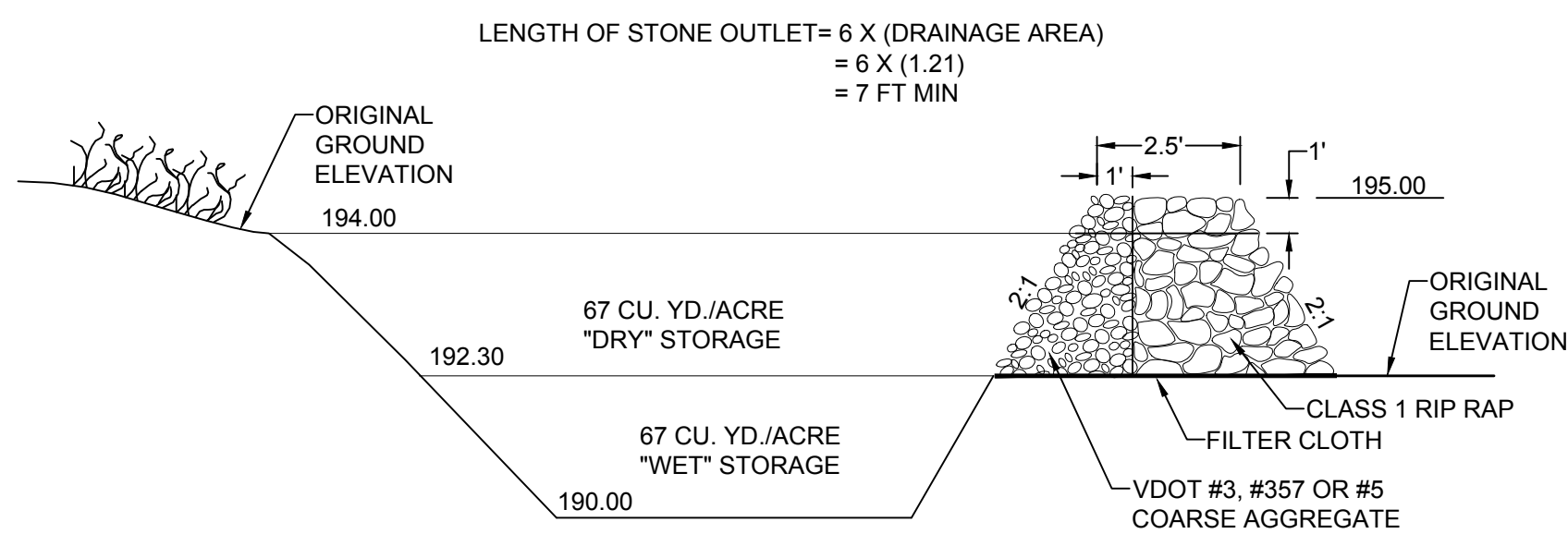
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NO SCALE 3.13-2



Area: 2.60 Acres
Dry/Wet Volumes: 67 cu yds/ Acre x 2.60 Acres = 174.2 cu yds
Total Volume: 134 cu yds/ Acre x 2.60 Acres = 348.4 cu yds

| Elevation (feet) | Area (sq. ft.) | A1+A2+√(A1xA2) (sq. ft.) | Volume (cu. ft.) | Volume Sum (cu. ft.) | Volume Sum (cu. yd.) |
|------------------|----------------|--------------------------|------------------|----------------------|----------------------|
| 188 | 1,692 | 0 | 0 | 0 | 0 |
| 189 | 2,026 | 5,570 | 1,857 | 1,857 | 69 |
| 190 | 2,385 | 6,609 | 2,203 | 4,059 | 150 |
| 191 | 2,769 | 7,723 | 2,574 | 6,634 | 246 |
| 192 | 3,178 | 8,912 | 2,971 | 9,604 | 356 |

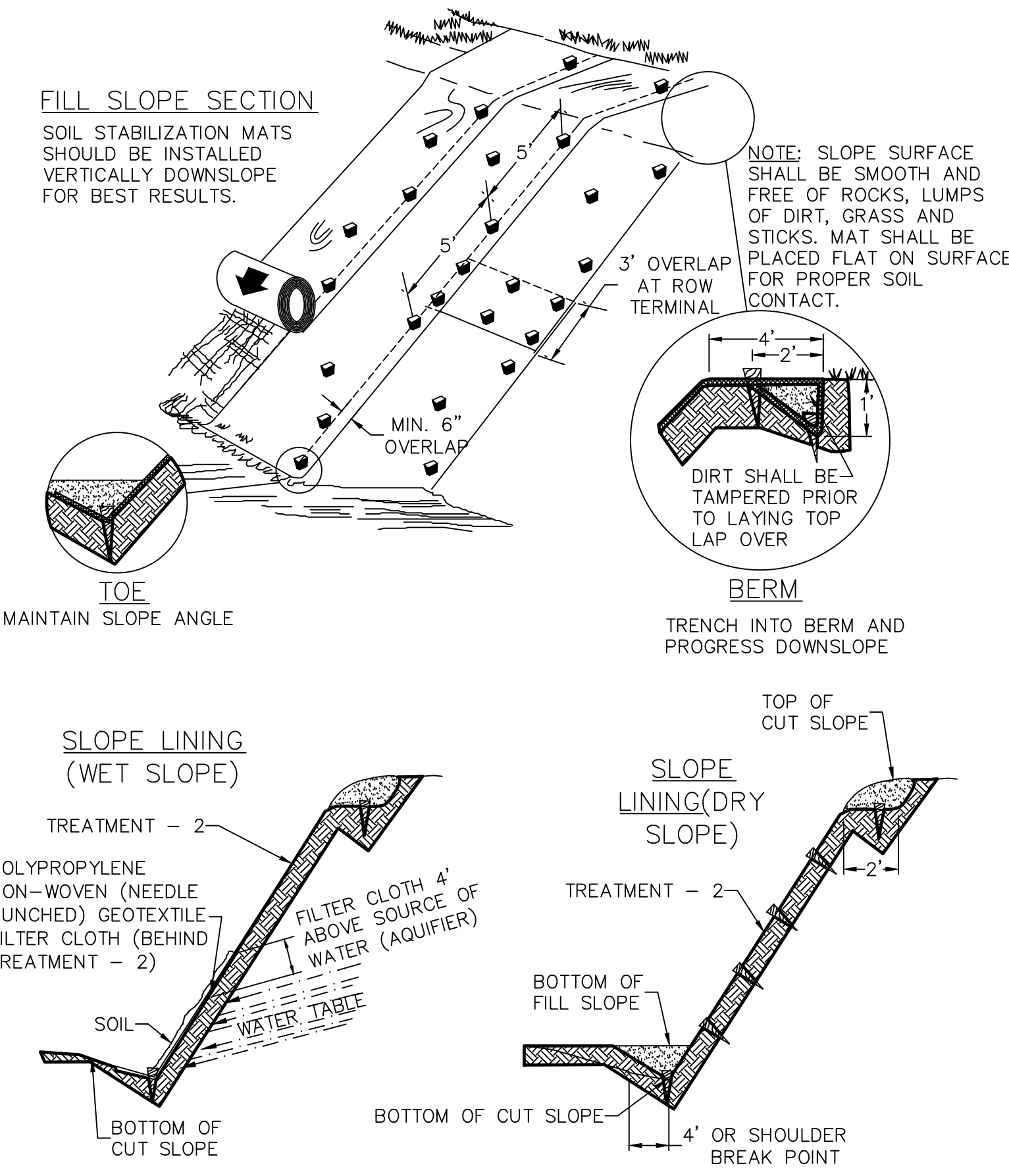
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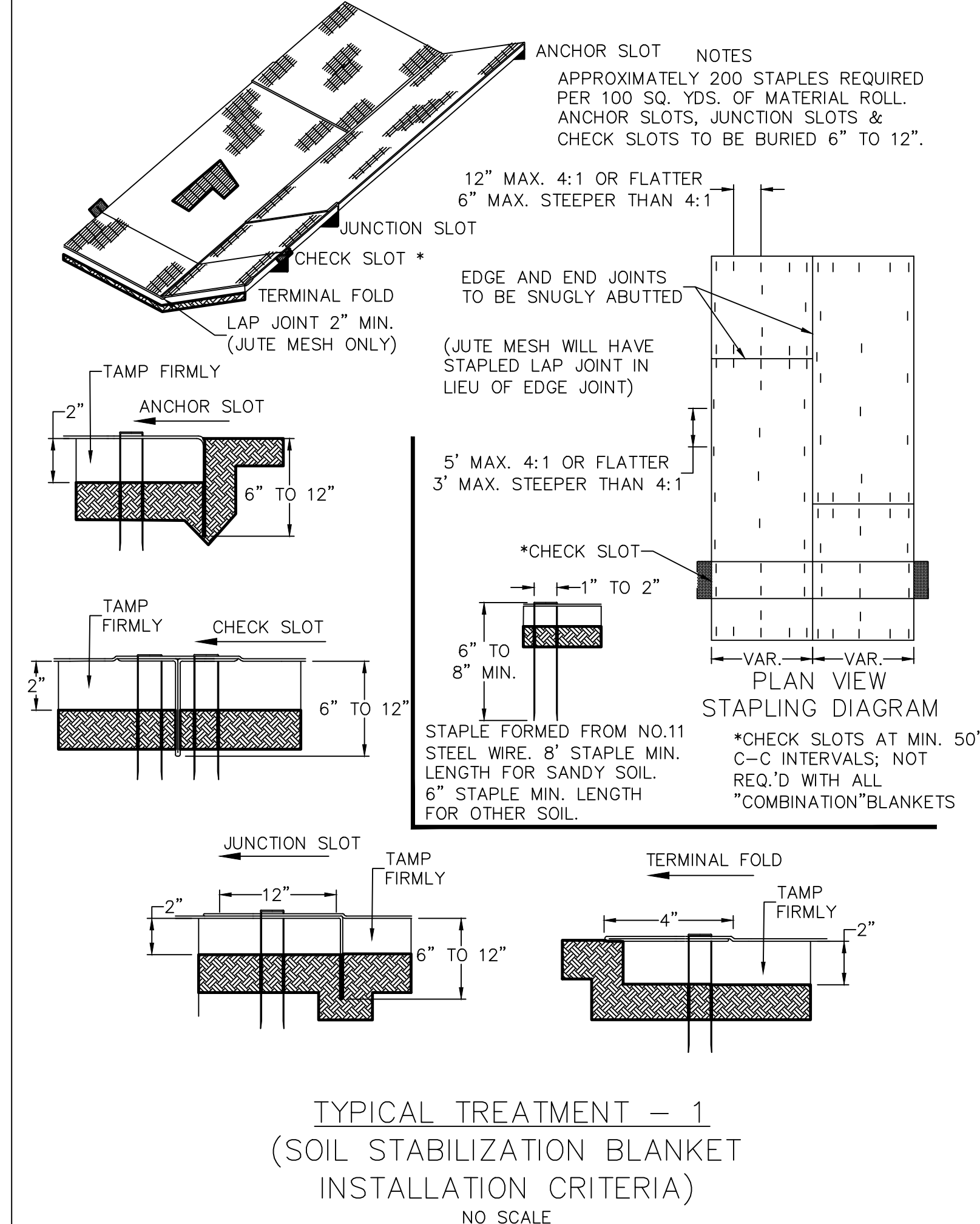
Area: 1.21 Acres
Dry/Wet Volumes: 67 cu yds/ Acre x 1.21 Acres = 81.1 cu yds
Total Volume: 134 cu yds/ Acre x 1.21 Acres = 162.1 cu yds

| Elevation (feet) | Area (sq. ft.) | A1+A2+√(A1xA2) (sq. ft.) | Volume (cu. ft.) | Volume Sum (cu. ft.) | Volume Sum (cu. yd.) |
|------------------|----------------|--------------------------|------------------|----------------------|----------------------|
| 190 | 693 | 0 | 0 | 0 | 0 |
| 191 | 911 | 2,398 | 799 | 799 | 30 |
| 192 | 1,154 | 3,091 | 1,030 | 1,830 | 68 |
| 193 | 1,423 | 3,859 | 1,286 | 3,116 | 115 |
| 194 | 1,716 | 4,702 | 1,567 | 4,683 | 173 |

ST TEMPORARY SEDIMENT TRAP #5
NO SCALE 3.13-2



TYPICAL TREATMENT - 2
SOIL STABILIZATION MATTING SLOPE INSTALLATION
NO SCALE



NOTE: EROSION CONTROL BLANKETS & MATTING SHALL BE FREE OF PLASTIC NETTING.

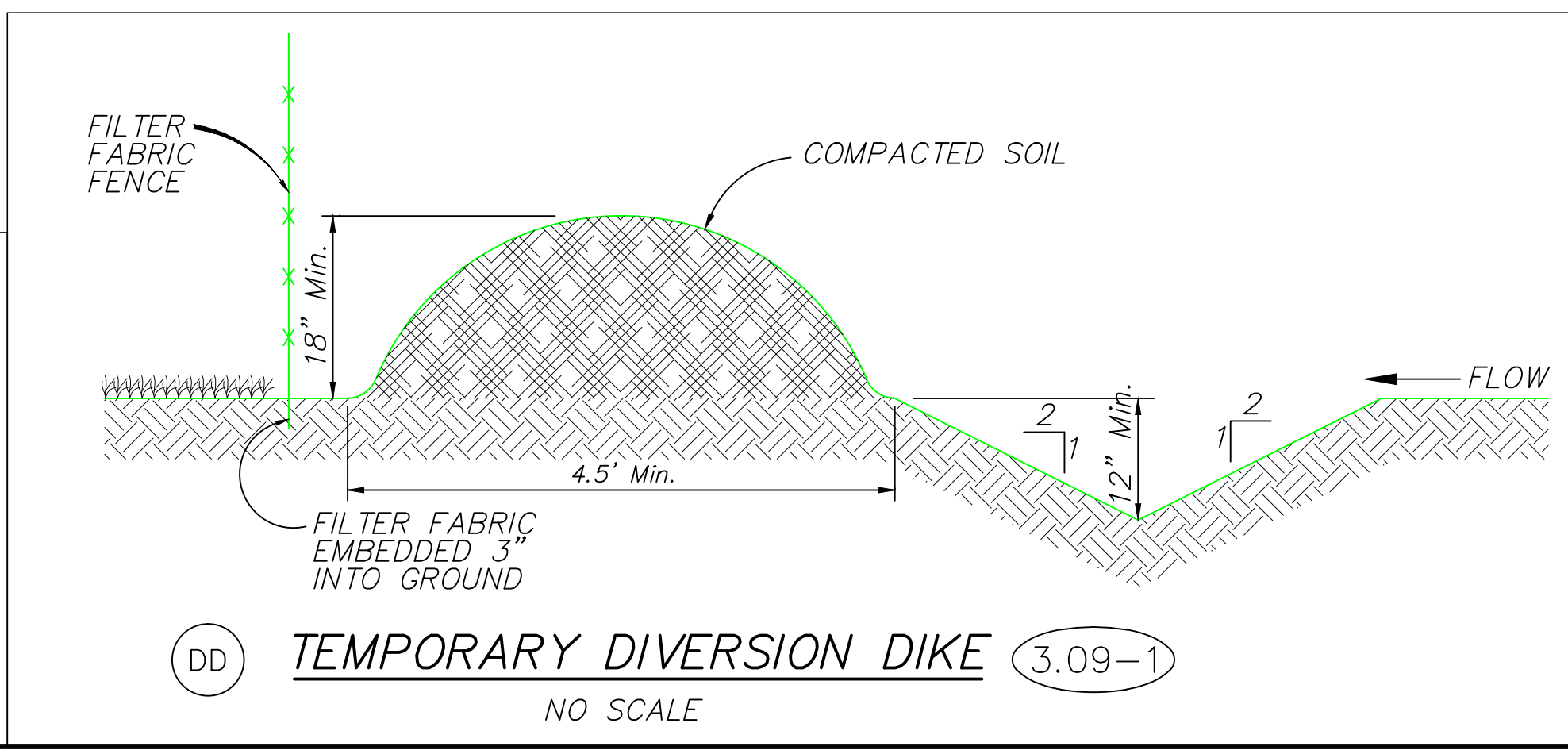
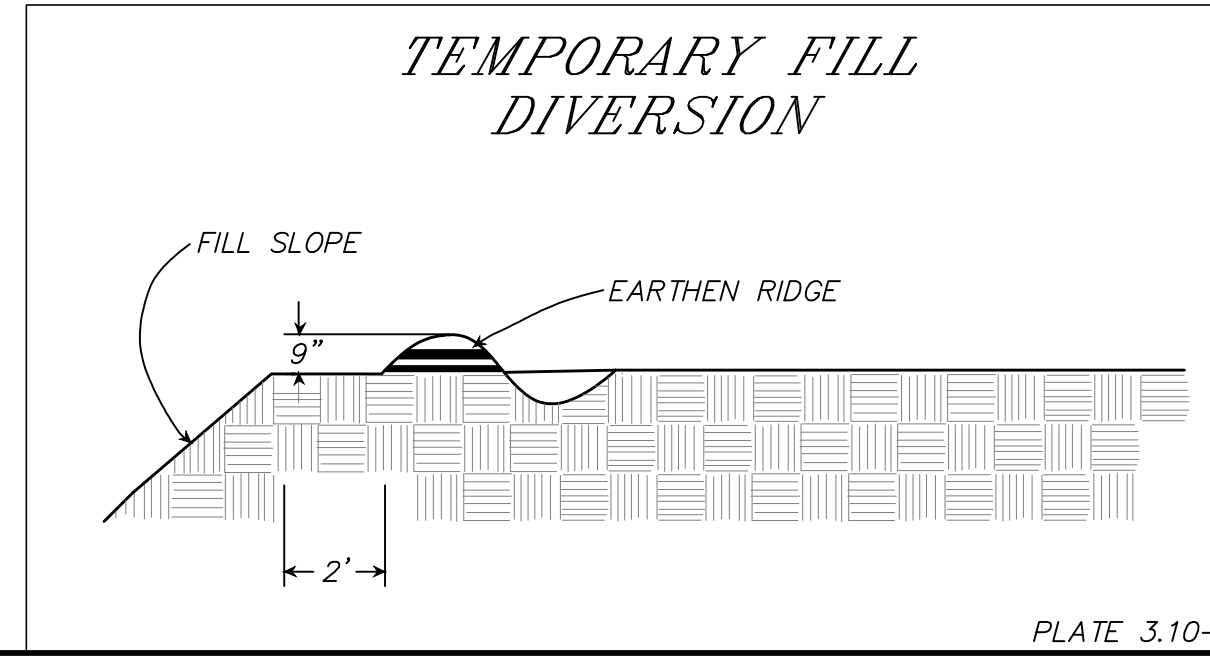


TABLE 3.32-E (Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR COASTAL PLAIN AREA

| LAND USE | SEED ¹ SPECIES | APPLICATION RATES |
|---|---|---|
| Minimum Care Lawn (Commercial or Residential) | Tall Fescue ² or Bermudagrass ³ | 175 - 200 lbs |
| High-Maintenance Lawn | Tall Fescue ² or Bermudagrass ³ (seed) or Bermudagrass ³ (by other vegetative establishment method, see Std. & Spec. 3.34) | 200-250 lbs 40 lbs. (unhulled) or 30 lbs. (hulled) |
| General Slope (3:1 or less) | Tall Fescue ² or Red Top Grass or Creeping Red Fescue or Seasonal Nurse Crop ⁴ | 128 lbs. 2 lbs. 20 lbs. TOTAL: 150 lbs. |
| Low-Maintenance Slope (Sloper than 3:1) | Tall Fescue ² or Bermudagrass ³ or Red Top Grass or Creeping Red Fescue or Seasonal Nurse Crop ⁴ or Sericea Lespedeza ⁵ | 93-108 lbs. 0-15 lbs. 2 lbs. 20 lbs. 20 lbs. TOTAL: 150 lbs. |

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCI) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCI. A current turfgrass variety list is available at the local County Extension office or through VCI at 804-746-4884 or at <http://va.ces.ncsu.edu/html/turfgrasspublications.htm>

2 - Use seasonal nurse crop in accordance with seeding dates as stated below:

| | |
|--|----------------|
| February, March - April | Annual Rye |
| May 1 st - August | Foxtail Millet |
| September, October - November 15 th | Annual Rye |
| November 16 th - January | Winter Rye |

3 - May through October, use hulled seed. All other seeding periods, use unhulled seed. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30-40 lbs/acre.

FERTILIZER & LIME

- Apply 10-20-10 fertilizer at a rate of 500 lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 - 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/esw/e&s.htm#pubs>

TABLE 3.31-B (Revised June 2003)
TEMPORARY SEEDING SPECIFICATIONS
QUICK REFERENCE FOR ALL REGIONS

| APPLICATION DATES | SEED SPECIES | APPLICATION RATES |
|-------------------|---|---------------------|
| Sept. 1 - Feb. 15 | 50/50 Mix of Annual Ryegrass (lolium multi-florum) & Cereal (Winter) Rye (Secale cereale) | 50 - 100 (lbs/acre) |
| Feb. 16 - Apr. 30 | Annual Ryegrass (lolium multi-florum) | 60 - 100 (lbs/acre) |
| May 1 - Aug. 31 | German Millet | 50 (lbs/acre) |

FERTILIZER & LIME

- Apply 10-10-10 fertilizer at a rate of 450 lbs. / acre (or 10 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 - 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/esw/e&s.htm#pubs>

TABLE 3.35-A
ORGANIC MULCH MATERIALS AND APPLICATION RATES

| MULCHES: | Per Acre | RATES: Per 1000 sq. ft. | NOTES: |
|-----------------------------|--|-------------------------|---|
| Straw or Hay | 1 1/2 - 2 tons (Minimum 2 tons for winter cover) | 70 - 90 lbs. | Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand. |
| Fiber Mulch | Minimum 1500 lbs. | 35 lbs. | Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry. |
| Corn Stalks | 4 - 6 tons | 185 - 275 lbs. | Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand. |
| Wood Chips | 4 - 6 tons | 185 - 275 lbs. | Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand. |
| Bark Chips or Shredded Bark | 50 - 70 cu. yds. | 1-2 cu. yds. | Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand. |

* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./1000 sq. ft.

Source: Va. DSWC

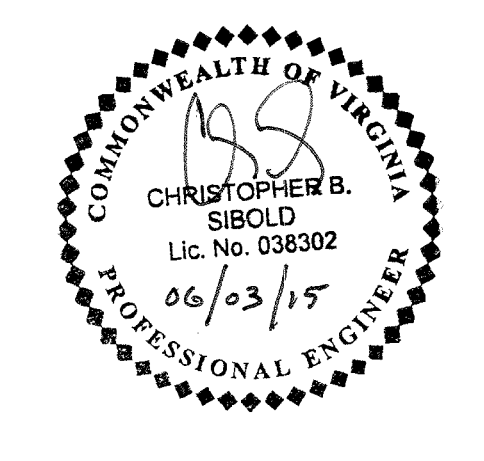


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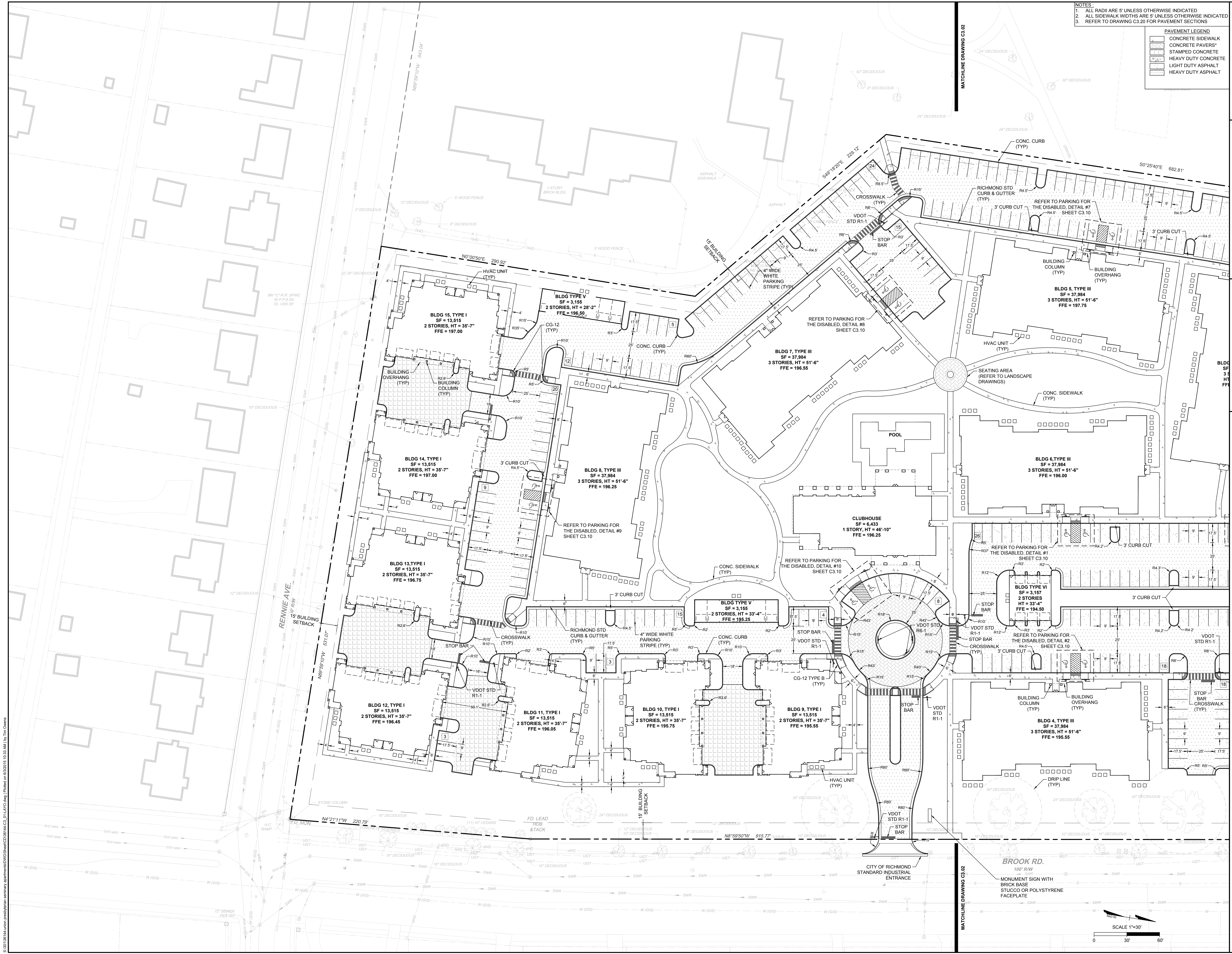
DATE: 06/03/2015
DRAWN BY: J. CHAPMAN
DESIGNED BY: R. SATMARIA
CHECKED BY: C. SIBOLD
SCALE: AS NOTED

TIMMONS GROUP
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA
EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
JOB NO. 36144
SHEET NO. C2.42



- NOTES:
1. ALL RADII ARE 5' UNLESS OTHERWISE INDICATED
 2. ALL SIDEWALK WIDTHS ARE 5' UNLESS OTHERWISE INDICATED
 3. REFER TO DRAWING C3.20 FOR PAVEMENT SECTIONS

| PAVEMENT LEGEND | |
|-----------------|---------------------|
| [Symbol] | CONCRETE SIDEWALK |
| [Symbol] | CONCRETE PAVERS |
| [Symbol] | STAMPED CONCRETE |
| [Symbol] | HEAVY DUTY CONCRETE |
| [Symbol] | LIGHT DUTY ASPHALT |
| [Symbol] | HEAVY DUTY ASPHALT |



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CHECKED BY
C. SIBOLD

SCALE
1" = 30'

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

SITE LAYOUT PLAN

JOB NO.
36144

SHEET NO.
C3.01

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 2. ALL SIDEWALK WIDTHS ARE 5' UNLESS OTHERWISE INDICATED
 3. REFER TO DRAWING C3.20 FOR PAVEMENT SECTIONS

PAVEMENT LEGEND

| | |
|--|--------------------|
| | CONCRETE SIDEWALK |
| | CONCRETE PAVERS |
| | STAMPED CONCRETE |
| | HEAVY DUTY ASPHALT |
| | LIGHT DUTY ASPHALT |
| | HEAVY DUTY ASPHALT |



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| 06/03/2015 | |

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J. CHAPMAN

DESIGNED BY
R. SATMARIA

CHECKED BY
C. SIBOLD

SCALE
1" = 30'

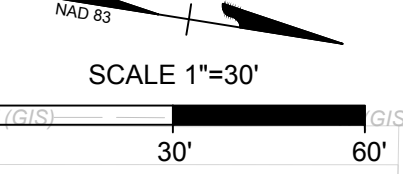
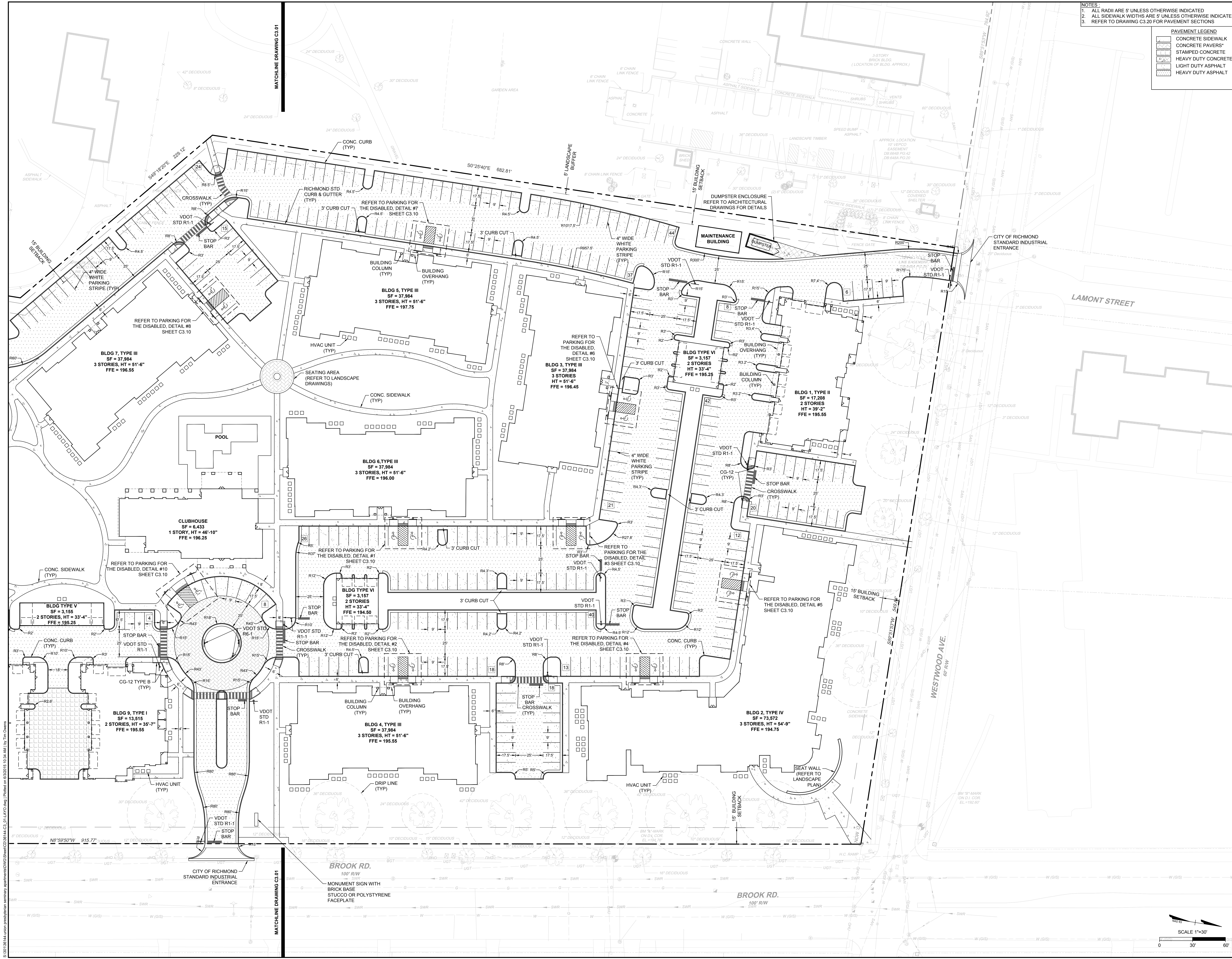
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BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

SITE LAYOUT PLAN

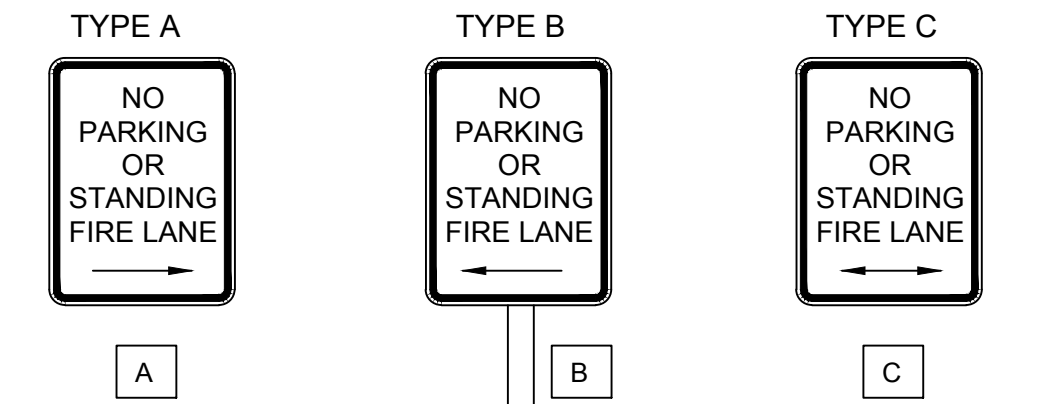
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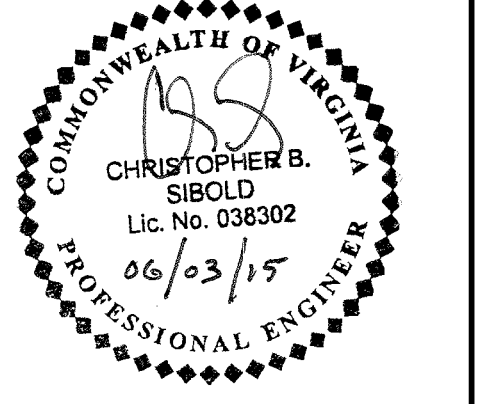
SPECIFICATIONS FOR FIRE LANE SIGNS



- POST SIGNS NO MORE THAN 100 FEET APART.
- RED LETTERS ON REFLECTIVE WHITE BACKGROUND WITH 3/8" RED TRIM STRIP AROUND ENTIRE OUTER EDGE OF SIGN.
- POSTING OF SIGNS:
MOUNT EACH SIGN SIX (6) FEET FROM GRADE LEVEL TO THE BOTTOM OF THE SIGN.

COORDINATE FINAL FIRE LANE STRIPING AND SIGN LOCATIONS IN THE FIELD WITH THE FIRE DEPARTMENT.

— DENOTES 4" WIDE YELLOW FIRE LANE PAINT 2" FROM F/C OR GUTTER PAN



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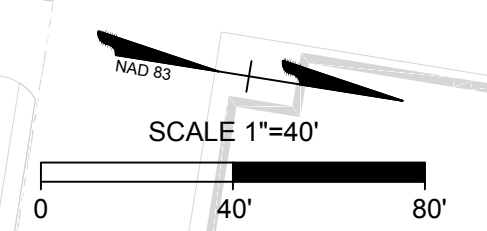
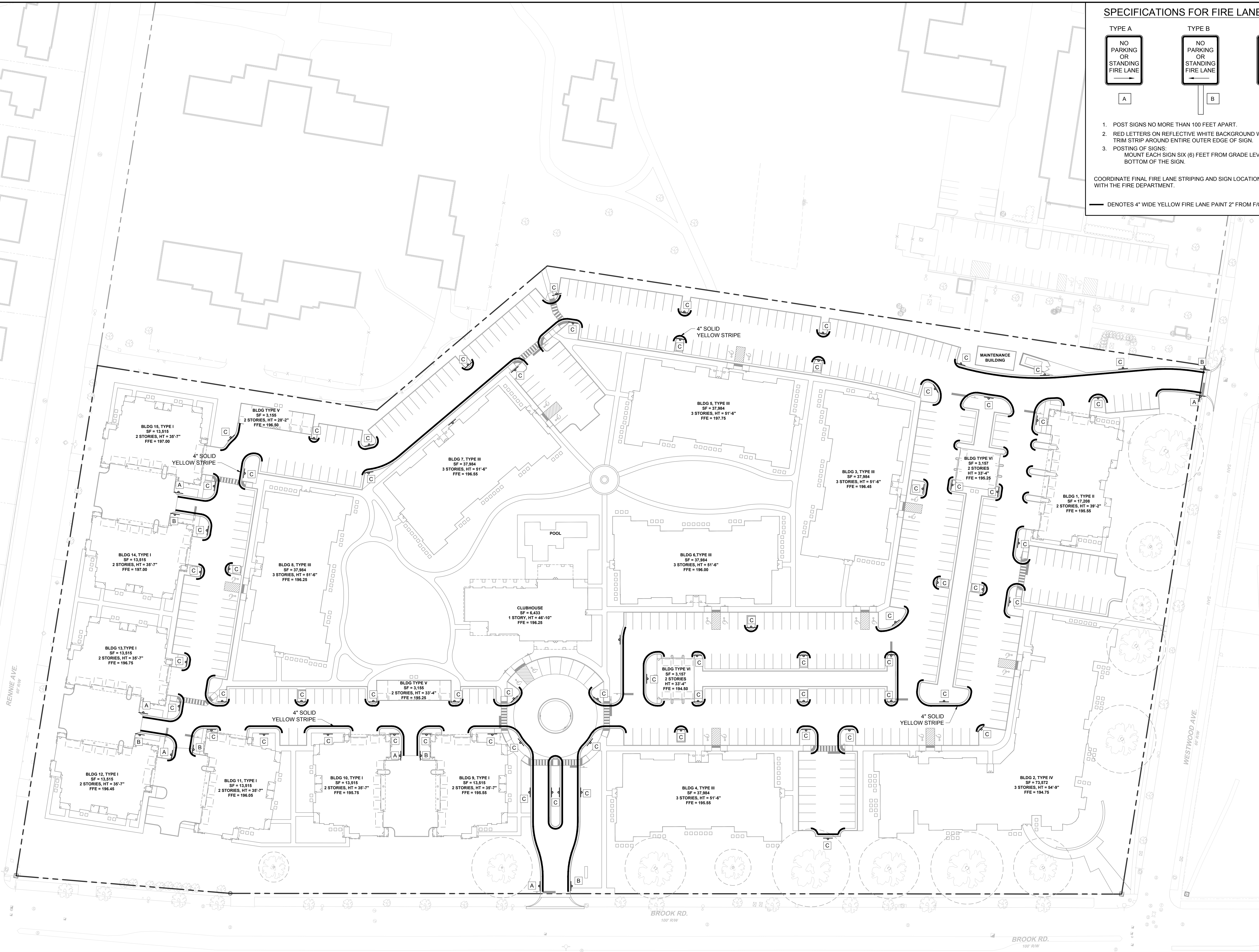
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|-------------|-------------|
| DRAWN BY | J. CHAPMAN |
| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SIBOLD |
| SCALE | 1" = 40' |

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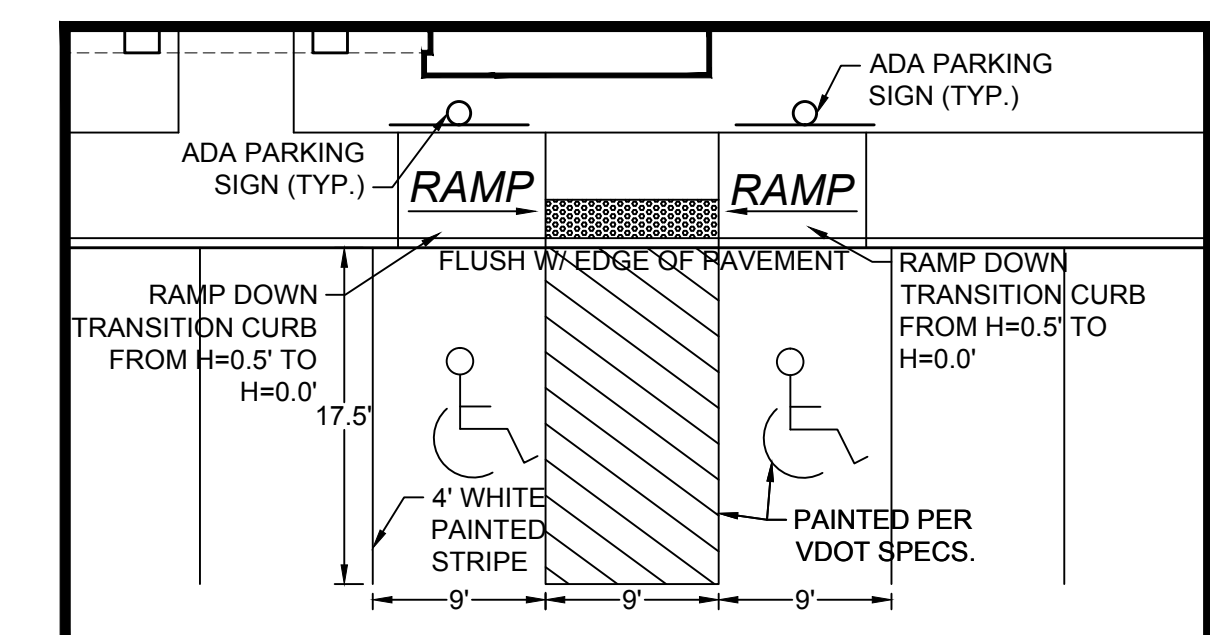
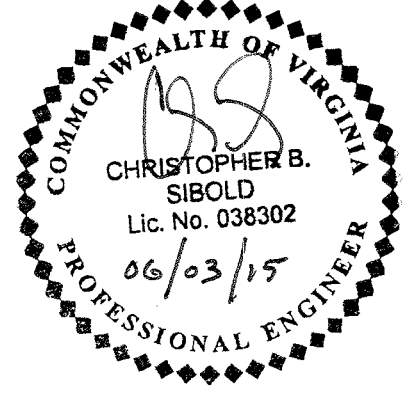
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

FIRE LANE SIGNAGE AND STRIPING PLAN

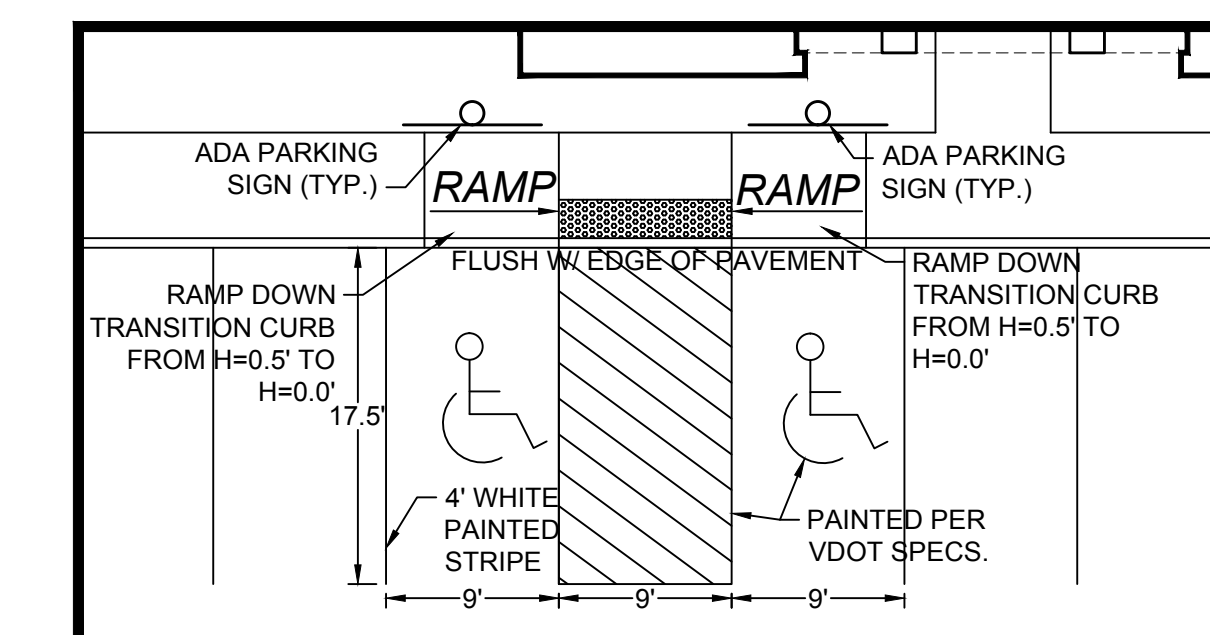
JOB NO. 36144
SHEET NO. C3.03



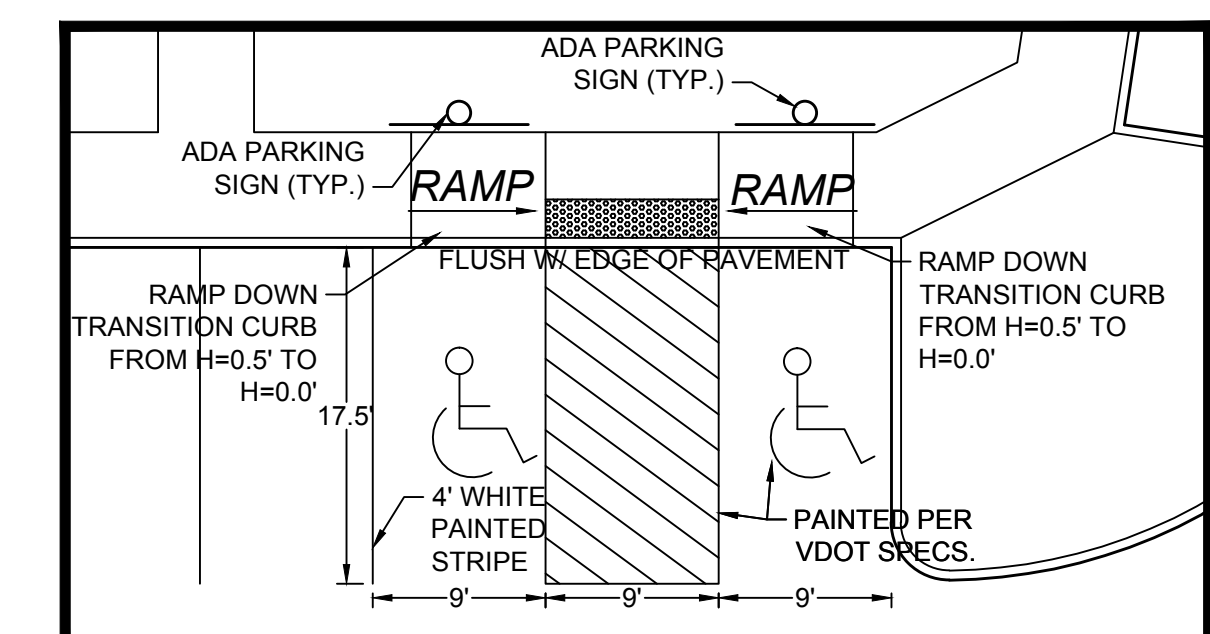
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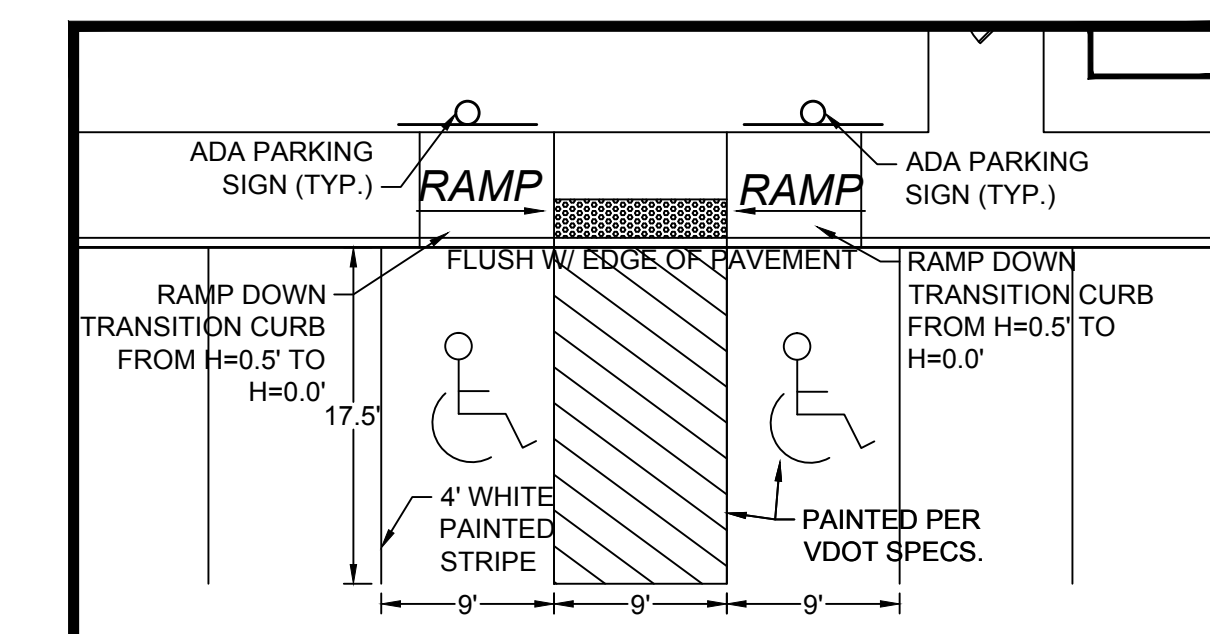
DETAIL #1 PARKING FOR THE DISABLED
1" = 10' (REFER TO C3.01 & C3.02)



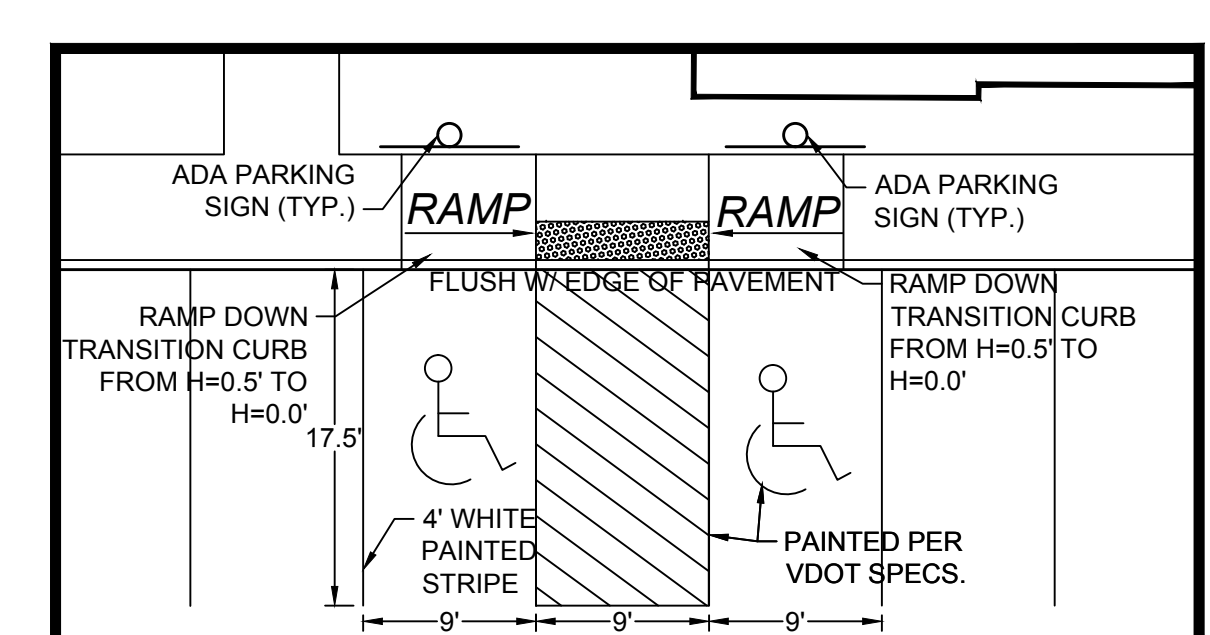
DETAIL #2 PARKING FOR THE DISABLED
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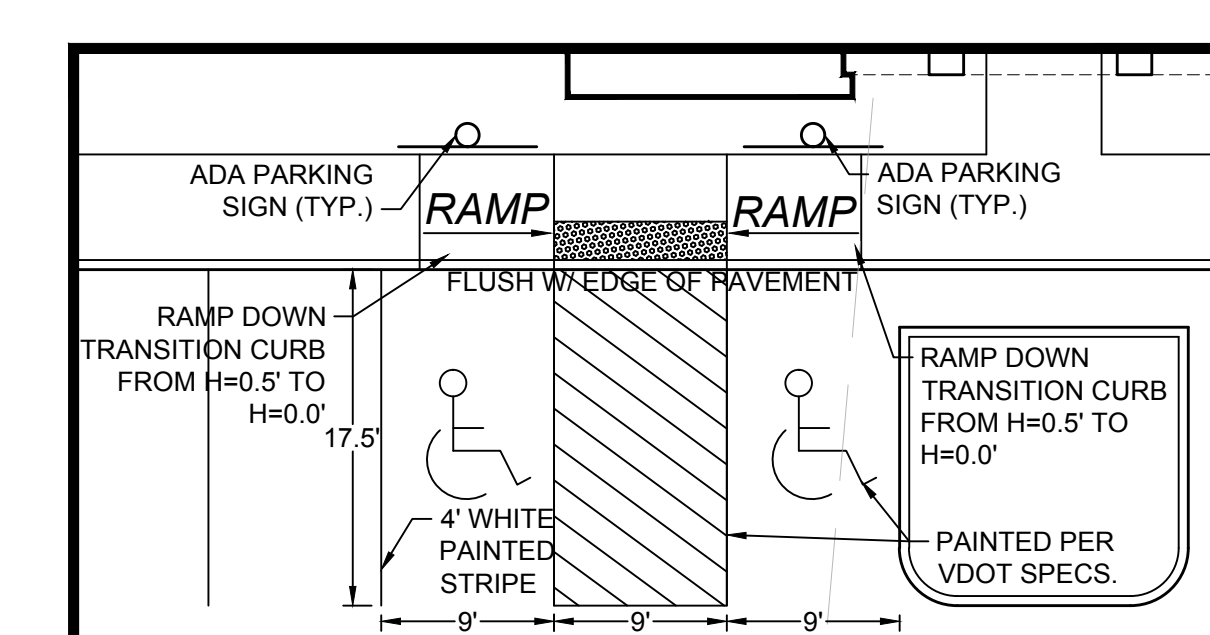
DETAIL #3 PARKING FOR THE DISABLED
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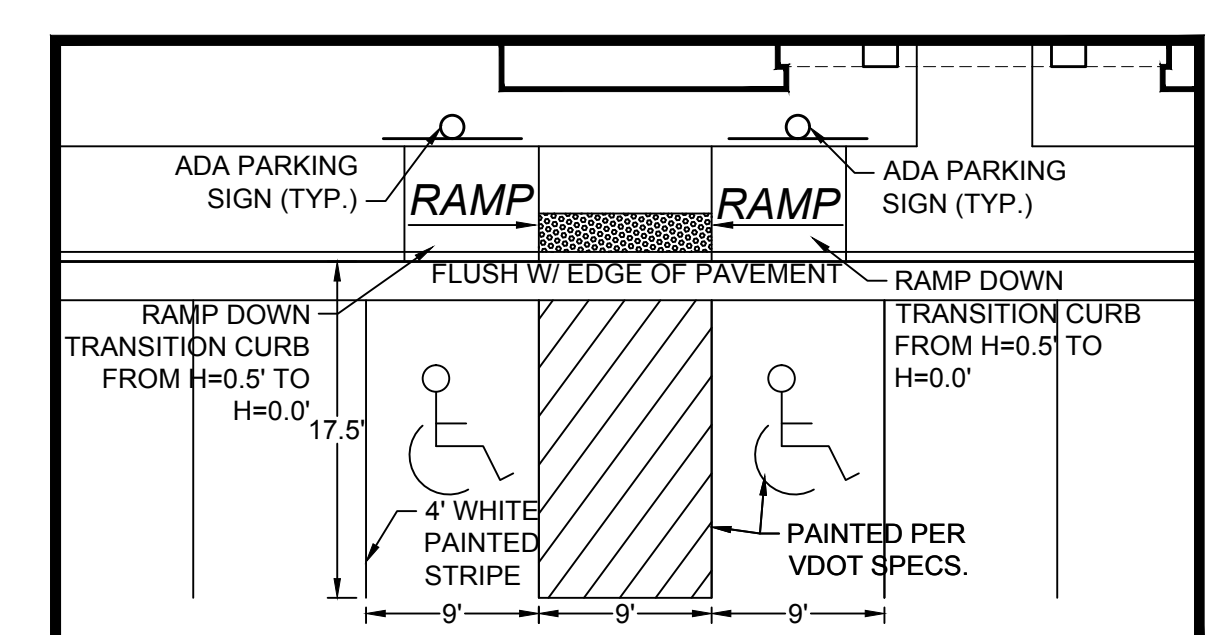
DETAIL #4 PARKING FOR THE DISABLED
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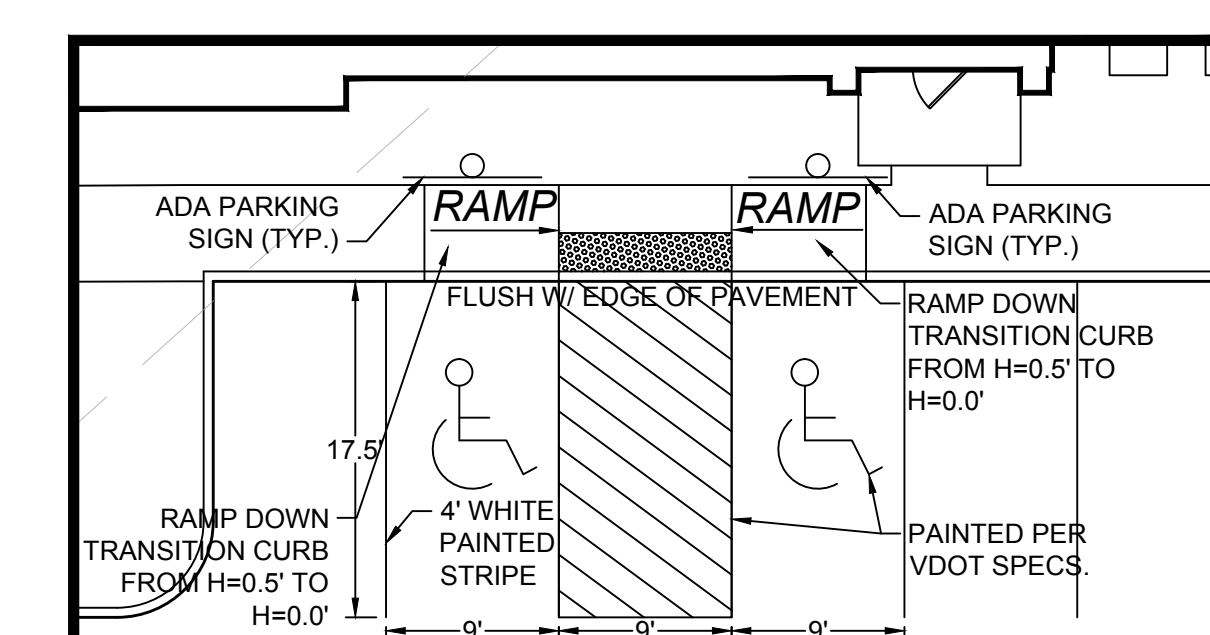
DETAIL #5 PARKING FOR THE DISABLED
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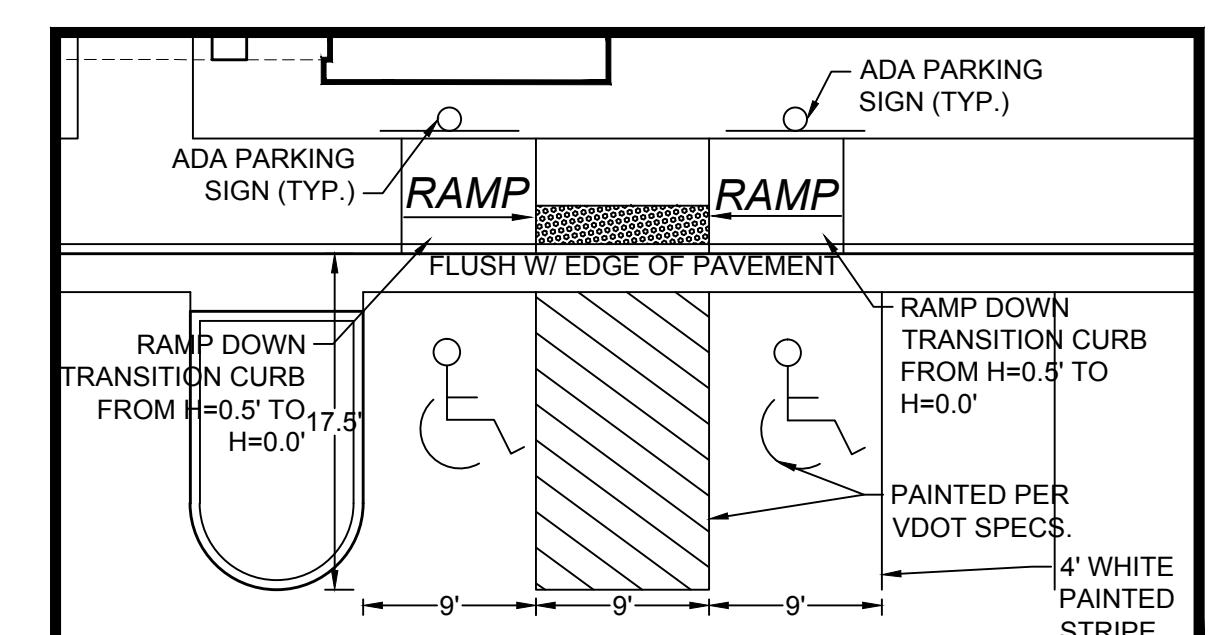
DETAIL #6 PARKING FOR THE DISABLED
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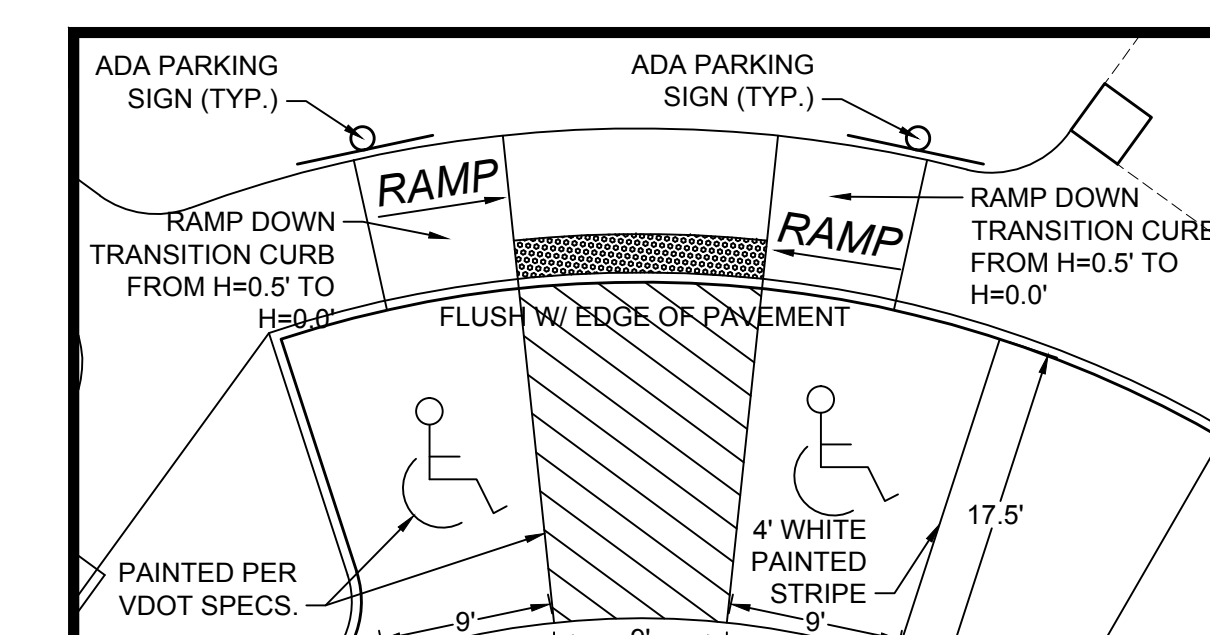
DETAIL #7 PARKING FOR THE DISABLED
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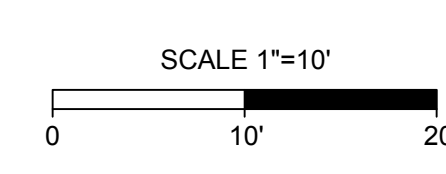
DETAIL #8 PARKING FOR THE DISABLED
1" = 10' (REFER TO C3.01 & C3.02)



DETAIL #9 PARKING FOR THE DISABLED
1" = 10' (REFER TO C3.01 & C3.02)



DETAIL #10 PARKING FOR THE DISABLED
1" = 10' (REFER TO C3.01 & C3.02)



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DRAWN BY
C. SIBOLD

DESIGNED BY
R. SATMARIA

CHECKED BY
J. CHAPMAN

SCALE
1" = 10'

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA
ADA PARKING DETAILS

JOB NO.
36144

SHEET NO.
C3.10

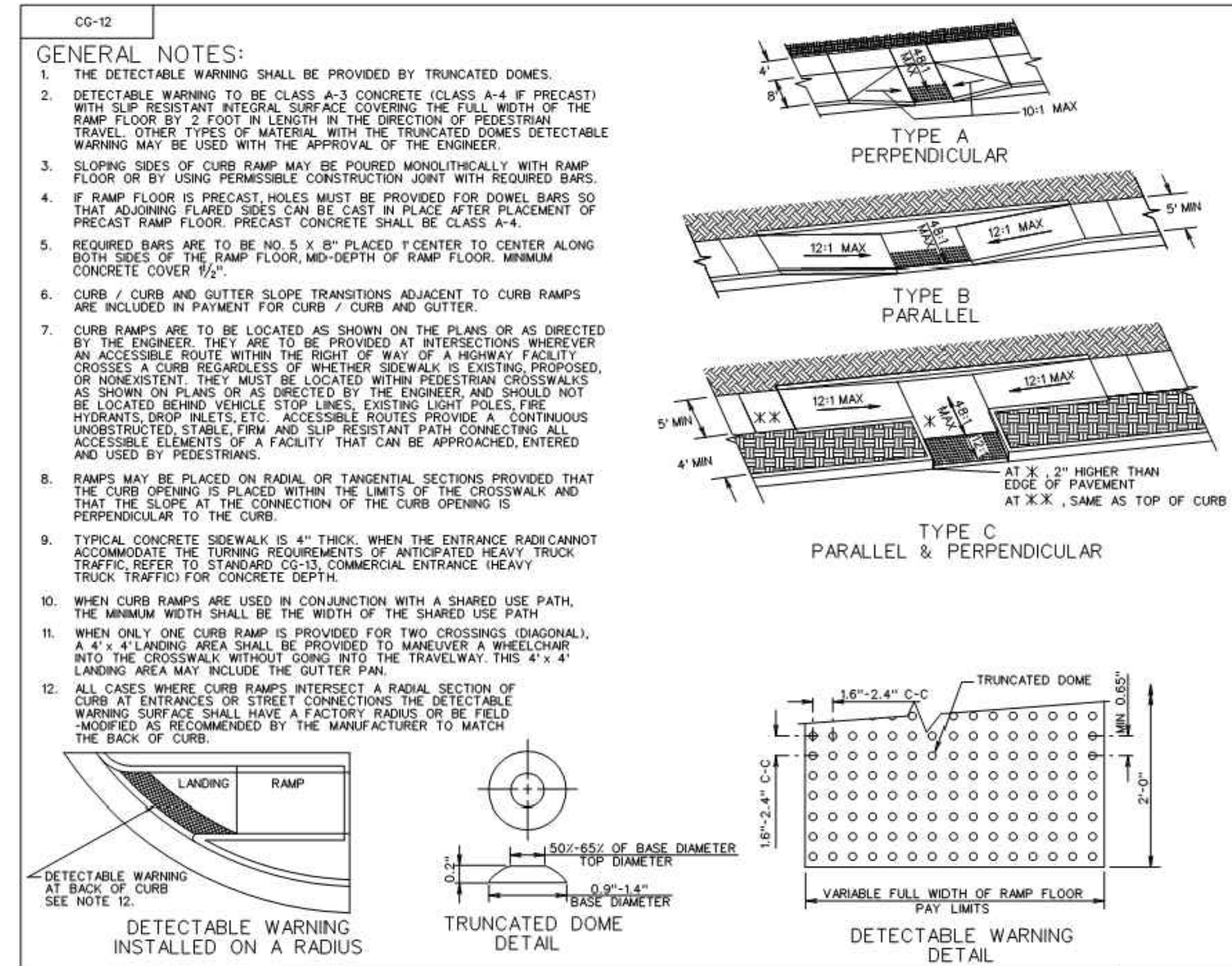


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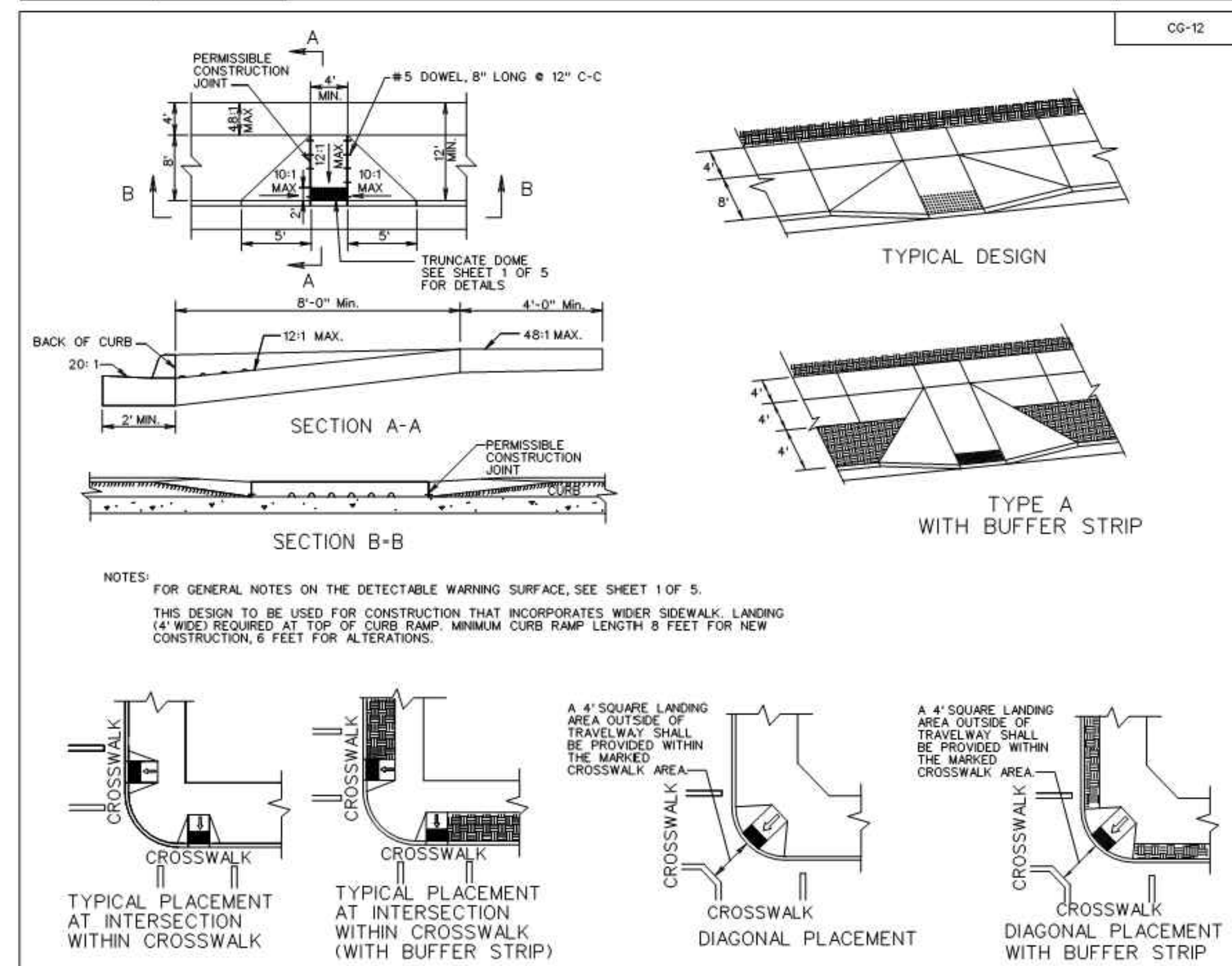
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 DESIGNED BY: R. SATMARIA
 CHECKED BY: C. SIBOLD
 SCALE: 1" = 30'

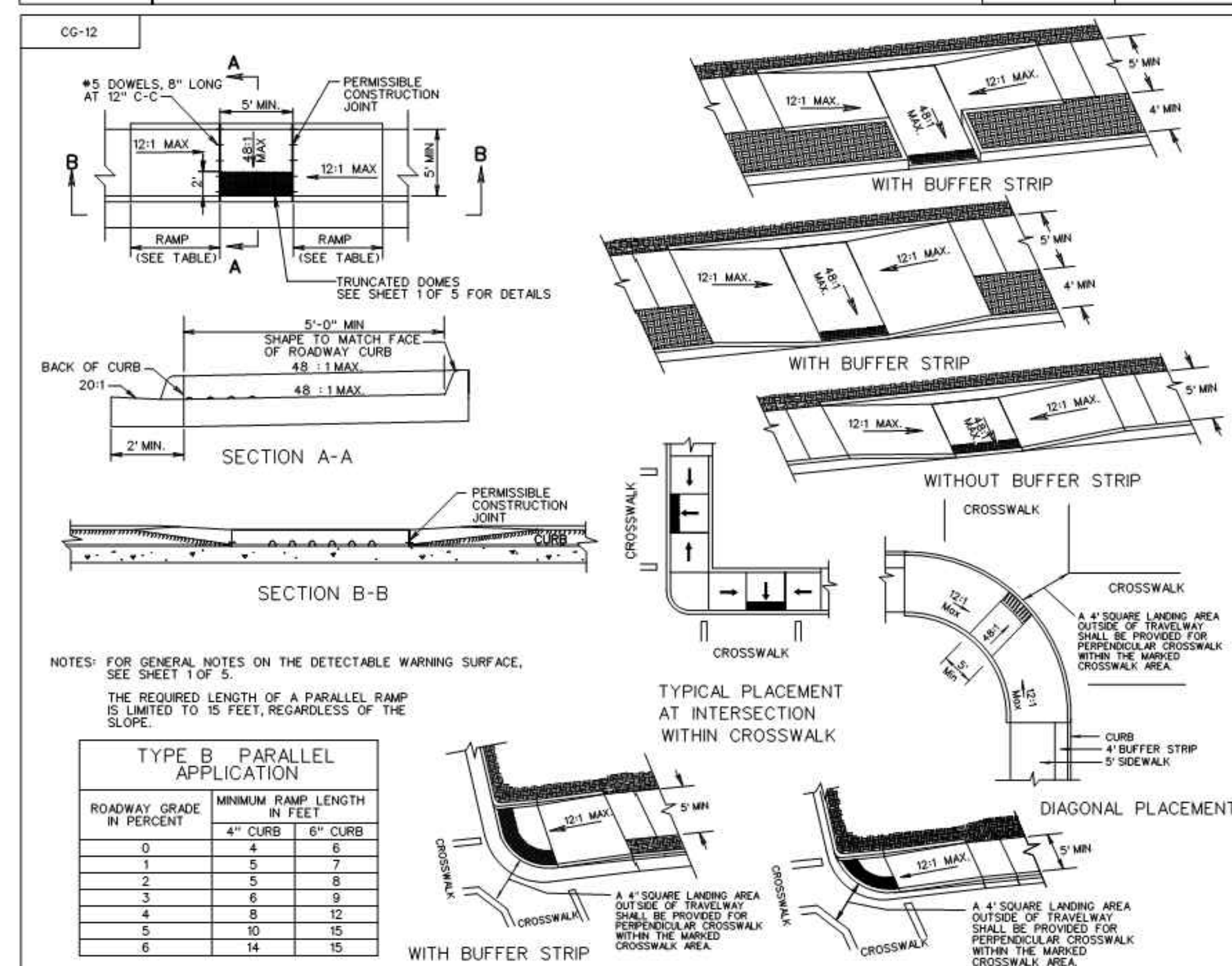
TIMMONS GROUP
 BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
 SITE NOTES & DETAILS



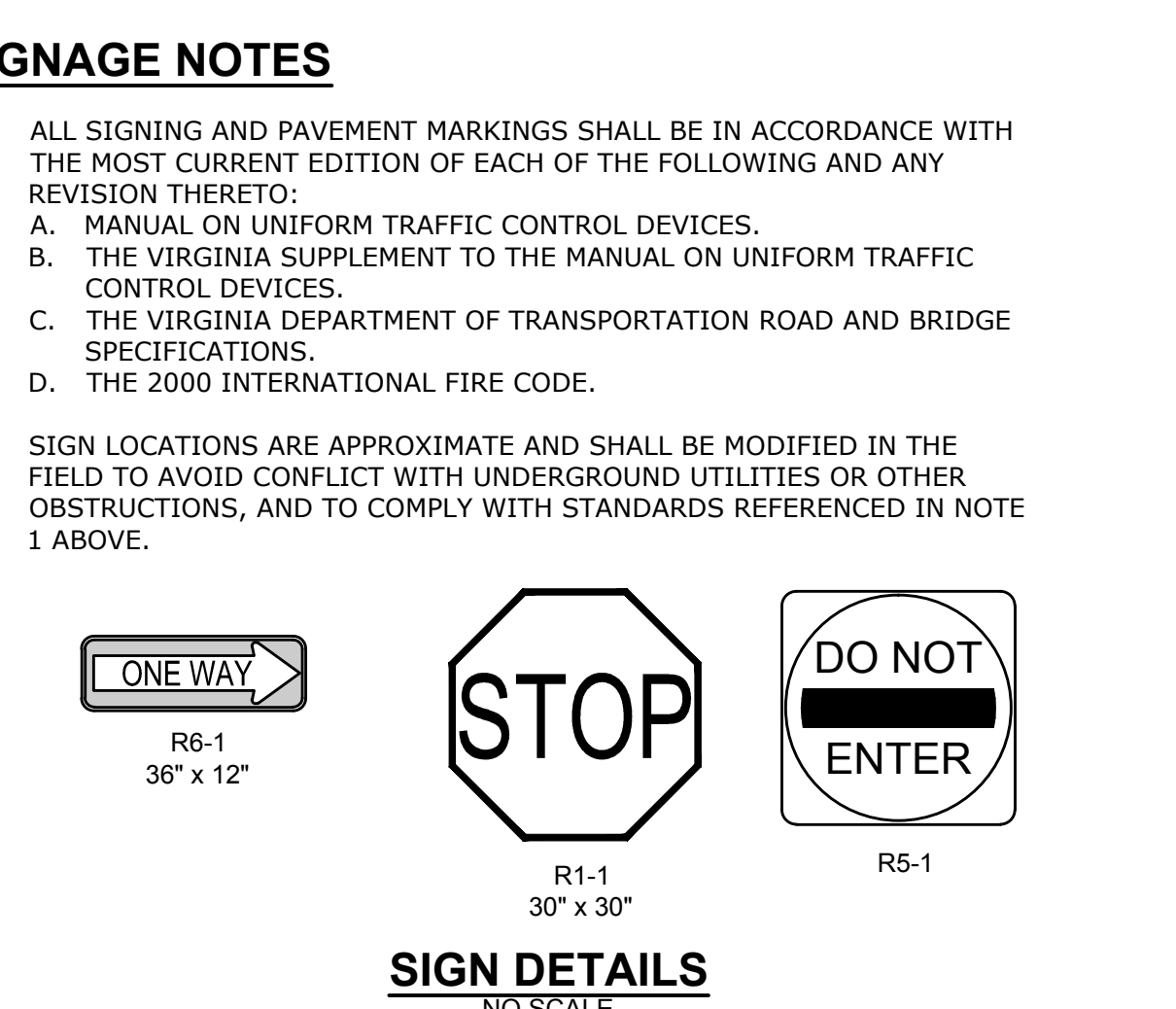
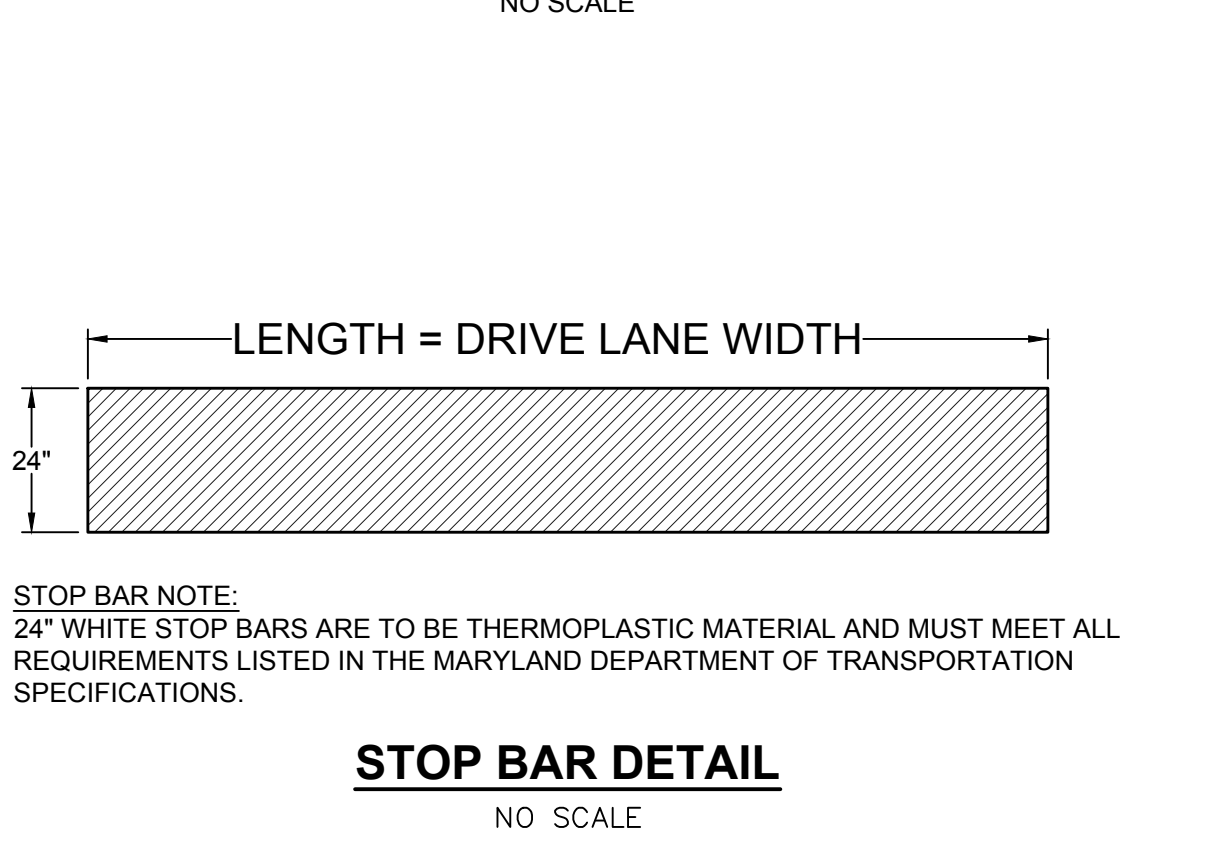
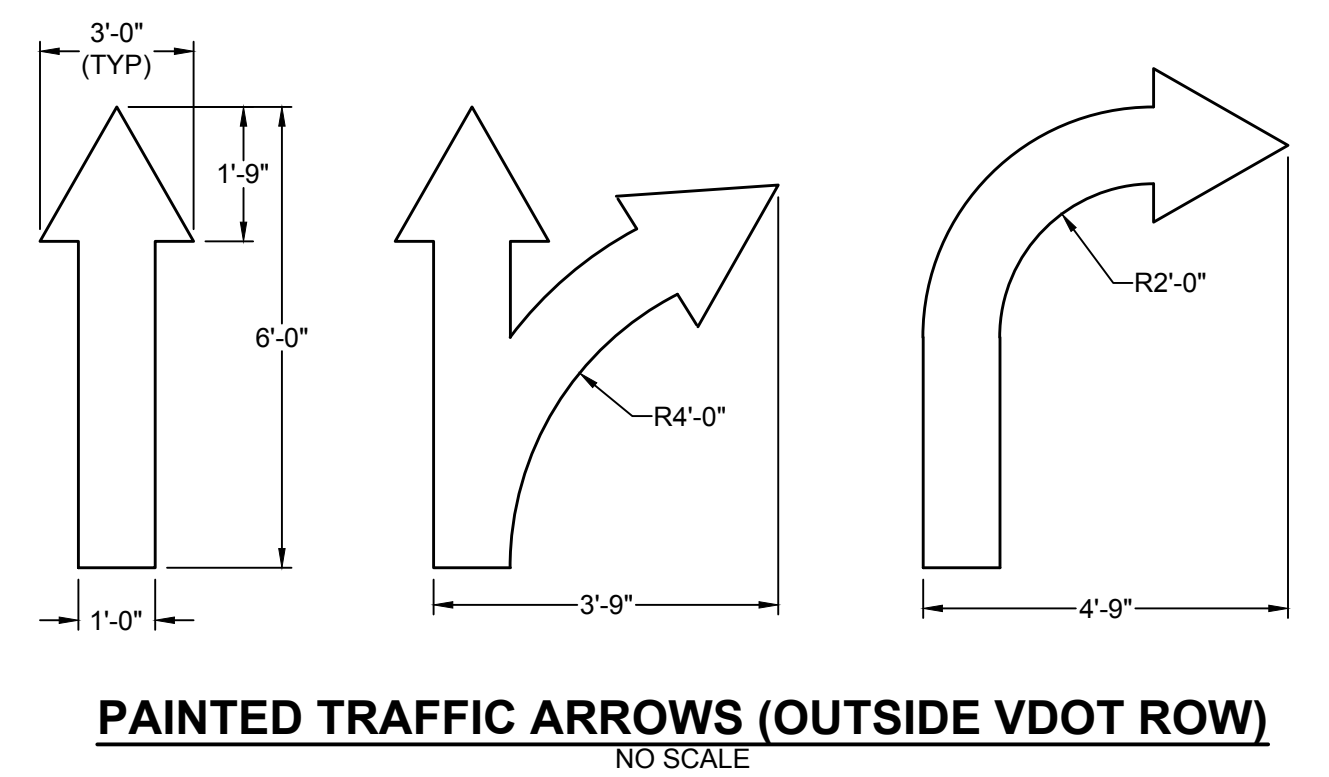
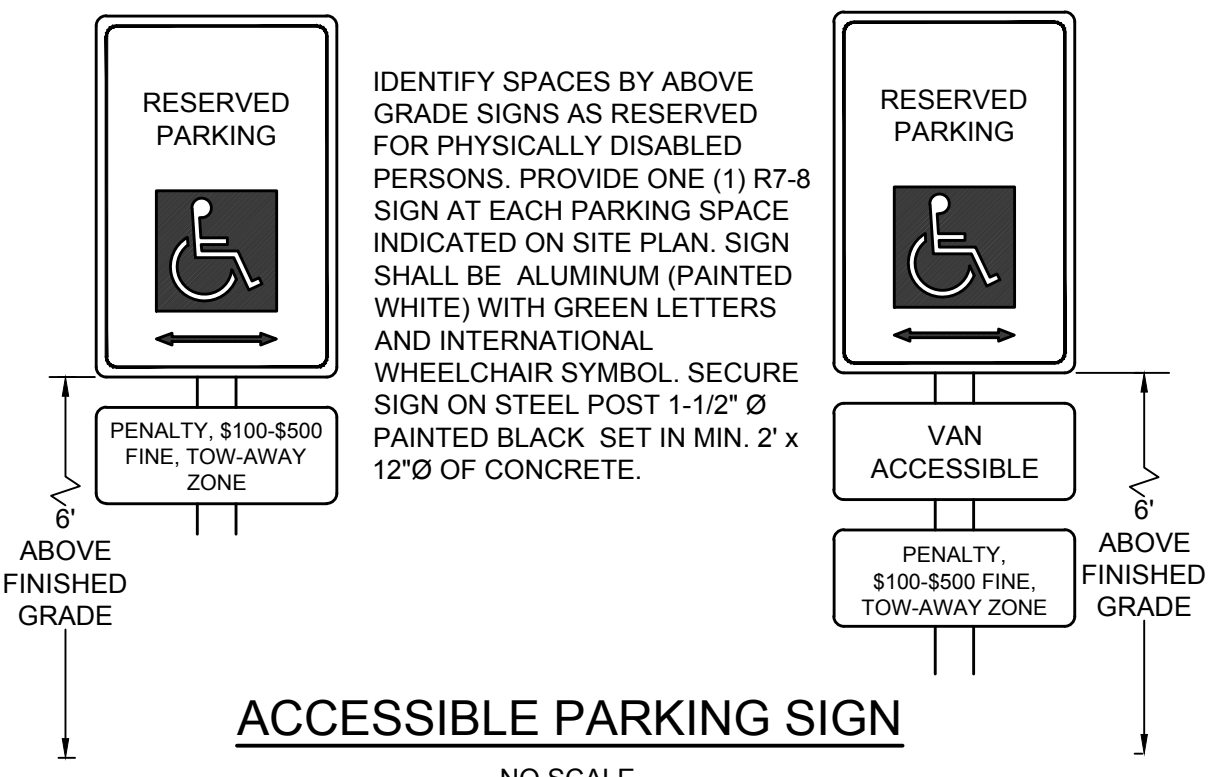
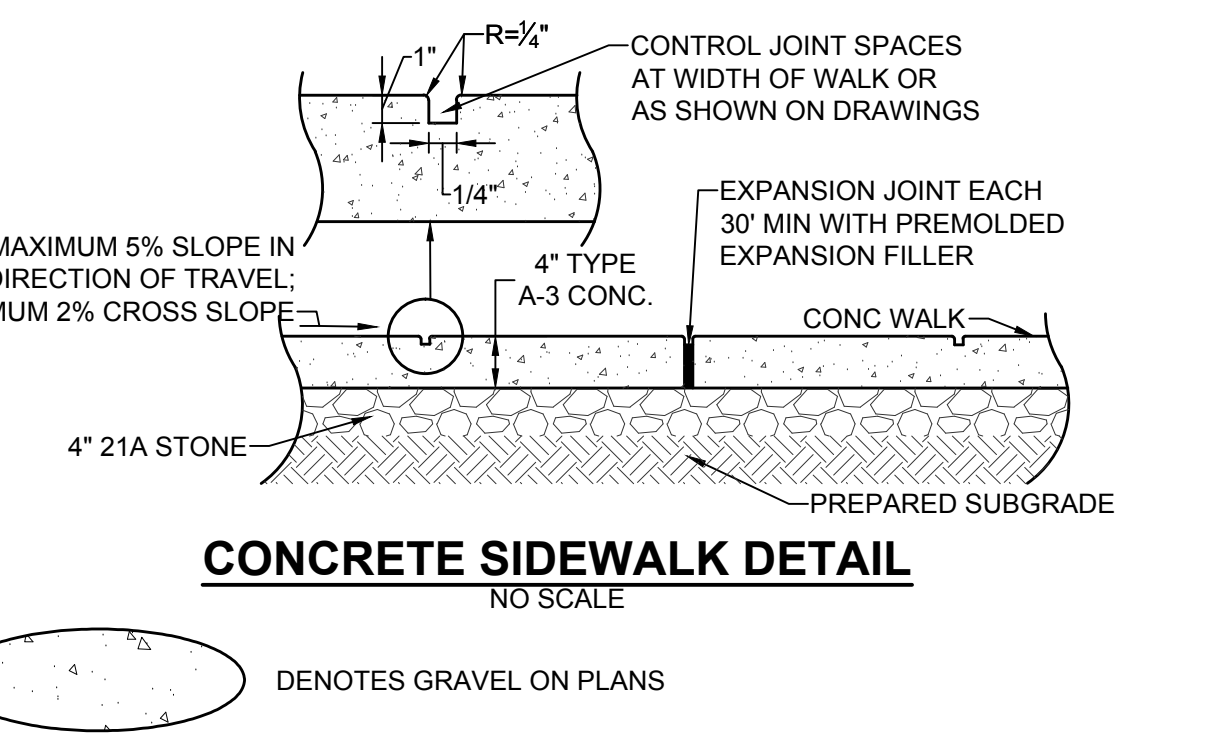
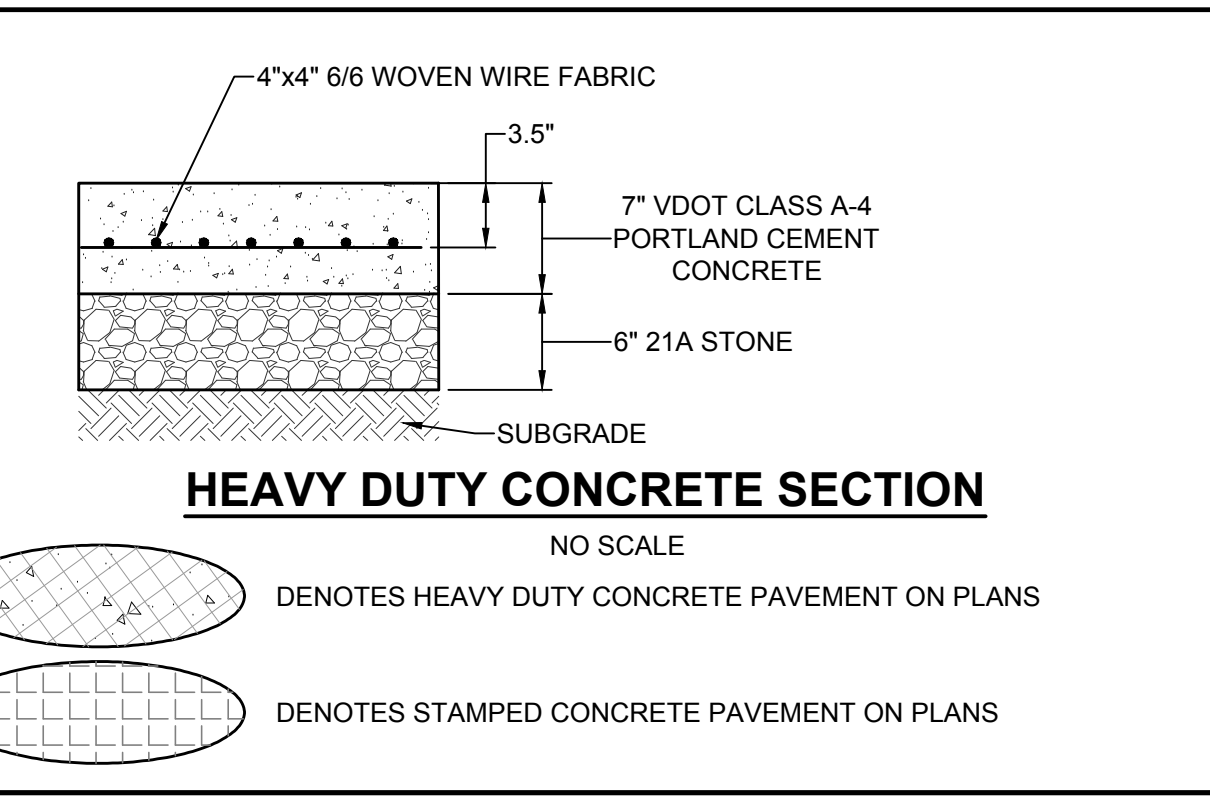
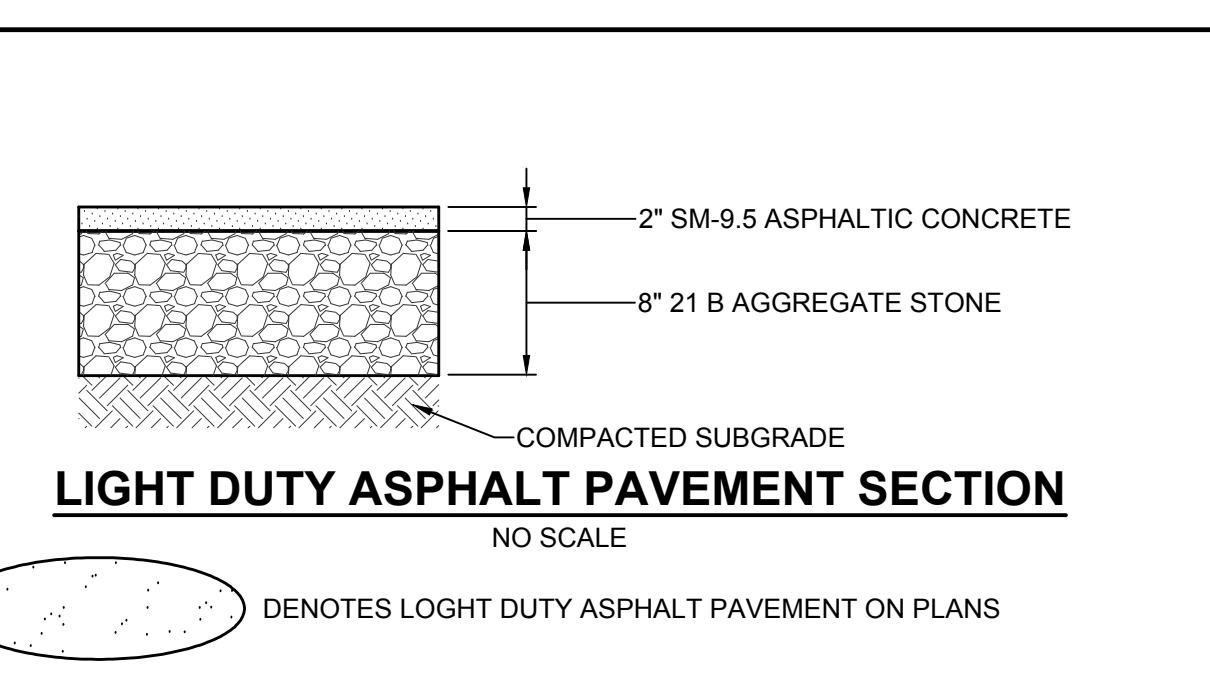
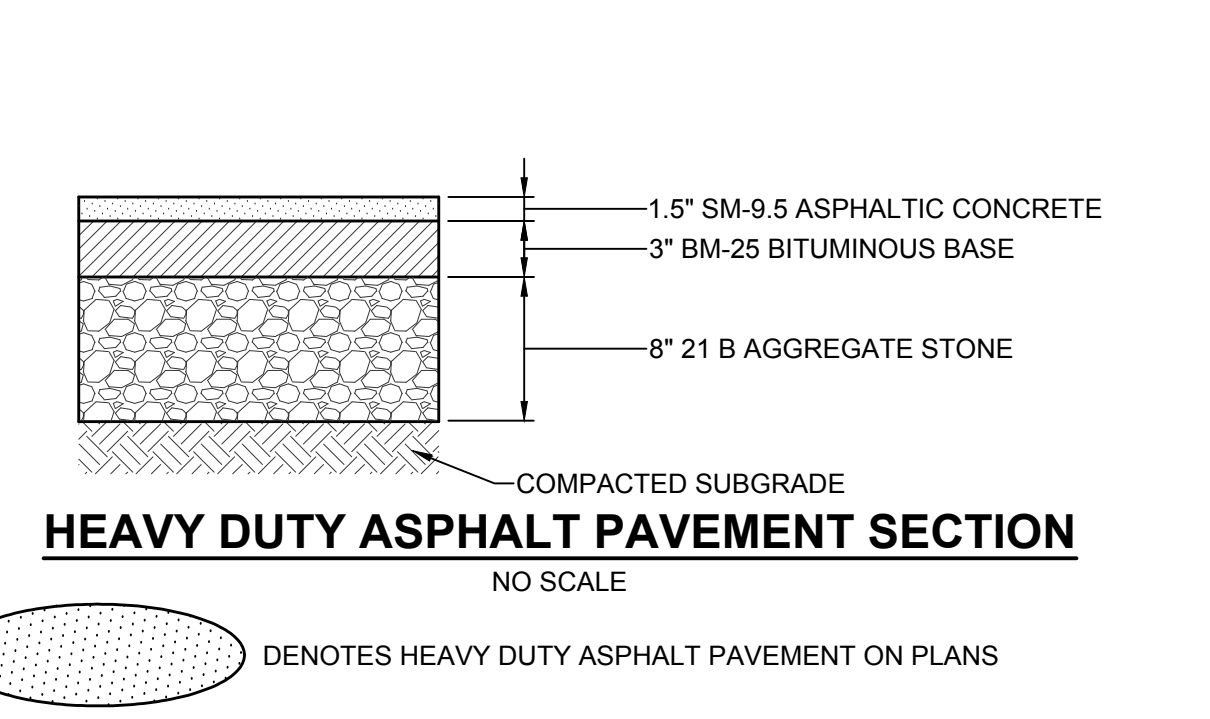
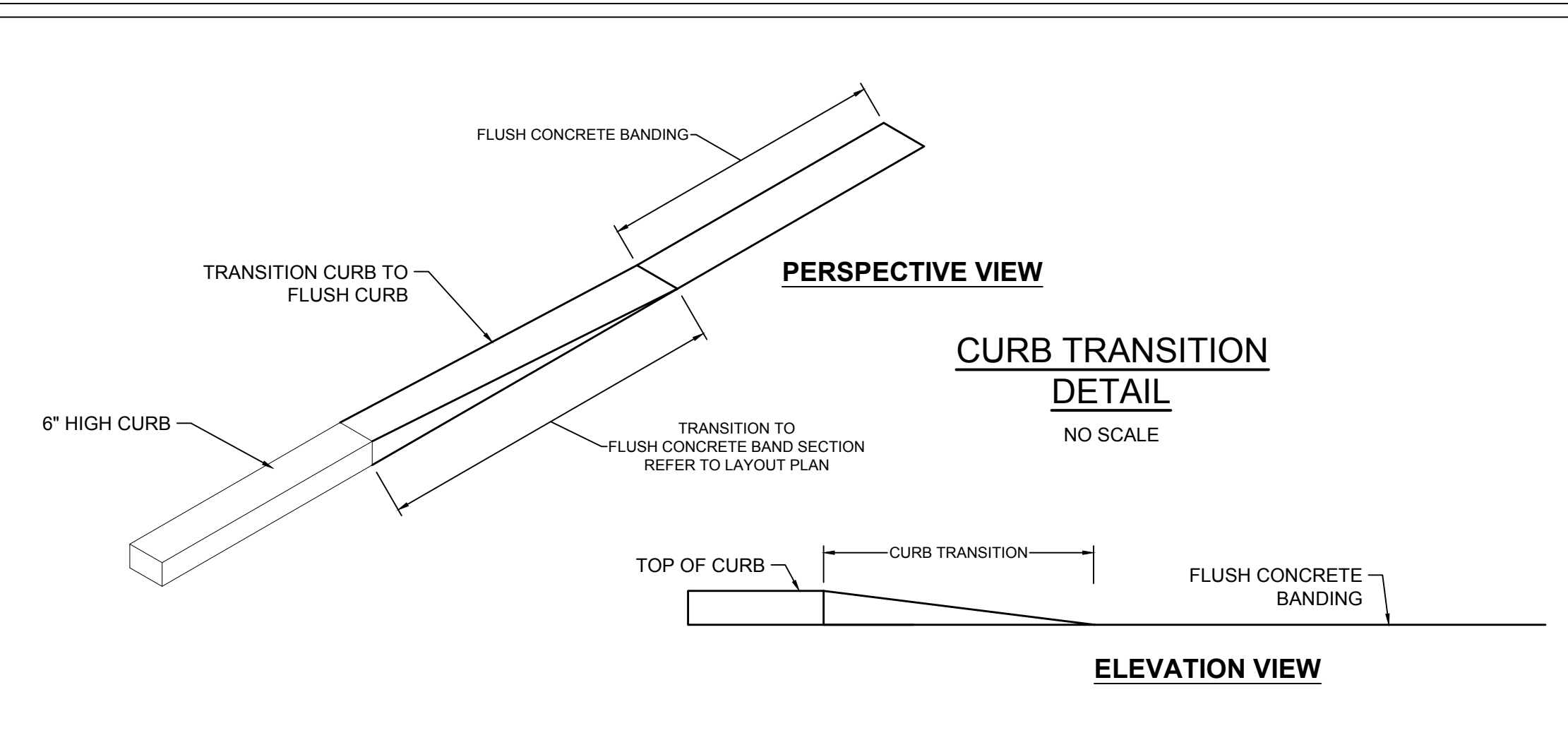
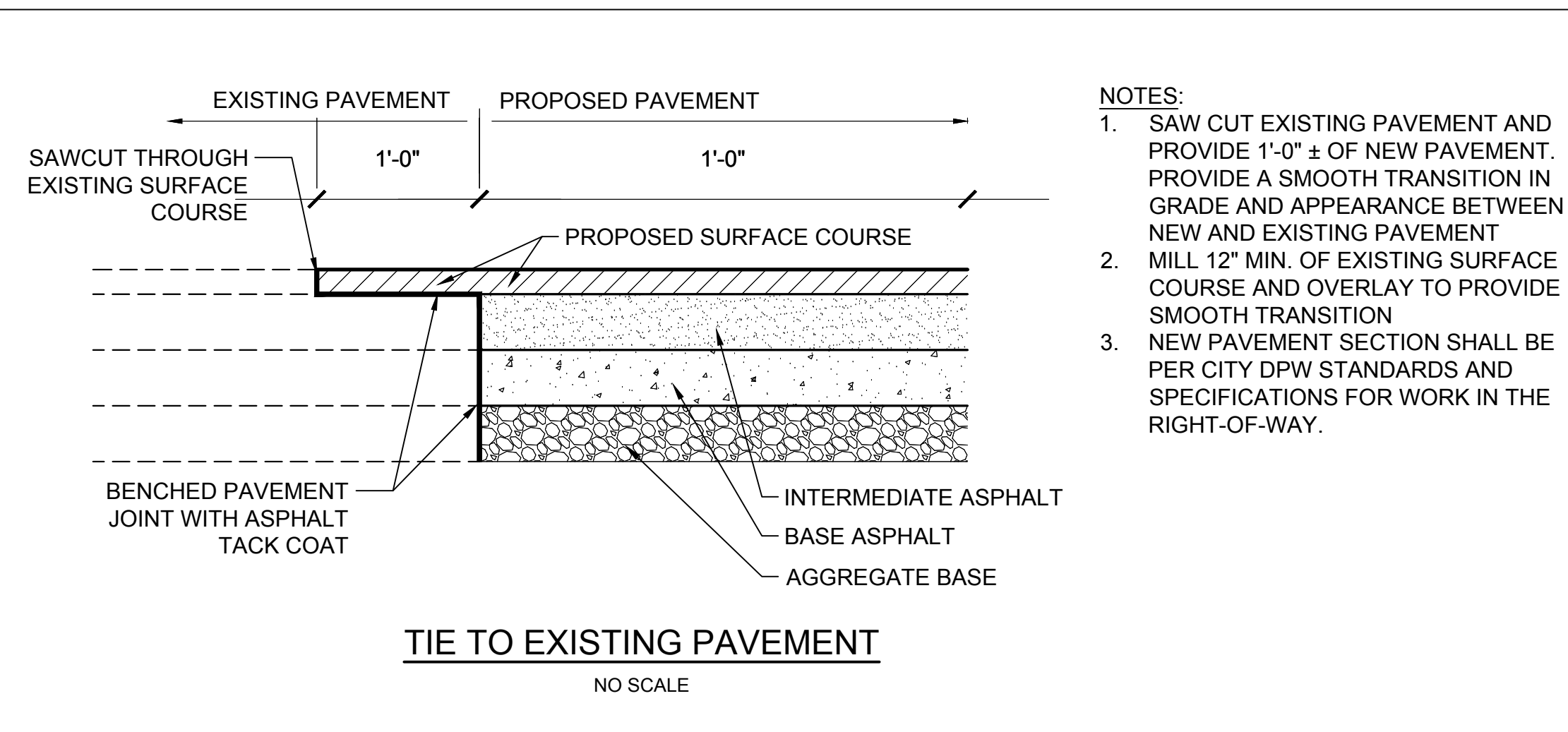
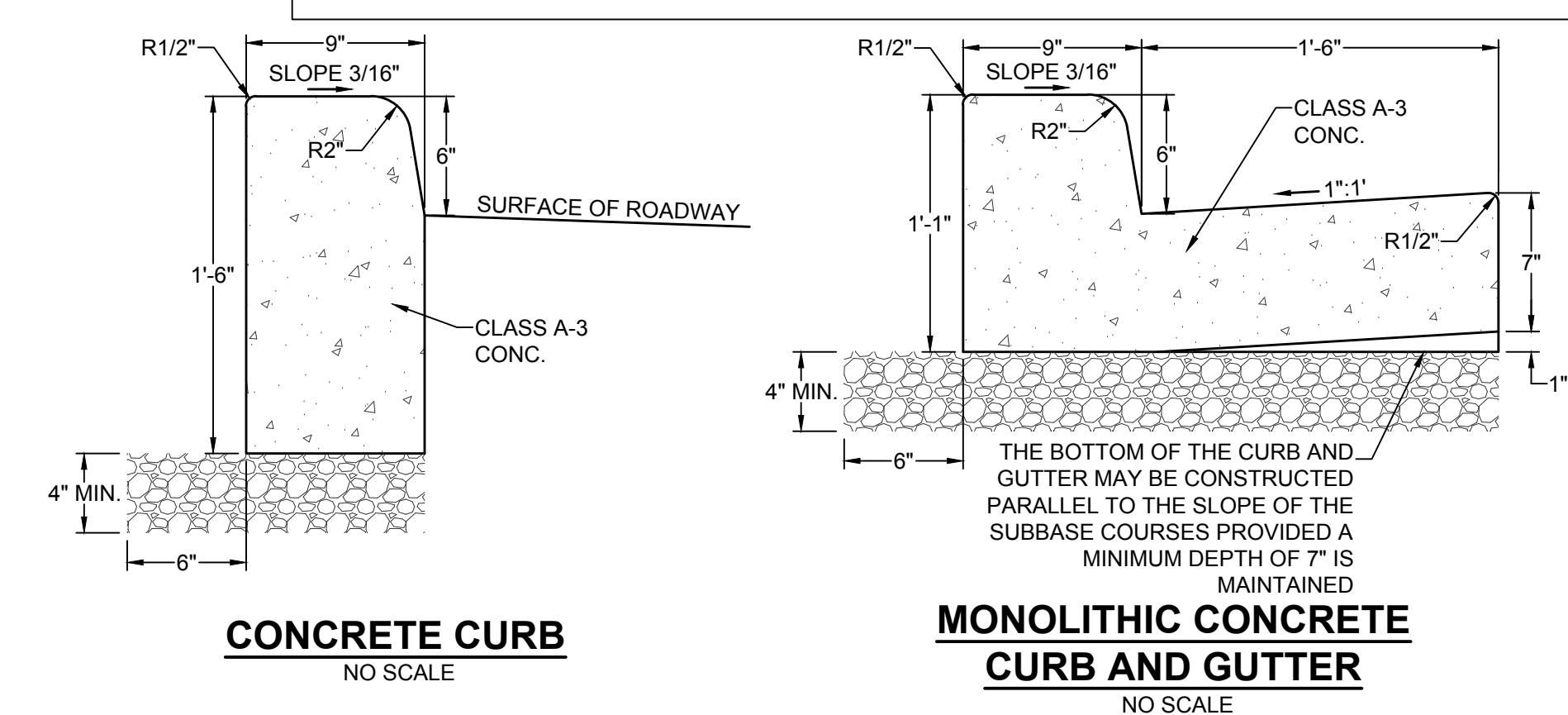
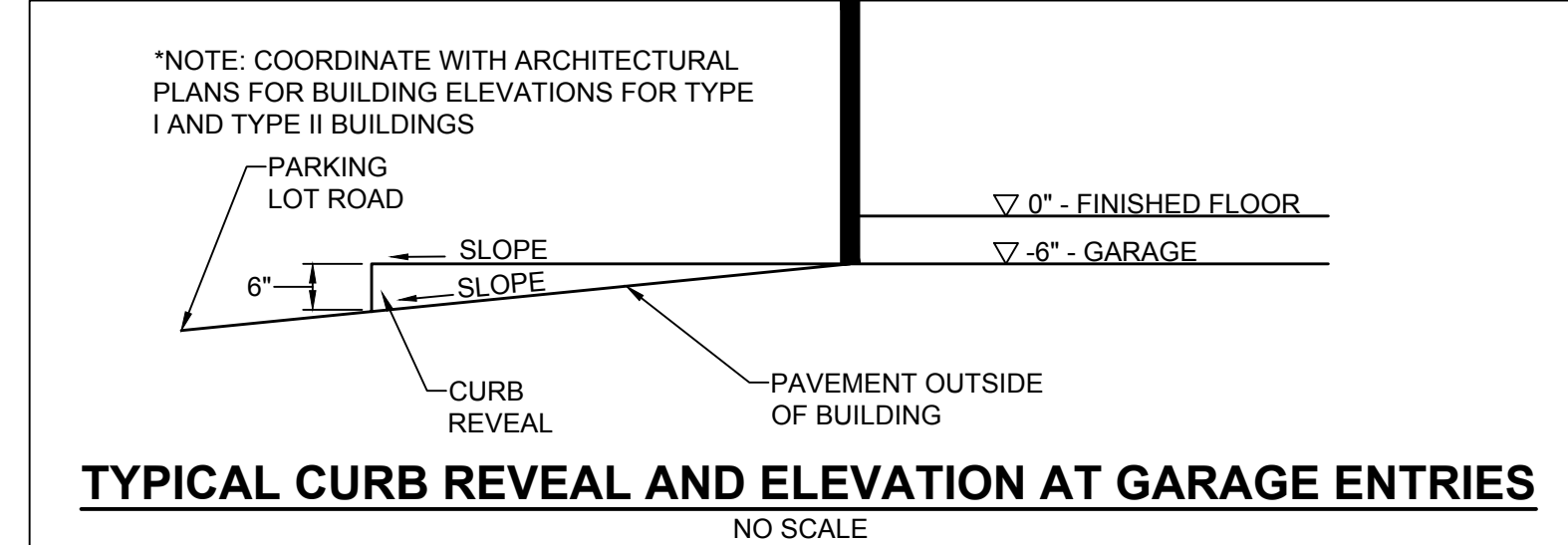
CG-12 DETECTABLE WARNING SURFACE (GENERAL NOTES)
 VIRGINIA DEPARTMENT OF TRANSPORTATION



CG-12 DETECTABLE WARNING SURFACE TYPE A (PERPENDICULAR) APPLICATION
 VIRGINIA DEPARTMENT OF TRANSPORTATION

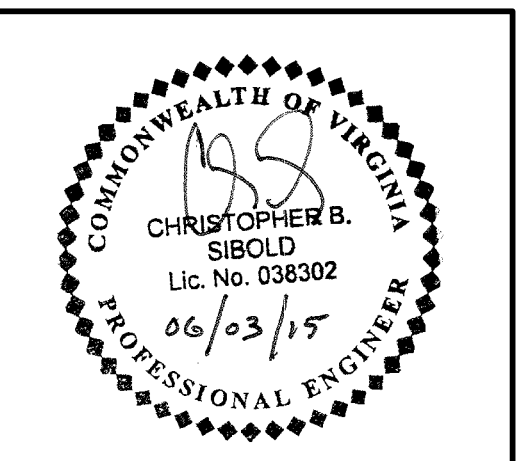
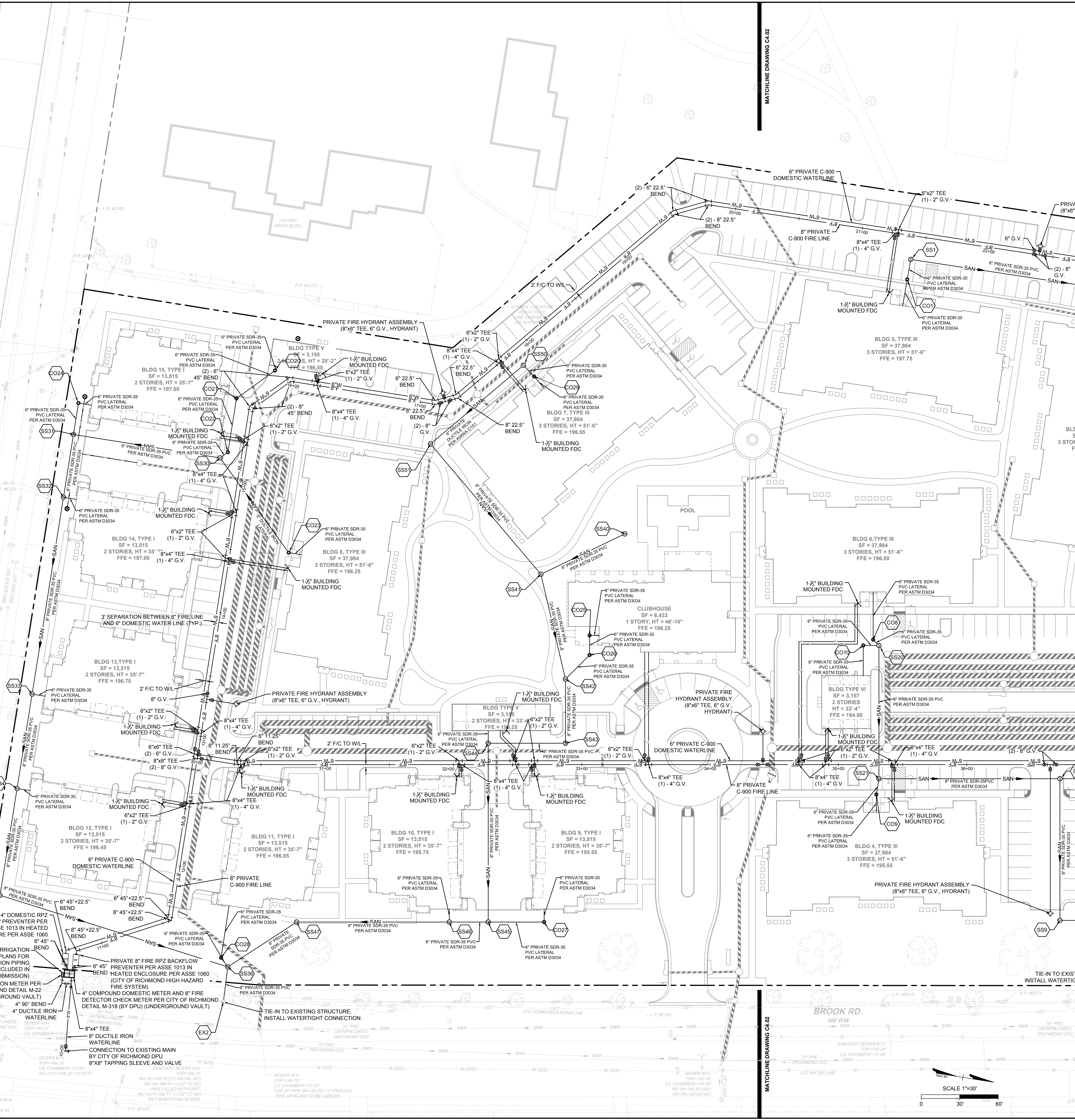


CG-12 DETECTABLE WARNING SURFACE TYPE B (PARALLEL) APPLICATION
 VIRGINIA DEPARTMENT OF TRANSPORTATION



S:\2015\15044-urban-parkway\15044-C3126-SITE-NOTES.dwg [Plotted on 6/3/2015 11:29 AM] by Tim Owens

- GENERAL UTILITY NOTES:**
- ALL WORK IN THE RIGHT-OF-WAY IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE MOST RECENT CITY OF RICHMOND STANDARDS FOR EXCAVATION AND RESTORATION.
 - CONTRACTOR SHALL NOTIFY THE DPU INSPECTOR A MINIMUM OF 48 HOURS PRIOR TO THE START OF WORK.
 - ALL UTILITY INSTALLATIONS IN THE PUBLIC RIGHT-OF-WAY SHALL BE CONSTRUCTED IN ACCORDANCE TO THE MOST RECENT CITY OF RICHMOND WATER DISTRIBUTION SYSTEM AND SANITARY SEWER SYSTEM DESIGN GUIDELINES AND STANDARD SPECIFICATIONS AND DETAILS.
 - ALL UTILITY INSTALLATION ON PRIVATE PROPERTY SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE INTERNATIONAL PLUMBING CODE.
 - CONTRACTOR MUST MAINTAIN GOOD EROSION CONTROL AND FLUSHING PROCEDURES. CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO ANY EXISTING UTILITIES THAT ARE TO REMAIN.
 - VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. NOTIFY ENGINEER IMMEDIATELY IF THERE IS A CONFLICT.
 - CONTACT "MISS UTILITY" OF CENTRAL VIRGINIA PRIOR TO THE START OF ANY EXCAVATION TO LOCATE EXISTING UTILITIES. 1-800-552-3120.
 - WATER SERVICE INSTALLATIONS MUST ADHERE TO THE CITY OF RICHMOND CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM.
 - A BACKWATER VALVE IS REQUIRED ON THE SANITARY LATERAL IF THE RIM ELEVATION OF THE MANHOLE UPSTREAM OF THE NEW CONNECTION IS HIGHER THAN ANY UNPROTECTED PLUMBING FIXTURE ELEVATIONS IN THE BUILDING.
 - EXISTING WATER MAIN MUST REMAIN IN SERVICE TO SERVE ALL EXISTING CITY WATER CUSTOMERS.
 - IF EXISTING WATER OR SEWER LATERALS ARE DISCOVERED DURING CONSTRUCTION THEY MUST BE REMOVED.
 - WATER TAP, SERVICE LATERAL, METER AND VAULT TO BE INSTALLED BY CITY DPU.
 - MAINTAIN A MINIMUM OF 3'-5" COVER ON ALL WATER SERVICE AND 5'-5" MINIMUM ON SANITARY SERVICE LATERALS IN THE RIGHT OF WAY.
 - EXISTING SEWER MAIN MUST BE FREE OF CRACKS, MAJOR DEFECTS, CLOGS OR SEDIMENT BUILDUP AND BE FREE FLOWING PRIOR TO LATERAL TAPS. VERIFY PRIOR TO CONSTRUCTION.
- UTILITY NOTES:**
- ALL SANITARY SEWER LATERALS ARE TO BE INSTALLED AT 2.08% MINIMUM.
 - ALL BUILDING FIRE CONNECTIONS SHALL BE 4" DUCTILE IRON PIPE UNLESS OTHERWISE NOTED.
 - ALL BUILDING DOMESTIC WATER CONNECTIONS SHALL BE 2" TYPE-K COPPER UNLESS OTHERWISE NOTED.



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 DESIGNED BY R. SATMARIA
 CHECKED BY C. SIBOLD

SCALE 1" = 30'

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

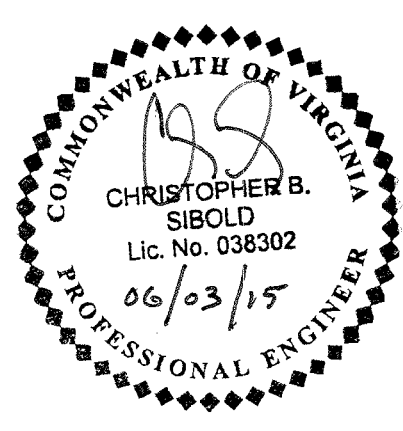
UTILITY PLAN

JOB NO. 36144
 SHEET NO. C4.01

Scale: 1" = 30'

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DESIGNED BY
R. SATMARIA

CHECKED BY
C. SIBOLD

SCALE
1" = 30'

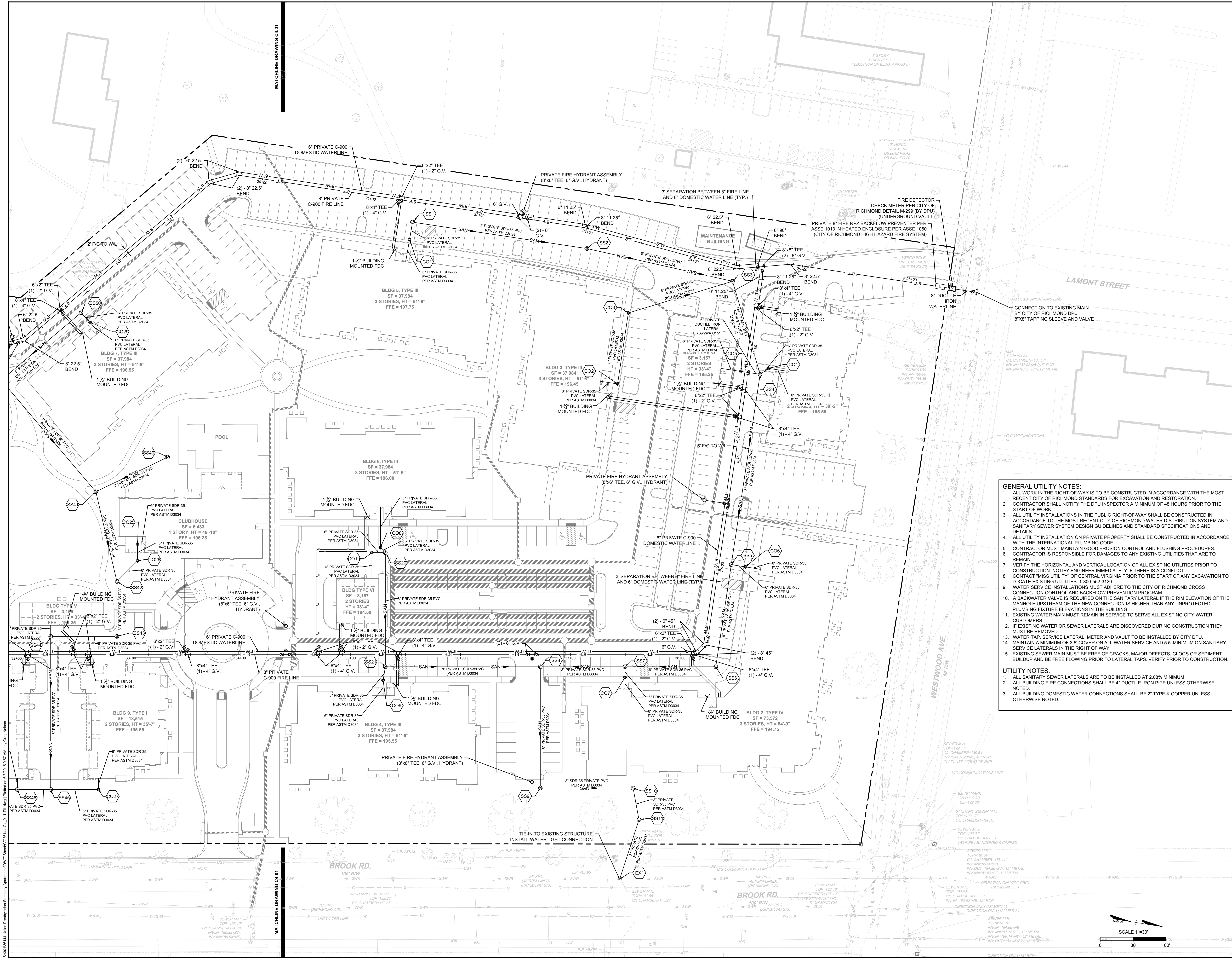
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BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

UTILITY PLAN

JOB NO.
36144

SHEET NO.
C4.02



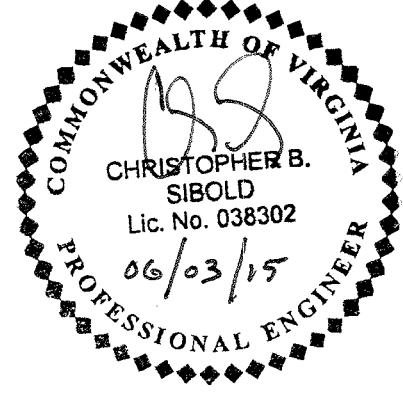
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 7. CONTACT MISS UTILITY OF CENTRAL VIRGINIA PRIOR TO THE START OF ANY EXCAVATION TO LOCATE EXISTING UTILITIES. 1-800-552-3120.
 8. WATER SERVICE INSTALLATIONS MUST ADHERE TO THE CITY OF RICHMOND CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM.
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 12. WATER TAP, SERVICE LATERAL, METER AND VAULT TO BE INSTALLED BY CITY DPU.
 13. MAINTAIN A MINIMUM OF 3.5' COVER ON ALL WATER SERVICE AND 5.5' MINIMUM ON SANITARY SERVICE LATERALS IN THE RIGHT OF WAY.
 14. EXISTING WATER MAIN MUST BE FREE OF CRACKS, MAJOR DEFECTS, CLOGS OR SEDIMENT BUILDUP AND BE FREE FLOWING PRIOR TO LATERAL TAPS. VERIFY PRIOR TO CONSTRUCTION.
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 3. ALL BUILDING DOMESTIC WATER CONNECTIONS SHALL BE 2" TYPE-K COPPER UNLESS OTHERWISE NOTED.



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MATCHLINE DRAWING C4.01

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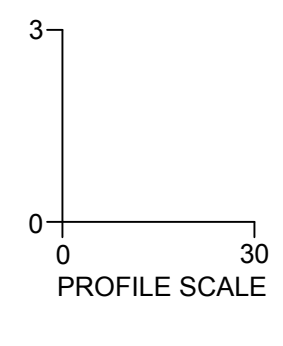
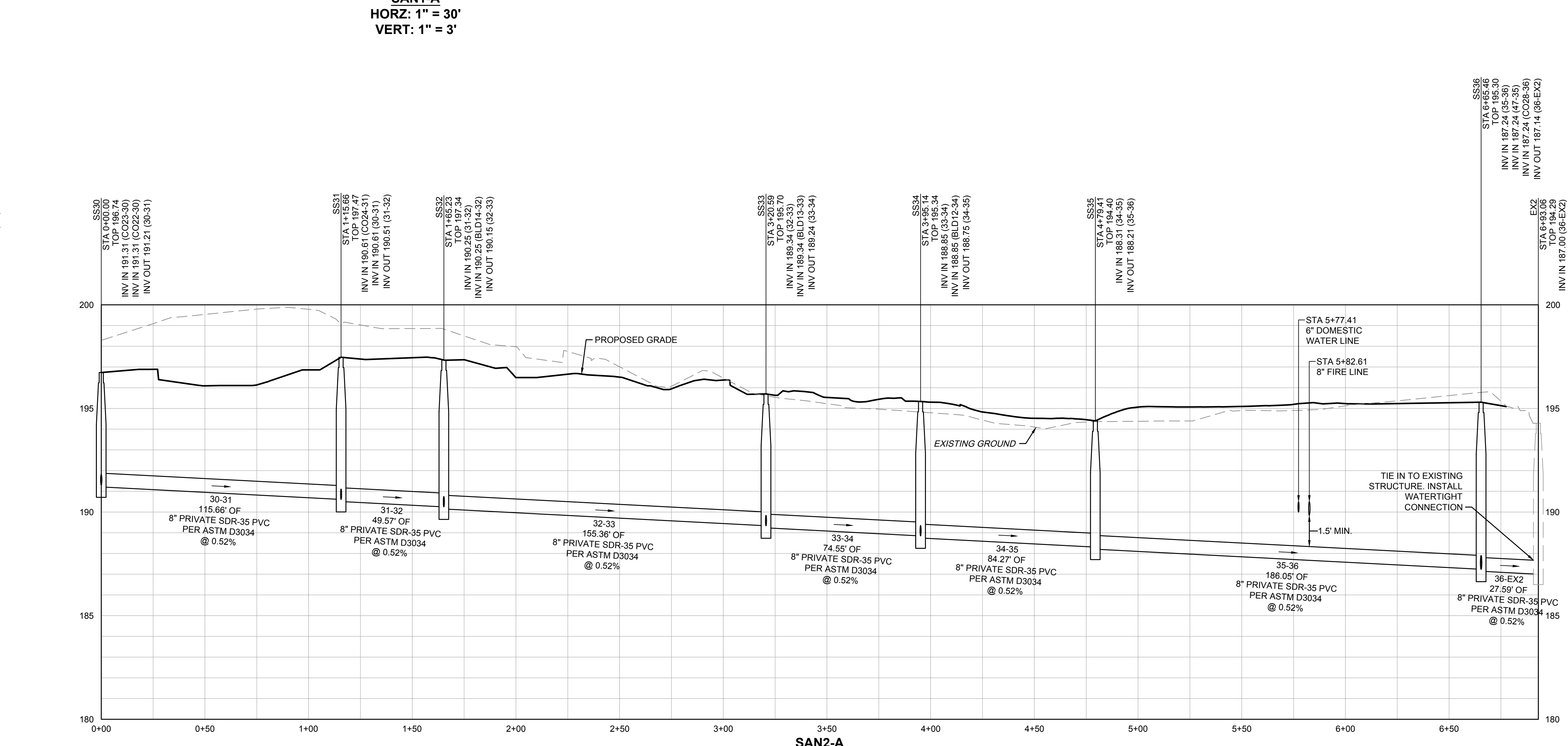
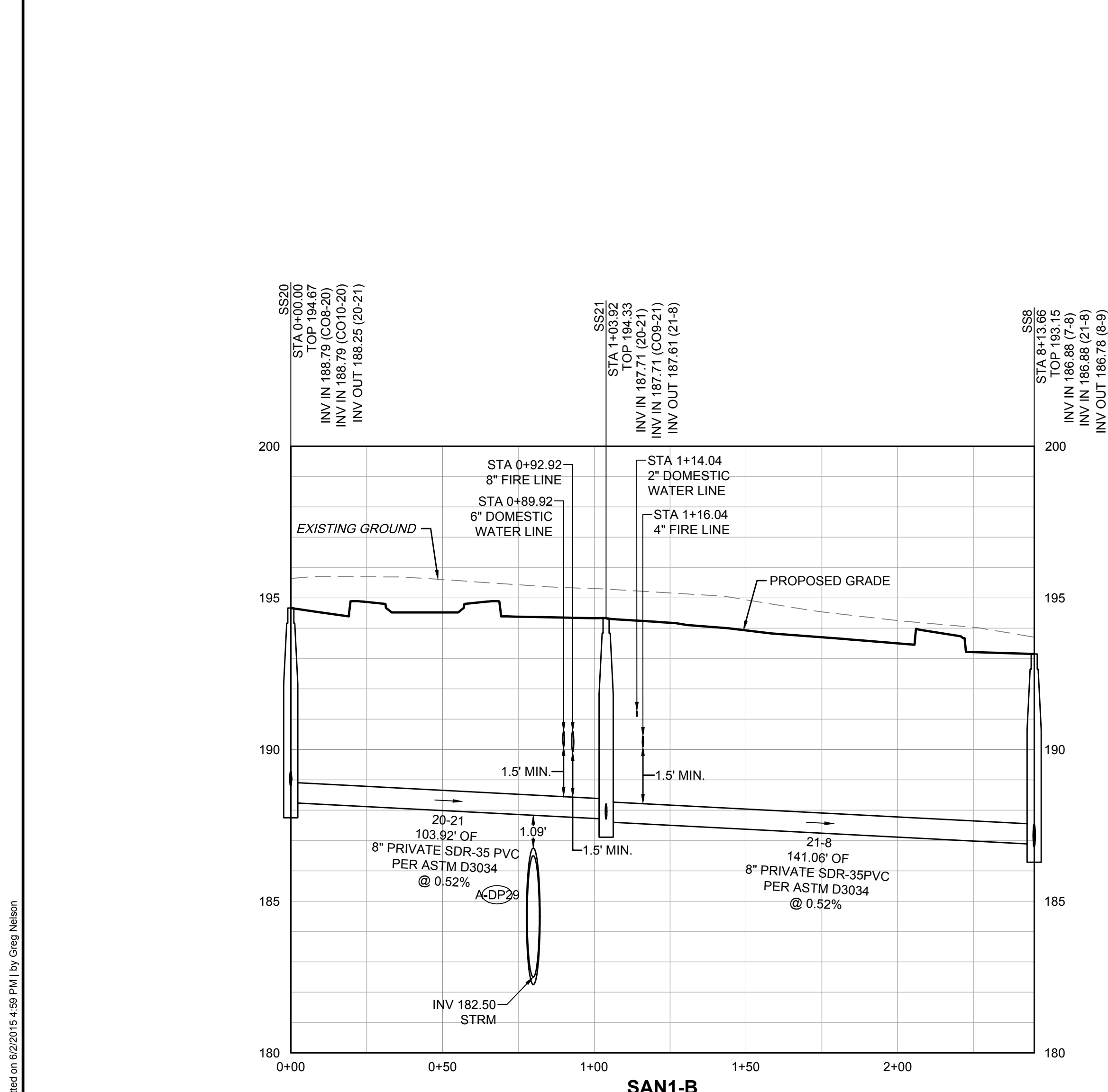
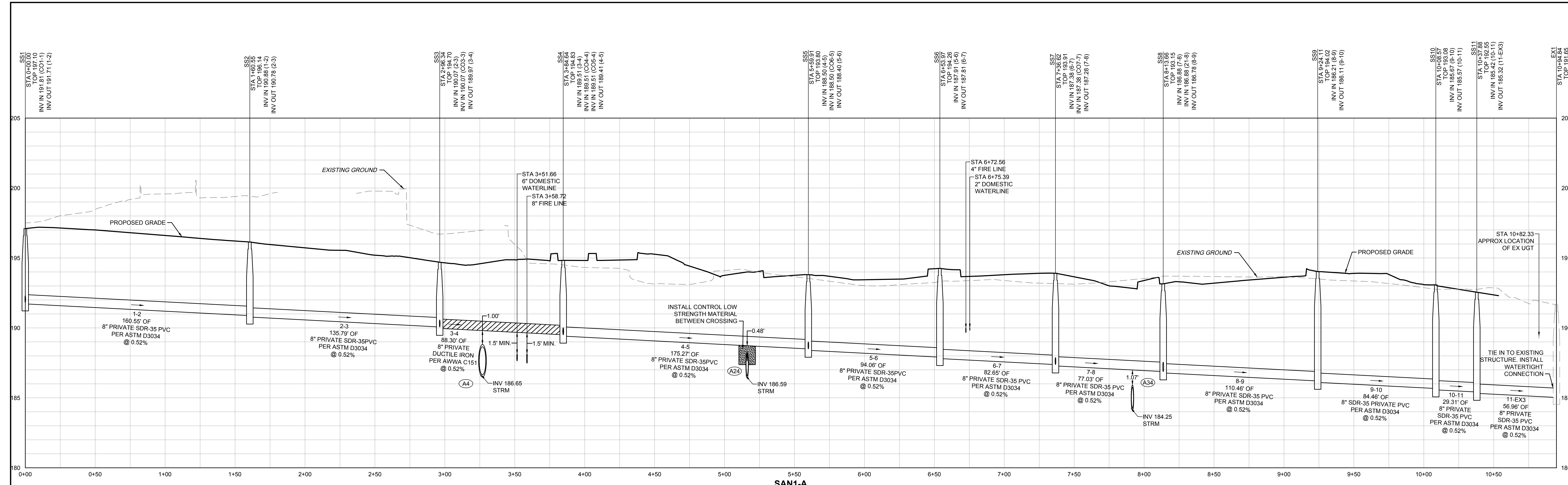
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| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SBOLD |

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| SCALE | AS NOTED |
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 CITY OF RICHMOND, VA
BRISTOL AT WESTWOOD
 SANITARY SEWER PROFILES

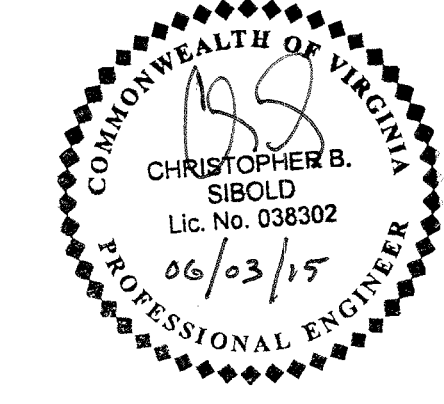
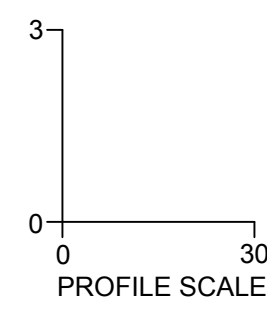
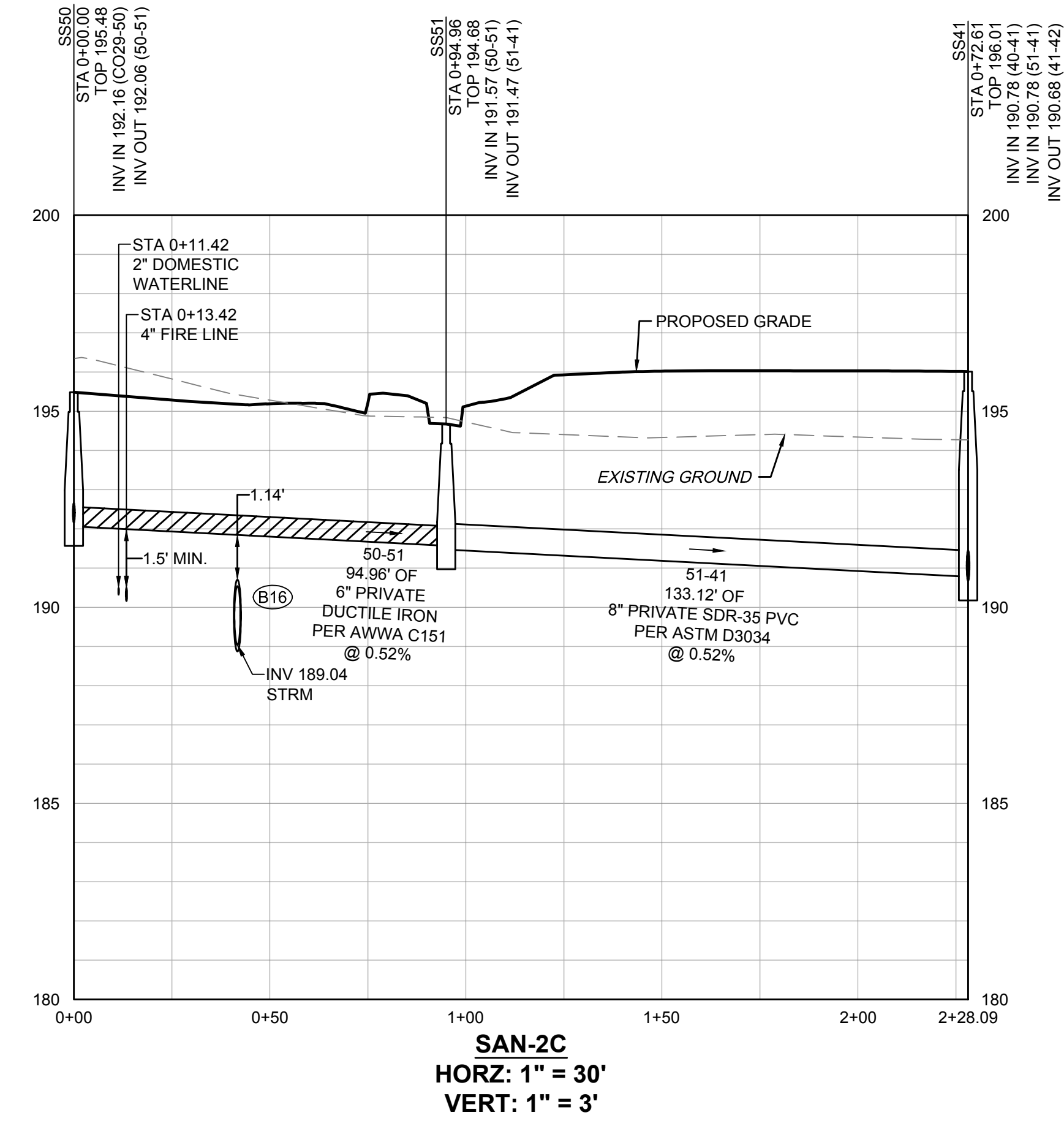
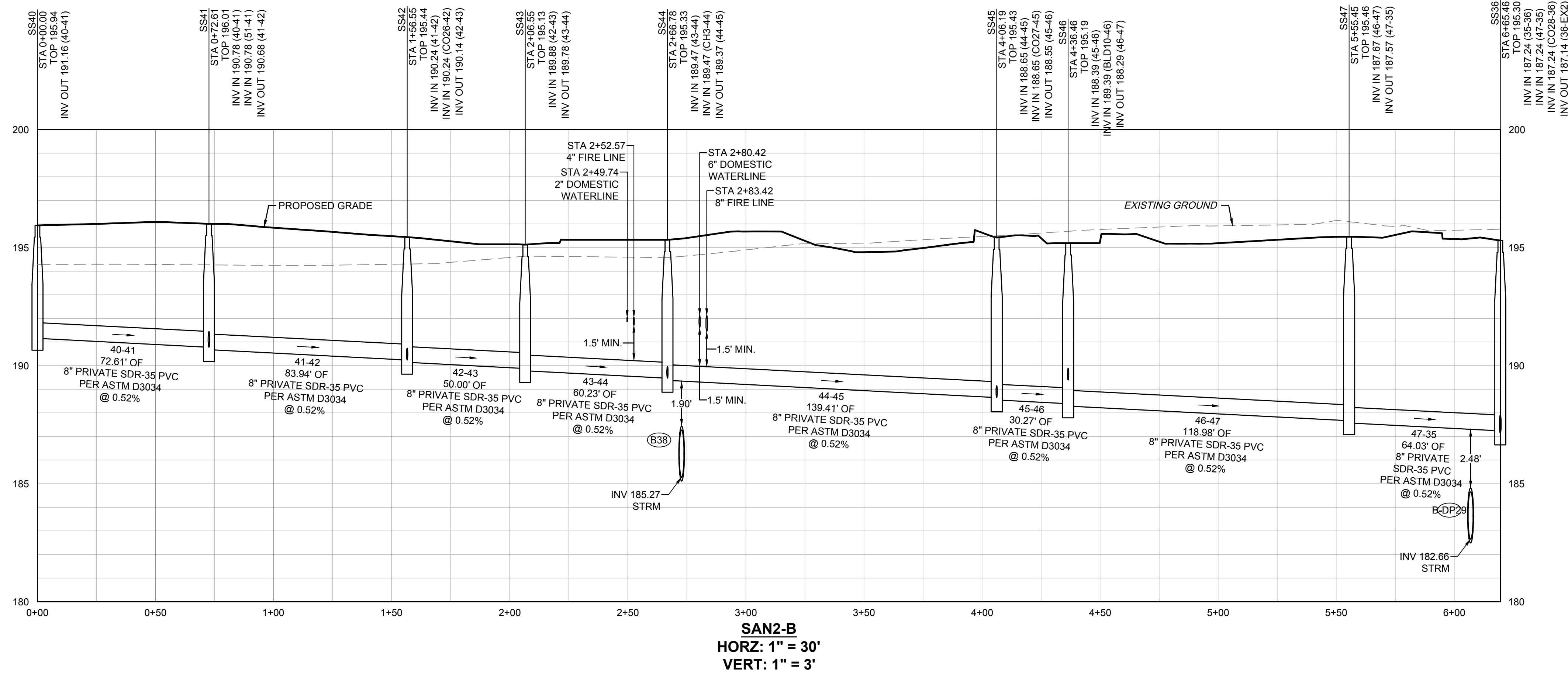
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| CHECKED BY | C. SIBOLD |
| SCALE | AS NOTED |

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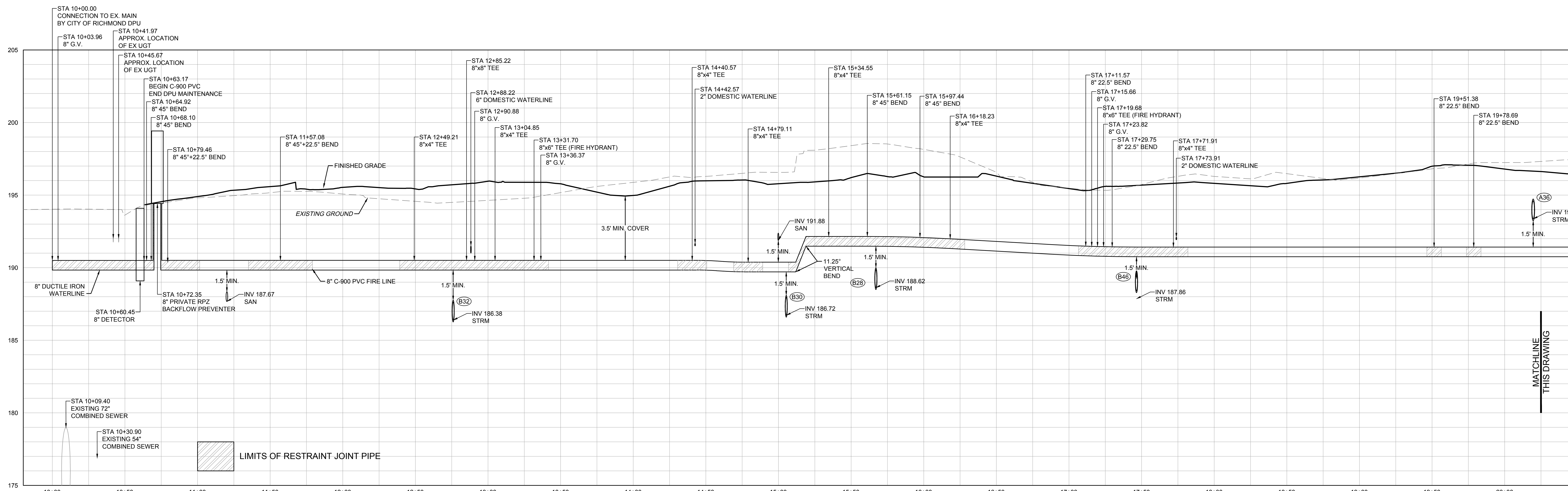
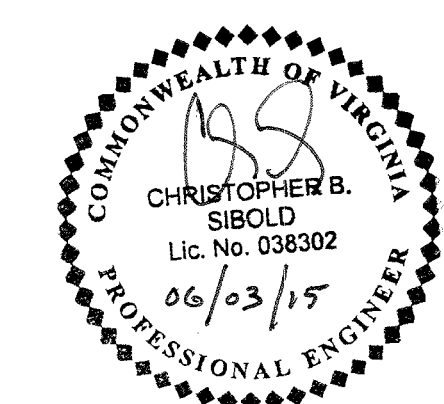
BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

SANITARY SEWER PROFILES

JOB NO.
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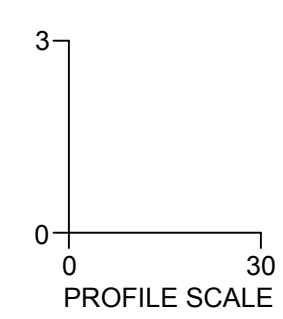
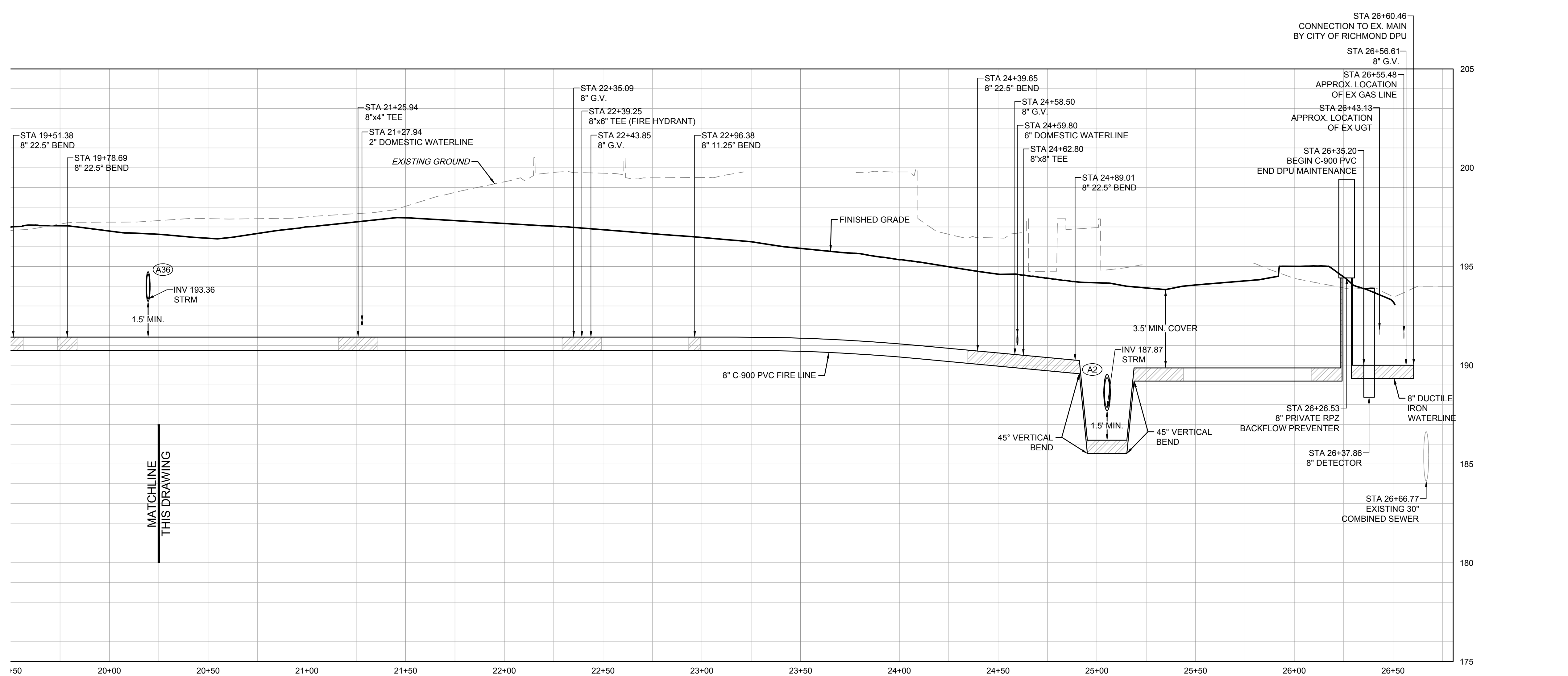
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NOTE: 6" DOMESTIC WATERLINE TO BE INSTALLED IN SAME TRENCH AS 8" FIRE LINE (REFER TO UTILITY PLAN) . 3' C/L TO C/L SPACING PROVIDED BETWEEN LINES, 6" DOMESTIC WATERLINE INSTALLED AT SAME ELEVATION AS 8" FIRE LINE.

WAT-1
 HORZ: 1" = 30'
 VERT: 1" = 3'



| | |
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| CHECKED BY C. SIBOLD | SCALE AS NOTED |

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BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

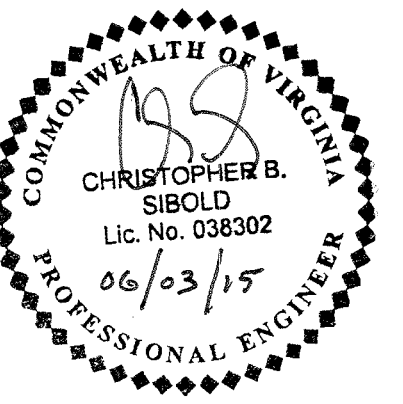
WATERLINE PROFILES

JOB NO.
36144

SHEET NO.
C4.20

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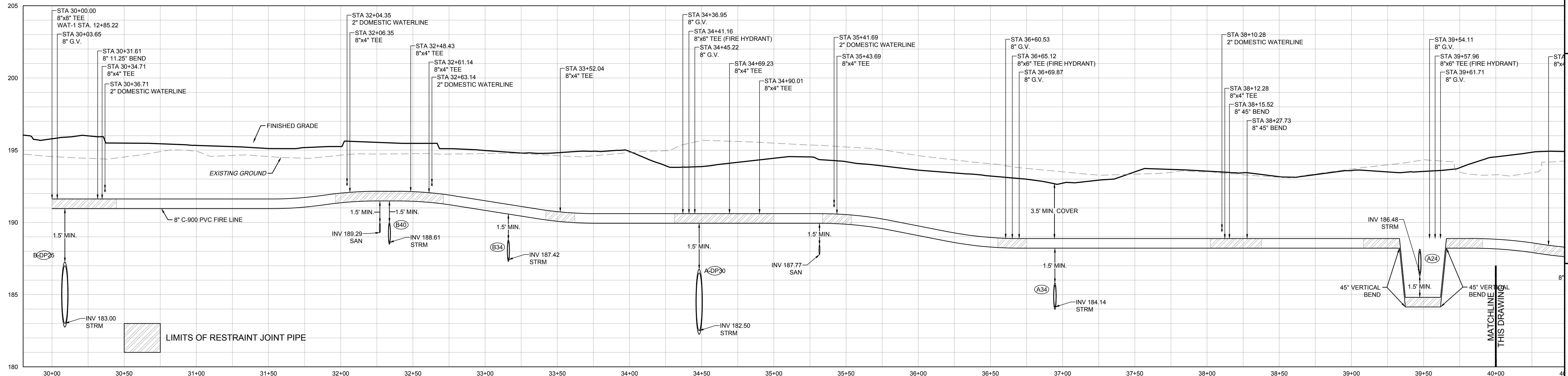
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|------------|----------------------|
| 06/03/2015 | |

| DATE | SCALE |
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| 06/03/2015 | AS NOTED |

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
 WATERLINE PROFILES

| |
|--------------------|
| JOB NO. 36144 |
| SHEET NO. C4.21 |

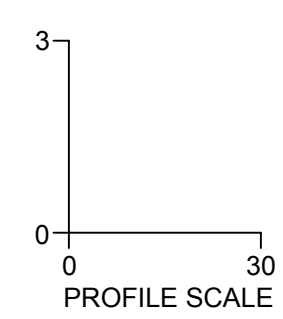
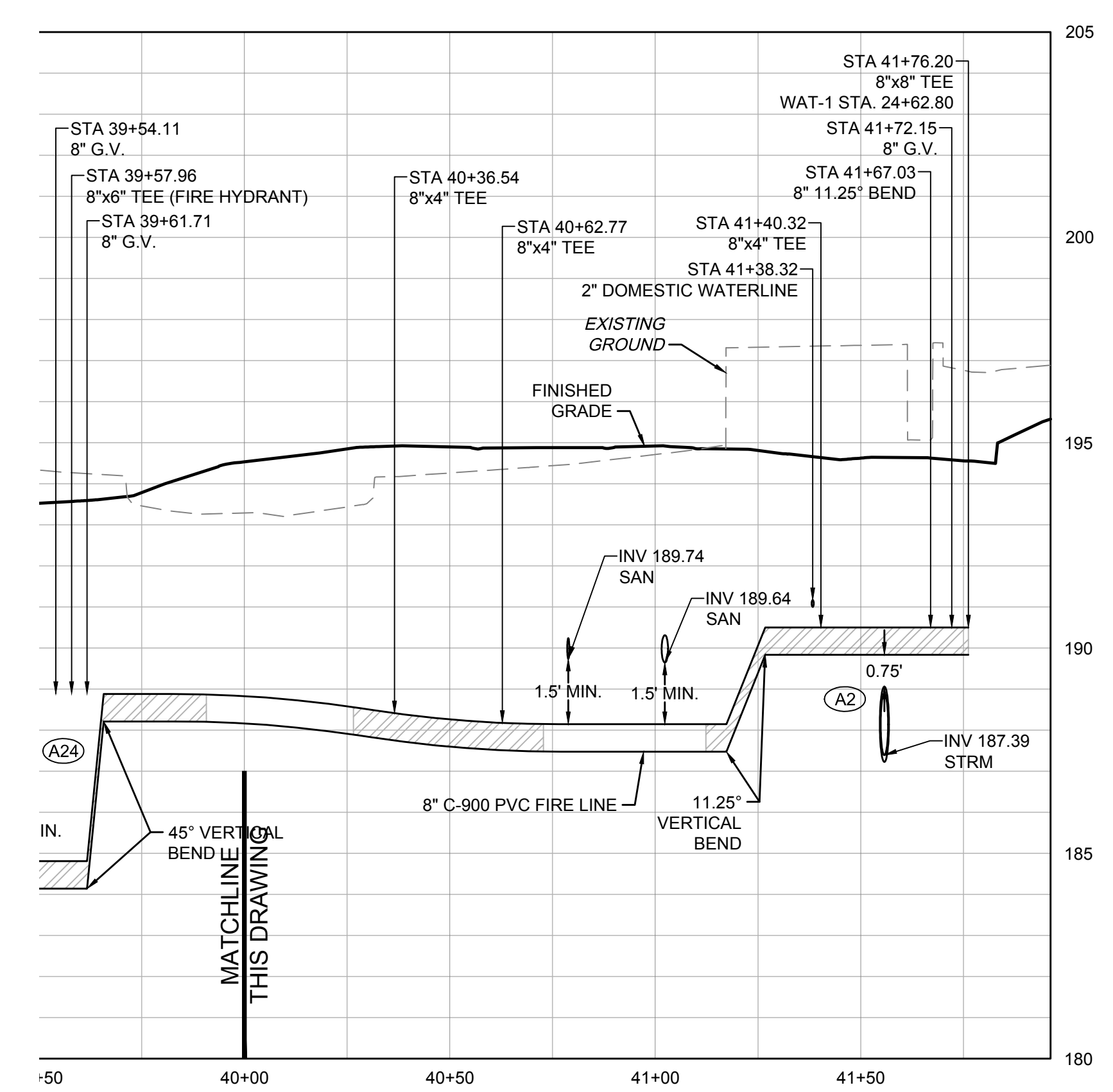


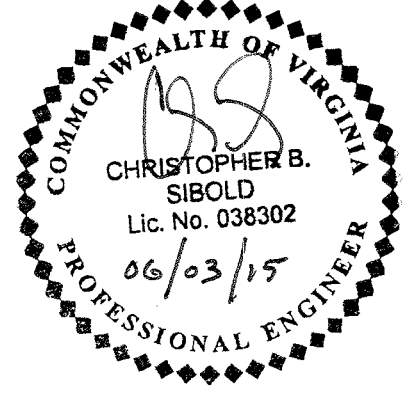
NOTE: 6" DOMESTIC WATERLINE TO BE INSTALLED IN SAME TRENCH AS 8" FIRE LINE (REFER TO UTILITY PLAN). 3' C/L TO C/L SPACING PROVIDED BETWEEN LINES, 6" DOMESTIC WATERLINE INSTALLED AT SAME ELEVATION AS 8" FIRE LINE.

WAT-2
 HORZ: 1" = 30'
 VERT: 1" = 3'

RESTRAINT JOINT SCHEDULE
 NOTE: LENGTHS SHOWN ARE FOR EACH SIDE OF FITTING.
 NOTE: MEGALUG RETAINING SYSTEM OR APPROVED EQUAL TO BE USED FOR RESTRAINED JOINT SYSTEM.
 (Restrain the larger side of the reducer)

| FITTING | LENGTH |
|--------------------------|--------|
| -6" 90° BEND | 17' |
| -8" 90° BEND | 22' |
| -6" 45° BEND | 7' |
| -8" 45° BEND | 10' |
| -6" 45°+22.5° BEND | 17' |
| -8" 45°+22.5° BEND | 22' |
| -6" 22.5° BEND | 4' |
| -8" 22.5° BEND | 5' |
| -6" 11.25° BEND | 2' |
| -8" 11.25° BEND | 3' |
| -6"x2" TEE | |
| Nominal restraint length | 10' |
| Branch restraint length | 1' |
| -8"x4" TEE | |
| Nominal restraint length | 10' |
| Branch restraint length | 1' |
| -6"x6" TEE | |
| Nominal restraint length | 10' |
| Branch restraint length | 1' |
| -8"x8" TEE | |
| Nominal restraint length | 10' |
| Branch restraint length | 1' |
| -8"x8" TEE | |
| Nominal restraint length | 10' |
| Branch restraint length | 1' |
| -8" 45° VERTICAL BEND | 33' |
| upper bend | 3' |
| lower bend | 8' |
| -6" 45° VERTICAL BEND | 25' |
| upper bend | 6' |
| lower bend | 6' |
| -8" 22.5° VERTICAL BEND | 16' |
| upper bend | 12' |
| lower bend | 3' |
| -6" 22.5° VERTICAL BEND | 12' |
| upper bend | 8' |
| lower bend | 2' |
| -8" 11.25° VERTICAL BEND | 8' |
| upper bend | 2' |
| lower bend | 2' |





THIS DRAWING PREPARED AT THE
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 Richmond, VA 23225
 TEL 804.200.6500 FAX 804.561.0116 www.timmons.com

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| DATE | REVISION DESCRIPTION |
|------------|----------------------|
| 06/03/2015 | |

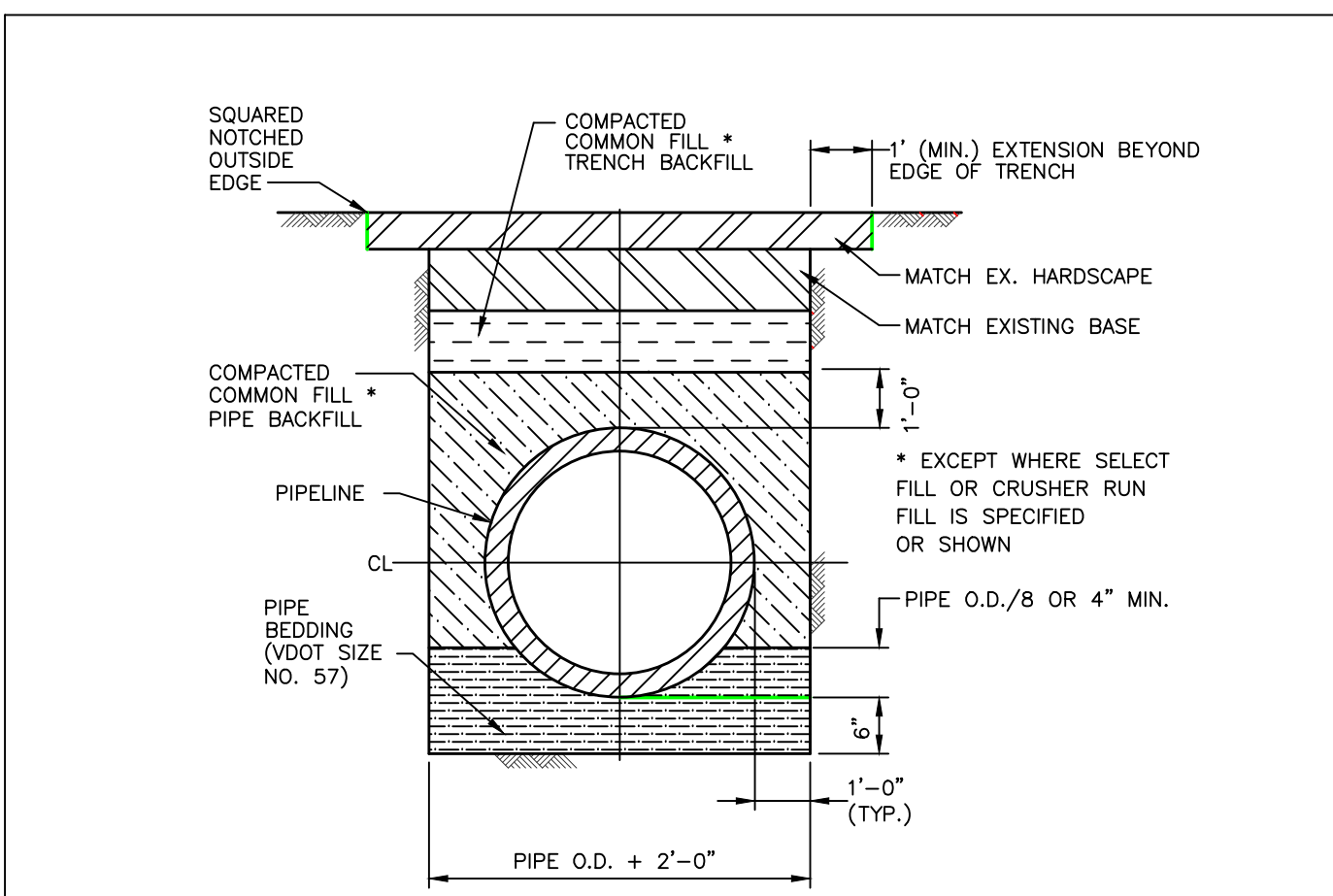
| |
|----------------------------|
| DRAWN BY J. CHAPMAN |
| DESIGNED BY R. SATMARIA |
| CHECKED BY C. SIBOLD |
| SCALE 1" = 30' |

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

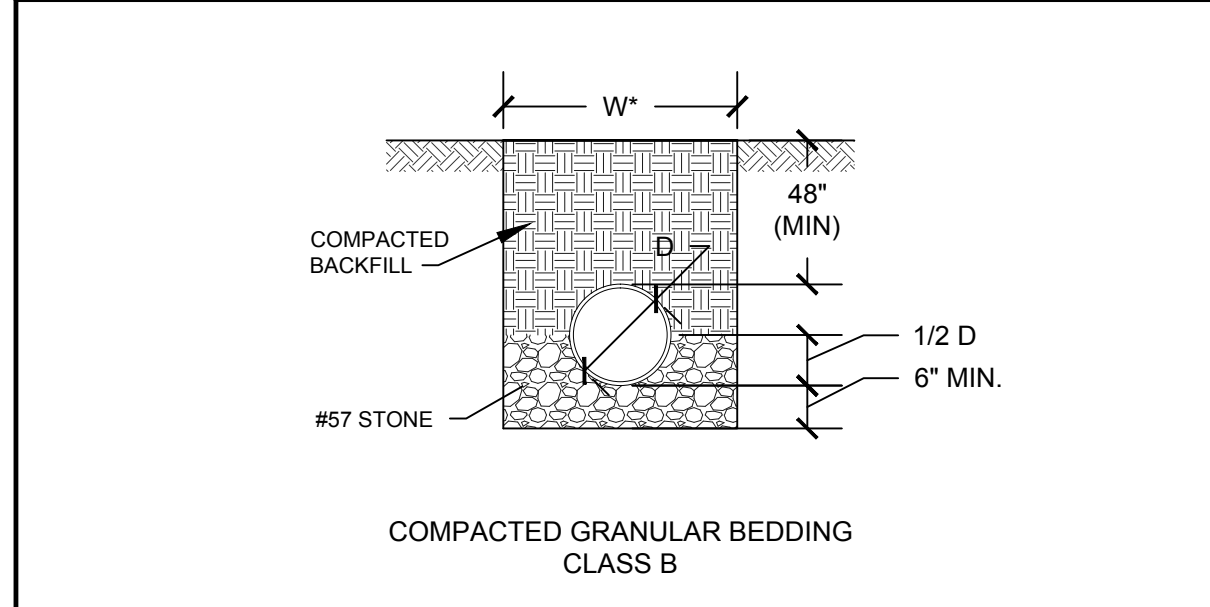
UTILITY NOTES & DETAILS

| |
|---------------------------|
| JOB NO. 36144 |
| SHEET NO. C4.30 |



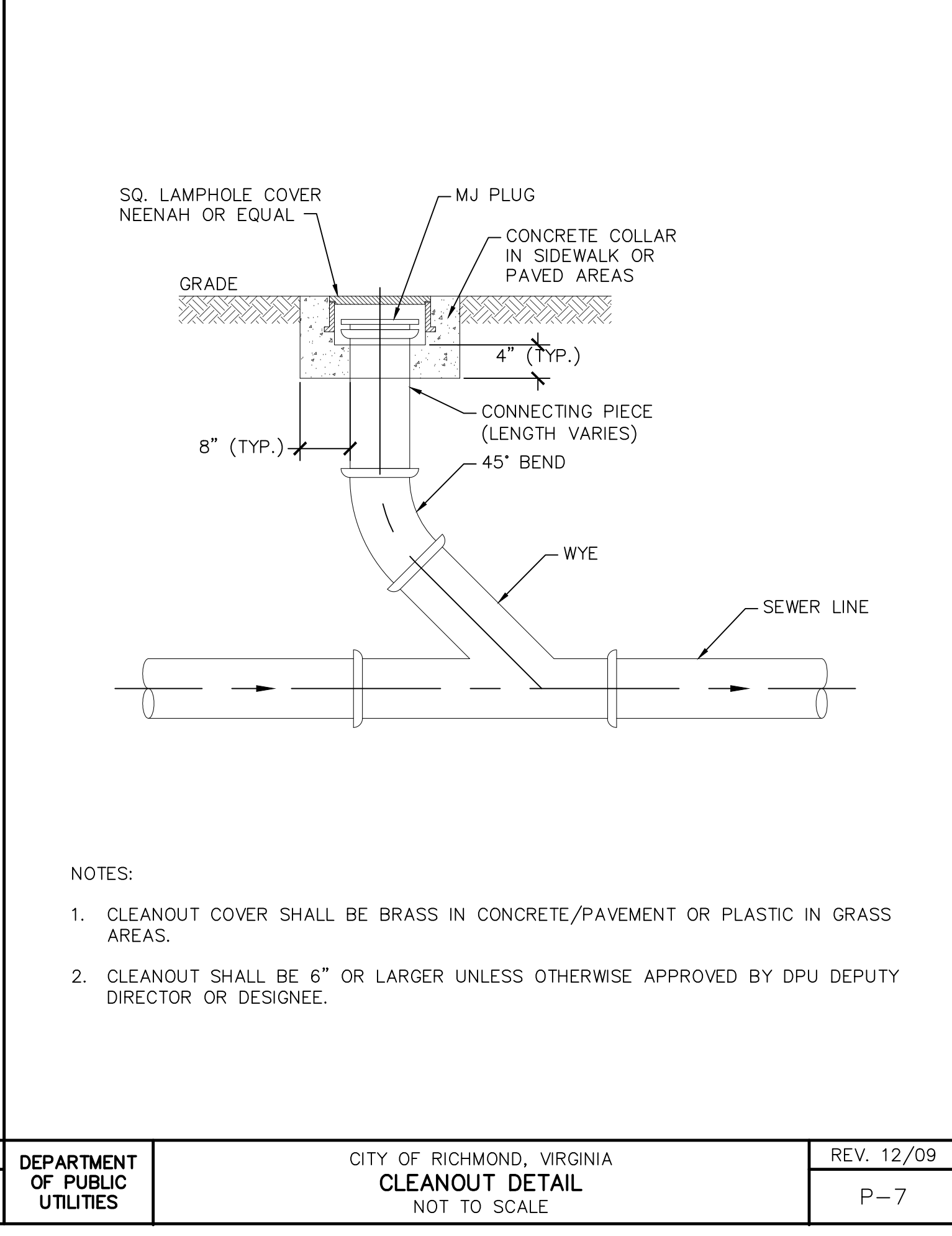
- PAVEMENT RESTORATION AND PIPE BACKFILL NOTES:**
- CUTS SHALL BE AS CLEAN AND STRAIGHT AS POSSIBLE, WITH NO OUTLINE DIMENSIONS LESS THAN 3 FEET WITHOUT SPECIAL APPROVAL OF THE DEPARTMENT'S INSPECTOR.
 - ALL ASPHALT PAVEMENT RESTORATION THICKNESS SHALL BE 1 1/2 TIMES THE EXISTING SECTION OR A MINIMUM OF 8-INCHES WHICHEVER IS GREATER. SEE THE DPW TRENCH RESTORATION ILLUSTRATION FOR THE TYPICAL CONCOURSE STANDARDS.
 - THE FINAL RESTORATION ON OPEN TRENCH CUTS REQUIRES THE DISTURBED PAVEMENT ZONE TO BE A SQUARE POINTED OFF AND STRAIGHT LINE. THE AREA OF PAVEMENT RESTORATION IS TO BE FULLY ENVELOPED BY THE FINAL SURFACE COURSE REPAIRS. THE ADJOINING SURFACE/TOP COURSE LAYER IS TO BE OVER-MILLED OR REMOVED. MINIMUM DEPTH OF 1.25 INCHES OR MORE. A MINIMUM DISTANCE OF ONE FOOT BEYOND EACH SIDE OF THE TRENCH WALL.
 - WHERE A SLURRY SEAL OR OTHER MICROSURFACE COATING IS THE FINISH SURFACE COURSE, A RE-TREATMENT APPLICATION IS REQUIRED.

- PIPE BEDDING AND TRENCH RESTORATION FOR PIPE TRENCHES**
- PAVEMENT RESTORATION AND PIPE BACKFILL NOTES:**
- PAVEMENT RESTORATION WIDTH VARIES AND MAY BE AS WIDE AS 4-TRENCH WIDTH ON BOTH SIDES AS NEEDED TO PROVIDE A SMOOTH TRANSITION TO EXISTING IN GRADE AND APPEARANCE. FOR ACTUAL REQUIREMENTS CONSULT THE INSPECTOR.
 - PIPE BACKFILL IN THE RIGHT OF WAY SHALL BE SELECT FILL PLACED IN 6" LIFTS AND COMPACTED TO 98% OF MAXIMUM DENSITY.
 - PIPE BACKFILL ON SITE MAY BE COMMON FILL COMPACTED TO 95% OF MAXIMUM DENSITY.
 - REFER TO LAYOUT DETAILS PAVEMENT SECTION AND EXISTING CONDITIONS FOR PAVEMENT FINISH REQUIREMENTS.
 - PAVEMENT SECTION IN THE RIGHT OF WAY SHALL MATCH EXISTING OR AT A MINIMUM BE EQUIVALENT TO SECTION SHOWN ABOVE.



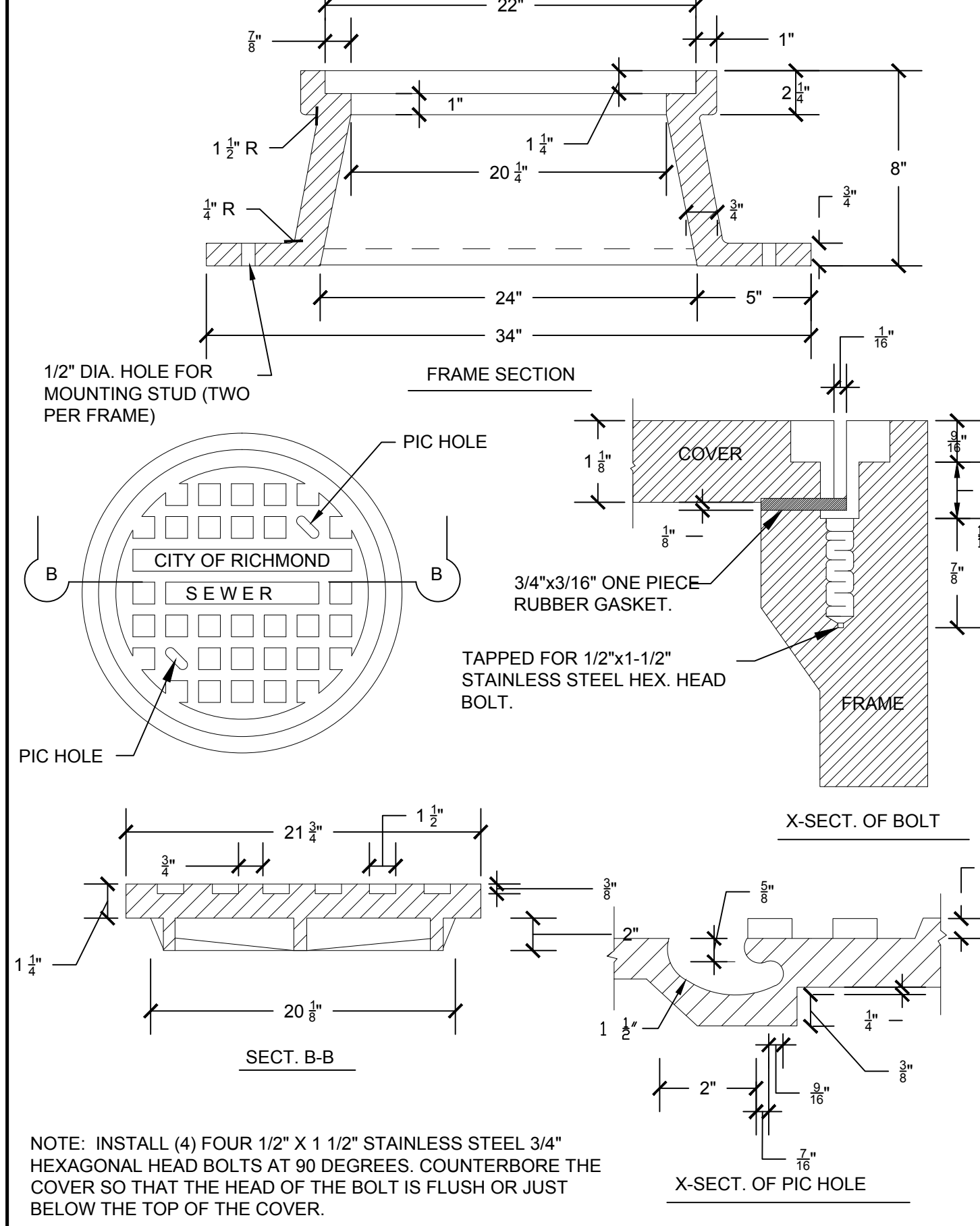
- NOTES:**
- * FOR "W" SEE DETAILS P-1A AND P-1B.
 - USE CLASS B COMPACTED GRANULAR BEDDING UNLESS OTHERWISE DIRECTED BY DPW TECHNICAL SERVICES DIVISION.
 - TRENCH, BACKFILL AND STREET RESTORATION SHALL BE IN ACCORDANCE WITH CITY OF RICHMOND DEPARTMENT OF PUBLIC WORKS AND/OR VDOT REQUIREMENTS.
 - DI PIPE IS REQUIRED IN AREAS WITH LESS THAN 48" OF COVER.

| | | |
|--------------------------------|---|-------------------|
| DEPARTMENT OF PUBLIC UTILITIES | CITY OF RICHMOND, VIRGINIA SEWER BEDDING NOT TO SCALE | REV. 12/09 P-2 |
|--------------------------------|---|-------------------|



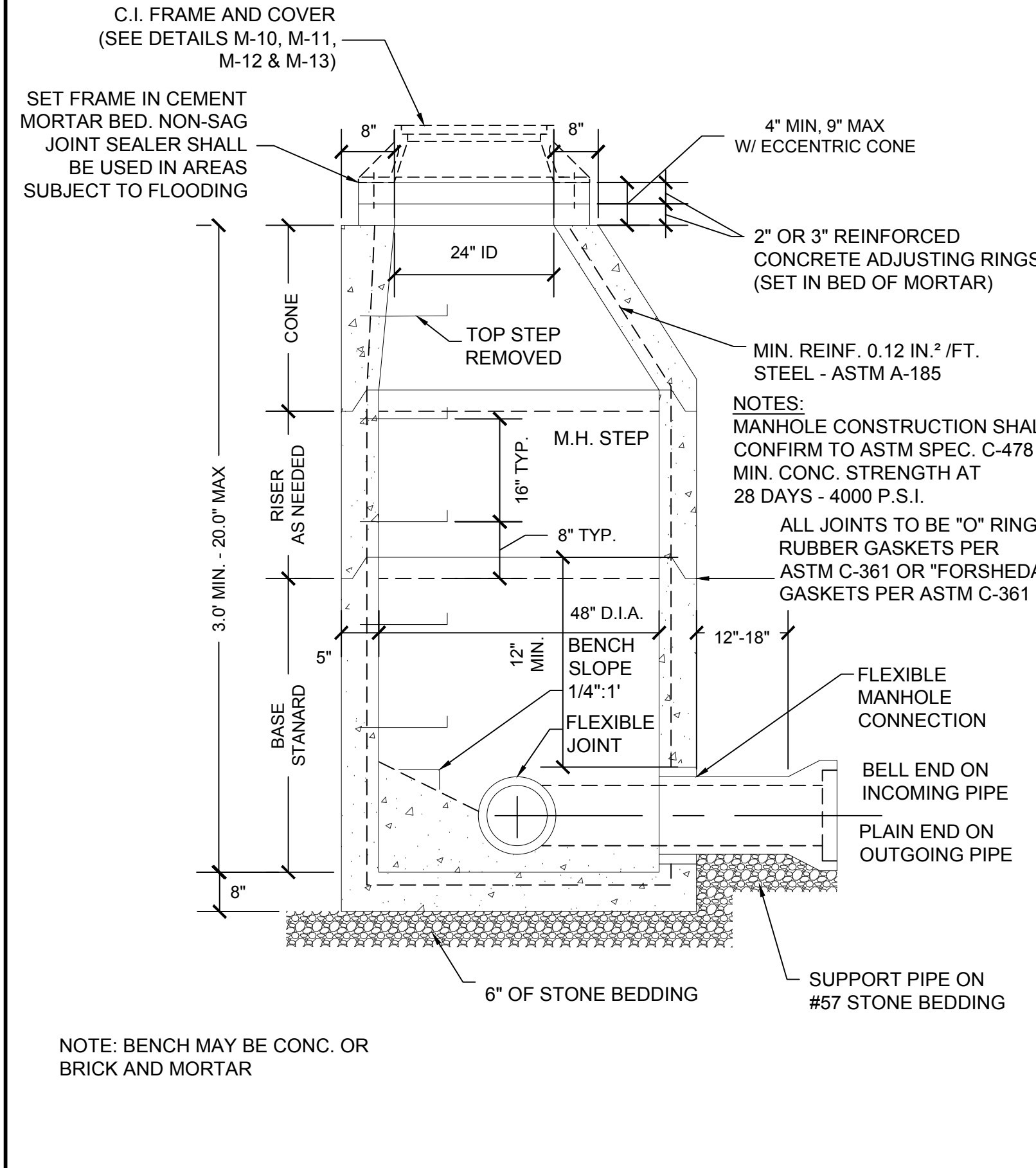
- NOTES:**
- CLEANOUT COVER SHALL BE BRASS IN CONCRETE/PAVEMENT OR PLASTIC IN GRASS AREAS.
 - CLEANOUT SHALL BE 6" OR LARGER UNLESS OTHERWISE APPROVED BY DPW DEPUTY DIRECTOR OR DESIGNEE.

| | | |
|--------------------------------|---|-------------------|
| DEPARTMENT OF PUBLIC UTILITIES | CITY OF RICHMOND, VIRGINIA CLEANOUT DETAIL NOT TO SCALE | REV. 12/09 P-7 |
|--------------------------------|---|-------------------|

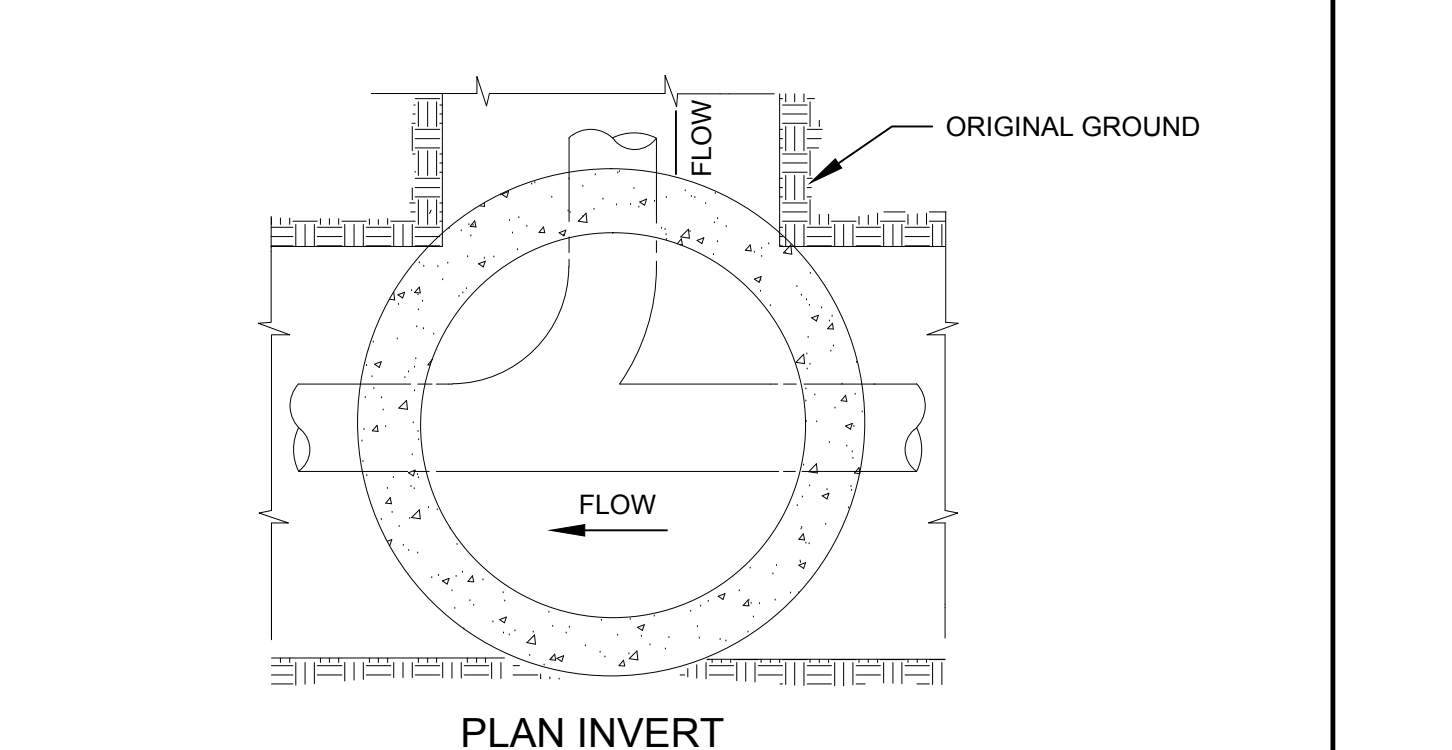


- NOTE:** INSTALL (4) FOUR 1/2" X 1 1/2" STAINLESS STEEL 3/4" HEXAGONAL HEAD BOLTS AT 90 DEGREES. COUNTERBORE THE COVER SO THAT THE HEAD OF THE BOLT IS FLUSH OR JUST BELOW THE TOP OF THE COVER.

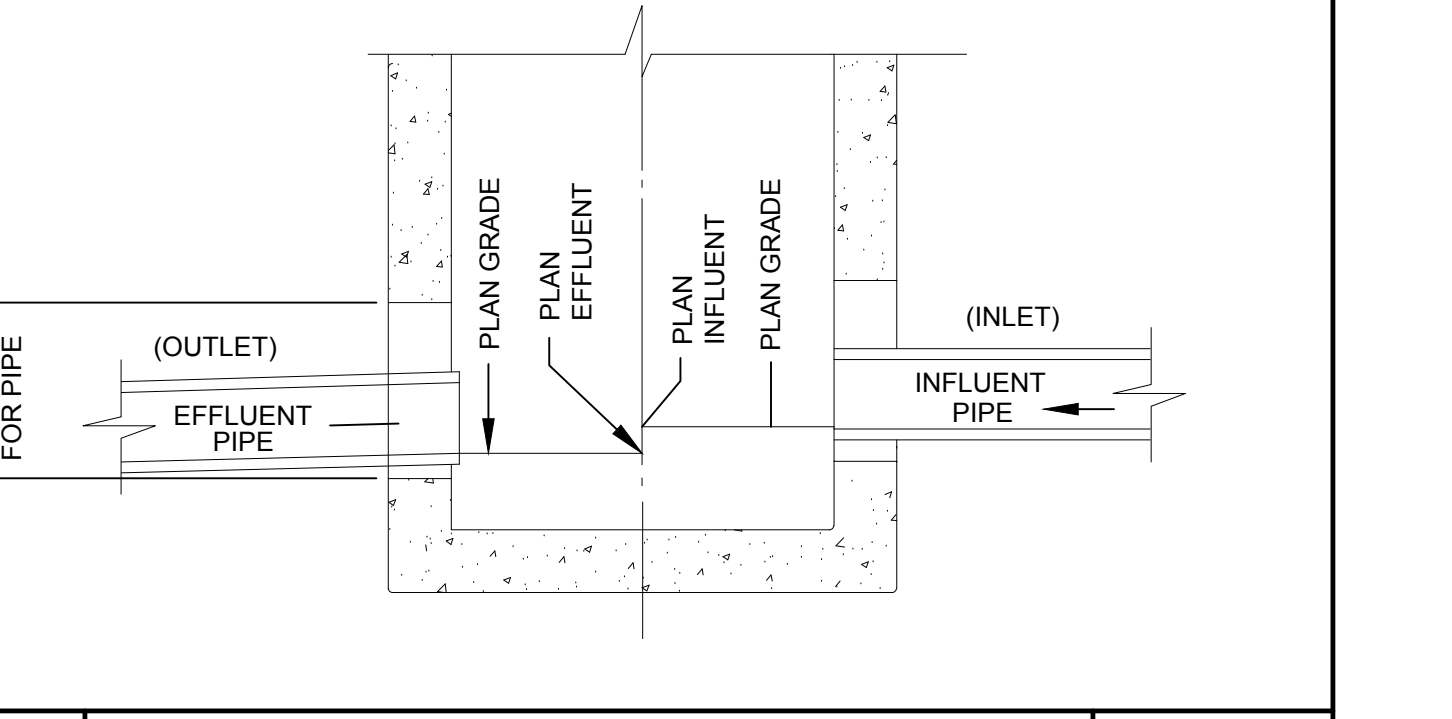
| | | |
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| DEPARTMENT OF PUBLIC UTILITIES | CITY OF RICHMOND, VIRGINIA WATERTIGHT FRAME AND COVER NOT TO SCALE | REV. 12/09 M-13 |
|--------------------------------|--|--------------------|



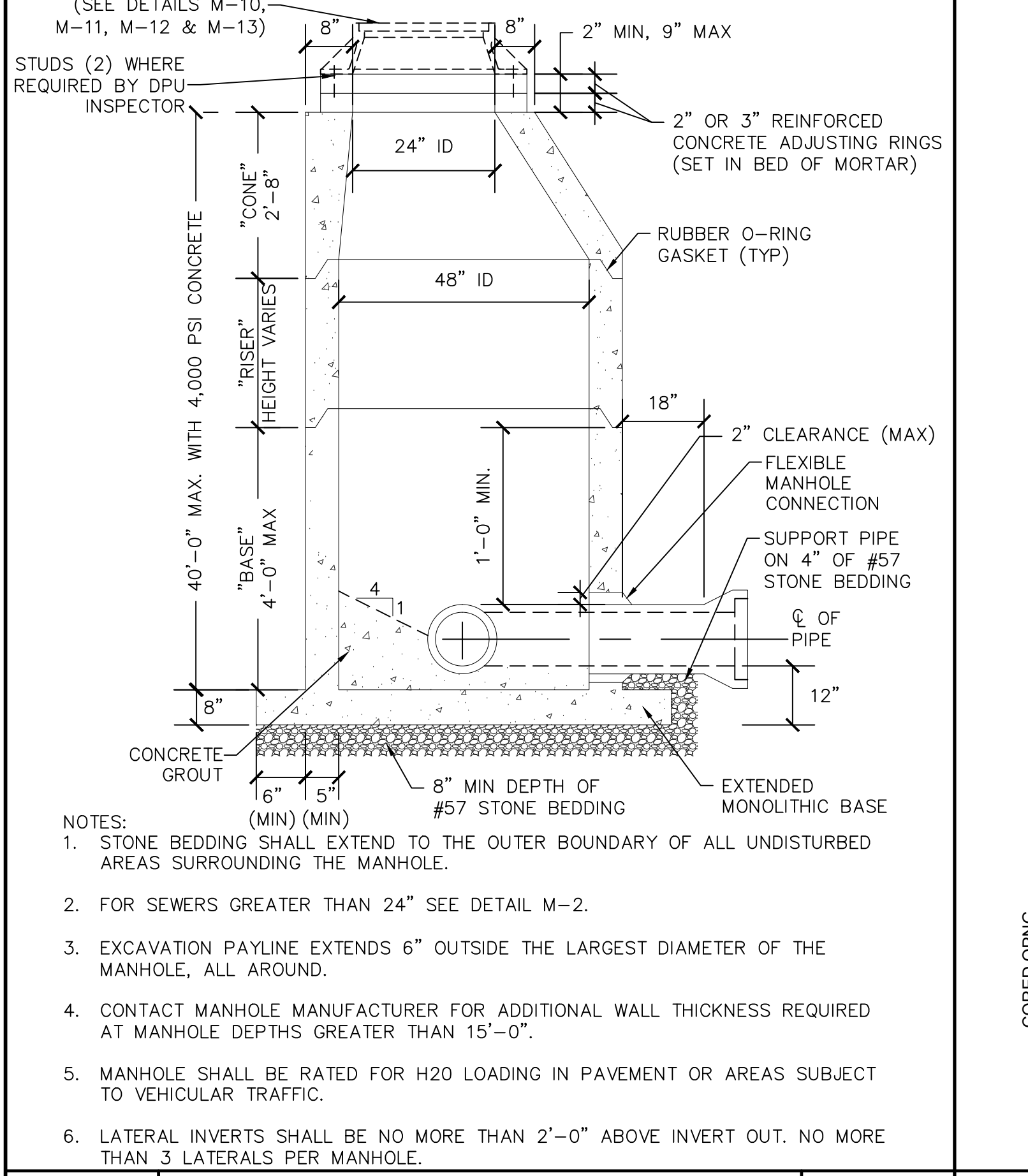
| | | |
|--------------------------------|---|-------------------|
| DEPARTMENT OF PUBLIC UTILITIES | CITY OF RICHMOND, VIRGINIA STANDARD MONITORING MANHOLE NOT TO SCALE | REV. 12/09 M-1 |
|--------------------------------|---|-------------------|



NOTE: THE EFFLUENT ELEVATION SHOWN AT A MANHOLE IS ESTABLISHED FROM THE INFLUENT ELEVATION OF THE MANHOLE IMMEDIATELY DOWNSTREAM. ELEVATIONS SHOWN APPLY AT THE 1/4 OF MANHOLES & ARE BASED ON THE HORIZONTAL DISTANCE, 1/4 TO 1/4 M.H. USING PERCENT OF GRADE INDICATED.

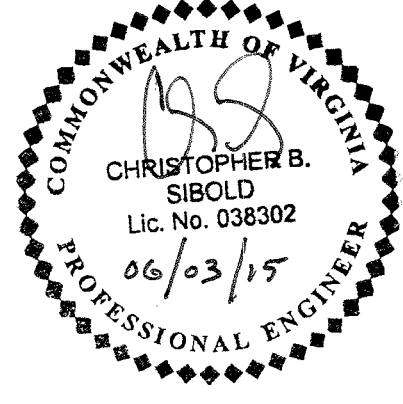


| | | |
|--------------------------------|---|--------------------|
| DEPARTMENT OF PUBLIC UTILITIES | CITY OF RICHMOND, VIRGINIA INVERT SHAPING DETAIL NOT TO SCALE | REV. 12/09 M-14 |
|--------------------------------|---|--------------------|



| | | |
|--------------------------------|---|-------------------|
| DEPARTMENT OF PUBLIC UTILITIES | CITY OF RICHMOND, VIRGINIA STANDARD PRECAST CONCRETE MANHOLE SEWERS 8" TO 24" NOT TO SCALE | REV. 12/09 M-1 |
|--------------------------------|---|-------------------|

S:\01\0844-urban_precast\sheet\summary_attachments\DWG\SHEET\C4.30-C4.40\UTING-CALC.DWG (Plotted on 6/3/2015 12:34 PM) by Rsp. Satmaria



ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: Bristol at Westwood - Building 1. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 8,607. Total Floor Area = Ai (Effe): 17,208. Calculated X(i) = 0.14. NFF = 3,111. Required Fire Flow - Rounded: 1,500 GPM.

Project Name: Bristol at Westwood - Building 2. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 24,524. Total Floor Area = Ai (Effe): 49,038. Calculated X(i) = 0.14. NFF = 5,967. Required Fire Flow - Rounded: 3,000 GPM.

Project Name: Bristol at Westwood - Building 3. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 12,870. Total Floor Area = Ai (Effe): 37,984. Calculated X(i) = 0.14. NFF = 4,805. Required Fire Flow - Rounded: 2,500 GPM.

Project Name: Bristol at Westwood - Building 4. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 12,870. Total Floor Area = Ai (Effe): 37,984. Calculated X(i) = 0.14. NFF = 4,407. Required Fire Flow - Rounded: 2,250 GPM.

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: Bristol at Westwood - Building 5. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 12,870. Total Floor Area = Ai (Effe): 37,984. Calculated X(i) = 0.14. NFF = 5,202. Required Fire Flow - Rounded: 2,500 GPM.

Project Name: Bristol at Westwood - Building 6. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 12,870. Total Floor Area = Ai (Effe): 37,984. Calculated X(i) = 0.14. NFF = 5,888. Required Fire Flow - Rounded: 3,000 GPM.

Project Name: Bristol at Westwood - Building 7. Type of Construction: wood frame construction. Class 1. Ground Floor Area (SF): 12,870. Total Floor Area = Ai (Effe): 37,984. Calculated X(i) = 0.14. NFF = 5,491. Required Fire Flow - Rounded: 2,500 GPM.

Table with 5 columns: Fixture, Fixture Value @ 35 psi, No. of Fixtures (set to zero if none), Fixture Value, COMMENTS. Lists fixtures like Bathroom, Whirlpool, Shower Head, etc. Total Fixture Value (FVT) = 18058. Meter Size based on FVT = 4".

METER SIZING
1. # OF UNITS = 301
2. (400 GPD/UNIT)(301 UNITS) = 120,400 GPD
3. USE VDH PEAK FLOW METHOD: (11.4)(120,400GPD/400)^(0.54) = 254 GPM PEAK FLOW
4" METER REQUIRED

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SCALE 1" = 30'

TIMMONS GROUP BRISTOL AT WESTWOOD CITY OF RICHMOND, VA UTILITY CALCULATIONS

Table with 2 columns: REVISION DESCRIPTION, DATE. Includes revision 1: DATE 06/03/2015, DRAWN BY J. CHAPMAN, DESIGNED BY R. SATMARIA, CHECKED BY C. SIBOLD.

S:\2015\44-Union Presbyterian Seminary\Apartment\DWG\DWG-CD-381-H4-C4-RU-IND-CALC-DWG.rvt Printed on 06/20/15 10:51 AM by Greg Veselin

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ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Building 8**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** **Class 1** (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **12,870** # of Stories: **3**
Total Floor area = Ai (Effe) **37,984** (Effective Area) Ai = **25,427**

Fire Area Considered
Construction Factor: Ci = 18 x (F) x √(Ai)
(Rounded to Nearest 250 GPM) Ci = **4,250**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **Oi = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | Xi | Pi | Xi+Pi | |
|--|--------------|------|-------|-------------|
| 31-60 | 1 0.14 | 0.00 | 0.14 | west |
| | 2 0.20 | 0.00 | 0.2 | north |
| | 3 0.10 | 0.00 | 0.1 | east |
| | 4 0.10 | 0.00 | 0.1 | south |
| | 5 | | 0 | |
| | 6 | | 0 | |
| | Total Xi+Pi= | | | 0.54 |

(LxH) of Facing Wall of Exposure Building [L=length (ft); H=number of stories] **201-300**
Class 1,3 All Construction (Exposure Building Class) **A**
Calculated Xi() = **0.14**

Description of protection: **Unprotected**
Communication Type **Open -Communications with Combustible Construction**
Length: **21-50**
Calculated P(i)= **0**

(X + P)j = 1.0 + ∑Xi = 1 (Xi + Pi) where n= number of sides of subject building **1.54**
[Maximum (X + P)j = 1.75; use (X + P)j = **1.54**]

Needed Fire Flow:
NFF = (Ci) x (Oi) x (X + P)j **NFF = 5,563**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF= **50%**
Required Fire Flow Total = **2,782**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **3,000 GPM**

Number of Hydrants Required: **3**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Building 9**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** **Class 1** (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **6,850** # of Stories: **2**
Total Floor area = Ai (Effe) **13,515** (Effective Area) Ai = **10,183**

Fire Area Considered
Construction Factor: Ci = 18 x (F) x √(Ai)
(Rounded to Nearest 250 GPM) Ci = **2,750**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **Oi = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | Xi | Pi | Xi+Pi | |
|--|--------------|------|-------|-------------|
| 31-60 | 1 0.20 | 0.00 | 0.2 | west |
| | 2 0.00 | 0.00 | 0 | north |
| | 3 0.00 | 0.00 | 0 | east |
| | 4 0.14 | 0.00 | 0.14 | south |
| | 5 | | 0 | |
| | 6 | | 0 | |
| | Total Xi+Pi= | | | 0.34 |

(LxH) of Facing Wall of Exposure Building [L=length (ft); H=number of stories] **201-300**
Class 1,3 All Construction (Exposure Building Class) **A**
Calculated Xi() = **0.14**

Description of protection: **Unprotected**
Communication Type **Open -Communications with Combustible Construction**
Length: **21-50**
Calculated P(i)= **0**

(X + P)j = 1.0 + ∑Xi = 1 (Xi + Pi) where n= number of sides of subject building **1.34**
[Maximum (X + P)j = 1.75; use (X + P)j = **1.34**]

Needed Fire Flow:
NFF = (Ci) x (Oi) x (X + P)j **NFF = 3,132**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF= **50%**
Required Fire Flow Total = **1,566**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **1,500 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Building 10**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** **Class 1** (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **6,850** # of Stories: **2**
Total Floor area = Ai (Effe) **13,515** (Effective Area) Ai = **10,183**

Fire Area Considered
Construction Factor: Ci = 18 x (F) x √(Ai)
(Rounded to Nearest 250 GPM) Ci = **2,750**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **Oi = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | Xi | Pi | Xi+Pi | |
|--|--------------|------|-------|-------------|
| 31-60 | 1 0.15 | 0.00 | 0.15 | west |
| | 2 0.14 | 0.00 | 0.14 | north |
| | 3 0.00 | 0.00 | 0 | east |
| | 4 0.14 | 0.00 | 0.14 | south |
| | 5 | | 0 | |
| | 6 | | 0 | |
| | Total Xi+Pi= | | | 0.43 |

(LxH) of Facing Wall of Exposure Building [L=length (ft); H=number of stories] **201-300**
Class 1,3 All Construction (Exposure Building Class) **A**
Calculated Xi() = **0.14**

Description of protection: **Unprotected**
Communication Type **Open -Communications with Combustible Construction**
Length: **21-50**
Calculated P(i)= **0**

(X + P)j = 1.0 + ∑Xi = 1 (Xi + Pi) where n= number of sides of subject building **1.43**
[Maximum (X + P)j = 1.75; use (X + P)j = **1.43**]

Needed Fire Flow:
NFF = (Ci) x (Oi) x (X + P)j **NFF = 3,343**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF= **50%**
Required Fire Flow Total = **1,671**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **1,750 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Building 11**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** **Class 1** (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **6,850** # of Stories: **2**
Total Floor area = Ai (Effe) **13,515** (Effective Area) Ai = **10,183**

Fire Area Considered
Construction Factor: Ci = 18 x (F) x √(Ai)
(Rounded to Nearest 250 GPM) Ci = **2,750**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **Oi = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | Xi | Pi | Xi+Pi | |
|--|--------------|------|-------|-------------|
| 31-60 | 1 0.09 | 0.00 | 0.09 | west |
| | 2 0.14 | 0.00 | 0.14 | north |
| | 3 0.00 | 0.00 | 0 | east |
| | 4 0.15 | 0.00 | 0.15 | south |
| | 5 | | 0 | |
| | 6 | | 0 | |
| | Total Xi+Pi= | | | 0.38 |

(LxH) of Facing Wall of Exposure Building [L=length (ft); H=number of stories] **201-300**
Class 1,3 All Construction (Exposure Building Class) **A**
Calculated Xi() = **0.14**

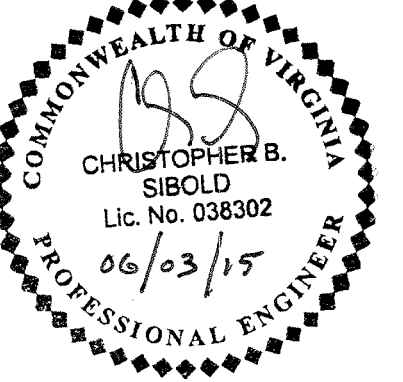
Description of protection: **Unprotected**
Communication Type **Open -Communications with Combustible Construction**
Length: **21-50**
Calculated P(i)= **0**

(X + P)j = 1.0 + ∑Xi = 1 (Xi + Pi) where n= number of sides of subject building **1.38**
[Maximum (X + P)j = 1.75; use (X + P)j = **1.38**]

Needed Fire Flow:
NFF = (Ci) x (Oi) x (X + P)j **NFF = 3,226**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF= **50%**
Required Fire Flow Total = **1,613**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **1,500 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)



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Richmond, VA 23225
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YOUR VISION ACHIEVED THROUGH OURS.

DATE
06/03/2015
DRAWN BY
J.CHAPMAN
DESIGNED BY
R.SATMARIA
CHECKED BY
C. SIBOLD

SCALE
1" = 30'

TIMMONS GROUP

JOB NO.
36144
SHEET NO.
C4.41

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA
UTILITY CALCULATIONS

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Building 15**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** Class 1 (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **6,850** # of Stories: **2** (Effective Area) Ai = **10,183**
Total Floor area = Ai (Eff): **13,515**

Fire Area Considered
Construction Factor: $C_i = 18 \times (F) \times \sqrt{A_i}$
(Rounded to Nearest 250 GPM) Ci = **2,750**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **O_i = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | X _i | P _i | X+P _i | |
|--|----------------|----------------|------------------|-------|
| 1 | 0.00 | 0.00 | 0 | west |
| 2 | 0.15 | 0.00 | 0.15 | north |
| 3 | 0.14 | 0.00 | 0.14 | east |
| 4 | 0.00 | 0.00 | 0 | south |
| 5 | | | | |
| 6 | | | | |
| Class 1,3 All Construction (Exposure Building Class) | | | A | |
| Calculated X _i | | | 0.14 | |
| Total X+P _i | | | 0.29 | |

Description of protection: **Unprotected**

Communication Type: **Open -Communications with Combustible Construction**

Length: **21-50**
Calculated P_i = **0**

$(X + P)_i = 1.0 + \sum_{i=1}^n (X_i + P_i)$ where n = number of sides of subject building
[Maximum (X + P)_i] = 1.75; use (X + P)_i = **1.29**

Needed Fire Flow:

$NFF = (C_i) \times (O_i) \times (X + P)_i$ NFF = **3,015**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF = **50%**
Required Fire Flow Total = **1,508**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **1,500 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Carriage 1**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** Class 1 (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **1,580** # of Stories: **2** (Effective Area) Ai = **2,369**
Total Floor area = Ai (Eff): **3,157**

Fire Area Considered
Construction Factor: $C_i = 18 \times (F) \times \sqrt{A_i}$
(Rounded to Nearest 250 GPM) Ci = **1,250**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **O_i = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | X _i | P _i | X+P _i | |
|--|----------------|----------------|------------------|-------|
| 1 | 0.00 | 0.00 | 0 | west |
| 2 | 0.14 | 0.00 | 0.14 | north |
| 3 | 0.00 | 0.00 | 0 | east |
| 4 | 0.15 | 0.00 | 0.15 | south |
| 5 | | | | |
| 6 | | | | |
| Class 1,3 All Construction (Exposure Building Class) | | | A | |
| Calculated X _i | | | 0.14 | |
| Total X+P _i | | | 0.29 | |

Description of protection: **Unprotected**

Communication Type: **Open -Communications with Combustible Construction**

Length: **21-50**
Calculated P_i = **0**

$(X + P)_i = 1.0 + \sum_{i=1}^n (X_i + P_i)$ where n = number of sides of subject building
[Maximum (X + P)_i] = 1.75; use (X + P)_i = **1.29**

Needed Fire Flow:

$NFF = (C_i) \times (O_i) \times (X + P)_i$ NFF = **1,371**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF = **50%**
Required Fire Flow Total = **685**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **750 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Carriage 2**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** Class 1 (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **1,580** # of Stories: **2** (Effective Area) Ai = **2,369**
Total Floor area = Ai (Eff): **3,157**

Fire Area Considered
Construction Factor: $C_i = 18 \times (F) \times \sqrt{A_i}$
(Rounded to Nearest 250 GPM) Ci = **1,250**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **O_i = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | X _i | P _i | X+P _i | |
|--|----------------|----------------|------------------|-------|
| 1 | 0.15 | 0.00 | 0.15 | west |
| 2 | 0.00 | 0.00 | 0 | north |
| 3 | 0.15 | 0.00 | 0.15 | east |
| 4 | 0.08 | 0.00 | 0.08 | south |
| 5 | | | | |
| 6 | | | | |
| Class 1,3 All Construction (Exposure Building Class) | | | A | |
| Calculated X _i | | | 0.14 | |
| Total X+P _i | | | 0.38 | |

Description of protection: **Unprotected**

Communication Type: **Open -Communications with Combustible Construction**

Length: **21-50**
Calculated P_i = **0**

$(X + P)_i = 1.0 + \sum_{i=1}^n (X_i + P_i)$ where n = number of sides of subject building
[Maximum (X + P)_i] = 1.75; use (X + P)_i = **1.38**

Needed Fire Flow:

$NFF = (C_i) \times (O_i) \times (X + P)_i$ NFF = **1,466**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF = **50%**
Required Fire Flow Total = **733**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **750 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
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ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Clubhouse**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** Class 1 (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **6,433** # of Stories: **1** (Effective Area) Ai = **6,433**
Total Floor area = Ai (Eff): **6,433**

Fire Area Considered
Construction Factor: $C_i = 18 \times (F) \times \sqrt{A_i}$
(Rounded to Nearest 250 GPM) Ci = **2,250**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **O_i = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | X _i | P _i | X+P _i | |
|--|----------------|----------------|------------------|-------|
| 1 | 0.15 | 0.00 | 0.15 | west |
| 2 | 0.15 | 0.00 | 0.15 | north |
| 3 | 0.06 | 0.00 | 0.06 | east |
| 4 | 0.14 | 0.00 | 0.14 | south |
| 5 | | | | |
| 6 | | | | |
| Class 1,3 All Construction (Exposure Building Class) | | | A | |
| Calculated X _i | | | 0.14 | |
| Total X+P _i | | | 0.52 | |

Description of protection: **Unprotected**

Communication Type: **Open -Communications with Combustible Construction**

Length: **21-50**
Calculated P_i = **0**

$(X + P)_i = 1.0 + \sum_{i=1}^n (X_i + P_i)$ where n = number of sides of subject building
[Maximum (X + P)_i] = 1.75; use (X + P)_i = **1.52**

Needed Fire Flow:

$NFF = (C_i) \times (O_i) \times (X + P)_i$ NFF = **2,907**
Does Building Have Automatic Sprinklers? **No**
Reduction Factor : 50% x NFF = **0%**
Required Fire Flow Total = **2,907**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **3,000 GPM**

Number of Hydrants Required: **3**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
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ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Carriage 3**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** Class 1 (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **1,579** # of Stories: **2** (Effective Area) Ai = **2,367**
Total Floor area = Ai (Eff): **3,155**

Fire Area Considered
Construction Factor: $C_i = 18 \times (F) \times \sqrt{A_i}$
(Rounded to Nearest 250 GPM) Ci = **1,250**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **O_i = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | X _i | P _i | X+P _i | |
|--|----------------|----------------|------------------|-------|
| 1 | 0.00 | 0.00 | 0 | west |
| 2 | 0.13 | 0.00 | 0.13 | north |
| 3 | 0.15 | 0.00 | 0.15 | east |
| 4 | 0.15 | 0.00 | 0.15 | south |
| 5 | | | | |
| 6 | | | | |
| Class 1,3 All Construction (Exposure Building Class) | | | A | |
| Calculated X _i | | | 0.14 | |
| Total X+P _i | | | 0.43 | |

Description of protection: **Unprotected**

Communication Type: **Open -Communications with Combustible Construction**

Length: **21-50**
Calculated P_i = **0**

$(X + P)_i = 1.0 + \sum_{i=1}^n (X_i + P_i)$ where n = number of sides of subject building
[Maximum (X + P)_i] = 1.75; use (X + P)_i = **1.43**

Needed Fire Flow:

$NFF = (C_i) \times (O_i) \times (X + P)_i$ NFF = **1,519**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF = **50%**
Required Fire Flow Total = **760**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **750 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
American Water Works Association, AWWA Manual M31 (sections reprinted with permission - Insurance Services Office, Inc., Copyright 1989)

ISO (Insurance Service Office) Method of Calculating NFF (Needed Fire Flow)

Project Name: **Bristol at Westwood - Carriage 4**
Timmons Job No.:
Calc. By: T. Owens
Date: 5/18/2015

Type of Construction: **wood frame construction** Class 1 (ISO Classification) (Class Factor) F = **1.5**
Ground Floor Area (SF): **1,579** # of Stories: **2** (Effective Area) Ai = **2,367**
Total Floor area = Ai (Eff): **3,155**

Fire Area Considered
Construction Factor: $C_i = 18 \times (F) \times \sqrt{A_i}$
(Rounded to Nearest 250 GPM) Ci = **1,250**

Type of Occupancy: **apartment** (Worst Case) Occupancy Factor: **O_i = 0.85**
Occupancy Class: **C-2 Limited-combustible**

Calculate Exposure (X) and Communication (P):
(calculate for each side and enter into the chart at right)

| Distance (FT) to the Exposure Building | X _i | P _i | X+P _i | |
|--|----------------|----------------|------------------|-------|
| 1 | 0.00 | 0.00 | 0 | west |
| 2 | 0.10 | 0.00 | 0.1 | north |
| 3 | 0.14 | 0.00 | 0.14 | east |
| 4 | 0.13 | 0.00 | 0.13 | south |
| 5 | | | | |
| 6 | | | | |
| Class 1,3 All Construction (Exposure Building Class) | | | A | |
| Calculated X _i | | | 0.14 | |
| Total X+P _i | | | 0.37 | |

Description of protection: **Unprotected**

Communication Type: **Open -Communications with Combustible Construction**

Length: **21-50**
Calculated P_i = **0**

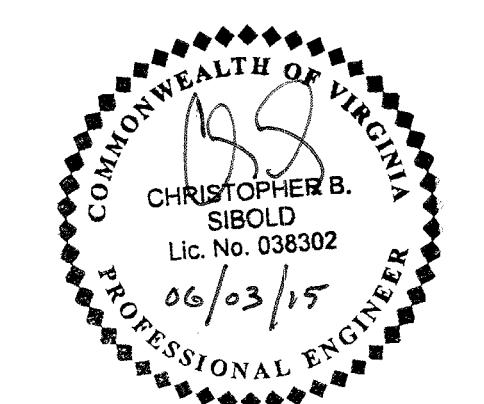
$(X + P)_i = 1.0 + \sum_{i=1}^n (X_i + P_i)$ where n = number of sides of subject building
[Maximum (X + P)_i] = 1.75; use (X + P)_i = **1.37**

Needed Fire Flow:

$NFF = (C_i) \times (O_i) \times (X + P)_i$ NFF = **1,456**
Does Building Have Automatic Sprinklers? **Yes**
Reduction Factor : 50% x NFF = **50%**
Required Fire Flow Total = **728**
Required Fire Flow - Rounded
<2500 nearest 250
>2500 nearest 500 **750 GPM**

Number of Hydrants Required: **1**
[Minimum based on IFC calculation @ 1750 gpm]
Additional hydrants may be required based on 350' max hose lay (commercial area)

Calculations of ISO Method Based on "Distribution System Requirements for Fire Protection"
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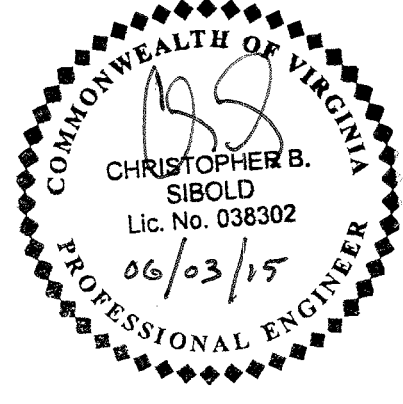
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CITY OF RICHMOND, VA
UTILITY CALCULATIONS

JOB NO.
36144

SHEET NO.
C4.42

S:\03\1044-Union-Tree\Utility-Calc\Bristol-Clubhouse-C4.42-UTM-CALC.DWG Plotted on 06/03/2015 9:58:48 AM by Greg Meason

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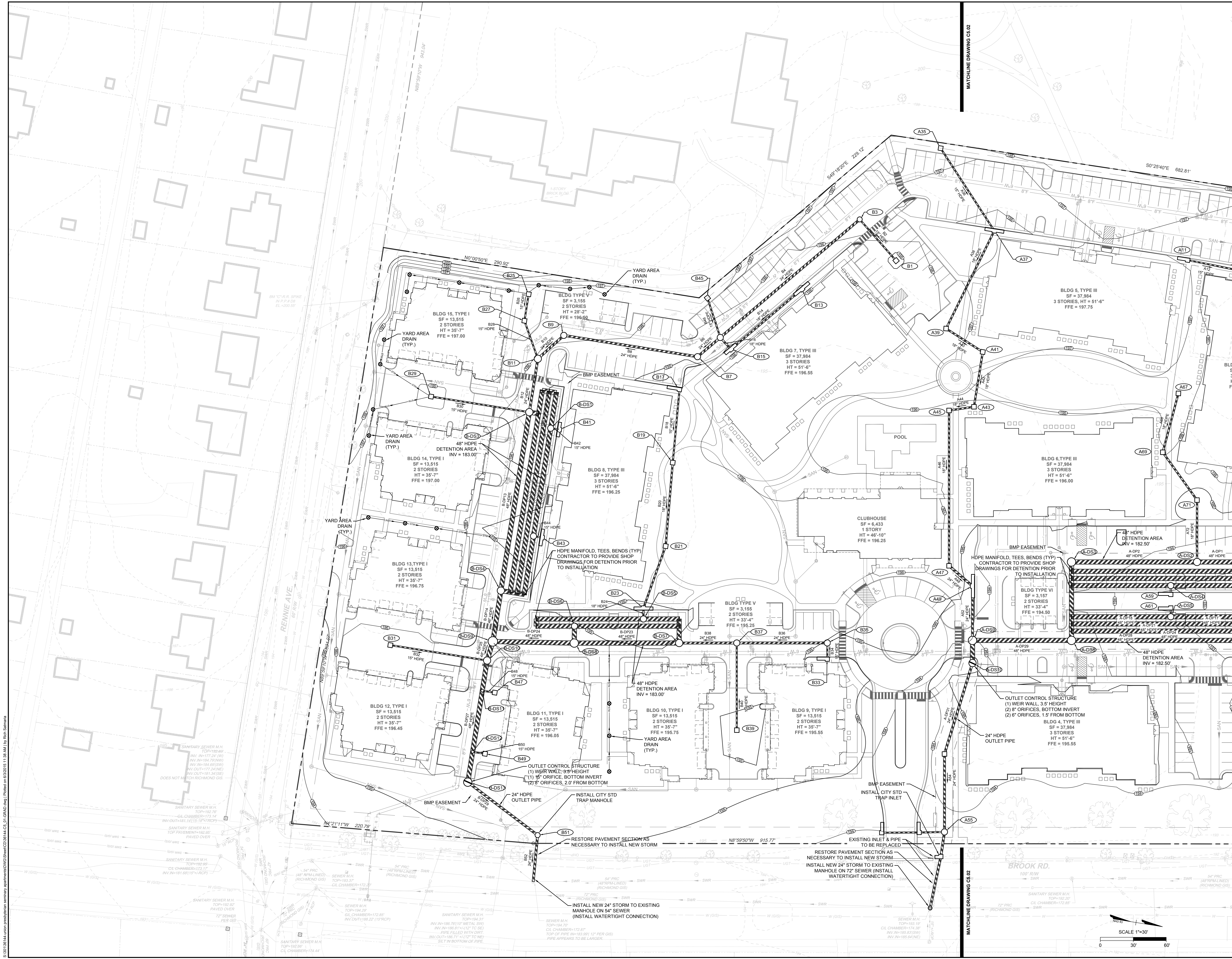
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 CITY OF RICHMOND, VA

GRADING AND DRAINAGE PLAN

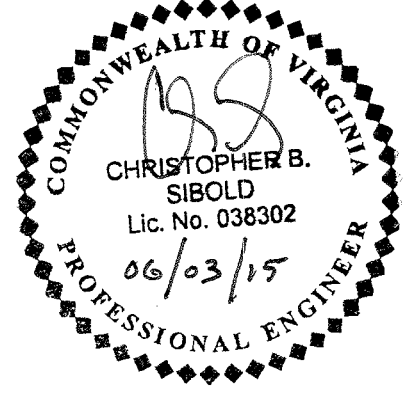
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SHEET NO.
 C5.01



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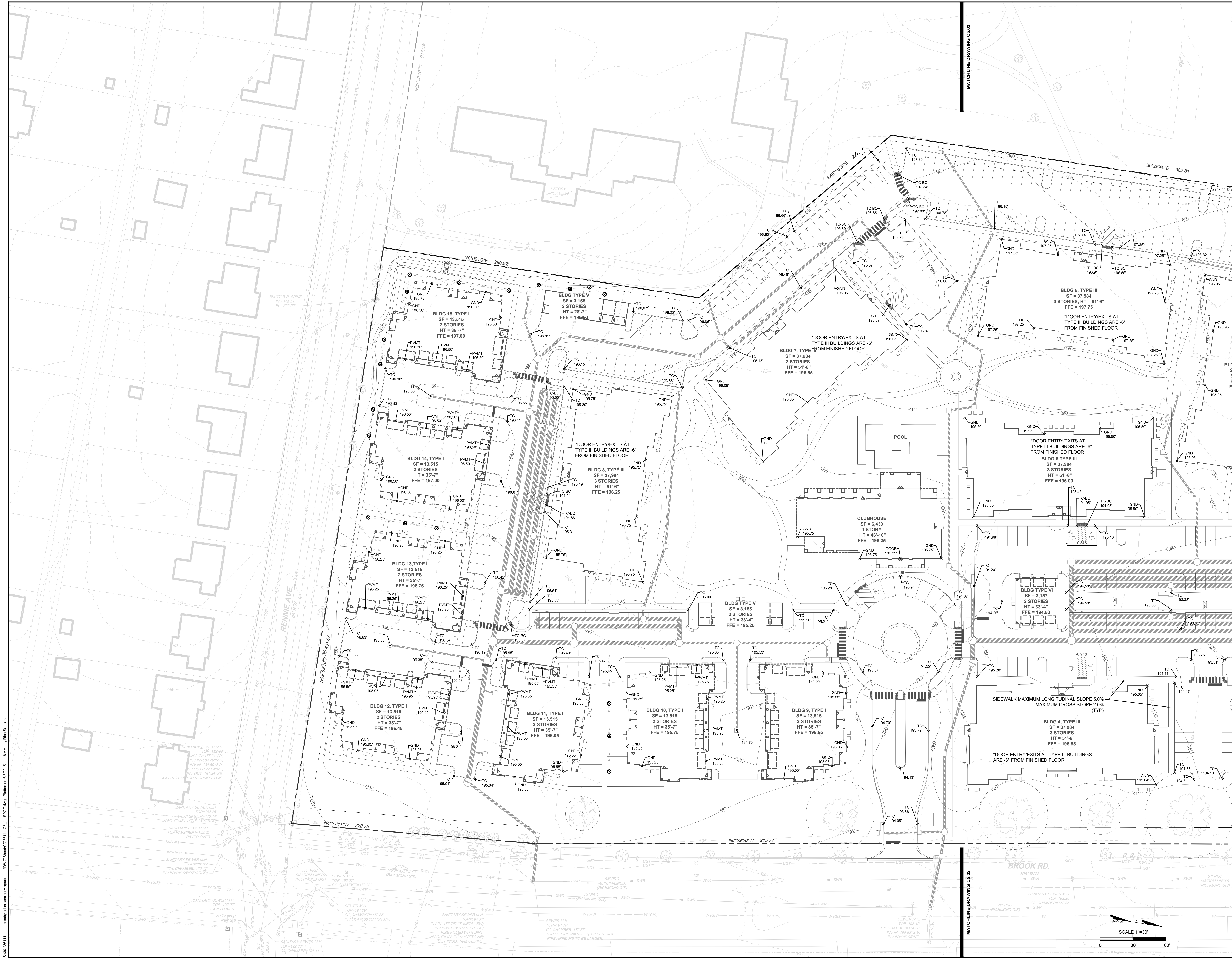
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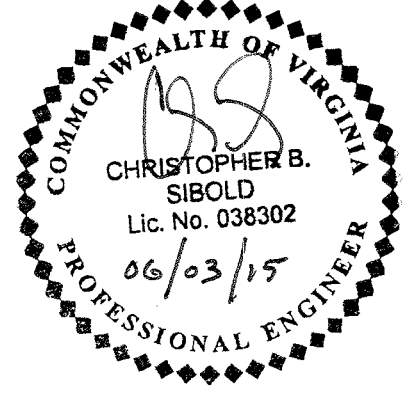
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 SPOT ELEVATION PLAN

JOB NO.
36144

SHEET NO.
C5.11



S:\2015\1544 urban presch\res\sewery\apartments\DWG\Sheet\C5.11-SPOT.dwg | PLOT on 6/3/2015 11:18 AM | Dr. Rob. Shimansky



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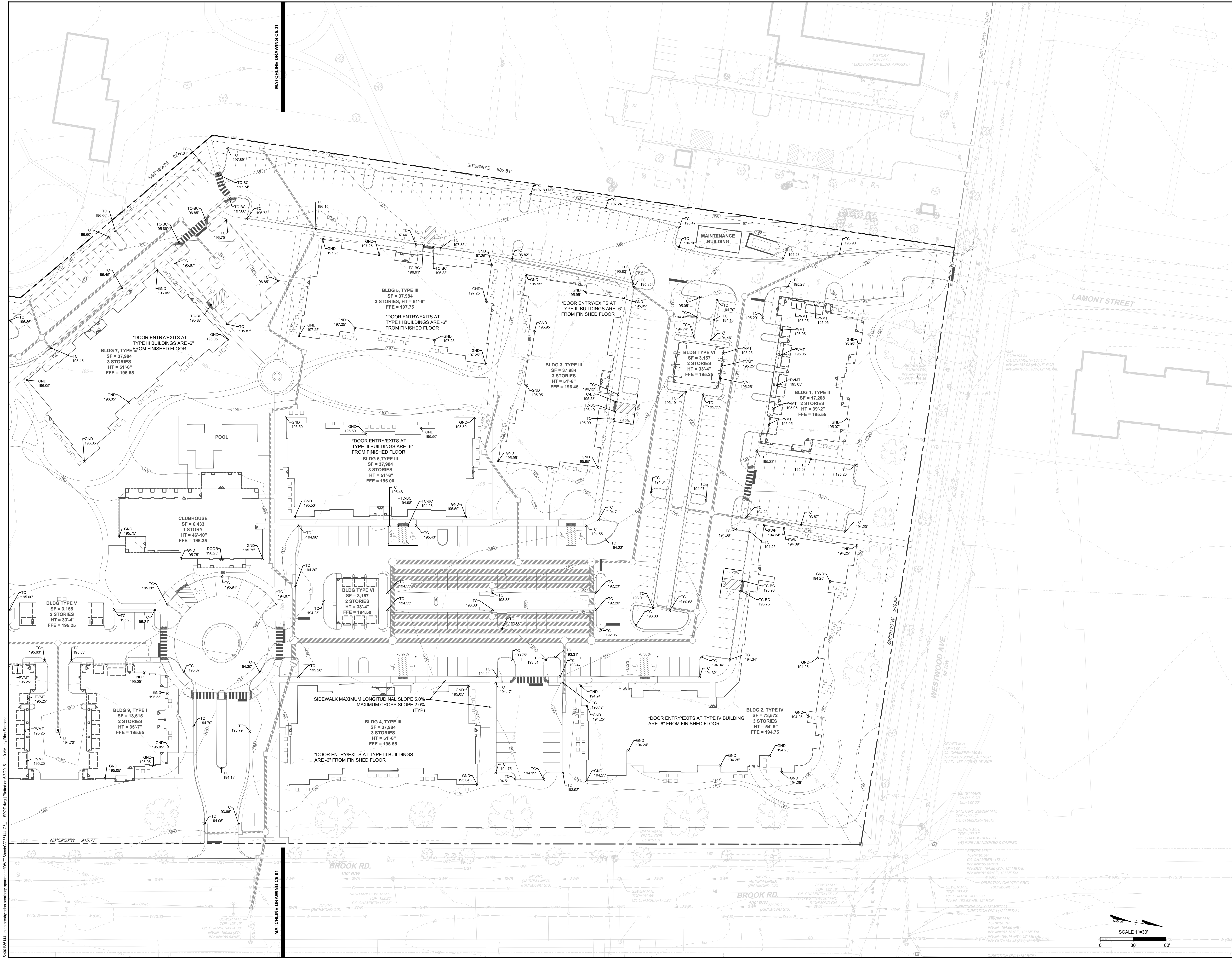
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| SHEET NO. | C5.12 |

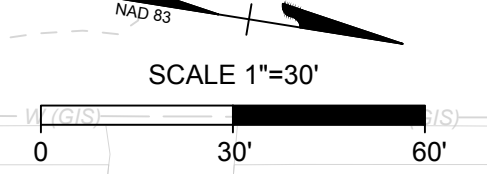
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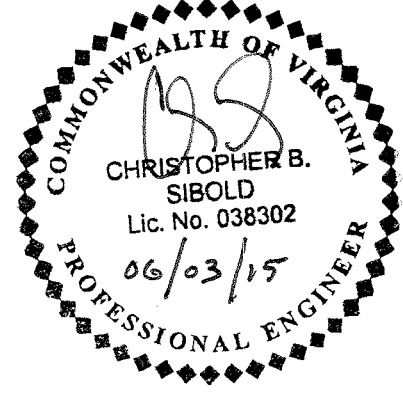
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MATCHLINE DRAWING C5.01

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SCALE
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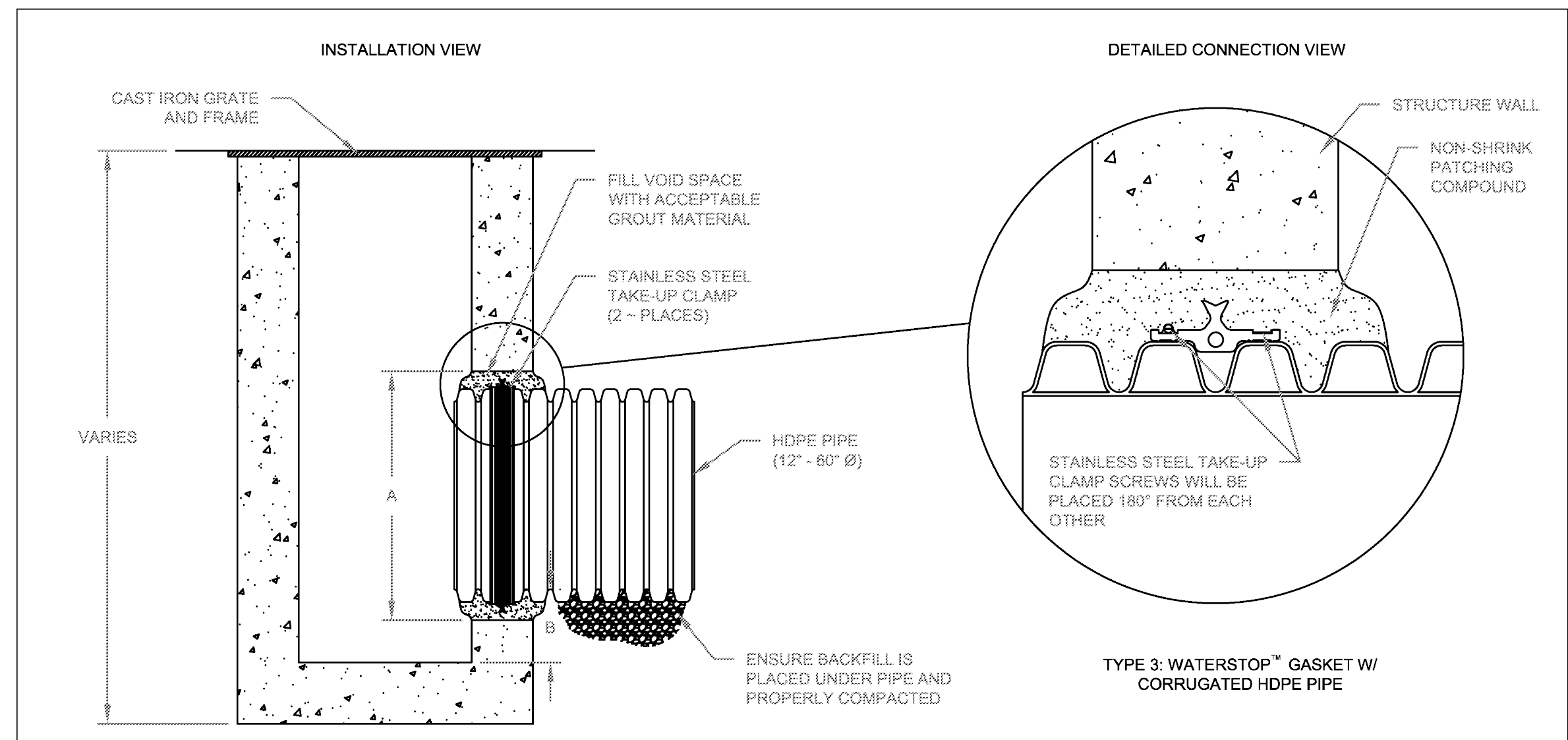
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CITY OF RICHMOND, VA

POSTDEVELOPED DRAINAGE AREA PLAN

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SHEET NO.
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INSTALLATION RECOMMENDATIONS ARE ALSO SPECIFIED IN INSTALLATION GUIDE 1.05: WATERSTOP INSTALLATION

| PIPE SIZE (IN) | PIPE OD (IN) | A-PROFILE HOLE Ø (IN) | H-PROFILE HOLE Ø (IN) | "A" MIN. DISTANCE PIPE INVERT TO STRUCTURE INVERT (IN) | "B" MIN. DISTANCE PIPE INVERT TO STRUCTURE INVERT (IN) | MANUFACTURER'S PRODUCT CODE |
|----------------|--------------|-----------------------|-----------------------|--|--|-----------------------------|
| 12 | 14.5 | 14.2 | 19.50 | 3.7 | 4.0 | 1702PS |
| 15 | 17.6 | 17.8 | 23.00 | 4.0 | 4.2 | 1802PS |
| 18 | 21.2 | 21.5 | 26.50 | 4.2 | 4.5 | 2402PS |
| 24 | 27.8 | 28.4 | 33.25 | 4.5 | 5.2 | 3002PS |
| 30 | 35.1 | 35.5 | 40.50 | 5.2 | 5.5 | 3602PS |
| 36 | 41.1 | 41.4 | 47.00 | 5.5 | 5.7 | 4202PS |
| 42 | 47.7 | 48.0 | 53.00 | 5.7 | 6.4 | 4802PS |
| 48 | 53.8 | 54.0 | 59.00 | 5.7 | 6.4 | 5402PS |
| 60 | 66.3 | 67.3 | 72.00 | 6.4 | | 6002PS |

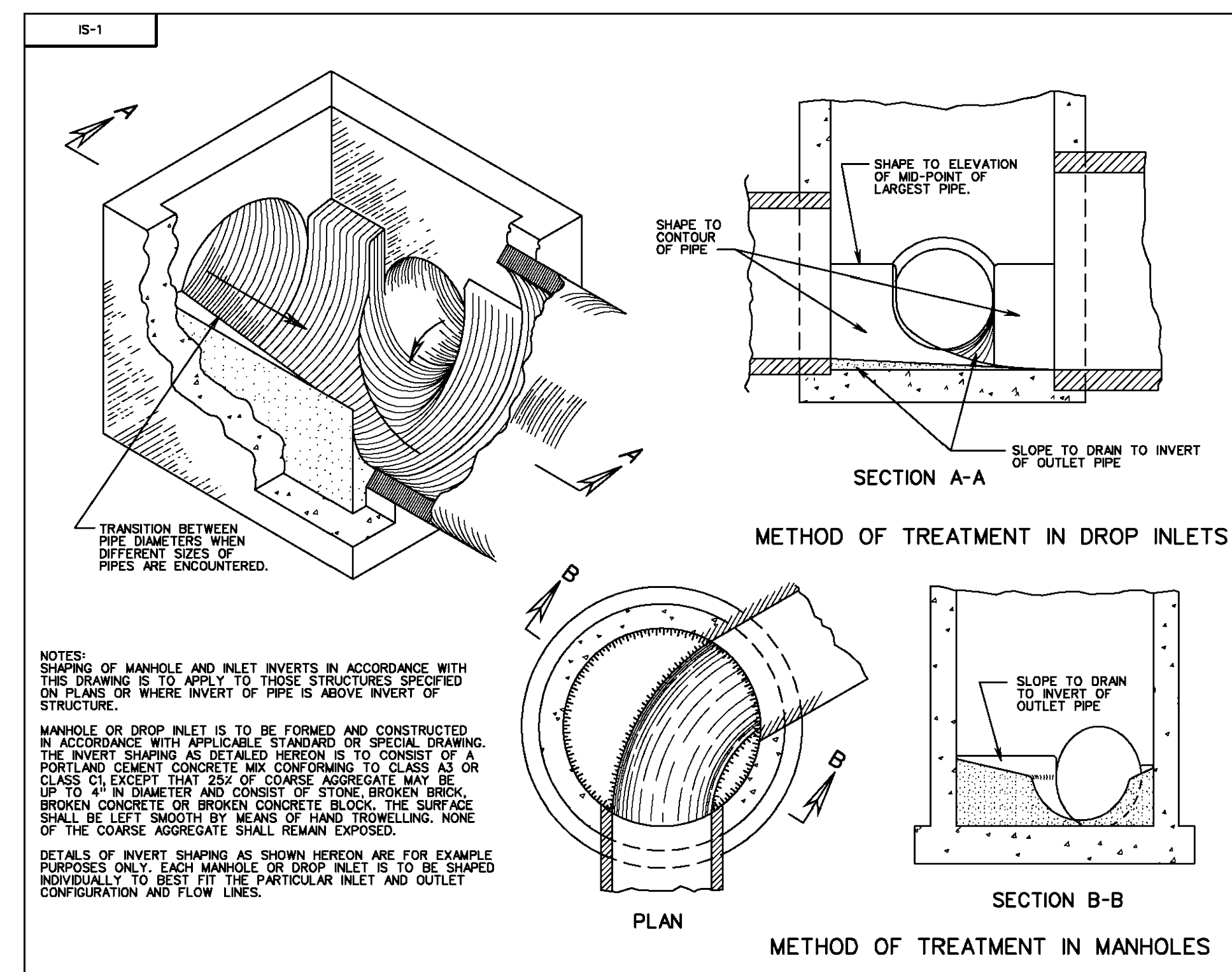
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| | | | | |
|------|-----------------|-----|----------|------|
| 1 | UPDATED DRAWING | TJR | 02/21/07 | CNS |
| REV. | DESCRIPTION | BY | DATE | CHKD |

WATERSTOP STRUCTURE CONNECTION DETAIL

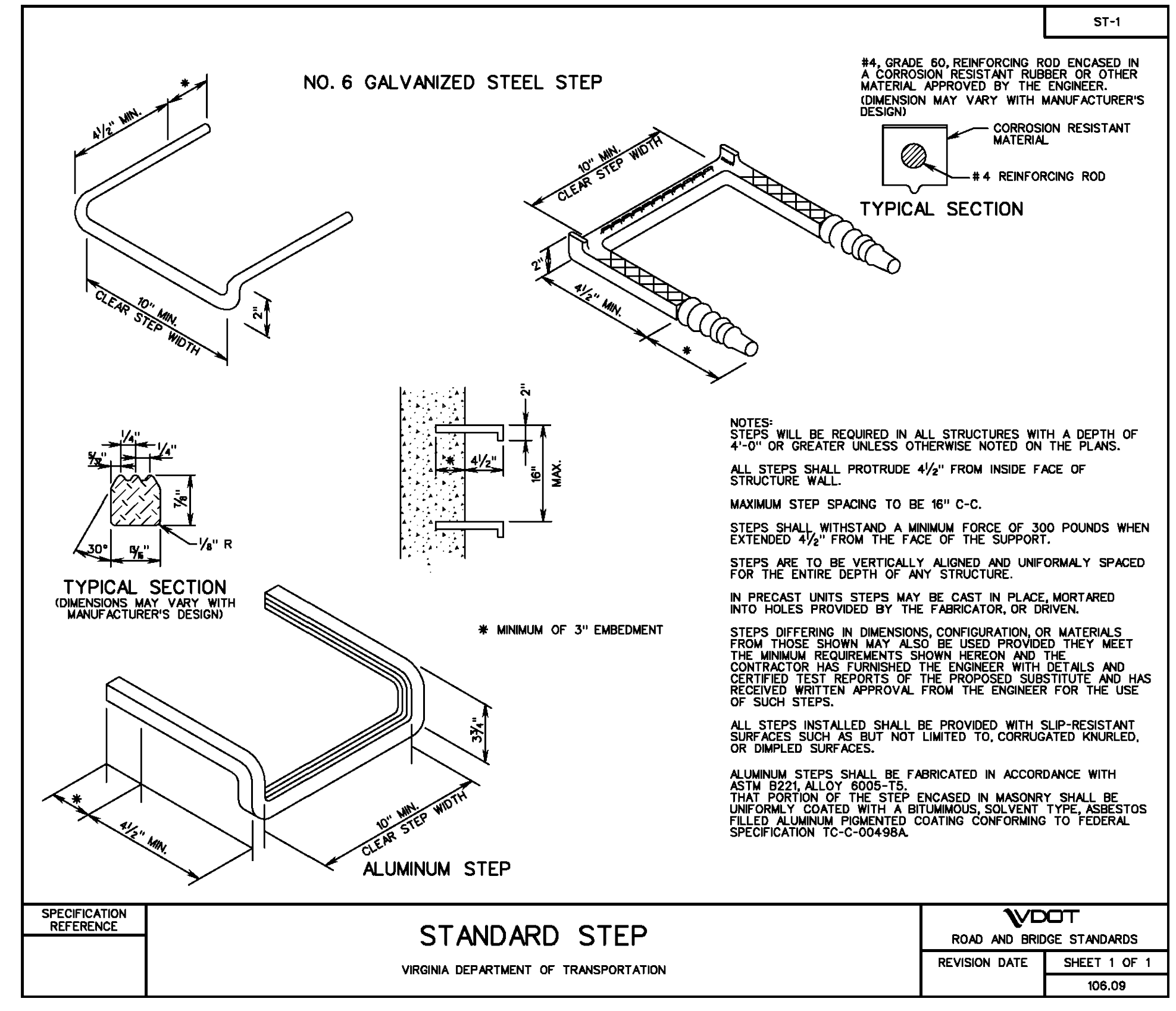
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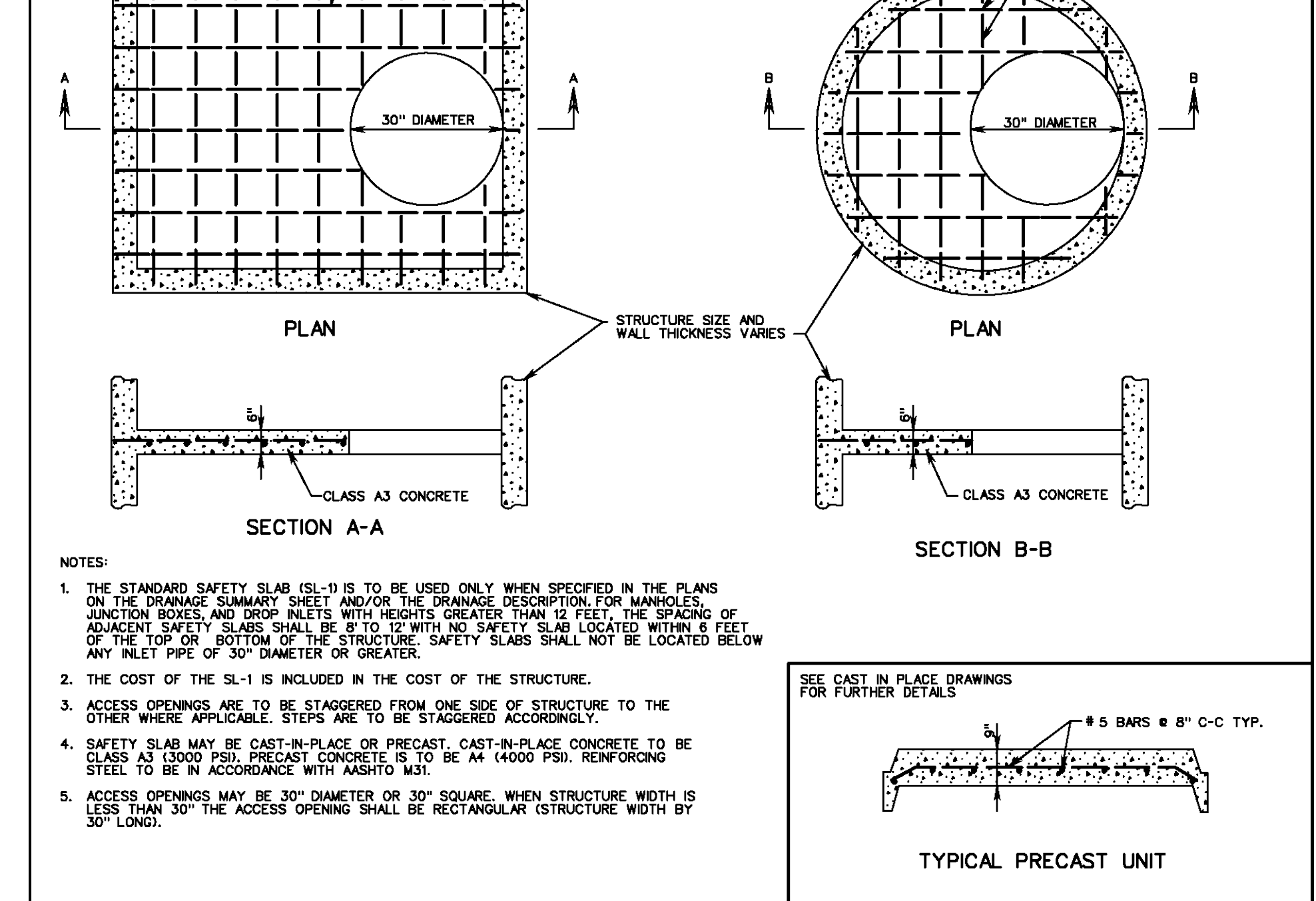


STANDARD METHOD OF SHAPING MANHOLE & INLET INVERTS
VIRGINIA DEPARTMENT OF TRANSPORTATION

| | | | |
|--------|---------------|-----|-------------------------|
| 106.08 | REVISION DATE | 302 | SPECIFICATION REFERENCE |
|--------|---------------|-----|-------------------------|

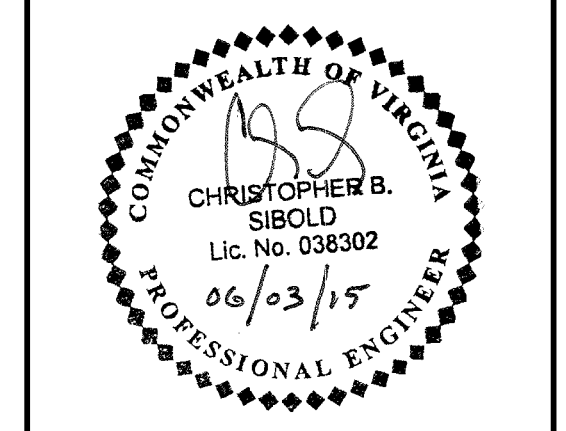


STANDARD STEP
VIRGINIA DEPARTMENT OF TRANSPORTATION



TYPICAL CONCRETE SAFETY SLAB FOR DROP INLETS, MANHOLES AND JUNCTION BOXES
VIRGINIA DEPARTMENT OF TRANSPORTATION

| | | | |
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| 106.14 | REVISION DATE | 302 | SPECIFICATION REFERENCE |
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DATE: 06/03/2015

DRAWN BY: J. CHAPMAN

DESIGNED BY: R. SATMARIA

CHECKED BY: C. SIBOLD

SCALE: 1" = 30"

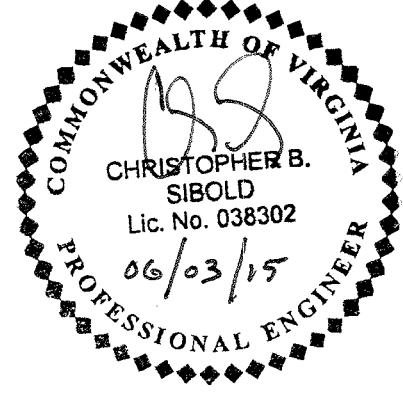
TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

GRADING & DRAINAGE NOTES & DETAILS

JOB NO.: 36144

SHEET NO.: C5.31



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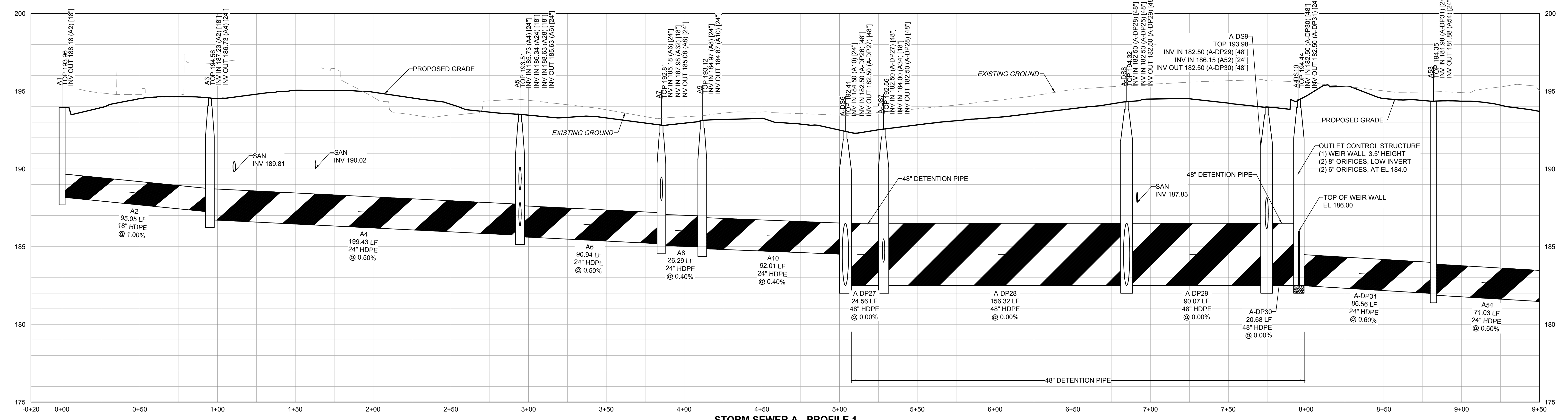
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| DESIGNED BY | R. SATMARIA |
| CHECKED BY | C. SIBOLD |
| SCALE | AS NOTED |

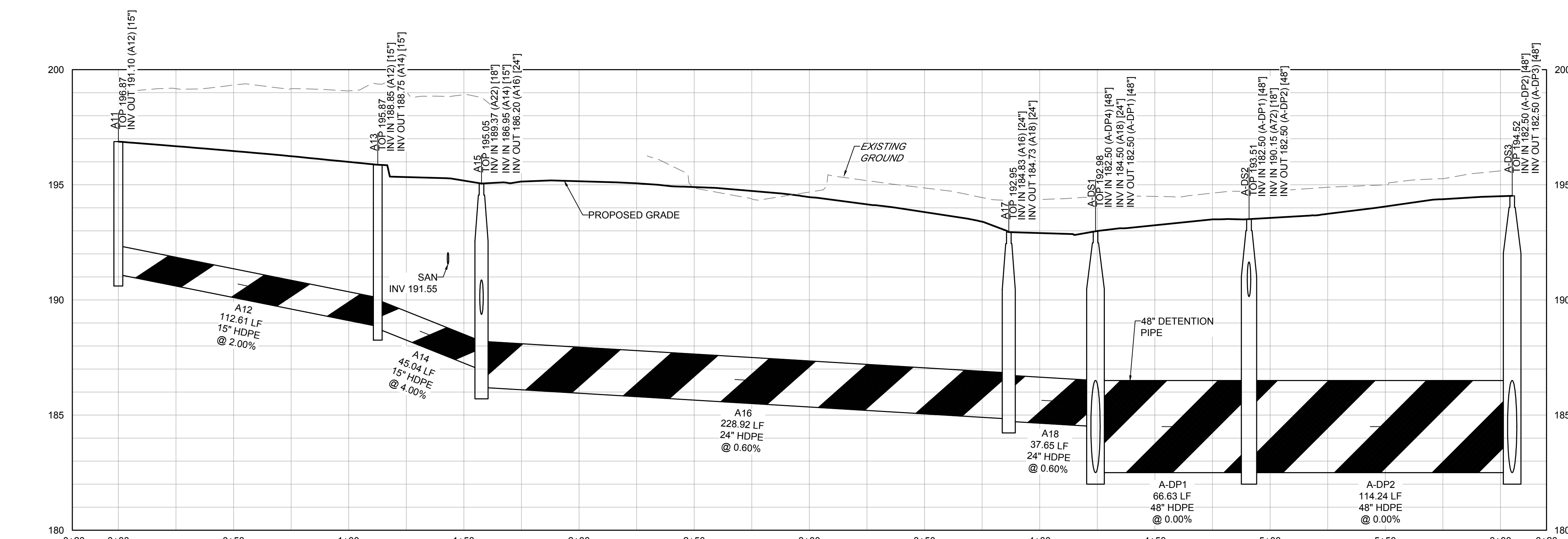
TIMMONS GROUP
 BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
 STORM SEWER PROFILES

JOB NO. 36144
 SHEET NO. C5.40

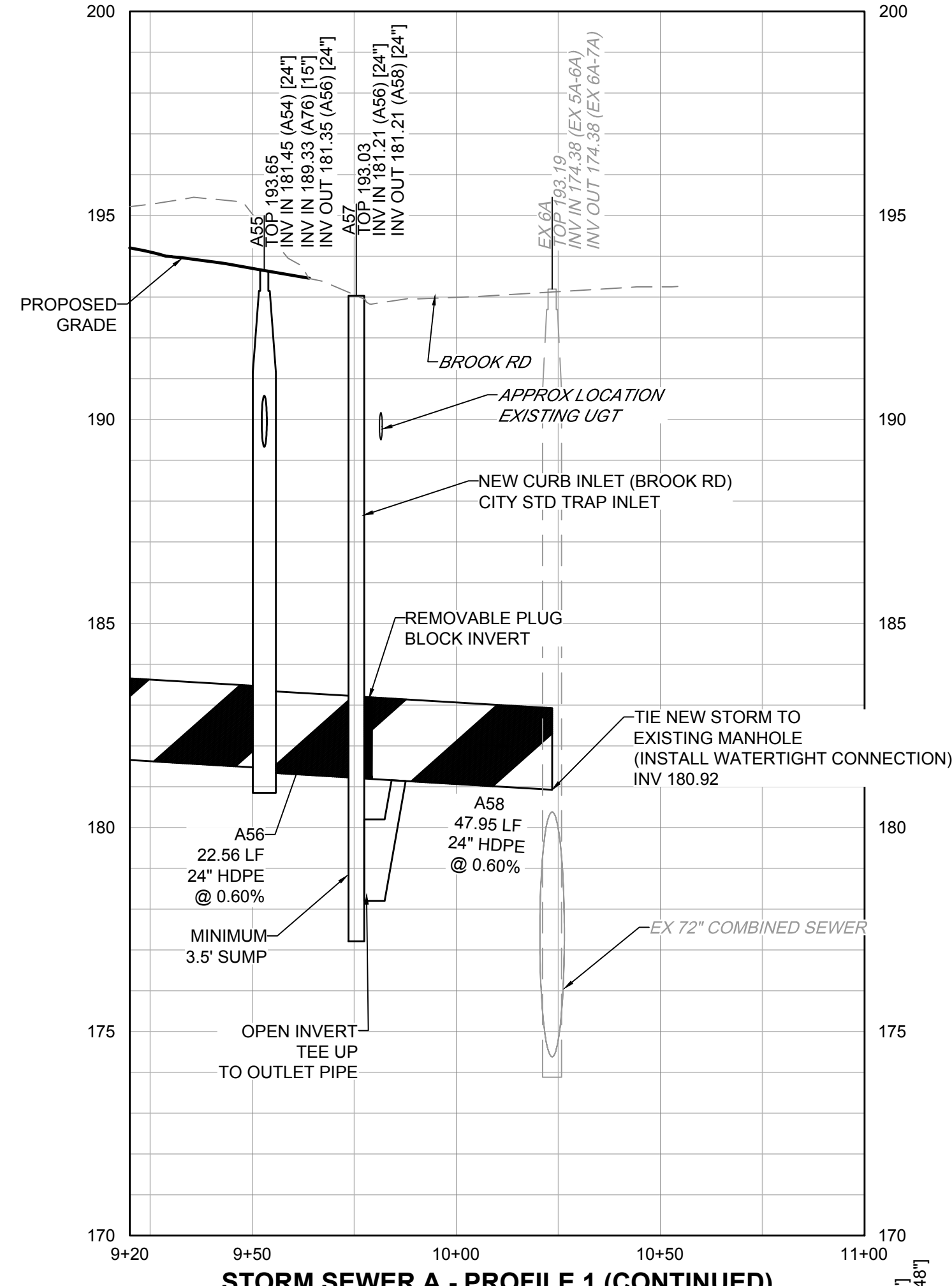


STORM SEWER A - PROFILE 1
 HORZ: 1" = 30'
 VERT: 1" = 3'

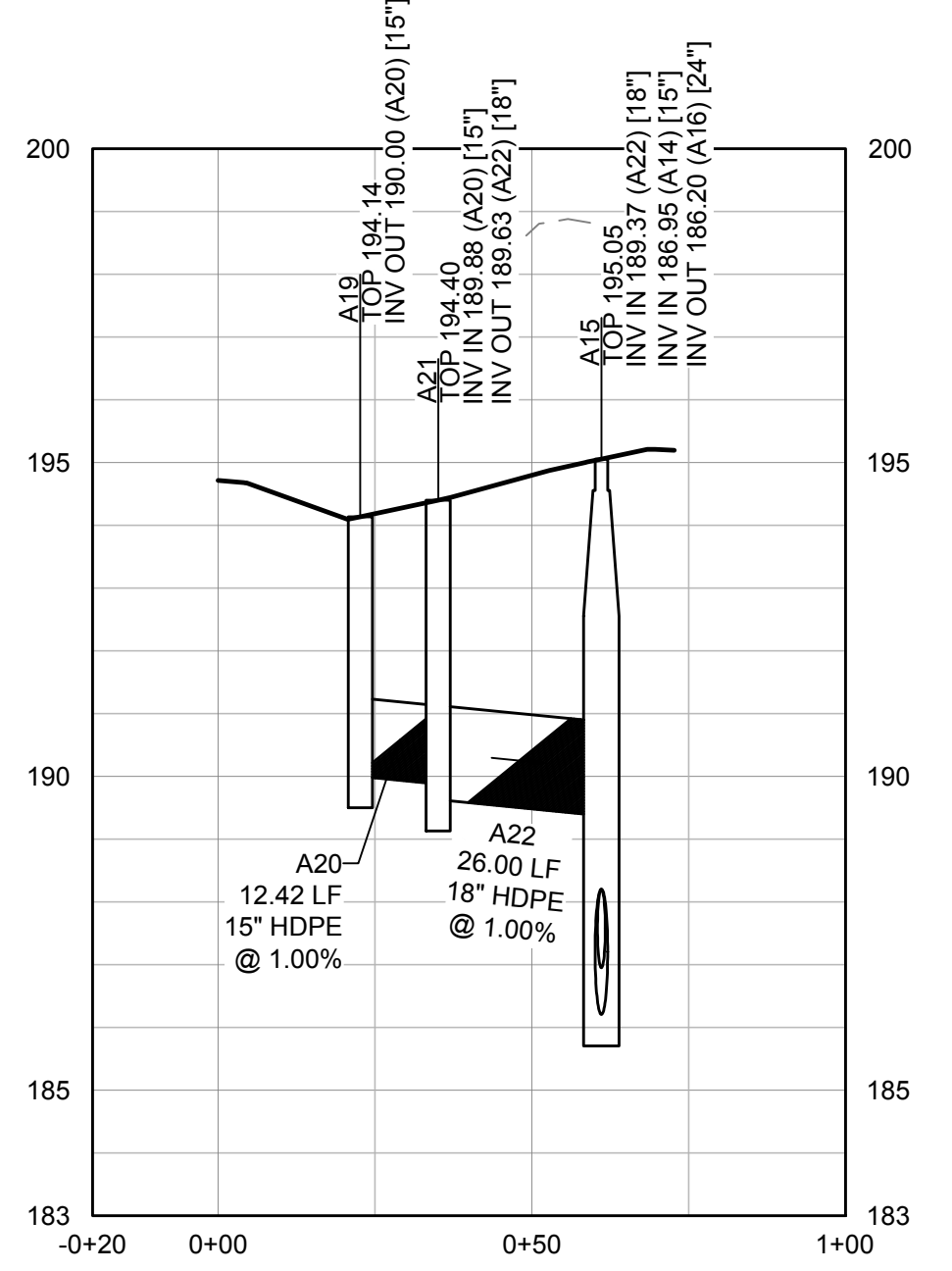
NOTE: STORM SEWER HDPE TO BE N-12 PIPE TYPE S, AASHTO M294 OR EQUIVALENT JOINTS TO BE WATERTIGHT PER ASTM D3212 OR EQUIVALENT



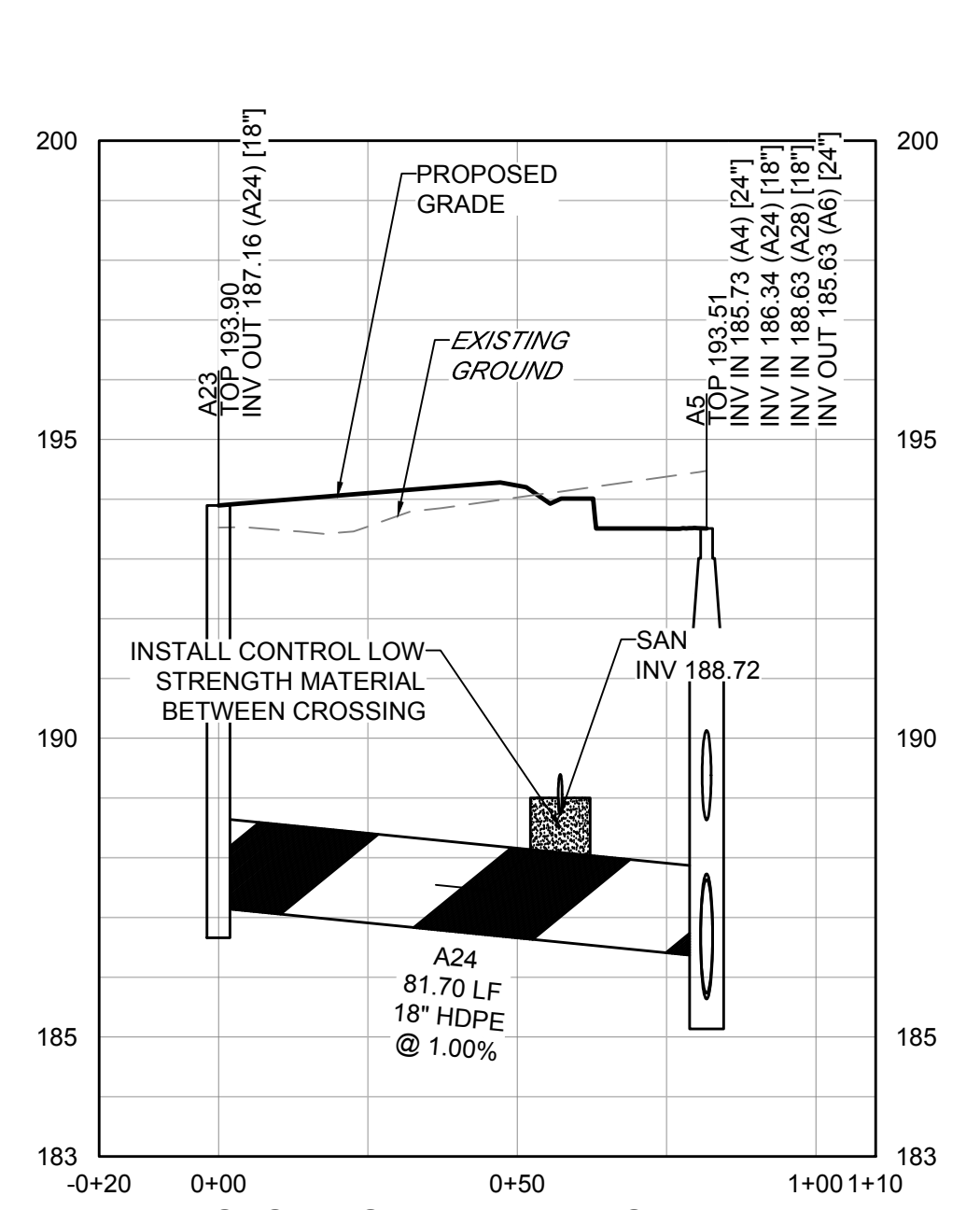
STORM SEWER A - PROFILE 2
 HORZ: 1" = 30'
 VERT: 1" = 3'



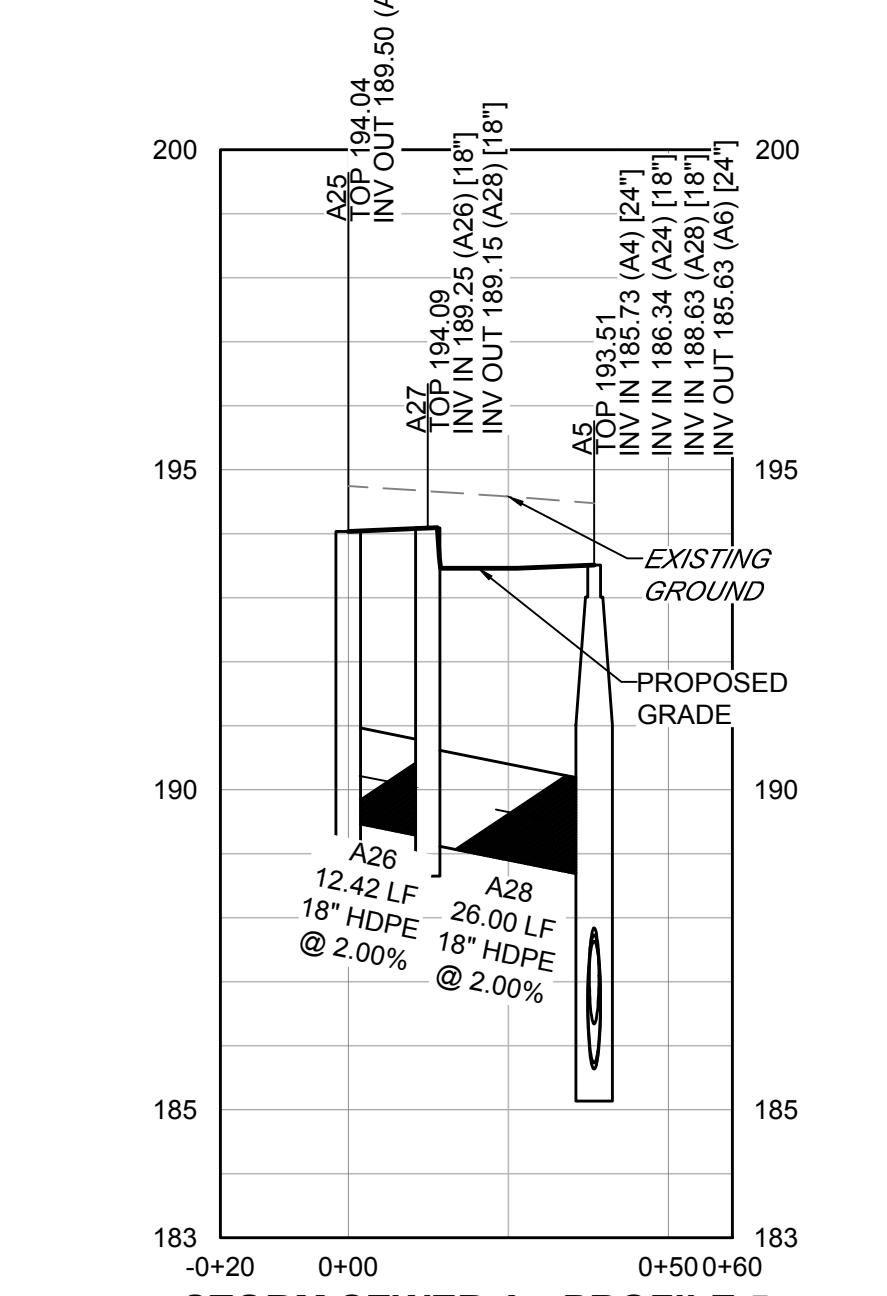
STORM SEWER A - PROFILE 1 (CONTINUED)
 HORZ: 1" = 30'
 VERT: 1" = 3'



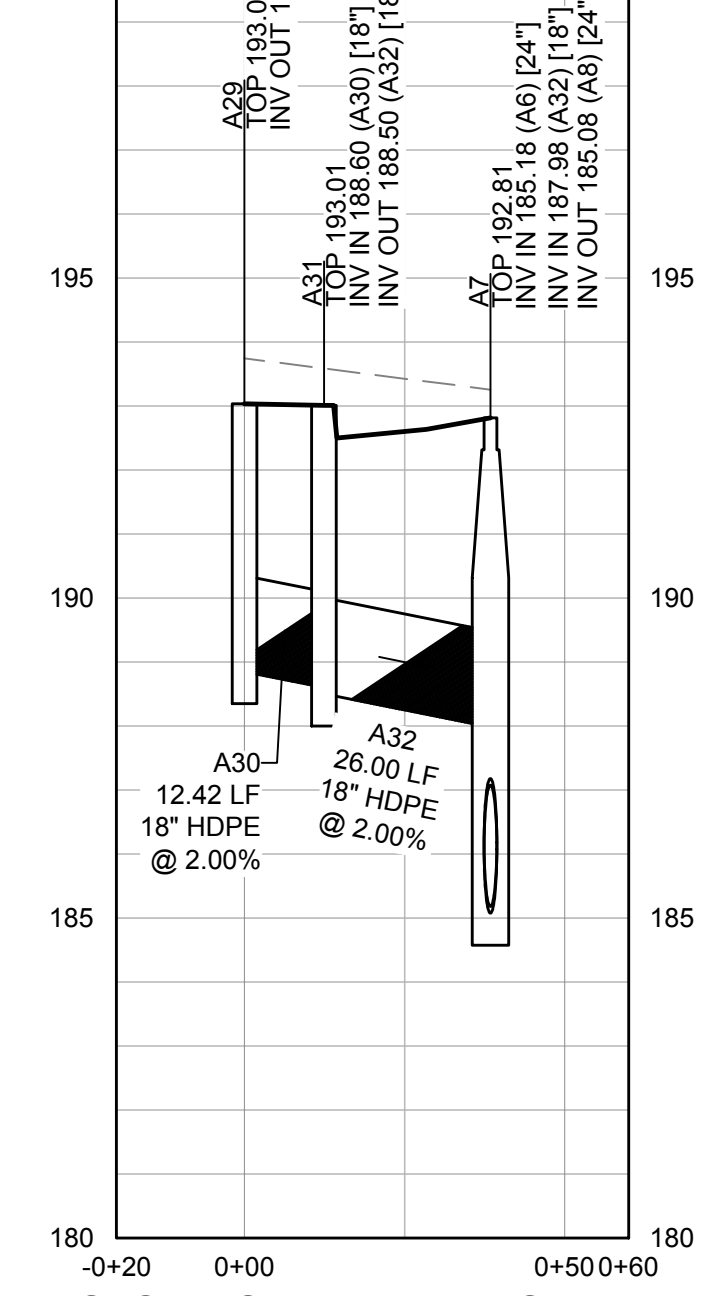
STORM SEWER A - PROFILE 3
 HORZ: 1" = 30'
 VERT: 1" = 3'



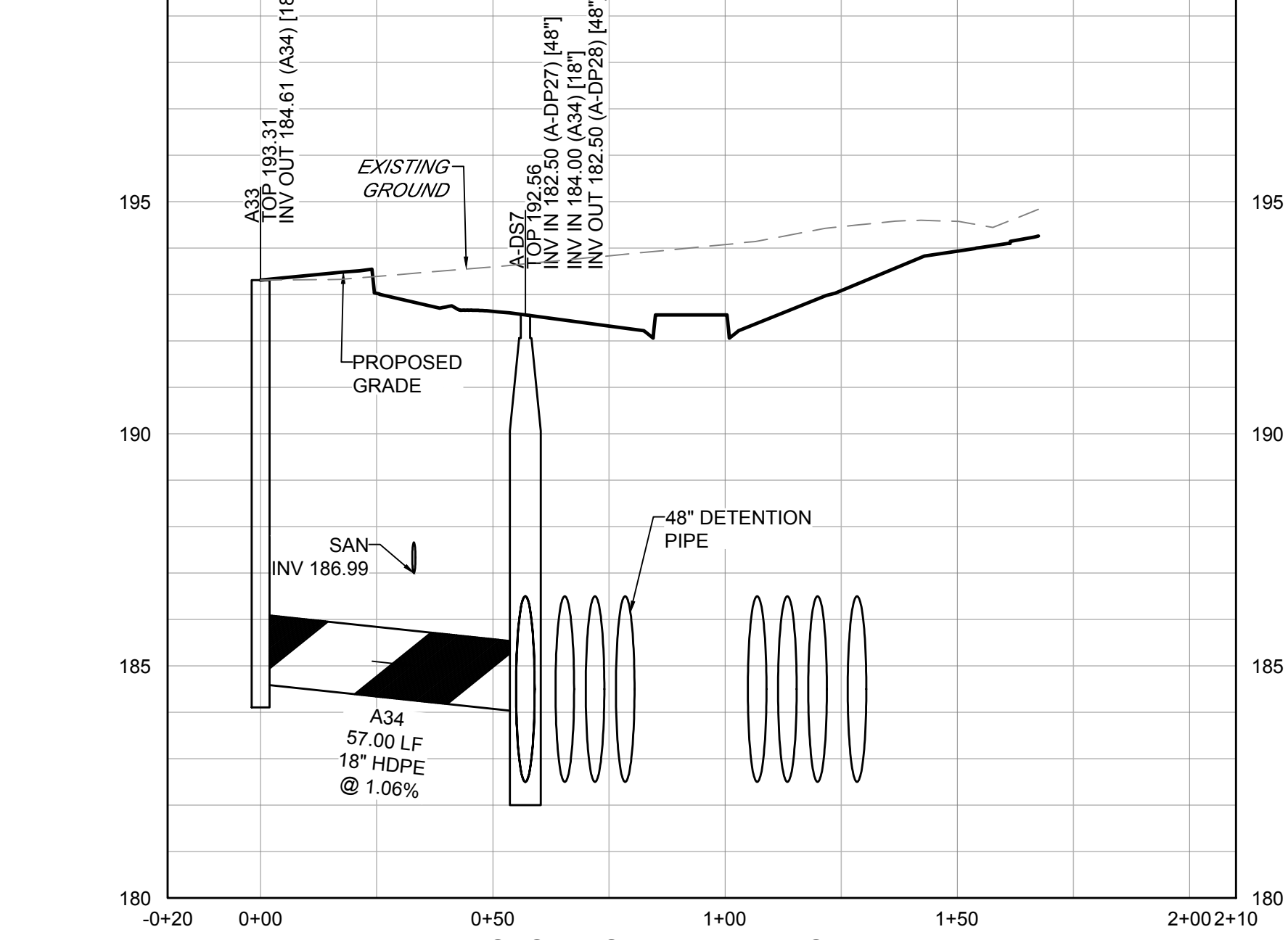
STORM SEWER A - PROFILE 4
 HORZ: 1" = 30'
 VERT: 1" = 3'



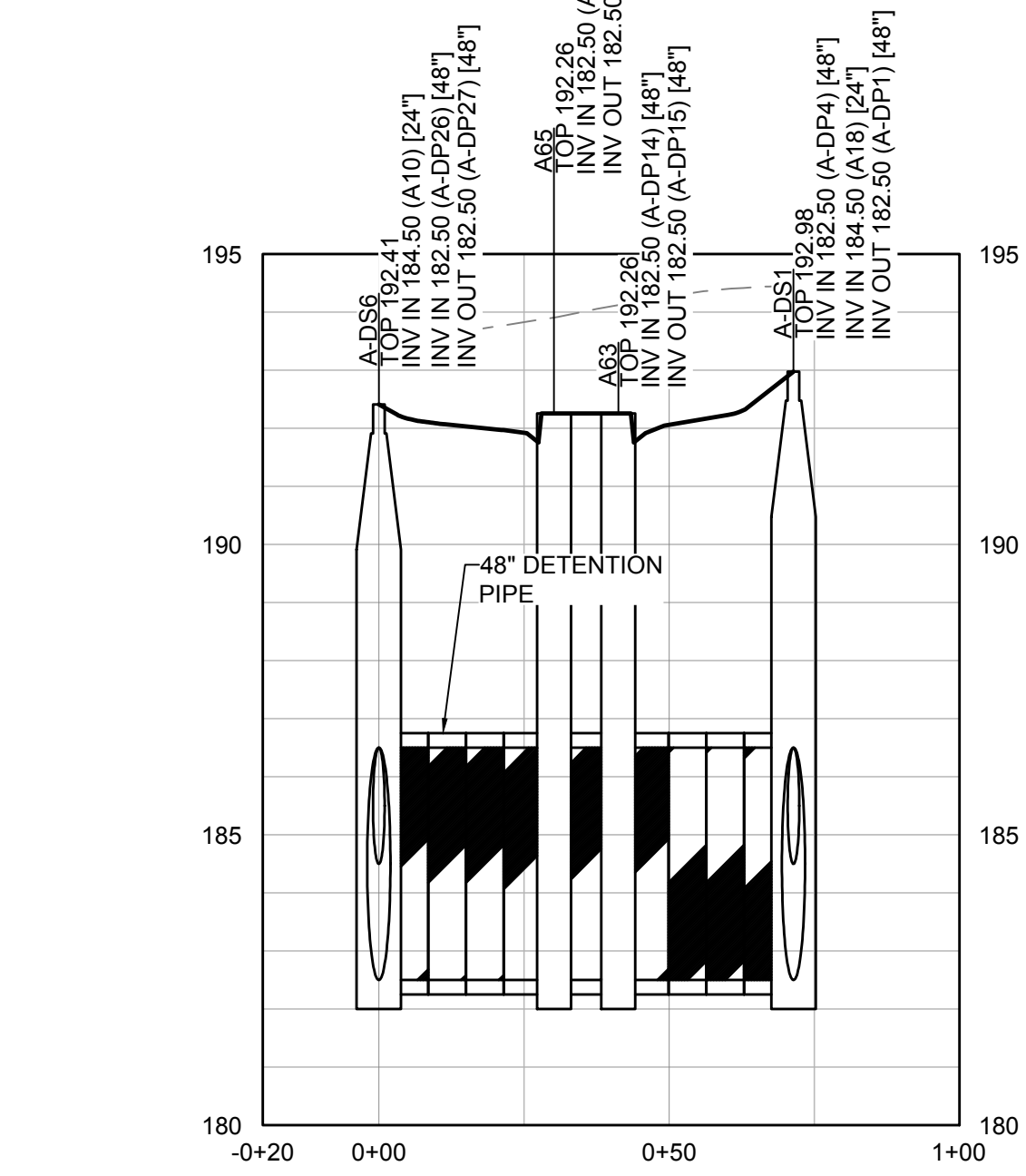
STORM SEWER A - PROFILE 5
 HORZ: 1" = 30'
 VERT: 1" = 3'



STORM SEWER A - PROFILE 6
 HORZ: 1" = 30'
 VERT: 1" = 3'

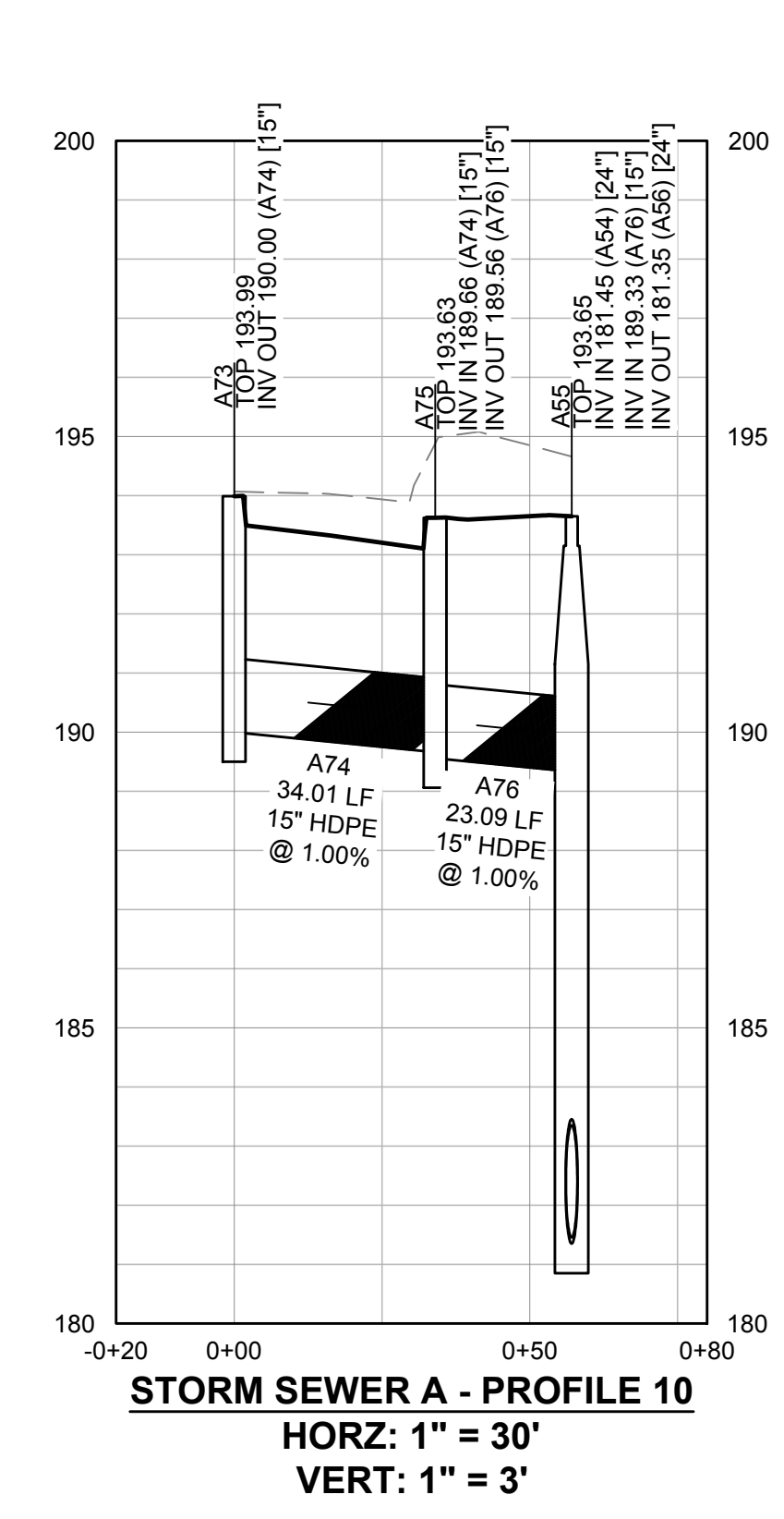
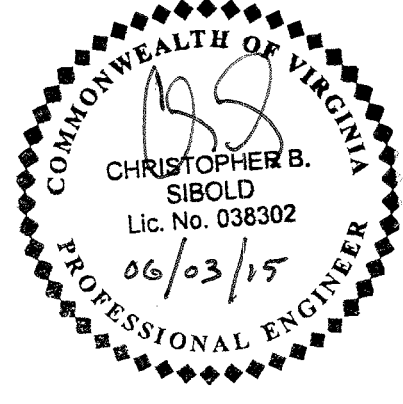


STORM SEWER A - PROFILE 7
 HORZ: 1" = 30'
 VERT: 1" = 3'

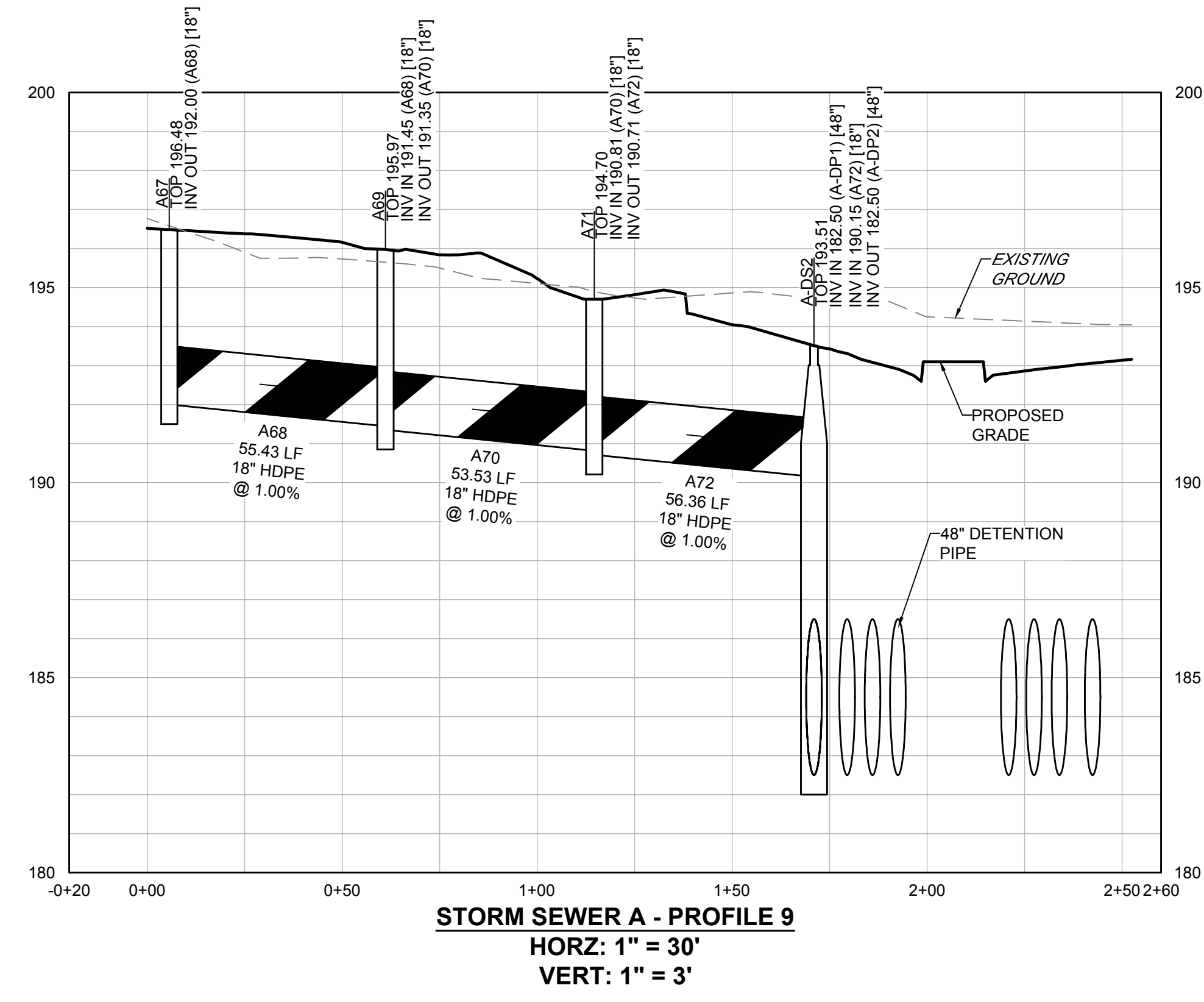


STORM SEWER A - PROFILE 11
 HORZ: 1" = 30'
 VERT: 1" = 3'

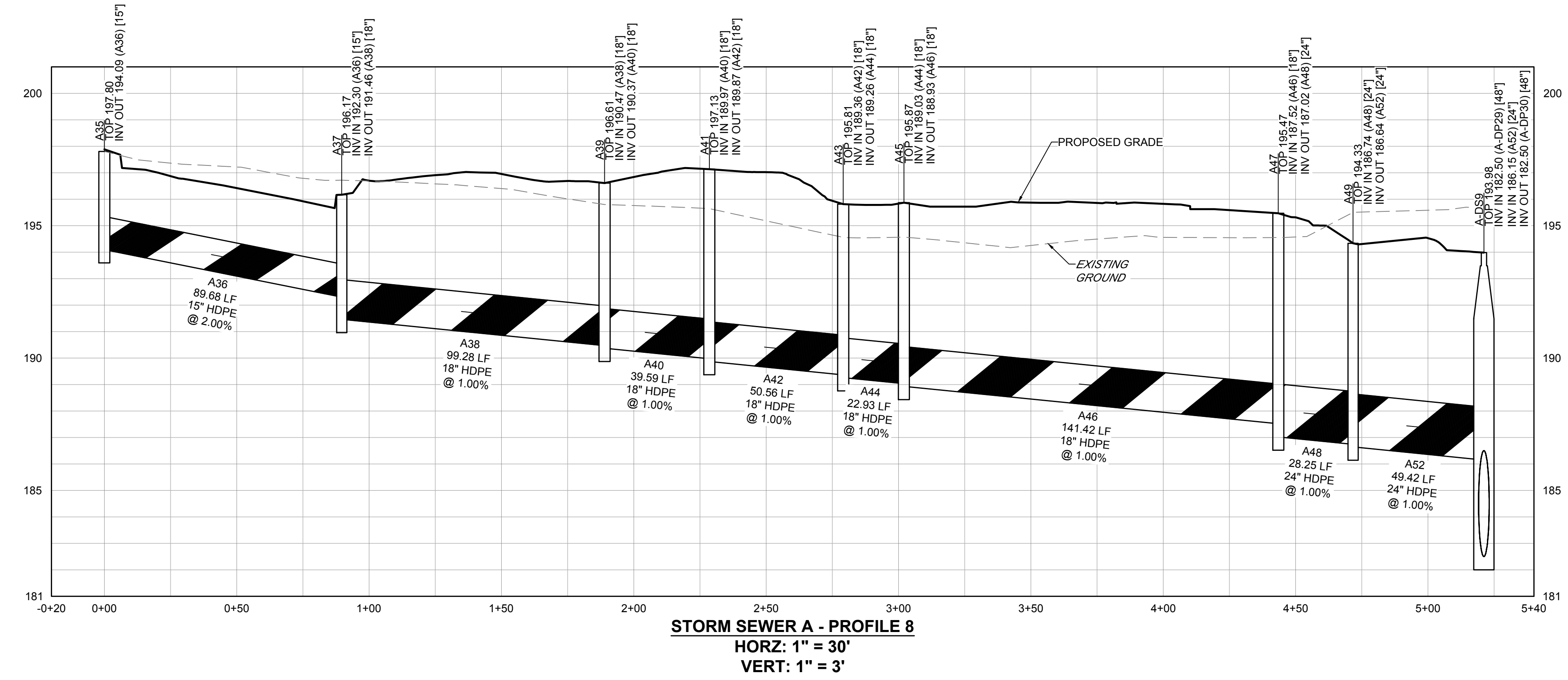
S:\2015\44-unbr-proj\sewer\sewer\DWG\Sheet\DWG\C5.40_C5_40_S1PR.dwg | Plot on 03/03/2015 11:21 AM by Rich Satmaria



STORM SEWER A - PROFILE 10
 HORZ: 1" = 30'
 VERT: 1" = 3'

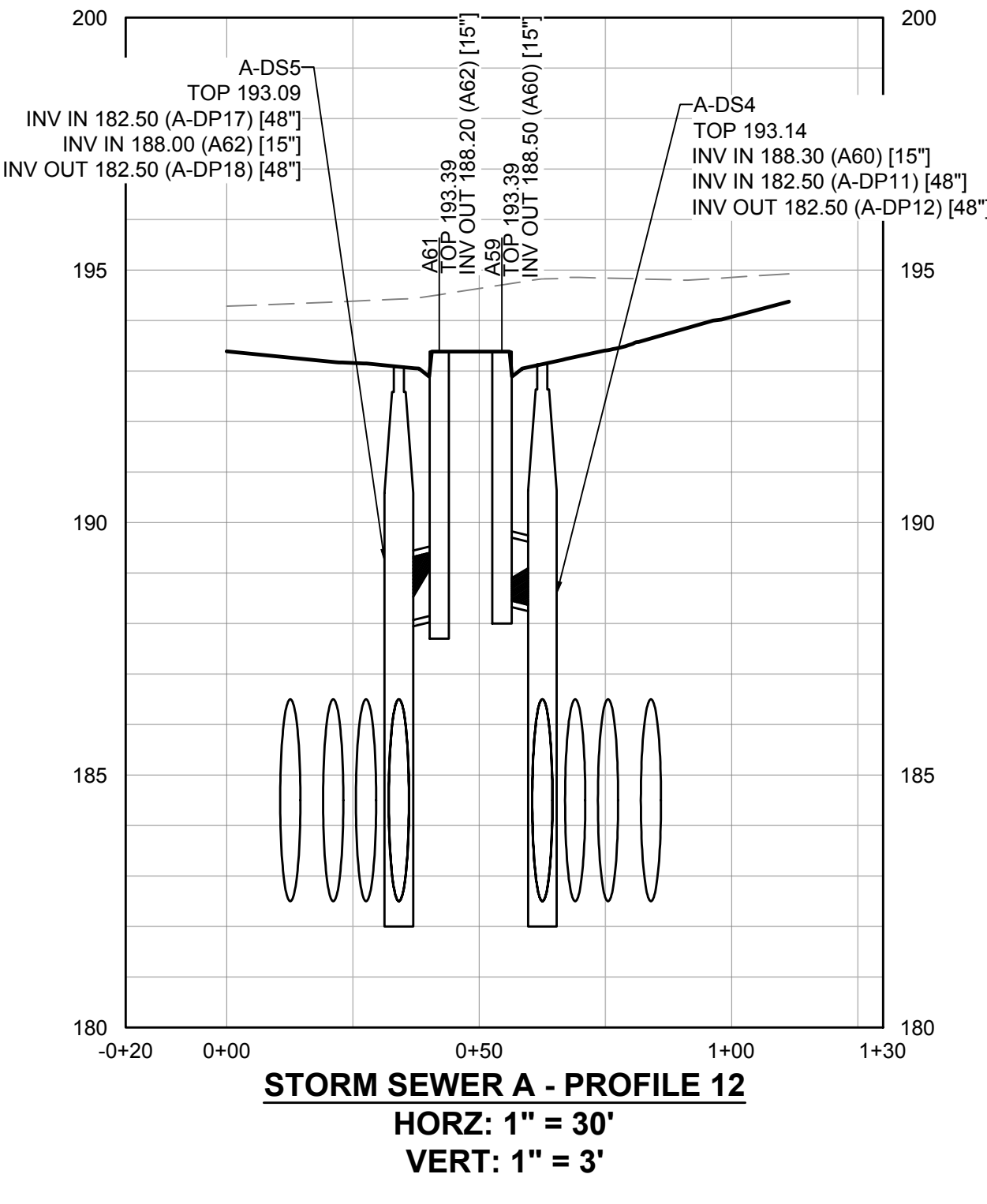


STORM SEWER A - PROFILE 9
 HORZ: 1" = 30'
 VERT: 1" = 3'



STORM SEWER A - PROFILE 8
 HORZ: 1" = 30'
 VERT: 1" = 3'

NOTE: STORM SEWER HDPE TO BE N-12 PIPE TYPE S, AASHTO M294 OR EQUIVALENT JOINTS TO BE WATERTIGHT PER ASTM D3212 OR EQUIVALENT



STORM SEWER A - PROFILE 12
 HORZ: 1" = 30'
 VERT: 1" = 3'

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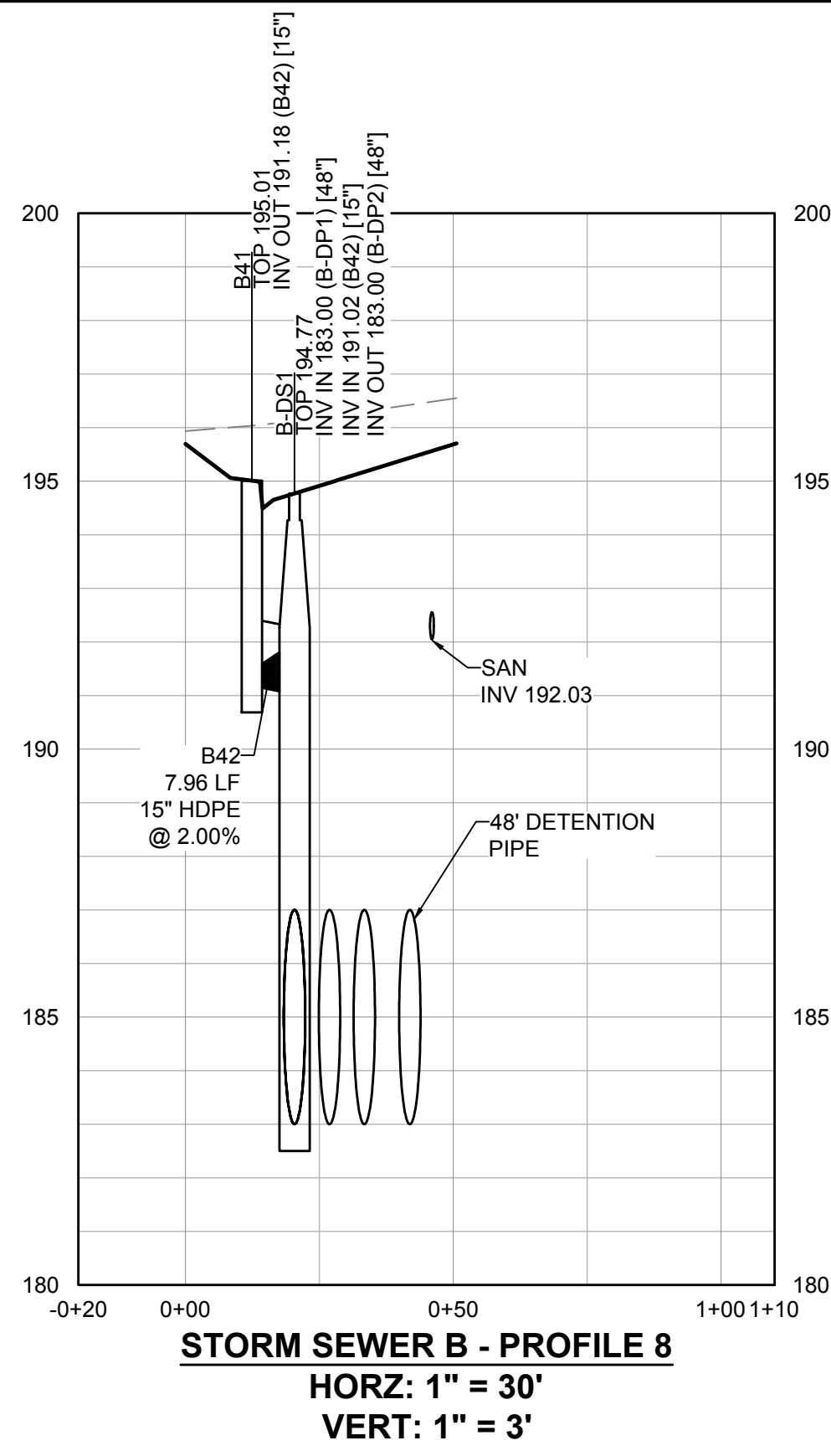
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| DESIGNED BY | R.SATMARIA |
| CHECKED BY | C.SIBOLD |
| SCALE | AS NOTED |

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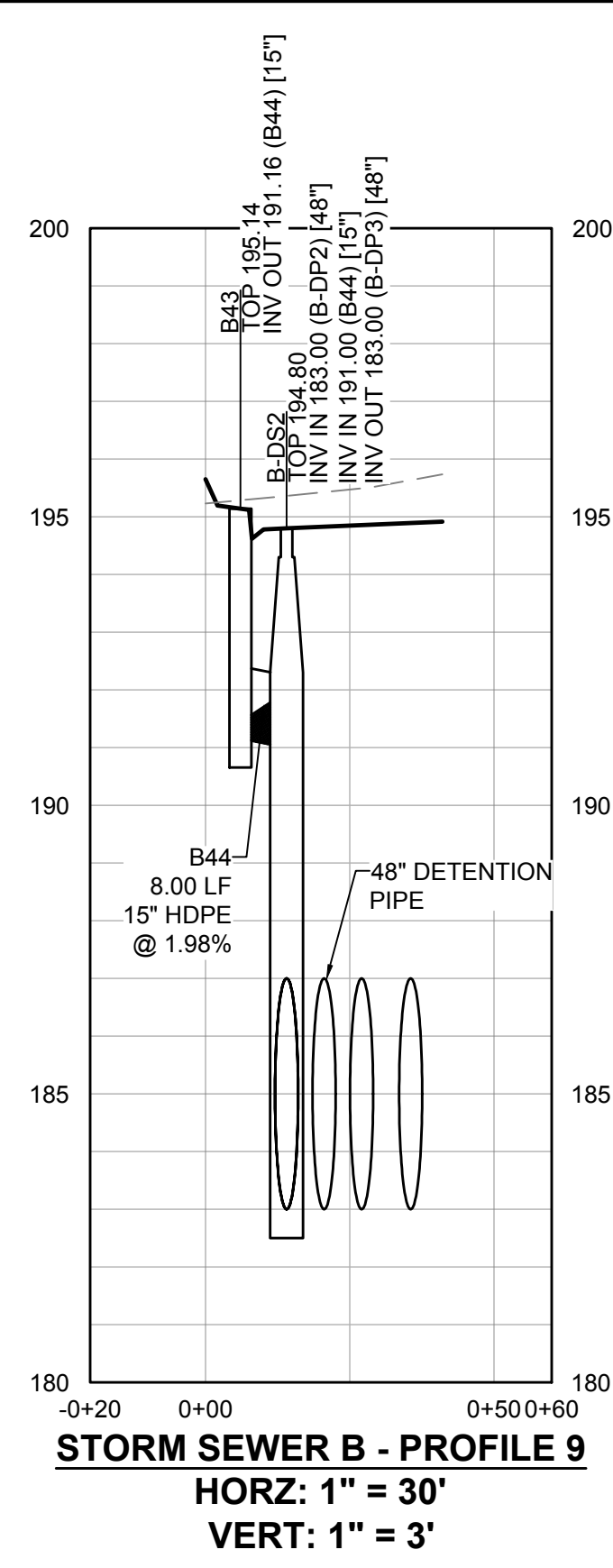
BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

STORM SEWER PROFILES

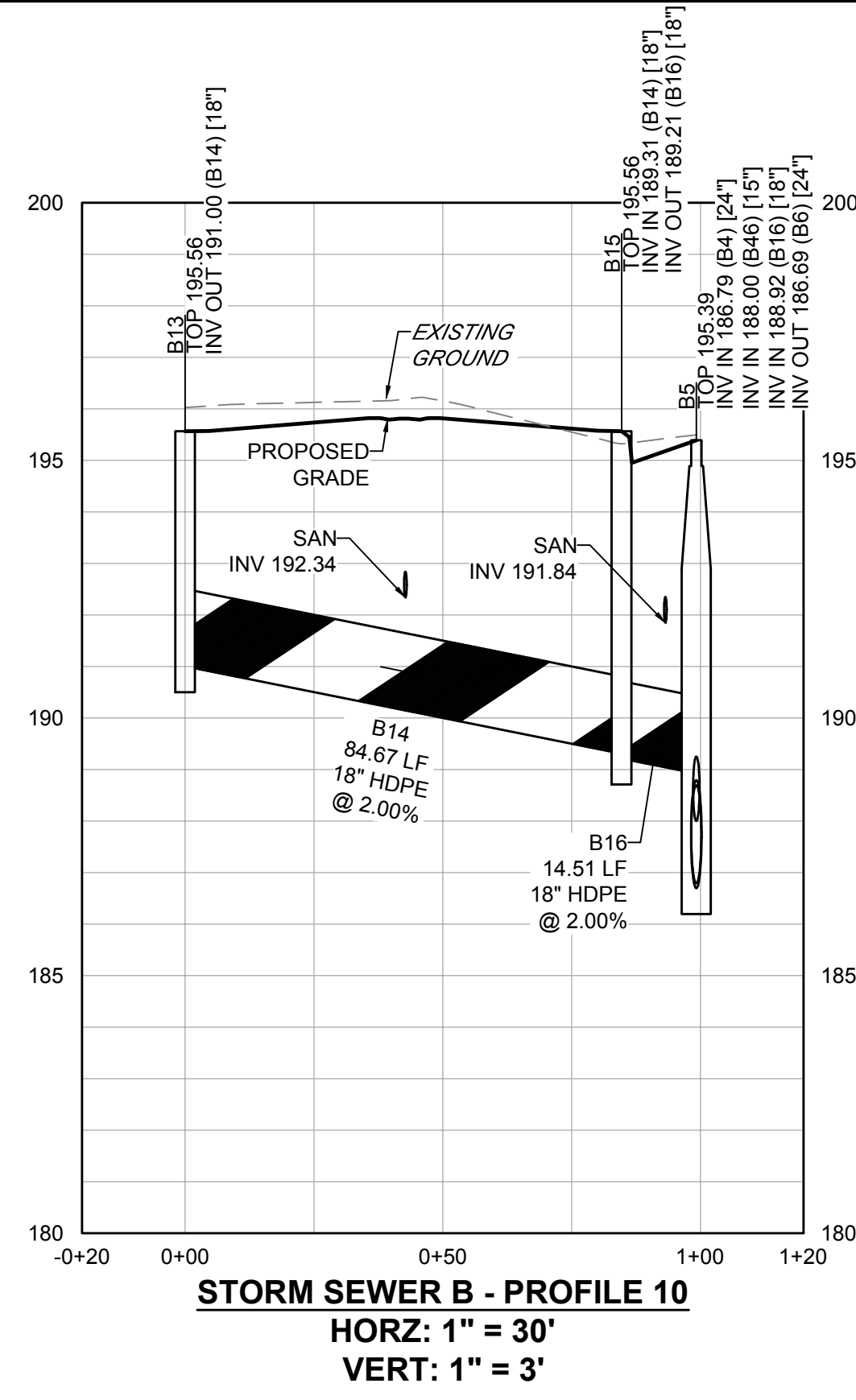
| | |
|-----------|-------|
| JOB NO. | 36144 |
| SHEET NO. | C5.41 |



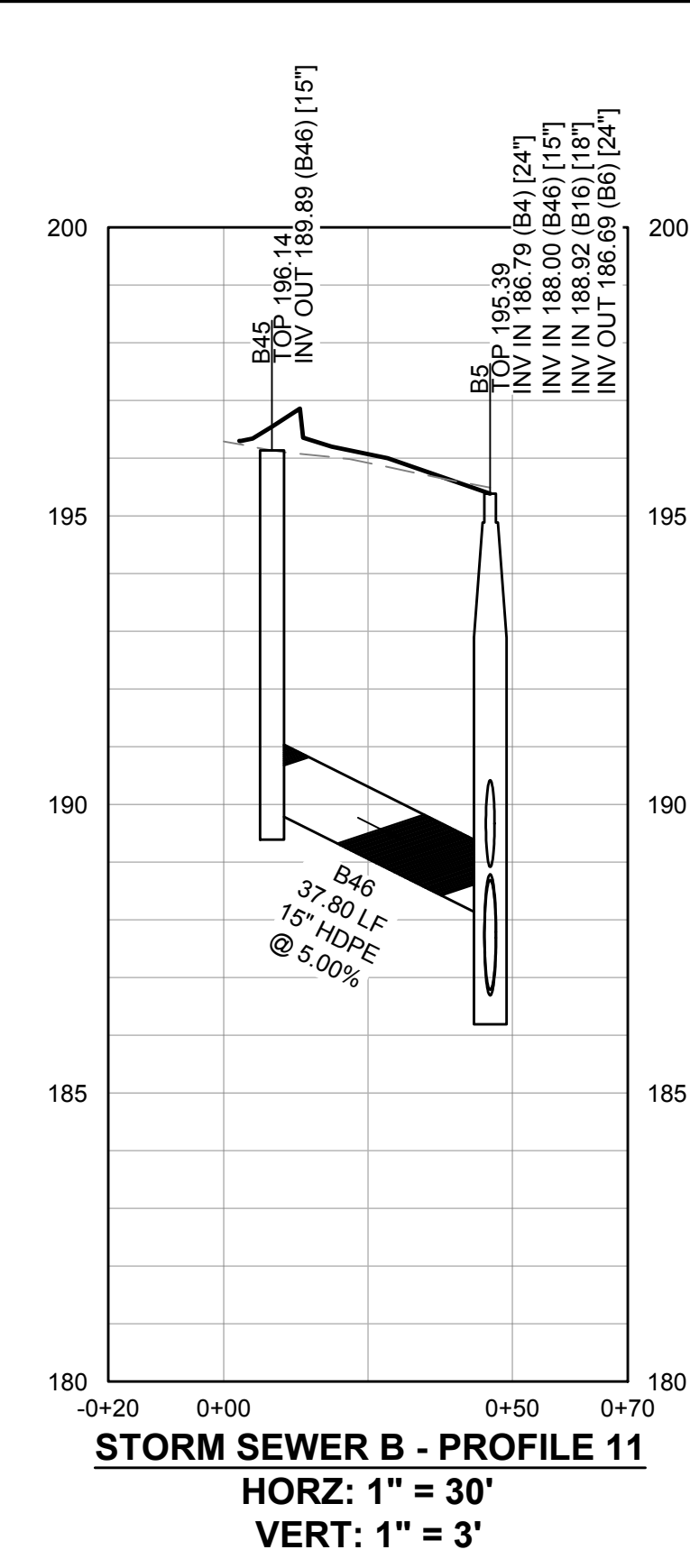
STORM SEWER B - PROFILE 8
 HORZ: 1" = 30'
 VERT: 1" = 3'



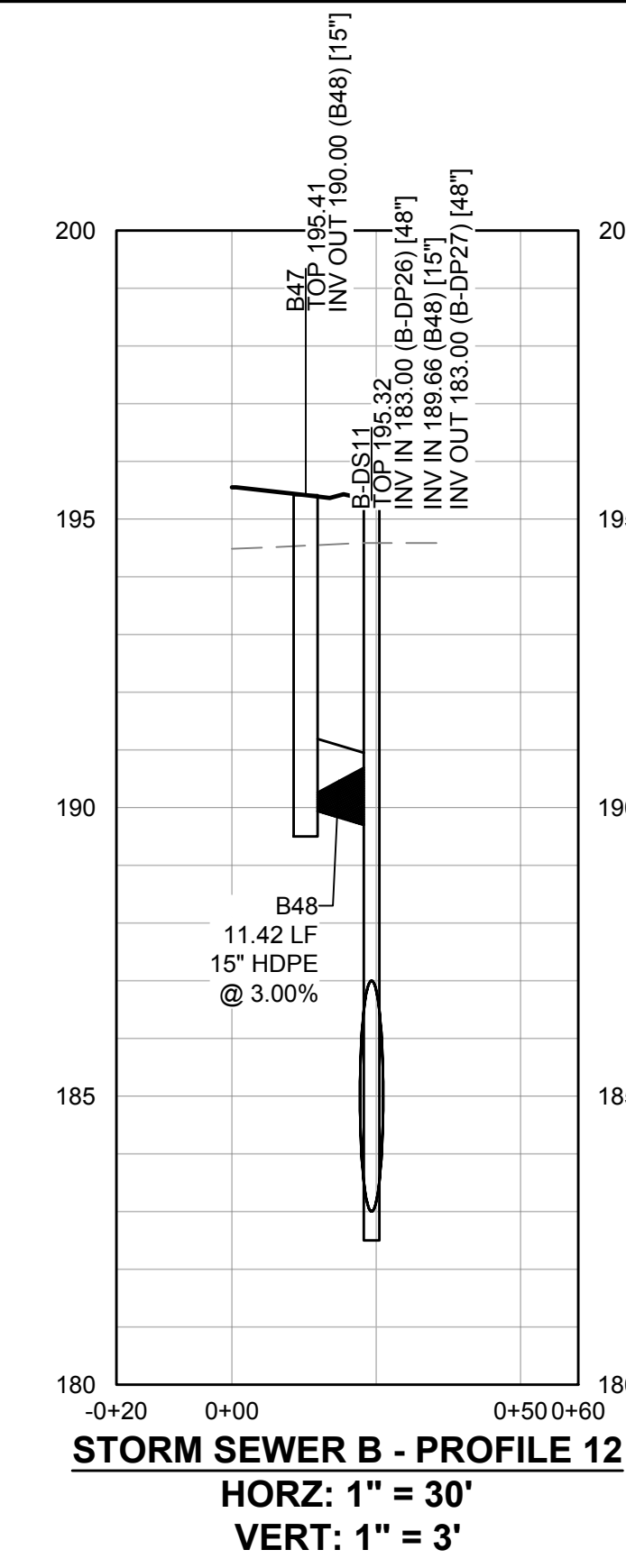
STORM SEWER B - PROFILE 9
 HORZ: 1" = 30'
 VERT: 1" = 3'



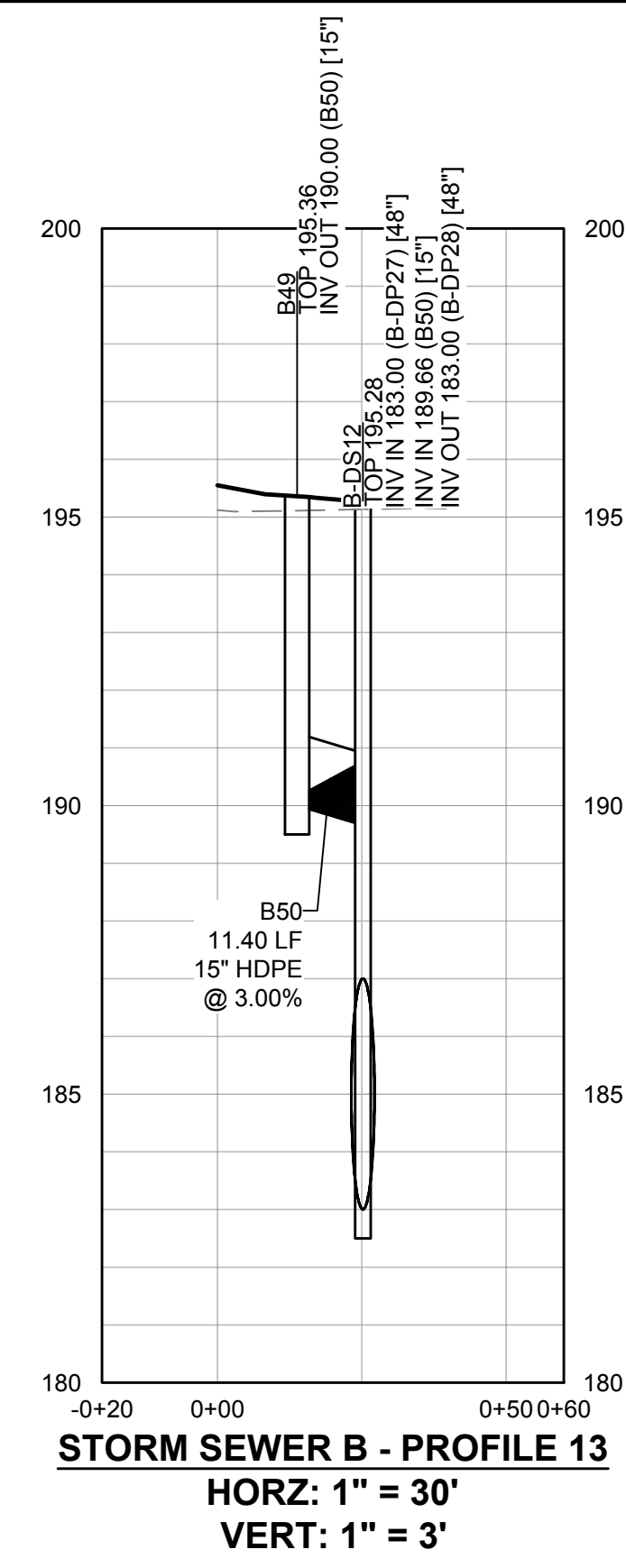
STORM SEWER B - PROFILE 10
 HORZ: 1" = 30'
 VERT: 1" = 3'



STORM SEWER B - PROFILE 11
 HORZ: 1" = 30'
 VERT: 1" = 3'



STORM SEWER B - PROFILE 12
 HORZ: 1" = 30'
 VERT: 1" = 3'



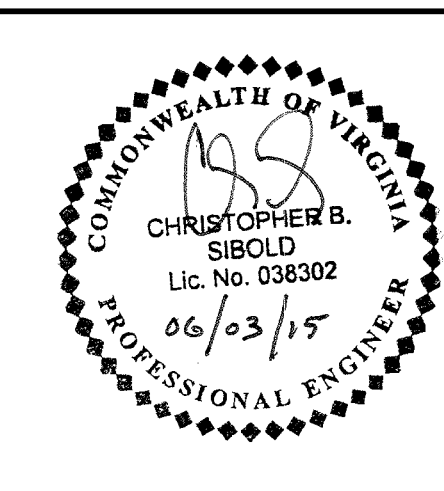
STORM SEWER B - PROFILE 13
 HORZ: 1" = 30'
 VERT: 1" = 3'

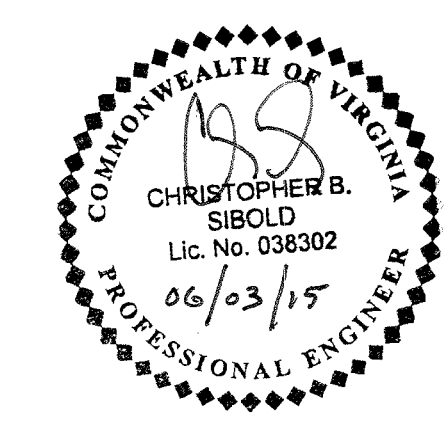
NOTE: STORM SEWER HDPE TO BE N-12 PIPE TYPE S, AASHTO M294 OR EQUIVALENT
 JOINTS TO BE WATERTIGHT PER ASTM D3212 OR EQUIVALENT

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REVISION DESCRIPTION

DATE
06/03/2015

DRAWN BY
J. CHAPMAN

DESIGNED BY
R. SATMARIA

CHECKED BY
C. SIBOLD

SCALE
1" = 30'

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

STORM SEWER PROFILES

JOB NO.
36144

SHEET NO.
C5.44

| STORM STRUCTURE TABLE | | | |
|-----------------------|--------|------------------|---|
| STRUCTURE # | TOP | STRUCTURE HEIGHT | DESCRIPTION |
| A-DS1 | 192.98 | 10.48' | MH-1, ST-1 |
| A-DS2 | 193.51 | 11.01' | MH-1, ST-1 |
| A-DS3 | 194.52 | 12.02' | MH-1, ST-1 |
| A-DS4 | 193.14 | 10.64' | MH-1, ST-1 |
| A-DS5 | 193.09 | 10.59' | MH-1, ST-1 |
| A-DS6 | 192.41 | 9.91' | MH-1, ST-1 |
| A-DS7 | 192.56 | 10.06' | MH-1, ST-1 |
| A-DS8 | 194.32 | 11.82' | MH-1, ST-1 |
| A-DS9 | 193.98 | 11.48' | MH-1, ST-1 |
| A-DS10 | 194.44 | 11.94' | MH-1, OUTLET CONTROL (2) 8" ORIFICES (2) 6" ORIFICES (1) WEIR WALL |

| STORM STRUCTURE TABLE | | | |
|-----------------------|--------|------------------|--------------------------|
| STRUCTURE # | TOP | STRUCTURE HEIGHT | DESCRIPTION |
| A1 | 193.96 | 5.78' | DI-3C, L=20', ST-1 |
| A3 | 194.56 | 7.83' | MH-1, IS-1, ST-1 |
| A5 | 193.51 | 7.87' | MH-1, IS-1, ST-1 |
| A7 | 192.61 | 7.74' | MH-1, IS-1, ST-1 |
| A9 | 193.12 | 8.26' | MH-1, IS-1, ST-1 |
| A11 | 196.87 | 5.77' | DI-3B, L=20', ST-1 |
| A13 | 195.87 | 7.12' | DI-3B, L=20', IS-1, ST-1 |
| A15 | 195.05 | 8.85' | MH-1, IS-1, ST-1 |
| A17 | 192.95 | 8.22' | MH-1, IS-1, ST-1 |
| A19 | 194.14 | 4.14' | DI-3C, L=6', ST-1 |
| A21 | 194.40 | 4.77' | DI-3C, L=8', IS-1, ST-1 |
| A23 | 193.90 | 6.74' | DI-3C, L=16', ST-1 |
| A25 | 194.04 | 4.54' | DI-3B, L=12', ST-1 |
| A27 | 194.09 | 4.94' | DI-3B, L=12', IS-1, ST-1 |
| A29 | 193.03 | 4.19' | DI-3B, L=12', ST-1 |
| A31 | 193.01 | 4.51' | DI-3B, L=12', IS-1, ST-1 |
| A33 | 193.31 | 8.71' | DI-3C, L=16', ST-1 |
| A35 | 197.80 | 3.71' | DI-1, ST-1 |
| A37 | 196.17 | 4.71' | DI-3C, L=16', IS-1, ST-1 |
| A39 | 196.61 | 6.24' | DI-1, IS-1, ST-1 |
| A41 | 197.13 | 7.26' | DI-1, IS-1, ST-1 |
| A43 | 195.81 | 6.55' | DI-1, IS-1, ST-1 |
| A45 | 195.87 | 6.94' | DI-1, IS-1, ST-1 |

| STORM STRUCTURE TABLE | | | |
|-----------------------|--------|------------------|--|
| STRUCTURE # | TOP | STRUCTURE HEIGHT | DESCRIPTION |
| A47 | 195.47 | 8.45' | DI-1, IS-1, ST-1 |
| A49 | 194.33 | 7.69' | DI-3C, L=20', IS-1, ST-1 |
| A53 | 194.35 | 12.47' | DI-1, IS-1, ST-1 |
| A55 | 193.65 | 12.30' | MH-1, IS-1, ST-1 |
| A57 | 193.03 | 15.32' | DI-3B TOP, L=6', ST-1 CITY STD TRAP INLET |
| A59 | 193.39 | 4.89' | DI-3B, L=12', ST-1 |
| A61 | 193.39 | 5.19' | DI-3B, L=12', ST-1 |
| A63 | 192.26 | 9.78' | DI-4BB, L=10', ST-1 |
| A65 | 192.26 | 9.76' | DI-4BB, L=10', ST-1 |
| A67 | 196.48 | 4.48' | DI-1, ST-1 |
| A69 | 195.97 | 4.62' | DI-1, IS-1, ST-1 |
| A71 | 194.70 | 3.99' | DI-1, IS-1, ST-1 |
| A73 | 193.99 | 3.99' | DI-3B, L=10', IS-1, ST-1 |
| A75 | 193.63 | 4.07' | DI-3B, L=10', IS-1, ST-1 |

| STORM PIPE TABLE | | | | | | | |
|------------------|-----|---------------|-----------------|-------------------|-------|-----------|-------------|
| PIPE # | DIA | FROM - TO | UPSTREAM INVERT | DOWNSTREAM INVERT | SLOPE | LENGTH | DESCRIPTION |
| A-DP1 | 48" | A-DS1 - A-DS2 | 182.50 | 182.50 | 0.00% | 66.63 LF | 48" HDPE |
| A-DP2 | 48" | A-DS2 - A-DS3 | 182.50 | 182.50 | 0.00% | 114.24 LF | 48" HDPE |
| A-DP3 | 48" | A-DS3 - 89 | 182.50 | 182.50 | 0.00% | 8.50 LF | 48" HDPE |
| A-DP4 | 48" | 116 - A-DS1 | 182.50 | 182.50 | 0.00% | 8.50 LF | 48" HDPE |
| A-DP5 | 48" | 116 - 89 | 182.50 | 182.50 | 0.00% | 180.88 LF | 48" HDPE |
| A-DP6 | 48" | 89 - 115 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP7 | 48" | 113 - 116 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP8 | 48" | 113 - 115 | 182.50 | 182.50 | 0.00% | 180.88 LF | 48" HDPE |
| A-DP9 | 48" | 115 - 119 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP10 | 48" | 117 - 113 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP11 | 48" | 117 - A-DS4 | 182.50 | 182.50 | 0.00% | 90.50 LF | 48" HDPE |
| A-DP12 | 48" | A-DS4 - 119 | 182.50 | 182.50 | 0.00% | 90.38 LF | 48" HDPE |
| A-DP13 | 48" | 119 - 125 | 182.50 | 182.50 | 0.00% | 28.42 LF | 48" HDPE |
| A-DP14 | 48" | 117 - A63 | 182.50 | 182.50 | 0.00% | 8.67 LF | 48" HDPE |
| A-DP15 | 48" | A63 - A65 | 182.50 | 182.50 | 0.00% | 11.08 LF | 48" HDPE |
| A-DP16 | 48" | A65 - 123 | 182.50 | 182.50 | 0.00% | 8.67 LF | 48" HDPE |
| A-DP17 | 48" | 123 - A-DS5 | 182.50 | 182.50 | 0.00% | 90.50 LF | 48" HDPE |
| A-DP18 | 48" | A-DS5 - 125 | 182.50 | 182.50 | 0.00% | 90.38 LF | 48" HDPE |
| A-DP19 | 48" | 125 - 122 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP20 | 48" | 123 - 120 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP21 | 48" | 120 - 122 | 182.50 | 182.50 | 0.00% | 180.88 LF | 48" HDPE |
| A-DP22 | 48" | 122 - 157 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |
| A-DP23 | 48" | 120 - 156 | 182.50 | 182.50 | 0.00% | 6.50 LF | 48" HDPE |

| STORM PIPE TABLE | | | | | | | |
|------------------|-----|----------------|-----------------|-------------------|-------|-----------|-------------|
| PIPE # | DIA | FROM - TO | UPSTREAM INVERT | DOWNSTREAM INVERT | SLOPE | LENGTH | DESCRIPTION |
| A-DP24 | 48" | 156 - 157 | 182.50 | 182.50 | 0.00% | 180.88 LF | 48" HDPE |
| A-DP25 | 48" | 157 - A-DS8 | 182.50 | 182.50 | 0.00% | 8.50 LF | 48" HDPE |
| A-DP26 | 48" | 156 - A-DS6 | 182.50 | 182.50 | 0.00% | 8.50 LF | 48" HDPE |
| A-DP27 | 48" | A-DS6 - A-DS7 | 182.50 | 182.50 | 0.00% | 24.56 LF | 48" HDPE |
| A-DP28 | 48" | A-DS7 - A-DS8 | 182.50 | 182.50 | 0.00% | 156.32 LF | 48" HDPE |
| A-DP29 | 48" | A-DS8 - A-DS9 | 182.50 | 182.50 | 0.00% | 90.07 LF | 48" HDPE |
| A-DP30 | 48" | A-DS9 - A-DS10 | 182.50 | 182.50 | 0.00% | 20.68 LF | 48" HDPE |
| A-DP31 | 24" | A-DS10 - A53 | 182.50 | 181.98 | 0.60% | 86.56 LF | 24" HDPE |
| A2 | 18" | A1 - A3 | 188.18 | 187.23 | 1.00% | 95.05 LF | 18" HDPE |
| A4 | 24" | A3 - A5 | 186.73 | 185.73 | 0.50% | 199.43 LF | 24" HDPE |
| A6 | 24" | A5 - A7 | 185.63 | 185.18 | 0.50% | 90.94 LF | 24" HDPE |
| A8 | 24" | A7 - A9 | 185.08 | 184.97 | 0.40% | 26.29 LF | 24" HDPE |
| A10 | 24" | A9 - A-DS6 | 184.87 | 184.50 | 0.40% | 92.01 LF | 24" HDPE |
| A12 | 15" | A11 - A13 | 191.10 | 188.85 | 2.00% | 112.61 LF | 15" HDPE |
| A14 | 15" | A13 - A15 | 188.75 | 186.95 | 4.00% | 45.04 LF | 15" HDPE |
| A16 | 24" | A15 - A17 | 186.20 | 184.83 | 0.60% | 228.92 LF | 24" HDPE |
| A18 | 24" | A17 - A-DS4 | 184.73 | 184.50 | 0.60% | 37.65 LF | 24" HDPE |
| A20 | 15" | A19 - A21 | 190.00 | 189.88 | 1.00% | 12.42 LF | 15" HDPE |
| A22 | 18" | A21 - A15 | 189.63 | 189.37 | 1.00% | 26.00 LF | 18" HDPE |
| A24 | 18" | A23 - A5 | 187.16 | 186.34 | 1.00% | 81.70 LF | 18" HDPE |
| A26 | 18" | A25 - A27 | 189.50 | 189.25 | 2.00% | 12.42 LF | 18" HDPE |
| A28 | 18" | A27 - A5 | 189.15 | 188.63 | 2.00% | 26.00 LF | 18" HDPE |
| A30 | 18" | A29 - A31 | 188.85 | 188.60 | 2.00% | 12.42 LF | 18" HDPE |

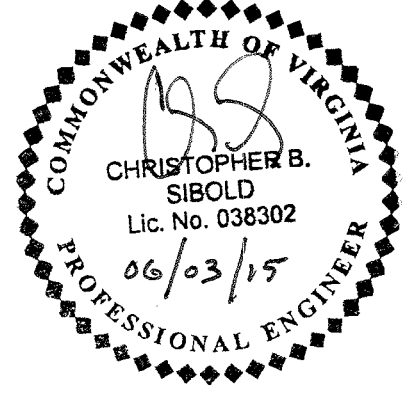
| STORM PIPE TABLE | | | | | | | |
|------------------|-----|-------------|-----------------|-------------------|-------|-----------|-------------|
| PIPE # | DIA | FROM - TO | UPSTREAM INVERT | DOWNSTREAM INVERT | SLOPE | LENGTH | DESCRIPTION |
| A32 | 18" | A31 - A7 | 188.50 | 187.98 | 2.00% | 26.00 LF | 18" HDPE |
| A34 | 18" | A33 - A-DS7 | 184.61 | 184.00 | 1.06% | 57.00 LF | 18" HDPE |
| A36 | 15" | A35 - A37 | 194.09 | 192.30 | 2.00% | 89.68 LF | 15" HDPE |
| A38 | 18" | A37 - A39 | 191.46 | 190.47 | 1.00% | 99.28 LF | 18" HDPE |
| A40 | 18" | A39 - A41 | 190.37 | 189.97 | 1.00% | 38.59 LF | 18" HDPE |
| A42 | 18" | A41 - A43 | 189.87 | 189.36 | 1.00% | 50.56 LF | 18" HDPE |
| A44 | 18" | A43 - A45 | 189.26 | 189.03 | 1.00% | 22.93 LF | 18" HDPE |
| A46 | 18" | A45 - A47 | 188.93 | 187.52 | 1.00% | 141.42 LF | 18" HDPE |
| A48 | 24" | A47 - A49 | 187.02 | 186.74 | 1.00% | 28.25 LF | 24" HDPE |
| A52 | 24" | A49 - A-DS9 | 186.64 | 186.15 | 1.00% | 49.42 LF | 24" HDPE |
| A54 | 24" | A53 - A55 | 181.88 | 181.45 | 0.60% | 71.03 LF | 24" HDPE |
| A56 | 24" | A55 - A57 | 181.35 | 181.21 | 0.60% | 22.56 LF | 24" HDPE |
| A58 | 24" | A57 - 18 | 181.21 | 180.92 | 0.60% | 47.95 LF | 24" HDPE |
| A60 | 15" | A59 - A-DS4 | 188.50 | 188.30 | 2.50% | 8.00 LF | 15" HDPE |
| A62 | 15" | A61 - A-DS5 | 188.20 | 188.00 | 2.51% | 8.00 LF | 15" HDPE |
| A68 | 18" | A67 - A69 | 192.00 | 191.45 | 1.00% | 53.53 LF | 18" HDPE |
| A70 | 18" | A69 - A15 | 191.35 | 190.81 | 1.00% | 53.53 LF | 18" HDPE |
| A72 | 18" | A71 - A-DS2 | 190.71 | 190.15 | 1.00% | 56.36 LF | 18" HDPE |
| A74 | 15" | A73 - A75 | 190.00 | 189.66 | 1.00% | 34.01 LF | 15" HDPE |
| A76 | 15" | A75 - A55 | 189.56 | 189.33 | 1.00% | 23.09 LF | 15" HDPE |

| STORM STRUCTURE TABLE | | | |
|-----------------------|--------|------------------|-------------|
| STRUCTURE # | TOP | STRUCTURE HEIGHT | DESCRIPTION |
| B-DS1 | 194.77 | 11.77' | MH-1, ST-1 |
| B-DS2 | 194.80 | 11.80' | MH-1, ST-1 |
| B-DS3 | 195.51 | 12.51' | MH-1, ST-1 |
| B-DS4 | 195.66 | 12.66' | MH-1, ST-1 |
| B-DS5 | 194.48 | 11.48' | MH-1, ST-1 |
| B-DS6 | 195.04 | 12.04' | MH-1, ST-1 |
| B-DS7 | 195.15 | 12.15' | MH-1, ST-1 |
| B-DS8 | 195.27 | 12.27' | MH-1, ST-1 |
| B-DS9 | 195.99 | 12.99' | MH-1, ST-1 |

| STORM STRUCTURE TABLE | | | |
|-----------------------|--------|------------------|--------------------------|
| STRUCTURE # | TOP | STRUCTURE HEIGHT | DESCRIPTION |
| B-DS10 | 195.82 | 12.82' | MH-1, ST-1 |
| B-DS11 | 195.32 | 12.32' | RISER TEE |
| B-DS12 | 195.28 | 12.28' | RISER TEE |
| B-DS13 | 195.77 | 12.77' | MH-1, ST-1 |
| B1 | 194.90 | 5.36' | DI-1, ST-1 |
| B3 | 196.25 | 8.46' | MH-1, IS-1, ST-1 |
| B5 | 195.39 | 8.69' | MH-1, IS-1, ST-1 |
| B7 | 195.18 | 8.75' | MH-1, IS-1, ST-1 |
| B9 | 196.28 | 10.69' | MH-1, IS-1, ST-1 |
| B11 | 195.81 | 10.51' | MH-1, IS-1, ST-1 |
| B13 | 195.56 | 4.56' | DI-3C, L=16', ST-1 |
| B15 | 195.56 | 6.35' | DI-3C, L=12', IS-1, ST-1 |
| B17 | 195.18 | 4.18' | DI-3B, L=12', IS-1, ST-1 |
| B19 | 195.86 | 6.45' | DI-1, IS-1, ST-1 |
| B21 | 195.70 | 7.15' | DI-1, IS-1, ST-1 |
| B23 | 194.76 | 6.91' | DI-3C, L=16', IS-1, ST-1 |
| B25 | 196.86 | 3.86' | DI-1 |
| B27 | 196.75 | 7.89' | DI-1, IS-1, ST-1 |
| B29 | 195.80 | 8.30' | DI-1, ST-1 |
| B31 | 195.55 | 8.35' | DI-1, ST-1 |

| STORM STRUCTURE TABLE | | | |
|-----------------------|--------|------------------|-------------------------------------|
| STRUCTURE # | TOP | STRUCTURE HEIGHT | DESCRIPTION |
| B33 | 195.31 | 7.81' | DI-3B, L=10', ST-1 |
| B35 | 194.90 | 8.99' | MH-1, IS-1, ST-1 |
| B37 | 195.38 | 10.07' | MH-1, IS-1, ST-1 |
| B39 | 194.70 | 5.41' | DI-1, ST-1 |
| B41 | 195.01 | 3.83' | DI-3C, L=12', ST-1 |
| B43 | 195.14 | 3.98' | DI-3C, L=14', ST-1 |
| B45 | 196.14 | 6.25' | DI-1, ST-1 |
| B47 | 195.41 | 5.41' | DI-1, ST-1 |
| B49 | 195.36 | 5.36' | DI-1, ST-1 |
| B51 | 195.33 | 16.41' | MH-1, ST-1 CITY STD TRAP MANHOLE |

| STORM PIPE TABLE | | | | | | | |
|------------------|-----|---------------|-----------------|-------------------|-------|-----------|-------------|
| PIPE # | DIA | FROM - TO | UPSTREAM INVERT | DOWNSTREAM INVERT | SLOPE | LENGTH | DESCRIPTION |
| B-DP1 | 48" | 141 - B-DS1 | 183.00 | 183.00 | 0.00% | 32.82 LF | 48" HDPE |
| B-DP2 | 48" | B-DS1 - B-DS2 | 183.00 | 183.00 | 0.00% | 99.50 LF | 48" HDPE |
| B-DP3 | 48" | B-DS2 - 144 | 183.00 | 183.00 | 0.00% | 53.68 LF | 48" HDPE |
| B-DP4 | 48" | 144 - 140 | 183.00 | 183.00 | 0.00% | 6.50 LF | 48" HDPE |
| B-DP5 | 48" | 137 - 140 | 183.00 | 183.00 | 0.00% | 186.00 LF | 48" HDPE |
| B-DP6 | 48" | 141 - 137 | 183.00 | 183.00 | 0.00% | 6.50 LF | 48" HDPE |
| B-DP7 | 48" | 137 - 136 | 183.00 | 183.00 | 0.00% | 6.50 LF | 48" HDPE |
| B-DP8 | 48" | 136 - 165 | 183.00 | 183.00 | 0.00% | 21.47 LF | 48" HDPE |
| B-DP9 | 48" | 165 - 135 | 183.00 | 183.00 | 0.00% | 164.53 LF | 48" HDPE |
| B-DP10 | 48" | 140 - 135 | | | | | |



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| DATE | REVISION DESCRIPTION |
|------------|----------------------|
| 06/03/2015 | |

DRAWN BY
C. SIBOLD

DESIGNED BY
R. SATMARIA

CHECKED BY
J. CHAPMAN

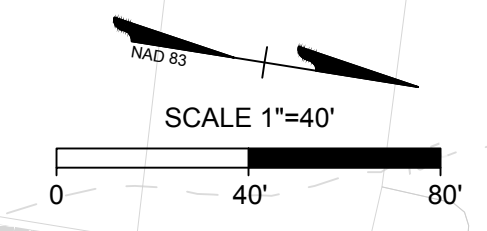
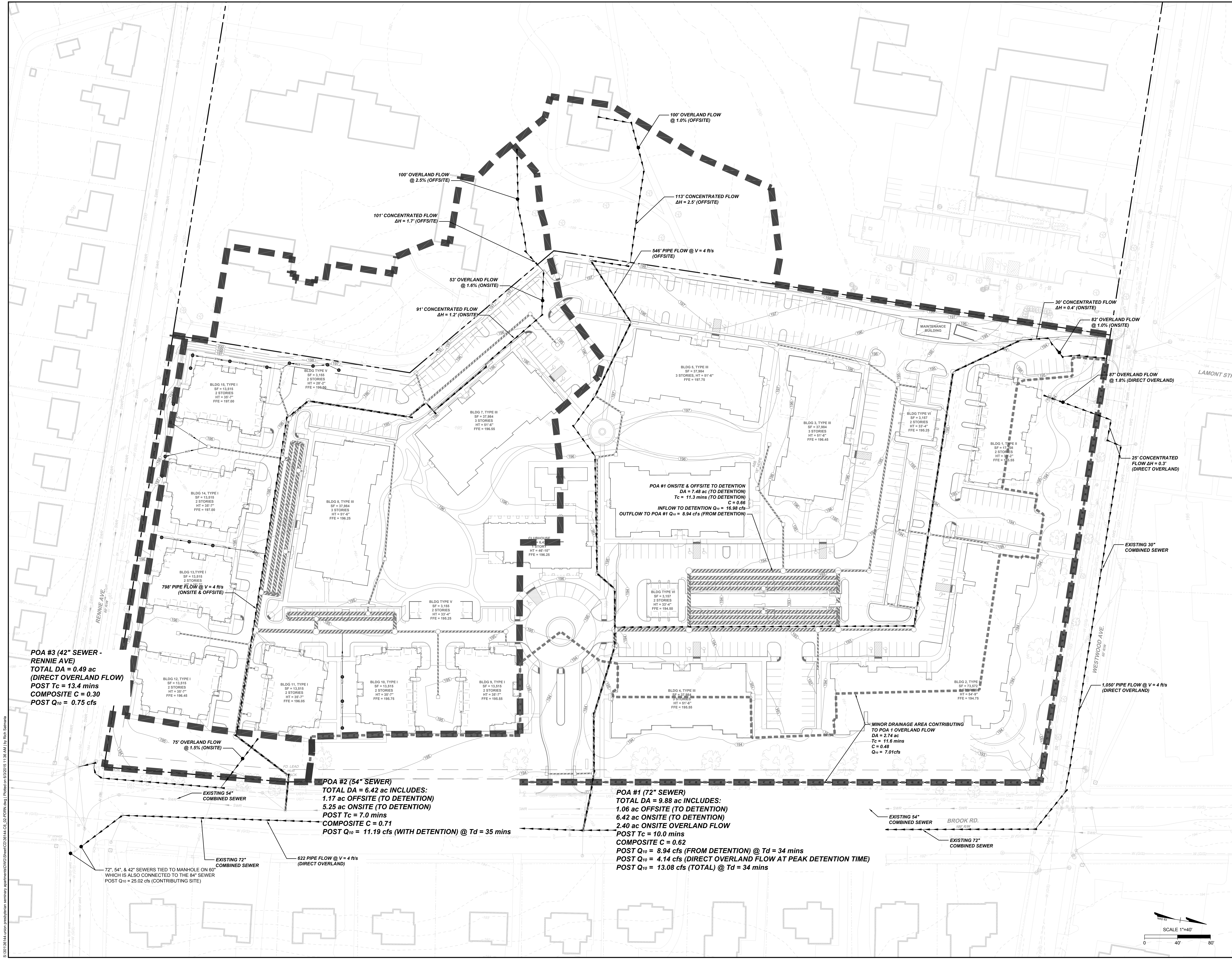
SCALE
1" = 40'

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
 POST-DEVELOPED STORMWATER MANAGEMENT PLAN

JOB NO.
36144

SHEET NO.
C6.02



S:\2015\15044\urban\prelim\sheet\sheetC6.02.dwg [Printed on 03/20/15 11:59 AM] by Rich Semmes

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POST-DEVELOPMENT HYDROLOGY (WITHOUT DETENTION)

| DA Description: POA #2 ONSITE (TO DETENTION) | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 1.40 | 0.42 |
| Pavement | 0.90 | 1.85 | 1.67 |
| Roof | 0.90 | 2.00 | 1.80 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 5.25 |
| Weighted C-factor | | | 0.74 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 53 | 1.6 | 91 | 1.2 |
| k (min) = 3.5 | | k (min) = 1.4 | |

| Pipe Flow: | |
|----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 798 | 4.0 |
| k (min) = 3.3 | |
| Total t _c (min) = 6.9 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 18.89 | 4.86 |
| Q ₁₀ = 25.16 | 6.48 |
| Q ₂₅ = 28.32 | 7.29 |
| Q ₅₀ = 36.30 | 9.34 |
| Q ₁₀₀ = 39.83 | 10.25 |

| DA Description: POA #1 ONSITE TO DETENTION | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 2.02 | 0.61 |
| Pavement | 0.90 | 2.85 | 2.57 |
| Roof | 0.90 | 1.55 | 1.40 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 6.42 |
| Weighted C-factor | | | 0.71 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 82 | 1.0 | 30 | 0.4 |
| k (min) = 4.8 | | k (min) = 0.6 | |

| Pipe Flow: | |
|----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 1017 | 4.0 |
| k (min) = 4.2 | |
| Total t _c (min) = 9.7 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 19.65 | 4.30 |
| Q ₁₀ = 26.31 | 5.76 |
| Q ₂₅ = 29.66 | 6.50 |
| Q ₅₀ = 38.01 | 8.32 |
| Q ₁₀₀ = 41.61 | 9.11 |

PRE-DEVELOPMENT HYDROLOGY

| DA Description: POA #1 | | | |
|------------------------|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 5.86 | 1.76 |
| Pavement | 0.90 | 1.78 | 1.60 |
| Roof | 0.90 | 0.51 | 0.46 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 8.15 |
| Weighted C-factor | | | 0.47 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 1.0 | 606 | 7.2 |
| k (min) = 8.0 | | k (min) = 6.2 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 730 | 4.0 |
| k (min) = 3.0 | |
| Total t _c (min) = 17.3 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 12.68 | 3.32 |
| Q ₁₀ = 17.28 | 4.53 |
| Q ₂₅ = 19.63 | 5.14 |
| Q ₅₀ = 25.26 | 6.62 |
| Q ₁₀₀ = 27.68 | 7.25 |

| DA Description: POA #2 OFFSITE (TO DETENTION) | | | |
|---|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 0.68 | 0.20 |
| Pavement | 0.90 | 0.30 | 0.27 |
| Roof | 0.90 | 0.19 | 0.17 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 1.17 |
| Weighted C-factor | | | 0.55 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 2.5 | 101 | 1.7 |
| k (min) = 5.7 | | k (min) = 1.4 | |

| Pipe Flow: | |
|----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 798 | 4.0 |
| k (min) = 3.3 | |
| Total t _c (min) = 9.0 | |

| Q (cfs) | I ₂ |
|-------------------------|----------------|
| Q ₂ = 2.85 | 4.42 |
| Q ₁₀ = 3.82 | 5.92 |
| Q ₂₅ = 4.30 | 6.67 |
| Q ₅₀ = 5.51 | 8.54 |
| Q ₁₀₀ = 6.03 | 9.35 |

| DA Description: POA #1 ONSITE TO DETENTION | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 0.91 | 0.27 |
| Pavement | 0.90 | 0.10 | 0.09 |
| Roof | 0.90 | 0.05 | 0.05 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 1.06 |
| Weighted C-factor | | | 0.38 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 1.0 | 113 | 2.5 |
| k (min) = 9.7 | | k (min) = 1.4 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 546 | 4.0 |
| k (min) = 2.3 | |
| Total t _c (min) = 13.4 | |

| Q (cfs) | I ₂ |
|-------------------------|----------------|
| Q ₂ = 1.53 | 3.76 |
| Q ₁₀ = 2.07 | 5.07 |
| Q ₂₅ = 2.34 | 5.74 |
| Q ₅₀ = 3.00 | 7.36 |
| Q ₁₀₀ = 3.29 | 8.06 |

| DA Description: POA #2 ONSITE | | | |
|-------------------------------|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 5.36 | 1.61 |
| Pavement | 0.90 | 0.25 | 0.23 |
| Roof | 0.90 | 0.18 | 0.16 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 5.79 |
| Weighted C-factor | | | 0.34 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 2.0 | 578 | 6.2 |
| k (min) = 9.5 | | k (min) = 6.3 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 358 | 4.0 |
| k (min) = 1.5 | |
| Total t _c (min) = 17.3 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 6.62 | 3.32 |
| Q ₁₀ = 9.03 | 4.53 |
| Q ₂₅ = 10.26 | 5.14 |
| Q ₅₀ = 13.20 | 6.62 |
| Q ₁₀₀ = 14.46 | 7.25 |

| DA Description: POA #2 ONSITE + OFFSITE (TO DETENTION) | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 2.08 | 0.62 |
| Pavement | 0.90 | 2.15 | 1.94 |
| Roof | 0.90 | 2.19 | 1.97 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 6.42 |
| Weighted C-factor | | | 0.71 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 53 | 1.6 | 91 | 1.2 |
| k (min) = 3.7 | | k (min) = 1.4 | |

| Pipe Flow: | |
|----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 798 | 4.0 |
| k (min) = 3.3 | |
| Total t _c (min) = 7.0 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 21.85 | 4.82 |
| Q ₁₀ = 29.11 | 6.43 |
| Q ₂₅ = 32.77 | 7.23 |
| Q ₅₀ = 42.00 | 9.27 |
| Q ₁₀₀ = 46.08 | 10.17 |

| DA Description: POA #1 ONSITE + OFFSITE TO DETENTION | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 2.93 | 0.88 |
| Pavement | 0.90 | 2.95 | 2.66 |
| Roof | 0.90 | 1.60 | 1.44 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 7.48 |
| Weighted C-factor | | | 0.66 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 1.0 | 113 | 2.5 |
| k (min) = 5.6 | | k (min) = 1.4 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 1017 | 4.0 |
| k (min) = 4.2 | |
| Total t _c (min) = 11.3 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 20.15 | 4.05 |
| Q ₁₀ = 27.08 | 5.44 |
| Q ₂₅ = 30.56 | 6.14 |
| Q ₅₀ = 39.19 | 7.88 |
| Q ₁₀₀ = 42.88 | 8.62 |

| DA Description: POA #2 OFFSITE | | | |
|--------------------------------|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 1.74 | 0.52 |
| Pavement | 0.90 | 0.30 | 0.27 |
| Roof | 0.90 | 0.19 | 0.17 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 2.23 |
| Weighted C-factor | | | 0.43 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 0.5 | 676 | 6.2 |
| k (min) = 9.9 | | k (min) = 7.5 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 358 | 4.0 |
| k (min) = 1.5 | |
| Total t _c (min) = 18.8 | |

| Q (cfs) | I ₂ |
|-------------------------|----------------|
| Q ₂ = 3.06 | 3.17 |
| Q ₁₀ = 4.18 | 4.34 |
| Q ₂₅ = 4.76 | 4.94 |
| Q ₅₀ = 6.13 | 6.36 |
| Q ₁₀₀ = 6.72 | 6.98 |

| DA Description: POA #3 DIRECT OVERLAND FLOW | | | |
|---|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 0.49 | 0.15 |
| Pavement | 0.90 | 0.00 | 0.00 |
| Roof | 0.90 | 0.00 | 0.00 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 0.49 |
| Weighted C-factor | | | 0.30 |

| Overland | | Concentrated: | |
|----------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 75 | 1.5 | 187 | 1.3 |
| k (min) = 10.2 | | k (min) = 3.2 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 0 | 4.0 |
| k (min) = 0.0 | |
| Total t _c (min) = 13.4 | |

| Q (cfs) | I ₂ |
|-------------------------|----------------|
| Q ₂ = 0.55 | 3.76 |
| Q ₁₀ = 0.75 | 5.07 |
| Q ₂₅ = 0.84 | 5.74 |
| Q ₅₀ = 1.08 | 7.23 |
| Q ₁₀₀ = 1.18 | 7.96 |

| DA Description: POA #1 DIRECT TO OUTFALL | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 1.94 | 0.58 |
| Pavement | 0.90 | 0.25 | 0.23 |
| Roof | 0.90 | 0.55 | 0.50 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 2.74 |
| Weighted C-factor | | | 0.48 |

| Overland | | Concentrated: | |
|---------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 87 | 1.8 | 25 | 0.3 |
| k (min) = 6.6 | | k (min) = 0.6 | |

| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 1050 | 4.0 |
| k (min) = 4.4 | |
| Total t _c (min) = 11.6 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 5.21 | 4.00 |
| Q ₁₀ = 7.01 | 5.38 |
| Q ₂₅ = 7.91 | 6.08 |
| Q ₅₀ = 10.15 | 7.79 |
| Q ₁₀₀ = 11.10 | 8.53 |

| DA Description: POA #2 ONSITE + OFFSITE | | | |
|---|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 7.10 | 2.13 |
| Pavement | 0.90 | 0.55 | 0.50 |
| Roof | 0.90 | 0.37 | 0.33 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 8.02 |
| Weighted C-factor | | | 0.37 |

| Overland | | Concentrated: | |
|----------------|-----------|---------------|--------|
| Length (ft) | Slope (%) | Length (ft) | H (ft) |
| 100 | 0.5 | 676 | 6.2 |
| k (min) = 11.5 | | k (min) = 7.5 | |

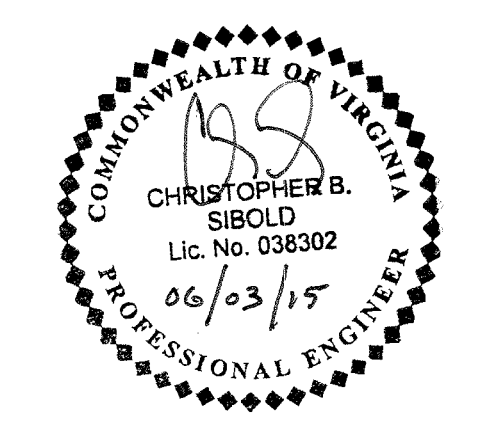
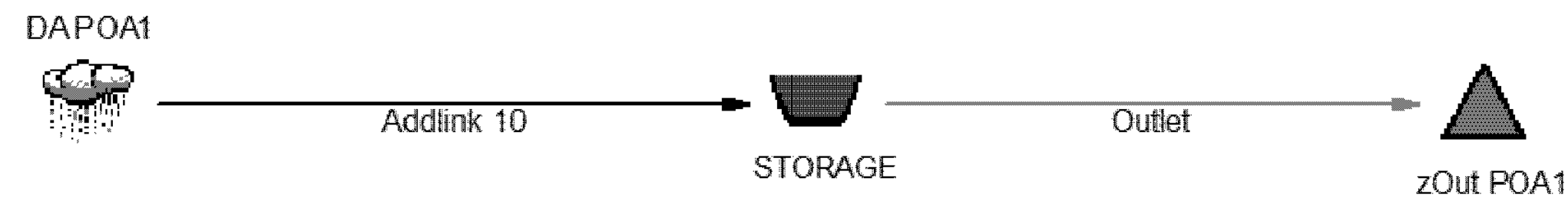
| Pipe Flow: | |
|-----------------------------------|----------|
| Length (ft) | V (ft/s) |
| 358 | 4.0 |
| k (min) = 1.5 | |
| Total t _c (min) = 20.5 | |

| Q (cfs) | I ₂ |
|--------------------------|----------------|
| Q ₂ = 8.97 | 3.03 |
| Q ₁₀ = 12.31 | 4.16 |
| Q ₂₅ = 14.04 | 4.75 |
| Q ₅₀ = 18.11 | 6.12 |
| Q ₁₀₀ = 19.87 | 6.72 |

| DA Description: POA #1 TOTAL ONSITE + OFFSITE TO OUTFALL | | | |
|--|-----------|------|----------|
| C-factor | Area (Ac) | CA | Overland |
| Grass | 0.30 | 4.87 | 1.46 |
| Pavement | 0.90 | 3.20 | 2.88 |
| Roof | 0.90 | 2.15 | 1.94 |
| Concrete | 0.90 | 0.00 | 0.00 |
| Gravel | 0.90 | 0.00 | 0.00 |
| Total Area | | | 10.22 |
| Weighted C-factor | | | 0.61 |

||
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POA #1 POST -DEVELOPMENT ROUTING



Type.... Master Network Summary Page 1.02
 Name.... Watershed
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

Type.... Individual Outlet Curves Page 10.04
 Name.... Outlet 2
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

Type.... Individual Outlet Curves Page 10.06
 Name.... Outlet 2
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

Type.... Pond Routing Calcs (Total Out) Page 11.07
 Name.... STORAGE OUT Tag: 10
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.
 Storm... e, b, d Tag: 10

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID Richmond BDE RDS

$i = b / ((T + d)^{**e})$

Where: i = rainfall intensity (in/hr)
 T = rainfall duration (min)
 e, b, d = rainfall equation coefficients

| Return Event | Rainfall Type | e coeff | b coeff | d coeff |
|--------------|----------------|---------|---------|---------|
| 10 | e, b, d Coeff. | .7200 | 47.9100 | 9.2500 |

MASTER NETWORK SUMMARY

Modified Rational Method Network
 (*Node=Outfall; *Node=Diversions; (Trun= HYG Truncation: Blank=None; L=Left; R=Right; LR=Left&Right)

| Node ID | Type | Return Event | HYG Vol cu.ft | Trun | Qpeak hrs | Qpeak cfs | Max WSEL ft | Pond Storage cu.ft |
|------------|----------|--------------|---------------|------|-----------|-----------|-------------|--------------------|
| DA POA1 | AREA | 10 | 30562 | | .1667 | 16.98 | | |
| STORAGE | IN POND | 10 | 30562 | | .1667 | 16.98 | | |
| STORAGE | OUT POND | 10 | 30554 | | .5666 | 8.94 | 186.14 | 20727 |
| *ZOUT POA1 | JCT | 10 | 30554 | | .5666 | 8.94 | | |

OVERALL MASTER SUMMARY

RATING TABLE FOR ONE OUTLET TYPE

| Pond WS. Elev. ft | Device | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Q Error +/-cfs | SUM DS HGL Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------|------------------|--------------------|----------------|-----------------------|-------------------------|-------------------------|
| 182.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.00 | .62 | 183.00 | 182.91 | 182.91 | .000 | .000 | Free Outfall |
| 183.50 | 1.82 | 183.50 | 183.21 | 183.21 | .000 | .000 | Free Outfall |
| 184.00 | 2.68 | 184.00 | 183.38 | 183.38 | .000 | .000 | Free Outfall |
| 184.50 | 3.20 | 184.50 | 183.61 | 183.61 | .000 | .000 | Free Outfall |
| 185.00 | 3.75 | 185.00 | 183.78 | 183.78 | .000 | .000 | Free Outfall |
| 185.50 | 4.28 | 185.50 | 183.91 | 183.91 | .000 | .000 | Free Outfall |
| 186.00 | 4.78 | 186.00 | 184.02 | 184.02 | .000 | .000 | Free Outfall |
| 186.50 | 4.62 | 186.50 | 184.65 | 184.65 | .000 | .000 | Free Outfall |
| 187.00 | 3.53 | 187.00 | 185.92 | 185.92 | .000 | .000 | Free Outfall |
| 187.50 | 2.29 | 187.50 | 187.04 | 187.04 | .000 | .000 | Free Outfall |
| 188.00 | 1.73 | 188.00 | 187.74 | 187.74 | .000 | .000 | Free Outfall |
| 188.50 | 1.38 | 188.50 | 188.33 | 188.33 | .000 | .000 | Free Outfall |
| 189.00 | 1.15 | 189.00 | 188.89 | 188.89 | .000 | .000 | Free Outfall |
| 189.50 | .98 | 189.50 | 189.42 | 189.42 | .000 | .000 | Free Outfall |
| 190.00 | .86 | 190.00 | 189.94 | 189.94 | .000 | .000 | Free Outfall |
| 190.50 | .76 | 190.50 | 190.45 | 190.45 | .000 | .000 | Free Outfall |

Type.... Individual Outlet Curves Page 10.05
 Name.... Outlet 2
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

RATING TABLE FOR ONE OUTLET TYPE

| Pond WS. Elev. ft | Device | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Q Error +/-cfs | SUM DS HGL Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------|------------------|--------------------|----------------|-----------------------|-------------------------|-------------------------|
| 182.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.00 | .62 | 183.00 | 182.91 | 182.91 | .000 | .000 | Free Outfall |
| 183.50 | 1.82 | 183.50 | 183.21 | 183.21 | .000 | .000 | Free Outfall |
| 184.00 | 2.68 | 184.00 | 183.38 | 183.38 | .000 | .000 | Free Outfall |
| 184.50 | 3.20 | 184.50 | 183.61 | 183.61 | .000 | .000 | Free Outfall |
| 185.00 | 3.75 | 185.00 | 183.78 | 183.78 | .000 | .000 | Free Outfall |
| 185.50 | 4.28 | 185.50 | 183.91 | 183.91 | .000 | .000 | Free Outfall |
| 186.00 | 4.78 | 186.00 | 184.02 | 184.02 | .000 | .000 | Free Outfall |
| 186.50 | 4.62 | 186.50 | 184.65 | 184.65 | .000 | .000 | Free Outfall |
| 187.00 | 3.53 | 187.00 | 185.92 | 185.92 | .000 | .000 | Free Outfall |
| 187.50 | 2.29 | 187.50 | 187.04 | 187.04 | .000 | .000 | Free Outfall |
| 188.00 | 1.73 | 188.00 | 187.74 | 187.74 | .000 | .000 | Free Outfall |
| 188.50 | 1.38 | 188.50 | 188.33 | 188.33 | .000 | .000 | Free Outfall |
| 189.00 | 1.15 | 189.00 | 188.89 | 188.89 | .000 | .000 | Free Outfall |
| 189.50 | .98 | 189.50 | 189.42 | 189.42 | .000 | .000 | Free Outfall |
| 190.00 | .86 | 190.00 | 189.94 | 189.94 | .000 | .000 | Free Outfall |
| 190.50 | .76 | 190.50 | 190.45 | 190.45 | .000 | .000 | Free Outfall |

Type.... Individual Outlet Curves Page 10.07
 Name.... Outlet 2
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

RATING TABLE FOR ONE OUTLET TYPE

| Pond WS. Elev. ft | Device | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Q Error +/-cfs | SUM DS HGL Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------|------------------|--------------------|----------------|-----------------------|-------------------------|-------------------------|
| 182.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.00 | .62 | 183.00 | 182.91 | 182.91 | .000 | .000 | Free Outfall |
| 183.50 | 1.82 | 183.50 | 183.21 | 183.21 | .000 | .000 | Free Outfall |
| 184.00 | 2.68 | 184.00 | 183.38 | 183.38 | .000 | .000 | Free Outfall |
| 184.50 | 3.20 | 184.50 | 183.61 | 183.61 | .000 | .000 | Free Outfall |
| 185.00 | 3.75 | 185.00 | 183.78 | 183.78 | .000 | .000 | Free Outfall |
| 185.50 | 4.28 | 185.50 | 183.91 | 183.91 | .000 | .000 | Free Outfall |
| 186.00 | 4.78 | 186.00 | 184.02 | 184.02 | .000 | .000 | Free Outfall |
| 186.50 | 4.62 | 186.50 | 184.65 | 184.65 | .000 | .000 | Free Outfall |
| 187.00 | 3.53 | 187.00 | 185.92 | 185.92 | .000 | .000 | Free Outfall |
| 187.50 | 2.29 | 187.50 | 187.04 | 187.04 | .000 | .000 | Free Outfall |
| 188.00 | 1.73 | 188.00 | 187.74 | 187.74 | .000 | .000 | Free Outfall |
| 188.50 | 1.38 | 188.50 | 188.33 | 188.33 | .000 | .000 | Free Outfall |
| 189.00 | 1.15 | 189.00 | 188.89 | 188.89 | .000 | .000 | Free Outfall |
| 189.50 | .98 | 189.50 | 189.42 | 189.42 | .000 | .000 | Free Outfall |
| 190.00 | .86 | 190.00 | 189.94 | 189.94 | .000 | .000 | Free Outfall |
| 190.50 | .76 | 190.50 | 190.45 | 190.45 | .000 | .000 | Free Outfall |

Type.... Pond E-V-Q Table Page 11.03
 Name.... STORAGE
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

LEVEL POOL ROUTING DATA

HYG Dir = S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4
 Inflow HYG file = NONE STORED - STORAGE IN 10
 Outflow HYG file = NONE STORED - STORAGE OUT 10

Pond Node Data = STORAGE
 Pond Volume Data = STORAGE
 Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 182.50 ft
 Starting Volume = 0 cu.ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Out = .00 cfs
 Time Increment = .0333 hrs

| Elevation ft | Outflow cfs | Storage cu.ft | Infiltr. cfs | Q Total cfs | 2s/t + 0 cfs |
|--------------|-------------|---------------|--------------|-------------|--------------|
| 182.50 | .00 | 0 | .00 | .00 | .00 |
| 183.00 | .62 | 1525 | .00 | .62 | 26.04 |
| 183.50 | 1.82 | 4131 | .00 | 1.82 | 70.67 |
| 184.00 | 2.68 | 7235 | .00 | 2.68 | 123.27 |
| 184.50 | 4.15 | 10562 | .00 | 4.15 | 180.20 |
| 185.00 | 5.39 | 13929 | .00 | 5.39 | 237.56 |
| 185.50 | 6.39 | 17212 | .00 | 6.39 | 293.29 |
| 186.00 | 7.28 | 20154 | .00 | 7.28 | 343.21 |
| 186.50 | 13.02 | 23130 | .00 | 13.02 | 381.85 |
| 187.00 | 22.00 | 23559 | .00 | 22.00 | 414.68 |
| 187.50 | 25.25 | 25301 | .00 | 25.25 | 446.97 |
| 188.00 | 27.20 | 27215 | .00 | 27.20 | 480.83 |
| 188.50 | 28.78 | 28425 | .00 | 28.78 | 502.57 |
| 189.00 | 30.17 | 29647 | .00 | 30.17 | 524.34 |
| 189.50 | 31.47 | 29650 | .00 | 31.47 | 525.69 |
| 190.00 | 32.70 | 29652 | .00 | 32.70 | 526.95 |
| 190.50 | 33.86 | 29654 | .00 | 33.86 | 528.14 |

ELEVATION - VOLUME - FLOW RATE OUTLET TABLE

RATING TABLE FOR ONE OUTLET TYPE

| Pond WS. Elev. ft | Device | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Q Error +/-cfs | SUM DS HGL Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------|------------------|--------------------|----------------|-----------------------|-------------------------|-------------------------|
| 182.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.00 | .62 | 183.00 | 182.91 | 182.91 | .000 | .000 | Free Outfall |
| 183.50 | 1.82 | 183.50 | 183.21 | 183.21 | .000 | .000 | Free Outfall |
| 184.00 | 2.68 | 184.00 | 183.38 | 183.38 | .000 | .000 | Free Outfall |
| 184.50 | 3.20 | 184.50 | 183.61 | 183.61 | .000 | .000 | Free Outfall |
| 185.00 | 3.75 | 185.00 | 183.78 | 183.78 | .000 | .000 | Free Outfall |
| 185.50 | 4.28 | 185.50 | 183.91 | 183.91 | .000 | .000 | Free Outfall |
| 186.00 | 4.78 | 186.00 | 184.02 | 184.02 | .000 | .000 | Free Outfall |
| 186.50 | 4.62 | 186.50 | 184.65 | 184.65 | .000 | .000 | Free Outfall |
| 187.00 | 3.53 | 187.00 | 185.92 | 185.92 | .000 | .000 | Free Outfall |
| 187.50 | 2.29 | 187.50 | 187.04 | 187.04 | .000 | .000 | Free Outfall |
| 188.00 | 1.73 | 188.00 | 187.74 | 187.74 | .000 | .000 | Free Outfall |
| 188.50 | 1.38 | 188.50 | 188.33 | 188.33 | .000 | .000 | Free Outfall |
| 189.00 | 1.15 | 189.00 | 188.89 | 188.89 | .000 | .000 | Free Outfall |
| 189.50 | .98 | 189.50 | 189.42 | 189.42 | .000 | .000 | Free Outfall |
| 190.00 | .86 | 190.00 | 189.94 | 189.94 | .000 | .000 | Free Outfall |
| 190.50 | .76 | 190.50 | 190.45 | 190.45 | .000 | .000 | Free Outfall |

Type.... Individual Outlet Curves Page 10.07
 Name.... Outlet 2
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.

Type.... Pond Routed HYG (total out) Page 11.12
 Name.... STORAGE OUT Tag: 10
 File.... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\PondPack\POA1 MRM-4.
 Storm... e, b, d Tag: 10

POND Routed TOTAL OUTFLOW HYG...

HYG file = STORAGE OUT
 HYG Tag = 10
 Peak Discharge = 8.94 cfs
 Time to Peak = .5667 hrs
 HYG Volume = 30553 cu.ft

STORAGE OUTFLOW HYDROGRAPH

| Time hrs | Output cfs | Time increment = .0333 hrs |
|----------|------------|----------------------------|
| 0.0000 | .00 | .32 |
| 0.0333 | 1.97 | 3.09 |
| 0.0667 | 4.97 | 5.89 |
| 0.1000 | 7.04 | 8.94 |
| 0.1333 | 7.12 | 6.82 |
| 0.1667 | 5.93 | 5.51 |
| 0.2000 | 4.64 | 4.44 |
| 0.2333 | 3.84 | 3.45 |
| 0.2667 | 2.94 | 2.66 |
| 0.3000 | 2.43 | 2.25 |
| 0.3333 | 2.04 | 1.91 |
| 0.3667 | 1.67 | 1.49 |
| 0.4000 | 1.27 | 1.13 |
| 0.4333 | .96 | .81 |
| 0.4667 | .73 | .65 |
| 0.5000 | .56 | .51 |
| 0.5333 | .44 | .43 |
| 0.5667 | .34 | .36 |
| 0.6000 | .27 | .28 |
| 0.6333 | .21 | .23 |
| 0.6667 | .17 | .18 |
| 0.7000 | .13 | .12 |
| 0.7333 | .10 | .09 |
| 0.7667 | .08 | .07 |
| 0.8000 | .06 | .05 |
| 0.8333 | .04 | .04 |
| 0.8667 | .03 | .03 |
| 0.9000 | .02 | .02 |
| 0.9333 | .02 | .02 |
| 0.9667 | .01 | .01 |
| 1.0000 | .01 | .01 |

OUTFLOW PEAK RATE AT HIGHEST STORAGE VOLUME

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
 1001 Braddock Road, Suite 200
 Fairfax, VA 22033
 TEL 664-20616

POA #2 POST -DEVELOPMENT ROUTING



Type... Master Network Summary Page 1.02
 Name... Watershed
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID Richmond BDE RDS

$i = b / ((T + d)^{**e})$

OVERALL MASTER SUMMARY

Where: i = rainfall intensity (in/hr)
 T = rainfall duration (min)
 e, b, d = rainfall equation coefficients

| Return Event | Rainfall Type | e coeff | b coeff | d coeff |
|--------------|----------------|---------|---------|---------|
| 10 | e, b, d Coeff. | .7200 | 47.9100 | 9.2500 |

MASTER NETWORK SUMMARY

Modified Rational Method Network
 (*Node=Outfall; *Node=Division;
 (Trun= HYG Truncation: Blank=None; L=Left; R=Right; LR=Left&Right)

| Node ID | Type | Return Event | HYG Vol cu.ft | Trun | Opeak hrs | Opeak cfs | Max WSEL ft | Pond Storage cu.ft |
|------------------|------|--------------|---------------|------|-----------|-----------|-------------|--------------------|
| DA POA2 | AREA | 10 | 30199 | | .1167 | 14.38 | | |
| POA2 STORAGE IN | POND | 10 | 30198 | | .1167 | 14.38 | | |
| POA2 STORAGE OUT | POND | 10 | 30193 | | .5833 | 11.19 | 186.51 | 14610 |
| *ZOUT POA2 | JCT | 10 | 30193 | | .5833 | 11.19 | | |

Type... Pond E-V-Q Table Page 11.02
 Name... POA2 STORAGE
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.

LEVEL POOL ROUTING DATA

HYG Dir = S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\
 Inflow HYG file = NONE STORED - POA2 STORAGE IN 10
 Outflow HYG file = NONE STORED - POA2 STORAGE OUT 10

Pond Node Data = POA2 STORAGE
 Pond Volume Data = POA2 STORAGE
 Pond Outlet Data = Outlet 1

No Infiltration
 INITIAL CONDITIONS
 Starting MS Elev = 183.00 ft
 Starting Volume = 0 cu.ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Qout = .00 cfs
 Time Increment = .0583 hrs

| Elevation ft | Outflow cfs | Storage cu.ft | Infiltr. cfs | Q Total cfs | 2s/t + 0 cfs |
|--------------|-------------|---------------|--------------|-------------|--------------|
| 183.00 | .00 | 0 | .00 | .00 | .00 |
| 183.50 | .58 | 1095 | .00 | .58 | 11.01 |
| 184.00 | 2.04 | 2968 | .00 | 2.04 | 30.30 |
| 184.50 | 3.87 | 5199 | .00 | 3.87 | 52.39 |
| 185.00 | 5.13 | 7950 | .00 | 5.13 | 77.41 |
| 185.50 | 7.08 | 10017 | .00 | 7.08 | 102.48 |
| 186.00 | 9.36 | 12404 | .00 | 9.36 | 127.49 |
| 186.50 | 11.85 | 15074 | .00 | 11.85 | 154.85 |
| 187.00 | 16.98 | 16885 | .00 | 16.98 | 176.17 |
| 187.50 | 21.24 | 17435 | .00 | 21.24 | 190.28 |
| 188.00 | 28.15 | 19154 | .00 | 28.15 | 210.57 |
| 188.50 | 30.87 | 21107 | .00 | 30.87 | 231.89 |
| 189.00 | 32.94 | 23160 | .00 | 32.94 | 253.51 |
| 189.50 | 34.78 | 25224 | .00 | 34.78 | 275.01 |
| 190.00 | 36.45 | 25226 | .00 | 36.45 | 276.70 |
| 190.50 | 38.05 | 25228 | .00 | 38.05 | 278.32 |

Type... Individual Outlet Curves Page 10.04
 Name... Outlet 1
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = C0 (Orifice-Circular)
 Upstream ID = (Pond Water Surface)
 Dnstream ID = C0 (Culvert-Circular)

| Pond MS. Elev. ft | Device Q cfs | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Error +/-ft | Q SUM Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------------|------------------|--------------------|----------------|--------------------|--------------------|-------------------------|
| 183.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.50 | .58 | 183.50 | 183.39 | 183.39 | .000 | .000 | Free Outfall |
| 184.00 | 2.04 | 184.00 | 183.76 | 183.76 | .000 | .000 | Free Outfall |
| 184.50 | 3.88 | 184.50 | 184.07 | 184.07 | .000 | .000 | Free Outfall |
| 185.00 | 5.13 | 185.00 | 184.25 | 184.25 | .000 | .000 | Free Outfall |
| 185.50 | 5.93 | 185.50 | 184.49 | 184.49 | .000 | .000 | Free Outfall |
| 186.00 | 6.59 | 186.00 | 184.75 | 184.75 | .000 | .000 | Free Outfall |
| 186.50 | 7.38 | 186.50 | 184.94 | 184.94 | .000 | .000 | Free Outfall |
| 187.00 | 7.09 | 187.00 | 185.56 | 185.56 | .000 | .000 | Free Outfall |
| 187.50 | 5.28 | 187.50 | 186.70 | 186.70 | .000 | .000 | Free Outfall |
| 188.00 | 4.02 | 188.00 | 187.54 | 187.54 | .000 | .000 | Free Outfall |
| 188.50 | 3.22 | 188.50 | 188.20 | 188.20 | .000 | .000 | Free Outfall |
| 189.00 | 2.66 | 189.00 | 188.80 | 188.80 | .000 | .000 | Free Outfall |
| 189.50 | 2.26 | 189.50 | 189.35 | 189.35 | .000 | .000 | Free Outfall |
| 190.00 | 1.97 | 190.00 | 189.89 | 189.89 | .000 | .000 | Free Outfall |
| 190.50 | 1.74 | 190.50 | 190.41 | 190.41 | .000 | .000 | Free Outfall |

Type... Individual Outlet Curves Page 10.05
 Name... Outlet 1
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.

RATING TABLE FOR ONE OUTLET TYPE OUTLET CONTROL RATINGS

Structure ID = C1 (Orifice-Circular)
 Upstream ID = (Pond Water Surface)
 Dnstream ID = C0 (Culvert-Circular)

| Pond MS. Elev. ft | Device Q cfs | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Error +/-ft | Q SUM Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------------|------------------|--------------------|----------------|--------------------|--------------------|-------------------------|
| 183.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.50 | .56 | 183.39 | Free | Free | .000 | .000 | Free Outfall |
| 184.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 184.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 185.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 185.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 186.00 | 1.16 | 185.50 | Free | 184.49 | .000 | .000 | Free Outfall |
| 186.50 | 2.77 | 186.00 | Free | 184.75 | .000 | .000 | Free Outfall |
| 187.00 | 4.07 | 187.00 | Free | 184.94 | .000 | .000 | Free Outfall |
| 187.50 | 3.03 | 187.50 | Free | 186.70 | .000 | .000 | Free Outfall |
| 188.00 | 2.31 | 188.00 | Free | 187.54 | .000 | .000 | Free Outfall |
| 188.50 | 1.85 | 188.50 | Free | 188.20 | .000 | .000 | Free Outfall |
| 189.00 | 1.53 | 189.00 | Free | 188.80 | .000 | .000 | Free Outfall |
| 189.50 | 1.30 | 189.50 | Free | 189.35 | .000 | .000 | Free Outfall |
| 190.00 | 1.13 | 190.00 | Free | 189.89 | .000 | .000 | Free Outfall |
| 190.50 | 1.00 | 190.50 | Free | 190.41 | .000 | .000 | Free Outfall |

POST DEVELOPMENT 10yr PEAK FLOW RATES:
 EXISTING FLOW RATE TARGET POA #2: 12.31 cfs

POST DEVELOPMENT DRAINAGE TO DETENTION 10yr PEAK OUTFLOW:
 11.66 cfs AT 35 mins (0.58333 hrs)

REFER TO DRAWING C6.10 FOR PRE-DEVELOPMENT CALCULATIONS

Type... Individual Outlet Curves Page 10.06
 Name... Outlet 1
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.

RATING TABLE FOR ONE OUTLET TYPE OUTLET CONTROL RATINGS

Structure ID = W0 (Weir-Rectangular)
 Upstream ID = (Pond Water Surface)
 Dnstream ID = C0 (Culvert-Circular)

| Pond MS. Elev. ft | Device Q cfs | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Error +/-ft | Q SUM Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------------|------------------|--------------------|----------------|--------------------|--------------------|-------------------------|
| 183.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 184.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 184.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 185.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 185.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 186.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 186.50 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 187.00 | 5.83 | 187.00 | Free | 185.56 | .000 | .000 | Free Outfall |
| 187.50 | 15.91 | 187.50 | Free | 186.70 | .000 | .000 | Free Outfall |
| 188.00 | 21.82 | 188.00 | Free | 187.54 | .000 | .000 | Free Outfall |
| 188.50 | 25.78 | 188.50 | Free | 188.20 | .000 | .000 | Free Outfall |
| 189.00 | 28.76 | 189.00 | Free | 188.80 | .000 | .000 | Free Outfall |
| 189.50 | 31.21 | 189.50 | Free | 189.35 | .000 | .000 | Free Outfall |
| 190.00 | 33.37 | 190.00 | Free | 189.89 | .000 | .000 | Free Outfall |
| 190.50 | 35.23 | 190.50 | Free | 190.41 | .000 | .000 | Free Outfall |

Type... Individual Outlet Curves Page 10.07
 Name... Outlet 1
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.

RATING TABLE FOR ONE OUTLET TYPE OUTLET CONTROL RATINGS

Structure ID = C0 (Culvert-Circular)
 Manning's open channel maximum capacity: 23.02 cfs
 Upstream ID = C0, O1, W0
 Dnstream ID = TW (Pond Outfall)

| Pond MS. Elev. ft | Device Q cfs | (into) HW HGL ft | Converge DS HGL ft | Next DS HGL ft | DS HGL Error +/-ft | Q SUM Error +/-cfs | DS Chan. TW Error +/-ft |
|-------------------|--------------|------------------|--------------------|----------------|--------------------|--------------------|-------------------------|
| 183.00 | .00 | ... | ... | ... | ... | ... | Free Outfall |
| 183.50 | .56 | 183.39 | Free | Free | .000 | .000 | Free Outfall |
| 184.00 | 2.03 | 183.76 | Free | Free | .000 | .000 | Free Outfall |
| 184.50 | 3.87 | 184.07 | Free | Free | .000 | .000 | Free Outfall |
| 185.00 | 5.12 | 184.25 | Free | Free | .000 | .000 | Free Outfall |
| 185.50 | 7.08 | 184.49 | Free | Free | .000 | .000 | Free Outfall |
| 186.00 | 9.36 | 184.75 | Free | Free | .000 | .000 | Free Outfall |
| 186.50 | 11.05 | 184.94 | Free | Free | .000 | .000 | Free Outfall |
| 187.00 | 16.98 | 185.56 | Free | Free | .000 | .015 | Free Outfall |
| 187.50 | 24.24 | 186.70 | Free | Free | .000 | .015 | Free Outfall |
| 188.00 | 28.19 | 187.54 | Free | Free | .000 | .000 | Free Outfall |
| 188.50 | 30.87 | 188.20 | Free | Free | .000 | .029 | Free Outfall |
| 189.00 | 32.94 | 188.80 | Free | Free | .000 | .013 | Free Outfall |
| 189.50 | 34.78 | 189.35 | Free | Free | .000 | .002 | Free Outfall |
| 190.00 | 36.45 | 189.89 | Free | Free | .000 | .029 | Free Outfall |
| 190.50 | 38.05 | 190.41 | Free | Free | .000 | .019 | Free Outfall |

Type... Pond Routing Calcs (Total Out) Page 11.06
 Name... POA2 STORAGE OUT Tag: 10
 Event: 10 yr
 File... S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\POA2 MRM-2.
 Storm... e, b, d Tag: 10

LEVEL POOL ROUTING CALCULATIONS

HYG Dir = S:\301\36144-Union Presbyterian Seminary Apartments\Calc\Stm\FondPack\
 Inflow HYG file = NONE STORED - POA2 STORAGE IN 10
 Outflow HYG file = NONE STORED - POA2 STORAGE OUT 10

| Time hrs | Inflow cfs | 2s/t + 0 cfs | 2s/t + 0 cfs | Infiltr. cfs | Outflow cfs | Storage cu-ft | Elev. ft |
|----------|------------|--------------|--------------|--------------|-------------|---------------|----------|
| .0000 | .00 | .00 | .00 | .00 | .00 | 0 | 183.00 |
| .0583 | 7.19 | 6.43 | 7.19 | .00 | .38 | 715 | 183.33 |
| .1167 | 14.38 | 24.27 | 28.00 | .00 | 1.86 | 2744 | 183.94 |
| .1750 | 14.38 | 45.34 | 53.04 | .00 | 3.89 | 5165 | 184.49 |
| .2333 | 14.38 | 68.19 | 74.10 | .00 | 4.95 | 7261 | 184.93 |
| .2917 | 14.38 | 80.28 | 92.95 | .00 | 6.34 | 9095 | 185.31 |
| .3500 | 14.38 | 93.68 | 109.04 | .00 | 7.68 | 10643 | 185.63 |
| .4083 | 14.38 | 104.65 | 122.44 | .00 | 8.90 | 11922 | 185.90 |
| .4667 | 14.38 | 113.80 | 133.41 | .00 | 9.80 | 12979 | 186.13 |
| .5250 | 14.38 | 121.87 | 142.56 | .00 | 10.50 | 13867 | 186.34 |
| .5833 | 14.38 | 127.96 | 150.33 | .00 | 11.19 | 14610 | 186.51 |
| .6417 | 7.19 | 127.48 | 149.53 | .00 | 11.02 | 14943 | 186.49 |
| .7000 | .00 | 114.88 | 134.87 | .00 | 9.90 | 13101 | 186.16 |
| .7583 | .00 | 98.46 | 114.88 | .00 | 8.21 | 11200 | 185.75 |
| .8167 | .00 | 84.92 | 98.46 | .00 | 6.77 | 9627 | 185.42 |
| .8750 | .00 | 73.50 | 84.92 | .00 | 5.71 | 8317 | 185.15 |
| .9333 | .00 | 63.85 | 73.50 | .00 | 4.92 | 7200 | 184.92 |
| .9917 | .00 | 54.83 | 63.85 | .00 | 4.41 | 6220 | 184.71 |
| 1.0500 | .00 | 46.93 | 54.83 | .00 | 3.95 | 5343 | 184.53 |
| 1.1083 | .00 | 40.21 | 46.93 | .00 | 3.56 | 4575 | 184.36 |
| 1.1667 | .00 | 34.36 | 40.21 | .00 | 3.23 | 3926 | 184.21 |
| 1.2250 | .00 | 29.81 | 34.36 | .00 | 2.98 | 3380 | 184.09 |
| 1.2833 | .00 | 25.81 | 29.81 | .00 | 2.70 | 2920 | 183.99 |
| 1.3417 | .00 | 22.42 | 25.81 | .00 | 2.48 | 2520 | 183.88 |
| 1.4000 | .00 | 19.53 | 22.42 | .00 | 2.22 | 2160 | 183.80 |
| 1.4583 | .00 | 17.08 | 19.53 | .00 | 2.00 | 1820 | 183.72 |
| 1.5167 | .00 | 15.00 | 17.08 | .00 | 1.82 | 1500 | 183.66 |
| 1.5750 | .00 | 13.24 | 15.00 | .00 | 1.68 | 1200 | 183.60 |
| 1.6333 | .00 | 11.74 | 13.24 | .00 | 1.57 | 900 | 183.56 |
| 1.6917 | .00 | 10.46 | 11.74 | .00 | 1.48 | 600 | 183.52 |
| 1.7500 | .00 | 9.36 | 10.46 | .00 | 1.41 | 300 | 183.48 |
| 1.8083 | .00 | 8.37 | 9.36 | .00 | 1.35 | 0 | 183.44 |
| 1.8667 | .00 | 7.48 | 8.37 | .00 | 1.30 | 0 | 183.38 |
| 1.9250 | .00 | 6.69 | 7.48 | .00 | 1.26 | 0 | 183.34 |
| 1.9833 | .00 | 5.98 | 6.69 | .00 | 1.23 | 0 | 183.30 |
| 2.0417 | .00 | 5.35 | 5.98 | .00 | 1.20 | 0 | 183.27 |
| 2.1000 | .00 | 4.79 | 5.35 | | | | |

STORM B
STORM SEWER DESIGN COMPUTATIONS
STORM FREQUENCY 10

PROJECT: Bristol at Westwood
LOCATION: 1311 Westwood Ave.
COUNTY: City of Richmond

Designed by: R.S.
Checked by: C.S.

UNITS ENGLISH

Table with 18 columns: PIPE NO, FROM POINT, TO POINT, DRAIN AREA, RUNOFF COEFF, INCRE ACCUMULATED, ADDTL CA, TOTAL INLET TIME, RAIN FALL, RUNOFF Q, INVERT ELEVATIONS, LENGTH OF PIPE, SLOPE, SIZE (Dia. Or Span/Rise), SHAPE, Capacity, Friction Slope, Vn, FLOW TIME, REMARKS.

STORM B PROJECT: Bristol at Westwood

DESIGNED BY: R.S.

Checked: C.S.

INCIDENCE PROBABILITY 10 Year

Table with 23 columns: INLET OR JUNCTION, INLET STATION, OUTLET WATER SURFACE ELEV., DIA. PIPE, DESIGN DISCH. Qo, LENGTH OF PIPE (L), FRICTION LOSS (FL), FRICTION LOSS (FH), JUNCTION LOSS (Vo, Ho, Qi, Vi, Qv, V12/2g, Hi, Angle, HA, Ht, 1.3 Ht, 0.5 Ht), FINAL H (Ft), Inlet Water Surface Elevation (Ft), Rim Elev, Comments.

STORM A
STORM SEWER DESIGN COMPUTATIONS
STORM FREQUENCY 10

PROJECT: Bristol at Westwood
LOCATION: 1311 Westwood Ave.
COUNTY: City of Richmond

Designed by: R.S.
Checked by: C.S.

UNITS ENGLISH

Table with 18 columns: PIPE NO, FROM POINT, TO POINT, DRAIN AREA, RUNOFF COEFF, INCRE ACCUMULATED, ADDTL CA, TOTAL INLET TIME, RAIN FALL, RUNOFF Q, INVERT ELEVATIONS, LENGTH OF PIPE, SLOPE, SIZE (Dia. Or Span/Rise), SHAPE, Capacity, Friction Slope, Vn, FLOW TIME, REMARKS.

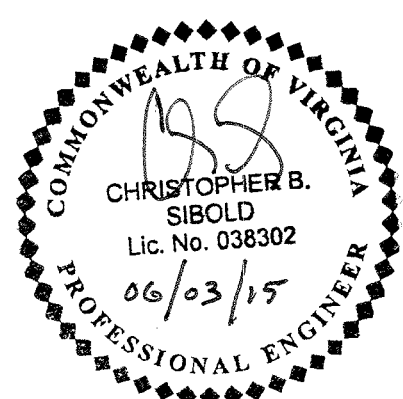
STORM A PROJECT: Bristol at Westwood

DESIGNED BY: R.S.

Checked: C.S.

INCIDENCE PROBABILITY 10 Year

Table with 23 columns: INLET OR JUNCTION, INLET STATION, OUTLET WATER SURFACE ELEV., DIA. PIPE, DESIGN DISCH. Qo, LENGTH OF PIPE (L), FRICTION LOSS (FL), FRICTION LOSS (FH), JUNCTION LOSS (Vo, Ho, Qi, Vi, Qv, V12/2g, Hi, Angle, HA, Ht, 1.3 Ht, 0.5 Ht), FINAL H (Ft), Inlet Water Surface Elevation (Ft), Rim Elev, Comments.



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DESIGNED BY

R. SATMARIA

CHECKED BY

C. SIBOLD

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DATE

JOB NO.
36144
SHEET NO.
C6.13

TIMMONS GROUP
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA
DRAINAGE CALCULATIONS



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 T. BUCKLEY
 DESIGNED BY
 F. HANCOCK
 CHECKED BY
 F. HANCOCK

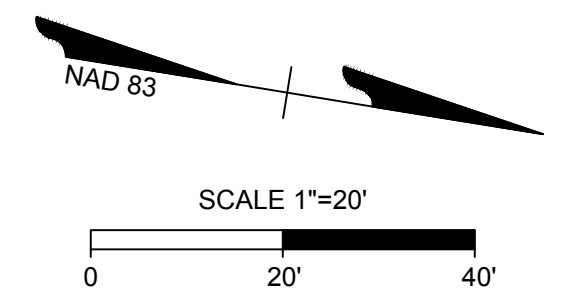
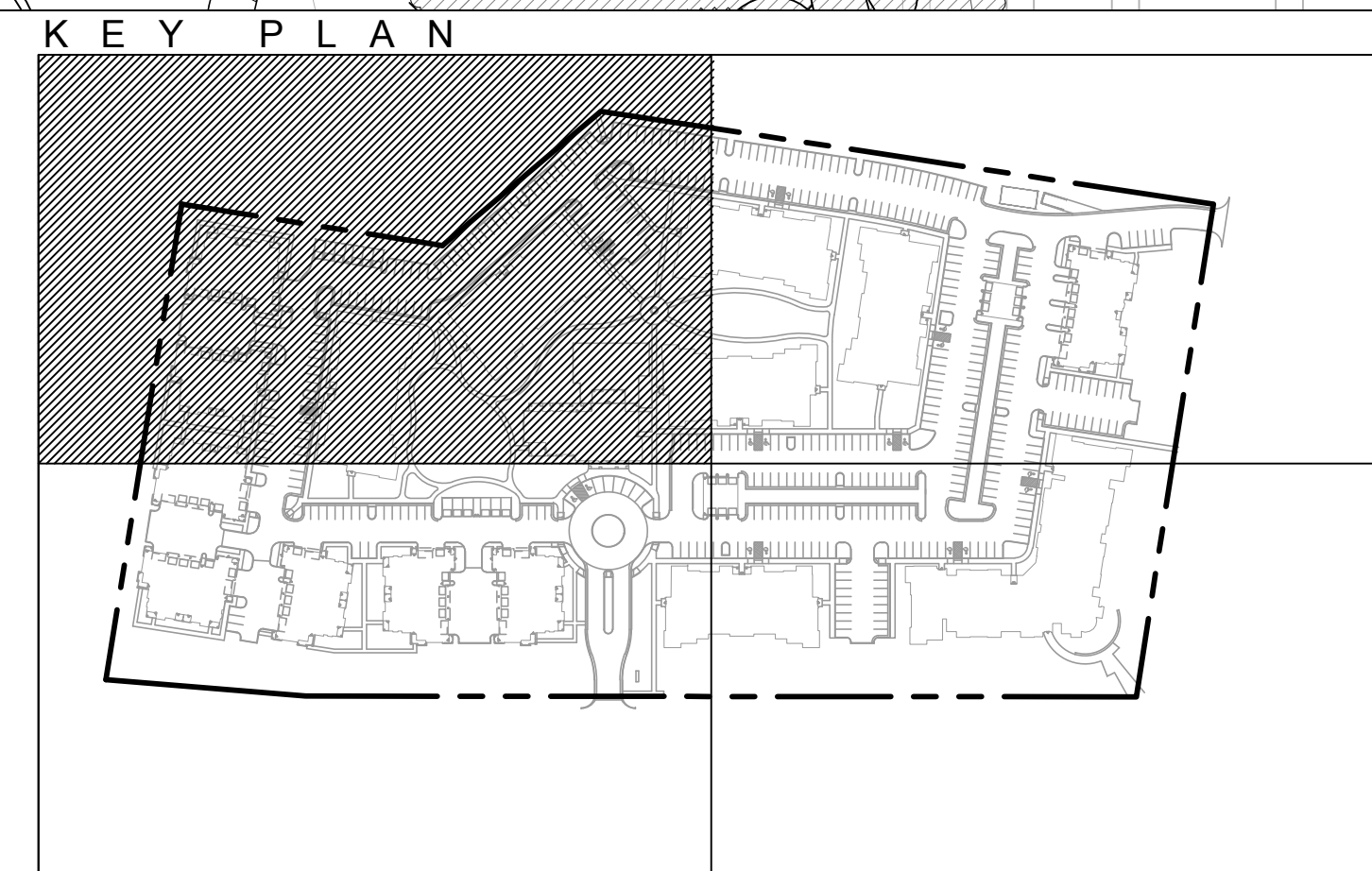
SCALE
 1" = 20'

TIMMONS GROUP
 BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
 DETAIL LANDSCAPE PLAN

JOB NO.
36144
 SHEET NO.
L1.1



| PLANT SCHEDULE | |
|----------------|-------------------------------------|
| TREES | BOTANICAL NAME |
| BET RV | BETULA NIGRA |
| ILE FOS | ILEX MATTENANTA FOSTERI |
| ILE NEL | ILEX X 'NELLIE R STEVENS' |
| JUN EAS | JUNIPERUS VIRGINIANA |
| NYS SYL | NYSSA SYLVATICA |
| PLA ACE | PLATANUS X ACERIFOLIA |
| QUE BIC | QUERCUS BICOLOR |
| QUE PHE | QUERCUS PHELLOS |
| ULM BOS | ULMUS PARVIFOLIA |
| SHRUBS | BOTANICAL NAME |
| ILE GLA | ILEX GLABRA |
| MYR CER | MYRTICA CERIFERA |
| PRU OTZ | PRUNUS LAUROCERASUS 'OTTO LUYKEN' |
| PRU SCH | PRUNUS LAUROCERASUS 'SCHIPKAENSIS' |
| RHO GIR | RHOODENDRON X GIRARD PLEASANT WHITE |
| VIB DAV | VIBURNUM DAVIDI |
| GROUND COVERS | BOTANICAL NAME |
| LIR MUS | LIRIOPE MUSCARI |



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DRAWN BY
T. BUCKLEY

DESIGNED BY
F. HANCOCK

CHECKED BY
F. HANCOCK

SCALE
1" = 20'

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

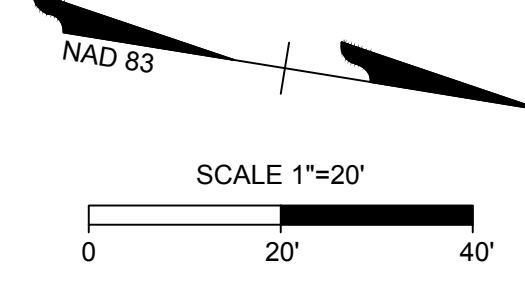
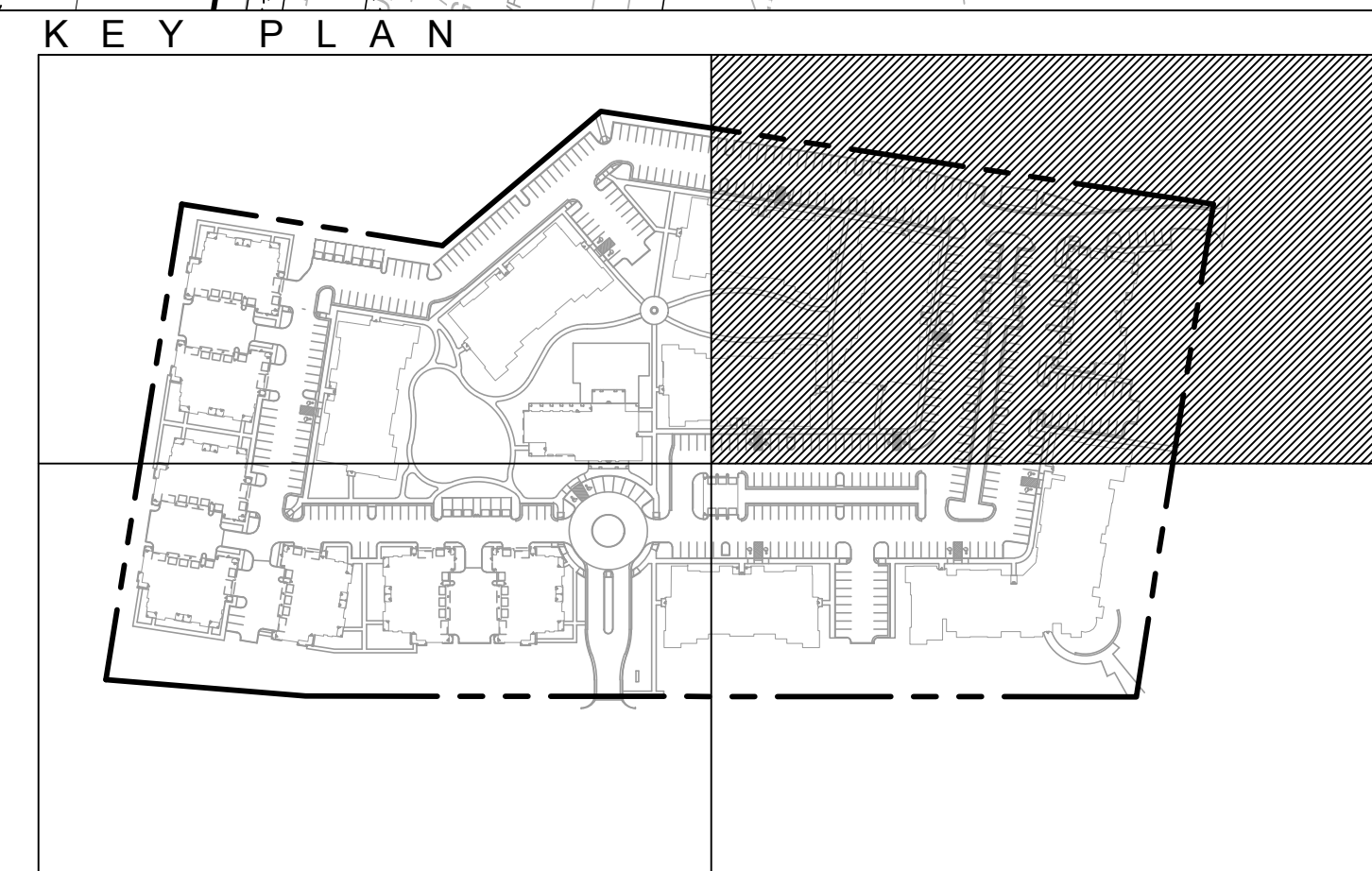
DETAIL LANDSCAPE PLAN

| | |
|-----------|-------|
| JOB NO. | 36144 |
| SHEET NO. | L1.2 |

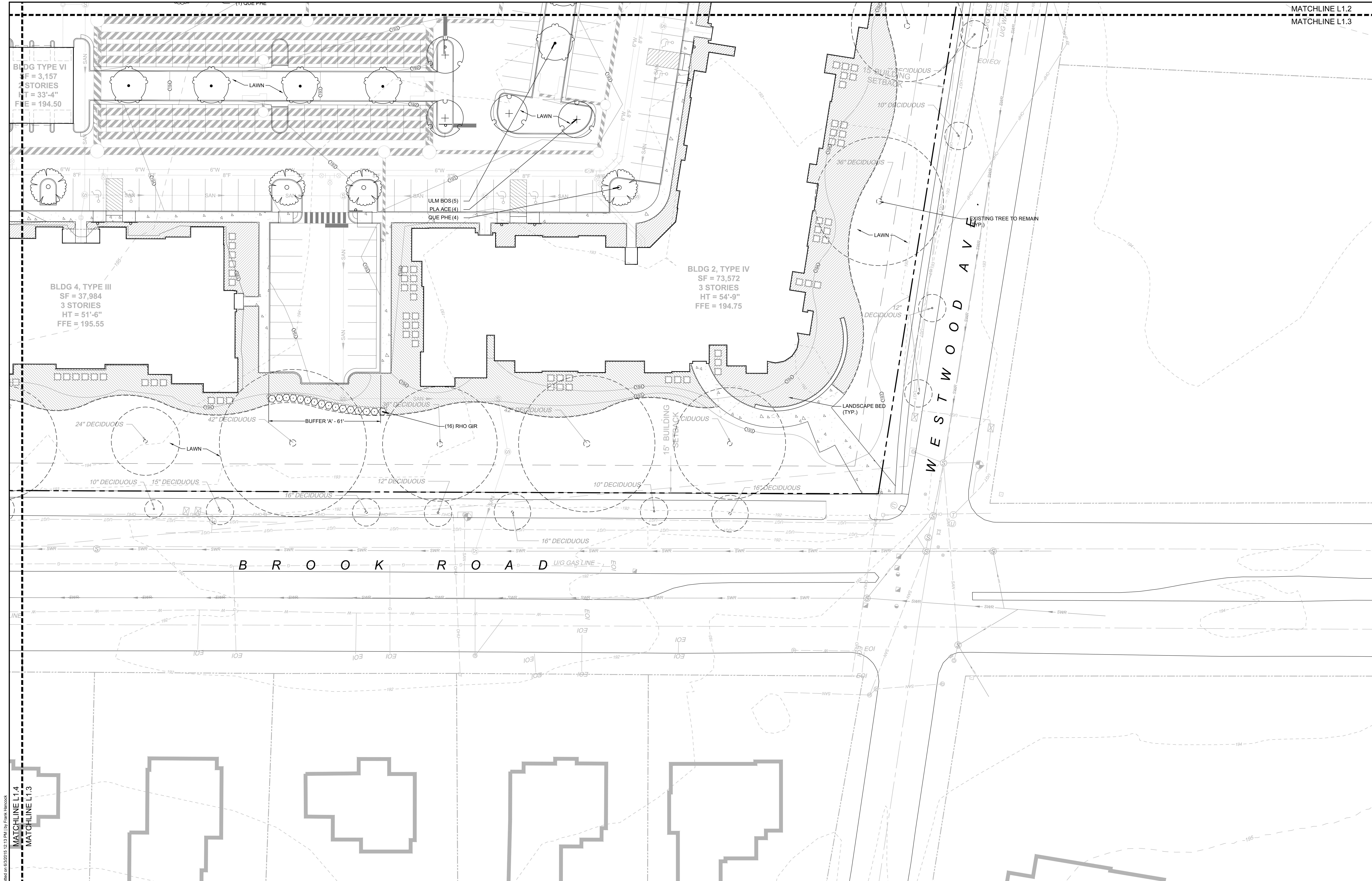


PLANT SCHEDULE

| TREES | BOTANICAL NAME |
|---------------|--|
| BET RIV | BETULA NIGRA |
| ILE FOS | ILEX X ATTENUATA 'FOSTERI' |
| ILE NEL | ILEX X 'NELLIE R STEVENS' |
| JUN EAS | JUNIPERUS VIRGINIANA |
| NYS SYL | NYSSA SYLVATICA |
| PLA ACE | PLATANUS X ACERIFOLIA |
| QUE BIC | QUERCUS BICOLOR |
| QUE PHE | QUERCUS PHELLOS |
| ULM BOS | ULMUS PARVIFOLIA |
| SHRUBS | BOTANICAL NAME |
| ILE GLA | ILEX GLABRA |
| MYR CER | MYRTICA CERIFERA |
| PRU OTZ | PRUNUS LAUROCERASUS 'OTTO LUYKEN' |
| PRU SCH | PRUNUS LAUROCERASUS 'SCHIPKAENSIS' |
| RHO GIR | RHOODENDENDRON X GIRARD PLEASANT WHITE |
| VIB DAV | VIBURNUM DAVIDI |
| GROUND COVERS | BOTANICAL NAME |
| LIR MUS | LIRIOPE MUSCARI |



S:\2015\15044 Union Tradeville Secondary Apartments\DWG\Sheet\CD\36144_L1_1_P1.dwg [Printed on 06/03/2015 12:43 PM] by Frank Hancock



MATCHLINE L1.2
MATCHLINE L1.3

BLDG TYPE VI
SF = 3,157
2 STORIES
HT = 33'-4"
FFE = 194.50

BLDG 4, TYPE III
SF = 37,984
3 STORIES
HT = 51'-6"
FFE = 195.55

BLDG 2, TYPE IV
SF = 73,572
3 STORIES
HT = 54'-9"
FFE = 194.75

ULM BOS(5)
PLA ACE(4)
QUE PHE(4)

WESTWOOD AV

BROOK ROAD

U/G GAS LINE

MATCHLINE L1.4
MATCHLINE L1.3



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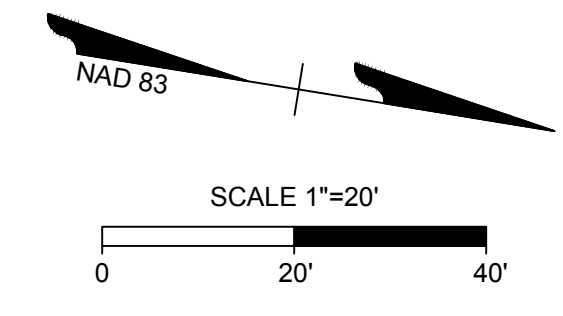
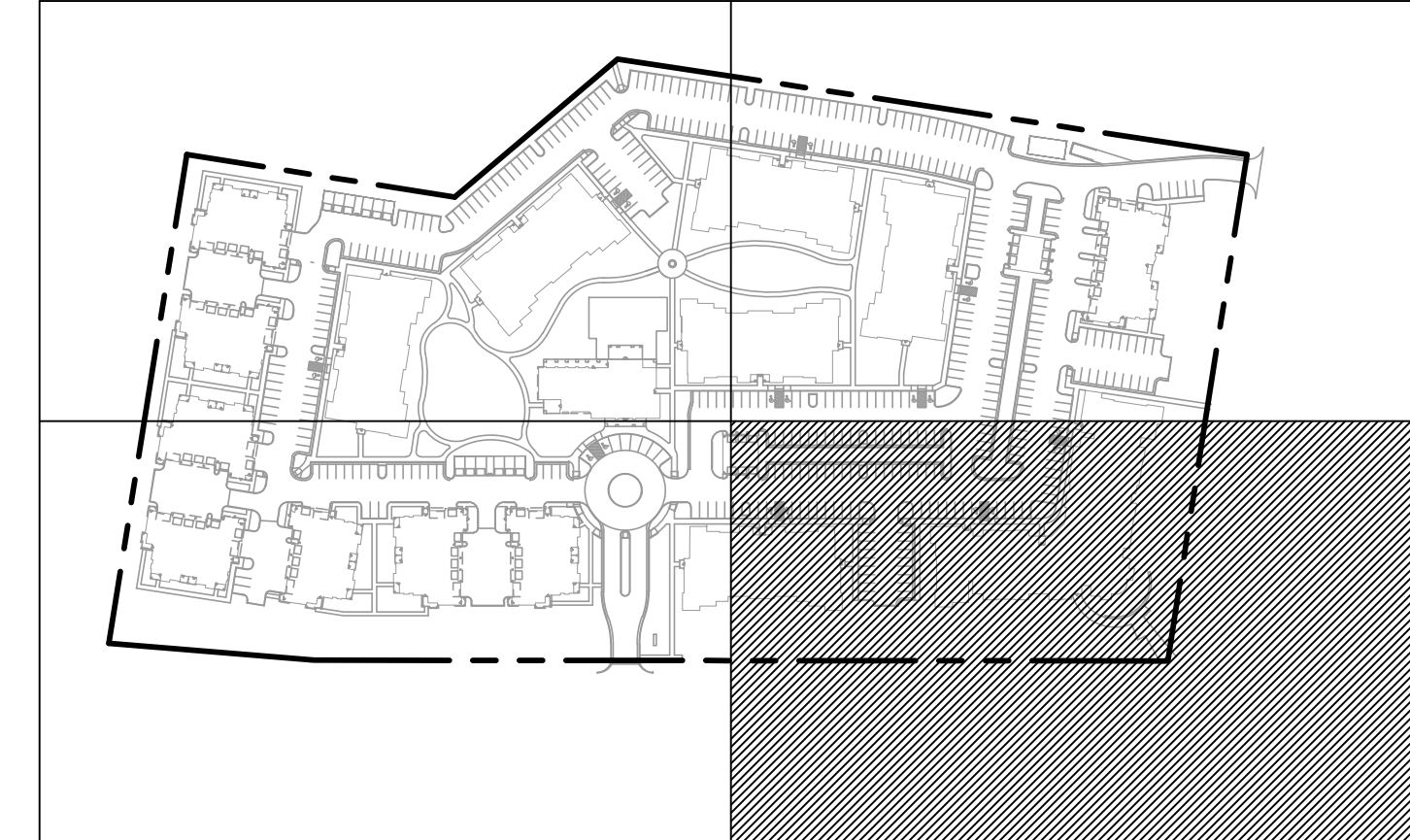
BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA
DETAIL LANDSCAPE PLAN

JOB NO.
36144
SHEET NO.
L1.3

PLANT SCHEDULE

| TREES | BOTANICAL NAME |
|---------------|---------------------------------------|
| BET RIV | BETULA NIGRA |
| ILE FOS | ILEX VATTENATA FOSTERI |
| ILE NEL | ILEX X 'NELLIE R STEVENS' |
| JUN EAS | JUNIPERUS VIRGINIANA |
| NYS SYL | NYSSA SYLVATICA |
| PLA ACE | PLATANUS X ACERIFOLIA |
| QUE BIC | QUERCUS BICOLOR |
| QUE PHE | QUERCUS PHELLOS |
| ULM BOS | ULMUS PARVIFOLIA |
| SHRUBS | BOTANICAL NAME |
| ILE GLA | ILEX GLABRA |
| MYR CER | MYRTICA CERIFERA |
| PRU OTZ | PRUNUS LAUROCERASUS 'OTTO LUYKEN' |
| PRU SCH | PRUNUS LAUROCERASUS 'SCHIPKAENSIS' |
| RHO GIR | RHO DODENDRON X GIRARD PLEASANT WHITE |
| VIB DAV | VIBURNUM DAVIDI |
| GROUND COVERS | BOTANICAL NAME |
| LIR MUS | LIRIOPE MUSCARI |

KEY PLAN



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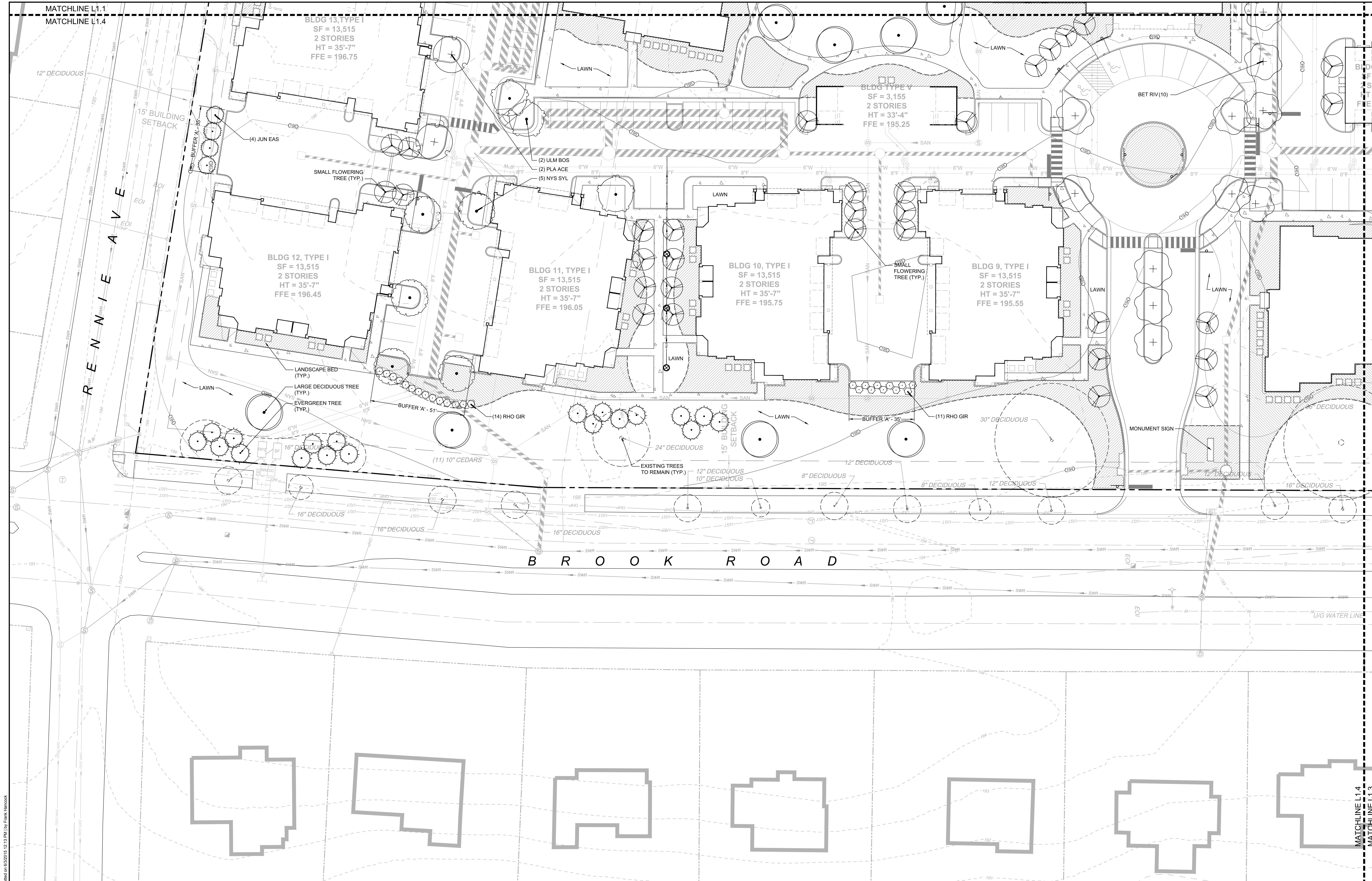
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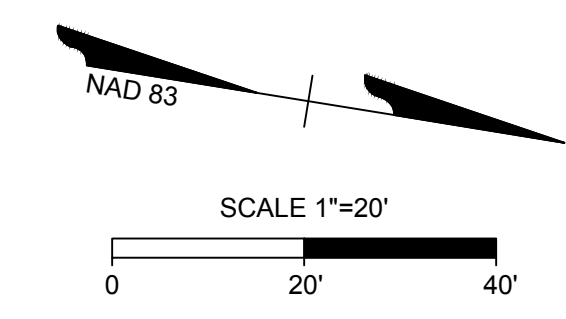
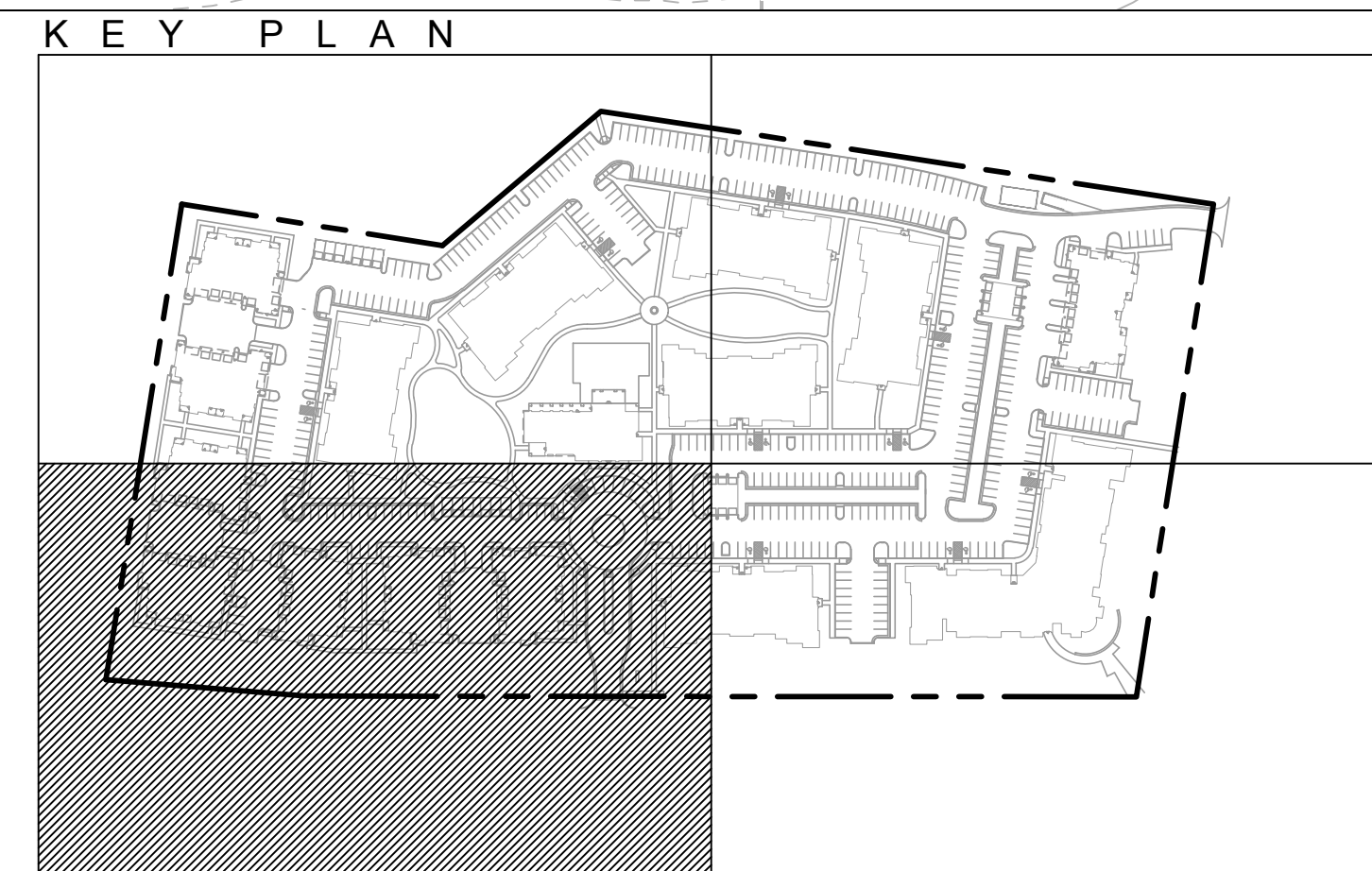
| DATE | REVISION DESCRIPTION |
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| 06/03/2015 | |

SCALE
 1" = 20'

TIMMONS GROUP
 BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA
 DETAIL LANDSCAPE PLAN
 JOB NO. 36144
 SHEET NO. L1.4



| PLANT SCHEDULE | |
|----------------|--------------------------------------|
| TREES | BOTANICAL NAME |
| BET RIV | BETULA NIGRA |
| ILE FOS | ILEX MATTENANTA FOSTERI |
| ILE NEI | ILEX X 'NELLIE R STEVENS' |
| JUN EAS | JUNIPERUS VIRGINIANA |
| NYS SYL | NYSSA SYLVATICA |
| PLA ACE | PLATANUS X ACERIFOLIA |
| QUE BIC | QUERCUS BICOLOR |
| QUE PHE | QUERCUS PHELLOS |
| ULM BOS | ULMUS PARVIFOLIA |
| SHRUBS | BOTANICAL NAME |
| ILE GLA | ILEX GLABRA |
| MYR CER | MYRTICA CERIFERA |
| PRU OTZ | PRUNUS LAUROCERASUS 'OTTO LUYKEN' |
| PRU SCH | PRUNUS LAUROCERASUS 'SCHIPKAENSIS' |
| RHO GIR | RHODODENDRON X GIRARD PLEASANT WHITE |
| VIB DAV | VIBURNUM DAVIDI |
| GROUND COVERS | BOTANICAL NAME |
| LIR MUS | LIRIOPE MUSCARI |



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GENERAL NOTES

- PRE-CONSTRUCTION**
- CONTRACTOR IS RESPONSIBLE FOR CONTACTING "MISS UTILITY" AT 1.800.552.7001 FOR LOCATION OF ALL UTILITY LINES. TREES SHALL BE LOCATED A MINIMUM OF 5 FEET FROM SEWER/WATER CONNECTIONS. NOTIFY LANDSCAPE ARCHITECT OF CONFLICTS.
 - VERIFY ALL PLANT MATERIAL QUANTITIES ON THE PLAN PRIOR TO BIDDING. PLANT LIST TOTALS ARE FOR CONVENIENCE ONLY AND SHALL BE VERIFIED PRIOR TO BIDDING.
 - PROVIDE PLANT MATERIALS OF QUANTITY, SIZE, GENUS, SPECIES, AND VARIETY INDICATED ON PLANS. ALL PLANT MATERIALS AND INSTALLATION SHALL COMPLY WITH RECOMMENDATIONS AND REQUIREMENTS OF ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK". IF SPECIFIED PLANT MATERIAL IS NOT OBTAINABLE, SUBMIT PROOF OF NON AVAILABILITY TO THE ARCHITECTS, TOGETHER WITH PROPOSAL FOR USE OF EQUIVALENT MATERIAL.
 - PROVIDE AND INSTALL ALL PLANTS AS IN ACCORDANCE WITH DETAILS AND CONTRACT SPECIFICATIONS.

- CONSTRUCTION/INSTALLATION**
- LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REJECT ANY PLANTS AND MATERIALS THAT ARE IN AN UNHEALTHY OR UNSIGHTLY CONDITION, AS WELL AS PLANTS AND MATERIALS THAT DO NOT CONFORM TO ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK".
 - LABEL AT LEAST ONE TREE AND ONE SHRUB OF EACH VARIETY AND CALIPER WITH A SECURELY ATTACHED, WATERPROOF TAG BEARING THE DESIGNATION OF BOTANICAL AND COMMON NAME.
 - INSTALL LANDSCAPE PLANTINGS AT ENTRANCES/EXITS AND PARKING AREAS ACCORDING TO PLANS SO THAT MATERIALS WILL NOT INTERFERE WITH SIGHT DISTANCES.
 - CONTRACTOR IS RESPONSIBLE FOR WATERING ALL PLANT MATERIAL DURING INSTALLATION AND UNTIL FINAL INSPECTION AND ACCEPTANCE BY OWNER. CONTRACTOR SHALL NOTIFY OWNER OF CONDITIONS WHICH AFFECTS THE GUARANTEE.

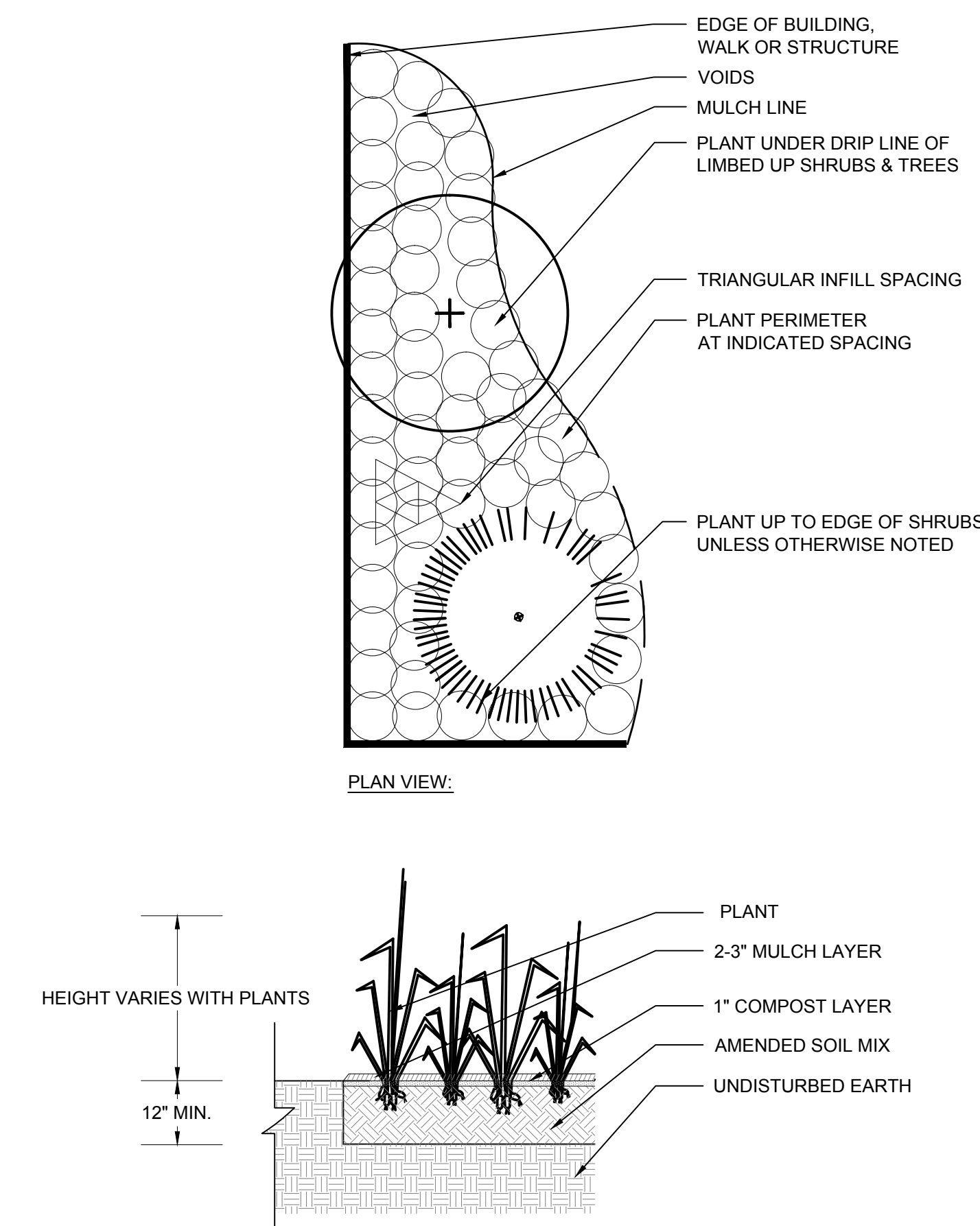
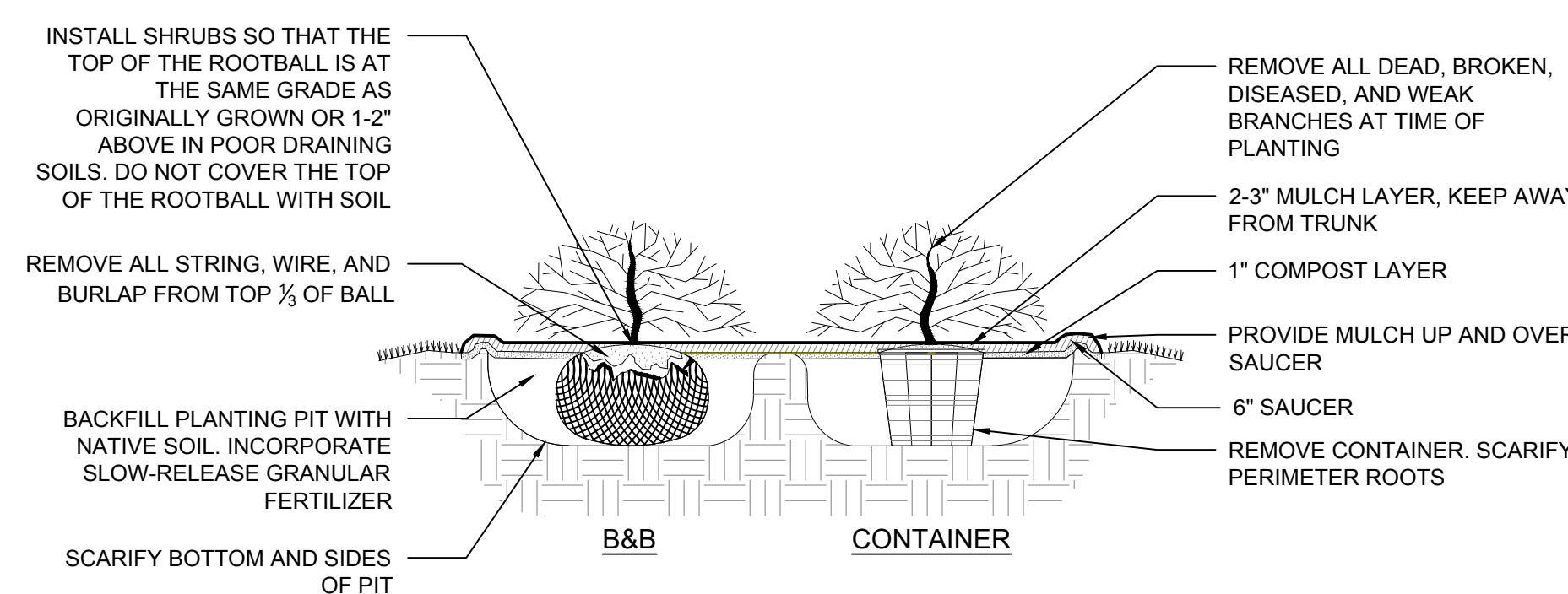
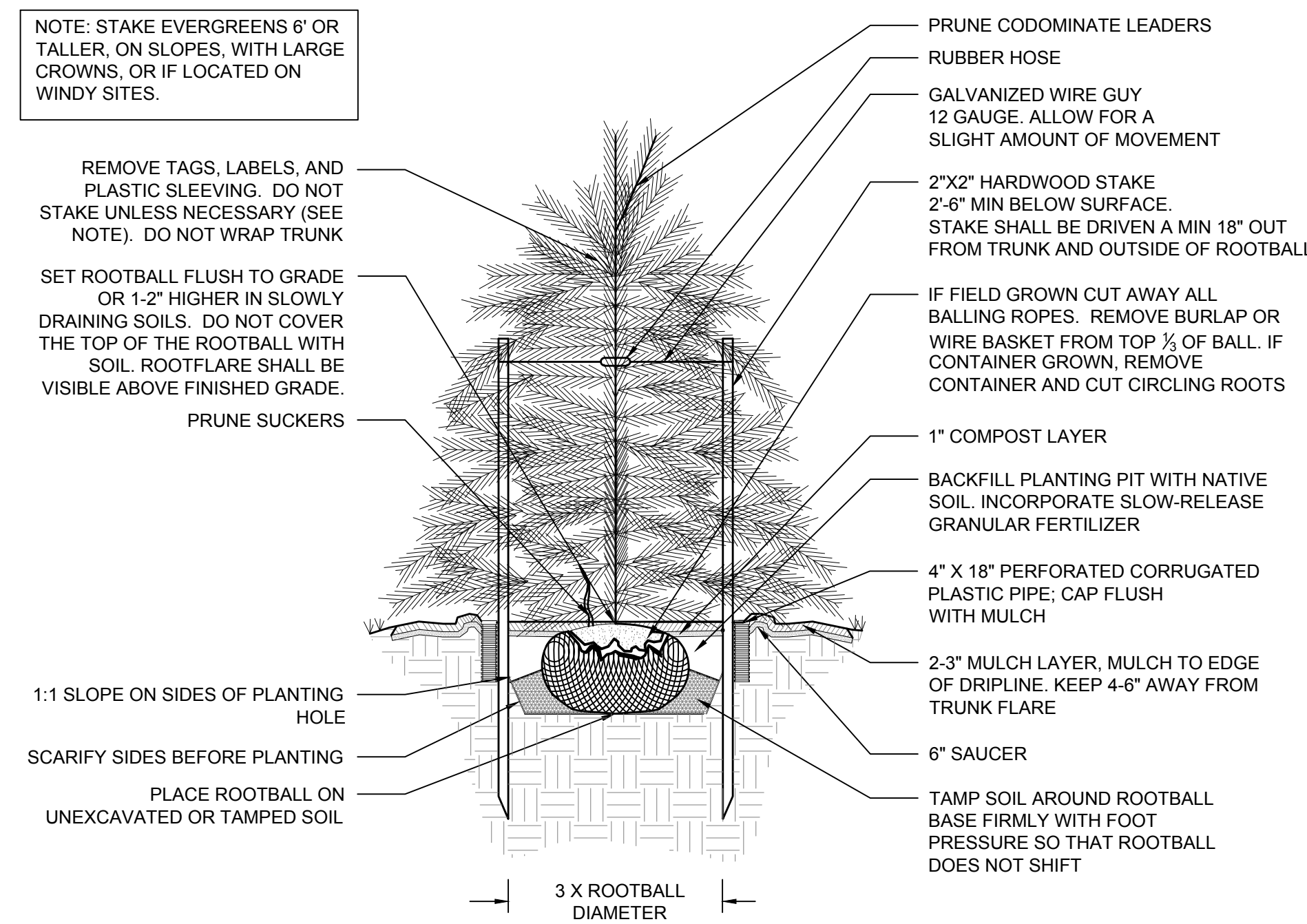
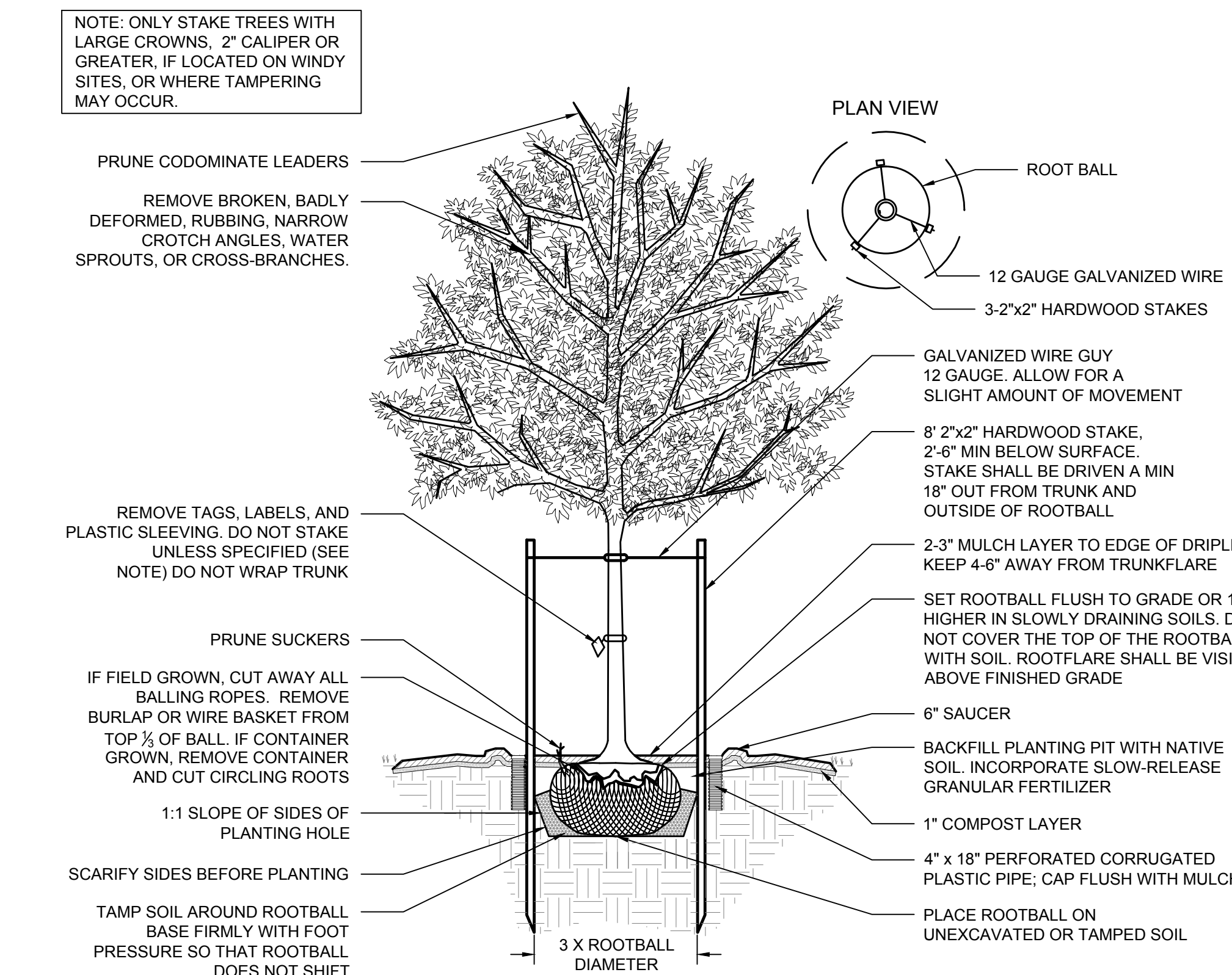
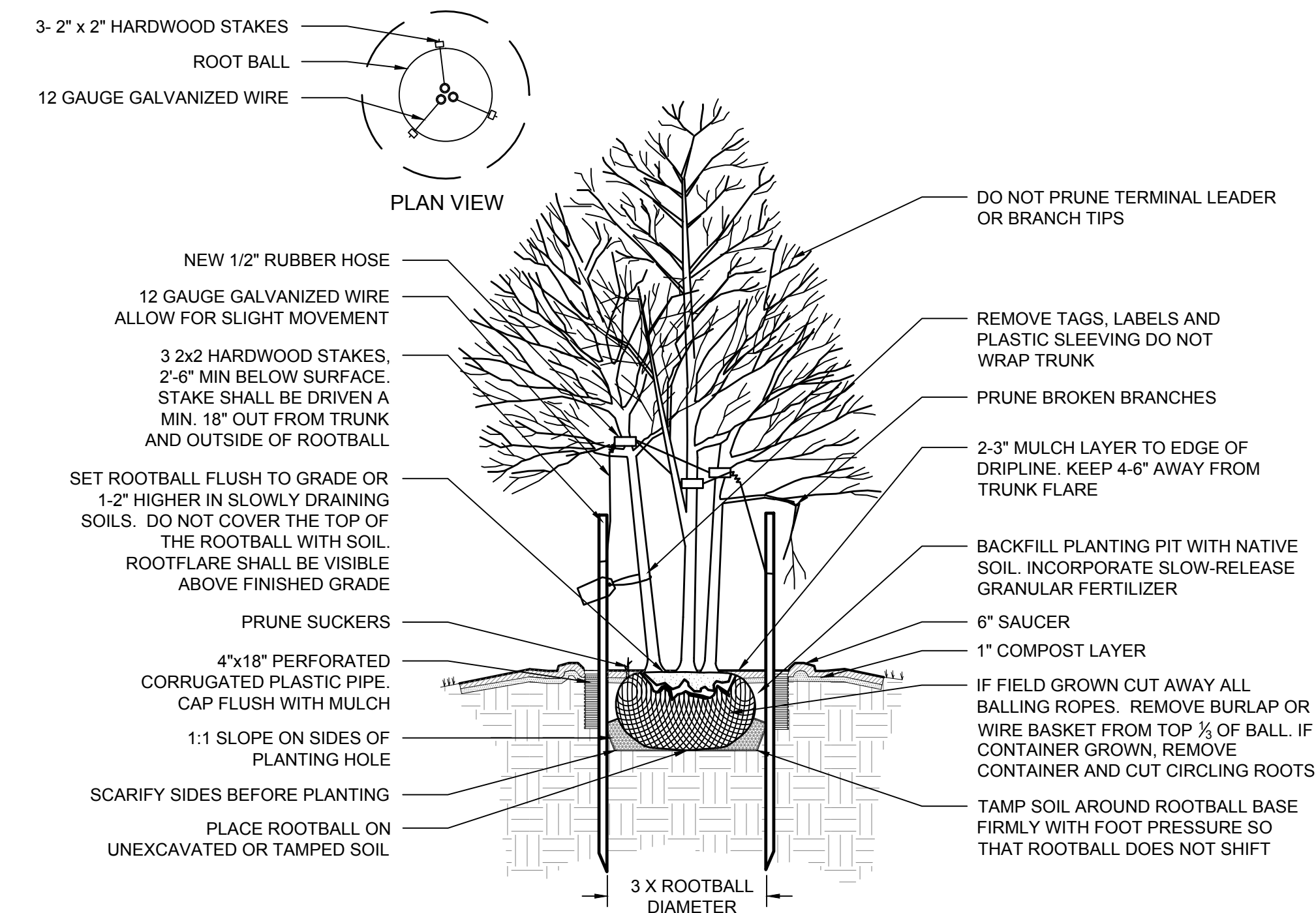
- INSPECTIONS/GUARANTEE**
- UPON COMPLETION OF LANDSCAPE INSTALLATION, THE LANDSCAPE CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR WHO WILL VERIFY COMPLETENESS, INCLUDING THE REPLACEMENT OF ALL DEAD PLANT MATERIAL. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING A FINAL INSPECTION BY THE LANDSCAPE ARCHITECT.
 - ALL EXTERIOR PLANT MATERIALS SHALL BE GUARANTEED FOR ONE FULL YEAR AFTER DATE OF FINAL INSPECTION AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH. DEFECTS RESULTING FROM NEGLIGENCE BY THE OWNER, ABUSE OR DAMAGE BY OTHERS, OR UNUSUAL PHENOMENA OR INCIDENTS WHICH ARE BEYOND THE CONTRACTORS CONTROL ARE NOT THE RESPONSIBILITY OF THE CONTRACTOR.
 - PLANT MATERIAL QUANTITIES AND SIZES WILL BE INSPECTED FOR COMPLIANCE WITH APPROVED PLANS BY A SITE PLAN REVIEW AGENT OF THE PLANNING DEPARTMENT PRIOR TO THE RELEASE OF THE CERTIFICATE OF OCCUPANCY.
 - REMOVE ALL GUY WIRES AND STAKES 12 MONTHS AFTER INSTALLATION.

CITY OF RICHMOND LANDSCAPE REQUIREMENTS

| AREA | QUANTITY | RATIO | REQUIRED | PROVIDED |
|--|-------------------------|--|---|--|
| INTERIOR PARKING LOT REQUIREMENT | 67 ISLANDS | (1) DECIDUOUS TREE PER ISLAND | TOTAL = (67) X 1 = (67) DECIDUOUS TREES | TOTAL = 71 (59) LARGE TREES (10) SMALL TREES |
| TREE COVERAGE REQUIREMENT | 464 SPACES | 30 SQ. FT. TREE COVERAGE PER PARKING SPACE | TOTAL = 464 X 30 SQ. FT. = 13,920 / 200 SQ. FT. PER 2 1/2" CAL. TREE = (46) TREES | TOTAL = 59 (3") CAL. LARGE DECIDUOUS TREES) |
| PARKING-STREET BUFFER REQUIREMENT ALTERNATIVE A | 278 LF PERIMETER BUFFER | COMPONENTS: • 2 1/2" CALIPER DECIDUOUS TREES • 6" MIN. HT. EVERGREEN TREES • 2' MIN. HT. EVERGREEN SHRUBS | | TOTAL = 278 LF EVERGREEN HEDGE @ 2' MIN. HT. |
| INTERIOR LOT LINE BUFFER REQUIREMENT ALTERNATIVE A | 969 LF PERIMETER BUFFER | COMPONENTS: • 3 1/2" MIN. HT. EVERGREEN SHRUBS FORMING A CONTINUOUS VISUAL SCREEN | | TOTAL = 969 LF EVERGREEN HEDGE @ 3 1/2" MIN. HT. |

PLANT SCHEDULE

| TREES | QTY | BOTANICAL NAME | COMMON NAME | MINIMUM INSTALLED SIZE | ROOT | REMARKS |
|---------------|-----|---|-----------------------|------------------------|-----------|--------------------|
| BET RIV | 14 | BETULA NIGRA | RIVER BIRCH | 3" CAL. | B&B | SINGLE STEM |
| ILE FOS | 5 | ILEX X ATTENUATA 'FOSTERI' | FOSTER'S HOLLY | 7'-8" HT. | B&B | LIMBED UP |
| ILE NEL | 8 | ILEX X 'NELLIE R STEVENS' | NELLIE STEVENS HOLLY | 7'-8" HT. | B&B | FULL TO THE GROUND |
| JUN EAS | 22 | JUNIPERUS VIRGINIANA | EASTERN RED CEDAR | 7'-8" HT. | B&B | SPECIMEN |
| NYS SYL | 13 | NYSSA SYLVATICA | BLACK GUM | 3" CAL. | B&B | SPECIMEN |
| PLA ACE | 10 | PLATANUS X ACERIFOLIA | LONDON PLANE TREE | 3" CAL. | B&B | SPECIMEN |
| QUE BIC | 3 | QUERCUS BICOLOR | SWAMP WHITE OAK | 3" CAL. | B&B | SPECIMEN |
| QUE PHE | 15 | QUERCUS PHELLOS | WILLOW OAK | 3" CAL. | B&B | SPECIMEN |
| ULM BOS | 14 | ULMUS PARVIFOLIA | LACEBARK ELM | 3" CAL. | B&B | SPECIMEN |
| SHRUBS | QTY | BOTANICAL NAME | COMMON NAME | MINIMUM INSTALLED SIZE | REMARKS | SPACING |
| ILE GLA | 47 | ILEX GLABRA | INKBERRY HOLLY | 42" HT. | CONTAINER | 5' O.C. |
| MYR CER | 30 | MYRICA CERIFERA | WAX MYRTLE | 42" HT. | CONTAINER | 5' O.C. |
| PRU OT2 | 11 | PRUNUS LAUROCERASUS 'OTTO LUYKEN' | LUYKENS LAUREL | 42" HT. | CONTAINER | 4' O.C. |
| PRU SCH | 74 | PRUNUS LAUROCERASUS 'SCHIPKAENSIS' | SCHIPKA LAUREL | 42" HT. | CONTAINER | 5' O.C. |
| RHO GIR | 57 | RHOODODENDRON X 'GIRARD PLEASANT WHITE' | GIRARD PLEASANT WHITE | 42" HT. | CONTAINER | 4' O.C. |
| VIB GRE | 43 | VIBURNUM RHYTIDOPHYLLUM 'GREEN TRUMP' | LEATHERLEAF VIBURNUM | 42" HT. | CONTAINER | 4' O.C. |
| GROUND COVERS | QTY | BOTANICAL NAME | COMMON NAME | MINIMUM INSTALLED SIZE | ROOT | SPACING |
| LIR MUS | 50 | LIRIOPE MUSCARI | LILY TURF | 1 GAL. | CONTAINER | 12" O.C. |



THIS DRAWING PREPARED AT THE
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| REVISION DESCRIPTION | DATE |
|----------------------|------------|
| | 06/03/2015 |

DRAWN BY
T. BUCKLEY

DESIGNED BY
F. HANCOCK

CHECKED BY
F. HANCOCK

SCALE
NTS

TIMMONS GROUP

BRISTOL AT WESTWOOD
CITY OF RICHMOND, VA

LANDSCAPE NOTES AND DETAILS

JOB NO.
36144

SHEET NO.
L2.0

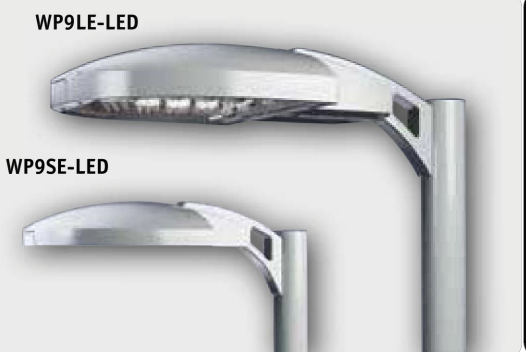
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WARP9 LED with PicoEmitter™

Small & Large Luminaire

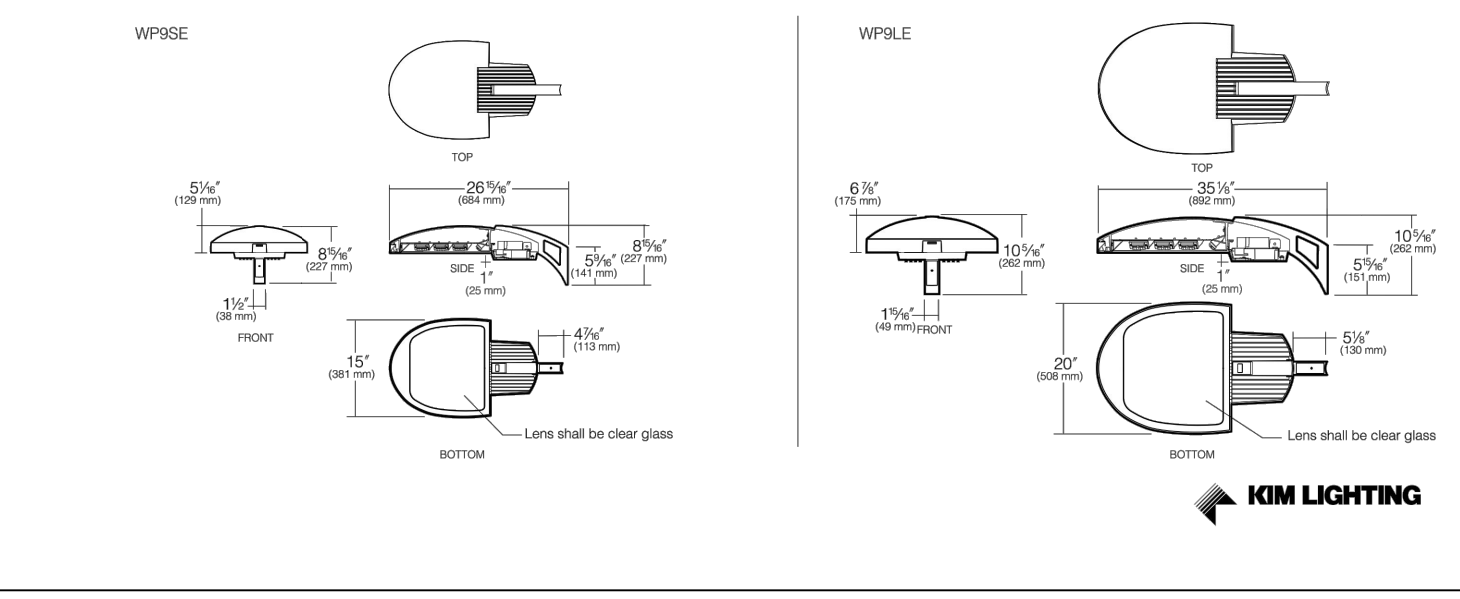
- FEATURES**
- LED PicoEmitter™ technology with up to 25% boost in lumen output
 - Patented design, incorporating visual stealth technology
 - Sealed optical chamber, IP-66 rated

- Features exclusive to wihubb technology**
- Wireless system with a 0 - 10V dimming interface with a dimming range of 10 - 100%



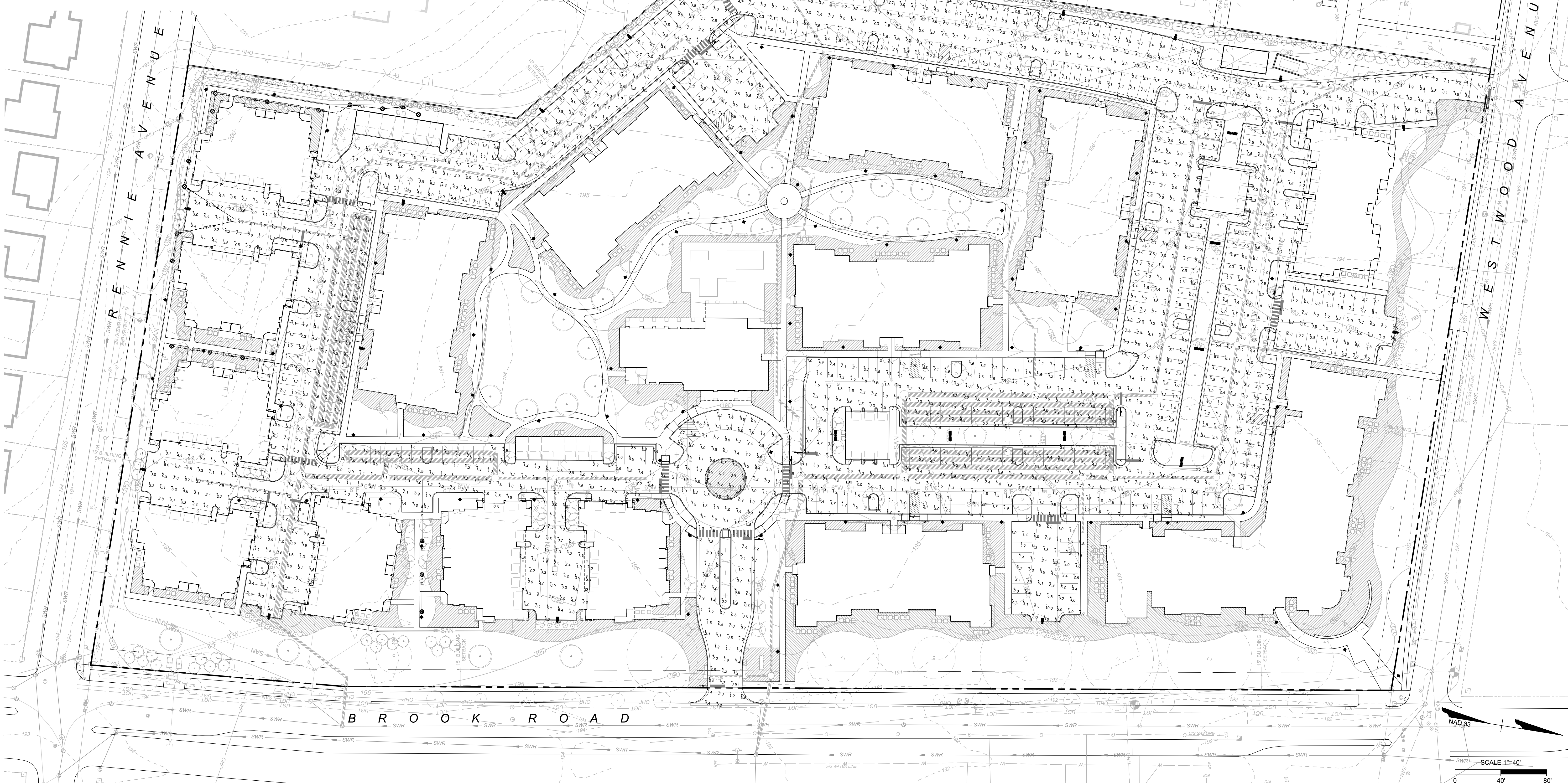
ORDERING INFORMATION (Example)

| MOUNTING | ETA | FINISH | FIXTURE | FIXTURE FINISH | FIXTURE OPTIONS | POLE |
|-------------------------|------|--------------------|--------------------|--|-----------------------------------|---|
| ISA 1 Arm Side Mt. 0.52 | 0.93 | BR | WP9SE135 Type I | BL Black | WFO Wagon Wheel Frame Type | See Arms & Poles Selection Guide at www.kimlighting.com for pole EPA & contents |
| ISA 2 Arm Side Mt. 1.04 | 1.9 | DB Dark Bronze | WP9SE135 Type II | SG Stealth Gray | SF Single Fuse for 120, 277, 347V | |
| ISA 2 Arm Side Mt. 0.82 | 1.47 | PS Platinum Silver | WP9SE135 Type III | WH White | DF Double Fuse for 208, 240, 480V | |
| ISA 3 Arm Side Mt. 1.3 | 2.5 | CC Custom Color* | WP9SE135 Type IV | A-25 Protocol Button | A-30 120V Protocol Button | |
| ISA 3 Arm Side Mt. 1.3 | 2.5 | | WP9SE135 Type V | A-31 208V Protocol Button | A-32 240V Protocol Button | |
| ISA 3 Arm Side Mt. 1.3 | 2.7 | | WP9SE135 Type VI | A-33 277V Protocol Button | A-35 347V Protocol Button | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9SE135 Type VII | A-34 480V Protocol Button | A-36 480V Protocol Button | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type I | LS Polycarbonate Lens* | TL Tamper-Resistant Lid** | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type II | WIKIM In-Fixture wireless control module | SCL Occupancy Sensor up to 32' H. | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type III | | SCM Occupancy Sensor up to 32' H. | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type IV | | | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type V | | | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type VI | | | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type VII | | | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type VIII | | | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type IX | | | |
| ISA 3 Arm Side Mt. 1.93 | 3.0 | | WP9LE135 Type X | | | |



SITE LIGHTING - FIXTURE CUT SHEET

| SYMBOL | MOUNTING HT. | ARRANGEMENT | MANUFACTURER | FIXTURE | DESCRIPTION |
|--------|--------------|-------------|--------------|-------------------|--------------------|
| ■ | 20' | DOUBLE @180 | KIM LIGHTING | WARP9 LED - LARGE | WP9LE-120L3K-2@180 |
| ■ | 20' | SINGLE | KIM LIGHTING | WARP9 LED - LARGE | WP9LE-120L3K |
| ◆ | 12' | SINGLE | KIM LIGHTING | WARP9 LED - SMALL | WP9SE-120L3K |



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DATE
 06/03/2015

DRAWN BY
 T. BUCKLEY

DESIGNED BY
 F. HANCOCK

CHECKED BY
 F. HANCOCK

SCALE
 1" = 40'

TIMMONS GROUP

BRISTOL AT WESTWOOD
 CITY OF RICHMOND, VA

LUMEN PLAN

JOB NO.
 36144

SHEET NO.
 L3.0

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