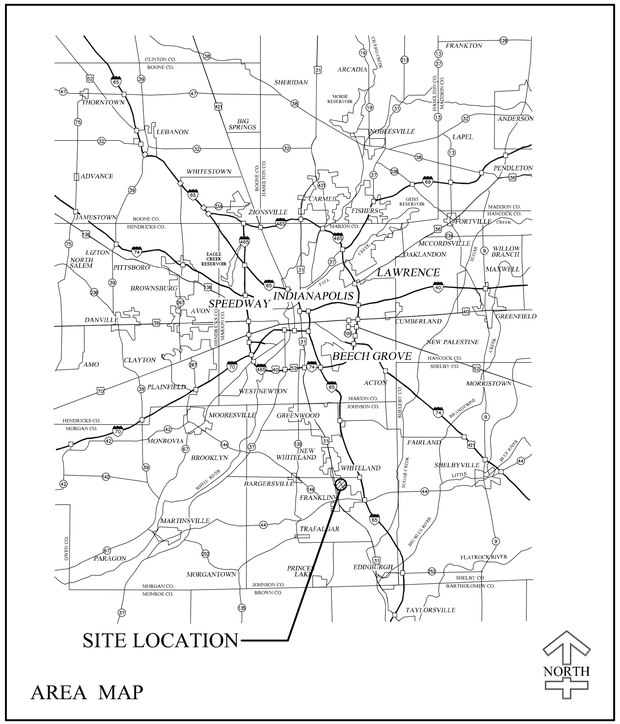
PATRIOT DEFENSE RESEARCH PARK BUILDINGS #1 AND #2

CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

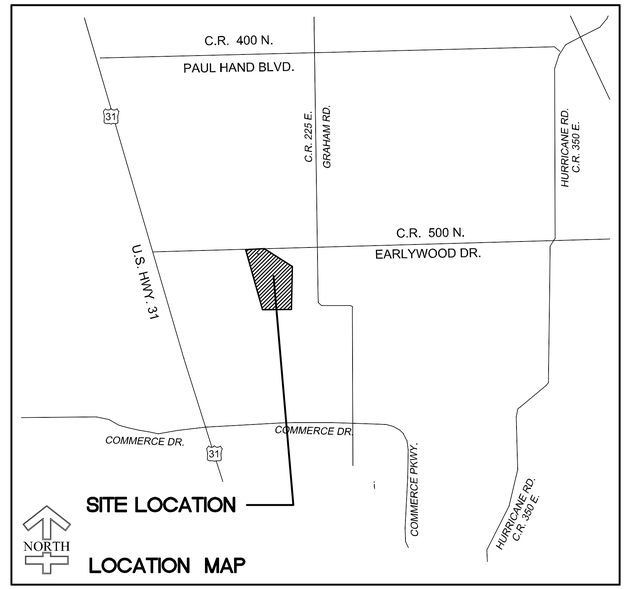
CONSTRUCTION PLANS

PREPARED FOR:

FRANKLIN TECH PARK VENTURES LLC
3022 HUDSON ST.
FRANKLIN, IN 46131
PHONE: (31) 736-8007
JERRY L. JOHNSON



AREA MAP



LOCATION MAP

ISSUE NO.	DATE	DESCRIPTION
1	9/3/21	SUBMIT FOR GOVERNMENTAL AGENCY APPROVALS

INDEX OF DRAWINGS

SHEET NO.	DESCRIPTION
C101	TITLE SHEET
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C301	PROPOSED SITE CONDITIONS (DIMENSIONAL PLAN)
C302	PROPOSED SITE CONDITIONS (GEOMETRIC PLAN)
C303–304	PROPOSED SITE CONDITIONS (GRADING PLAN)
C305	PROPOSED SITE CONDITIONS (POND DETAIL)
C306	PROPOSED SITE CONDITIONS (ENTRANCE DETAIL)
C307	PROPOSED SITE CONDITIONS (STREET PLAN AND PROFILE)
C401–402	STORM WATER POLLUTION PREVENTION PLAN (INTIAL PRE CONSTR.)
C403–404	STORM WATER POLLUTION PREVENTION PLAN (CONSTRUCTION/GRADING PHASE)
C405–406	STORM WATER POLLUTION PREVENTION PLAN (POST CONSTR.)
C501	UTILITY PLAN
C502	WATER DISTRIBUTION PLAN
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C704	SANITARY SEWER DETAILS
C705	WATER DETAILS
C801–802	STORM WATER POLLUTION PREVENTION PLAN DETAILS
C901	SPECIFICATIONS
C902	WATER SPECIFICATIONS

DATES:

EST. PROPOSED START DATE: FALL 2021
EST. COMPLETION DATE: FALL 2022

USE:

PROPOSED USE: INDUSTRIAL: GENERAL
EXISTING ZONING: IG

UTILITY CONTACT INFORMATION

SANITARY SEWERS
FRANKLIN PUBLIC WORKS
796 SOUTH STATE ST.
FRANKLIN, IN 46131
PHONE #: (317) 736-3640
CONTACT: SALLY BROWN
SBROWN@FRANKLIN.IN.GOV

TELEPHONE
CENTURYLINK
1147 NORTH MORTON STREET
FRANKLIN, IN 46131
PHONE #: (317) 736-4863
CONTACT: JOHN C. UNVERFERTH
JOHN.C.UNVERFERTH@CENTURYLINK.COM

WATER
INDIANA-AMERICAN WATER CO.
153 N. EMERSON AVE.
GREENWOOD, IN 46143
PHONE #: (317) 893-3560
CONTACT: TRACY WHITE
TRACY.WHITE@AMWATER.COM

ELECTRIC
DUKE ENERGY
2515 N. MORTON ST.
FRANKLIN, IN 46131
PHONE #: (317) 736-2014
CONTACT: REECE HEILERS
REECE.HEILERS@DUKE-ENERGY.COM

TELEPHONE
METRONET
111 COMMERCE DRIVE
FRANKLIN, IN 46131
PHONE #: (317) 465-1046
CONTACT: CHRISTOPHER BLUTO
CHRISTOPHER.BLUTO@METRONETINC.COM

CABLE
COMCAST
1600 WEST VERNAL PIKE
BLOOMINGTON IN 47404
PHONE #: (812) 355-7822
CONTACT: STEVE MCARTOR
STEVE_MCARTOR@CABLE.COMCAST.COM

GAS
CENTERPOINT ENERGY
600 INDUSTRIAL DRIVE
FRANKLIN, IN 46131
PHONE #: (317) 736.2915
CONTACT: KIMBERLY KELLY
KIM.KELLY@CENTERPOINTENERGY.COM

LEGAL DESCRIPTION

A PART OF THE NORTHWEST QUARTER OF SECTION 2 AND PART OF THE NORTHEAST QUARTER OF SECTION 3, ALL IN TOWNSHIP 12 NORTH, RANGE 4 EAST OF THE SECOND PRINCIPAL MERIDIAN, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SECTION 35, TOWNSHIP 13 NORTH, RANGE 4 EAST OF THE SECOND PRINCIPAL MERIDIAN, SAID POINT BEING MARKED BY A RAILROAD SPIKE FOUND IN THE CENTERLINE OF EARLYWOOD DRIVE IN THE CITY OF FRANKLIN, INDIANA, SAID POINT ALSO BEING ON THE NORTH LINE OF THE NORTHWEST QUARTER OF THE SAID SECTION 2; THENCE SOUTH 89 DEGREES 17 MINUTES 00 SECONDS WEST ON AND ALONG SAID NORTH LINE 365.61 FEET TO THE POINT OF BEGINNING BEING MARKED BY A PK NAIL FOUND; THENCE SOUTH 61 DEGREES 25 MINUTES 18 SECONDS EAST ON AND ALONG THE CENTERLINE OF GRAHAM DITCH 1118.07 FEET TO THE CENTERLINE OF CANARY DITCH; THENCE SOUTH 12 DEGREES 24 MINUTES 20 SECONDS WEST ON AND ALONG THE CENTERLINE OF CANARY DITCH 313.56 FEET; THENCE CONTINUING ON AND ALONG SAID DITCH CENTERLINE SOUTH 06 DEGREES 00 MINUTES 00 SECONDS WEST 300.00 FEET; THENCE CONTINUING ON AND ALONG SAID DITCH CENTERLINE SOUTH 12 DEGREES 00 MINUTES 00 SECONDS EAST 150.00 FEET; THENCE CONTINUING ON AND ALONG SAID DITCH CENTERLINE SOUTH 01 DEGREE 24 MINUTES 07 SECONDS EAST 400.00 FEET; THENCE SOUTH 89 DEGREES 24 MINUTES 50 SECONDS WEST 841.93 FEET TO AN IRON ROD FOUND ON THE EAST RIGHT-OF-WAY LINE OF THE CONRAIL RAILROAD SAID POINT BEING 25 FEET EAST OF THE CENTERLINE OF SAID RAILROAD MEASURED AT RIGHT ANGLES; THENCE NORTH 16 DEGREES 08 MINUTES 50 SECONDS WEST ON AND ALONG THE SAID RIGHT-OF-WAY ANGLES; THENCE NORTH 16 DEGREES 08 MINUTES 50 SECONDS WEST ON AND ALONG THE SAID RIGHT-OF-WAY LINE 1758.95 FEET TO A RAILROAD SPIKE FOUND ON THE NORTH LINE OF THE NORTHEAST QUARTER OF THE SAID SECTION 3; THENCE NORTH 89 DEGREES 17 MINUTES 00 SECONDS EAST ON AND ALONG THE SAID NORTH LINE AND ALSO THE NORTH LINE OF SAID SECTION 2 A DISTANCE OF 406.99 FEET TO THE POINT OF BEGINNING, CONTAINING 36.7364 ACRES, MORE OR LESS.

FLOOD ZONE DESIGNATION

A MAJORITY OF THE SITE LIES IN FLOOD HAZARD ZONE X (AREA OUTSIDE 500 YR. FLOODPLAIN), SHADED ZONE X (AREA OF 500 YR. FLOODPLAIN) AND ZONE "AE" (AREA OF 100 YR. FLOODPLAIN, STUDIED) AS SCALE FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR JOHNSON COUNTY, INDIANA, COMMUNITY NUMBER, 18081, PANEL NUMBER, 0139 E, DATED 1/29/21

BENCHMARKS:

SITE ELEVATIONS ARE BASED ON GPS GEOID "G2012bu7" USING A PROJECTION OF "INDIANA EAST" AND DATUM NAD83 NO TRANS.

ONSITE BENCHMARK – ELEVATION 756.66 (NAVD 1983)
TOP OF SANITARYT SEWER MANHOLE CASTING 362' WEST AND 38' NORTH OF INTERSECTION OF EARLYWOOD DRIVE (CO. RD. 300 N.) AND ESSEX DR.

CERTIFIED BY:

Jeffery K. Smith 9/3/21

JEFFERY K. SMITH
REGISTERED ENGINEER NO. 19419
STATE OF INDIANA

JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER

PREPARED BY:

PROJECTS *plus*

GREENWOOD SURVEYING COMPANY

SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A – Greenwood, Indiana 46143
(317)-882-5003

SHEET **C101**
JOB # 21008

NORTH

0 25' 50' 75' 100'

DEMOLITION PLAN NOTES

1. NOTIFY ENGINEER IMMEDIATELY IF THERE ARE QUESTIONS REGARDING THE DRAWINGS AND/OR THE SPECIFICATIONS, OR IF THERE ARE ANY CONFLICTS BETWEEN THE DRAWINGS AND THE EXISTING CONDITIONS.

2. ALL PERIMETER EROSION CONTROL AND/OR CONSTRUCTION FENCING SHALL BE IN PLACE PRIOR TO ANY SOIL DISTURBANCE

3. THE EXISTING UTILITIES SHOWN HAVE BEEN LOCATED FROM VISIBLE FIELD EVIDENCE AND PROJECTS PLUS MAKES NO GUARANTEES THAT THE UTILITY INFORMATION SHOWN COMPRISES ALL SUCH UTILITIES IN THE AREA, IN SERVICE OR ABANDONED. PROJECTS PLUS FURTHER STATES THAT THE UNDERGROUND UTILITY DATA SHOWN DOES NOT INDICATE PRECISE LOCATIONS. ANY CONTRACTOR DOING ANY EXCAVATION WILL CALL IN THEIR OWN UTILITY LOCATES PRIOR TO COMMENCING WORK. ANY DAMAGE SHALL BE REPAIRED TO SATISFACTION OF STORAGE EXPRESS AND OPERATING AUTHORITY AT NO COST TO STORAGE EXPRESS. THE CONTRACTOR SHALL VERIFY THE LOCATION OF UNDERGROUND UTILITIES TO BE REMOVED, RELOCATED OR ABANDONED PRIOR TO COMMENCING DEMOLITION ACTIVITIES.

4. THE CONTRACTOR SHALL COORDINATE WORK ASSOCIATED WITH THE REMOVAL, RELOCATION OR ABANDONMENT OF UTILITIES WITH THE UTILITY COMPANY OR ENTITY HAVING OWNERSHIP OF EACH RESPECTIVE UTILITY. COSTS FOR DISCONNECTION, REMOVAL, AND/OR RELOCATION OF EXISTING UTILITIES AS SHOWN ON THE DRAWINGS OR AS NECESSARY TO ALLOW FOR EXECUTION OF THE WORK SHALL BE PAID BY THE CONTRACTOR.

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- EXISTING STORM SEWER W/ END SECTION, DITCH INLET AND PAVEMENT INLET
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- 752 — EXISTING CONTOUR LINE

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SCALE 1"=50'
DRAWN JPH
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PATRIOT DEFENSE RESEARCH PARK
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TITLE
EXISTING SITE CONDITIONS

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway, Greenwood, Indiana 46143
(317)-882-5003

SEAL

JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C201

DATE
SEPTEMBER 3, 2021

811
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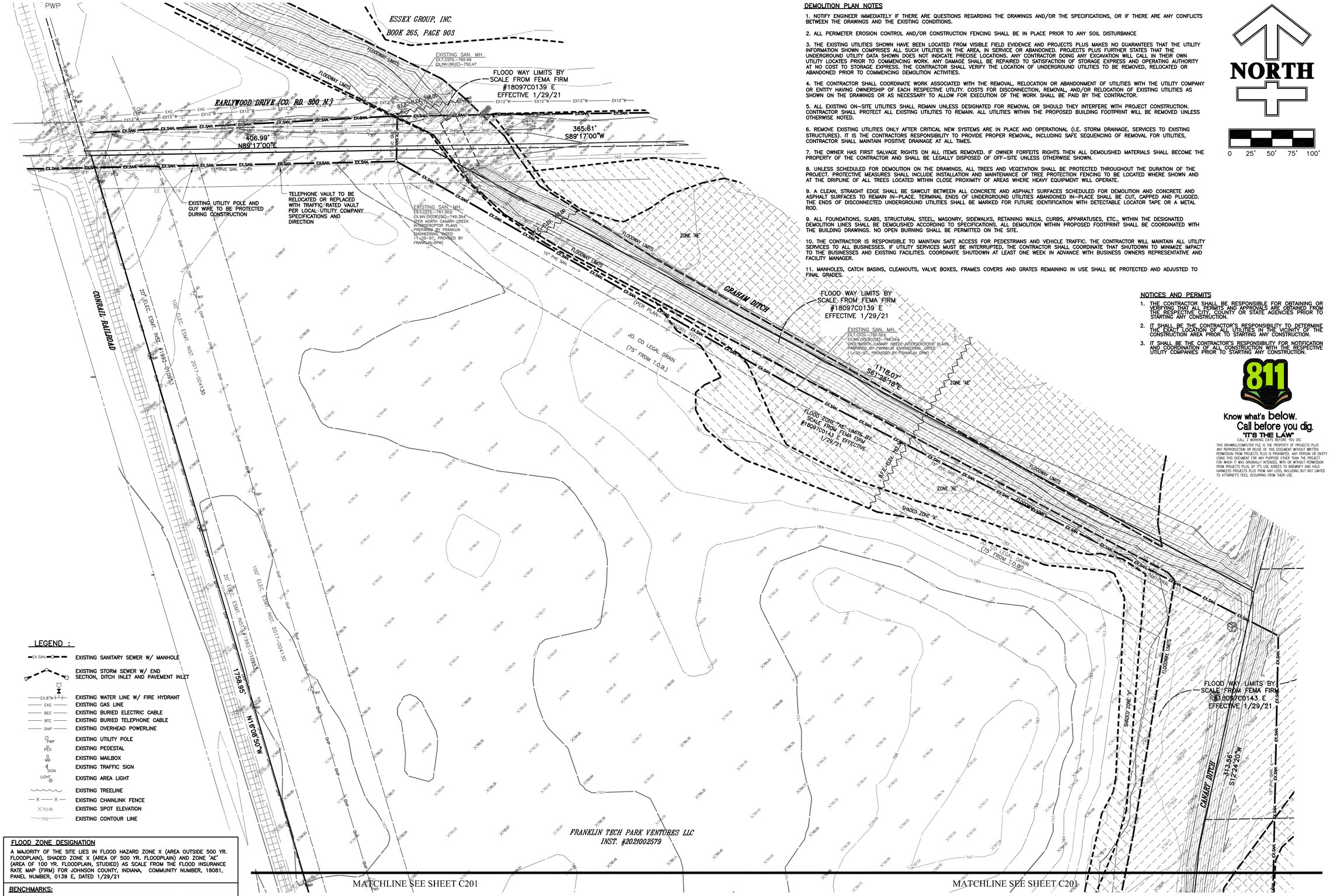

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NORTH

0 25' 50' 75' 100'

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SCALE 1"=50' | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
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TITLE
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PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Alpert Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER 21008

SHEET C202

DATE SEPTEMBER 3, 2021

EARLYWOOD DRIVE (CO. RD. 300 N.)

EX. 40' R/W

406.99'
N89°17'00"E

365.61'
S89°17'00"W

EX. 40' R/W

10' LANDSCAPE BUFFER

FOR DETAIL OF ENTRANCE
SEE SHEET NO. C306

50' B.S.L.

10' LANDSCAPE BUFFER

50' B.S.L.

CONRAIL RAILROAD

20' ELEC. ESMT. INST. #1992-010953

100' ELEC. ESMT. INST. 2017-004130

20' ELEC. ESMT. INST. #1992-010953

100' ELEC. ESMT. INST. 2017-004130

1758.95'
N16°08'50"W

R184.0'

R171.0'

28.0'

11.0'

4.0'

15.0'

R25.0'

60.7'

32.5'

12.5'

20.0'

24.8'

20.0'

20.0'

13 SPACES @ 9' = 117.0'
6 SPACES @ 9' = 54.0'

R15.0'

20.0'

12.0'

20.0'

OFFICE

PROPOSED BUILDING #1
26,400 S.F.

230.0'

120.0'

12.0'

20.0'

PAINT BOOTH

40.0'

110.0'

90.0'

10.0'

10.0'

54.0'

189.0'

160.0'

100.0'

375.0'

20 SPACES @ 9' = 180.0'

114.0'

24.0'

20.0'

24.0'

106.0'

R3.0'

R25.0'

R25.0'

R25.0'

24.0'

24.0'

R25.0'

R25.0'

CRAHAM DITCH

1118.07'
S61°25'18"E

30' S.S.E.
(PER PLAN - UNKNOWN INST.)

JO. CO LEGAL DRAIN
(75' FROM T.O.B.)

KATHLEEN WAY

R31.0'

R82.0'

R24.5'

16.4'

61.1'

56.3'

R25.0'

R25.0'

30.0'

R230.0'

246.2'

JO. CO LEGAL DRAIN
(75' FROM T.O.B.)

30' S.S.E.
(PER PLAN - UNKNOWN INST.)

177.7'

650.0'

60.0'

35.0'

R35.0'

201.9'

24.0'

R50.0'

PROPOSED BUILDING #2
80,000 S.F.

400.0'

60.0'

200.0'

24.0'

50.0'

R50.0'

197.6'

JO. CO LEGAL DRAIN
(75' FROM T.O.B.)

CANARY DITCH

313.56'
S12°24'20"W

300.00'
S06°00'00"W

196.2'

FRANKLIN TECH PARK VENTURES LLC
INST. #2021002579
ZONED: IG

PARKING COUNT	
PARKING SPACES (PROPOSED)	40 EA.
HANDICAP PARKING SPACES (PROPOSED)	2 EA.
TOTAL PARKING SPACES	42 EA.

LEGEND :

B.S.L. BUILDING SETBACK LINE

GENERAL NOTES:

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4. ALL GRASS AND/OR SHRUBBERY DISTURBED BY NEW CONSTRUCTION SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.
5. ALL TRAFFIC CONTROL SIGNAGE AND DEVICES SHALL MEET MOST CURRENT I.M.U.C.T.D. STANDARDS.
6. ALL DIMENSIONS ARE TO FACE OF CURB, UNLESS NOTED.

NORTH

0 25' 50' 75' 100'

NOTICES AND PERMITS

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DATE	SYMBOL	REVISION

SCALE 1"=50'
DRAWN JPH
CHECKED JKS
CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS
(DIMENSIONAL PLAN)

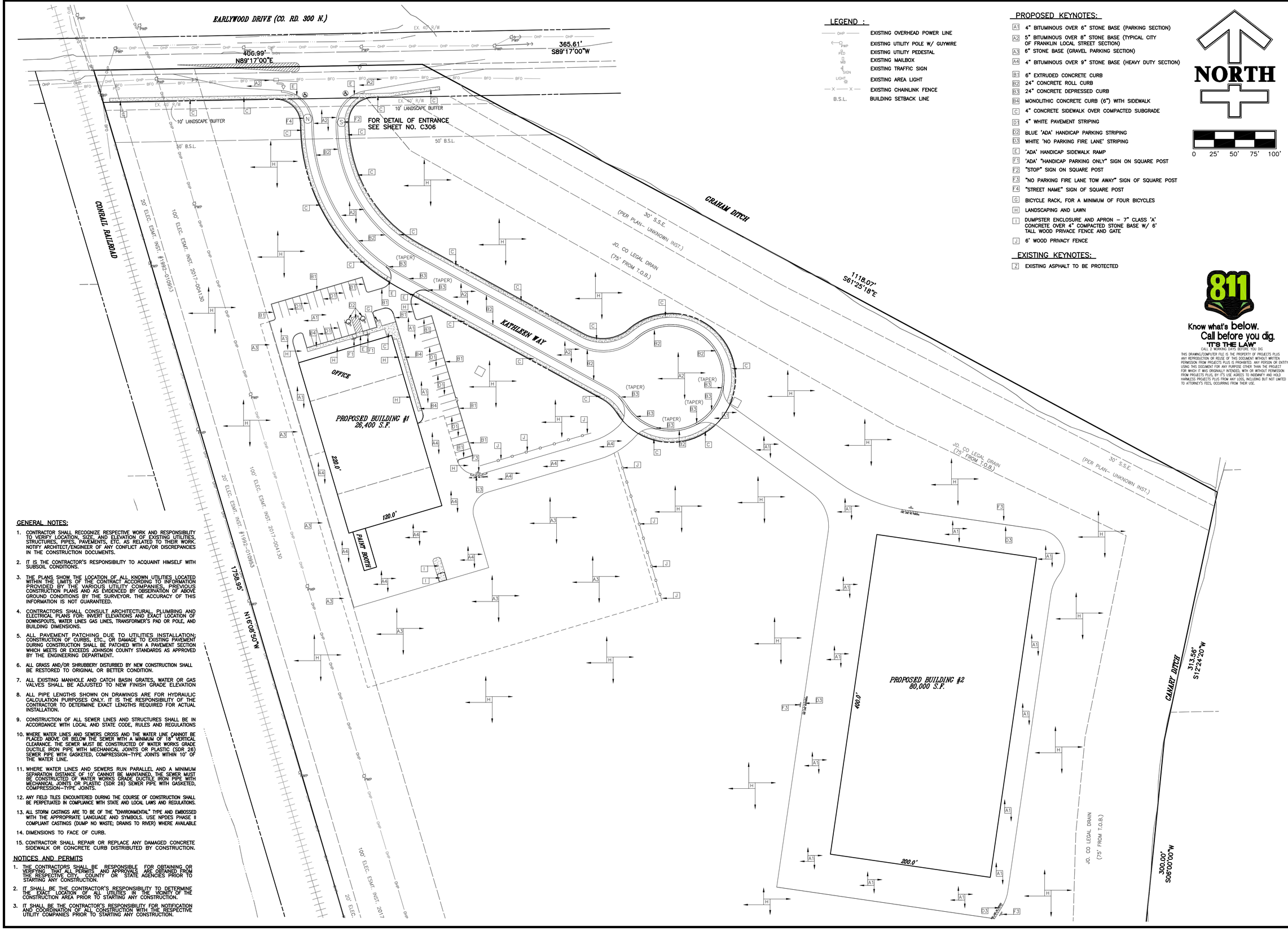
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Allport Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
Jeffery K. Smith
9/3/21

JOB NUMBER
21008

SHEET
C301

DATE
SEPTEMBER 3, 2021



LEGEND :

- OHP — EXISTING OVERHEAD POWER LINE
- PWP — EXISTING UTILITY POLE W/ GUYWIRE
- PED — EXISTING UTILITY PEDESTAL
- MB — EXISTING MAILBOX
- SIGN — EXISTING TRAFFIC SIGN
- LIGHT — EXISTING AREA LIGHT
- X — X — EXISTING CHAINLINK FENCE
- B.S.L. — BUILDING SETBACK LINE

PROPOSED KEYNOTES:

- A1 4" BITUMINOUS OVER 6" STONE BASE (PARKING SECTION)
- A2 5" BITUMINOUS OVER 8" STONE BASE (TYPICAL CITY OF FRANKLIN LOCAL STREET SECTION)
- A3 6" STONE BASE (GRAVEL PARKING SECTION)
- A4 4" BITUMINOUS OVER 9" STONE BASE (HEAVY DUTY SECTION)
- B1 6" EXTRUDED CONCRETE CURB
- B2 24" CONCRETE ROLL CURB
- B3 24" CONCRETE DEPRESSED CURB
- B4 MONOLITHIC CONCRETE CURB (6") WITH SIDEWALK
- C 4" CONCRETE SIDEWALK OVER COMPACTED SUBGRADE
- D1 4" WHITE PAVEMENT STRIPING
- D2 BLUE 'ADA' HANDICAP PARKING STRIPING
- D3 WHITE 'NO PARKING FIRE LANE' STRIPING
- E 'ADA' HANDICAP SIDEWALK RAMP
- F1 'ADA' "HANDICAP PARKING ONLY" SIGN ON SQUARE POST
- F2 "STOP" SIGN ON SQUARE POST
- F3 "NO PARKING FIRE LANE TOW AWAY" SIGN OF SQUARE POST
- F4 "STREET NAME" SIGN OF SQUARE POST
- G BICYCLE RACK, FOR A MINIMUM OF FOUR BICYCLES
- H LANDSCAPING AND LAWN
- I DUMPSTER ENCLOSURE AND APRON – 7" CLASS 'A' CONCRETE OVER 4" COMPACTED STONE BASE W/ 6' TALL WOOD PRIVACY FENCE AND GATE
- J 6' WOOD PRIVACY FENCE

EXISTING KEYNOTES:

- Z EXISTING ASPHALT TO BE PROTECTED

NORTH

0 25' 50' 75' 100'

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PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS
(GEOMETRIC PLAN)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Alpert Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

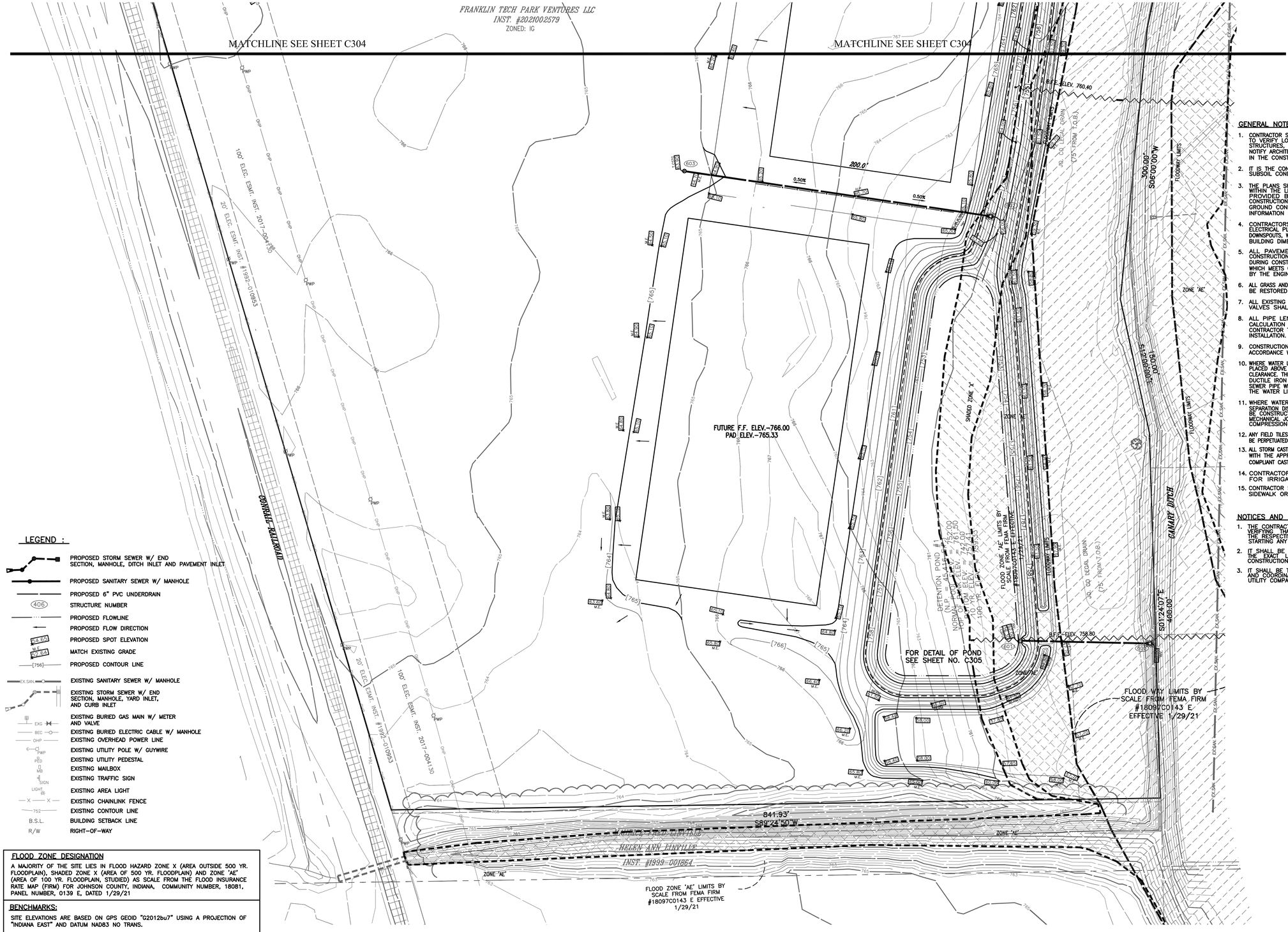
SEAL

JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
Jeffery K. Smith 9/3/21

JOB NUMBER 21008

SHEET C302

DATE SEPTEMBER 3, 2021



NORTH

LEGEND :

- PROPOSED STORM SEWER W/ END SECTION, MANHOLE, DITCH INLET AND PAVEMENT INLET
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- (406) STRUCTURE NUMBER
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- PROPOSED FLOW DIRECTION
- PROPOSED SPOT ELEVATION
- M.E. MATCH EXISTING GRADE
- [756] PROPOSED CONTOUR LINE
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- X EXISTING CHAINLINK FENCE
- 752 EXISTING CONTOUR LINE
- B.S.L. BUILDING SETBACK LINE
- R/W RIGHT-OF-WAY

FLOOD ZONE DESIGNATION

A MAJORITY OF THE SITE LIES IN FLOOD HAZARD ZONE X (AREA OUTSIDE 500 YR. FLOODPLAIN), SHADED ZONE X (AREA OF 500 YR. FLOODPLAIN) AND ZONE 'AE' (AREA OF 100 YR. FLOODPLAIN, STUDIED) AS SCALE FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR JOHNSON COUNTY, INDIANA, COMMUNITY NUMBER, 18081, PANEL NUMBER, 0139 E, DATED 1/29/21

BENCHMARKS:

SITE ELEVATIONS ARE BASED ON GPS GEOID "G2012bu7" USING A PROJECTION OF "INDIANA EAST" AND DATUM NAD83 NO TRANS.

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TOP OF SANITARYT SEWER MANHOLE CASTING 362' WEST AND 38' NORTH OF INTERSECTION OF EARLYWOOD DRIVE (CO. RD. 300 N.) AND ESSEX DR.

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CHECKED JKS
CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS
(GRADING PLAN)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Alpert Parkway, Suite 2, Greenwood, Indiana 46143
(317)–882–5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
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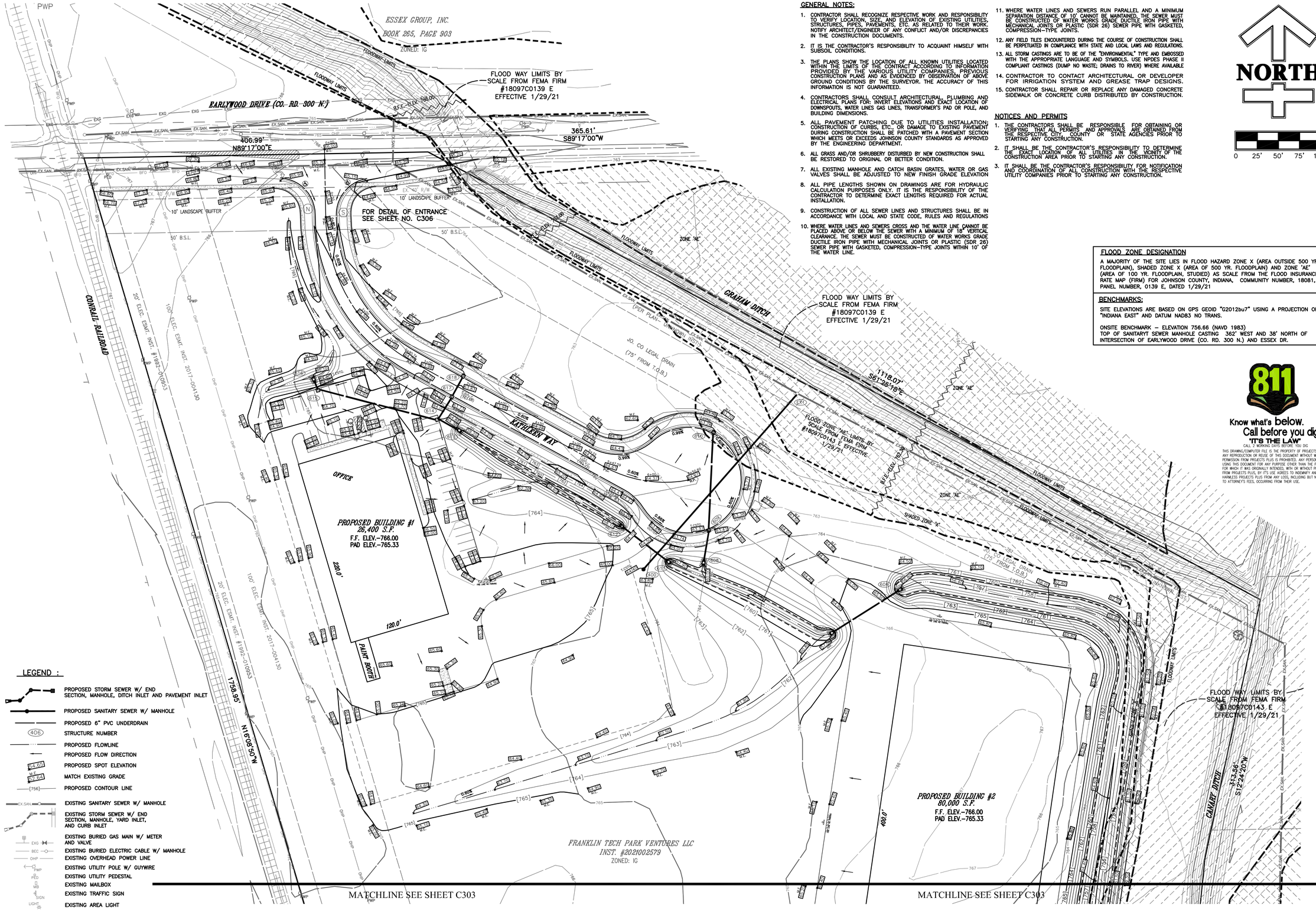

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SCALE 1"=50'
DRAWN JPH
CHECKED JKS
CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS
(GRADING PLAN)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway, Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C304

DATE
SEPTEMBER 3, 2021

POND LINER SPECIFICATIONS:

IT MAY BE NECESSARY TO CONSTRUCT A LINER TO SEAL THE MORE PERMEABLE SANDY CLAYS AND SAND SEAMSWHICH MAY BE PRESENT AT A SHALLOW DEPTH WITHIN THE SIDE SLOPE OR BOTTOM OF THE EXCAVATION. THE CONTRACTOR SHALL PERFORM SOILS ANALYSIS TESTS IN THE POND AREAS TO DETERMINE IF THE PONDS WILLREQUIRE A LINER. IN THE EVENT THAT CONSTRUCTION OF A LINER BECOMES NECESSARY, POND LINER SPECIFICATIONS HAVE BEEN INCLUDED BELOW.
ACCEPTABLE LINERS ARE AS FOLLOWS:

1. NATURAL CLAY LINER
A. LABORATORY TESTING SHALL BE PERFORMED ON THE DESIGNATED LINER MATERIAL TO DETERMINE THE OPTIMUMLINER COMPACTION CRITERIA, PERMEABILITY TESTING SHALL BE PERFORMED ON REMOLDED SAMPLES, COMPACTED TO THIS STANDARD. LABORATORY TESTING SHALL BE PERFORMED AT LEAST ONE (I) MONTH PRIOR TO INITIATING LINING ACTIVITIES.

B. THE CONTRACTOR SHALL IDENTIFY AND RETAIN THE ENGINEER–APPROVED LINER MATERIAL FOR USE ONSEALING THE SIDE SLOPES AND BOTTOM OF THE POND. THE OPTIMUM NATURAL LINER MATERIAL SHALL NOT BE USED FOR OTHER PORTIONS OF SITE WORK PRIOR TO VERIFICATION THAT ADEQUATE RESOURCES AREAVAILABLE AND HAVE BEEN STOCKPILED. IT IS IMPORTANT THAT THE STOCKPILED SOILS BE STORED IN AS SMALL AN AREA AS POSSIBLE TO RETAIN NATURAL MOISTURE. THE CONTRACTOR SHOULD ANTICIPATE THAT ADDITIONAL SOIL WORK MAY BE REQUIRED TO BRING THE LINER MATERIAL TO REQUIRED UNIFORM MOISTURE LEVEL.

C. A REPRESENTATIVE OF THE TESTING ENGINEER SHALL BE PRESENT FOR INSPECTION OF THE BASE AND SIDE SLOPES OF THE POND PRIOR TO AND DURING COMPACTION OF THE LINER MATERIALS,

D. THE CLAY LINING MATERIAL, APPROVED BY THE TESTING ENGINEER, SHALL BE COMPACTED TO A MINIMUM OF 12 INCHES THICK ON THE UPPER TWO THIRDS OF THE SIDE SLOPES AND 18 INCHES ON THE LOWER ONE THIRD. A COMPACTED MINIMUM OF 18 TO 24 INCHES APPROVED LINING MATERIAL SHALL BE PLACED ACROSS THE BASE OF THE POND.

E. THE CLAY LINER MATERIAL SHALL BE REGULARLY SAMPLED AND TESTED FOR CONFORMANCE TO THE MOISTURE AND ATTERBERG LIMITS ESTABLISHED FOR THE APPROVED LINER MATERIAL(S). FIELD DENSITY AND MOISTUR TESTING SHALL BE PERFORMED FREQUENTLY DURING CONSTRUCTION TO ESTABLISH A CORRELATION BETWEEN DENSITY AND FIELD PERMEABILITY. IT IS IMPERATIVE THAT MOISTURE LEVELS BE MAINTAINED OVER OPTIMUM AS DETERMINED IN LABORATORY TESTING. ONLY BY MAINTAINING THIS CONDITION WILL IT BE POSSIBLE TO APPROACH THE ZERO VOIDS CONDITION AND MAXIMIZE NATURAL LINER CAPABILITIES. OFFSITE SOURCES FOR CLAY LINER MATERIAL MAY BE USED WITH APPROVAL BY THE OWNER'S REPRESENTATIVE AND ONSITE TESTING ENGINEER.

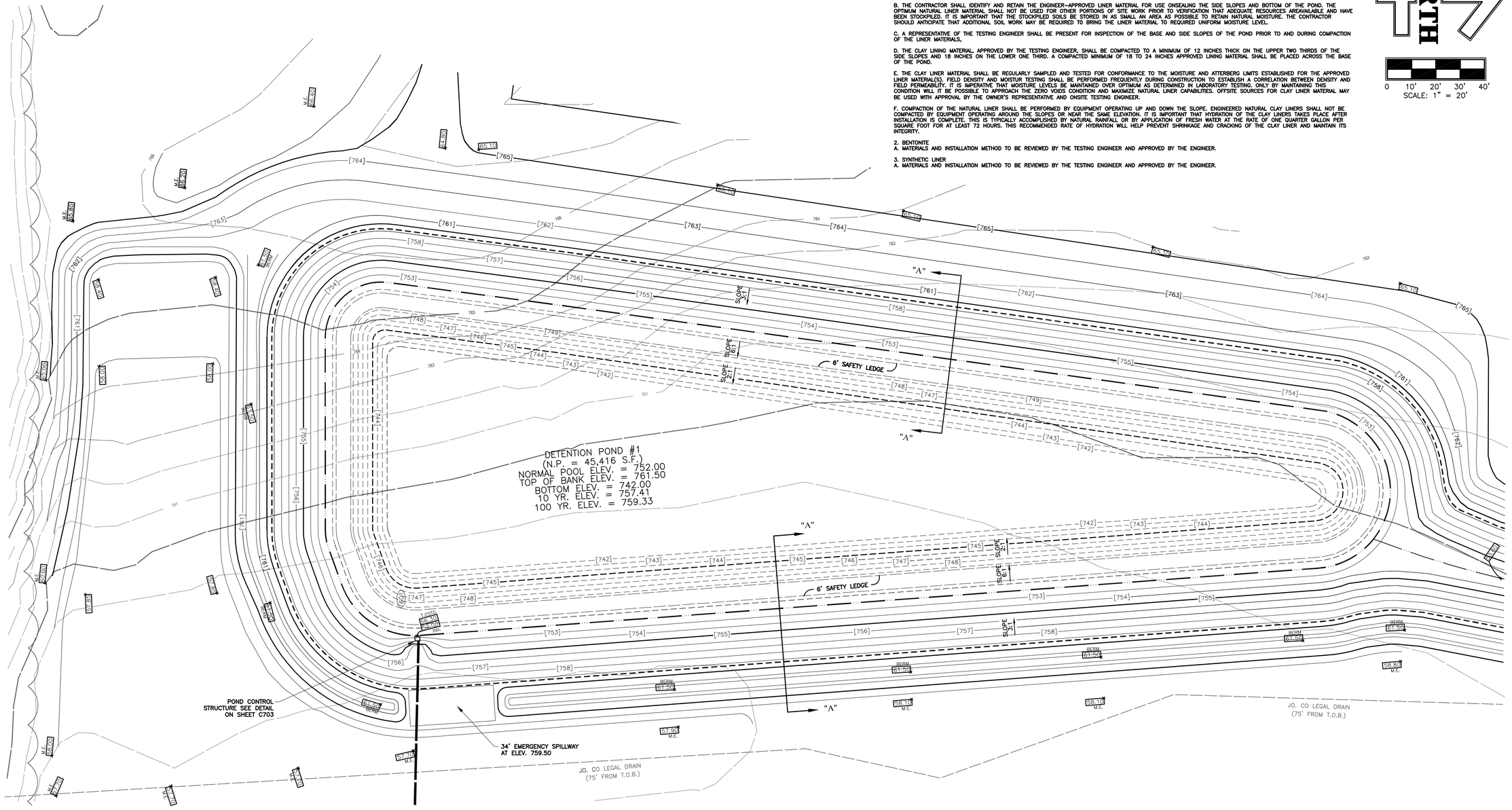
F. COMPACTION OF THE NATURAL LINER SHALL BE PERFORMED BY EQUIPMENT OPERATING UP AND DOWN THE SLOPE. ENGINEERED NATURAL CLAY LINERS SHALL NOT BE COMPACTED BY EQUIPMENT OPERATING AROUND THE SLOPES OR NEAR THE SAME ELEVATION. IT IS IMPORTANT THAT HYDRATION OF THE CLAY LINERS TAKES PLACE AFTER INSTALLATION IS COMPLETE. THIS IS TYPICALLY ACCOMPLISHED BY NATURAL RAINFALL OR BY APPLICATION OF FRESH WATER AT THE RATE OF ONE QUARTER GALLON PER SQUARE FOOT FOR AT LEAST 72 HOURS. THIS RECOMMENDED RATE OF HYDRATION WILL HELP PREVENT SHRINKAGE AND CRACKING OF THE CLAY LINER AND MAINTAIN ITS INTEGRITY.

2. BENTONITE
A. MATERIALS AND INSTALLATION METHOD TO BE REVIEWED BY THE TESTING ENGINEER AND APPROVED BY THE ENGINEER.

3. SYNTHETIC LINER
A. MATERIALS AND INSTALLATION METHOD TO BE REVIEWED BY THE TESTING ENGINEER AND APPROVED BY THE ENGINEER.

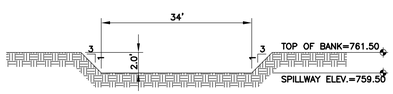
NORTH

0 10' 20' 30' 40'
SCALE: 1" = 20'

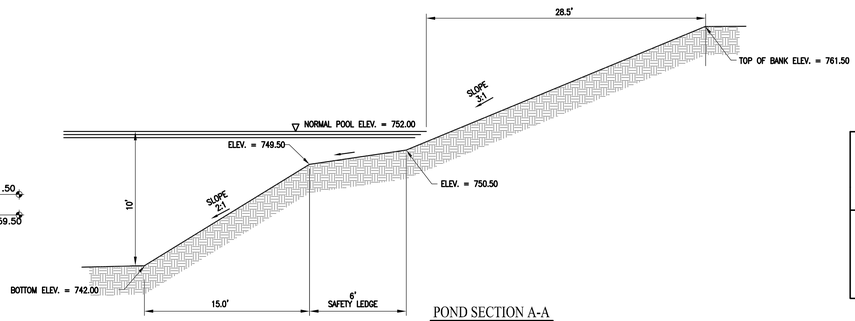


LEGEND :

- PROPOSED STORM SEWER W/ END SECTION, MANHOLE, DITCH INLET AND CURB INLET
- (406) STRUCTURE NUMBER
- PROPOSED FLOWLINE
- 55.65 PROPOSED SPOT ELEVATION
- M.E. 57.64 MATCH EXISTING GRADE
- [756] PROPOSED CONTOUR LINE
- 752 EXISTING CONTOUR LINE



POND EMERGENCY SPILLWAY



POND SECTION A-A

NOTICES AND PERMITS

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3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY FOR NOTIFICATION AND COORDINATION OF ALL CONSTRUCTION WITH THE RESPECTIVE UTILITY COMPANIES PRIOR TO STARTING ANY CONSTRUCTION.

FLOOD ZONE DESIGNATION

A MAJORITY OF THE SITE LIES IN FLOOD HAZARD ZONE X (AREA OUTSIDE 500 YR. FLOODPLAIN), SHADED ZONE X (AREA OF 500 YR. FLOODPLAIN) AND ZONE "AE" (AREA OF 100 YR. FLOODPLAIN, STUDIED) AS SCALE FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR JOHNSON COUNTY, INDIANA, COMMUNITY NUMBER, 18081, PANEL NUMBER, 0139 E, DATED 1/29/21

BENCHMARKS:

SITE ELEVATIONS ARE BASED ON GPS GEOID "G2012bu7" USING A PROJECTION OF "INDIANA EAST" AND DATUM NAD83 NO TRANS.

ONSITE BENCHMARK – ELEVATION 756.66 (NAVD 1983)
TOP OF SANITARYT SEWER MANHOLE CASTING 362' WEST AND 38' NORTH OF INTERSECTION OF EARLYWOOD DRIVE (CO. RD. 300 N.) AND ESSEX DR.

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DATE	SYMBOL	REVISION

SCALE 1"=20'
DRAWN JPH
CHECKED JKS
CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS
(POND DETAIL)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite 300, Greenwood, Indiana 46143
(317)-882-5003

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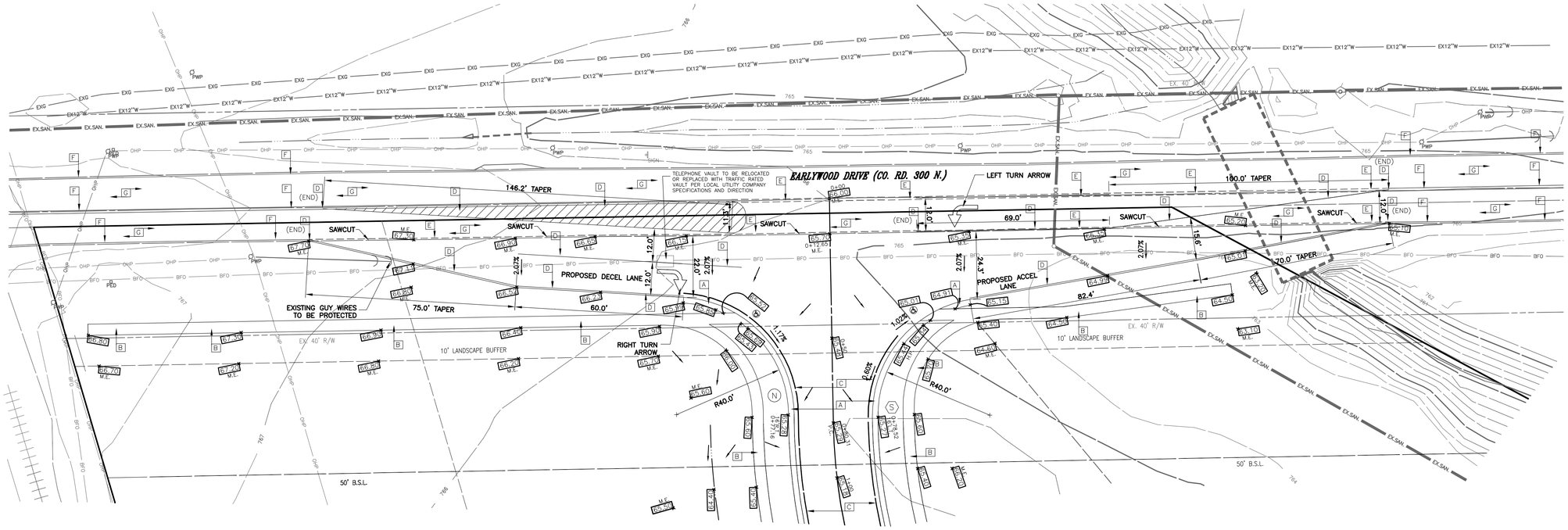

NORTH

0 10' 20' 30' 40'

LEGEND :

- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- EXISTING CONTOUR LINE
- PROPOSED HANDICAP ACCESS RAMP
- PROPOSED STREET NAME SIGN
- PROPOSED STOP SIGN
- EXISTING OVERHEAD POWER LINE
- EXISTING UTILITY POLE W/ GUYWIRE
- EXISTING BURIED GAS MAIN
- EXISTING BURIED TELEPHONE CABLE

KEYNOTE LEGEND :

- A 2' CONC. ROLL CURB (TYP.)
- B 4' CONC. SIDEWALK (TYP.)
- C 6" PVC CURB UNDERDRAIN (TYP.)
- D PROPOSED WHITE STRIPING
- E EXISTING STRIPING TO BE REMOVED
- F EXISTING STRIPING TO REMAIN
- G EXISTING PAVEMENT TO REMAIN

NOTES

1. ALL UTILITY CROSSINGS OR TRENCHES WITHIN (5) FEET OF THE EDGE OF PAVEMENT SHALL BE BACKFILLED TO THE SUBGRADE WITH GRANULAR MATERIAL AND COMPACTED IN SIX INCH LIFTS.
2. FOR CURB UNDERDRAIN LOCATIONS, SEE STREET PLAN AND PROFILE(S). FOR REAR YARD UNDERDRAIN LOCATIONS, SEE UNDERDRAIN AND SUMP PUMP LATERAL LOCATION PLAN(S).

FOR EASEMENT LOCATIONS AND DESIGNATIONS SEE FINAL RECORD PLAT AND RESTRICTIONS

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TOP OF SANITARYT SEWER MANHOLE CASTING 362' WEST AND 38' NORTH OF INTERSECTION OF EARLYWOOD DRIVE (CO. RD. 300 N.) AND ESSEX DR.

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SYMBOL	REVISION	DATE

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PROJECT
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BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS (ENTRANCE DETAIL)

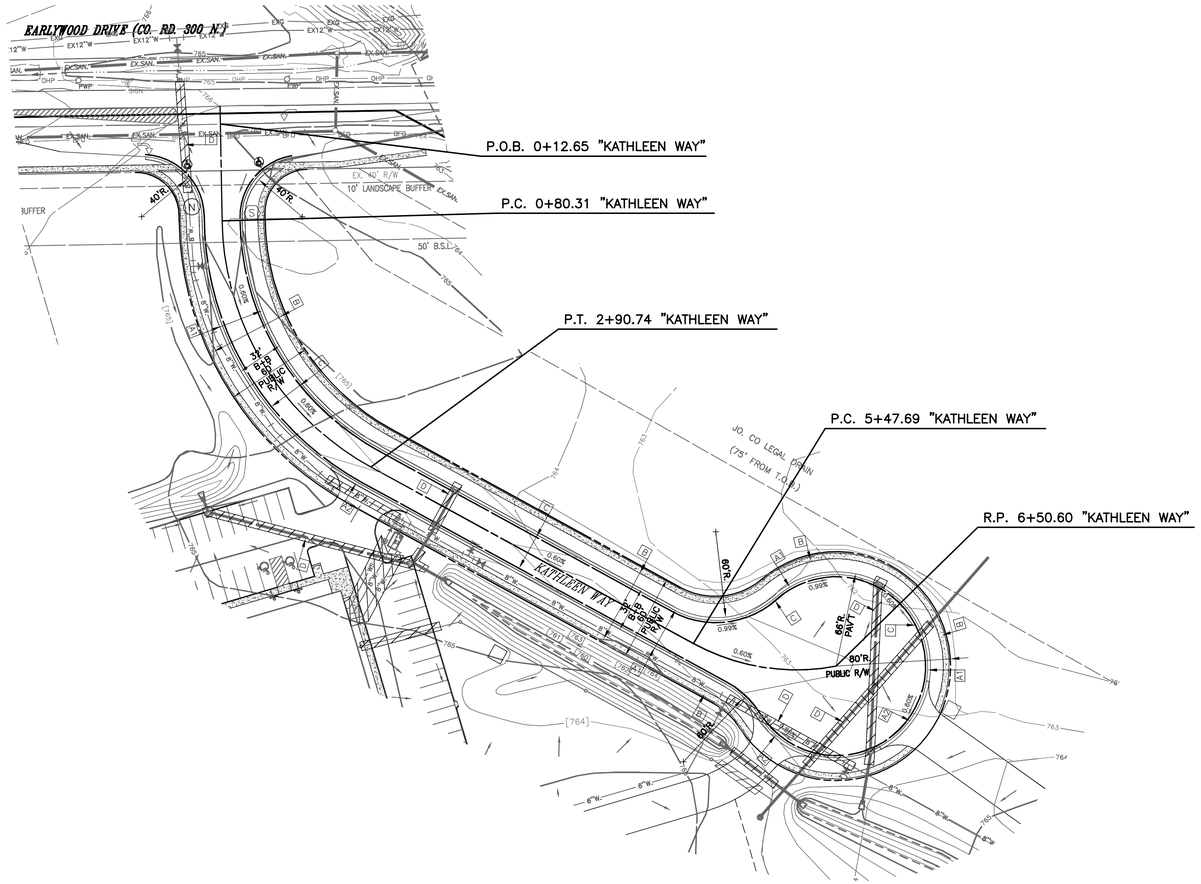
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Alpert Avenue, Suite A, Greenwood, Indiana 46143
(317)-882-5003

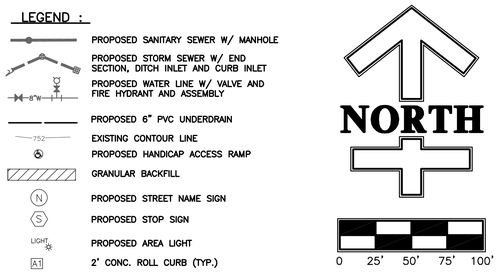
SEAL
JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
Jeffery K. Smith 9/3/21

JOB NUMBER 21008

SHEET C306

DATE SEPTEMBER 3, 2021





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NOTES

1. ALL UTILITY CROSSINGS OR TRENCHES WITHIN (5) FEET OF THE EDGE OF PAVEMENT SHALL BE BACKFILLED TO THE SUBGRADE WITH GRANULAR MATERIAL (THE UPPERMOST 48" OF GRANULAR MATERIAL SHALL BE #53 STONE) AND COMPACTED IN SIX INCH LIFTS.
2. ALL SIGNS AND SUPPORTING STRUCTURES SHALL CONFORM TO THE LATEST EDITIONS OF THE INDIANA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (I.M.U.T.C.D.)
3. THE PAVING/SUBGRADE CONTRACTOR SHALL NOTIFY THE CITY OF FRANKLIN ENGINEERING DEPARTMENT (317) 736-3633 AT LEAST 24 HOURS PRIOR TO PROOF ROLL ON THE PROPOSED STREETS.

FOR EASEMENT LOCATIONS AND DESIGNATIONS SEE FINAL RECORD PLAT AND RESTRICTIONS

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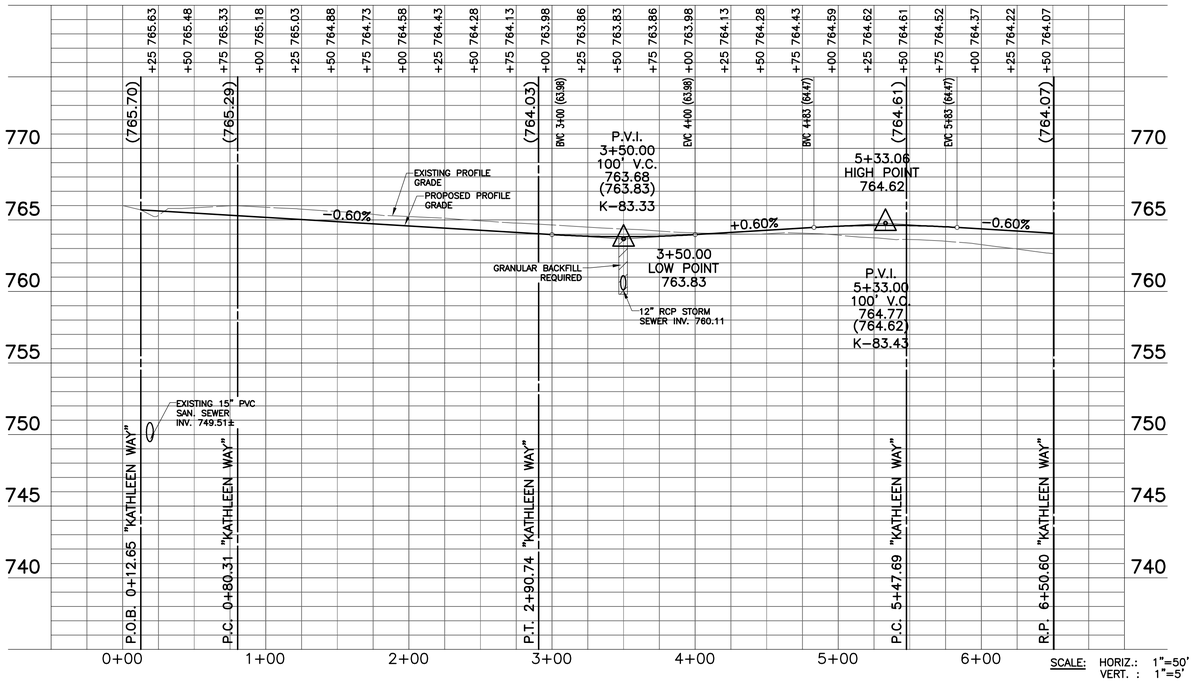

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DATE | REVISION | SYMBOL

SCALE AS SHOWN | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
PROPOSED SITE CONDITIONS
(STREET PLAN AND PROFILES)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING—LAND SURVEYING—CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C307

DATE
SEPTEMBER 3, 2021

INDEX OF REQUIRED INFORMATION FOR CONSTRUCTION STORM WATER POLLUTION PREVENTION FOR PATRIOT DEFENSE RESEARCH PARK – BUILDINGS #1 AND #2

A1.

EROSION CONTROL PLAN INDEX								
ELEMENT	SHEET.	ELEMENT	SHEET.	ELEMENT	SHEET.	ELEMENT	SHEET.
A1	C401–C406	A12	N/A	A23	C305–C306	B10	C401–C406,C1102
A2	ATTACHED	A13	C401–C406			B11	C401–C406,C1101
A3	C401–C406	A14	C401–C406	B1	C401–C406,C1102	B12	C401–C406,C1101
A4	C101	A15	C401–C406	B2	C401–C406,C1101	B13	C401–C406,C1101
A5	C101	A16	C401–C406	B3	C401–C404,C1103	B14	C401–C406,C1101
A6	C301–C306	A17	C201–C202	B4	C401–C406,C1101	B15	C401–C406,C1101
A7	C401–C406	A18	C1101	B5	C401–C406,C1102	C1	C401–C406
A8	N/A	A19	C701–706	B6	C401–C406,C1102	C2	C1101
A9	C401–C406	A20	N/A	B7	C401–C406,C1102	C3	C701–C704, C1101
A10	C201	A21	C403–C404	B8	C401–C406,C1102	C4	C1101
A11	C401–C406	A22	C201–C202	B9	N/A	C5	C401–C406

A2. INCLUDED IN SUBMITTAL PACKET
A3. PATRIOT DEFENSE RESEARCH PARK – BUILDINGS #1 AND #2 IS LOCATED OFF EARLYWOOD DR., FRANKLIN, IN 46131 AT THE INTERSECTION OF EARLYWOOD DR. AND ESSEX DR. THE SITE IS A PROPOSED INDUSTRIAL DEVELOPMENT ON 36.74 ACRES, IMPROVEMENTS SHALL CONSIST OF CONSTRUCTION OF A TWO INDUSTRIAL BUILDING, STORM SEWER, SWALES, ASPHALT PAVEMENT, CONCRETE CURBS, CONCRETE WALKS, DETENTION POND AND EARTH WORK.
A4. VICINITY MAP ON TITLE SHEET – SEE SHEET C101
A5. LEGAL DESCRIPTION – PART OF THE NW 1/4 SECTION 2 AND NE 1/4 SECTION 3, TOWNSHIP 12 NORTH, RANGE 4 EAST
LATITUDE: N39°31'06"LONGITUDE: W86°03'50"
A6. LOTS AND IMPROVEMENTS SHOWN ON PROPOSED SITE CONDITIONS – SEE SHEET(S) C301–C306
A7. HYDROLOGIC UNIT CODE: 05120204090030
A8. NO STATE OR FEDERAL WATER QUALITY PERMITS ARE REQUIRED FOR THIS PROJECT.
A9. THE STORM WATER WILL DISCHARGE TO A PROPOSED DETENTION POND LOCATED ALONG THE SOUTH SIDE OF THE PROJECT SITE AND THEN THE OUTLET ALONG THE SOUTH PROPERTY LINE, MAINTAINING THE CURRENT RELEASE POINT. DISCHARGE ULTIMATELY RELEASE TO THE CANARY DITCH.
A10. NO WETLANDS EXIST ON THE PROJECT SITE
A11. RECEIVING WATERS: CANARY DITCH
A12. WE ANTICIPATE NO POTENTIAL AREAS WERE DISCHARGE WILL ENTER GROUNDWATER.
A13. 100 YEAR FLOOD PLAINS, FLOODWAYS AND FLOODWAY FRINGES ARE SHOWN ON THE EXISTING SITE CONDITION PLAN(S) – SEE SHEET(S) C201–C202
A14. PRE–CONSTRUCTION 10 YEAR OUTFLOW = 7.29 C.F.S.
POST–CONST. 10 YEAR OUTFLOW = 2.16 C.F.S.
A15. LAND USE OF ADJACENT PROPERTIES:
NORTH: INDUSTRIAL
WEST: INDUSTRIAL
SOUTH: INDUSTRIAL
EAST: INDUSTRIAL
A16. BOUNDARY OF DISTURBED AREA SHOWN ON STORM WATER POLLUTION PREVENTION PLAN(S) – SEE SHEET(S) C401–C406
A17. EXISTING SITE CURRENTLY BARE WITH GRASSES AS SHOWN ON THE EXISTING SITE CONDITION PLAN – SEE SHEET(S) C201–C202
A18. SOIL MAP LOCATED ON THE STORM WATER POLLUTION PREVENTION DETAIL SHEET – SEE SHEET C801
A19. LOCATION, SIZE AND DIMENSIONS OF STORM WATER SYSTEMS SHOWN ON STORM PLAN AND PROFILE SHEET(S) – SEE SHEET(S) C503–C504
A20. NO OFFSITE CONSTRUCTION ACTIVITIES WILL BE NECESSARY.
A21. SOIL STOCKPILE, BORROW AND DISPOSAL AREAS ARE SHOWN ON STORM WATER POLLUTION PREVENTION PLAN(S) – SEE SHEET(S) C403–C404
A22. EXISTING SITE TOPOGRAPHY SHOWN ON THE EXISTING SITE CONDITION PLAN(S) – SEE SHEET(S) C201–C202
A23. PROPOSED FINAL SITE TOPOGRAPHY SHOWN ON PROPOSED SITE CONDITION PLAN(S) – SEE SHEET(S) C304–C305

B1. POTENTIAL STORM WATER POLLUTANT SOURCES ASSOCIATED WITH CONSTRUCTION ACTIVITY INCLUDE GASOLINE, OIL AND OTHER FLUIDS FROM CONSTRUCTION EQUIPMENT, CONCRETE, ASPHALT AND SEDIMENT LADEN RUNOFF. CONTRACTOR SHALL ESTABLISH AN EMPLOYEE PARKING AREA AND VEHICLE MAINTENANCE AREA AS SHOWN ON THE PLAN(S). A PROPER CONCRETE WASHOUT AREA SHALL ALSO BE ESTABLISHED AS SHOWN ON THE PLAN(S), THIS WASHOUT PIT SHALL MEET REQUIREMENTS SET FORTH IN THE CURRENT I.S.W.Q.M. FOR DETAIL OF WASHOUT PIT SEE SHEET C802
B2. INDIVIDUAL STORM WATER QUALITY MEASURES ARE SHOWN ON THE ATTACHED PLAN, I.E. FILTER FENCING, CONSTRUCTION ENTRANCE, SEEDING AND BLANKETS. PERENNIAL VEGETATIVE COVER WITH A UNIFORM DENSITY OF 70% IS REQUIRED BEFORE REMOVAL OF TEMPORARY EROSION CONTROL MEASURES. AN EROSION CONTROL CONSTRUCTION SEQUENCE SCHEDULING, SHOWING THE IMPLEMENTATION RELATIVE TO LAND DISTURBING ACTIVITIES IS SHOWN ON STORM WATER POLLUTION PREVENTION DETAIL SHEET – SEE SHEET C801
B3. A CONSTRUCTION ENTRANCE LOCATION IS SHOWN ON STORM SEWER POLLUTION PREVENTION PLAN(S) – SEE SHEET(S) C401–C404, FOR SPECIFICATIONS AND DETAILS REGARDING THE ENTRANCE IS SHOWN STORM WATER POLLUTION PREVENTION DETAIL SHEET, SEE SHEET C1102
B4. SEDIMENT CONTROL MEASURES FOR SHEET FLOW SHOWN ON STORM SEWER POLLUTION PREVENTION PLAN(S) – SEE SHEET(S) C401–C406, DETAIL ON SHEET C801. CONTRACTOR TO INSURE ALL REQUIRED MEASURES OF FILTER FENCE ARE INSTALLED AND REQUIRED VEGETATIVE FILTER STRIPS ARE MAINTAINED.
B5. SEDIMENT CONTROL MEASURES FOR CONCENTRATED FLOW SHOWN ON STORM SEWER POLLUTION PREVENTION PLAN(S) – SEE SHEET(S) C401–C406, DETAIL ON SHEET C802. CONTRACTOR TO GRADE DIVERSIONARY DITCHES TO CHANNEL WATER AS CONSTRUCTION PROCEEDS SO THAT SEDIMENT IS NOT ALLOWED TO FLOW UNFILTER. NORTH AMERICAN GREEN SC–150 SHALL BE UTILIZED.
B6. STORM SEWER INLET PROTECTION MEASURES ARE SHOWN ON STORM SEWER POLLUTION PREVENTION PLAN(S), SEE SHEET(S) C401–C406, FOR DETAILS, SEE SHEET C802. CONTRACTOR TO INSTALL TEMPORARY BASKET INSERTS, FILTER INSERTS, FILTER SLEEVES/TUBES, WIRE BASKETS OR OTHER REQUIRED INLET PROTECTION MEASURES SHOWN ON THE PLAN(S).
B7. RUNOFF CONTROL MEASURES ARE SHOWN ON STORM SEWER POLLUTION PREVENTION PLAN(S), SEE SHEET(S) C401–C406, FOR DETAILS SHEET C802. CONTRACTOR SHALL INSTALL ALL DIVERSIONS, TEMPORARY SLOPE DRAIN OR OTHER REQUIRED RUNOFF CONTROL MEASURES SHOWN ON THE PLAN(S).
B8. STORM WATER OUTLET PROTECTION MEASURES, I.E. TEMPORARY SEDIMENT RISER, ARE SHOWN ON STORM SEWER POLLUTION PREVENTION PLAN(S), SEE SHEET(S) C401–C406, FOR DETAILS SHEET C802. CONTRACTOR SHALL INSTALL ALL RIPRAP SLOPE PROTECTION OR OTHER REQUIRED RUNOFF CONTROL MEASURES SHOWN ON THE PLAN(S). CONTRACTOR SHALL REMOVE ALL TEMPORARY INLET/OUTLET MEASURES ONCE FINAL STABILIZATION IS COMPLETED.
B9. NO GRADE STABILIZATION MEASURES ARE NECESSARY
B10. STORM WATER QUALITY LOCATIONS AND MEASURES ARE SHOWN ON THE STORM WATER POLLUTION PREVENTION SHEET(S), SEE SHEET(S) C401–C406, FOR SPECIFICATIONS, DIMENSIONS AND CONSTRUCTION DETAILS, SEE SHEET C802. CONTRACTOR SHALL INSTALL THE VARIOUS EROSION CONTROL MEASURES SHOWN STORM SEWER POLLUTION PREVENTION PLAN(S).
B11. SURFACE STABILIZATION METHODS SHOWN ON STORM WATER POLLUTION PREVENTION SHEET(S), SEE SHEET(S) C401–C406, FOR DETAIL, SEE GENERAL NOTE ON THE STORM WATER POLLUTION PREVENTION SHEET(S). CONTRACTOR SHALL INSTALL THE REQUIRED SEEDING, MULCH BLANKETS OR OTHER SURFACE STABILIZATION MEASURES SHOWN ON THE PLAN(S).
B12. PERMANENT SURFACE STABILIZATION METHODS SHOWN ON STORM WATER POLLUTION PREVENTION SHEET(S), SEE SHEET(S) C401–C406, FOR DETAIL, SEE GENERAL NOTE ON THE STORM WATER POLLUTION PREVENTION SHEET(S). CONTRACTOR SHALL INSTALL THE REQUIRED SEEDING, MULCH BLANKETS OR OTHER SURFACE STABILIZATION MEASURES SHOWN ON THE PLAN(S).
B13. MATERIAL HANDLING AND STORAGE ASSOCIATED WITH CONSTRUCTION ACTIVITY SHALL MEET THE SPILL PREVENTION AND SPILL RESPONSE REQUIREMENTS IN 327 IAC 2–6.1. FULL EMERGENCY PLAN IS SHOWN ON STORM WATER POLLUTION PREVENTION DETAIL SHEET, SEE SHEET C801. ALL MATERIALS SHALL BE HANDLED IN ACCORDANCE WITH GUIDELINES SET FORTH IN MATERIAL SAFETY DATA SHEET(S) PROVIDED BY MANUFACTURER.
B14. MONITORING AND MAINTENANCE GUIDELINES FOR EACH PROPOSED POLLUTION PREVENTION MEASURE ARE TO BE PROVIDE BY THE CONTRACTOR, A SELF–MONITORING PROGRAM THAT INCLUDE THE FOLLOWING MUST BE IMPLEMENTED:
A) A TRAINED INDIVIDUAL SHALL PERFORM A WRITTEN EVALUATION OF THE PROJECT SITE
1. BY THE END OF THE NEXT BUSINESS DAY FOLLOWING EACH MEASURABLE STORM EVENT AND
2. AT LEAST ONE (1) TIME PER WEEK
B) THE EVALUATION MUST ADDRESS:
1. THE MAINTENANCE OF EXISTING STORM WATER QUALITY MEASURES TO ENSURE THEY ARE FUNCTIONING PROPERLY AND
2. IDENTIFY ADDITIONAL MEASURES NECESSARY TO REMAIN IN COMPLIANCE WITH ALL APPLICABLE STATUTES AND RULES
C) WRITTEN EVALUATION REPORTS MUST INCLUDE:
1. THE NAME OF THE INDIVIDUAL PERFORMING THE ACTION
2. THE DATE OF THE EVALUATION
3. PROBLEMS IDENTIFIED AT THE PROJECT SITE AND
4. DETAILS OF CORRECTIVE ACTIONS RECOMMENDED AND COMPLETED.
IF SPILL OCCURS, NOTIFICATION MUST BE MADE TO THE IDEM OFFICE OF EMERGENCY RESPONSE (1–888–233–7745) AND THE NATIONAL RESPONSE CENTER (1–800–424–8802)
B15. R
EROSION CONTROL FOR INDIVIDUAL BUILDING LOTS CONSTRUCTION SEQUENCE AS FOLLOWS:
1. CONSTRUCT STONE DRIVEWAY.
2. LIMIT ALL DELIVERIES TO THE STONE DRIVEWAY.
3. PRESERVE AS MUCH OF THE EXISTING VEGETATION AS POSSIBLE.
4. LARGE EXPOSED AREAS ON OR NEAR SLOPES WILL REQUIRE A SILT FENCE.
5. AFTER CONSTRUCTION OF FOUNDATION, ROUGH GRADE AND SEED LOT.
6. AFTER BUILDING GUTTERS ARE INSTALLED, USE TEMPORARY EXTENSIONS TO LET WATER PASS EXPOSED AREAS
7. AFTER FINAL GRADING, SEED OR SOD THE YARD AS SOON AS POSSIBLE

C1. EXPECTED POLLUTANTS ASSOCIATED WITH THE PROPOSED LAND USE INCLUDE FLUIDS FROM VEHICULAR TRAFFIC (I.E. OIL, GREASE, ANTIFREEZE, GASOLINE, ETC.), SAND AND GRIT FROM ROADWAY SURFACES AND SUBSTANCES ASSOCIATED WITH THE MAINTENANCE OF LAWNS AND GARDENS. THE ONLY OTHER REASONABLY FORESEEN POLLUTION FROM THIS SITE WILL BE MINIMAL AMOUNT OF LITTER AND TRASH FROM IMPROPER DISPOSAL.
C2. POST CONSTRUCTION STORMWATER QUALITY SHOULD BE INSTALLED PRIOR TO MAJOR LAND DISTURBANCE OCCURRING.
1. EROSION CONTROL MEASURES SHOWN ON THIS PLAN TO BE INSTALLED FIRST.
2. ANY WATER QUALITY BEST MANAGEMENT PRACTICE (BMP) STRUCTURES TO BE UTILIZED FOR SEDIMENT CONTROL
3. INSPECT AND RE–SEED SWALES AS NEEDED AFTER COMPLETION OF FINAL GRADING.
4. MONITOR AND MAINTAIN SWALE AREAS UNTIL A MATURE STAND OF GRASS EXISTS.
5. CLEAN ALL CATCH BASINS OF DEBRIS WHEN GRADING IS COMPLETE.
6. SWEEP STREETS REGULARLY AND KEEP FREE OF DEBRIS.
7. FINAL STABILIZATION OF THE SITE USING PERMANENT SEEDING OF ALL OPEN AREAS.
C3. POST–CONSTRUCTION STORM WATER QUALITY WILL BE ACCOMPLISHED BY ROUTING THE SITE RUNOFF THROUGH A DRY DETENTION POND DESIGNED TO DETAIN, FOR AT LEAST 24 HOURS AFTER PEAK RUNOFF, 20% OF THE RUNOFF GENERATED FROM EITHER A 1–1/4" STORM EVENT OR 1/2" OF DIRECT RUNOFF, WHICHEVER IS GREATER. THE DETENTION FACILITY ACTS AS A PERMANENT STORMWATER CONTROL STRUCTURE PROVIDING BOTH DETENTION AND TREATMENT OF CONTAMINATED STORMWATER RUNOFF. THE POND'S NATURAL PHYSICAL, BIOLOGICAL, AND CHEMICAL PROCESSES THEN WORK TO REMOVE POLLUTANTS. SEDIMENTATION PROCESSES REMOVE PARTICULATES, ORGANIC MATTER, AND METALS, WHILE DISSOLVED METALS AND NUTRIENTS ARE REMOVED THROUGH BIOLOGICAL UPTAKE. FURTHER MAINTENANCE INCLUDES SWEEPING OF ALL PAVED SURFACES AS WELL AS COLLECTION OF ANY LITTER. ALL DRAINAGE SWALES AND GREEN SPACES WILL BE MAINTAINED WITH REGULAR MOWING DURING GROWING SEASONS.
C4. WATER QUALITY MEASURES (I.E. STRUCTURES AND NON–STRUCTURAL) ARE IDENTIFIED ON THE STORM SEWER POLLUTION PREVENTION PLAN(S), SEE SHEET(S) C403–C406
C5. MAINTENANCE OF ALL STORM WATER POLLUTION PREVENTION MEASURES WILL BE THE RESPONSIBILITY OF THE PROJECT OWNER UTILIZING PROCEDURES OUTLINED ON THESE PLAN(S). ANY GRASSED OR VEGETATED AREAS THAT EXPERIENCE EROSION FROM RAINFALL EVENTS SHOULD BE REPAIRED AND REVEGETATED AS SOON AS POSSIBLE.

A. EROSION OF THE DETENTION POND BANKS SHOULD BE ADDRESSED AS SOON AS IT BECOMES VISIBLE BY FILLING THE ERODED AREA WITH SUITABLE SOIL AND ESTABLISHING VEGETATION IMMEDIATELY, PREFERABLY BY SODDING. THE SAME MEASURE SHOULD BE USED FOR STEEP BANKS OR ANY BERMS OR SWALES. THE PONDS SHOULD ALSO BE MONITORED FOR SEDIMENT. IF THE BOTTOM OF THE POND RECEIVED SIGNIFICANT SEDIMENT (LESS THAN 2 FEET DEEP), THE SEDIMENT SHOULD BE REMOVED AND REPLACED ONSITE. AN ENGINEER SHOULD BE CONTACTED TO IDENTIFY THE SOURCE AND RECOMMEND REPAIRS.

B. PAVEMENT AREAS SHOULD BE MONITORED FOR POLLUTANTS; ANY LARGE QUANTITIES OF FLUID SUCH AS OIL, ANTIFREEZE, BRAKE FLUID, ETC. FOUND ON THE PAVEMENT SHOULD BE REPORTED TO THE OWNER. THE OWNER SHOULD CLEAN THE POLLUTANTS AND PREVENT THE SOURCE FROM ENTERING THE SITE IN THE FUTURE. FINALLY, PAVEMENTS SHOULD ALSO BE MONITORED FOR SEDIMENT COMING FROM VEGETATIVE AREAS. IF POST CONSTRUCTION EROSION IS OCCURRING, THE SOURCE SHOULD BE RE–STABILIZED AS SOON AS POSSIBLE BY SEEDING, SODDING OR MULCHING.

SITE CONTACT:
JOHN L. PRICE
PROJECT DEVELOPMENT DIRECTOR
PATRIOT PRODUCTS LLC
PHONE: 317–727–1333
JLPRICE1333@COMCAST.NET

NORTH

0 25' 50' 75' 100'

LEGEND :

- EX.SAN. — EXISTING SANITARY SEWER W/ MANHOLE
- EXISTING STORM SEWER W/ END SECTION, MANHOLE, YARD INLET, AND CURB INLET
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GENERAL NOTES:

1. FERTILIZER AND AGRICULTURAL LIMESTONE SHALL BE SPREAD UNIFORMLY OVER THE AREA TO BE SEEDED. THEY SHALL BE MIXED INTO THE TOP 2" OF SOIL WITH A DISK HARROW, ROTARY TILLER, OR OTHER APPROVED EQUIPMENT. FERTILIZER SHALL BE SPREAD AT THE RATE OF 400 POUNDS PER ACRE, AND AGRICULTURAL LIMESTONE AT THE RATE OF 1/2 TON PER ACRE UNLESS OTHERWISE SPECIFIED.

2. TEMPORARY SEEDING: THE AREAS WHERE STRIPPING, CUTS OR FILLS HAVE BEEN GRADED SHALL BE SEEDED FOR SILT AND EROSION PROTECTION WITH ONE OF THE FOLLOWING METHODS:

A. EARLY SPRING MIX: 100% OATS SEEDING RATE: 50 LBS./ACRE

B. SPRING OR LATE FALL MIX: 100% ANNUAL RYE SEEDING RATE: 50 LBS./ACRE

C. FALL MIX: 100% PERENNIAL RYE SEEDING RATE: 50 LBS./ACRE

STRAW OR MULCH AS APPROVED BY THE ENGINEER SHALL BE APPLIED AT A RATE OF 2 TONS PER ACRE.

3. MULCH–SEEDING: MULCH–SEEDING SHALL BE AS PER I.S.W.Q.M. SPECIFICATIONS, DATED OCTOBER 2007. FERTILIZER SHALL BE 12–12–12 APPLIED AT THE RATE OF 400 POUNDS PER ACRE. SEED MIXTURE SHALL BE 60 POUNDS PER ACRE OF PERENNIAL RYE GRASS AND 60 POUNDS PER ACRE OF KENTUCKY 31 FESCUE OR ALTA FESCUE.

4. WATER QUALITY MAINTENANCE– AT THE COMPLETION OF CONSTRUCTION ALL EXCESS SOIL AND OTHER MATERIAL SHALL BE REMOVED FROM THE SITE. TO ENSURE PROPER WATER QUALITY THE SITE AND ITS STORM WATER CONVEYANCE FACILITIES SHALL BE INSPECTED AT REGULAR INTERVALS AND AFTER ALL MAJOR RAIN EVENTS. THE STORM WATER CONVEYANCE SYSTEMS SHALL BE KEPT FREE OF DEBRIS AND FLUIDS THAT COULD POTENTIALLY POLLUTE STORM WATER RUNOFF.

5. PROJECT SITE OWNER OR THEIR REPRESENTATIVE, KNOWLEDGEABLE IN EROSION AND SEDIMENT CONTROL, SHALL INSPECT THE SITE FOR STORM WATER POLLUTION PREVENTION DEFICIENCIES AT LEAST WEEKLY AND AGAIN WITHIN 24 HOURS OF EVERY 1/2 INCH RAIN EVENT.

6. ALL HAZARDOUS MATERIALS USED DURING THE CONSTRUCTION OF THIS SITE SHALL BE HANDLED AT ALL TIMES ACCORDING TO RECOMMENDATIONS IN THE MATERIAL SAFETY DATA SHEETS PROVIDED BY THE MANUFACTURER. SITE CONTRACTOR TO IMPLEMENT A SPILL PREVENTION PLAN PRIOR TO START OF CONSTRUCTION.

7. ALL EROSION CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE "INDIANA STORM WATER QUALITY MANUAL" AND THE SCS "FIELD OFFICE TECHNICAL GUIDE".

NOTICES AND PERMITS

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NOTES:

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3. FOR EROSION CONTROL IMPLEMENTATION AND MAINTENANCE SCHEDULE SEE "EROSION CONTROL REQUIREMENTS" ON SHEET NO. C801
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DRAWN JPH
CHECKED JKS
CERTIFIED JKS

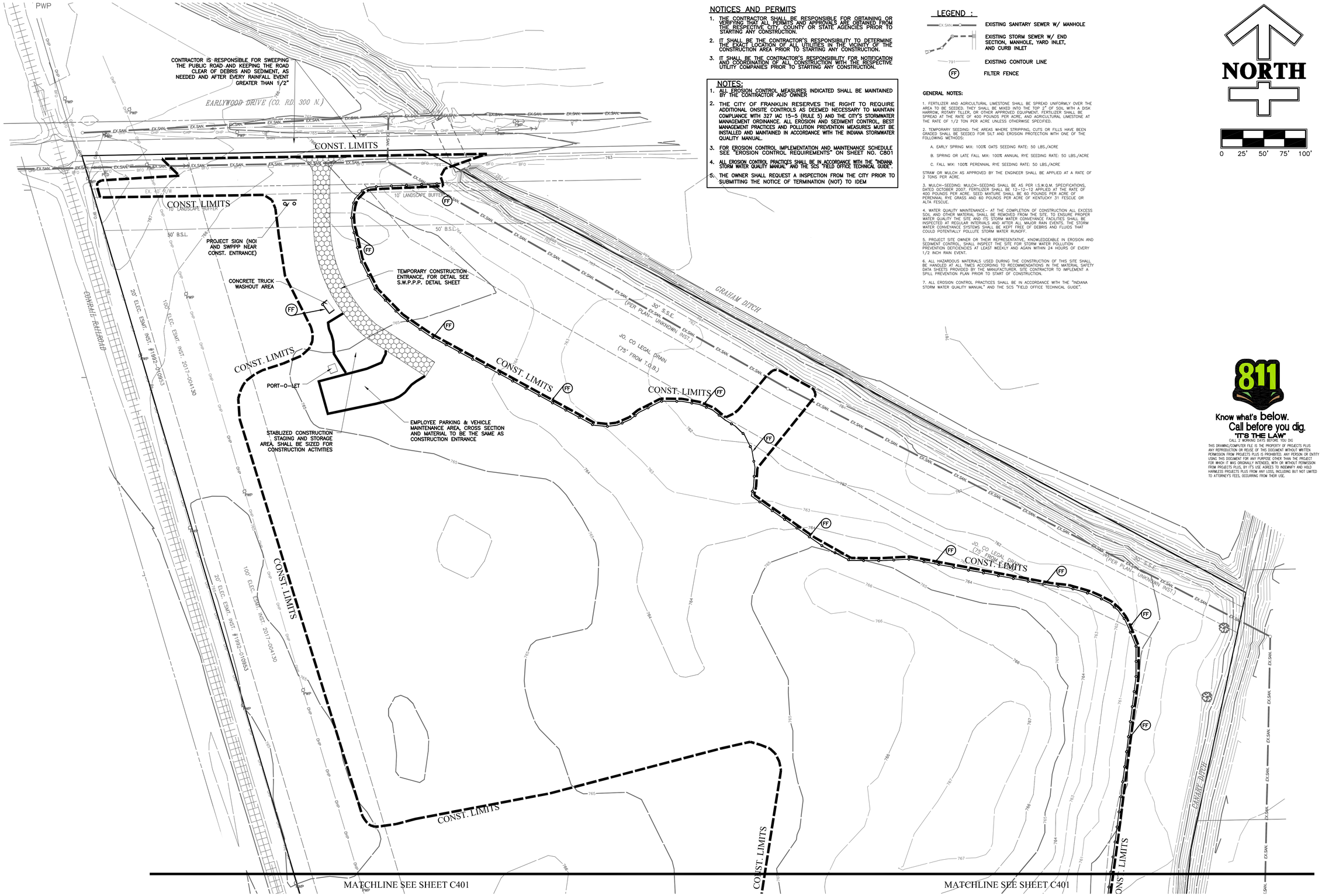
PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
STORM WATER POLLUTION PREVENTION PLAN (INTIAL PRE CONST.)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Airport Parkway, Greenwood, Indiana 46143
(317)–882–5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER 21008
SHEET C401
DATE SEPTEMBER 3, 2021



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4. ALL EROSION CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE "INDIANA STORM WATER QUALITY MANUAL" AND THE SCS "FIELD OFFICE TECHNICAL GUIDE".
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- EX.SAN. — EXISTING SANITARY SEWER W/ MANHOLE
- EXISTING STORM SEWER W/ END SECTION, MANHOLE, YARD INLET, AND CURB INLET
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NORTH

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PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
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SEAL

JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
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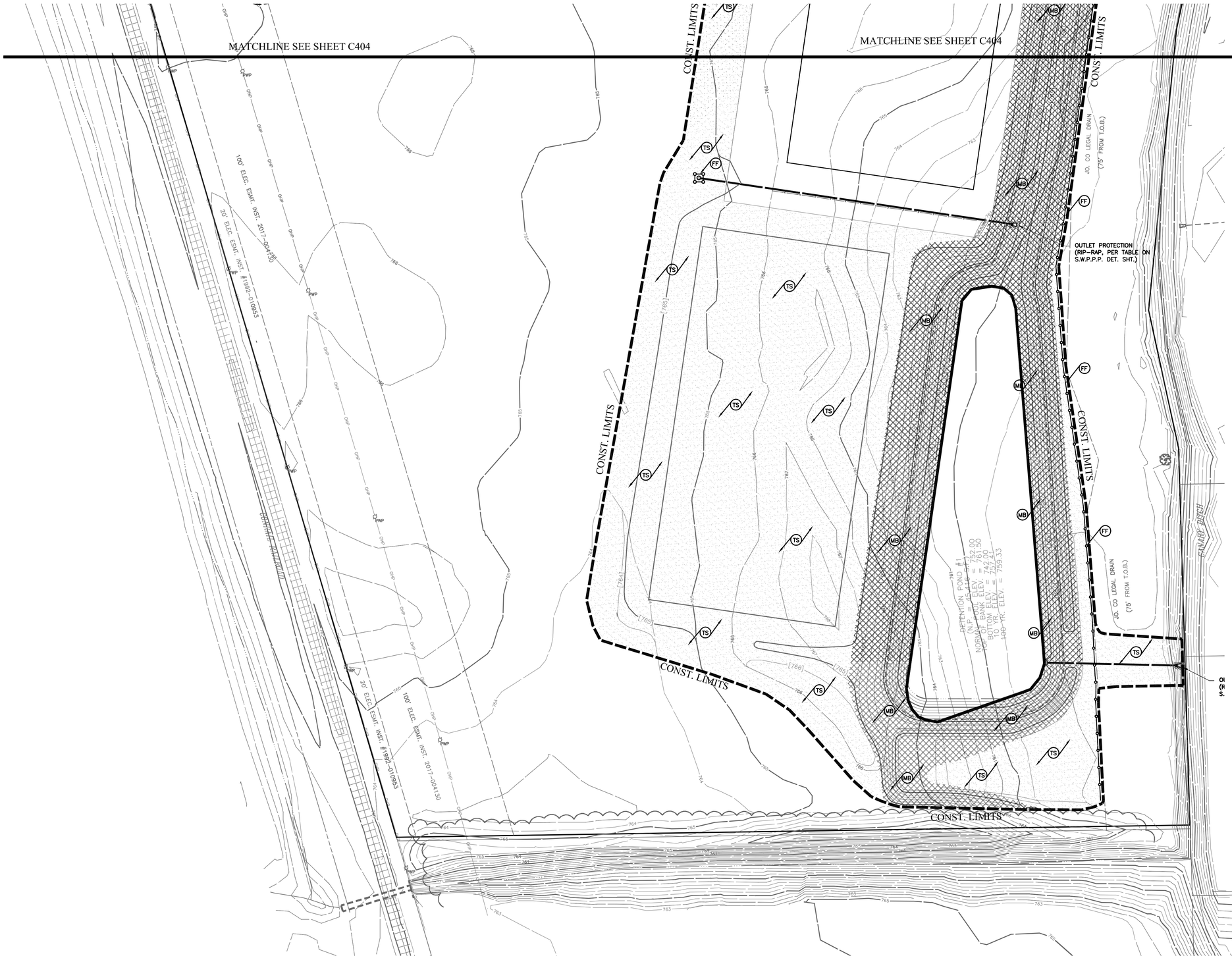

LEGEND :

- PROPOSED SANITARY SEWER W/ MANHOLE
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- EXISTING CONTOUR LINE
- (FF) FILTER FENCE
- (MB) MULCH-SEEDING WITH NORTH AMERICAN GREEN SC-150 BLANKET OR EQUIVALENT (REQUIRED ALONG ALL DISTURBED POND BANKS AND TO THE TOP OF BANKS FOR ALL SWALES)
- (DI) DROP INLET PROTECTION
- (RR) RIP-RAP OUTLET PROTECTION REQUIRED

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SYMBOL	REVISION	DATE

SCALE 1"=50' | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT: PATRIOT DEFENSE RESEARCH PARK BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE: STORM WATER POLLUTION PREVENTION PLAN (CONSTRUCTION/GRADING PHASE)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite 1 Greenwood, Indiana 46143
(317)-882-5003

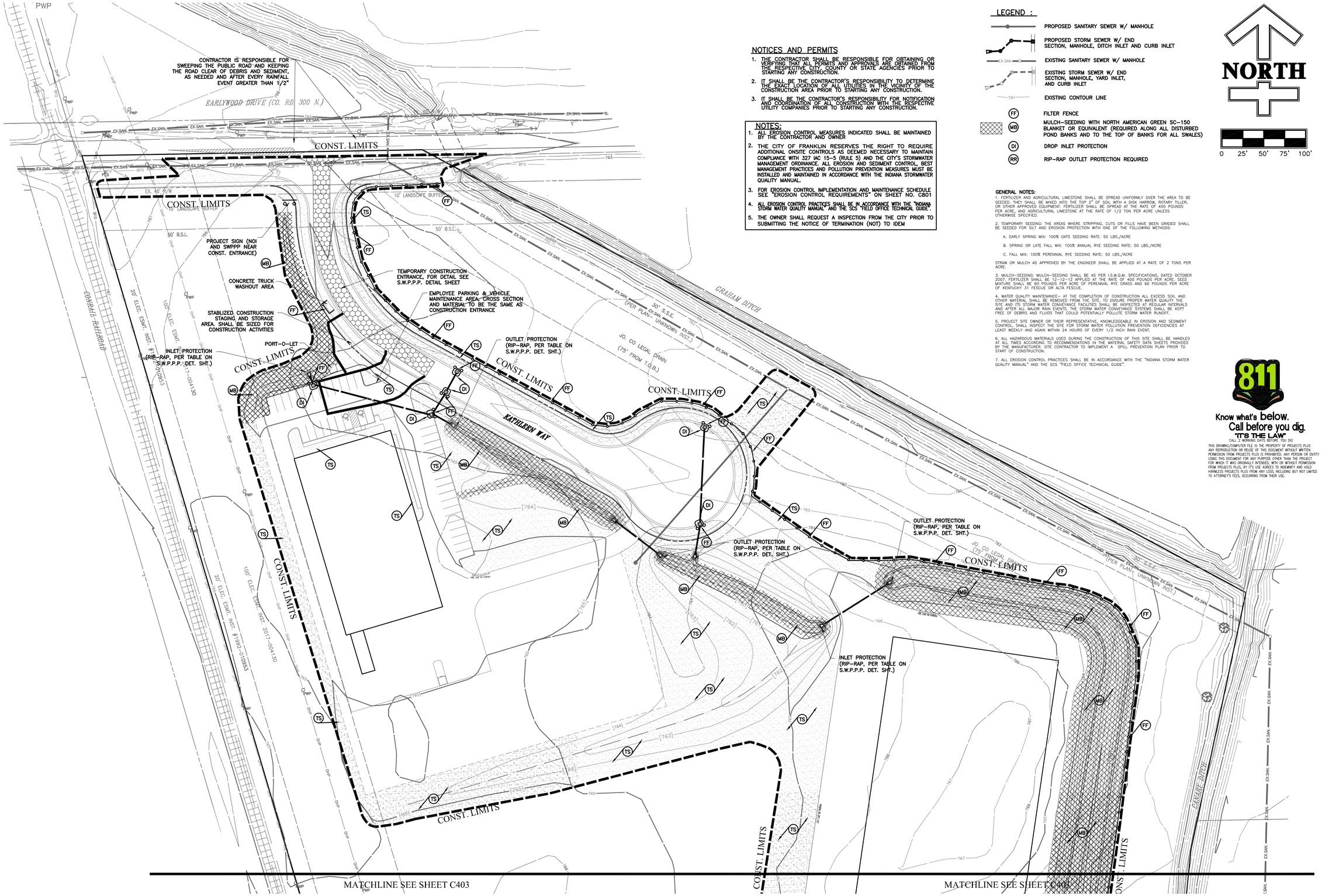
SEAL

JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
Jeffery K. Smith 9/3/21

JOB NUMBER 21008

SHEET C403

DATE SEPTEMBER 3, 2021



NOTICES AND PERMITS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING OR VERIFYING THAT ALL PERMITS AND APPROVALS ARE OBTAINED FROM THE RESPECTIVE CITY, COUNTY OR STATE AGENCIES PRIOR TO STARTING ANY CONSTRUCTION.
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NOTES:

1. ALL EROSION CONTROL MEASURES INDICATED SHALL BE MAINTAINED BY THE CONTRACTOR AND OWNER
2. THE CITY OF FRANKLIN RESERVES THE RIGHT TO REQUIRE ADDITIONAL ONSITE CONTROLS AS DEEMED NECESSARY TO MAINTAIN COMPLIANCE WITH 327 IAC 15-5 (RULE 5) AND THE CITY'S STORMWATER MANAGEMENT ORDINANCE. ALL EROSION AND SEDIMENT CONTROL, BEST MANAGEMENT PRACTICES AND POLLUTION PREVENTION MEASURES MUST BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE INDIANA STORMWATER QUALITY MANUAL.
3. FOR EROSION CONTROL IMPLEMENTATION AND MAINTENANCE SCHEDULE SEE "EROSION CONTROL REQUIREMENTS" ON SHEET NO. C801
4. ALL EROSION CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE "INDIANA STORM WATER QUALITY MANUAL" AND THE SCS "FIELD OFFICE TECHNICAL GUIDE".
5. THE OWNER SHALL REQUEST A INSPECTION FROM THE CITY PRIOR TO SUBMITTING THE NOTICE OF TERMINATION (NOT) TO IDEM

LEGEND :

- PROPOSED SANITARY SEWER W/ MANHOLE
- PROPOSED STORM SEWER W/ END SECTION, MANHOLE, DITCH INLET AND CURB INLET
- EX. SAN. — EXISTING SANITARY SEWER W/ MANHOLE
- EXISTING STORM SEWER W/ END SECTION, MANHOLE, YARD INLET, AND CURB INLET
- 791 — EXISTING CONTOUR LINE
- (FF) FILTER FENCE
- (MB) MULCH-SEEDING WITH NORTH AMERICAN GREEN SC-150 BLANKET OR EQUIVALENT (REQUIRED ALONG ALL DISTURBED POND BANKS AND TO THE TOP OF BANKS FOR ALL SWALES)
- (DI) DROP INLET PROTECTION
- (RR) RIP-RAP OUTLET PROTECTION REQUIRED

NORTH

0 25' 50' 75' 100'

GENERAL NOTES:

1. FERTILIZER AND AGRICULTURAL LIMESTONE SHALL BE SPREAD UNIFORMLY OVER THE AREA TO BE SEEDED. THEY SHALL BE MIXED INTO THE TOP 2" OF SOIL WITH A DISK HARROW, ROTARY TILLER, OR OTHER APPROVED EQUIPMENT. FERTILIZER SHALL BE SPREAD AT THE RATE OF 400 POUNDS PER ACRE, AND AGRICULTURAL LIMESTONE AT THE RATE OF 1/2 TON PER ACRE UNLESS OTHERWISE SPECIFIED.
2. TEMPORARY SEEDING: THE AREAS WHERE STRIPPING, CUTS OR FILLS HAVE BEEN GRADED SHALL BE SEEDED FOR SILT AND EROSION PROTECTION WITH ONE OF THE FOLLOWING METHODS:
   A. EARLY SPRING MIX: 100% OATS SEEDING RATE: 50 LBS./ACRE
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4. WATER QUALITY MAINTENANCE- AT THE COMPLETION OF CONSTRUCTION ALL EXCESS SOIL AND OTHER MATERIAL SHALL BE REMOVED FROM THE SITE. TO ENSURE PROPER WATER QUALITY THE SITE AND ITS STORM WATER CONVEYANCE FACILITIES SHALL BE INSPECTED AT REGULAR INTERVALS AND AFTER ALL MAJOR RAIN EVENTS. THE STORM WATER CONVEYANCE SYSTEMS SHALL BE KEPT FREE OF DEBRIS AND FLUIDS THAT COULD POTENTIALLY POLLUTE STORM WATER RUNOFF.
5. PROJECT SITE OWNER OR THEIR REPRESENTATIVE, KNOWLEDGEABLE IN EROSION AND SEDIMENT CONTROL, SHALL INSPECT THE SITE FOR STORM WATER POLLUTION PREVENTION DEFICIENCIES AT LEAST WEEKLY AND AGAIN WITHIN 24 HOURS OF EVERY 1/2 INCH RAIN EVENT.
6. ALL HAZARDOUS MATERIALS USED DURING THE CONSTRUCTION OF THIS SITE SHALL BE HANDLED AT ALL TIMES ACCORDING TO RECOMMENDATIONS IN THE MATERIAL SAFETY DATA SHEETS PROVIDED BY THE MANUFACTURER. SITE CONTRACTOR TO IMPLEMENT A SPILL PREVENTION PLAN PRIOR TO START OF CONSTRUCTION.
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PROJECTS plus
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1257 Alpert Parkway, Suite A (Greenwood), Indiana 46143
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SEAL

JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
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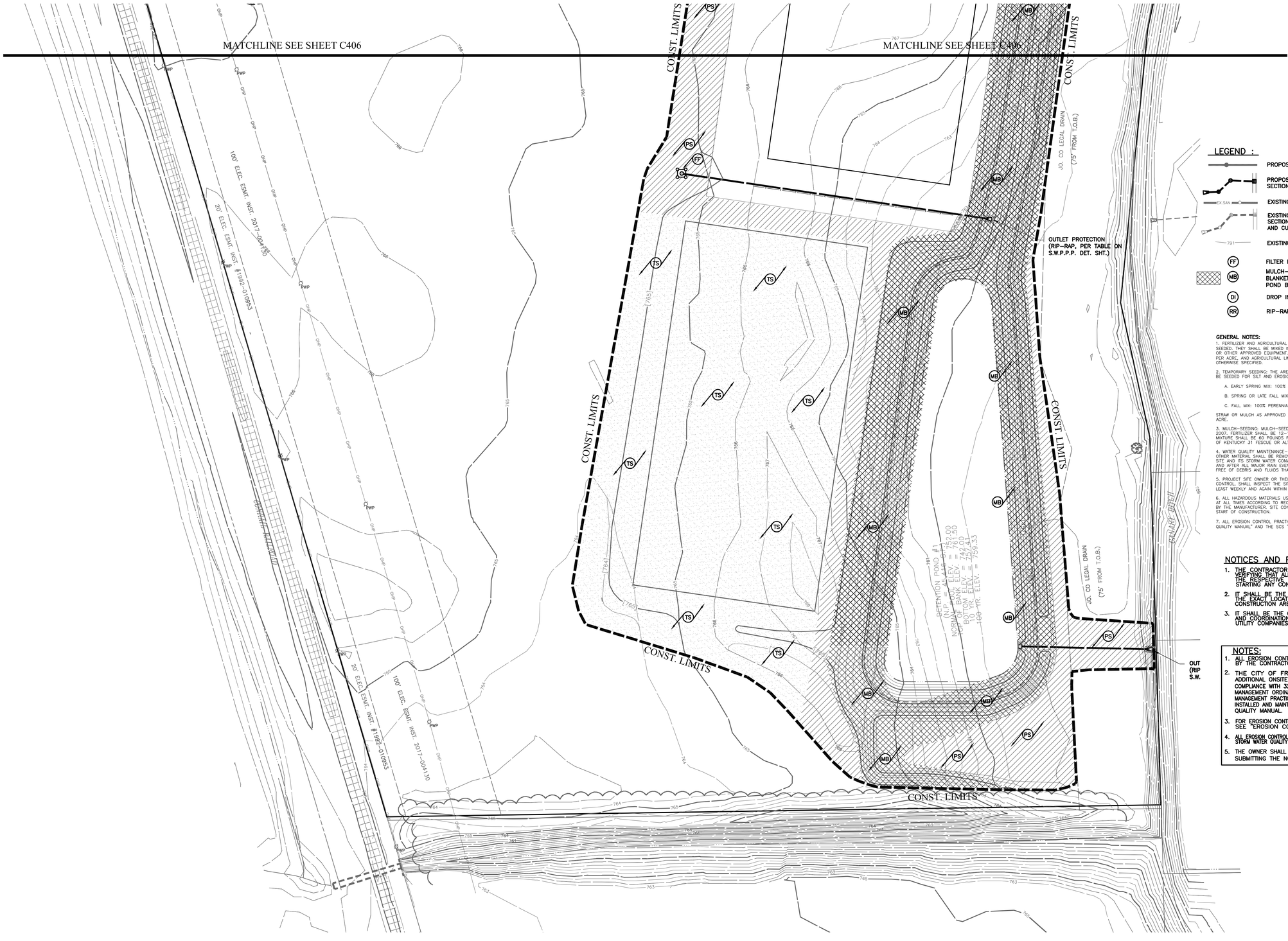

NORTH

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PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
STORM WATER POLLUTION PREVENTION PLAN (POST CONSTR.)

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway South, Greenwood, Indiana 46143
(317)-882-5003

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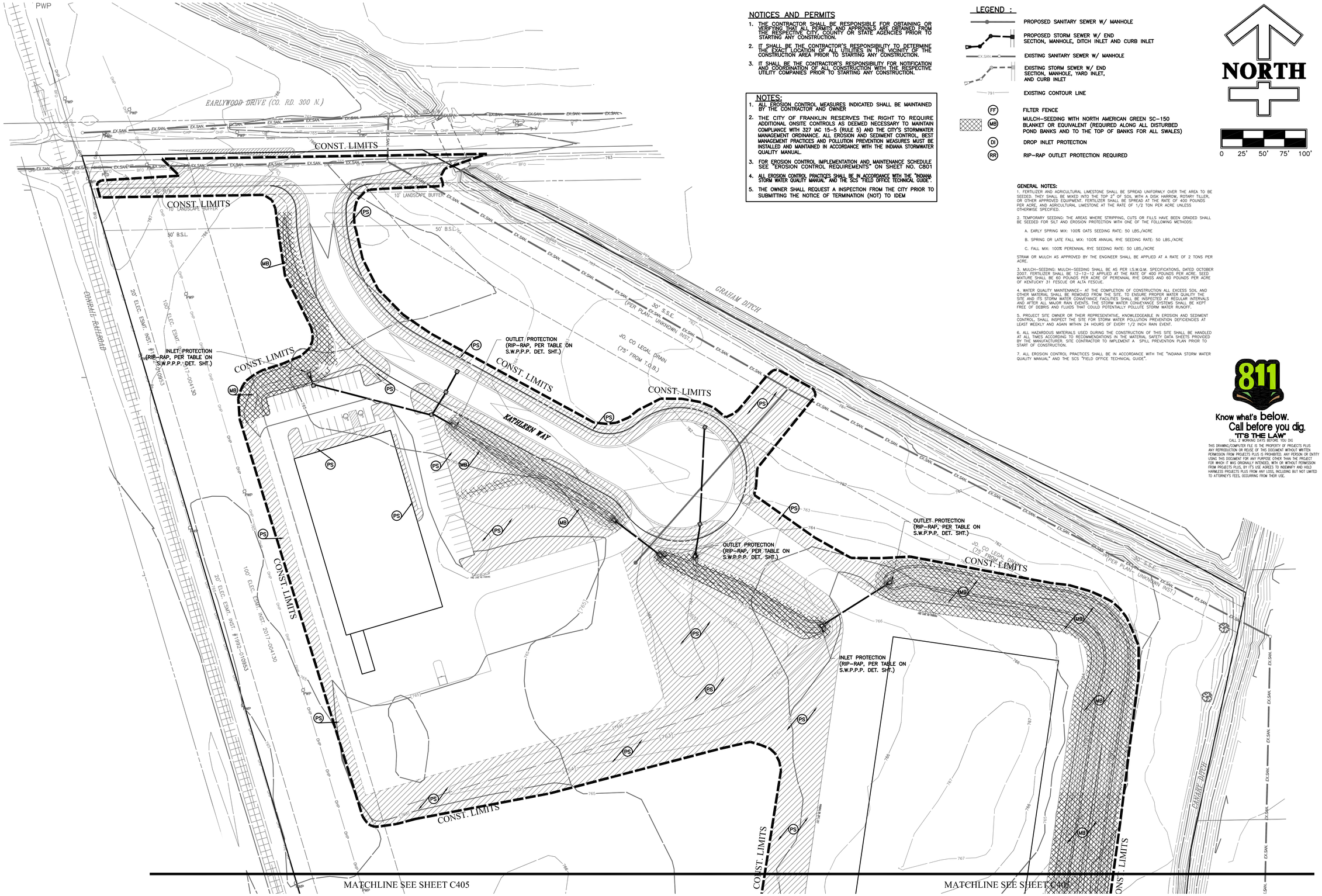

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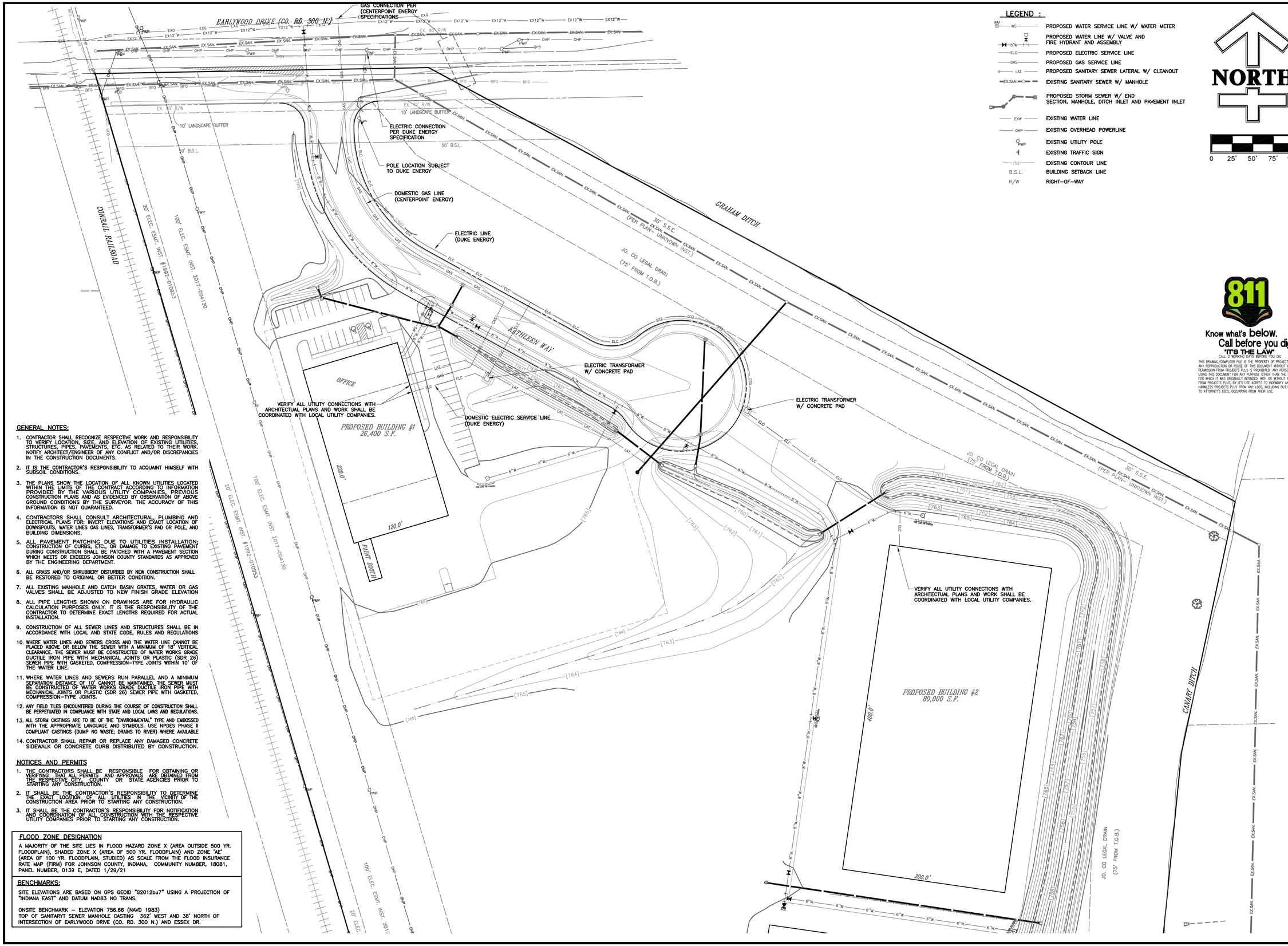

LEGEND :

- PROPOSED WATER SERVICE LINE W/ WATER METER
- PROPOSED WATER LINE W/ VALVE AND FIRE HYDRANT AND ASSEMBLY
- PROPOSED ELECTRIC SERVICE LINE
- PROPOSED GAS SERVICE LINE
- PROPOSED SANITARY SEWER LATERAL W/ CLEANOUT
- EXISTING SANITARY SEWER W/ MANHOLE
- PROPOSED STORM SEWER W/ END SECTION, MANHOLE, DITCH INLET AND PAVEMENT INLET
- EXISTING WATER LINE
- EXISTING OVERHEAD POWERLINE
- EXISTING UTILITY POLE
- EXISTING TRAFFIC SIGN
- EXISTING CONTOUR LINE
- BUILDING SETBACK LINE
- RIGHT-OF-WAY

NORTH

0 25' 50' 75' 100'

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GENERAL NOTES:

1. CONTRACTOR SHALL RECOGNIZE RESPECTIVE WORK AND RESPONSIBILITY TO VERIFY LOCATION, SIZE, AND ELEVATION OF EXISTING UTILITIES, STRUCTURES, PIPES, PAVEMENTS, ETC. AS RELATED TO THEIR WORK. NOTIFY ARCHITECT/ENGINEER OF ANY CONFLICT AND/OR DISCREPANCIES IN THE CONSTRUCTION DOCUMENTS.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACQUAINT HIMSELF WITH SUBSOIL CONDITIONS.
3. THE PLANS SHOW THE LOCATION OF ALL KNOWN UTILITIES LOCATED WITHIN THE LIMITS OF THE CONTRACT ACCORDING TO INFORMATION PROVIDED BY THE VARIOUS UTILITY COMPANIES. PREVIOUS CONSTRUCTION PLANS AND AS EVIDENCED BY OBSERVATION OF ABOVE GROUND CONDITIONS BY THE SURVEYOR. THE ACCURACY OF THIS INFORMATION IS NOT GUARANTEED.
4. CONTRACTORS SHALL CONSULT ARCHITECTURAL, PLUMBING AND ELECTRICAL PLANS FOR: INVERT ELEVATIONS AND EXACT LOCATION OF DOWNSPOUTS, WATER LINES GAS LINES, TRANSFORMER'S PAD OR POLE, AND BUILDING DIMENSIONS.
5. ALL PAVEMENT PATCHING DUE TO UTILITIES INSTALLATION, CONSTRUCTION OF CURBS, ETC., OR DAMAGE TO EXISTING PAVEMENT DURING CONSTRUCTION SHALL BE PATCHED WITH A PAVEMENT SECTION WHICH MEETS OR EXCEEDS JOHNSON COUNTY STANDARDS AS APPROVED BY THE ENGINEERING DEPARTMENT.
6. ALL GRASS AND/OR SHRUBBERY DISTURBED BY NEW CONSTRUCTION SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.
7. ALL EXISTING MANHOLE AND CATCH BASIN GRATES, WATER OR GAS VALVES SHALL BE ADJUSTED TO NEW FINISH GRADE ELEVATION
8. ALL PIPE LENGTHS SHOWN ON DRAWINGS ARE FOR HYDRAULIC CALCULATION PURPOSES ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE EXACT LENGTHS REQUIRED FOR ACTUAL INSTALLATION.
9. CONSTRUCTION OF ALL SEWER LINES AND STRUCTURES SHALL BE IN ACCORDANCE WITH LOCAL AND STATE CODE, RULES AND REGULATIONS
10. WHERE WATER LINES AND SEWERS CROSS AND THE WATER LINE CANNOT BE PLACED ABOVE OR BELOW THE SEWER WITH A MINIMUM OF 18" VERTICAL CLEARANCE. THE SEWER MUST BE CONSTRUCTED OF WATER WORKS GRADE DUCTILE IRON PIPE WITH MECHANICAL JOINTS OR PLASTIC (SDR 26) SEWER PIPE WITH GASKETED, COMPRESSION-TYPE JOINTS WITHIN 10' OF THE WATER LINE.
11. WHERE WATER LINES AND SEWERS RUN PARALLEL AND A MINIMUM SEPARATION DISTANCE OF 10' CANNOT BE MAINTAINED, THE SEWER MUST BE CONSTRUCTED OF WATER WORKS GRADE DUCTILE IRON PIPE WITH MECHANICAL JOINTS OR PLASTIC (SDR 26) SEWER PIPE WITH GASKETED, COMPRESSION-TYPE JOINTS.
12. ANY FIELD TILES ENCOUNTERED DURING THE COURSE OF CONSTRUCTION SHALL BE PERPETUATED IN COMPLIANCE WITH STATE AND LOCAL LAWS AND REGULATIONS.
13. ALL STORM CASTINGS ARE TO BE OF THE "ENVIRONMENTAL" TYPE AND EMBOSSED WITH THE APPROPRIATE LANGUAGE AND SYMBOLS. USE NPDES PHASE II COMPLIANT CASTINGS (DUMP NO WASTE; DRAINS TO RIVER) WHERE AVAILABLE
14. CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED CONCRETE SIDEWALK OR CONCRETE CURB DISTRIBUTED BY CONSTRUCTION.

NOTICES AND PERMITS

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2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ALL UTILITIES IN THE VICINITY OF THE CONSTRUCTION AREA PRIOR TO STARTING ANY CONSTRUCTION.
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FLOOD ZONE DESIGNATION

A MAJORITY OF THE SITE LIES IN FLOOD HAZARD ZONE X (AREA OUTSIDE 500 YR. FLOODPLAIN), SHADED ZONE X (AREA OF 500 YR. FLOODPLAIN) AND ZONE "AE" (AREA OF 100 YR. FLOODPLAIN, STUDIED) AS SCALE FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR JOHNSON COUNTY, INDIANA, COMMUNITY NUMBER, 18081, PANEL NUMBER, 0139 E, DATED 1/29/21

BENCHMARKS:

SITE ELEVATIONS ARE BASED ON GPS GEOID "G2012bu7" USING A PROJECTION OF "INDIANA EAST" AND DATUM NAD83 NO TRANS.

ONSITE BENCHMARK – ELEVATION 756.66 (NAVD 1983)
TOP OF SANITARYT SEWER MANHOLE CASTING 362' WEST AND 38' NORTH OF INTERSECTION OF EARLYWOOD DRIVE (CO. RD. 300 N.) AND ESSEX DR.

SYMBOL	REVISION	DATE

SCALE 1"=50' | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
UTILITY PLAN

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1125 Airport Center Drive, Greenwood, Indiana 46143
(317)-882-5003

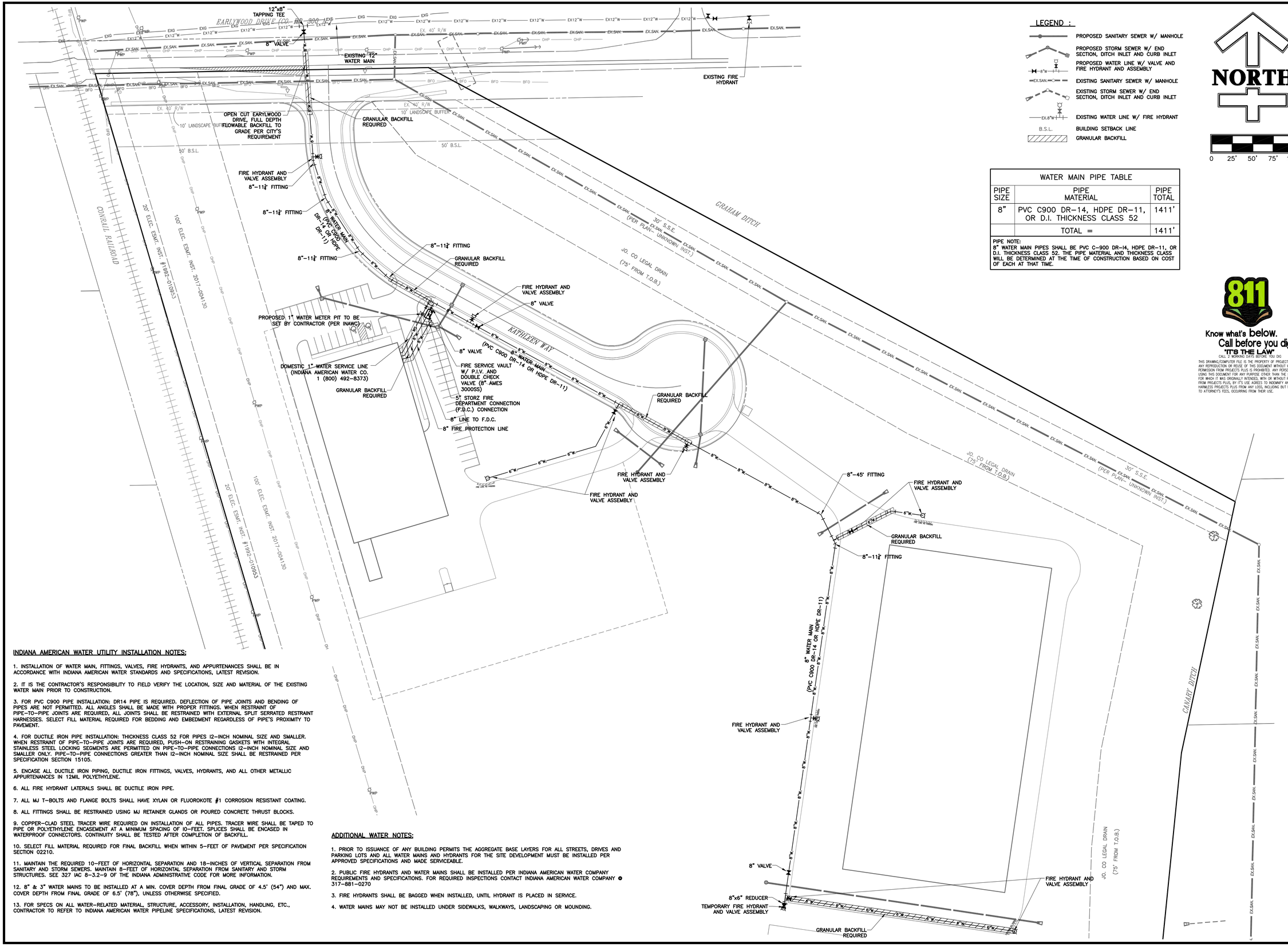
SEAL

JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
Jeffery K. Smith 9/3/21

JOB NUMBER 21008

SHEET C501

DATE SEPTEMBER 3, 2021



LEGEND :

- PROPOSED SANITARY SEWER W/ MANHOLE
- PROPOSED STORM SEWER W/ END SECTION, DITCH INLET AND CURB INLET
- PROPOSED WATER LINE W/ VALVE AND FIRE HYDRANT AND ASSEMBLY
- EXISTING SANITARY SEWER W/ MANHOLE
- EXISTING STORM SEWER W/ END SECTION, DITCH INLET AND CURB INLET
- EXISTING WATER LINE W/ FIRE HYDRANT
- B.S.L. BUILDING SETBACK LINE
- GRANULAR BACKFILL

NORTH

0 25' 50' 75' 100'

WATER MAIN PIPE TABLE		
PIPE SIZE	PIPE MATERIAL	PIPE TOTAL
8"	PVC C900 DR-14, HDPE DR-11, OR D.I. THICKNESS CLASS 52	1411'
	TOTAL =	1411'

PIPE NOTE:
8" WATER MAIN PIPES SHALL BE PVC C-900 DR-14, HDPE DR-11, OR D.I. THICKNESS CLASS 52. THE PIPE MATERIAL AND THICKNESS CLASS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BASED ON COST OF EACH AT THAT TIME.

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INDIANA AMERICAN WATER UTILITY INSTALLATION NOTES:

1. INSTALLATION OF WATER MAIN, FITTINGS, VALVES, FIRE HYDRANTS, AND APPURTENANCES SHALL BE IN ACCORDANCE WITH INDIANA AMERICAN WATER STANDARDS AND SPECIFICATIONS, LATEST REVISION.

2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION, SIZE AND MATERIAL OF THE EXISTING WATER MAIN PRIOR TO CONSTRUCTION.

3. FOR PVC C900 PIPE INSTALLATION; DR14 PIPE IS REQUIRED. DEFLECTION OF PIPE JOINTS AND BENDING OF PIPES ARE NOT PERMITTED. ALL ANGLES SHALL BE MADE WITH PROPER FITTINGS. WHEN RESTRAINT OF PIPE-TO-PIPE JOINTS ARE REQUIRED, ALL JOINTS SHALL BE RESTRAINED WITH EXTERNAL SPLIT SERRATED RESTRAINT HARNESSES. SELECT FILL MATERIAL REQUIRED FOR BEDDING AND EMBEDMENT REGARDLESS OF PIPE'S PROXIMITY TO PAVEMENT.

4. FOR DUCTILE IRON PIPE INSTALLATION: THICKNESS CLASS 52 FOR PIPES 12-INCH NOMINAL SIZE AND SMALLER. WHEN RESTRAINT OF PIPE-TO-PIPE JOINTS ARE REQUIRED, PUSH-ON RESTRAINING GASKETS WITH INTEGRAL STAINLESS STEEL LOCKING SEGMENTS ARE PERMITTED ON PIPE-TO-PIPE CONNECTIONS 12-INCH NOMINAL SIZE AND SMALLER ONLY. PIPE-TO-PIPE CONNECTIONS GREATER THAN 12-INCH NOMINAL SIZE SHALL BE RESTRAINED PER SPECIFICATION SECTION 15105.

5. ENCASE ALL DUCTILE IRON PIPING, DUCTILE IRON FITTINGS, VALVES, HYDRANTS, AND ALL OTHER METALLIC APPURTENANCES IN 12MIL POLYETHYLENE.

6. ALL FIRE HYDRANT LATERALS SHALL BE DUCTILE IRON PIPE.

7. ALL MJ T-BOLTS AND FLANGE BOLTS SHALL HAVE XYLAN OR FLUOROKOTE #1 CORROSION RESISTANT COATING.

8. ALL FITTINGS SHALL BE RESTRAINED USING MJ RETAINER GLANDS OR POURED CONCRETE THRUST BLOCKS.

9. COPPER-CLAD STEEL TRACER WIRE REQUIRED ON INSTALLATION OF ALL PIPES. TRACER WIRE SHALL BE TAPED TO PIPE OR POLYETHYLENE ENCASEMENT AT A MINIMUM SPACING OF 10-FEET. SPLICES SHALL BE ENCASED IN WATERPROOF CONNECTORS. CONTINUITY SHALL BE TESTED AFTER COMPLETION OF BACKFILL.

10. SELECT FILL MATERIAL REQUIRED FOR FINAL BACKFILL WHEN WITHIN 5-FEET OF PAVEMENT PER SPECIFICATION SECTION 02210.

11. MAINTAIN THE REQUIRED 10-FEET OF HORIZONTAL SEPARATION AND 18-INCHES OF VERTICAL SEPARATION FROM SANITARY AND STORM SEWERS. MAINTAIN 8-FEET OF HORIZONTAL SEPARATION FROM SANITARY AND STORM STRUCTURES. SEE 327 IAC 8-3.2-9 OF THE INDIANA ADMINISTRATIVE CODE FOR MORE INFORMATION.

12. 8" & 3" WATER MAINS TO BE INSTALLED AT A MIN. COVER DEPTH FROM FINAL GRADE OF 4.5' (54") AND MAX. COVER DEPTH FROM FINAL GRADE OF 6.5' (78"), UNLESS OTHERWISE SPECIFIED.

13. FOR SPECS ON ALL WATER-RELATED MATERIAL, STRUCTURE, ACCESSORY, INSTALLATION, HANDLING, ETC., CONTRACTOR TO REFER TO INDIANA AMERICAN WATER PIPELINE SPECIFICATIONS, LATEST REVISION.

ADDITIONAL WATER NOTES:

1. PRIOR TO ISSUANCE OF ANY BUILDING PERMITS THE AGGREGATE BASE LAYERS FOR ALL STREETS, DRIVES AND PARKING LOTS AND ALL WATER MAINS AND HYDRANTS FOR THE SITE DEVELOPMENT MUST BE INSTALLED PER APPROVED SPECIFICATIONS AND MADE SERVICEABLE.

2. PUBLIC FIRE HYDRANTS AND WATER MAINS SHALL BE INSTALLED PER INDIANA AMERICAN WATER COMPANY REQUIREMENTS AND SPECIFICATIONS. FOR REQUIRED INSPECTIONS CONTACT INDIANA AMERICAN WATER COMPANY ● 317-881-0270

3. FIRE HYDRANTS SHALL BE BAGGED WHEN INSTALLED, UNTIL HYDRANT IS PLACED IN SERVICE.

4. WATER MAINS MAY NOT BE INSTALLED UNDER SIDEWALKS, WALKWAYS, LANDSCAPING OR MOUNDING.

DATE	REVISION	SYMBOL

SCALE 1"=50' | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
WATER DISTRIBUTION PLAN

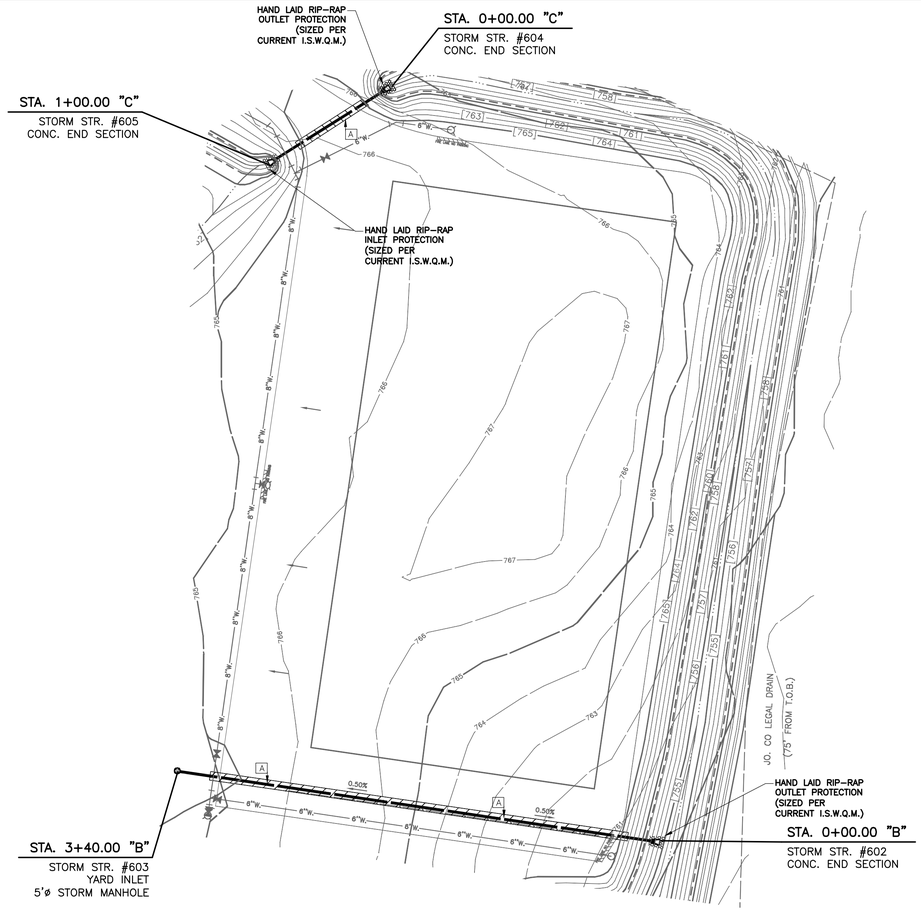
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Alpert Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

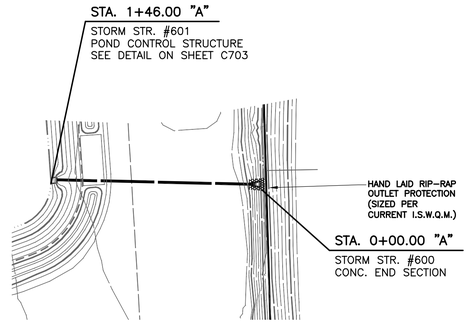
SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER 21008

SHEET C502

DATE SEPTEMBER 3, 2021





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A MAJORITY OF THE SITE LIES IN FLOOD HAZARD ZONE X (AREA OUTSIDE 500 YR. FLOODPLAIN), SHADED ZONE X (AREA OF 500 YR. FLOODPLAIN) AND ZONE 'AE' (AREA OF 100 YR. FLOODPLAIN, STUDIED) AS SCALE FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR JOHNSON COUNTY, INDIANA, COMMUNITY NUMBER, 18081, PANEL NUMBER, 0139 E, DATED 1/29/21

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STORM CASTING NOTE:

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NORTH

0 25' 50' 75' 100'

STORM SEWER NOTES

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2. ALL CASTINGS SHALL HAVE STANDARD "ENVIRONMENTALLY FRIENDLY LOGOS" EMBOSSED INTO THE INLET.
3. ALL UTILITY CROSSINGS OR TRENCHES WITHIN (5) FEET OF THE EDGE OF PAVEMENT SHALL BE BACKFILLED TO THE SUBGRADE WITH GRANULAR MATERIAL (THE UPPERMOST 48" OF GRANULAR MATERIAL SHALL BE #53 STONE) AND COMPACTED IN SIX INCH LIFTS.
4. ALL EXISTING FIELD TILES DISTURBED DURING CONSTRUCTION SHALL BE RE-DIRECTED TO THE NEAREST STORM STRUCTURE AND SHOWN ON AS-BUILT DRAWINGS.

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FOR EASEMENT LOCATIONS AND DESIGNATIONS SEE FINAL RECORD PLAT AND RESTRICTIONS

LEGEND :

27	LOT NUMBER
	PROPOSED SANITARY SEWER W/ MANHOLE
	PROPOSED STORM SEWER W/ END SECTION, DITCH INLET AND CURB INLET
8"W	PROPOSED WATER LINE W/ VALVE AND FIRE HYDRANT AND ASSEMBLY
752	EXISTING CONTOUR LINE
S.S.,D.&U.E.	SANITARY SEWER, DRAINAGE AND UTILITY EASEMENT
D.&U.E.	DRAINAGE AND UTILITY EASEMENT
B.S.L.	BUILDING SETBACK LINE
	GRANULAR BACKFILL
A	GRANULAR BACKFILL REQUIRED

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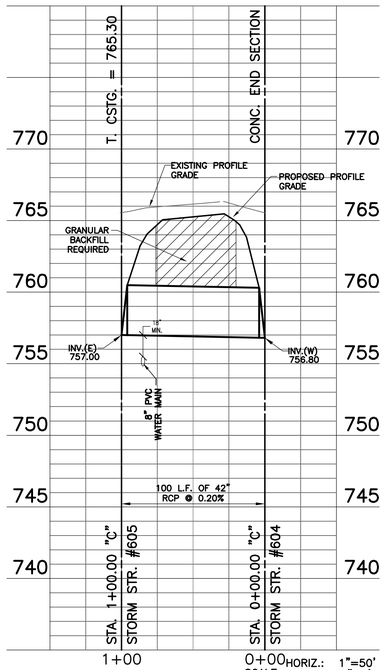
LINE 'C'



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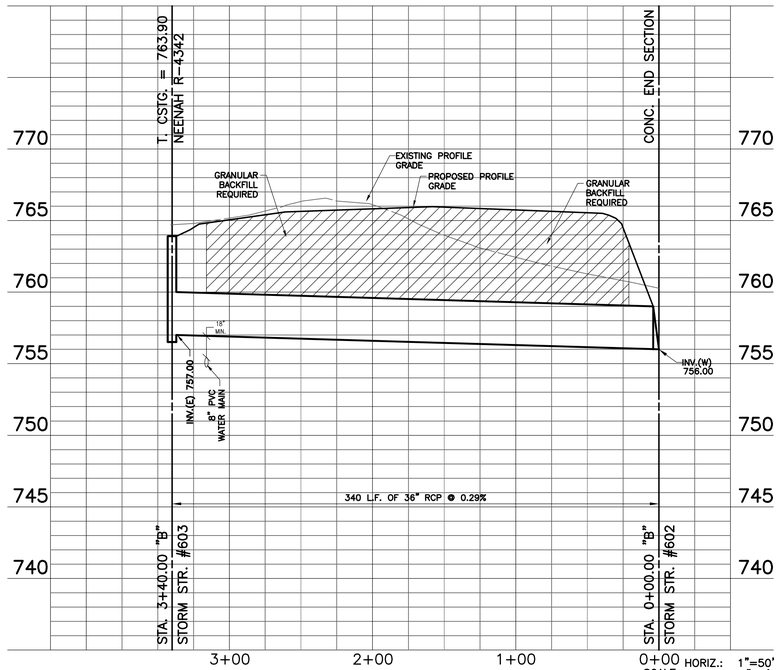

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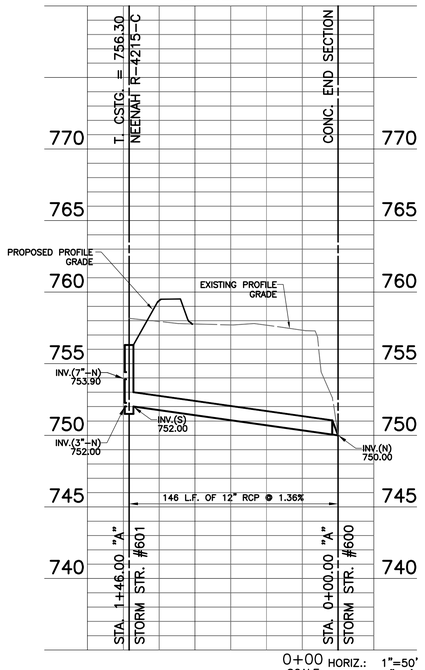


DATE	REVISION	SYMBOL

SCALE: AS SHOWN | DRAWN: JPH | CHECKED: JKS | CERTIFIED: JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
STORM SEWER PLAN AND PROFILES

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Allport Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

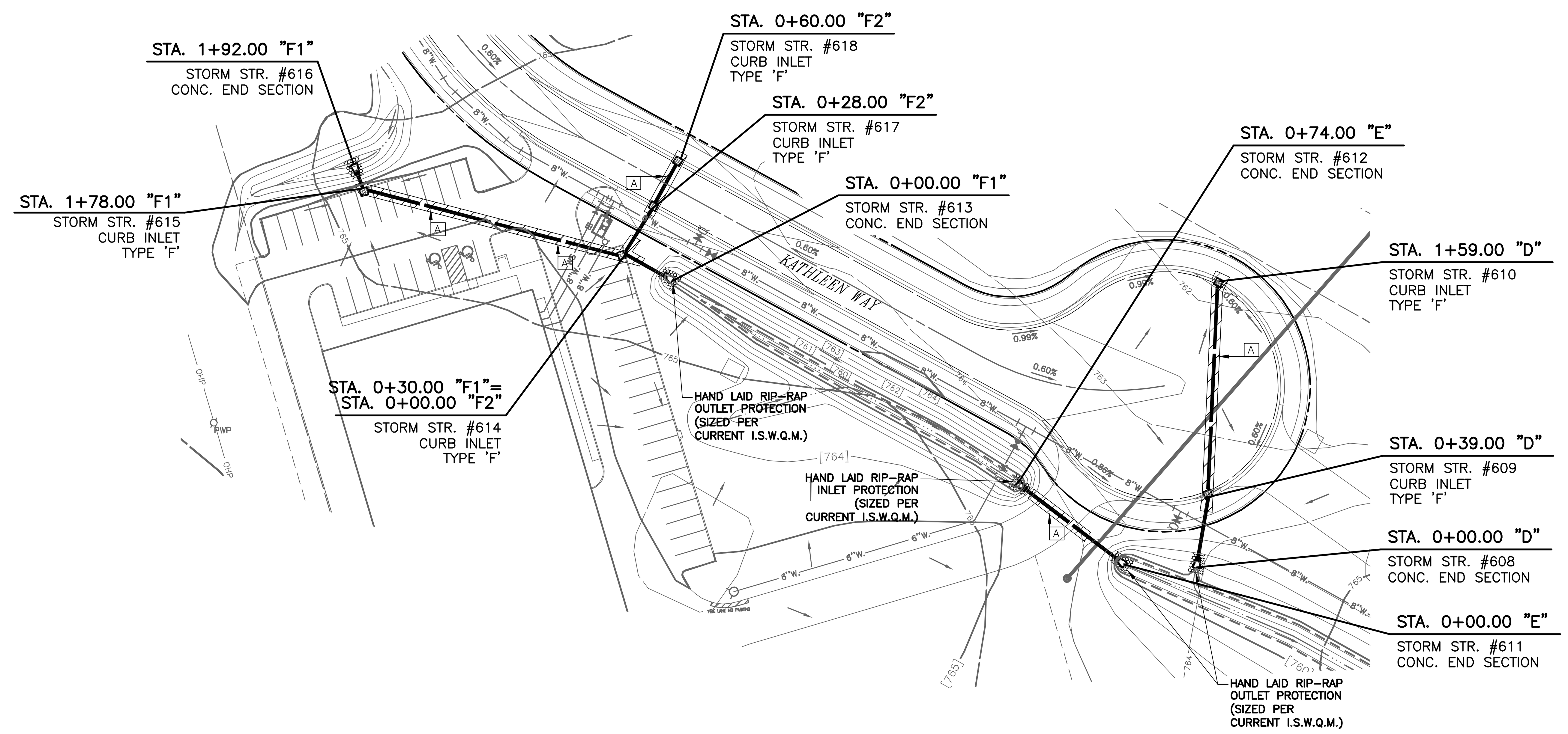
SEAL

JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C503

DATE
SEPTEMBER 3, 2021



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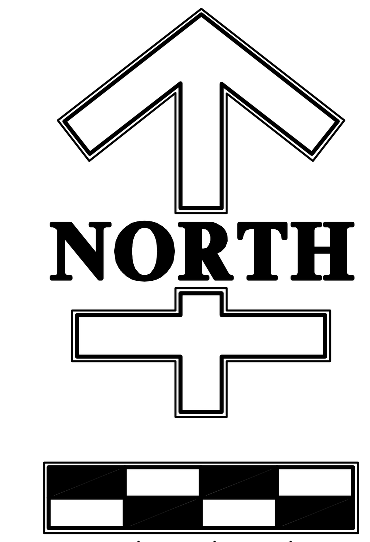

LEGEND :

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	PROPOSED STORM SEWER W/ END SECTION, DITCH INLET AND CURB INLET
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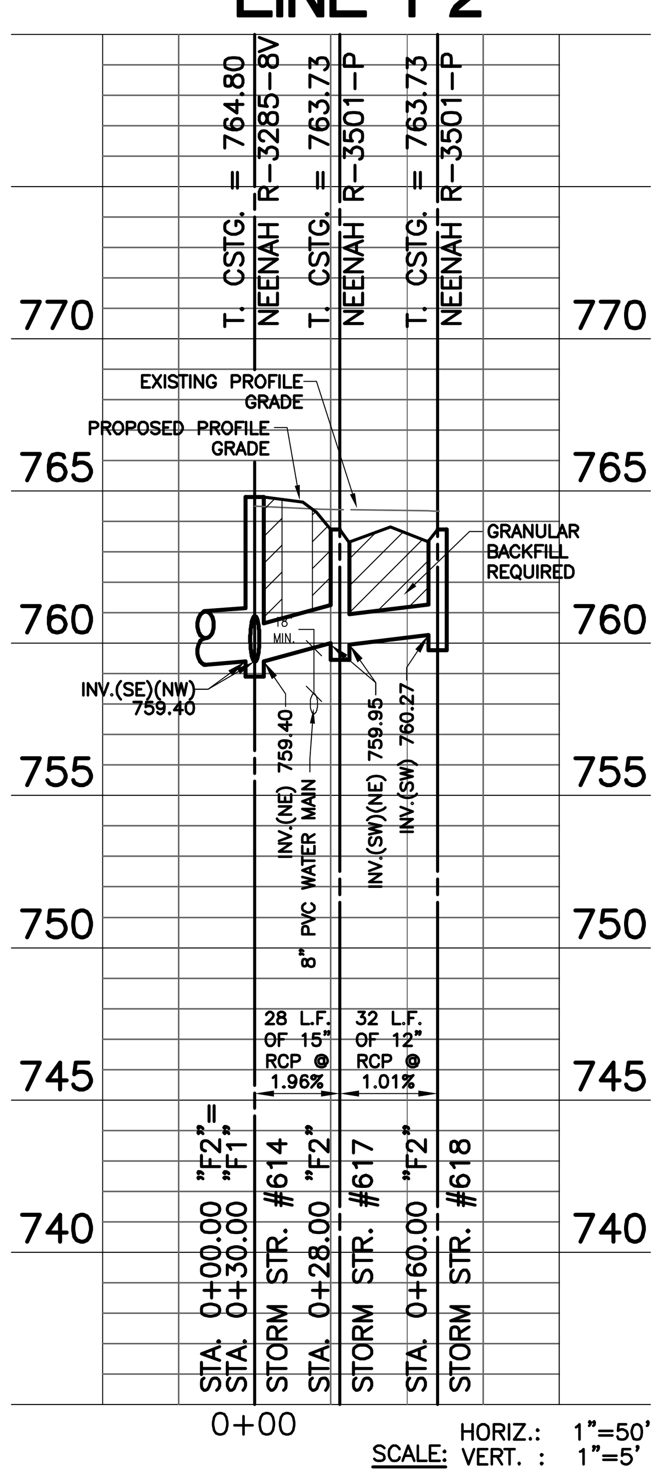
LINE 'F2'



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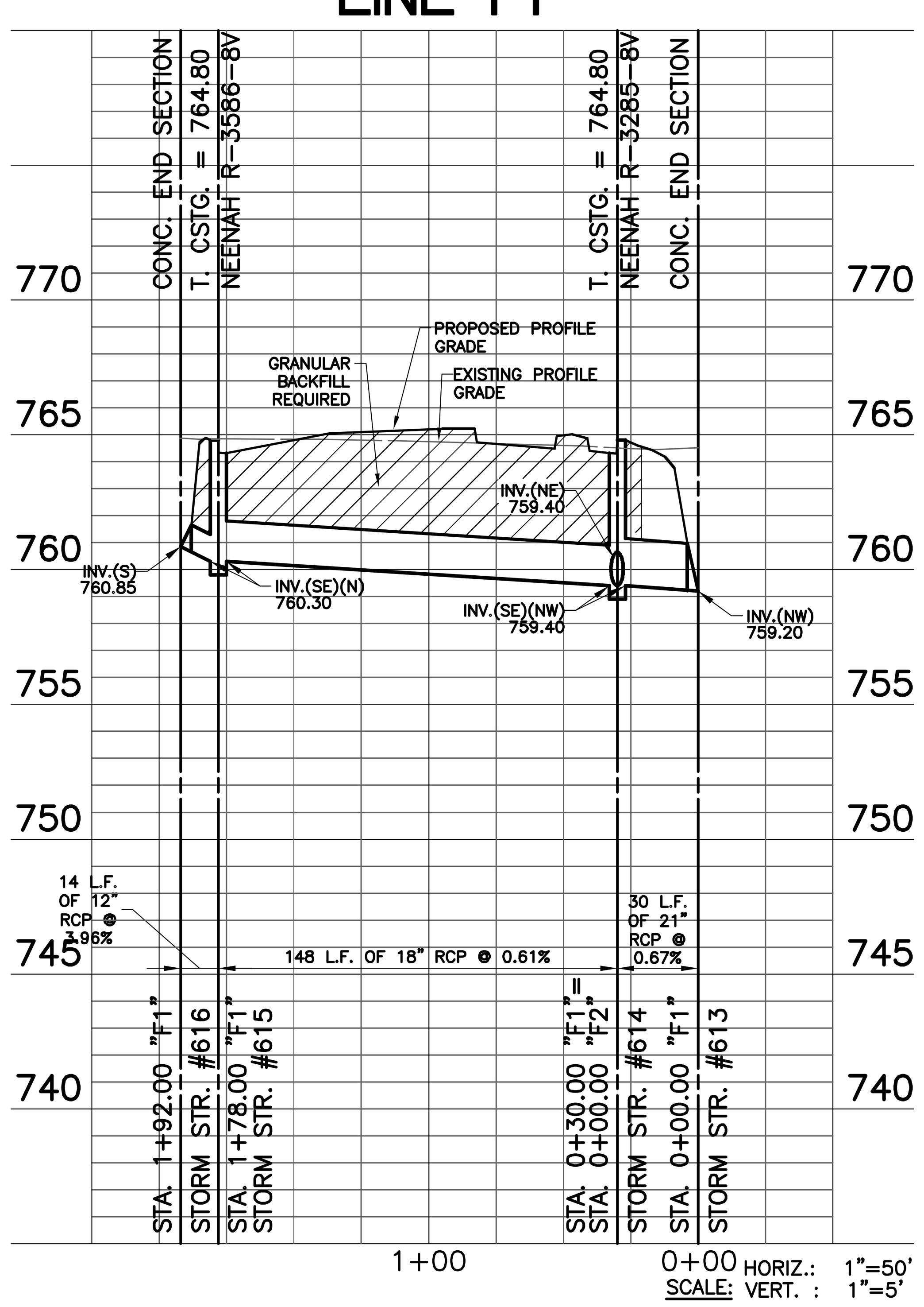

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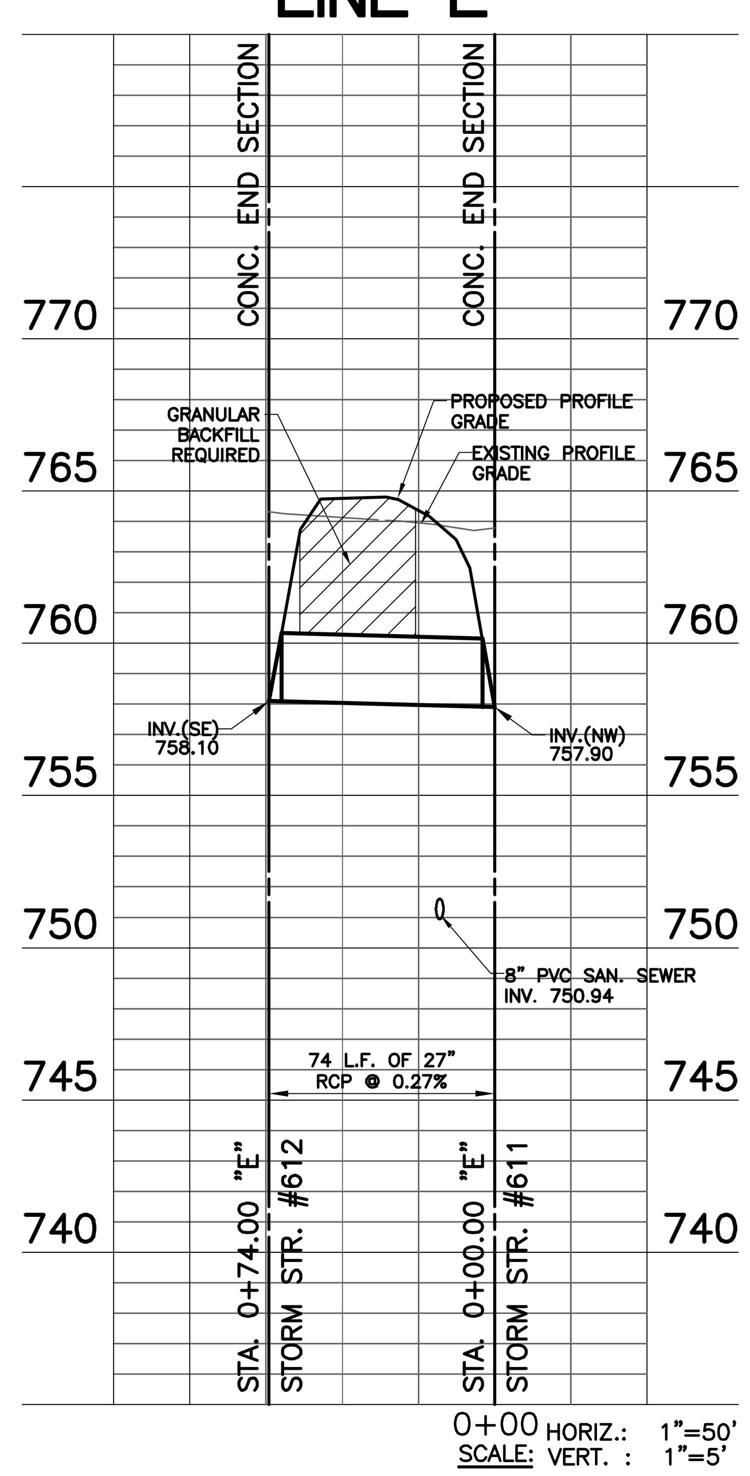

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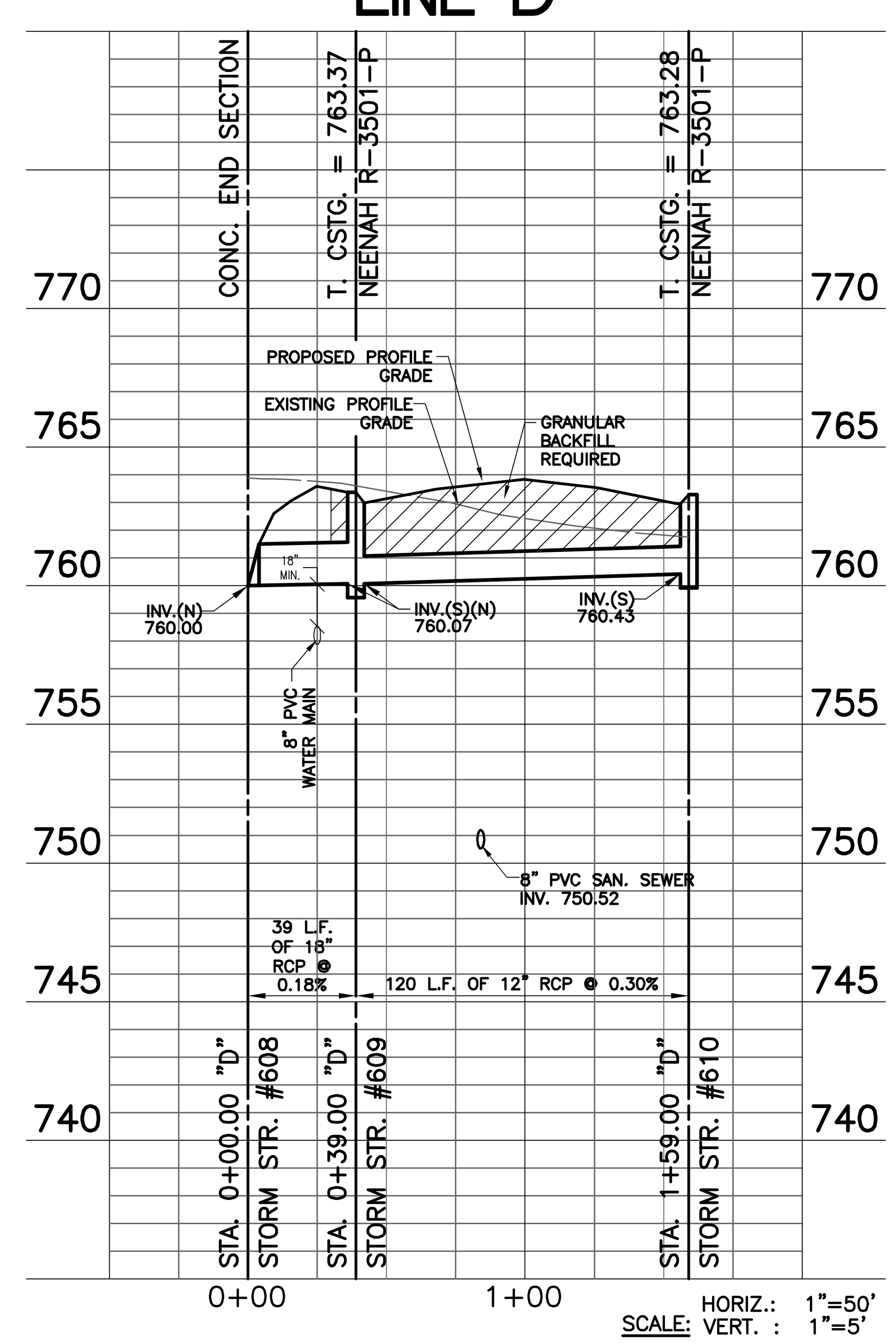


DATE	REVISION	SYMBOL

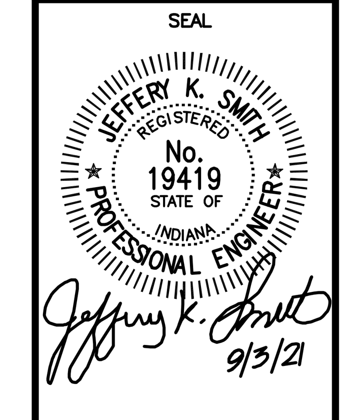
SCALE: AS SHOWN | DRAWN: JPH | CHECKED: JKS | CERTIFIED: JKS

PROJECT: PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE: STORM SEWER PLAN AND PROFILES

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A – Greenwood, Indiana 46143
(317)-882-5003

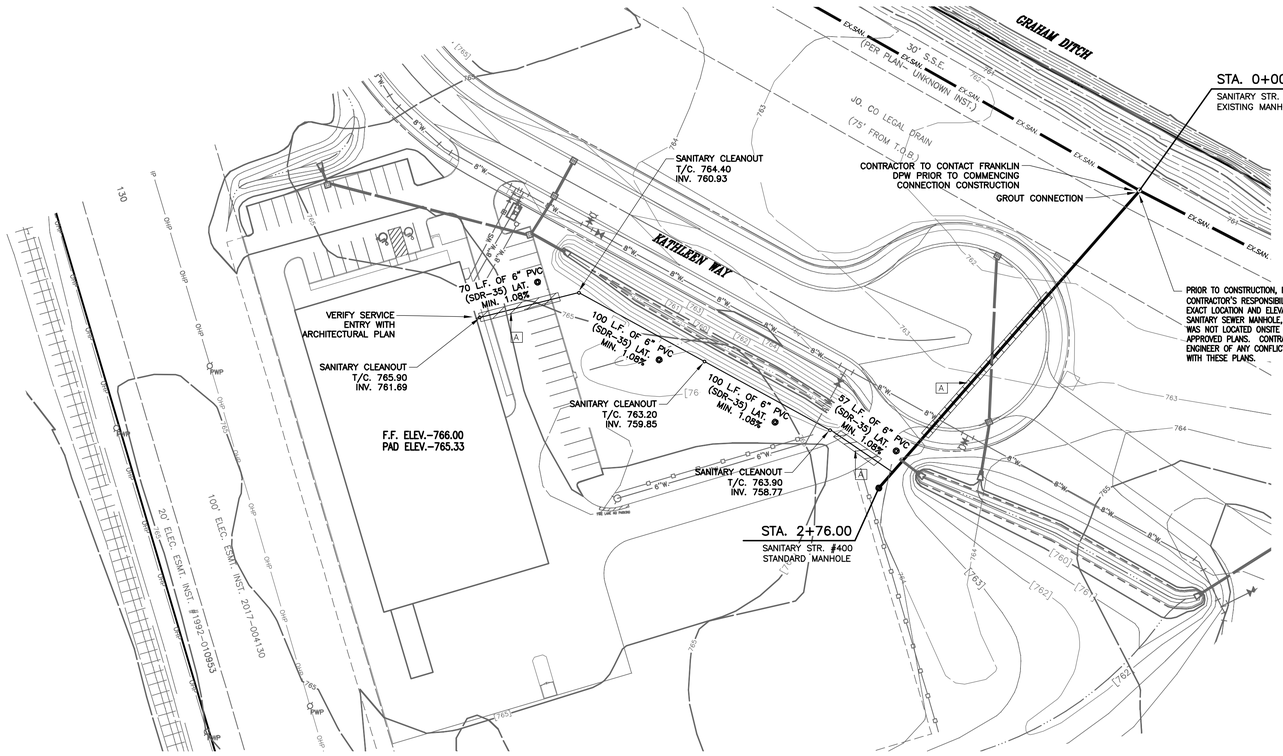
SEAL



JOB NUMBER
21008

SHEET
C504

DATE
SEPTEMBER 3, 2021



GENERAL NOTES

1. NONE OF THE SANITARY SEWER IN THIS PROJECT ARE TO BE CONSTRUCTED UNTIL THE LEITER OF APPROVAL FROM THE DEPARTMENT OF ENVIRONMENTAL MANAGEMENT HAS BEEN RECEIVED BY THE ENGINEER AND A COPY FORWARDED TO THE CONTRACTOR.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING OR VERIFYING THAT ALL PERMITS AND APPROVALS ARE OBTAINED FROM THE RESPECTIVE CITY, COUNTY OR STATE AGENCIES PRIOR TO STARTING ANY CONSTRUCTION.
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5. IF ALTERNATE STRUCTURES ARE TO BE SUPPLIED, SHOP DRAWINGS MUST BE SUBMITTED TO THE ENGINEER AND APPROVED IN WRITING PRIOR TO INSTALLATION.
6. SANITARY LATERALS SHALL BE LAID AT A GRADE NOT LESS THAN 1.00% TO A DEPTH AT THE PROPERTY LINE OF NOT LESS THAN 6.00 FEET
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE AVAILABLE TO THE BUILDER, DIMENSIONS TO LOCATE SEWER STUBS AND/OR ANY UTILITY CONDUIT STUBS INSTALLED.
8. ALL UTILITY CROSSINGS OR TRENCHES WITHIN (5) FEET OF THE EDGE OF OF PAVEMENT SHALL BE BACKFILLED TO THE SUBGRADE WITH GRANULAR MATERIAL (THE UPPERMOST 48" OF GRANULAR MATERIAL SHALL BE #53 STONE) AND COMPACTED IN SIX INCH LIFTS.
9. CONTRACTOR SHALL MAINTAIN A MINIMUM OF 18" VERTICAL BETWEEN WATER MAINS, SANITARY & STORM SEWERS, ALSO A MINIMUM OF 10' HORIZONTAL SEPARATION BETWEEN WATER MAINS & SANITARY SEWER

NORTH

0 25' 50' 75' 100'

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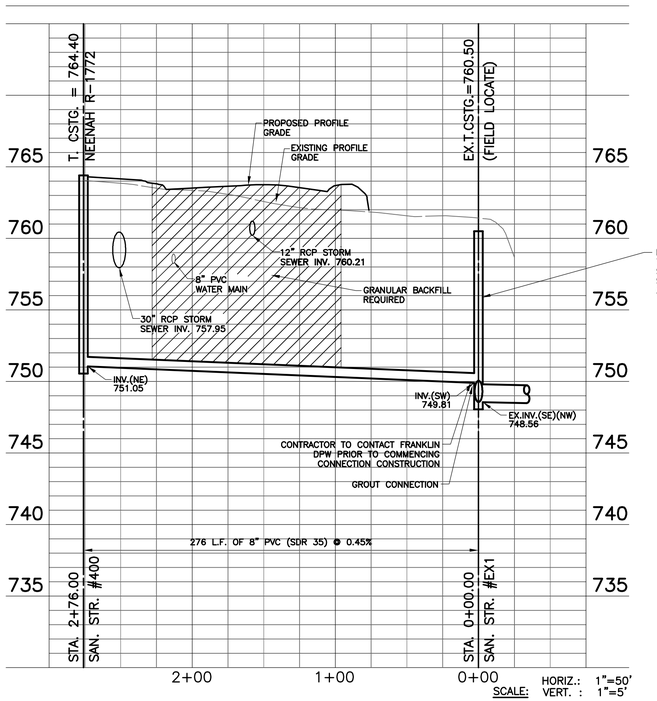
- PROPOSED SANITARY SEWER W/ MANHOLE
- PROPOSED STORM SEWER W/ END SECTION, DITCH INLET AND CURB INLET
- PROPOSED WATER LINE W/ VALVE AND FIRE HYDRANT AND ASSEMBLY
- PROPOSED 6" SERVICE LATERAL
- 65 L.F. OF 6"-LAT. 20S FROM STR. #414 — PROPOSED LATERAL DATA
- 752 — EXISTING CONTOUR LINE
- GRANULAR BACKFILL
- A — GRANULAR BACKFILL REQUIRED



PRIOR TO CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT LOCATION AND ELEVATION OF THE EXISTING SANITARY SEWER MANHOLE, AS THIS STRUCTURE WAS NOT LOCATED ONSITE AND IS SHOWN PER APPROVED PLANS. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY CONFLICTS OR DISCREPANCIES WITH THESE PLANS.

SCALE: HORIZ.: 1"=50'
VERT. : 1"=5'

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SYMBOL	REVISION	DATE

SCALE: AS SHOWN | DRAWN: JPH | CHECKED: JKS | CERTIFIED: JKS

PROJECT: PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE: SANITARY SEWER PLAN AND PROFILE

PROJECTS plus
GREENWOOD SURVETING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

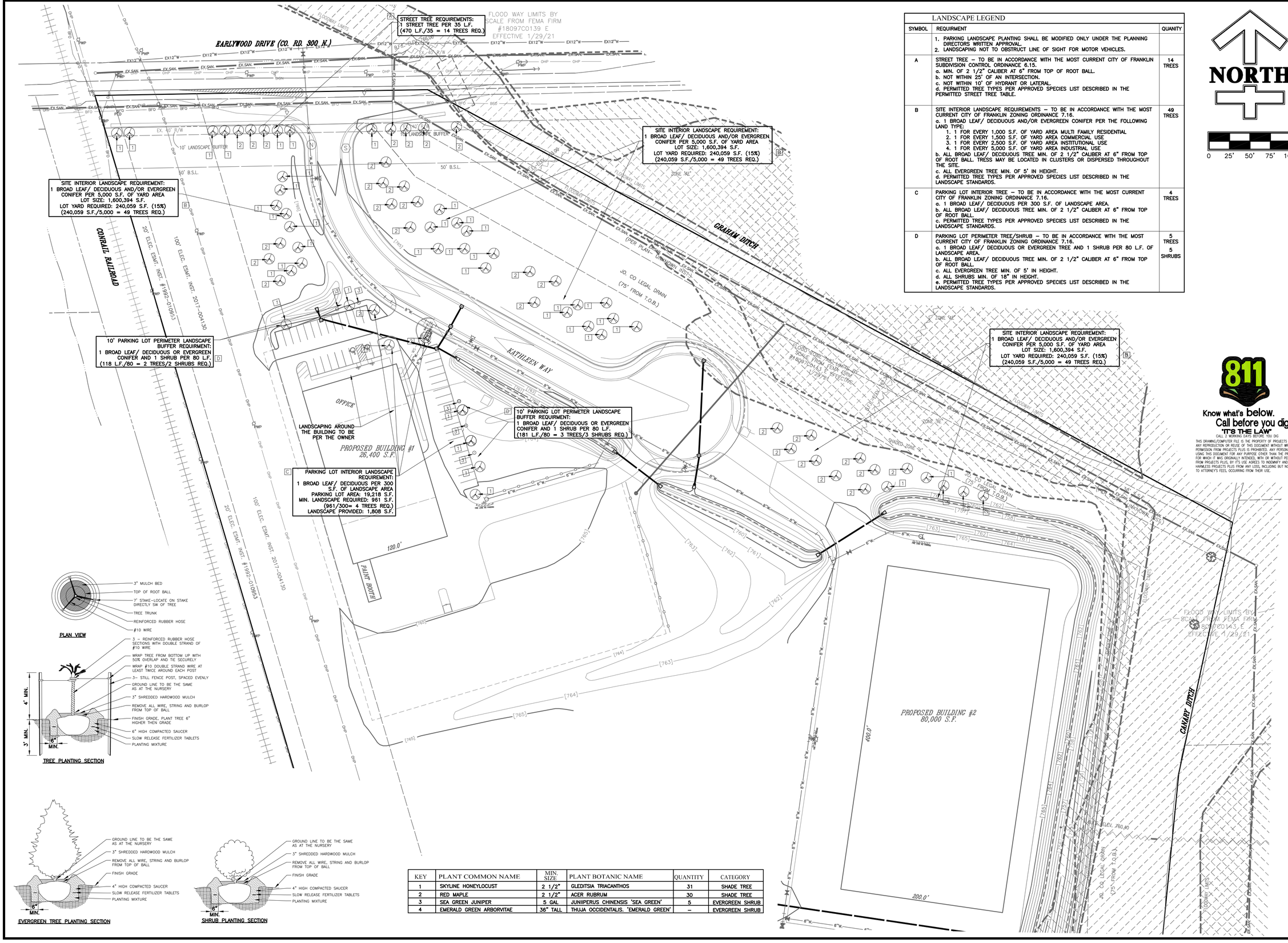
SEAL

JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER: 21008

SHEET: C505

DATE: SEPTEMBER 3, 2021



LANDSCAPE LEGEND

SYMBOL	REQUIRMENT	QUANITY
	1. PARKING LANDSCAPE PLANTING SHALL BE MODIFIED ONLY UNDER THE PLANNING DIRECTORS WRITTEN APPROVAL. 2. LANDSCAPING NOT TO OBSTRUCT LINE OF SIGHT FOR MOTOR VEHICLES.	
A	STREET TREE – TO BE IN ACCORDANCE WITH THE MOST CURRENT CITY OF FRANKLIN SUBDIVISION CONTROL ORDINANCE 6.15. a. MIN. OF 2 1/2" CALIBER AT 6" FROM TOP OF ROOT BALL. b. NOT WITHIN 25' OF AN INTERSECTION. c. NOT WITHIN 10' OF HYDRANT OR LATERAL. d. PERMITTED TREE TYPES PER APPROVED SPECIES LIST DESCRIBED IN THE PERMITTED STREET TREE TABLE.	14 TREES
B	SITE INTERIOR LANDSCAPE REQUIREMENTS – TO BE IN ACCORDANCE WITH THE MOST CURRENT CITY OF FRANKLIN ZONING ORDINANCE 7.16. a. 1 BROAD LEAF/ DECIDUOUS AND/OR EVERGREEN CONIFER PER THE FOLLOWING LAND TYPE: 1. 1 FOR EVERY 1,000 S.F. OF YARD AREA MULTI FAMILY RESIDENTIAL 2. 1 FOR EVERY 1,500 S.F. OF YARD AREA COMMERCIAL USE 3. 1 FOR EVERY 2,500 S.F. OF YARD AREA INSTITUTIONAL USE 4. 1 FOR EVERY 5,000 S.F. OF YARD AREA INDUSTRIAL USE b. ALL BROAD LEAF/ DECIDUOUS TREE MIN. OF 2 1/2" CALIBER AT 6" FROM TOP OF ROOT BALL. TRESS MAY BE LOCATED IN CLUSTERS OR DISPERSED THROUGHOUT THE SITE. c. ALL EVERGREEN TREE MIN. OF 5' IN HEIGHT. d. PERMITTED TREE TYPES PER APPROVED SPECIES LIST DESCRIBED IN THE LANDSCAPE STANDARDS.	49 TREES
C	PARKING LOT INTERIOR TREE – TO BE IN ACCORDANCE WITH THE MOST CURRENT CITY OF FRANKLIN ZONING ORDINANCE 7.16. a. 1 BROAD LEAF/ DECIDUOUS PER 300 S.F. OF LANDSCAPE AREA. b. ALL BROAD LEAF/ DECIDUOUS TREE MIN. OF 2 1/2" CALIBER AT 6" FROM TOP OF ROOT BALL. c. PERMITTED TREE TYPES PER APPROVED SPECIES LIST DESCRIBED IN THE LANDSCAPE STANDARDS.	4 TREES
D	PARKING LOT PERIMETER TREE/SHRUB – TO BE IN ACCORDANCE WITH THE MOST CURRENT CITY OF FRANKLIN ZONING ORDINANCE 7.16. a. 1 BROAD LEAF/ DECIDUOUS OR EVERGREEN TREE AND 1 SHRUB PER 80 L.F. OF LANDSCAPE AREA. b. ALL BROAD LEAF/ DECIDUOUS TREE MIN. OF 2 1/2" CALIBER AT 6" FROM TOP OF ROOT BALL. c. ALL EVERGREEN TREE MIN. OF 5' IN HEIGHT. d. ALL SHRUBS MIN. OF 18" IN HEIGHT. e. PERMITTED TREE TYPES PER APPROVED SPECIES LIST DESCRIBED IN THE LANDSCAPE STANDARDS.	5 TREES 5 SHRUBS

NORTH

0 25' 50' 75' 100'

PLAN VIEW

TREE PLANTING SECTION

EVERGREEN TREE PLANTING SECTION

SHRUB PLANTING SECTION

KEY	PLANT COMMON NAME	MIN. SIZE	PLANT BOTANIC NAME	QUANTITY	CATEGORY
1	SKYLINE HONEYLOCUST	2 1/2"	GLEDITSIA TRIACANTHOS	31	SHADE TREE
2	RED MAPLE	2 1/2"	ACER RUBRUM	30	SHADE TREE
3	SEA GREEN JUNIPER	5 GAL	JUNIIPERUS CHINENSIS 'SEA GREEN'	5	EVERGREEN SHRUB
4	EMERALD GREEN ARBORVITAE	36" TALL	THUJA OCCIDENTALIS. 'EMERALD GREEN'	–	EVERGREEN SHRUB

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TITLE
LANDSCAPE PLAN

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A, Greenwood, Indiana 46143
(317)–882–5003

SEAL

JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
Jeffery K. Smith 9/3/21

JOB NUMBER 21008

SHEET C601

DATE SEPTEMBER 3, 2021

TYPICAL SECTION, CURB & GUTTER STREETS

GRANULAR BACKFILL WILL NOT BE REQUIRED WHEN ENTIRE TRENCH ARE IS 5'-0" OR MORE BEYOND THE BACK EDGE OF THE EXISTING CURB.

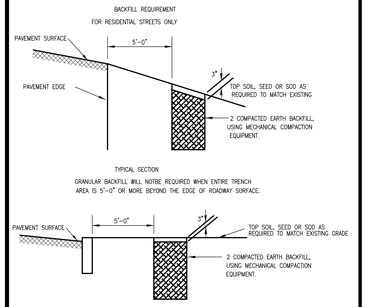
ALL EXCAVATED AREA UNDER PAVED ROADWAYS, OR WITHIN 5'-0" OF THE PAVEMENT EDGE, OR BACK OF CURB SHALL BE BACKFILLED WITH GRANULAR MATERIAL TO WITHIN 3 INCHES OF THE TOP OF THE TRENCH (OR TO FINAL GRADE UNDER PAVEMENT). THIS GRANULAR BACKFILL SHALL BE PLACED IN 12 INCH LIFTS AND EACH LAYER SHALL BE COMPACTED BY MECHANICAL MEANS TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY.

HOWEVER, GRANULAR BACKFILL MAY BE PLACED IN 24 INCH LIFTS PROVIDED EACH LAYER IS COMPACTED BY A COMBINATION OF SATURATION AND MECHANICAL MEANS TO AT LEAST 95% OF ITS MAXIMUM DENSITY.

IF ANY PORTION OF THE TRENCH AREA IS NEARER THAN 5'-0" FROM THE EDGE OF THE ROADWAY SURFACE, THE ENTIRE TRENCH MUST BE BACKFILLED WITH GRANULAR MATERIAL.

2 THIS COMPACTION PROCEDURE IS NOT REQUIRED FOR UNIMPROVED AREA OR WHERE PROBLEMS RELATED TO TRENCH SETTLEMENT IS NEGLIGIBLE.

ALL SEEDING AND SODDING SHALL CONFORM TO THE LATEST EDITION OF THE ISHC STANDARD SPECIFICATIONS.



STANDARD FULL DEPTH
GRANULAR BACKFILL DETAILS

GENERAL NOTES FOR CURB AND GUTTER

WHERE SIDEWALK IS CONSTRUCTED IMMEDIATELY ADJACENT TO CURB, THE SURFACE OF THE SIDEWALK SHALL BE CONSTRUCTED 1/2" HIGHER THAN THE TOP OF THE CURB.

TRANSVERSE JOINTS SHALL BE CUT WITH A JOINTER HAVING A RADIUS OF 1/4" OF SPACING AS INDICATED OR DIRECTED.

COST OF TRANSVERSE PREFORMED JOINT FILLER TO BE INCLUDED IN CONTRACT PRICE FOR "CONCRETE SIDEWALK".

* COMPACTED SUBGRADE – THE UPPER 6 INCHES SHALL COMPLY WITH THE DENSITY REQUIREMENTS OF THE CONTRACT IMMEDIATELY PRIOR TO PLACING THE MATERIAL THEREON. ALL SOFT YIELDING OR OTHER UNSUITABLE MATERIAL, WHICH CANNOT BE COMPACTED SATISFACTORILY, SHALL BE REMOVED. ALL ROCK ENCOUNTERED SHALL BE REMOVED OR BROKEN OFF AT LEAST SIX (6) INCHES BELOW THE SUBGRADE SURFACE. ANY HOLES OR DEPRESSIONS RESULTING FROM THE REMOVAL OF THE UNSUITABLE MATERIAL, SHALL BE FILLED WITH SATISFACTORY MATERIAL AND COMPACTED TO CONFORM WITH THE SURROUNDING SUBGRADE SURFACE.

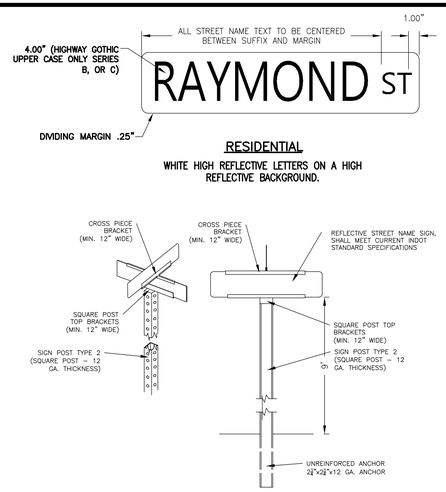
** WHERE SIDEWALK IS CONSTRUCTED ADJACENT TO CURB, THE SPACE BEHIND THE NEW CURB SHALL BE FILLED WITH GRANULAR MATERIAL TO THE REQUIRED ELEVATION AND COMPACTED IN LAYERS NOT TO EXCEED 4".

*** WHERE SIDEWALK IS NOT CONSTRUCTED ADJACENT TO THE CURB, THE SPACE BEHIND THE CURB SHALL BE FILLED WITH SUITABLE MATERIAL TO THE REQUIRED ELEVATION AND COMPACTED IN LAYERS NOT TO EXCEED 4"

**** WHEN BUILT IN CONJUNCTION WITH CONCRETE PAVEMENT EXPANSION AND CONTRACTION JOINTS SHOULD BE PLACED AT THE SAME LOCATIONS AS IN THE PAVEMENT SLAB. THE CURB AND GUTTER SHOULD BE TIED TO THE PAVEMENT BY 1/2" ROUND DEFORMED BARS AT ABOUT 3 FOOT INTERVALS. IF NO CONCRETE PAVEMENT IS BEING BUILT, AT THE TIME, THE CURB IS CONSTRUCTED, EXPANSION JOINTS SHOULD BE PLACED AT THE ENDS OF ALL RETURNS AND AT INTERVALS NOT TO EXCEED 100 FEET. CONTRACTION JOINTS SHOULD BE INSTALLED AT 20 FOOT SPACING.

GENERAL NOTES:

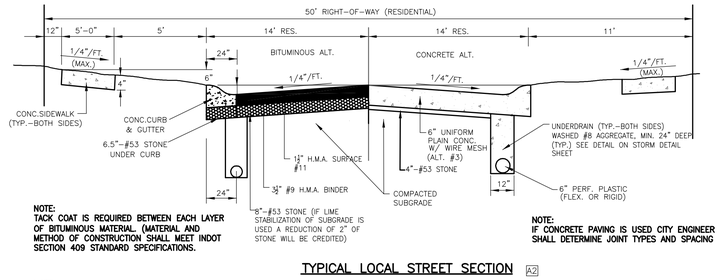
1. WHEN THE INTERSECTION IS NOT SIGNALIZED, SIDEWALK RAMPS SHALL BE PLACED ON THE RESIDENTIAL STREET SIDE ONLY. WHEN INTERSECTION IS SIGNALIZED, SIDEWALK RAMPS SHALL BE PLACED ON BOTH RESIDENTIAL STREET AND ARTERIAL STREET SIDE.
2. CURB CUT RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS OR AS DIRECTED.
3. RAMPS SHALL BE PROVIDED AT ALL CORNERS OF STREET INTERSECTIONS WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT WALK LOCATIONS IN MID-BLOCK IN THE VICINITIES OF HOSPITALS, MEDICAL CENTERS, AND ATHLETIC STADIUMS.
4. SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COURSE BROOMING, TRANSVERSE TO THE SLOPE OF THE RAMP.
5. SIDEWALKS SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.
6. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON ALL RAMPS WITH NO BREAKS IN GRADE.
7. DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS;EXCEPT WHERE EXISTING DRAINAGE STRUCTURES ARE BEING UTILIZED IN THE NEW CONSTRUCTION, LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF DRAINAGE STRUCTURE.
8. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP.
9. EXPANSION JOINT FOR THE RAMP SHALL BE A MAXIMUM 1/2" WIDE. THE TOP OF THE JOINT FILLER FOR RAMP TYPES SHALL BE FLUSH WITH ADJACENT CONCRETE.
10. CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
11. SLOPE OF RAMP MAY BE MODIFIED WHEN FIELD CONDITIONS WARRANT AND WHEN APPROVED BY THE DEPARTMENT OF TRANSPORTATION.



RESIDENTIAL

WHITE HIGH REFLECTIVE LETTERS ON A HIGH REFLECTIVE BACKGROUND.

STREET NAME SIGN DETAIL F4

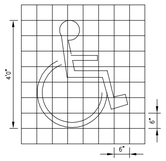


NOTE:
TACK COAT IS REQUIRED BETWEEN EACH LAYER OF BITUMINOUS MATERIAL. (MATERIAL AND METHOD OF CONSTRUCTION SHALL MEET INDOT SECTION 409 STANDARD SPECIFICATIONS.

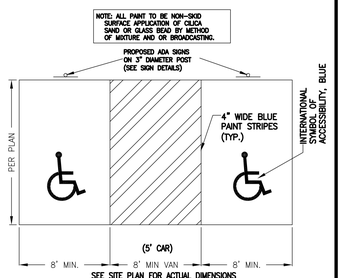
NOTE:
ALL SUBGRADE AND STONE BASE MUST PASS A PROOF ROLL TEST AS REQUIRED BY CITY ENGINEER

NOTE:
IF CONCRETE PAVING IS USED CITY ENGINEER SHALL DETERMINE JOINT TYPES AND SPACING

TYPICAL LOCAL STREET SECTION A2



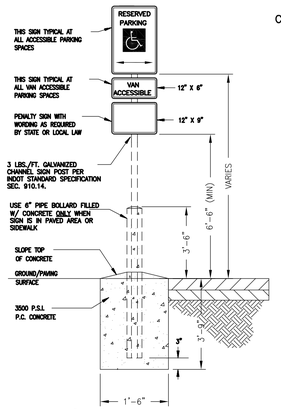
HANDICAP PAVEMENT MARKING DETAIL D2



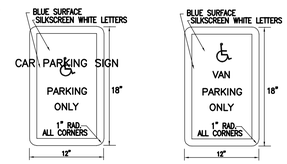
SEE SITE PLAN FOR ACTUAL DIMENSIONS
NOTE: ONE IN EIGHT ACCESSIBLE SPACES SHALL BE VAN ACCESSIBLE

"ADA" PARKING SPACES D2

ALL SIGNS SHALL COMPLY WITH U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES"LOCAL CODES AND AS SPECIFIED. MOUNT SIGNS TO POST IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.



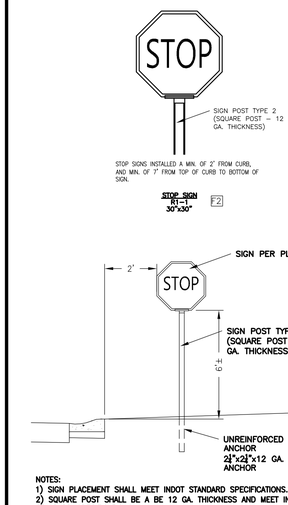
'ADA' SIGN BOLLARD MOUNT DETAIL F1



VAN PARKING SIGN

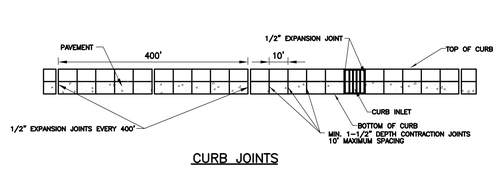
NOTE: 12"X18" 18 GAUGE HOT DIP GALVANIZED NON-REFLECTIVE SIGN WITH 12' POST DRIVEN 4 FEET INTO GROUND. POST SHALL BE 12' LONG GALVANIZED 2 1/2" OD STEEL POSTS PAINTED GREEN TO MATCH LIGHT POLES SET BOTTOM OF SIGN 7' ABOVE GRADE

"ADA" SIGNS F1

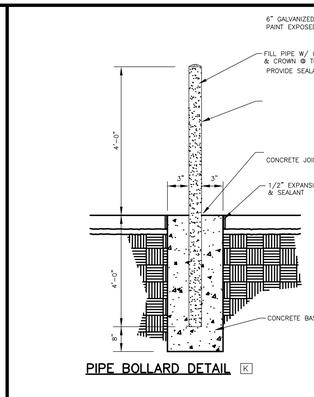


NOTES:
1) SIGN PLACEMENT SHALL MEET INDOT STANDARD SPECIFICATIONS.
2) SQUARE POST SHALL BE A BE 12 GA. THICKNESS AND MEET INDOT STANDARD SPECIFICATIONS
3) ALL SIGN SIZES, SHAPES, COLORS, AND MATERIAL SHALL MEET THE INDIANA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

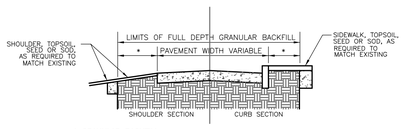
TYPICAL SIGN LOCATION DETAIL F2



CURB JOINTS



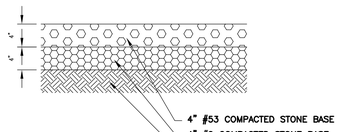
PIPE BOLLARD DETAIL K



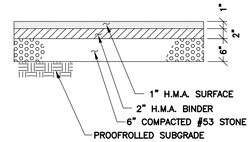
* GRANULAR BACKFILL:
ALL CUTS MADE IN OR UNDER ANY ROAD SURFACE SHALL BE BACKFILLED WITH GRANULAR MATERIAL. WHERE A CUT EITHER TRANSVERSES OR PARALLELS THE ROAD SURFACE, GRANULAR BACKFILL SHALL BE PLACED IN THAT PORTION OF THE CUT LOCATED WITHIN THREE (3) FEET OF THE ROAD SURFACE OR WITHIN A DISTANCE OF EQUAL TO ONE-HALF (1/2) THE DEPTH OF THE CUT, WHICH-EVER IS GREATER.

MATERIAL PLACEMENT AND COMPACTION SHALL CONFORM TO GENERAL ORDINANCE NO. 24, 1985, SECTION 28-32B.

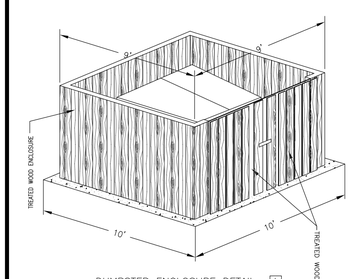
CURB JOINT DETAIL



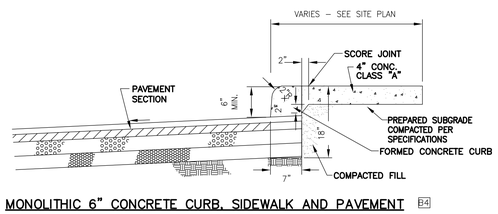
GRAVEL PARKING SECTION A3



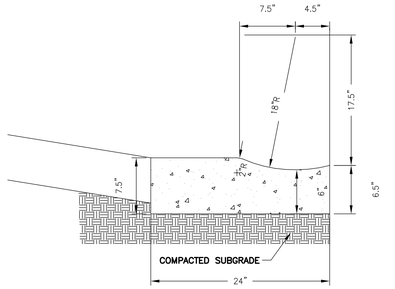
INTERIOR ASPHALT PAVEMENT DETAIL A1



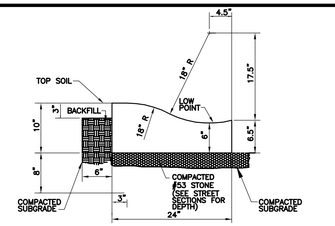
DUMPSTER ENCLOSURE DETAIL 1



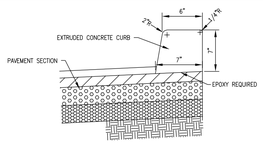
MONOLITHIC 6" CONCRETE CURB, SIDEWALK AND PAVEMENT B4



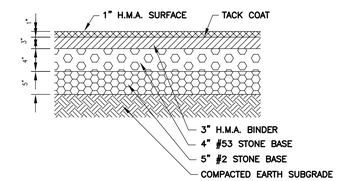
CONCRETE DEPRESSED CURB AND GUTTER B3



CONCRETE ROLL CURB AND GUTTER B2



EXTRUDED CONCRETE CURB B1



INTERIOR HEAVY DUTY PAVEMENT SECTION A4

SYMBOL	REVISION	DATE

SCALE 1"=50'
DRAWN JPH
CHECKED JKS
CERTIFIED JKS

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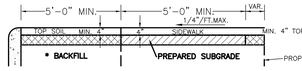
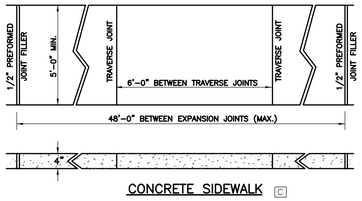


* THE SPACE BEHIND THE CURB SHALL BE FILLED WITH SUITABLE MATERIAL TO THE REQUIRED ELEVATION AND COMPACTED IN LAYERS NOT TO EXCEED 6" IN DEPTH.

SUBGRADE UNDER ALL CURB, SIDEWALK, AND DRIVES SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 207.02 OF THE STANDARD SPECIFICATIONS.

TYPICAL SIDEWALK SECTION [C]



CONCRETE SIDEWALK [C]

DATE	REVISION	SYMBOL

SCALE 1"=50' | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
SITE DETAILS

PROJECTS *plus*
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite 1, Greenwood, Indiana 46143
(317)–882–5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C702

DATE
SEPTEMBER 3, 2021

NOTES:

1. The bottom edge of the ramp and top of curb shall be flush with the edge of adjacent pavement and gutter line.
2. The turning space shall have a minimum clear dimension of 5 ft x 4 ft. Where a flared side is used, a minimum turning space of 5 ft is required, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope. Where a lateral perpendicular curb ramp is used, a constrained turning space shall have a minimum clear dimension of 5 ft x 5 ft.
3. Curb ramp surface shall be coarse broomed transverse to the running slope.
4. See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
5. See Standard Drawing E 604-SWCR-02, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
6. See Standard Drawing E 604-CCU-01 for sidewalk expansion joint details.

LEGEND:
- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface
- Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION
PERPENDICULAR CURB RAMP COMPONENT DETAILS
SEPTEMBER 2018
STANDARD DRAWING NO. E 604-SWCR-04

No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 03/29/18 DATE
CHIEF ENGINEER — /s/ John Lucke — 04/27/18 DATE

E

NOTES:

1. A detectable warning surface shall be placed at each street, highway, or railroad crossing. See Standard Drawing E 604-SWCR-13 for detectable warning surface placement at a sidewalk driveway crossing.
2. The detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and extend the full width as shown. The detectable warning surface shall not be placed across a grade break.
3. Where the distance from the face of the detectable warning surface is 6 ft or less to the back of curb, the detectable warning surface shall be placed perpendicular to the ramp. Where the distance from the face of the detectable warning surface is more than 6 ft from the back of curb, the detectable warning surface shall be placed at the back of curb as shown or in an alternate placement configuration. See Standard Drawing E 604-SWCR-13 for alternate detectable warning surface placement.
4. The detectable warning surface on a parallel curb ramp shall be placed on the turning space at the flush transition between the street and turning space at the back of curb.
5. The detectable warning surface on a blended transition or depressed corner shall be placed at the back of curb as shown or in an alternate placement configuration. See Standard Drawing E 604-SWCR-13 for alternate detectable warning surface placement.
6. See Standard Drawing E 604-SWCR-14 for detectable warning surface details.

LEGEND:
- Buffer or Other Non-Walkable Surface
- Detectable Warning Surface (DWS)
- Ramp
- Grade Break

INDIANA DEPARTMENT OF TRANSPORTATION
DETECTABLE WARNING SURFACE PLACEMENT AND CONFIGURATION
SEPTEMBER 2018
STANDARD DRAWING NO. E 604-SWCR-12

No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 03/29/18 DATE
CHIEF ENGINEER — /s/ John Lucke — 04/27/18 DATE

E

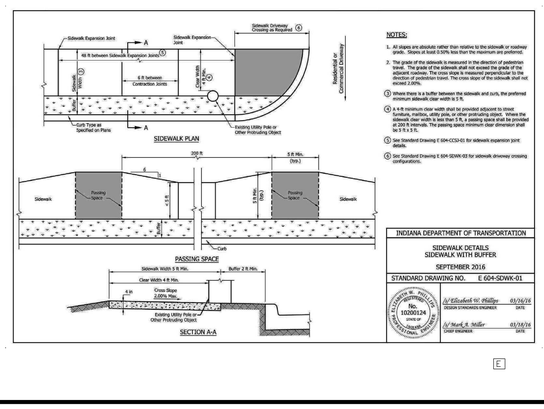
NOTES:

1. Detectable warning surface shall consist of truncated domes. Domes shall be aligned in a radial pattern in the direction of pedestrian travel and center-to-center spacing within the ranges specified.
2. The detectable warning surface may be field cut. Truncated dome spacing between adjacent cones shall be within the ranges specified.
3. The detectable warning surface shall contrast visually with adjacent surfaces, either light-on-dark or dark-on-light.
4. The detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and extend the full width as shown. The detectable warning surface shall not be placed across a grade break.
5. The maximum counter slope of the gutter or street at the bottom of the ramp shall be 5.00%. Where the algebraic difference between the running slope and the counter slope exceeds 13%, a 2-ft minimum level strip should be provided at the bottom of the ramp.
6. Where a concrete border is used for forming, the border shall be cast monolithically with the ramp. The width of the border on the ramp shall not reduce the ramp width for more than 2 in. on each side.
7. Where forming other than a concrete border is used, the edge restraint shall not encroach upon the ramp width.

INDIANA DEPARTMENT OF TRANSPORTATION
DETECTABLE WARNING SURFACE DETAILS
SEPTEMBER 2018
STANDARD DRAWING NO. E 604-SWCR-14

No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 03/29/18 DATE
CHIEF ENGINEER — /s/ John Lucke — 04/27/18 DATE

E



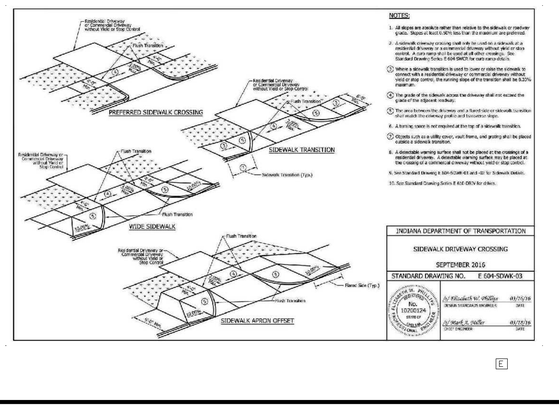
NOTES:

1. All slopes are absolute rather than relative to the sidewalk or roadway grade. Slopes at least 0.50% less than the maximum are preferred.
2. The grade of the sidewalk is measured in the direction of pedestrian travel. The grade of the sidewalk shall not exceed the grade of the adjacent roadway. The cross slope is measured perpendicular to the direction of pedestrian travel. The cross slope of the sidewalk shall not exceed 2.00%.
3. Where there is a buffer between the sidewalk and curb, the preferred minimum sidewalk clear width is 5 ft.
4. A 4-ft minimum clear width shall be provided adjacent to street furniture, mailbox, utility pole, or other protruding object. Where the sidewalk clear width is less than 5 ft, a passing space shall be provided at 200-ft intervals. The passing space minimum clear dimension shall be 5 ft x 5 ft.
5. See Standard Drawing E 604-CCU-01 for sidewalk expansion joint details.
6. See Standard Drawing E 604-SDWK-03 for sidewalk driveway crossing configurations.

INDIANA DEPARTMENT OF TRANSPORTATION
SIDEWALK DETAILS SIDEWALK WITH BUFFER
SEPTEMBER 2016
STANDARD DRAWING NO. E 604-SDWK-01

No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 03/16/18 DATE
CHIEF ENGINEER — /s/ Mark R. Miller — 04/18/16 DATE

E



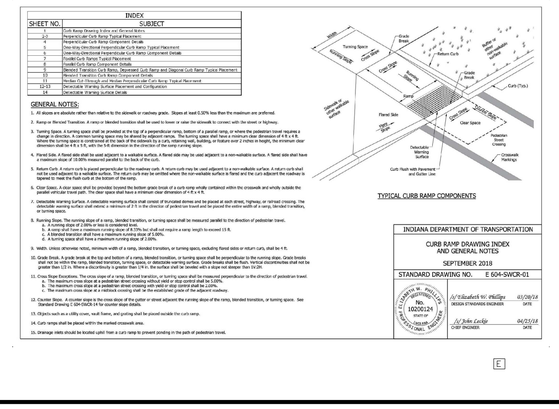
NOTES:

1. All slopes are absolute rather than relative to the sidewalk or roadway grades. Slopes at least 0.50% less than the maximum are preferred.
2. A sidewalk driveway crossing shall only be used on a sidewalk at a residential driveway or a commercial driveway without skid or stop control. A curb ramp shall be used at all other crossings. See Standard Drawing E 604-SWCR for curb ramp details.
3. Where a sidewalk transition is used to lower or raise the sidewalk to connect with a residential driveway or commercial driveway without skid or stop control, the running slope of the transition shall be 8.33% maximum.
4. The grade of the sidewalk across the driveway shall not exceed the grade of the adjacent roadway.
5. The area between the driveway and a flared side or sidewalk transition shall match the driveway profile and horizontal slope.
6. A turning space is not required at the top of a sidewalk transition.
7. Objects such as a utility cover, vault frame, and grating shall be placed outside a sidewalk transition.
8. A detectable warning surface shall not be placed at the crossing of a residential driveway. A detectable warning surface may be placed at the crossing of a commercial driveway without skid or stop control.
9. See Standard Drawing E 604-SDWK-01 and -02 for Sidewalk Details.
10. See Standard Drawing Series E 604-DRIVE for drives.

INDIANA DEPARTMENT OF TRANSPORTATION
SIDEWALK DRIVEWAY CROSSING
SEPTEMBER 2016
STANDARD DRAWING NO. E 604-SDWK-03

No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 03/29/18 DATE
CHIEF ENGINEER — /s/ Mark R. Miller — 04/18/16 DATE

E



INDEX	
SHEET NO.	SUBJECT
1	Curb Ramp Drawing Index and General Notes
2	Perpendicular Curb Ramp Typical Placement
3	One-Way Directional Perpendicular Curb Ramps
4	One-Way Directional Perpendicular Curb Ramp Typical Placement
5	One-Way Directional Perpendicular Curb Ramp Component Details
6	Parallel Curb Ramps Typical Placement
7	Parallel Curb Ramp Component Details
8	Blended Transition Curb Ramp, Depressed Curb Ramp and Diagonal Curb Ramp Typical Placement
9	Blended Transition Curb Ramp Component Details
11	Median Cut-Through and Median Peninsula Curb Ramp Typical Placement
12-13	Detectable Warning Surface Placement and Configuration
14	Detectable Warning Surface Details

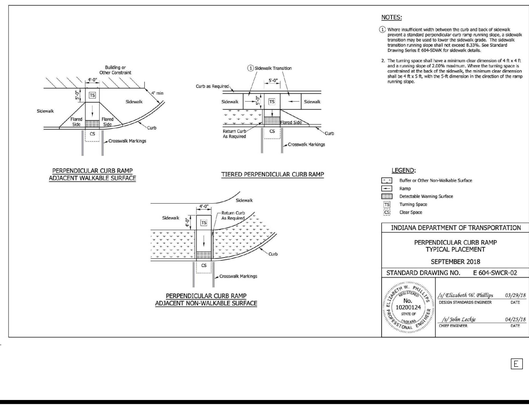
GENERAL NOTES:

1. All slopes are absolute rather than relative to the sidewalk or roadway grade. Slopes at least 0.50% less than the maximum are preferred.
2. Ramp or Blended Transition. A ramp or blended transition shall be used to lower or raise the sidewalk to connect with the street or highway.
3. Turning Space. A turning space shall be provided at the top of a perpendicular ramp, a parallel ramp, or where the pedestrian travel requires a change in direction. A common turning space may be shared by adjacent ramps. The turning space shall have a minimum clear dimension of 4 ft x 4 ft. Where a flared side is used, a minimum turning space of 5 ft is required, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope.
4. Flared Side. A flared side shall be used adjacent to a walkable surface. A flared side may be used adjacent to a non-walkable surface. A flared side shall have a maximum slope of 10.00% measured parallel to the back of the curb.
5. Return Curb. A return curb is placed perpendicular to the roadway curb. A return curb may be used adjacent to a non-walkable surface. A return curb shall not be used adjacent to a walkable surface. The return curb may be omitted where the non-walkable surface is flared and the curb adjacent the roadway is tapered to meet the flush curb at the bottom of the ramp.
6. Clear Space. A clear space shall be provided beyond the bottom grade break of a curb ramp wholly contained within the crosswalk and wholly outside the parallel vehicular travel path. The clear space shall have a minimum clear dimension of 4 ft x 4 ft.
7. Detectable warning surface. A detectable warning surface shall consist of truncated domes and be placed at each street, highway, or railroad crossing. The detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and be placed the entire width of a ramp, blended transition, or turning space.
8. Running Slope. The running slope of a ramp, blended transition, or turning space shall be measured parallel to the direction of pedestrian travel.
   a. A ramp shall have a maximum running slope of 8.33%.
   b. A ramp shall have a maximum running slope of 8.33% but shall not require a ramp length to exceed 15 ft.
   c. A blended transition shall have a maximum running slope of 5.00%.
   d. A turning space shall have a maximum running slope of 2.00%.
9. Width. Unless otherwise noted, minimum width of a ramp, blended transition, or turning space, excluding flared sides or return curb, shall be 4 ft.
10. Grade Break. A grade break at the top and bottom of a ramp, blended transition, or turning space shall be perpendicular to the running slope. Grade breaks shall not be within the ramp, blended transition, turning space, or detectable warning surface. Grade breaks shall be flush. Vertical discontinuities shall not be greater than 1/2 in. Where a discontinuity is greater than 1/4 in, the surface shall be beveled with a slope not steeper than 50.00.
11. Cross Slope Exceptions. The cross slope of a ramp, blended transition, or turning space shall be measured perpendicular to the direction of pedestrian travel.
   a. The maximum cross slope at a walkable surface crossing with yield or stop control shall be 2.00%.
   b. The maximum cross slope at a pedestrian street crossing with yield or stop control shall be 2.00%.
   c. The maximum cross slope at a roadway crossing shall be the established grade of the adjacent roadway.
12. Counter Slope. A counter slope is the cross slope of the gutter or street adjacent the running slope of the ramp, blended transition, or turning space. See Standard Drawing C 604-SWCR-14 for counter slope details.
13. Objects such as a utility cover, vault frame, and grating shall be placed outside the curb ramp.
14. Curb ramps shall be placed within the marked crosswalk area.
15. Drainage inlets should be located uphill from a curb ramp to prevent ponding in the path of pedestrian travel.

INDIANA DEPARTMENT OF TRANSPORTATION
CURB RAMP DRAWING INDEX AND GENERAL NOTES
SEPTEMBER 2018
STANDARD DRAWING NO. E 604-SWCR-01

No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 01/28/19 DATE
CHIEF ENGINEER — /s/ John Lucke — 04/27/18 DATE

E



NOTES:

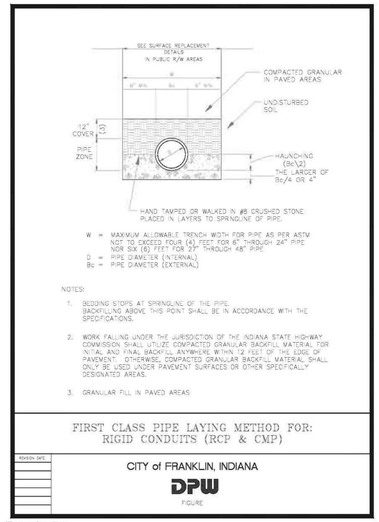
1. Where insufficient width between the curb and back of sidewalk prevent a standard perpendicular curb ramp running slope, a sidewalk transition may be used to lower the sidewalk grade. The sidewalk transition running slope shall not exceed 8.33%. See Standard Drawing Series E 604-SDWK for sidewalk details.
2. The turning space shall have a minimum clear dimension of 4 ft x 4 ft and a running slope of 2.00% maximum. Where the turning space is constrained by the back of the sidewalk, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope.

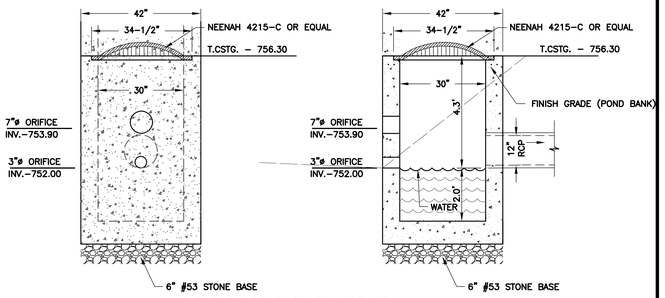
LEGEND:
- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface
- Turning Space
- Clear Space

INDIANA DEPARTMENT OF TRANSPORTATION
PERPENDICULAR CURB RAMP TYPICAL PLACEMENT
SEPTEMBER 2018
STANDARD DRAWING NO. E 604-SWCR-02

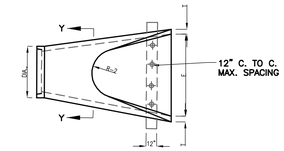
No. 10200124 STATE OF INDIANA — Jeffery W. Phillips — DESIGN STANDARDS ENGINEER — /s/ Elizabeth W. Phillips — 03/29/18 DATE
CHIEF ENGINEER — /s/ John Lucke — 04/27/18 DATE

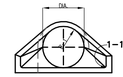
E



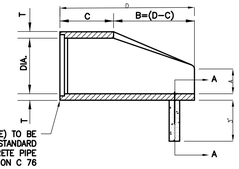


POND #1 CONTROL STRUCTURE

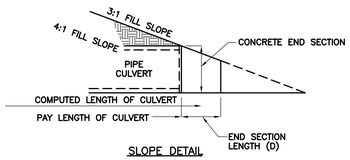




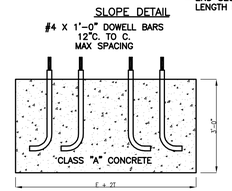
SECTION Y–Y



LONGITUDINAL SECTION



SLOPE DETAIL



SECTION A–A

NOTES:

CONCRETE IN THIS SECTION SHALL BE THE SAME GRADE AND STRENGTH AS SPECIFIED FOR REINFORCED CONCRETE PIPE, A.S.T.M. DESIGNATION C–76 CLASS 11 (AS SET OUT IN STANDARD SPECIFICATIONS).

REINFORCEMENT IN THE "C" PORTION SHALL BE THE SAME AS SPECIFIED FOR THE REINFORCED CONCRETE, A.S.T.M. DESIGNATION C–76 CLASS II FOR THE SIZE OF CONNECTION PIPE.

REINFORCEMENT IN THE "B" PORTION SHALL HAVE A CROSS SECTIONAL AREA EQUAL TO THAT OF ONE LAYER OF STEEL IN THE "C" PORTION.

THE END OF THE PIPE CULVERT SHALL BE PLACED IN THE CONCRETE END SECTION SO THAT THE FLOW LINES ARE FLUSH. THE JOINT SHALL BE COMPLETELY FILLED WITH MORTAR.

IN 3:1 OR 4:1 FILL SLOPE, CHANGE TO THE SLOPE OF THE END SECTION IN A SMOOTH, PLEASING TRANSITION APPROXIMATELY 10'–0" IN LENGTH.

VARIATION IN DIMENSIONS – THE THICKNESS OF THE CONCRETE, THE POSITIONS OF STEEL, AND THE INTERNAL DIAMETER OF THE PIPE SHALL CONFORM WITH THE VARIATIONS IN DIMENSIONS AS PROVIDED IN THE SPECIFICATIONS FOR REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE, A.S.T.M. DESIGNATION C–76.

CONCRETE PIPE TOE ANCHORS SHALL BE REQUIRED ON ALL CONCRETE PIPE END SECTIONS.

PRECAST CONCRETE END SECTION

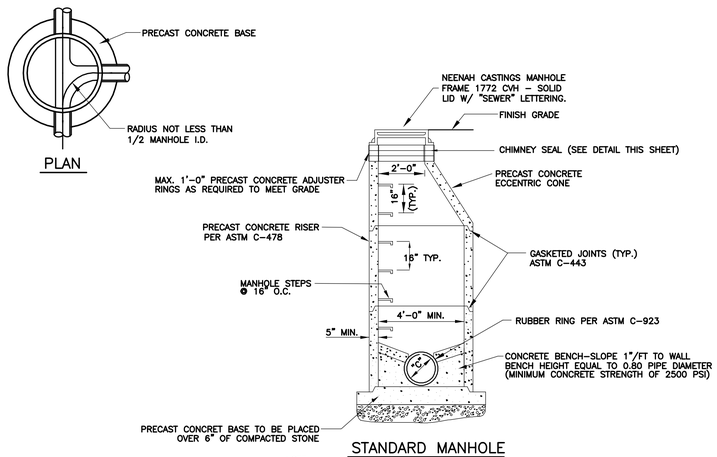
DIA.	WALL	WT. SEC.	A	B	C	D	E	R–1	R–2	SKIRT
12	2	530	4	24	48 7/8	72 7/8	24	10 1/16	9	3 1/2
15	2 1/4	740	6	27	46	73	30	12 1/2	11	3 1/2
18	2 1/2	990	9	27	46	73	36	15 1/2	12	4
21	2 3/4	1280	9	35	38	73	42	16 1/8	13	4
24	3	1520	9 1/2	43 1/2	30	73 1/2	48	16 11/16	14	4 1/2
27	3 1/4	1930	10 1/2	48	25 1/2	73 1/2	54	17 3/4	14 1/2	4 1/2
30	3 1/2	2190	12	54	19 3/4	73 3/4	60	18 5/16	15	5
33	3 3/4	3150	13 1/2	58 1/2	39 1/4	97 3/4	66	23 3/4	17 1/2	5 1/2
36	4	4100	15	63	34 3/4	97 3/4	72	24 1/16	20	5 1/2

W = MAXIMUM ALLOWABLE TRENCH WIDTH FOR PIPE ASTM NOT TO EXCEED FOUR (4) FEET OR 6" THROUGH 24" PIPE NOR SIX (6) FEET FOR 27" THROUGH 48" PIPE
D = PIPE DIAMETER (INTERNAL)
Bc= PIPE DIAMETER (EXTERNAL)

NOTES

1. BEDDING STOPS AT A POINT 12" ABOVE THE TOP OF THE PIPE. BACKFILLING ABOVE THIS POINT SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
2. WORK FALLING UNDER JURISDICTION OF THE INDIANA STATE HIGHWAY COMMISSION SHALL UTILIZE COMPACTED GRANULAR BACKFILL MATERIAL FOR INITIAL AND FINAL BACKFILL ANYWHERE WITHIN 12 FEET OF THE EDGE OF PAVEMENT. OTHERWISE, COMPACTED GRANULAR BACKFILL MATERIAL SHALL ONLY BE USED UNDER PAVEMENT SURFACES OR OTHER SPECIFICALLY DESIGNATED AREAS.

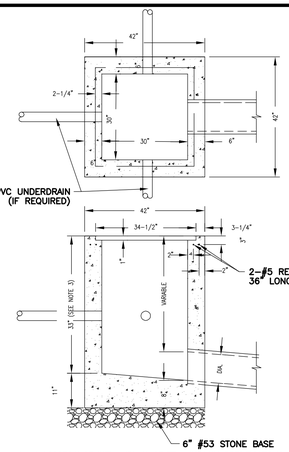
FIRST CLASS PIPE LAYING METHOD FOR:
1) FLEXIBLE (PVC, RPVC, ABS & HDPE PIPE) AND
2) DUCTILE IRON WITHIN PVM'T LIMITS



STANDARD MANHOLE

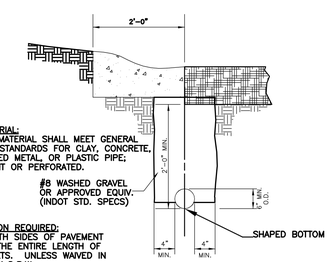
NOTE:

1. FOR ALL MANHOLES 6'–0" OR LESS IN DEPTH– PROVIDE RISER WITH FLAT TOP IN LIEU OF ECCENTRIC CONE IN ACCORDANCE WITH ASTM C–478.
2. THE CROWN OF THE INFLUENT PIPE SHALL BE AT OR ABOVE THE CROWN OF THE OUTLET PIPE.
3. DROP MANHOLES SHALL BE USED WHENEVER THE DISTANCE FROM THE INVERT OF THE INCOMING LINE AND THE BOTTOM OF THE MANHOLE IS GREATER THAN TWO FEET.

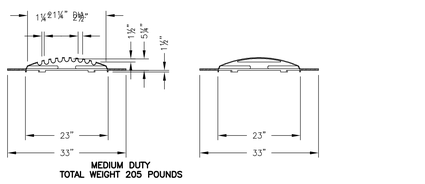


1. IN ACCORDANCE WITH INDIANA STATE HIGHWAY SPECIFICATIONS.
2. MINIMUM CONCRETE COMPRESSIVE STRENGTH 4000 P.S.I.
3. IN/DOT DIMENSIONS. OTHER DIMENSION AVAILABLE
4. PRECAST ADJUSTING SECTIONS AVAILABLE.

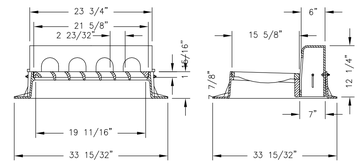
INLET TYPE "E"



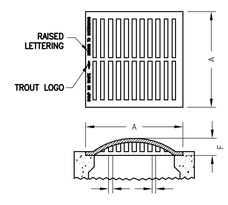
CURB UNDERDRAIN DETAIL
(TYPICAL INSTALLATION)



R–4342 DITCH GRATE, STOOL TYPE

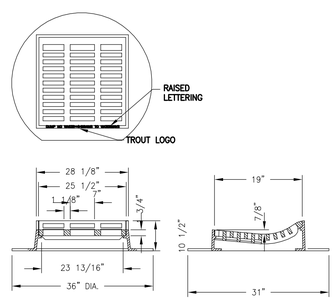


R–3286–8V CURB INLET FRAME, GRATE, CURB BOX
HEAVY DUTY



CATALOG NO.	DIMENSIONS IN INCHES					WT. LBS.
	A	F	G	H		
R–4215–A	24x30	4 1/4	1 5/8	1 1/2		160
R–4215–C	34x34	6	1 1/2	1 1/4		190

R–4215 SERIES CONVEX GRATES



HEAVY DUTY – BICYCLE FRIENDLY

R–3501–P INLET FOR ROLL TYPE CURB

CASTING NOTE:
ALL STORM CASTINGS ARE TO HAVE THE REQUIRED "NO DUMPING, DRAINS TO STREAM" AND A SYMBOL OF A FISH CAST IN RAISED OR RECESSED LETTER AT A HEIGHT OF 1" MINIMUM.

DATE	REVISION	SYMBOL

SCALE 1"=50'
DRAWN JPH
CHECKED JKS
CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
SITE DETAILS

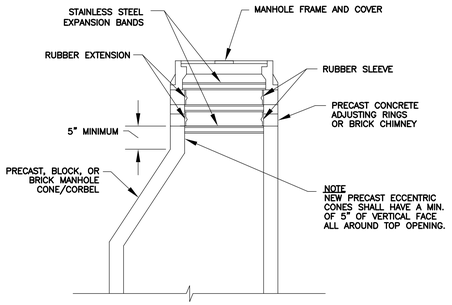
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite 1, Greenwood, Indiana 46143
(317)–882–5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C703

DATE
SEPTEMBER 3, 2021



TO SPAN CHIMNEY HEIGHTS OF:

0–4½"	STD CHIMNEY SEAL ONLY
2–7½"	WIDE CHIMNEY SEAL ONLY
OVER 4½"–10½"	STD. SEAL + 7" EXTENSION
OVER 7½"–13½"	WIDE SEAL + 7" EXTENSION

NOTE: EXTERIOR SEAL IS ALSO ACCEPTALBE

TYPICAL CHIMNEY SEAL DETAIL

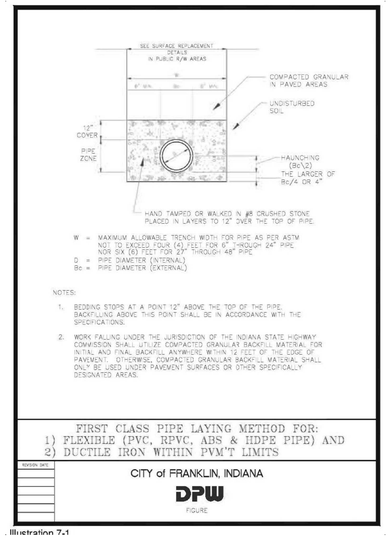
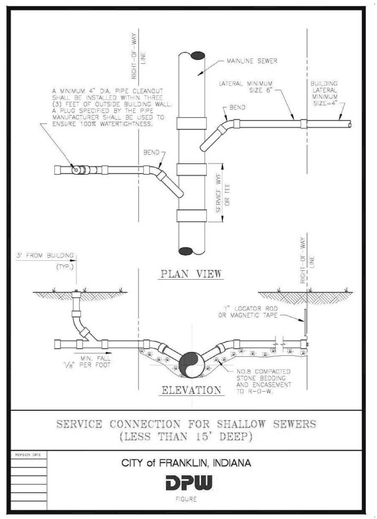
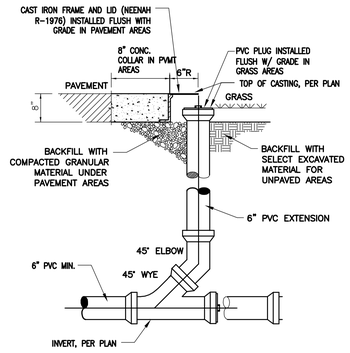
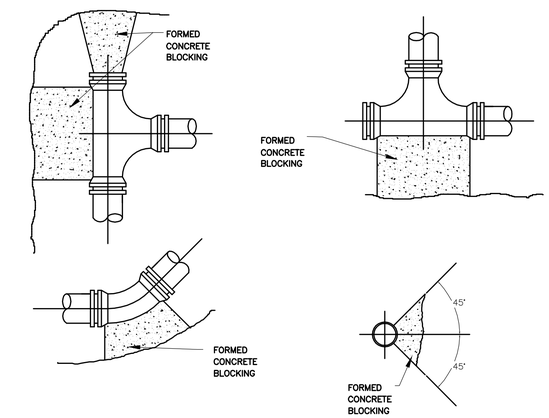


Illustration 7.1





TYPICAL SERVICE LATERAL CLEANOUT



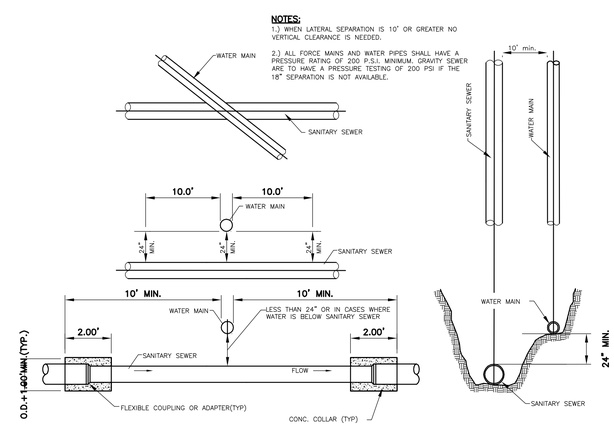
AREA IN SQ. FT. REQUIRED FOR CONC. THRUST BLOCKING

SIZE	TEE & PLUG	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4"	2.0	2.5	1.5	1.0	1.0
6"	4.0	5.5	3.0	1.5	1.0
8"	6.5	9.0	5.0	2.5	1.5
10"	10.0	14.0	7.5	4.0	2.0
12"	14.0	20.0	11.0	5.5	3.0

NOTE:
THE THRUST BLOCK AREAS ARE BASED ON A SOIL BEARING LOAD OF 2000 LBS./SQ. FT.

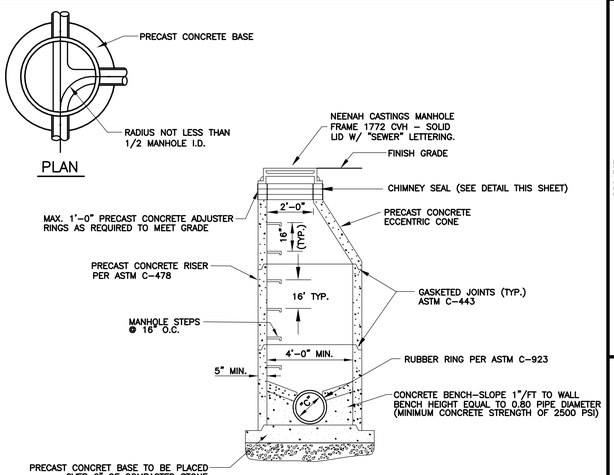
GREASE ALL PIPE SURFACES PRIOR TO PLACEMENT OF CONCRETE.

THRUST BLOCKING DETAILS FOR FORCE MAIN



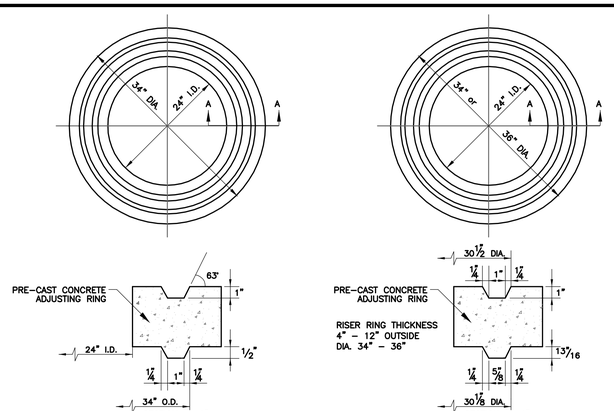
MIN. CROSSOVER AND SEPERATION REQUIREMENTS FOR WATER MAINS AND SANITARY SEWERS

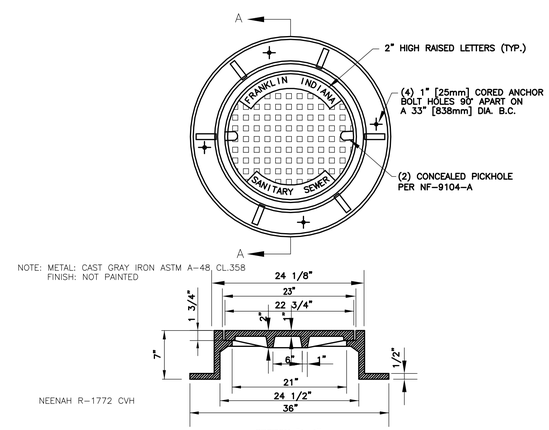
NOTE: CONTRACTOR TO COMPLY WITH 327-3-6-9.
NOTE: THE OUTSIDE OF THE WATERMAIN IS TO BE PLACED GREATER THAN 8 FEET FROM THE OUTSIDE OF A MANHOLE.



STANDARD MANHOLE

NOTE:
1. FOR ALL MANHOLES 6'–0" OR LESS IN DEPTH– PROVIDE RISER WITH FLAT TOP IN LIEU OF ECCENTRIC CONE IN ACCORDANCE WITH ASTM C–478.
2. THE CROWN OF THE INFLUENT PIPE SHALL BE AT OR ABOVE THE CROWN OF THE OUTLET PIPE.
3. DROP MANHOLES SHALL BE USED WHENEVER THE DISTANCE FROM THE INVERT OF THE INCOMING LINE AND THE BOTTOM OF THE MANHOLE IS GREATER THAN TWO FEET.





SANITARY SEWER MANHOLE FRAME & COVER – STANDARD MANHOLE DETAIL

REVISION	DATE

SCALE: NONE
DRAWN: JPH
CHECKED: JKS
CERTIFIED: JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
SANITARY SEWER DETAILS

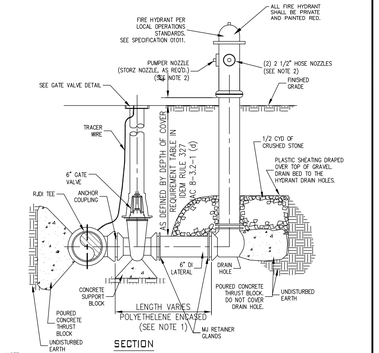
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING–LAND SURVEYING–CONSTRUCTION LAYOUT
1251 Alpert Parkway, Greenwood, Indiana 46143
(317)–882–5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C704

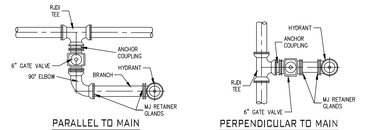
DATE
SEPTEMBER 3, 2021



SECTION

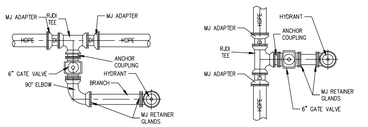
NOTE:
1. THE FIRE HYDRANT LATERAL, GATE VALVE, AND FIRE HYDRANT BARREL SHALL BE ENCASED IN POLYETHYLENE ENCASEMENT UP TO FINISHED GRADE PER SPECIFICATION 15130 PRIOR TO BACKFILL. THE POLYETHYLENE ENCASEMENT SHALL NOT INTERFERE WITH THE DRAIN HOLE.
2. WHEN INSTALLED BEHIND CURB, PUMPER AND HOSE NOZZLES TO BE AT LEAST 18"-24", DEPENDING ON LOCAL REQUIREMENTS, FROM FACE OF CURB.

FIRE HYDRANT DETAILS
N.T.S.



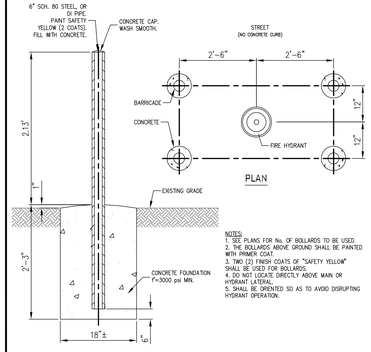
PARALLEL TO MAIN

PERPENDICULAR TO MAIN



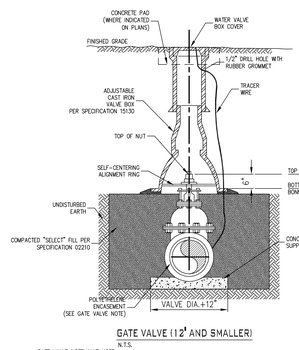
PARALLEL TO HDPE MAIN

PERPENDICULAR TO HDPE MAIN



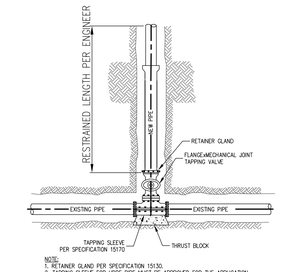
NOTES:
1. SEE PLANS FOR No. OF BOLLARDS TO BE USED.
2. THE BOLLARDS ABOVE GROUND SHALL BE PAINTED WITH PRIMER COAT.
3. TWO (2) FINISH COATS OF "SAFETY YELLOW" SHALL BE USED FOR BOLLARDS.
4. DO NOT INSTALL DIRECTLY ABOVE MAIN OR HYDRANT LATERAL.
5. SHALL BE ORIENTED SO AS TO AVOID DISRUPTING HYDRANT OPERATION.

FIRE HYDRANT PROTECTION-PIPE BOLLARD DETAIL
N.T.S.



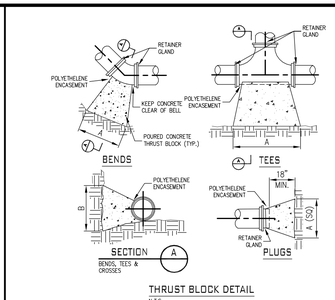
GATE VALVE (12' AND SMALLER)
N.T.S.

GATE VALVE NOTE/VALVE NOTE
THE POLYETHELENE ENCASEMENT SHALL BE INSTALLED UP TO THE OPERATING NUT, AND OVER THE LOWER PORTION OF THE VALVE BOX, LEAVING THE OPERATING NUT EXPOSED AND FREE TO BE OPERATED WITHIN THE VALVE BOX.



NOTES:
1. RETAINER GLAND PER SPECIFICATION 15130.
2. TAPPING SLEEVE FOR HDPE PIPE MUST BE APPROVED FOR THE APPLICATION BY THE MANUFACTURER AND IAWC.

TAPPING SLEEVE AND TAPPING VALVE DETAIL
N.T.S.



THRUST BLOCK DETAIL
N.T.S.

NOTES:
1. THRUST BLOCK DIMENSIONS SHALL BE PROVIDED BY THE DESIGN ENGINEER.
2. THRUST BLOCKS SHALL BE INSTALLED AGAINST UNDISTURBED SOIL WITH ADEQUATE BEARING TO PREVENT MOVEMENT OF FITTING.
3. NO THRUST BLOCKS TO BE PLACED IN SEWER LATERAL DITCHES.
4. THRUST BLOCKING MUST FIT IN EASEMENT, IN SOME CASES ADDITIONAL RESTRAINT MAY BE REQUIRED.
5. DESIGN TO BE BASED ON 200 PSI HYDROSTATIC WATER PRESSURE (150 PSI STATIC PRESSURE PLUS 50 PSI WATER HAMMER).
6. INSTALL POLYETHYLENE ENCASEMENT ON ALL D.I. PIPE AND FITTINGS PRIOR TO POURING CONCRETE.
7. PIPE JOINTS AND BOLTS MUST BE ACCESSIBLE.
8. ALLOW SUFFICIENT CLEARANCE BETWEEN CONCRETE AND BOLTS FOR FUTURE MAINTENANCE.
9. ALL ANCHOR BOLTS SHALL BE CORROSION RESISTANT, AND SIZED PER SPECIFICATION.
10. THRUST BLOCKING DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. IN SOME CASES, ADDITIONAL RESTRAINT MAY BE REQUIRED.
11. CONCRETE USED FOR THRUST BLOCKS SHALL BE MIN 3000 PSI CONCRETE.
12. FOR UNSTABLE SOIL CONDITIONS, THE ENGINEER SHALL VERIFY THRUST BLOCK DIMENSIONS.

SCALE	1"=50'
DRAWN	JPH
CHECKED	JKS
CERTIFIED	JKS

SYMBOL	REVISION	DATE

INDIANA AMERICAN WATER
ENGINEERING DEPARTMENT
153 N. EMERSON AVENUE
GREENWOOD, INDIANA 46143

STANDARD DETAIL		
FIRE HYDRANT DETAIL		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JULY, 2018	APP'D BY: E.N.	

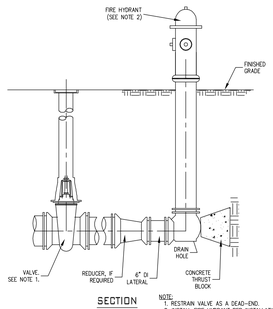
STANDARD DETAIL		
FIRE HYDRANT INSTALLATION DETAILS		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JULY, 2018	APP'D BY: E.N.	

STANDARD DETAIL		
FIRE HYDRANT PROTECTION-PIPE BOLLARD DETAIL		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JULY, 2018	APP'D BY: E.N.	

STANDARD DETAIL		
GATE VALVE (12" AND SMALLER)		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JANUARY, 2018	APP'D BY: E.N.	

STANDARD DETAIL		
TAPPING SLEEVE AND TAPPING VALVE		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JANUARY, 2018	APP'D BY: E.N.	

STANDARD DETAIL		
THRUST BLOCKS		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JANUARY, 2018	APP'D BY: E.N.	

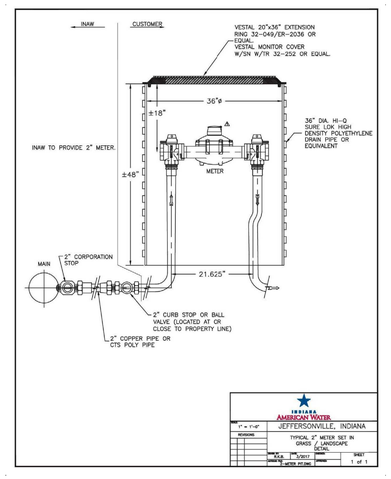


SECTION

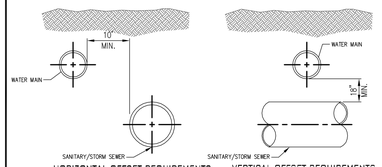
NOTE:
1. RESTRAIN VALVE AS A DEAD-END.
2. INSTALL FIRE HYDRANT PER INSTALLATION STANDARD DETAIL HYDRANT AUXILIARY VALVE NOT REQUIRED.

TEMPORARY DEAD-END FIRE HYDRANT
N.T.S.

STANDARD DETAIL		
TEMPORARY DEAD-END FIRE HYDRANT DETAIL		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JULY, 2018	APP'D BY: E.N.	



HORIZONTAL OFFSET REQUIREMENTS
FOR SANITARY/STORM SEWER STRUCTURES

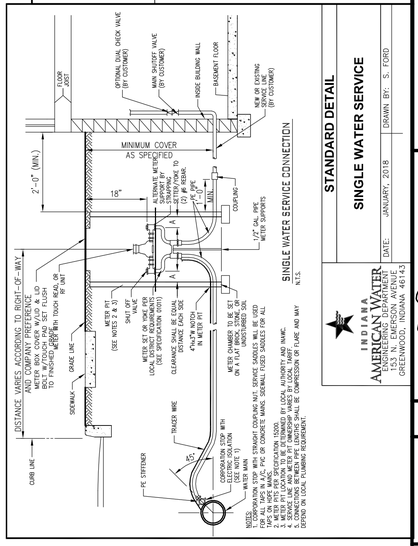


HORIZONTAL OFFSET REQUIREMENTS VERTICAL OFFSET REQUIREMENTS

BASIC SEPARATION REQUIREMENTS/SEPARATION REQUIREMENTS:
1. WATER MAINS AND SEWERS SHOULD BE SEPARATED AS FAR AS IS REASONABLE IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS. THE STANDARD DEPTH OF COVER REQUIREMENTS PER COUNTY, AS SPECIFIED IN 327 IAC 8, SHALL BE MAINTAINED FOR ALL WATER MAIN CROSSINGS.
2. PARALLEL CONSTRUCTION: THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWERS SHALL BE AT LEAST 10

REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY/STORM SEWERS & STRUCTURES

STANDARD DETAIL		
SEWER SEPARATION		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	
LATEST REV: JULY, 2018	APP'D BY: E.N.	



SINGLE WATER SERVICE CONNECTION
N.T.S.

STANDARD DETAIL		
SINGLE WATER SERVICE		
DATE: JANUARY, 2018	DRAWN BY: S. FORD	

INDIANA AMERICAN WATER
ENGINEERING DEPARTMENT
153 N. EMERSON AVENUE
GREENWOOD, INDIANA 46143

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING—LAND SURVEYING—CONSTRUCTION LAYOUT
1257 Airport Parkway, Suite A, Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

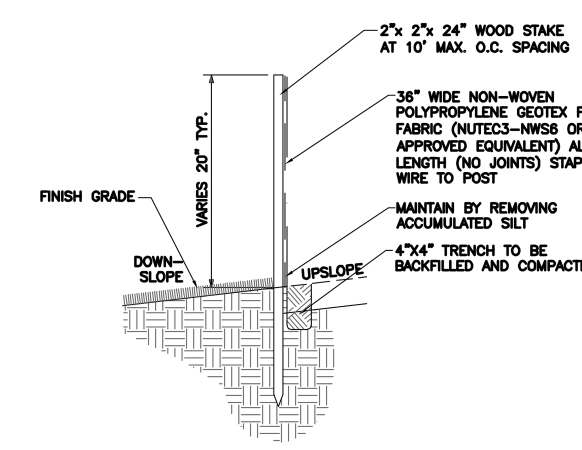
PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
WATER DETAILS

JOB NUMBER
21008

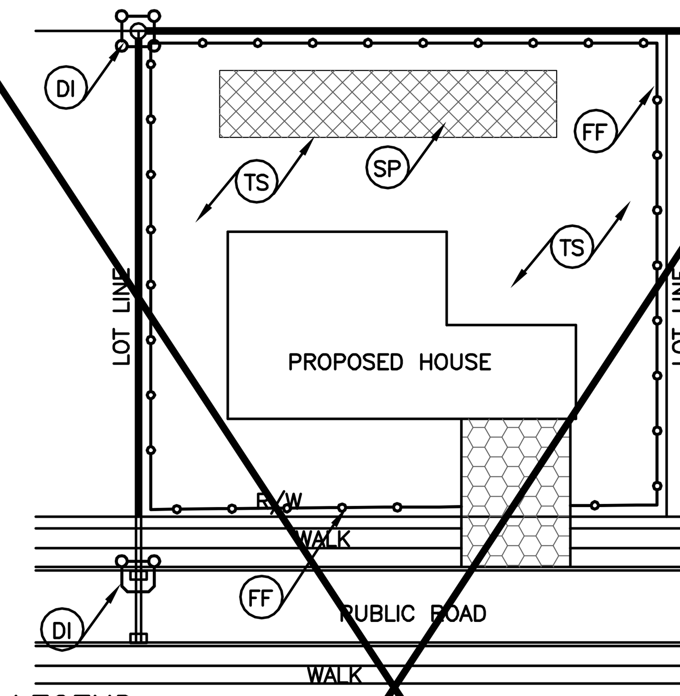
SHEET
C705

DATE
SEPTEMBER 3, 2021



1. INSPECT ONCE PER WEEK OR AFTER EACH RAIN EVENT.
2. IF FENCE FABRIC TEARS, STARTS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE AFFECT PORTION IMMEDIATELY.
3. REMOVE DEPOSITED SEDIMENT WHEN IT REACHES HALF THE HEIGHT OF THE FENCE AT ITS LOWEST POINT OR IS CAUSING THE FABRIC TO BULGE.
4. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEAN OUT.
5. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE THE FENCE AND SEDIMENT DEPOSITS BRING THE DISTURBED AREA TO GRADE, AND STABILIZE.

FILTER FENCE INSTALLATION DETAIL



LEGEND :

- (FF) FILTER FENCE
- (TS) TEMPORARY-SEEDING
- (DI) DROP INLET PROTECTION
- (SP) STOCKPILE PROTECTION
- GRAVEL CONSTRUCTION ENTRANCE

INDIVIDUAL LOT EROSION PLAN

INDIVIDUAL LOT EROSION NOTES :

1. ALL EROSION CONTROL MEASURE SHALL BE IN COMPLIANCE WITH THE INDIANA STORM WATER QUALITY MANUAL – PLANNING AND SPECIFICATIONS GUIDE FOR EFFECTIVE EROSION AND SEDIMENT CONTROL AND POST-CONSTRUCTION WATER QUALITY, OCTOBER 2007.

2. THE SILT FENCE AND APPROPRIATE EROSION CONTROL SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION. LOCATION OF SILT FENCE TO APPROVED BY CITY.

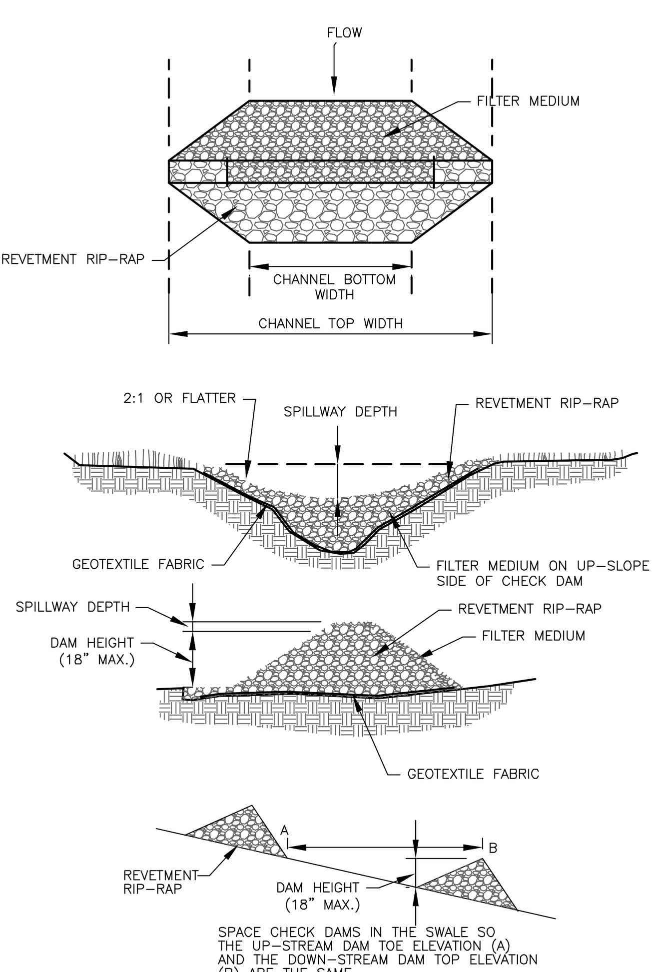
3. CONCRETE WASHOUT BASIN TO BE AVAILABLE WITHIN SUBDIVISION OR BUILDER WILL NEED TO INSTALL ONE.

SECTION 2 – MATERIAL HANDLING AND SPILL PREVENTION PLAN
MATERIAL HANDLING AND SPILL PREVENTION PLAN:
IN ORDER TO MINIMIZE THE RELEASE OF POTENTIAL POLLUTANTS DURING CONSTRUCTION THE CONTRACTORS SHALL IMPLEMENT THIS MATERIAL HANDLING AND SPILL PREVENTION PLAN. THE CONTRACTOR SHALL REVIEW THIS PLAN WITH ALL SUBCONTRACTORS AND REQUIRE THAT THEY IMPLEMENT THE PLAN AS WELL.

1. CONSTRUCTION EQUIPMENT
A. FUELING, LUBRICATION AND FLUIDS: ALL OPERATIONS INVOLVING THE ADDITION OF FLUIDS TO EQUIPMENT SHOULD BE DONE IN ONE LOCATION, AS DESIGNATED BY THE GENERAL CONTRACTOR, OR DEVELOPER/OWNER, SO THAT SPILLS ARE LIMITED TO ONE LOCATION ON THE SITE, WHICH WILL FACILITATE THE CLEANUP OF SPILLS. IF AN ONSITE-FUELING TANK IS PLANNED TO BE ON SITE, IT SHALL BE DOUBLE WALLED AND STORED IN THIS DESIGNED AREA. THIS LOCATION IS AN AREA THAT WILL NOT ALLOW SPILLED FLUIDS TO MIGRATE INTO SUBSURFACE SOILS. IN THE EVENT OF A SPILL, THE FLUID SHALL IMMEDIATELY BE CLEANED UP BY REMOVING THE CONTAMINATED SOIL OR STONE, WHICH SHALL BE DISPOSED OF IN AN ACCEPTABLE MANNER. SPILLS ON HARD SURFACES SHALL BE SOAKED UP BY AN ACCEPTABLE MATERIAL SUCH AS OIL DRY AND THE ABSORBENT MATERIAL DISPOSED OF IN A PROPER MANNER. THE SPILL SHALL ALSO BE REPORTED IMMEDIATELY TO THE CONTRACTOR'S SUPERINTENDENT.
B. EQUIPMENT REPAIR, ESPECIALLY WHEN FLUIDS MUST BE REMOVED FROM THE EQUIPMENT OR THE POSSIBILITY OF FLUID SPILLS IS HIGH, SHOULD ALWAYS BE DONE OFFSITE AT A FACILITY THAT IS MORE SUITABLE THAN A CONSTRUCTION SITE TO HANDLE SPILLS. WHEN EQUIPMENT MUST BE REPAIRED ONSITE IT SHOULD BE MOVED TO THE MAINTENANCE AND FUELING AREA IF POSSIBLE. OTHERWISE, SUITABLE ON SITE CONTAINERS SHOULD BE PLACED UNDER THE EQUIPMENT DURING REPAIR TO CATCH ANY SPILLED FLUIDS AND THESE FLUIDS SHOULD BE DISPOSED OF IN A PROPER MANNER.
C. ALL REUSABLE FLUID CONTAINERS, SUCH AS GASOLINE CANS, SHALL BE INSPECTED FOR LEAKS EACH TIME THEY ARE USED. IF LEAKS ARE FOUND, THE FLUID SHALL BE REMOVED FROM THE CONTAINER IN A PROPER MANNER AND THE CONTAINER DISPOSED OF IN AN ACCEPTABLE MANNER. EMPTY DISPOSABLE CONTAINER, SUCH AS GREASE TUBES AND LUBRICATING OIL AND BRAKE FLUID CONTAINERS, AND THEIR PACKAGING, SHALL BE DISPOSED OF IN A PROPER MANNER AND SHALL NOT BE LEFT ON THE GROUND OR IN THE OPEN ON THE CONSTRUCTION SITE.
2. CONSTRUCTION MATERIALS AND THEIR PACKAGING
A. EROSION CONTROL MEASURE SHOWN ON THE SUBJECT PROJECT SHALL BE IMPLEMENTED PRIOR TO AND DURING CONSTRUCTION IN THE PROPER SEQUENCING TO MINIMIZE SOIL EROSION. EROSION CONTROLS SHALL BE INSPECTED AND MAINTAINED AS DESCRIBED ELSEWHERE ON THE PLANS. EXCESSIVE DUSTING OF SOIL ON THE SITE SHALL BE MINIMIZED BY REDUCING CONSTRUCTION TRAFFIC ACROSS BARE SOIL DURING DRY AND/OR WINDY WEATHER, AND BY APPLYING WATER OR OTHER ACCEPTABLE DUST CONTROL MEASURES TO THE SOIL. UPON COMPLETION OF CONSTRUCTION AND SUITABLE ESTABLISHMENT OF PERMANENT VEGETATION, TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE, CHECK DAMS AND INLET PROTECTION DEVICES SHALL BE REMOVED IN A MANNER TO MINIMIZE ADDITIONAL LAND DISTURBANCE. ANY AREAS DISTURBED BY THESE OPERATIONS SHALL BE PROPERLY REVEGATATED.
B. LARGE WASTE MATERIALS CREATED BY CUTTING, SAWING, DRILLING, OR OTHER OPERATIONS SHALL BE PROPERLY DISPOSED OF IN SUITABLE WASTE CONTAINERS. THE SITE SHALL BE CHECKED AT THE END OF THE DAY, AS A MINIMUM, AND ALL WASTE MATERIALS, INCLUDING THOSE BLOWN ACROSS OR OFF THE SITE BY WIND SHALL BE PICKED UP AND DISPOSED OF IN SUITABLE CONTAINERS. WHERE POSSIBLE, OPERATIONS SUCH AS SAWING THAT CREATE SMALL PARTICLES SHOULD BE PERFORMED IN ONE SPOT IN AN AREA PROTECTED FROM WIND, AND WASTE PARTICLES COLLECTED AND DISPOSED OF FREQUENTLY TO MINIMIZE WIND DISPERSAL.
PACKAGING USED TO TRANSPORT MATERIALS TO THE SITE FOR CONSTRUCTION OF THE FACILITY SHALL BE DISPOSED OF PROPERLY, WEATHER THE MATERIAL IS TAKEN OUT OF ITS PACKAGE AND INCORPORATED INTO THE PROJECT IMMEDIATELY OR STORED ONSITE FOR FUTURE USE. PACKAGED MATERIALS STORED ONSITE SHALL BE INSPECTED REGULARLY AND ANY LOOSE PACKAGING SHALL BE REPAIRED OR DISPOSED OF PROPERLY.
C. ALL DEWATERING OF ACTIVITIES SHALL BE DONE IN ACCORDANCE TO GOOD EROSION CONTROL PRACTICES. THESE PRACTICES SHOULD INCLUDE THE USE OF DIRT BAGS SUCH AS DANDY DIRT BAGS. THE USE OF THESE TYPES OF DEWATERING DEVICES WILL REMOVE LARGE QUANTITIES OF SILT, SEDIMENT, AND DIRT AND PREVENT THESE MATERIALS TO ENTER THE STORM SEWER SYSTEM.
D. IF THE USE OF LIME IS USED TO STABILIZE THE SOIL OF THE SITE THEN ALL CONSTRUCTION EQUIPMENT USED SHALL BE CLEANED OF ALL EXCESS MATERIAL WITH WATER IN THE MAINTENANCE AND REFUELING AREA AS SHOWN WITHIN THESE PLANS.
E. NUTRIENTS AND FERTILIZERS SHALL ONLY BE USED TO ESTABLISH RAPID VEGETATION. WHEN THESE PRODUCTS ARE UTILIZED, THE USER SHOULD PAY STRICT ATTENTION TO THE PRODUCTS RECOMMENDED USAGE.
3. CONCRETE WASTE WATER
A. ALL CONCRETE WASTEWATER SHALL BE DISPOSED OF IN THE DESIGNED AREA AS DIRECTED BY THE GENERAL CONTRACTOR OR DEVELOPER/OWNER. THIS AREA IS TO BE A 3' DEEP, 10' SQUARE PIT AS DETAILED ON THE EROSION CONTROL PLAN. THIS AREA SHALL BE INSPECTED ON A DAILY BASIS AT A MINIMUM. WHEN THIS AREA BECOMES FULL, THE POLLUTANTS SHALL BE EXCAVATED, PLACED IN AN ACCEPTABLE CONTAINER AND DISPOSED OF IN PROPER MANNER.
4. PAINT PRODUCTS
A. ALL EXCESS PAINT AND THEIR RELATED PRODUCTS SHALL BE DISPOSED OF IN THE MANNER AT WHICH THE MANUFACTURER SUGGESTS. UNDER NO CIRCUMSTANCES WILL PAINT OR THEIR RELATED PRODUCTS BE CLEANED OR DISPOSED OF IN SOIL, SANITARY SEWERS, STORM SEWERS OR DETENTION BASINS. ANY VIOLATION OF THIS SHALL BE REPORTED TO THE JOB SUPERINTENDENT.

IN THE EVENT OF ACCIDENTALLY CONTAMINATION ALL EFFORTS SHOULD BE MADE TO REMOVE CONTAMINANTS IN AN APPROPRIATE MANNER. THE JOHNSON COUNTY FIRE DEPARTMENT SHOULD BE CONTACTED IMMEDIATELY TO DETERMINE IF FURTHER MEASURES ARE NEEDED.

PERMANENT SEEDING SPECIFICATIONS:
1) ALL DISTURBED LAWN AREAS SHALL RECEIVE PERMANENT SEEDING IMMEDIATELY.
2) ALL DISTURBED LAWN AREA TO HAVE A MINIMUM OF 6 INCHES OF TOPSOIL (COMPACTED THICKNESS).
3) TOPSOIL TO BE FERTILE, FRIABLE, SANDY LOAM REASONABLY FREE OF SUBSOIL, CLAY LUMPS, STONES LARGER THAN ½", EXCESSIVE QUANTITIES OF SMALL STONE/GRAVEL, BRUSH AND OTHER LITER.
4) SOLVE ANY SURFACE OR SUBSURFACE DRAINAGE PROBLEMS AND CONSTRUCT PERMANENT EROSION CONTROL STRUCTURES.
5) PERFORM THE MAJOR FILLING, SHAPING AND SMOOTHING OF GULLIES OR ERODED AREAS.
6) HAVE TOPSOIL TESTED TO CHECK PH AND NUTRIENT LEVELS. PROVIDE FERTILIZER AND SOIL AMENDMENTS AS REQUIRED TO MEET/EXCEED MINIMUM REQUIREMENTS AS SUGGESTED ON SOILS TEST RESULTS FOR LAWNS.
7) WORK FERTILIZER AND SOIL NUTRIENTS INTO TOP 2-3 INCHES OF THE TOPSOIL WITH A SMALL DISK, HARROW OR RAKE OPERATED ACROSS THE SLOPE AS MUCH AS POSSIBLE.
8) ROLL THE TOPSOIL WITH A WATER BALLAST ROLLER WEIGHING 100 TO 300 POUNDS DEPENDING ON SOIL TYPE. ROLL WITH TOPSOIL IN A SEMI-DRY CONDITION IN TWO OPPOSITE DIRECTIONS (RIGHT ANGLES).
9) RAKE OR SCARIFY AND CUT OR FILL IRREGULARITIES THAT DEVELOP AS REQUIRED AND AGAIN ROLL UNTIL AREA IS TRUE AND UNIFORM, FREE FROM LUMPS, DEPRESSIONS AND IRREGULARITIES.
10) SOW SEED WITH ADEQUATE EQUIPMENT AT A TIME WHEN LITTLE OR NO WIND IS BLOWING. BROADCAST HALF OF SEED IN ONE DIRECTION AND THE OTHER HALF IN THE OPPOSITE DIRECTION (RIGHT ANGLES).
11) COVER SEED TO A DEPTH OF ½" BY RAKING OR HARROWING. PROVIDE A LIGHT LAYER OF STRAW OR HAY MULCH AT A RATE OF 2 TONS PER ACRE. APPLY TACKIFIER TO STABILIZE MULCH.
12) HYDROSEEDING IS ACCEPTABLE METHOD OF SEEDING.
13) KEEP TOPSOIL RELATIVELY MOIST UNTIL LAWN IS ESTABLISHED.
14) RESEED AREAS THAT DO NOT SHOW PROMPT GERMINATION AT 14 DAY INTERVALS UNTIL AN ACCEPTABLE STAND OF GRASS IS ASSURED.
15) ALL LAWNS SHALL BE GUARANTEED TO HAVE A FULL UNIFORM STAND OF ACCEPTABLE GRASS AT END OF ONE YEAR GUARANTEE PERIOD WITH NO BARE SPOTS COMPRISING MORE THAN 2% OF ANY LAWN AREA. ANY AREA SO NOTED WILL BE REWORKED UNTIL AN ACCEPTABLE STAND OF GRASS IS ESTABLISHED.
16) ALL LAWNS TO BE MAINTAINED UNTIL FINAL INSPECTION BY LANDSCAPE DESIGNER BUT NOT LESS THAN 60 DAYS FROM TIME OF INSTALLATION. MAINTENANCE TO INCLUDE WATERING, WEEDING, CULTIVATION, MULCHING, MOWING AND ALL OTHER NECESSARY OPERATIONS REQUIRED FOR PROPER ESTABLISHMENT OF LAWN.



ROCK CHECK DAM DETAIL

SECTION 1 – EMERGENCY RESPONSE NUMBERS

EMERGENCY RESPONSE TO ANY LIFE THREATENING PROBLEM	911
COUNTY FIRE DEPARTMENT	911
COUNTY POLICE DEPARTMENT	911
INDIANA DEPARTMENT OF NATURAL RESOURCES	812-477-8773
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT	317-233-7745
JOHNSON COUNTY SOIL AND WATER	317-342-5594

THIS PLAN TO BE USED FOR EROSION CONTROL PURPOSES ONLY. THE CITY/COUNTY ENGINEER HAS THE RIGHT TO REQUIRE ADDITIONAL EROSION CONTROL MEASURES IN THE FIELD AS CONDITIONS WARRANT.

ALL EROSION CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE INDIANA STORM WATER QUALITY MANUAL DATED OCTOBER 2007 BY THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM).

SOILS TYPE LEGEND

Br BROOKSTON SILTY CLAY LOAM
THE MAIN SOIL FEATURES THAT ADVERSELY AFFECT ENGINEERING USES OF THIS SOIL ARE A SEASONAL HIGH WATER TABLE, HIGH POTENTIAL FROST ACTION, MODERATE SHRINK-SWELL POTENTIAL, AND MODERATE PERMEABILITY. THIS SOIL HAS SEVERE LIMITATIONS FOR BUILDING SITES. THE SITES NEED TO BE ARTIFICIALLY DRAINED AND PROTECTED FROM FLOODING. DWELLINGS AND SMALL BUILDINGS WITH BASEMENTS SHOULD NOT BE CONSTRUCTED ON THIS SOIL. USING PROPERLY DESIGNED FOUNDATIONS AND FOOTINGS HELPS TO PREVENT STRUCTURAL DAMAGE FROM FROST ACTION AND SHRINKING AND SWELLING OF THE SOIL. THIS SOIL HAS SEVERE LIMITATIONS FOR LOCAL ROADS AND STREETS BECAUSE OF SEASONAL HIGH WATER TABLE AND HIGH POTENTIAL FROST ACTION. INSTALLATION OF DRAINAGE DITCHES ALONG ROADS HELPS TO LOWER THE WATER TABLE AND PREVENT DAMAGE FROM FROST ACTION. THE BASE MATERIAL FOR ROADS AND STREETS SHOULD BE REPLACED OR STRENGTHENED WITH SUITABLE MATERIAL.

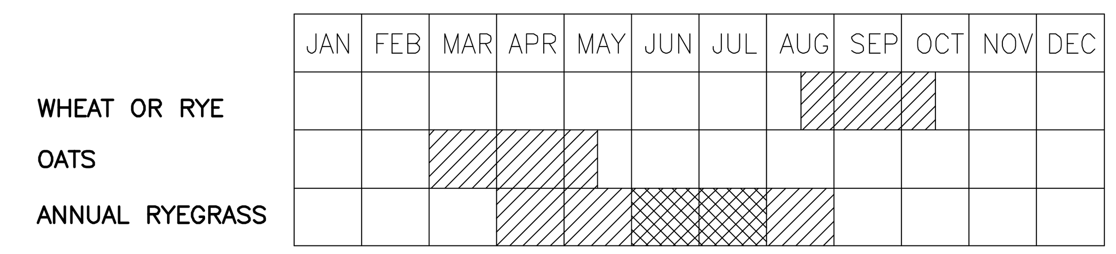
CrA CROSBY SILT LOAM, 0 TO 3 PERCENT SLOPES
THE MAIN SOIL FEATURES THAT ADVERSELY AFFECT ENGINEERING USES OF THIS SOIL ARE MODERATE POTENTIAL FROST ACTION, MODERATE PERMEABILITY IN THE SUBSOIL, RAPID PERMEABILITY IN THE UNDERLYING MATERIAL, AND MODERATE SHRINK-SWELL POTENTIAL. THIS SOIL HAS SLIGHT LIMITATIONS FOR BUILDING SITES AND SEPTIC TANK ABSORPITON FIELDS. IT HAS MODERATE LIMITATIONS FOR LOCAL ROADS AND STREETS BECAUSE OF SHRINK-SWELL POTENTIAL. THE BASE MATERIAL FOR ROADS NEEDS TO BE STRENGTHENED OR REPLACED WITH SUITABLE MATERIAL.

MmB2 MIAMI SILT LOAM, 2 TO 6 PERCENT SLOPES, ERODED. THE MAIN SOIL FEATURES THAT ADVERSELY AFFECT ENGINEERING USES ARE MODERATE POTENTIAL FROST ACTION, MODERATE SHRINK-SWELL POTENTIAL, AND MODERATELY SLOW PERMEABILITY. THE SOIL HAS SEVERE LIMITATIONS FOR BUILDING SITES BECAUSE OF SLOPE. THIS SOIL HAS SEVERE LIMITATIONS FOR LOCAL ROADS AND STREETS. THIS SOILS HAS SEVERE LIMITATIONS FOR SEPTIC TANK ABSORPTION FIELDS BECAUSE OF MODERATELY SLOW PERMEABILITY AND SLOPE.

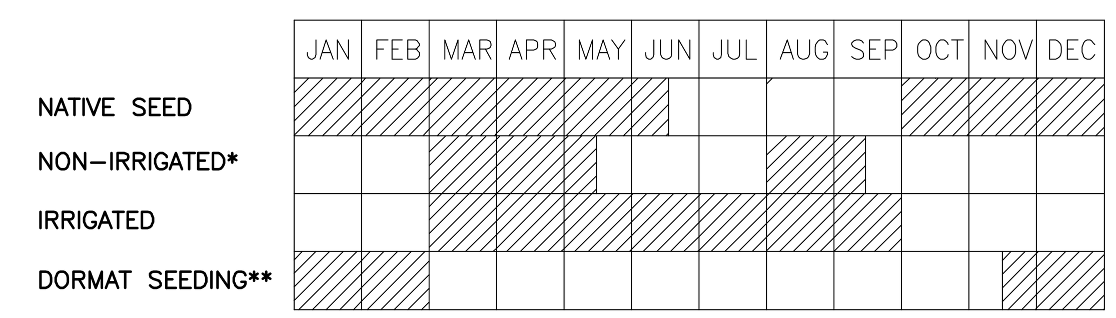
MnC2 MIAMI SILT LOAM, 6 TO 12 PERCENT SLOPES, ERODED.
THE MAIN SOIL FEATURES THAT ADVERSELY AFFECT ENGINEERING USES ARE MODERATE POTENTIAL FROST ACTION, MODERATE SHRINK-SWELL POTENTIAL, AND MODERATELY SLOW PERMEABILITY. THE SOIL HAS SEVERE LIMITATIONS FOR BUILDING SITES BECAUSE OF SLOPE. THIS SOIL HAS SEVERE LIMITATIONS FOR LOCAL ROADS AND STREETS. THIS SOILS HAS SEVERE LIMITATIONS FOR SEPTIC TANK ABSORPTION FIELDS BECAUSE OF MODERATELY SLOW PERMEABILITY AND SLOPE.

CsB2 CROSBY-MIAMI SILT LOAM
2 TO 4 PERCENT SLOPES. THE MAIN SOIL FEATURES THAT ADVERSELY AFFECT THE ENGINEERING USES OF THIS SOIL ARE A SEASONAL HIGH WATER TABLE, MODERATE SHRINK-SWELL POTENTIAL, HIGH POTENTIAL FROST ACTION, AND SLOW PERMEABILITY. THIS SOIL HAS SOME SEVERE LIMITATIONS FOR BUILDING SITES. THE SITES NEED TO BE ARTIFICIALLY DRAINED TO PREVENT WETNESS FROM BECOMING A PROBLEM. DWELLINGS AND SMALL BUILDINGS WITH BASEMENTS SHOULD NOT BE CONSTRUCTED ON THIS SOIL. USING PROPERLY DRAINED FOUNDATIONS AND FOOTINGS HELPS TO PREVENT STRUCTURAL DAMAGE FROM LOW STRENGTH AND SHRINKING AND SWELLING OF THE SOIL. THIS SOIL HAS SEVER LIMITATIONS FOR LOCAL ROADS AND STREETS. THE BASE MATERIAL FOR ROADS NEEDS TO BE STRENGTHENED OR REPLACED WITH SUITABLE MATERIAL.

MtC3 MIAMI CLAY LOAM
6 TO 12 PERCENT SLOPES, SEVERELY ERODED. THE MAIN SOIL FEATURES THAT ADVERSELY AFFECT THE ENGINEERING USES OF THIS SOIL ARE A MODERATE SHRINK-SWELL POTENTIAL, MODERATE POTENTIAL FROST ACTION, AND SLOW PERMEABILITY. THIS SOIL HAS MODERATE LIMITATIONS FOR LOCAL ROADS AND STREETS. THE BASE MATERIAL FOR ROADS NEEDS TO BE STRENGTHENED OR REPLACED WITH SUITABLE MATERIAL.



TEMPORARY SEEDING DATES:



IRRIGATION NEEDED DURING THIS PERIOD, TO CONTROL EROSION AT TIMES OTHER THAN IN THE SHADED AREAS, USE MULCH

* LATE SUMMER SEEDING DATES MAY BE EXTENDED 5 DAYS IF MULCH IS APPLIED.

** INCREASE SEEDING APPLICATION BY 50%

PERMANENT SEEDING DATES

SEEDING DATES

KIND OF SEED	1000 SQ.FT.	ACRE	REMARKS
WHEAT OR RYE	3.5 LBS.	2 BU.	COVER SEED 1" TO 1-1/2" DEEP
SPRING OATS	2.3 LBS.	3 BU.	COVER SEED TO 1" DEEP
ANNUAL RYEGRASS	1 LB.	40 LBS.	COVER SEED TO 1/4" DEEP

* NOT NECESSARY WHERE MULCH IS APPLIED.

TEMPORARY SEED MIXTURES

SPECIES	SEEDING RATE LBS/ACRE	LBS/1000 SQ. FT.	SUITABLE PH	SITE SUITABILITY DROUGHTY	WELL DRAINED	WET
LEVEL AND SLOPING. OPEN AREAS						
1. TALL FESCUE	35	.8	5.5-8.3	2	1	2
2. TALL FESCUE	25	.6	5.5-8.3		1	
RED CLOVER**	5	.12				
3. KENTUCKY BLUEGRASS	15	.4	5.5-7.5	2	1	
CREEPING RED FESCUE	15	.4				
STEEP BANKS AND CUTS						
4. TALL FESCUE	15	.4	5.8-7.5	2	1	2
KENTUCKY BLUEGRASS	25	.6				
5. TALL FESCUE	35	.8	5.5-8.3	2	1	
EMERALD CROWNVETCH	10	.25				
LAWNS AND HIGH MAINTENANCE AREAS						
6. KENTUCKY BLUEGRASS	40	.9	5.8-7.5	2	1	
CREEPING RED FESCUE	40	.9				
7. PERENNIAL RYEGRASE (TURF TYPE)	170	4.0	5.0-7.5		1	
8. TALL FESCUE	170	4.0	5.5-8.3	2	1	2

1 – PREFERRED 2 – WILL TOLERATE

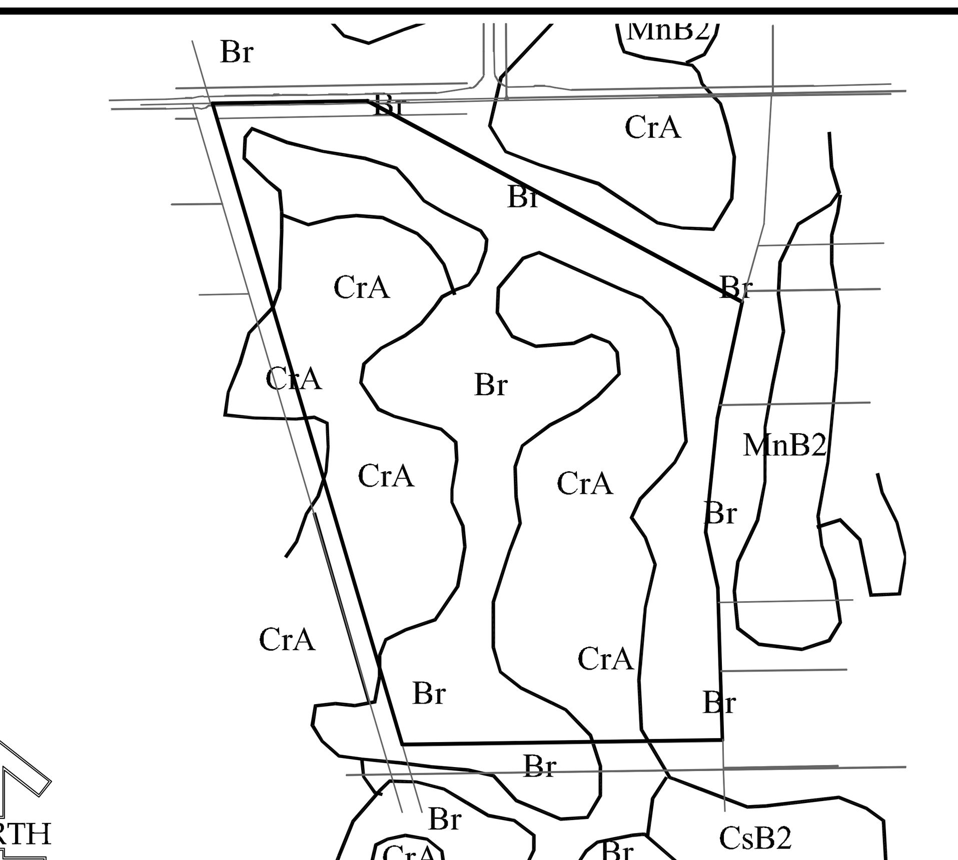
PERMANENT SEED MIXTURES

APPLY LIME TO RAISE THE PH TO THE LEVEL NEEDED FOR SPECIES BEING SEEDED. APPLY 23 POUNDS OF 12-12-12 ANALYSIS FERTILIZER (OR EQUIVALENT) PER 1000 SQ. FT. (APPROXIMATELY 1000 POUNDS PER ACRE) OR FERTILIZE ACCORDING TO TEST. APPLICATION OF 150 LBS. OF AMMONIUM NITRATE ON AREAS LOW IN ORGANIC MATTER AND FERTILITY WILL GREATLY ENHANCE VEGETATIVE GROWTH.

WORK THE FERTILIZER AND LIME INTO THE SOIL TO A DEPTH CF 2-3 INCHES WITH A HARRCW. DISK OR RAKE OPERATED ACROSS THE SLOPE AS MUCH AS POSSIBLE.

SELECT A SEEDING MIXTURE BASED ON PROJECTED USE OF THE AREA, WHILE CONSIDERING BEST SEEDING DATES.

SEEDING PREPARATION



SOILS MAP

EROSION CONTROL REQUIREMENTS FOR COMPLIANCE WITH IDEM GENERAL PERMIT RULES FOR STORM WATER RUNOFF FROM CONSTRUCTION SITES

1. ALL EROSION CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE INDIANA STORM WATER QUALITY MANUAL DATED OCTOBER 2007 BY THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM).
2. THE EROSION CONTROL MEASURES INCLUDED IN THIS PLAN SHALL BE INSTALLED PRIOR TO INITIAL LAND DISTURBANCE ACTIVITIES OR AS SOON AS PRACTICAL. SEDIMENT SHALL BE PREVENTED FROM DISCHARGING FROM THE PROJECT SITE BY INSTALLING AND MAINTAINING SILT FENCE, STRAW BALES, SEDIMENT BASINS, ETC. AS SHOWN I=ON THIS PLAN. IF SHOWN ON THIS PLAN, ENERGY-DISSIPATION DEVICES OR EROSION CONTROL AT THE OUTFALL OF THE STORM SEWER SYSTEM SHALL BE INSTALLED AT THE TIME OF THE CONSTRUCTION OF THE OUTFALL. THE PROPOSED DETENTION BASIN SHALL BE UTILIZED AS A SEDIMENT BASIN DURING CONSTRUCTION FOR AS LONG AS PRACTICAL.
3. ALL ON-SITE STORM DRAIN INLETS SHALL BE PROTECTED AGAINST SEDIMENTATION WITH FILTER FABRIC, OR EQUIVALENT BARRIERS AS SHOWN ON THIS PLAN.
4. EXCEPT AS PREVENTED BY INCLEMENT WEATHER CONDITIONS OR OTHER CIRCUMSTANCES BEYOND THE CONTROL OF THE CONTRACTOR / DEVELOPER APPROPRIATE EROSION CONTROL PRACTICES WILL BE INITIATED WITHIN (7) SEVEN DAYS OF THE LAST LAND DISTURBING ACTIVITY AT THE SITE. THE SITE SHALL BE STABILIZED BY SEEDING, SODDING, MULCHING, COVERING, OR BY OTHER EQUIVALENT EROSION CONTROL MEASURES.
5. THIS EROSION CONTROL PLAN SHALL BE IMPLEMENTED ON ALL DISTURBED AREAS WITHIN THE CONSTRUCTION SITE. ALL MEASURES INVOLVING EROSION CONTROL PRACTICES SHALL BE INSTALLED UNDER THE GUIDANCE OF A QUALIFIED PERSONNEL EXPERIENCED IN EROSION CONTROL AND FOLLOWING THE PLANS AND SPECIFICATIONS INCLUDED HEREIN.
6. DURING THE PERIOD OF CONSTRUCTION ACTIVITY, ALL SEDIMENT BASINS AND OTHER EROSION CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR. AT THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE THE TRANSFER OF REQUIRED MAINTENANCE RESPONSIBILITIES WITH THE OWNER.
7. PUBLIC OR PRIVATE ROADWAYS SHALL BE KEPT CLEARED OF ACCUMULATED SEDIMENT. BULK CLEARING OF ACCUMULATED SEDIMENT SHALL NOT INCLUDE FLUSHING THE AREA WITH WATER. CLEARED SEDIMENT SHALL BE RETURNED TO THE POINT OF LIKELY ORIGIN OR OTHER SUITABLE LOCATION.
8. THE CONTRACTOR SHALL CONTROL WASTES, GARBAGE, DEBRIS, WASTEWATER, AND OTHER SUBSTANCES ON THE SITE IN SUCH A WAY THAT THEY SHALL NOT BE TRANSPORTED FROM THE SITE BY THE ACTION OF WINDS, STORM WATER RUNOFF, OR OTHER FORCES. PROPER DISPOSAL OR MANAGEMENT OF ALL WASTES AND UNUSED BUILDING MATERIALS APPROPRIATE TO THE NATURE OF THE WASTE OR MATERIAL IS REQUIRED.

EROSION CONTROL CONSTRUCTION SEQUENCE SCHEDULING

CONSTRUCTION PHASE (SPECIFIC ACTIVITIES OR EROSION CONTROL PRACTICES)	CONSTRUCTION SCHEDULE CONSIDERATIONS	MONITORING AND MAINTENANCE SCHEDULE	CONSTRUCTION START DATE (APPROX. DATE)
PRE-CONSTRUCTION ACTIONS (EVALUATION/PROTECTION OF IMPORTANT SITE CHARACTERISTICS)	PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES, CONTRACTOR TO HAVE PRE-CONSTRUCTION MEETING WITH CITY OFFICIAL (IF REQUIRED) BEFORE CONSTRUCTION, EVALUATE, MARK, AND PROTECT IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, UNIQUE AREAS (e.g., WETLANDS) TO BE PRESERVED, ON-SITE SEPTIC SYSTEM ABSORPTION FIELDS, AND VEGETATION SUITABLE FOR FILTER STRIPS, ESPECIALLY IN PERIMETER AREAS.	ESTABLISH AND EVALUATE PROJECT ASSIGN SUPERINTENDENT WHOM WILL BE IN CHARGE OF OVERSEEING EROSION FACILITIES.	WEEK OF . (LASTING APPOX. 1 WEEK)
CONSTRUCTION ACCESS (CONSTRUCTION ENTRANCES, CONSTRUCTION ROUTES, EQUIPMENT PARKING AREAS)	STABILIZE BARE AREAS IMMEDIATELY WITH GRAVEL AND TEMPORARY VEGETATION PRIOR TO COMMENCING WORK.	INSPECT CONSTRUCTION ENTRANCE WEEKLY AND AFTER EACH 1/2" RAIN EVENT AND HEAVY USEAGE. RESHAPE AND TOP DRESS AS NEEDED INCLUDING REMOVAL OF IMMEDIATED SEDIMENTS BY SWEEPING OR BRUSHING. IF FLUSHING PROVIDE ADEQUATE SEDIMENT TRAPS FOR WATER CONVEYANCE.	WEEK OF . (LASTING APPOX. 1 WEEK)
SEDIMENT BARRIERS AND TRAPS (SEDIMENT BASINS, SILT FENCES, OUTLET PROTECTION)	INSTALL PRINCIPAL BASINS AFTER CONSTRUCTION SITE IS ASSESSED. INSTALL ADDITIONAL TRAPS AND BARRIERS AS NEEDED DURING GRADING. CONSTRUCT DETENTION BASINS AFTER CONSTRUCTED, INSTALL PERIMETER SWALES.	INSPECT THE FABRIC BARRIER WEEKLY AND AFTER EACH 1/2" RAIN EVENT, AND MAKE NEEDED REPAIRS IMMEDIATELY. REMOVE SEDIMENT FROM THE POOL AREA TO PROVIDE STORAGE FOR THE NEXT STORM. AVOID DAMAGING OR UNDERCUTTING THE FABRIC DURING SEDIMENT REMOVAL. WHEN THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE AND PROPERLY DISPOSE OF ALL CONSTRUCTION MATERIAL AND SEDIMENT, GRADE THE AREA TO THE ELEVATION OF THE TOP OF THE INLET, THEN STABILIZE.	WEEK OF . (LASTING APPOX. 1 WEEK)
RUNOFF CONTROL (DIVERSIONS, PERIMETER DIKES, WATER BARS, OUTLET PROTECTION)	INSTALL PRACTICES AFTER PRINCIPAL SEDIMENT TRAPS ARE INSTALLED BUT BEFORE SITE GRADING. INSTALL ADDITIONAL RUNOFF CONTROL MEASURES DURING GRADING AS NEEDED.	INSPECT THE SEDIMENT BASIN WEEKLY AND AFTER EACH 1/2" RAIN EVENT. REMOVE AND PROPERLY DISPOSE OF SEDIMENT WHEN IT ACCUMULATES TO ONE-HALF THE DESIGN VOLUME (LEVEL MARKED BY A REFERENCE STAKE) PERIODICALLY CHECK THE EMBANKMENT, EMERGENCY SPILLWAY, AND OUTLET FOR EROSION DAMAGE, PIPING, SETTLING, SEEPAGE, OR SLUMPING ALONG THE TOE OR AROUND THE BARREL; AND REPAIR IMMEDIATELY. REMOVE TRASH AND OTHER DEBRIS FROM THE RISER, EMERGENCY SPILLWAY, AND POOL AREA. CLEAN OR REPLACE THE GRAVEL AROUND THE RISER IF THE SEDIMENT POOL DOES NOT DRAIN PROPERLY. REMOVE THE BASIN AFTER THE DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED, INSPECTED, AND APPROVED. DO SO BY DRAINING ANY WATER, REMOVING THE SEDIMENT TO A DESIGNATED DISPOSAL AREA, SMOOTHING THE SITE TO BLEND WITH THE SURROUNDING AREA, THEN STABILIZING.	WEEK OF . (LASTING APPOX. 1 WEEK)
RUNOFF CONVEYANCE SYSTEMS (STABILIZED STREAMBANKS, STORM SEWER DRAINS, INLET AND OUTLET PROTECTION, OPEN CHANNELS)	WHERE NECESSARY, STABILIZE STREAMBANKS AS EARLY AS POSSIBLE. INSTALL PRINCIPAL CONVEYANCE SYSTEM WITH RUNOFF CONTROL MEASURES. INSTALL REMAINDER OF SYSTEM AFTER GRADING.	PLACEMENT STORM SEWER DRAINS, INLETS AND PIPES TO BE IMMEDIATELY FOLLOWED BY INLET PROTECTION MEASURES AND TEMPORARY SEDIMENT TRAPS. OPEN CHANNEL DRAINAGE SWALES TO BE IMMEDIATELY FOLLOWED BY PLACEMENT OF EROSION CONTROL BLANKETS. INSPECT TEMPORARY SEDIMENT TRAPS WEEKLY AND AFTER EACH STORM EVENT, AND IMMEDIATELY REPAIR ANY EROSION AND PIPING HOLES. REMOVE SEDIMENT WHEN IT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH. REPLACE SPILLWAY GRAVEL FACING IF CLOGGED. INSPECT VEGETATION, AND RE-SEED IF NECESSARY. CHECK THE SPILLWAY DEPTH PERIODICALLY TO ENSURE A MINIMUM OF 1 1/2-FT. DEPTH FROM THE LOWEST POINT OF THE SETTLED EMBANKMENT TO HIGHEST POINT OF THE SPILLWAY CREST, AND FILL ANY LOW AREAS TO MAINTAIN DESIGN ELEVATION.	WEEK OF . (LASTING APPOX. 4 WEEK)
LAND CLEARING AND GRADING (CUTTING/FILLING, GRADING DRAINS, SEDIMENT TRAPS, BARRIERS, DIVERSIONS, SURFACE ROUGHENING)	BEGIN MAJOR CLEARING AND GRADING AFTER INSTALLING THE KEY SEDIMENT AND RUNOFF MEASURES. CLEAR BORROW AND DISPOSAL AREAS AS NEEDED. INSTALL ADDITIONAL CONTROL MEASURES AS GRADING PROGRESSES.	INSPECT NEWLY TOPSOILED AREAS WEEKLY UNTIL VEGETATION IS ESTABLISHED. REPAIR ERODED OR DAMAGED AREAS AND REVEGETATE.	WEEK OF . (LASTING APPOX. 4 WEEK)
SURFACE STABILIZATION (TEMPORARY AND PERMANENT SEEDING, MULCHING, SODDING, RIP-RAP)	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETED.	INSPECT WEEKLY AND ESPECIALLY AFTER EACH 1/2" RAIN EVENT, UNTIL THE STAND IS SUCCESSFULLY ESTABLISHED. (CHARACTERISTICS OF A SUCCESSFUL STAND INCLUDE: VIGOROUS DARK GREEN OR BLUISH-GREEN SEEDLINGS; UNIFORM DENSITY WITH NURSE PLANTS, LEGUMES, AND GRASSES WELL INTER- MIXES; GREEN LEAVES; AND THE PERENNIALS REMAINING GREEN THROUGHOUT THE SUMMER, AT LEAST AT THE PLANT BASE.) PLAN TO ADD FERTILIZER THE FOLLOWING GROWING SEASON ACCORDING TO SOIL TEST RECOMMENDATIONS. REPAIR DAMAGED, BARE, OR SPARSE AREAS BY FILLING ANY GULLIES, RE-FERTILIZING, OVER-OR RE-SEEDING, AND MULCHING. IF PLANT COVER IS SPARSE OR PATCHY, REVIEW THE PLANT MATERIALS CHOSEN, SOIL FERTILITY, MOISTURE CONDITION, AND MULCHING; THEN REPAIR THE AFFECTED AREA EITHER BY OVER-SEEDING OR BY RE-SEEDING AND MULCHING AFTER RE- PREPARING THE SEEDBED. IF VEGETATION FAILS TO GROW, CONSIDER SOIL TESTING TO DETERMINE ACIDITY OR NUTRIENT DEFICIENCY PROBLEMS. IF ADDITIONAL FERTILIZATION IS NEEDED TO GET A SATISFACTORY STAND, DO SO ACCORDING TO SOIL TEST RECOMMENDATIONS. INSPECT AFTER STORM EVENTS TO CHECK FOR MOVEMENT OF MULCH OR FOR EROSION. IF WASHOUT, BREAKAGE, OR EROSION IS PRESENT, REPAIR THE SURFACE, THEN RE-SEED, RE-MULCH AND, IF APPLICABLE, INSTALL NEW NETTING. CONTINUE INSPECTIONS UNTIL VEGETATION IS FIRMLY ESTABLISHED. INSPECT PERIODICALLY FOR DISPLACED ROCK MATERIAL, SLUMPING, AND EROSION AT EDGE, ESPECIALLY DOWNSTREAM OR DOWN SLOPE. (PROPERLY DESIGNED AND INSTALLED RIPRAP USUALLY REQUIRES VERY LITTLE MAINTENANCE IF PROMPTLY REPAIRED.)	WEEK OF . (LASTING APPOX. 2 WEEK)
UTILITY / PAVEMENT CONSTRUCTION (UTILITIES, PAVING)	INSTALL NECESSARY EROSION AND SEDIMENT CONTROL PRACTICES AS WORK TAKES PLACE.	DURING VEGETATIVE ESTABLISHMENT, INSPECT WEEKLY AND AFTER EACH 1/2" RAIN EVENT FOR ANY EROSION BELOW THE BLANKET. IF ANY AREA SHOWS EROSION, PULLBACK THAT PORTION OF THE BLANKET COVERING IT, ADD SOIL, RE-SEED THE AREA, AND RE- LAY AND STAPLE THE BLANKET. AFTER VEGETATIVE ESTABLISHMENT, CHECK THE TREATED AREA PERIODICALLY.	WEEK OF . (LASTING APPOX. 6 WEEK)
BUILDING CONSTRUCTION	INSTALL NECESSARY EROSION AND SEDIMENT CONTROL PRACTICES AS WORK TAKES PLACE.	DURING VEGETATIVE ESTABLISHMENT, INSPECT WEEKLY AND AFTER EACH 1/2" RAIN EVENT FOR ANY EROSION BELOW THE BLANKET. IF ANY AREA SHOWS EROSION, PULLBACK THAT PORTION OF THE BLANKET COVERING IT, ADD SOIL, RE-SEED THE AREA, AND RE- LAY AND STAPLE THE BLANKET. AFTER VEGETATIVE ESTABLISHMENT, CHECK THE TREATED AREA PERIODICALLY.	WEEK OF . (LASTING APPOX. 3 YEARS)
LANDSCAPING AND FINAL STABILIZATION (TOPSOIL, TREES, AND SHRUBS, PERMANENT SEEDING, MULCHING, SODDING, RIP-RAP)	STABILIZE ALL OPEN AREAS INCLUDING BORROW AND SPOIL AREAS. REMOVE TEMPORARY CONTROL MEASURES AND STABILIZE. PERMANENT SEED ALL BARE SOIL AREAS.	INSPECT WEEKLY AND AFTER EACH 1/2" RAIN EVENT, UNTIL THE STAND IS SUCCESSFULLY ESTABLISHED. REPAIR DAMAGED, BARE, OR SPARSE AREAS BY FILLING ANY GULLIES, RE-FERTILIZING, OVER-OR RE-SEEDING, AND MULCHING. IF PLANT COVER IS SPARSE OR PATCHY, REVIEW THE PLANT MATERIALS CHOSEN, SOIL FERTILITY, MOISTURE CONDITION, AND MULCHING; THEN REPAIR THE AFFECTED AREA EITHER BY OVER-SEEDING OR BY RE-SEEDING AND MULCHING AFTER RE- PREPARING THE SEEDBED. IF ADDITIONAL FERTILIZATION IS NEEDED TO GET A SATISFACTORY STAND, DO SO ACCORDING TO SOIL TEST RECOMMENDATIONS.	WEEK OF . (LASTING APPOX. 2 WEEK)

MAINTENANCE-- INSPECT PRACTICES ONCE A WEEK, & AFTER EACH 1/2" RAIN EVENT.

SYMBOL	REVISION	DATE

SCALE NONE | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
STORM WATER POLLUTION PREVENTION PLAN DETAILS

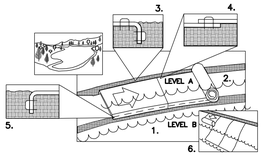
PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A – Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER 21008

SHEET C801

DATE SEPTEMBER 3, 2021

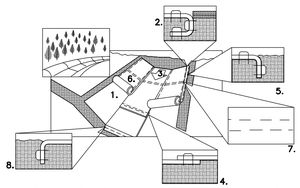


1. FOR OPTIMUM PERFORMANCE LOWER WATER FROM LEVEL A TO LEVEL B BEFORE INSTALLATION, IF POSSIBLE.
2. PREPARE SOIL BEFORE INSTALLING BLANKETS INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED.
3. THE TOP EDGE OF THE BLANKET MUST BE ANCHORED IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
4. PLACE BLANKETS END OVER END WITH A 3" TO 4" OVERLAP, STAPLE THROUGH BOTH BLANKETS OF THE OVERLAPPED AREA. APPROXIMATELY 6" APART.
5. THE EDGE OF THE BLANKET THAT FALLS BELOW NORMAL WATER LEVEL MUST BE ANCHORED IN A 12" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. (STONE MAY BE SUBSTITUTED FOR SOIL BACKFILL).
6. IF BANK IS STEEP OR IF WATER LEVEL VARIES MORE THAN THE WIDTH OF THE BLANKET, USE VERTICAL INSTALLATION.

NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF 18" OR LONGER METAL/WASHER PINS MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.

REFER TO GENERAL STAPLE PATTERN GUIDE FOR CORRECT STAPLE PATTERN RECOMMENDATIONS FOR SLOPE INSTALLATIONS.

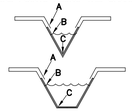
SHORELINE APPLICATIONS



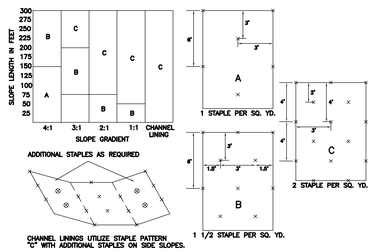
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW ON BOTTOM OF CHANNEL.
4. PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH A 6" OVERLAP. USE A DOUBLE ROW OF STAGGERED STAPLES 4" APART TO SECURE BLANKETS.
5. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED IN6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. BLANKETS ON SIDE SLOPES MUST BE OVERLAPPED 4" OVER THE CENTER BLANKET AND STAPLED.
7. IN MEDIUM/HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOM-MENDED AT 30 TO 40 FOOT INTERVALS. USE A ROW OF STAPLES 4" APART OVER THE ENTIRE WIDTH OF THE CHANNEL. PLACE A SECOND ROW 4" BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

NOTE:
HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM SIDE SLOPE VERTICES



CHANNEL APPLICATIONS



GENERAL STAPLE RECOMMENDATIONS

STAPLE PATTERNS APPLY TO ALL NORTH AMERICAN GREEN EROSION CONTROL BLANKETS. STAPLE PATTERNS MAY VARY DEPENDING UPON SOIL TYPE AND AVERAGE ANNUAL RAINFALL.

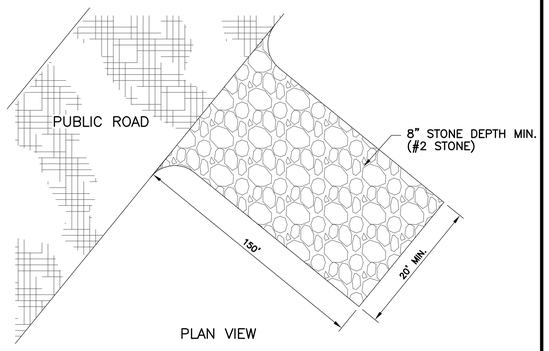
AT SLOPE LENGTHS GREATER THAN 300 FEET OR WHERE DRAINAGE OVER LARGE AREAS IS DIRECTED ONTO THE BLANKETS, STAPLE PATTERN "C" SHOULD BE UTILIZED.

CHANNEL LININGS REQUIRED A 2.0' MINIMUM OVERLAP AT LONGITUDINAL JOINTS. SIDESLOPES SHALL REQUIRE A 6" MINIMUM OVERLAP. WHERE OVERLAPS OCCUR, THE UPSTREAM BLANKET SHALL OVERLAP THE DOWNSTREAM.

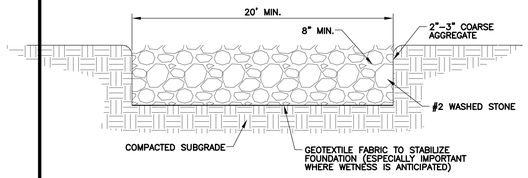
IF OTHER THAN NORTH AMERICAN GREEN EROSION CONTROL BLANKETS ARE INSTALLED FOLLOW THE INSTALLATION DIRECTIONS RECOMMENDED BY THAT PRODUCTS COMPANY.

BLANKET STAPLE PATTERN

EROSION CONTROL BLANKET INSTALLATION



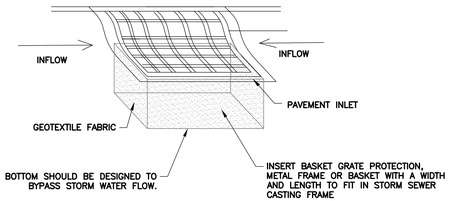
PLAN VIEW



PROFILE VIEW

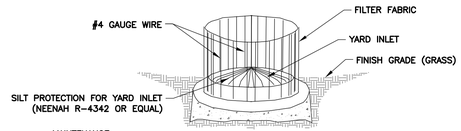
1. STONE SIZE SHALL CONFORM TO ASTM D48 SIZE #1(2" TO 3" DIA.)
2. PERIODIC STONE TOP DRESSING & WASHING AS REQUIRED.

TEMPORARY CONSTRUCTION ENTRANCE DETAIL



1. INSPECT ONCE PER WEEK OR AFTER EACH 1/2" OF RAINFALL. REMOVE EXCESS DEPOSITS, REPLACE OR CLEAN FABRIC AS NEEDED. IF PROTECTION BECOMES INEFFECTIVE, REPAIR OR REPLACE IMMEDIATELY.
2. TO BE USED IN CONJUNCTION WITH OTHER SEDIMENT CONTROL MEASURES
3. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE THE INSERT AND SEDIMENT DEPOSITS.

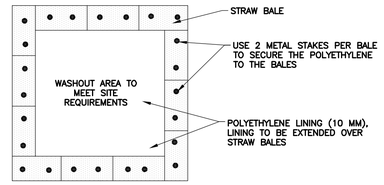
TEMPORARY BASKET INSERT PROTECTION DETAIL (PAVEMENT INLET)



MAINTENANCE
1. INSPECT THE YARD INLET PROTECTION ONCE PER WEEK DURING CONSTRUCION AND AFTER EACH STORM EVENT, AND MAKE NEEDED REPAIRS IMMEDIATELY.
2. IF PROTECTION BECOMES INEFFECTIVE, REPAIR OR REPLACE IMMEDIATELY.
3. REMOVE SEDIMENT FROM THE POOL AREA TO ENSURE ADEQUATE RUNOFF STORAGE FROM THE NEXT STORM EVENT.
4. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE THE FABRIC AND SEDIMENT DEPOSITS BRING THE DISTURBED AREA TO GRADE, AND STABILIZE.

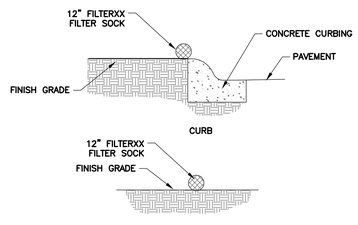
DROP INLET BASKET
1. INTENT OF THE PROTECTION DEVICE IS TO DETAIN STORMWATER RUNOFF FOR PURPOSE OF ALLOWING SUSPENDED SOLIDS TO SETTLE OUT BEFORE WATER ENTERS THE YARD INLET.
2. BOTTOM OF PROTECTION SHALL BE SEALED AGAINST THE BOTTOM OF THE CASTING, OVERALL DIMENSIONS SHALL BE NO SMALLER THEN THE YARD INLET CASTING. HEIGHT SHALL BE 15".
3. BASKET FRAME SHALL BE WELDED WIRE MESH OR BENT AND WELDED TO ITSELF TO FIT CASTING. WIRE FRAME SHALL BE .149 DIA OR LARGER WITH OPENINGS NO LARGER THEN 18 SQ. IN. TOP OF BASKET TO REMAIN OPEN.
4. FABRIC SHALL BE WOVEN POLPROPLYLENE, ALLOWING 15-25 GAL/MIN./SQ. IN. IF NON-WOVEN FABRIC IS USED, THE MAINTENANCE INTERVALS SHALL BE INCREASE TO REPLACE SILT LADEN FABRIC. FRABIC SHALL BE ATTACHED TO FRAM AND FOLDED UNDER BOTTOM TO SEAL AGAINST CASTING.

YARD INLET PROTECTION DETAIL



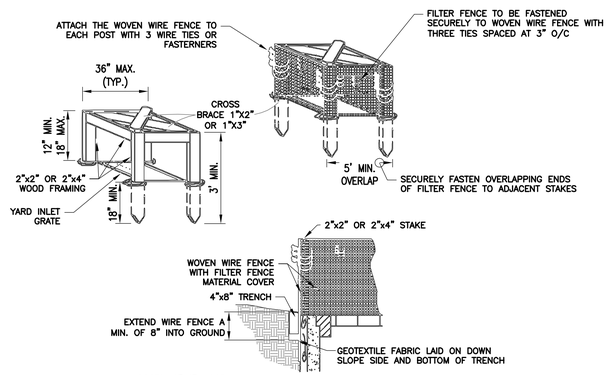
NOTE:
1. INSPECT ONCE PER WEEK OR AFTER EACH RAIN EVENT.
2. WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ACTIVITIES.
3. SIGN SHALL BE CLEARLY PLACED AT THE WASHOUT AREA NEAR THE CONSTRUCTION ENTRANCE.
4. CONTRACTOR SHALL PROVIDE ADDITIONAL WASHOUT AREAS OR LARGER AREAS, IF REQUIRED TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
5. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM WASHOUT AREA AND DISPOSED OF AT A APPROVED WASTE SITE.
6. ONCE WASHOUT AREA IS REMOVED, SEED DISTURBED AREA AS NECESSARY.

CONCRETE WASHOUT DETAIL



NOTE:
1. INSPECT ONCE PER WEEK OR AFTER EACH RAIN EVENT. INSPECT FOR DAMAGE FROM VEHICULAR OR CONSTRUCTION ACTIVITY, REPAIR AS NECESSARY.
2. REMOVE ACCUMULATED SEDIMENT FROM PAVED AREA (DO NOT FLUSH WITH WATER) AFTER EACH STORM EVENT. PLACE REMOVED SEDIMENT IN A AREA THAT WILL BE RE-ENTER PAVED AREAS OR STORM INLETS.

MULCH WATTEL FLOWLINE/CURB PROTECTION

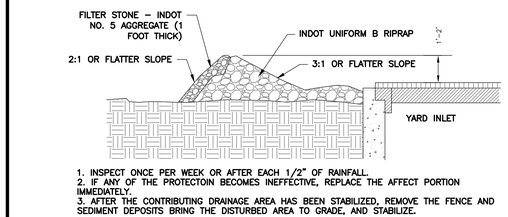


POSTS: 2"x4" WOOD
FENCE: WOVEN WIRE, 14-1/2 GA., 6" MAX MESH OPENING
FABRIC: IN ACCORDANCE WITH ASTM D 6461

INSTALLATION:
1. FOR FABRIC, DIG AN 8" DEEP, 4" WIDE TRENCH AROUND THE PERIMETER OF THE INLET, OR TUCK FABRIC IN UNDER INLET CASTING.
2. USING PRE-ASSEMBLED GEOTEXTILE FABRIC AND WIRE MESH, TIGHTLYSTRETCH THE GEOTEXTILE FABRIC AROUND CASTING.
3. PLACE THE BOTTOM 12 INCHES OF GEOTEXTILE FABRIC INTO THE EIGHT-INCH DEEP TRENCH, LAYING THE REMAINING FOUR INCHES IN THE BOTTOM OF THE TRENCH AND EXTENDING AWAY FROM THE INLET OR TUCK FABRIC IN UNDER CASTING.
4. BACKFILL THE TRENCH WITH SOIL MATERIAL AND COMPACT IT IN PLACE.
5. PROVIDE CROSS BRACING WITH SQUARED PROTECTION CONFIGURATION.

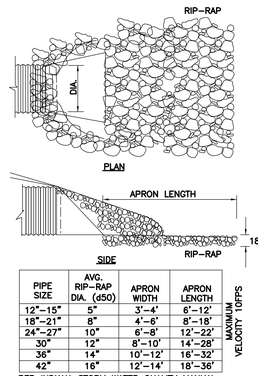
MAINTENANCE:
1. INSPECT WEEKLY AND AFTER EACH RAIN EVENT OF 1/2" OR MORE.
2. INSPECT GEOTEXTILE FABRIC AND MAKE NEEDED REPAIRS IMMEDIATELY.
3. WHEN SEDIMENT DEPTH IS EQUAL TO OR GREATER THAN HALF THE FENCE HEIGHT, REMOVE SEDIMENT AND HAUL TO AN APPROVED LOCATION.
4. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE THE INSERT AND SEDIMENT DEPOSITS.

FILTER FENCE INLET PROTECTION DETAIL



1. INSPECT ONCE PER WEEK OR AFTER EACH 1/2" OF RAINFALL.
2. IF ANY OF THE PROTECTOIN BECOMES INEFFECTIVE, REPLACE THE AFFECT PORTION IMMEDIATELY.
3. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, REMOVE THE FENCE AND SEDIMENT DEPOSITS BRING THE DISTURBED AREA TO GRADE, AND STABILIZE.

GRAVEL DONUT DROP INLET PROTECTION



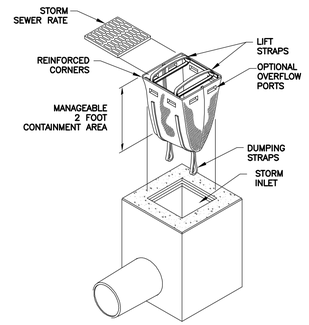
PIPE SIZE	AVG. RIP-RAP DIA. (d50)	APRON WIDTH	APRON LENGTH
12"-15"	5"	3'-4'	6'-12'
18"-21"	8"	4'-6'	8'-18'
24"-27"	10"	6'-8'	12'-22'
30"	12"	8'-10'	14'-28'
36"	14"	10'-12'	16'-32'
42"	16"	12'-14'	18'-36'

MAXIMUM VELOCITY 10FPS

PER INDIANA STORM WATER QUALITY MANUAL DATED OCTOBER 2007

1. INSTALL AT LOCATION SHOWN PLANS. ENSURE SMOOTH TRANSITION TO SURROUNG GRADE. INSTALL GEOTEXTILE FABRIC ON COMPACTED SUBGRADE PRIOR TO INSTALLATION OF APRON.
2. INSPECT ONCE PER WEEK OR AFTER EACH RAIN EVENT. CHECK FOR STONE DISPLACEMENT, REPLACE AS NECESSARY. CHECK FOR PIPE UNDERCUTTING AND EROSION SCOURING, REPAIRE AS NEEDED.
3. REFER TO CHAPTER 7 OF THE INDIANA STORM WATER QUALITY MANUAL, DATED, OCTOBER 2007 FOR REQUIRED PRACTICES FOR CONCRETE WASHOUTS

OUTLET/INLET PROTECTION DETAIL



DANDY SACK

INSTALLATION:
1. REMOVE THE GRATE FROM THE CATCH BASIN.
2. FOR OIL AND SEDIMENT MODEL; TO INSTALL OR REPLACE ABSORBENT, PLACE ABSORBENT PILLOW IN UNIT, ON THE BOTTOM (BELOW-GRADE SIDE) OF THE UNIT.
3. STAND THE GRATE ON END. MOVE THE TOP LIFTING STRAPS OUT OF THE WAY AND PLACE THE GRATE INTO THE DANDY SACK UNIT SO THAT THE GRATE IS BELOW THE TOP STRAPS AND ABOVE THELOWER STRAPS. THE GRATE SHOULD BE CRADLED BETWEEN THE UPPER AND LOWER STRAPS.
4. HOLDING THE LIFTING DEVICES, INSERT THE GRATE INTO THE INLET, BEING CAREFUL THAT THE GRATE REMAINS IN PLACE AND BEING CAREFUL NOT TO DAMAGE THE DANDY SACK UNIT.

MAINTENANCE:
1. REMOVE ALL ACCUMULATED SEDIMENT AND DEBRIS FROM VICINITY OF UNIT AFTER EACH STONN EVENT.
2. AFTER EACH STORM EVENT AND AT REGULAR INTERVALS, LOOK INTO THE DANDY SACK UNIT. IF THE UNIT IS MORE THAN 1/3 FULL OF ACCUMULATED SEDIMENT, THE UNIT MUST BE EMPTIED.
3. TO EMPTY THE UNIT, USING THE LIFTING STRAPS LIFT THE UNIT OUT OF THE INLET AND REMOVE THE GRATE, TRANSPORT THE UNIT TO AN APPROPRIATE LOCATION FOR REMOVAL OF THE CONTENTS. HOLDING THE DUMPING STRAPS ON THE OUTSIDE AT THE BOTTOM OF THE UNIT, TUM THE UNIT UPSIDE DOWN, EMPTYING THE CONTENTS. REINSTALL UNIT AS ABOVE.
4. FOR OIL AND SEDIMENT MODEL; REMOVE AND REPLACE ABSORBENT WHEN NEAR SATURATION.
5. DISPOSE OF UNIT AND/OR ABSORBENT IN ACCORD WITH APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL LAWS AND REGULATIONS.

TEMPORARY INLET PROTECTION DETAIL

SYMBOL	REVISION	DATE

SCALE: NONE
DRAWN: JPH
CHECKED: JKS
CERTIFIED: JKS

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REGISTERED
No. 19419
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9/3/21

JOB NUMBER
21008

SHEET
C802

DATE
SEPTEMBER 3, 2021

SITE WORK GENERAL NOTES AND SPECIFICATIONS

GENERAL:
WHEREVER A CONFLICT OR DEFICIENCY OCCURS BETWEEN THE CONSTRUCTION STANDARDS AND SPECIFICATIONS ADOPTED BY THE JOHNSON COUNTY PLANNING AND HIGHWAY DEPARTMENTS. THE HIGHER OR MORE RESTRICTIVE STANDARD OR SPECIFICATION SHALL APPLY.

REFERENCE MATERIAL:

SUBDIVISION CONTROL AND LAND DEVELOPMENT ORDINANCE CHAPTER 102 OF CITY OF FRANKLIN AS REVISED AND CURRENT I.N.D.O.T. STANDARD SPECIFICATIONS

A. NOTICES AND PERMITS
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING OR VERIFYING THAT ALL PERMITS AND APPROVALS ARE OBTAINED FROM THE RESPECTIVE CITY, COUNTY AND STATE AGENCIES PRIOR TO STARTING CONSTRUCTION.
2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES IN THE VICINITY OF THE CONSTRUCTION AREA PRIOR TO STARTING ANY CONSTRUCTION.
3. IT SHALL BE THE CONTRACTORS RESPONSIBILITY FOR NOTIFICATION AND COORDINATION OF ALL CONSTRUCTION WITH THE RESPECTIVE UTILITY COMPANIES, PRIOR TO STARTING ANY CONSTRUCTION.
4. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER AND CONTRACTOR TO MAINTAIN QUALITY CONTROL THROUGHOUT THE PROJECT; FAILURE TO DO SO MAY RESULT IN REMOVAL AND REPLACEMENT OF THE DEFECTIVE WORK. IT IS RECOMMENDED THAT THE DEVELOPER HAVE A QUALIFIED INSPECTOR ON THE JOB SITE AT ALL TIMES DURING CONSTRUCTION.
5. IT IS ESSENTIAL THAT THE WORK TO BE DONE IN CONJUNCTION WITH THIS PROJECT SHALL BE INSTALLED ACCORDING TO THESE SPECIFICATIONS. THE ENGINEER WILL BE REQUIRED TO CERTIFY TO CERTAIN PORTIONS OF THIS PROJECT UPON COMPLETION. THEREFORE, IT IS NECESSARY TO OBTAIN APPROVAL AND ACCEPTANCE BY THE JOHNSON COUNTY PLANNING AND HIGHWAY DEPT. THAT CONSTRUCTION WAS DONE IN COMPLIANCE WITH THESE PLANS AND SPECIFICATIONS.

B. CLEARING AND GRUBBING
1. CLEARING AND GRUBBING SHALL CONSIST OF CUTTING, REMOVAL AND SATISFACTORY DISPOSAL OF ALL TREES, DOWN TIMBER, BRUSH, PROJECTING ROOTS, STUMPS, RUBBISH, BOULDERS, BROKEN CONCRETE, FENCING (AS DESIGNATED) AND OTHER MATERIAL ON THE PROJECT SITE AND WITHIN THE BOUNDARY AS SHOWN ON THE CONSTRUCTION DOCUMENTS AND/OR AS DESIGNATED BY "CONSTRUCTION LIMITS".
2. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT TREES TO BE LEFT REMAINING IN THE PROJECT AREA SHALL NOT RECEIVE LIMB, BARK OR ROOT INJURIES. WHEN SUCH INJURIES OCCUR, ALL ROUGH EDGES OF SCARRED AREAS SHALL BE REMOVED IN ACCORDANCE WITH ACCEPTED HORTICULTURAL PRACTICE AND THE SCARS COATED THOROUGHLY WITH AN ASPHALTIC BASE TREE PAINT.
3. ALL "UNSUITABLE MATERIAL" FROM CLEARING OPERATIONS STATED IN ITEM B-1 SHALL BE REMOVED TO DISPOSAL AREA(S) OFF OF THE PROJECT SITE.
4. MATERIALS SHALL NOT BE DISPOSED OF BY BURNING UNLESS APPROVED BY THE LOCAL FIRE MARSHAL.

C. TREE REMOVAL AND PROTECTION
1. TREES SHALL BE REMOVED FROM THE PROJECT SITE ONLY WHERE THE AREA IS TO BE OCCUPIED BY ROAD AND SURFACED AREAS IN ACCORDANCE WITH SPECIFICATIONS OF THE CITY OF FRANKLIN PLANNING AND HIGHWAY DEPARTMENTS.
2. TREES SHALL BE REMOVED FROM THE PROJECT SITE AS DIRECTED BY THE DEVELOPER AND SO DESIGNATED.
3. TREES SHALL BE REMOVED FROM THE PROJECT SITE WHERE THEY INTERFERE DIRECTLY WITH THE PLACEMENT OF STORM OR SANITARY SEWERS AND THAT SUCH EXCAVATION IS OR WILL BE FATAL TO SUCH ADJACENT TREES.
4. THE CONTRACTOR SHALL ENDEAVOR TO SAVE AND PROTECT TREES OF VALUE AND WORTH WHICH DO NOT IMPAIR CONSTRUCTION OF IMPROVEMENTS AS DESIGNATED. IN THE EVENT CUT OR FILL EXCEEDS 0.5 FOOT OVER THE ROOT AREA, THE DEVELOPER SHALL BE CONSULTED WITH RESPECT TO PROTECTIVE MEASURES TO BE TAKEN, IF ANY, TO PRESERVE SUCH TREES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE METHOD FOR PROTECTION OF TOPS, TRUNKS AND ROOTS OF EXISTING TREES ON THE PROJECT SITE THAT ARE TO REMAIN. EXISTING TREES SUBJECT TO CONSTRUCTION DAMAGE SHALL BE BOXED, FENCED OR OTHERWISE PROTECTED BEFORE ANY ADJACENT WORK IS STARTED. EARTH OR MATERIAL AND EQUIPMENT SHALL NOT BE STOCKPILED OR STORED WITHIN THE SPREAD OF BRANCHES. BRANCHES WHICH NEED TO BE REMOVED OR ARE BROKEN SHALL BE NEATLY TRIMMED AND SCARS SHALL BE COVERED WITH TREE PAINT.

D. STRIPPING OF TOPSOIL
1. THE CONTRACTOR SHALL VERIFY THAT ALL TOPSOIL HAS BEEN REMOVED IN THE AREAS TO BE OCCUPIED BY ROAD, WALKS AND DESIGNATED BUILDING AREAS. TOPSOIL SHALL BE REMOVED TO A DEPTH OF SIX (6) INCHES OR DEEPER, IF NECESSARY, TO REMOVE VEGETABLE MATTER WHERE REQUIRED.
2. TOPSOIL SHALL BE KEPT SEPARATED FROM SUITABLE FILL MATERIALS AND SHALL NOT BE USED AS FILL UNDER PAVEMENT AND/OR BUILDING AREAS.
3. TOPSOIL SHALL BE STORED AT A LOCATION WHERE IT DOES NOT INTERFERE WITH CONSTRUCTION OPERATIONS. EXCESS TOPSOIL SHALL BE USED FOR FINISH GRADING OF SITE, OF DRAINAGE SWALES, YARDS OF NEW RESIDENCES, BUFFER STRIPS, ETC.
4. TOPSOIL SHALL BE REASONABLY FREE FROM SUBSOILS DEBRIS AND STONES.

E. GRADING
1. THE CONTRACTOR SHALL PERFORM ALL GRADING OPERATIONS TO BRING SUBGRADES, AFTER FINAL COMPACTION, TO THE REQUIRED GRADES AND SECTIONS FOR SITE IMPROVEMENT.
2. SUBGRADE SHALL BE PROOF ROLLED WITH SUITABLE EQUIPMENT AND ALL SPONGY AND OTHERWISE UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL.
3. SUBGRADE SHALL BE PREPARED IN COMPLIANCE WITH SECTION 207 OF THE CURRENT I.N.D.O.T. STANDARD SPECIFICATIONS, FOR ALL AREAS OF STREET CONSTRUCTION.
4. ALL FILL MATERIAL SHALL BE FORMED FROM SOIL FREE OF DELETERIOUS MATERIAL. PRIOR TO PLACEMENT OF FILL A SAMPLE OF THE PROPOSED FILL MATERIAL SHOULD BE SUBMITTED TO A SOILS ENGINEER FOR HIS APPROVAL AND COPIES OF THE SOLID PROCTORS SHALL BE SUBMITTED TO PROJECTS PLUS.
5. ALL FILLS IN EXCESS OF TWO (2) FEET SHALL BE CONSIDERED AS STRUCTURAL FILLS AND AS SUCH SHALL BE COMPACTED IN SIX INCH LIFTS WITH COMPACTION TESTS FOR EACH LIFT. COMPACTION FOR ALL STRUCTURAL FILL AREAS SHALL BE 95 PERCENT STANDARD PROCTOR AND TEST RESULTS SHALL BE SUBMITTED TO PROJECTS PLUS.
6. ALL FILL MATERIAL IN AREAS OUTSIDE OF BUILDING AND PAVEMENT AREAS SHALL BE COMPACTED LIGHTLY AND PROTECTED FROM EROSION BY ONE OR MORE OF THE METHODS OF ITEM G. ALL AREAS WHERE BUILDING AND PAVEMENT CONSTRUCTION IS FEASIBLE SHALL NOT HAVE UNSUITABLE MATERIAL PLACED IN THAT LOCATION, AND FILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR OR BETTER.

F. STANDARD SANITARY SEWER CONSTRUCTION
1. THE SPECIFICATIONS STATED ON THESE PROJECT SPECIFIC PLANS ARE TO TAKE PRECEDENCE EXCEPT IN THE CASE WHERE LOCAL SPECIFICATIONS ARE MORE STRINGENT.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING OR VERIFYING ALL PERMITS FOR ALL OR PORTIONS OF THIS PROJECT PRIOR TO STARTING ANY CONSTRUCTION.
3. SANITARY SEWERS SHALL BE INSTALLED IN ACCORDANCE WITH LATEST CITY OF FRANKLIN DEPARTMENT OF WORKS SPECIFICATIONS, ALSO IN ACCORDANCE WITH A.S.T.M. D-2321 AND PER SECTION 327 IAC 3-6 TECHNICAL STANDARDS FOR SANITARY COLLECTION SYSTEMS. A INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT PERMIT SHALL BE OBTAINED PRIOR TO STARTING AND CONSTRUCTION.
4. SANITARY SEWERS SHOWN ON THE CONSTRUCTION PLANS WERE DESIGNED WITH POLY-VINYL CHLORIDE PIPE IN ACCORDANCE WITH A.S.T.M. D-3034, S.D.R.-35 FOR PIPES THAT ARE 15 INCH IN DIAMETER OR LESS AND ARE LESS THAN 15 FEET DEEP. PVC PIPE AND FITTINGS THAT ARE GREATER THAN 18 INCH IN DIAMETER SHALL CONFORM TO A.S.T.M. F-679. ALL SANITARY PIPES GREATER THAN 15 FEET DEEP SHALL BE RATED AS HEAVY WALL S.D.R.-26. ALL FITTINGS REGARDLESS OF DEPTH SHALL BE NOTED AS HEAVY WALL S.D.R.-26. THE FORCEMAIN SHALL BE AWWA C-900, DR14.
5. NOT USED
6. SANITARY MANHOLES SHALL BE PRECAST CONCRETE IN ACCORDANCE WITH A.S.T.M. C-478. ALL JOINTS AND LIFTING HOLES ON THE EXTERIOR, SHALL BE SEALED WITH NON-SHRINK GROUT. INTERIOR LIFT HOLES PROHIBITED.
7. CASTINGS SHALL BE OF TYPE AND KIND AS SHOWN ON THE DETAIL SHEET.
8. PLASTIC SANITARY SEWERS SHALL BE MARKED FOR EASY IDENTIFICATION.
9. WATER AND SEWER LINE CROSSINGS AND SEPARATIONS SHALL BE IN ACCORDANCE WITH TEN STATES STANDARDS AND LOCAL CODES.
   a. WHERE WATER LINES AND SEWER LINES CROSS AND THE WATER LINE CANNOT BE PLACED ABOVE THE SEWER LINE A MINIMUM OF 18" WITH A MINIMUM COVER OF 48", THE SEWER LINE SHALL BE CONSTRUCTED OF WATERWORKS GRADE CAST IRON PIPE WITH MECHANICAL JOINTS.
   b. WHERE WATER LINES AND SANITARY SEWER LINES RUN PARALLEL WITH ONE ANOTHER, A MINIMUM OF 10' HORIZONTAL SEPARATION SHALL BE MAINTAINED.
10. ALL FUTURE SEWER INSTALLATION, EITHER CONNECTED TO OR EXTENDED FROM THIS SYSTEM, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE SPECIFICATIONS.
11. NO ROOF DRAINS, FOOTING DRAINS, AND/OR SURFACE WATER DRAINS MAY BE CONNECTED TO THE SANITARY SEWER SYSTEMS, INCLUDING TEMPORARY CONNECTIONS DURING CONSTRUCTION, INCLUDING SUMP PUMPS, ARE PROHIBITED.
12. BUILDINGS SHALL BE SERVICED BY A 6" MINIMUM SANITARY SEWER LATERAL. THE ENDS SHALL BE PLUGGED AND SEALED WITH A WATER TIGHT PLASTIC DISC. WYES ARE TO BE TILTED UP TO 45 DEGREES FROM THE HORIZONTAL, WITH SUITABLE FITTINGS FOR ALL CHANGES IN DIRECTION. IF 6" PVC LATERALS ARE USED, THEY SHALL BE IN ACCORDANCE WITH A.S.T.M. D-3034 AND A.S.T.M. D-2321 FOR PROPER INSTALLATION. MAGNETIC TAPE LOCATOR SHALL BE PLACED AT THE END OF EACH LATERAL TO IDENTIFY THE LOCATION OF THE LATERAL.
13. THE CONTRACTOR SHALL PROVIDE PROJECTS PLUS WITH "AS-BUILT" LATERAL LOCATIONS.
14. MANHOLE SECTIONS SHALL HAVE "O" RINGS WHICH SHALL MEET A.S.T.M. C-433.
15. MANHOLE WATERSTOPS SHALL BE INSTALLED AT ALL CONNECTIONS TO MANHOLES, WHERE FLEXIBLE TYPE MANHOLE CONNECTIONS ARE NOT USED.
16. ALL PRECAST MANHOLES SHALL BE BEDDED ON A GRANULAR FOUNDATION.
17. THE CONTRACTOR SHALL REMOVE BY PUMPING OR OTHER SUITABLE METHODS ANY WATER WHICH MAY ACCUMULATE IN TRENCHES.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTS FOR LEAKAGE, INFILTRATION AND DEFLECTION AS ESTABLISHED BY THE CITY OF FRANKLIN, I.D.E.M. AND THE STATE BOARD OF HEALTH, AND THE SANITARY SEWER CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING CERTIFIED TESTS RESULTS TO THE ENGINEER. ANY PORTIONS NOT PASSING SAID TESTS FOR ACCEPTANCE SHALL BE REPAIRED OR REPLACED AT THE SANITARY SEWER CONTRACTORS EXPENSE, INCLUDING RE-EXCAVATION AND BACKFILL.

a. DEFLECTION TEST
1a. DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS TO PERMIT STABILIZATION OF THE SOIL-PIPE SYSTEM.

1b. NO PIPE SHALL EXCEED A DEFLECTION OF 5 PERCENT. IF DEFLECTION EXCEEDS 5 PERCENT, REPLACEMENT OR CORRECTION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH REQUIREMENTS IN THE APPROVED SPECIFICATIONS.

1c. THE RIGID BALL OR MANDREL USED FOR THE DEFLECTION TEST SHALL HAVE A DIAMETER NOT LESS THAN 95 PERCENT OF THE BASE INSIDE DIAMETER OR AVERAGE INSIDE DIAMETER OF THE PIPE DEPENDING ON WHICH IS SPECIFIED IN THE ASTM SPECIFICATION, INCLUDING THE APPENDIX, TO WHICH THE PIPE IS MANUFACTURED. THE TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES.

b. AIR TEST
1a. THE AIR TEST SHALL, AS A MINIMUM, CONFORM TO THE TEST PROCEDURE DESCRIBED IN ASTM C-828 FOR CLAY PIPE, ASTM C 924 FOR CONCRETE PIPE, ASTM F-1417 FOR PLASTIC PIPE, AND FOR OTHER MATERIALS TEST PROCEDURES APPROVED

1b. FOR AIR TESTING, (TIME-PRESSURE DROP METHOD) EACH END OF THE SECTIONOF PIPE TO BE TESTED SHALL BE PLUGGED WITH AIR STOPPERS FURNISHED BY THE CONTRACTOR.AIR SHALL SLOWLY BE SUPPLIED TO THE PLUGGED PIPE INSTALLATION BY AN AIR COMPRESSOR, FURNISHED BY THE CONTRACTOR, UNTIL PRESSURE REACHES 4.0 P.S.I.. IF GROUNDWATER ELEVATION IS ABOVE INVERT OF SEWER BEING TESTED, AN ADDITIONAL 1.0 P.S.I. OF AIR PRESSURE SHALL BE ADDED FOR EACH 2.3 FEET OF WATER ABOVE THE INVERT OF THE SEWER. AT LEAST 2 MINUTES SHALL BE ALLOWED FOR THE AIR PRESSURE TO STABILIZE.

THE RATE OF AIR LOSS SHALL THEN BE DETERMINED BY MEASURING THE TIME INTERVAL REQUIRED FOR PRESSURE TO DECREASE FROM 3.5 TO 2.5 PSI. THE PRESSURE GAUGE AND STOP WATCH WILL BE FURNISHED BY THE OWNER.

1c. THE PIPELINE SHALL BE CONSIDERED ACCEPTABLE WHEN TESTED AT AN AVERAGE PRESSURE OF 3.0 PSI IF (1) THE TOTAL RATE OF AIR LOSS FROM ANY SECTION TESTED IN ITS ENTIRETY BETWEEN MANHOLE AND CLEANOUT STRUCTURE DOES NOT EXCEED 2.0 CFM, OR (2) THE SECTION UNDER TEST DOES NOT LOSE AIR AT A RATE GREATER THAN 0.0030 CFM PER SQUARE FOOT OF INTERNAL PIPE SURFACE.

1d. THE REQUIREMENTS OF THIS SPECIFICATION SHALL BE CONSIDERED SATISFIED IF THE TIME REQUIRED IN SECONDS FOR THE PRESSURE TO DECREASE FROM 3.5 TO 2.5 PSI IS NOT LESS THAN SHOWN IN THE "ALLOWABLE TIME TABLE".

ALLOWABLE TIME TABLE:

PIPE DIAMETER in.	MINIMUM TIME MINUS.	LENGTH FOR MINIMUM TIME FT.	TIME FOR LONGER LENGTHS	SPECIFICATION TIME FOR LENGTH (L) SHOWN, MIN;S							
				100 FT.	150 FT.	200 FT.	250 FT.	300 FT.	350 FT.	400 FT.	450 FT.
4	3:48	597	0.380	3:48	3:48	3:48	3:48	3:48	3:48	3:48	3:48
6	5:40	388	0.854	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520	7:34	7:34	7:34	7:34	7:34	8:52	10:06	11:24
10	8:26	239	2.374	8:26	8:26	8:26	8:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418	11:20	11:24	11:24	14:15	17:06	19:56	22:47	25:38
16	14:10	159	5.342	14:10	14:10	17:48	22:15	28:42	31:09	35:38	40:04
18	17:00	133	7.892	17:00	19:18	25:38	32.:03	38:27	44:62	51:16	57:41
21	19:50	114	10.470	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674	22:47	34:11	48:34	56:58	68:22	79:46	81:10	102:33
27	26:30	88	17.808	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366	35:37	58:25	71:13	89:02	106:50	124:38	142:26	160:16
33	31:10	72	26.852	48:05	64:38	86:10	107:43	128:16	150:43	172:21	193:53
36	34:00	68	30.768	51:17	78:66	102:34	128:12	163:50	179:29	205:07	210:46

1e. FOR EXFILTRATION TEST, THE INLET END OF THE UPSTREAM AND DOWNSTREAM MANHOLES SHALL BE CLOSED WITH WATERTIGHT BULKHEADS. THEN THE SEWER AND THE UPSTREAM MANHOLE SHALL BE FILLED WITH WATER UNTIL THE ELEVATION OF WATER IN THE UPSTREAM MANHOLE IS TWO FEET HIGHER THAN THE TOP OF THE PIPE IN THE LINE BEING TESTED, OR TWO FEET ABOVE THE EXISTING GROUND WATER IN THE TRENCH, WHICHEVER IS THE HIGHER ELEVATION. THE EXFILTRATION WILL BE MEASURED BY DETERMINING THE AMOUNT OF WATER REQUIRED TO MAINTAIN THE INITIAL WATER ELEVATION FOR ONE HOUR FROM THE START OF THE TEST.

c. SANITARY MANHOLE VACUUM TESTING

ALL MANHOLE VACUUM TESTS SHALL BE CONDUCTED IN THE PRESENCE OF A REPRESENTATIVE OF THE CITY OF FRANKLIN. ALL MANHOLE TESTS SHALL BE IN ACCORDANCE WITH ASTMC 1244-93 STANDARD TEST METHOD FOR CONCRETE SEWER MANHOLES BY THE NEGATIVE AIR PRESSURE (VACUUM) TEST. CITY OF FRANKLIN MAY HAVE ADDITIONAL REQUIREMENTS.

THE VACUUM TEST EQUIPMENT SHALL CONSIST OF: INFLATABLE PLUGS FOR ALL INCOMING AND OUTGOING SEWER LINES; AN INFLATABLE TEST COLLAR TO SEAL THE MANHOLE AT THE MANHOLE FRAME; AND A VACUUM PUMP. A VACUUM GAUGE SHALL BE LOCATED IN-LINE BETWEEN THE TEST COLLAR AND THE PUMP TO ACCURATELY INDICATE THE VACUUM IN INCHES OF MERCURY WITHIN THE MANHOLE. THE VACUUM GAUGE SHALL HAVE A RANGE TO NO MORE THAN THIRTY (30) INCHES OF MERCURY, WITH SCALE MARKINGS OF NO GREATER THAN ONE-HALF (½) INCH OF MERCURY VACUUM AND AN ACCURACY TO WITHIN ± TWO PERCENT (2%) OF TRUE VACUUM.

THE VACUUM TEST SHALL BE CONDUCTED BY PLUGGING ALL INCOMING AND OUTGOING SEWER LINES IN THE MANHOLE AT A LOCATION BEYOND THE CONNECTION OF THE SEWER PIPE WITH THE MANHOLE. ALL PLUGS SHALL BE BLOCKED IN PLACE SO AS NOT TO MOVE DURING THE TEST. THE VACUUM TESTING COLLAR SHALL BE INFLATED IN THE FRAME IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. A VACUUM OF TEN (10) INCHES OF MERCURY SHALL BE DRAWN AND THE VACUUM PUMP TURNED OFF AND THE VALVE BETWEEN THE VACUUM PUMP AND THE VACUUM GAUGE SHALL BE TURNED OFF.

THE TIME PERIOD WHICH IS TAKEN FOR THE VACUUM TO FALL FROM TEN INCHES (10") OF MERCURY TO NINE INCHES (9") OF MERCURY SHALL BE DETERMINED. IF THE TIME TAKEN FOR THE VACUUM TO REDUCE THE TEN INCHES (10") OF MERCURY TO NINE INCHES (9") OF MERCURY IS LESS THAN THE TIME INDICATED IN THE FOLLOWING TABLE, THEN THE MANHOLE WORK SHALL BE CONSIDERED NOT ACCEPTABLE AND SHALL BE REJECTED. IF THE TIME IS EQUAL TO OR EXCEEDS THE TIME INDICATED BELOW, THE MANHOLE WORK SHALL BE ACCEPTED.

MANHOLE DEPTH (FT.)	TIME (SEC) DIAMETER= 48"	60"	72"
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	65
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	69	85	105
28	70	91	113
30	74	98	121
FOR EACH ADDITIONAL 2' ADD:	5	7	8

CONTRACTOR SHALL SUBMIT TO THE ENGINEER THE RESULTS OF EACH MANHOLE VACUUM TEST. SUCH REPORTS SHALL INCLUDE A DESCRIPTION OF THE LOCATION OF THE MANHOLE, THE TIME, DATE AND WEATHER OF THE TEST, A LIST OF ALL PERSONS PRESENT, THE DIAMETER AND DEPTH OF THE MANHOLE AND THE ALLOWABLE TEST RESULTS, AND THE ACTUAL TEST RESULTS.

ALL MANHOLES SHALL BE REPAIRED BY CONTRACTOR AND RETESTED AS DESCRIBED ABOVE UNTIL A SUCCESSFUL TEST IS MADE. AFTER EACH TEST, THE TEMPORARY PLUGS SHALL BE REMOVED.

18. PIPE SHALL BE LAID IN OPEN TRENCHES, EXCEPT WHEN CONDITIONS REQUIRE AND THE APPROPRIATE APPROVING AGENCIES GIVE WRITTEN PERMISSION FOR TUNNELING OR JACKING OF PIPE.
19. TRENCH SHALL BE OPENED SUFFICIENTLY AHEAD OF PIPE LAYING TO REVEAL OBSTRUCTIONS AND SHALL BE PROPERLY PROTECTED AND/OR BARRICADED WHEN LEFT UNATTENDED.
20. TRENCHES SHALL BE SHEETED AND BRACED AS NECESSARY TO PROTECT WORKMEN AND ADJACENT STRUCTURES. ALL TRENCHING SHALL BE DONE IN ACCORDANCE WITH I.O.S.H.A. STANDARDS TO PROTECT WORKMEN.
21. THE FLOW CHANNELS FOR THE SANITARY SEWER MANHOLES SHALL BE U-SHAPED WITH THE BENCHWALLS EXTENDING TO THE CROWN OF THE INCOMING AND OUTGOING PIPES. CHANGES IN SIZE AND GRADE SHALL BE MADE BY SMOOTH TRUE CURVES FOR ALL CONNECTING SEWERS AT EACH MANHOLE.
22. NUMBER 53 STONE BACKFILL SHALL BE REQUIRED UNDER ALL PAVEMENT AREAS AND WITHIN 5' OF THE EDGE OF PAVEMENT.
23. ALL TRENCHES UNDER PAVEMENT SHALL BE COMPACTED TO 95 PERCENT MODIFIED PROCTOR.
25. THE MINIMUM CELL CLASSIFICATION FOR P.V.C. SHALL BE 12454B OR C PER A.S.T.M. STANDARDS
24. ALL GRAVITY AND FORCEMAIN PIPE SHALL BE INSTALLED WITH BELL END OF THE PIPE AT THE UPSTREAM SIDE OF FLOW OR AT THE END IN WHICH THE FIRST RECEIVES THE FLOW.
25. ALL FORCEMAIN SHALL BE HYDROSTATICALLY TESTED. THE FORCEMAIN TEST SECTION SHALL BE SLOWLY FILLED WITH WATER AND PRESSURIZED TO A TEST PRESSURE 50 HIGHER THAN NORMAL OPERATING PRESSURE. THE TEST DURATION SHALL BE A MINIMUM OF TWO (2) HOURS. SUITABLE MEANS SHALL BE PROVIDED BY THE CONTRACTOR FOR DETERMINING WATER LOST BY LEAKAGE UNDER THE TEST PRESSURE. NO PIPE INSTALLATION WILL BE ACCEPTED UNTIL OR UNLESS THIS LEAKAGE IS LESS THEN TEN (10) GALLONS PER INCH OF PIPE DIAMETER PER MILE OF PIPE PER DAY, AT THE DESIGNATED TEST PRESSURE.
26. THE CITY OF FRANKLIN SHALL BE NOTIFIED IN ADVANCED OF ALL SANITARY SEWER TESTING.

G. EROSION PROTECTION DURING CONSTRUCTION
1. THE CONTRACTOR SHALL PROVIDE ADEQUATE EROSION PROTECTION MEASURES DURING AND AFTER CONSTRUCTION SUCH AS BUT NOT LIMITED TO:
   a. SILTATION BASINS
   b. SILT TRAPS
   c. STRAW BALE DAMS
   d. SOIL CEMENT
   e. MULCH AND SEEDING
   f. SOIL STABILIZATION FABRIC
   g. JUTE NETTING
2. SPECIFIC EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AND INSTALLED PER THE EROSION CONTROL PLAN INCLUDED IN THESE CONSTRUCTION PLANS.
3. DETAILS AND PLACEMENT SPECIFICATIONS FOR THE ABOVE ITEMS ARE AVAILABLE ON REQUEST FROM THE ENGINEER.
4. ALL EROSION CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE INDIANA STORM WATER QUALITY MANUAL DATED OCTOBER 2007 BY THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM).

H. STORM SEWER CONNECTION
1. STORM SEWER STRUCTURES SHALL COMPLY WITH CURRENT SPECIFICATIONS OF THE CITY OF FRANKLIN PLANNING AND HIGHWAY DEPARTMENTS ALL OTHER RESPONSIBLE AGENCIES IN RESPECT TO DESIGN AND QUALITY OF CONSTRUCTION.
2. ALL STORM SEWER CONSTRUCTION INSIDE PUBLIC RIGHT-OF-WAY, EITHER EXISTING OR TO BE DEDICATED, SHALL BE IN ACCORDANCE WITH CURRENT I.N.D.O.T. STANDARD SPECIFICATIONS
3. WHERE REINFORCED CONCRETE PIPE IS SHOWN ON THE CONSTRUCTION PLANS, IT SHALL BE IN ACCORDANCE WITH A.S.T.M. C-76 CLASS III WALL "C" UNLESS OTHERWISE SPECIFIED ON THE PLANS.
4. MANHOLES, CATCH BASINS AND INLETS SHALL BE PRECAST CONCRETE. USE OF BRICK OR BLOCK WILL NOT BE PERMITTED UNLESS AUTHORIZED IN WRITING BY THE ENGINEER AND APPROVED IN WRITING BY THE CITY OF FRANKLIN PLANNING AND HIGHWAY DEPARTMENTS DRAINAGE SECTION PRIOR TO CONSTRUCTION.
   a. IF THE CONTRACTOR ELECTS TO USE ALTERNATE PRECAST STRUCTURES, HE SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER PRIOR TO ANY CONSTRUCTION.
5. PRECAST CONCRETE AND STEEL FOR MANHOLES AND INLETS SHALL BE IN ACCORDANCE WITH A.S.T.M. C-478.
6. CASTINGS SHALL BE AS SHOWN ON THE DETAIL SHEET(S) FOR MANUFACTURER, TYPE AND MODEL NUMBER.
7. NUMBER 53 STONE BACKFILL SHALL BE REQUIRED UNDER ALL PAVEMENT AREAS AND TRENCHES WITHIN FIVE(5) FEET OF THE EDGE OF PAVEMENT.
8. ALL TRENCHES UNDER PAVEMENT SHALL BE COMPACTED TO 95 PERCENT MODIFIED PROCTOR.

I. UTILITIES
1. WATER SERVICE
   a. ALL MAIN WATER LINES SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE INDIANA-AMERICAN WATER COMPANY (UTILITY DEPT.) AND COORDINATION OF CONSTRUCTION OF THESE MAINS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE COORDINATED PRIOR TO STARTING ANY CONSTRUCTION.
   b. INSTALLATION AND MATERIALS FOR ALL WATER MAIN CONSTRUCTION SHALL MEET CITY OF FRANKLIN UTILITIES AND INDIANA STATE BOARD OF HEALTH SPECIFICATIONS.
   c. SEE SANITARY SEWER (F-9a & F9-b) FOR VERTICAL AND HORIZONTAL SEPARATIONS.
   d. GRANULAR BACKFILL (NO.53 STONE) SHALL BE REQUIRED FOR ALL UTILITIES CROSSINGS UNDER AND WITHIN 5 FEET OF PAVEMENT, AREAS AND TRENCHES UNDER PAVEMENT SHALL BE COMPACTED TO 95 PERCENT MODIFIED PROCTOR.
2. ELECTRIC AND TELEPHONE
   a. CONDUIT SHALL BE REQUIRED FOR ALL CROSSINGS UNDER PAVEMENT AREAS.
   b. THE CONTRACTOR SHALL COORDINATE PLACEMENT OF THESE CONDUITS WITH THE POWER AND TELEPHONE COMPANIES PRIOR TO CONSTRUCTION.
   c. GRANULAR BACKFILL (NO.53 STONE) SHALL BE REQUIRED FOR ALL CROSSINGS UNDER PAVEMENT AREAS AND TRENCHES SHALL BE COMPACTED TO 95 PERCENT MODIFIED PROCTOR.
   d. CONCRETE PADS FOR ELECTRIC AND TELEPHONE TRANSFORMERS SHALL BE SET AT THE APPROXIMATE GROUND GRADE AS SHOWN ON THE SITE DEVELOPMENT GRADING PLANS FOR THE RESPECTIVE LOCATIONS.
   e. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH EACH UTILITY FOR INSTALLATION OF ANY LINES OR CONDUITS OR ANY OTHER EQUIPMENT REQUIRED IN THE PROJECT. THE UTILITIES SHALL BE NOTIFIED PRIOR TO THE PLACEMENT OF PAVEMENT A MINIMUM OF 7 WORKING DAYS SO THAT THEY MIGHT INSTALL ANY CROSSINGS.

J. GRANULAR BACKFILL
SHALL BE IN ACCORDANCE WITH CURRENT I.N.D.O.T. STANDARD SPECIFICATIONS

K. PAVEMENT CONSTRUCTION
1. ALL STREET CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND CONFORM TO THE MINIMUM STANDARDS OF CITY OF FRANKLIN PLANNING AND HIGHWAY DEPARTMENTS, AND IF THEIR ARE AREAS UNDEFINED USE THE CURRENT I.N.D.O.T. STANDARD SPECIFICATIONS

2. FLEXIBLE PAVEMENT

a. MATERIALS

a1. GENERAL: USE LOCALLY AVAILABLE MATERIALS AND GRADATIONS WHICH EXHIBIT A SATISFACTORY RECORD OF PREVIOUS INSTALLATIONS.

a2. COMPACTED AGGREGATE BASE: SOUND, ANGULAR CRUSHED LIMESTONE, CRUSHED OR UNCRUSHED GRAVEL, OR CRUSHED OR PROCESSED AIR-COOLED BLAST FURNACE SLAG. COURSE AGGREGATE SHALL BE CLASS A, B, C OR D AND CONFORM TO INDIANA DEPARTMENT OF TRANSPORTATION (I.N.D.O.T.) STANDARD SPECIFICATION SECTION 903.

a3. BASE COURT AGGREGATE: SOUND, ANGULAR CRUSHED STONE, CRUSHED OR UNCRUSHED GRAVEL, OR CRUSHED SLAG, SAND, STONE, OR SLAG SCREENINGS. COARSE AGGREGATES SHALL BE CLASS A OR B AND CONFORM TO I.N.D.O.T. STANDARD SPECIFICATION SECTION 903.

a4. COARSE AGGREGATE FOR SURFACE AND BINDER MIXTURES: CRUSHED STONE, CRUSHED GRAVEL, CRUSHED SLAB, AND SHARP EDGED NATURAL SAND. SURFACE COARSE AGGREGATES SHALL BE CLASS A AND CONFORM TO I.N.D.O.T. STANDARD SPECIFICATIONS SECTION 903.

a5. ASPHALT CEMENT: PETROLEUM ASPHALT CEMENT, AP 5 WITH PENETRATION OF 60-70 OR VISCOSITY GRADED ASPHALT CEMENT AC-20 CONFORMING TO I.N.D.O.T. STANDARD SPECIFICATION SECTION 903.

a6. PRIME COAT: MEDIUM-CURE LIQUID ASPHALT OR ASPHALT EMULSION CONFORMING TO I.N.D.O.T. STANDARD SPECIFICATION SECTION 408.

a7. TACK COAT: RAPID-CURE LIQUID ASPHALT OR ASPHALT EMULSION CONFORMING TO I.N.D.O.T. STANDARD SPECIFICATION SECTION 409.

a8. LANE MARKING PAINT: CHLORINATED RUBBER-ALKYD TYPE, AASHTO M248 (FS TT-P-115), TYPE III.

a9. SEAL COAT: ASPHALT PAVEMENT SEALER (BLACK) ASTM-D-3320.

b. ASPHALT-AGGREGATE MIXTURE
ALL BITUMINOUS MIXTURES ARE TO CONFORM TO CURRENT I.N.D.O.T. SPECIFICATIONS. CONTRACTOR SHALL PROVIDE A JOB MIX FORMULA PER EACH TYPE OF ASPHALT PRIOR TO CONSTRUCTION

b1. SURFACE COURSE: #11

b2. BINDER COURSE: #8

b3. BASE COURSE: TYPE: #5D

c. SURFACE PREPARATION

c1. REMOVE LOOSE MATERIAL FROM COMPACTED SUBBASE SURFACE IMMEDIATELY BEFORE APPLYING PRIME COAT.

1. PROOF ROLL SUBGRADE SURFACE TO CHECK FOR UNSTABLE AREAS AND AREAS REQUIRING ADDITIONAL COMPACTION.

2. NOTIFY CONTRACTOR OF UNSATISFACTORY CONDITIONS. DO NOT BEGIN PAVING WORK UNTIL DEFICIENT SUBBASE AREAS HAVE BEEN CORRECTED AND ARE READY TO RECEIVE PAVING.

c2. AGGREGATE BASE: AFTER PLACEMENT, PROOF ROLL COMPACTED AGGREGATE BASE SURFACE TO CHECK FOR UNSTABLE AREAS AND AREAS REQUIRING ADDITIONAL COMPACTION.

1. NOTIFY CONTRACTOR OF UNSATISFACTORY CONDITIONS. DO NOT BEGIN PAVING WORK UNTIL DEFICIENT AGGREGATE BASE AREAS HAVE BEEN CORRECTED AND ARE READY TO RECEIVE PAVING.

2. REMOVE LOOSE MATERIAL FROM COMPACTED AGGREGATE BASE SURFACE IMMEDIATELY BEFORE APPLYING PRIME COAT.

c3. TACK COAT: APPLY TO CONTACT SURFACES OF PREVIOUSLY CONSTRUCTED ASPHALT AND SURFACES ABUTTING OR PROJECTING INTO ASPHALT CONCRETE PAVEMENT. DISTRIBUTE AT RATE OF 0.05 TO 0.15 GAL. PER SQ. YD. OF SURFACE.

1. ALLOW TO DRY UNTIL AT PROPER CONDITION TO RECEIVE PAVING.

2. EXERCISE CARE IN APPLYING BITUMINOUS MATERIALS TO AVOID SMEARING OF ADJOINING SURFACES. REMOVE AND CLEAN DAMAGED SURFACES.

d. PLACING THE MIX

d1. GENERAL: PLACE BITUMINOUS AGGREGATE MIXTURE ON PREPARED SURFACE, SPREAD AND STRIKE-OFF. SPREAD MIXTURE AT MINIMUM TEMPERATURE OF 225 DEGREES F. (107 DEGREES C). PLACE INACCESSIBLE AND SMALL AREAS BY HAND. PLACE EACH COURSE TO REQUIRED GRADE, CROSS-SECTION, AND COMPACTED THICKNESS.

d2. BASE COURSE, COMPACTED AGGREGATE: SPREAD AND COMPACT IN TWO LIFTS AS FOLLOWS:

1. FIRST LIFT: NO. 5'S SHALL BE A MINIMUM OF 4" OR 1/2 THE TOTAL DEPTH OF AGGREGATE. EXTEND THE FIRST LIFT 4" OR A DISTANCE EQUAL TO THE DEPTH OF THE LIFT BEYOND THE SECOND LIFT.

2. SECOND LIFT: SIZE NO. 53.

d3. PRIME COAT: SUBBASE SURFACE SHALL BE PRIMED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF SECTION 408 OF I.N.D.O.T. STANDARD SPECIFICATIONS.

d4. HOT ASPHALT CONCRETE BINDER COURSE: SPREAD AND ROLL TO MINIMUM FINISH DEPTHS INDICATED ON DETAILS.

d5. TACK COAT: BINDER COURSE SHALL BE TACKED PRIOR TO THE INSTALLATION OF THE SURFACE COURSE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF SECTION 409 OF I.N.D.O.T. STANDARD SPECIFICATIONS.

d6. SURFACE COURSE: SPREAD AND ROLL TO MINIMUM FINISH DEPTH INDICATED ON DETAILS. FINISH ELEVATION SHALL BE TRUE TO LINE AND GRADE WITHIN 1/2" OF TRUE ELEVATION.

d7. PAVER PLACING: PLACE IN STRIPS NOT LESS THAN 10' WIDE, UNLESS OTHERWISE ACCEPTABLE TO ARCHITECT/ENGINEER. AFTER FIRST STRIP HAS BEEN PLACED AND ROLLED, PLACE SUCCEEDING STRIPS AND EXTEND ROLLING TO OVERLAP PREVIOUS STRIPS. COMPLETE BINDER COURSE FOR A SECTION BEFORE PLACING SURFACE COURSE.

d8. JOINTS: MAKE JOINTS BETWEEN OLD AND NEW PAVEMENTS, OR BETWEEN PAVER PASSES, OR BETWEEN SUCCESSIVE DAYS WORK, TO ENSURE CONTINUOUS BOND BETWEEN ADJOINING WORK. CONSTRUCT JOINTS TO HAVE SAME TEXTURE, DENSITY AND SMOOTHNESS AS OTHER SECTIONS. CLEAN CONTACT SURFACES AND APPLY TACK COAT.

e. ROLLING

e1. GENERAL: BEGIN ROLLING WHEN MIXTURE WILL BEAR ROLLER WEIGHT WITHOUT EXCESSIVE DISPLACEMENT.

1. COMPACT MIXTURE WITH HOT HAND TAMPERS OR VIBRATING PLATE COMPACTORS IN AREAS INACCESSIBLE TO ROLLERS.

e2. BREAKDOWN ROLLING: ACCOMPLISH BREAKDOWN OR INITIAL ROLLING IMMEDIATELY FOLLOWING ROLLING OF JOINTS AND OUTSIDE EDGE. CHECK SURFACE AFTER BREAKDOWN ROLLING, AND REPAIR DISPLACED AREAS BY LOOSENING AND FILLING, IF REQUIRED, WITH HOT MATERIAL.

e3. SECOND ROLLING: FOLLOW BREAKDOWN ROLLING AS SOON AS POSSIBLE, WHICH MIXTURE IS HOT. CONTINUE SECOND ROLLING UNTIL MIXTURE HAS BEEN THOROUGHLY COMPACTED.

e4. FINISH ROLLING: PERFORM FINISH ROLLING WHILE MIXTURE IS STILL WARM ENOUGH FOR REMOVAL OF ROLLER MARKS. CONTINUE ROLLING UNTIL ROLLER MARKS ARE ELIMINATED AND COURSE HAS ATTAINED MAXIMUM DENSITY.

e5. PATCHING: REMOVE AND REPLACE PAVING AREAS MIXED WITH FOREIGN MATERIALS AND DEFECTIVE AREAS. CUT OUT SUCH AREAS AND FILL WITH FRESH, HOT BITUMINOUS AGGREGATE MIX. COMPACT BY ROLLING TO MAXIMUM SURFACE DENSITY AND SMOOTHNESS.

e6. PROTECTION: AFTER FINAL ROLLING, DO NOT PERMIT VEHICULAR TRAFFIC ON PAVEMENT UNTIL IT HAS COOLED AND HARDENED.

e7. ERECT BARRICADES TO PROTECT PAVING FROM TRAFFIC UNTIL MIXTURE HAS COOLED ENOUGH NOT TO BECOME MARKED.

e8. SEAL COAT: ALLOW PAVEMENT 30 DAYS TO CURE BEFORE SEALER IS APPLIED. ACCORDING TO MANUFACTURER'S RECOMMENDATIONS APPLY TWO COATS OF PAVEMENT SEALER. DO NOT APPLY SEAL COAT UNTIL AFTER SURFACE COURSE HAS BEEN CHECKED AND ANY IRREGULARITIES OR ERRORS HAVE BEEN SATISFACTORILY CORRECTED.

1. APPLY FIRST COAT IN LENGTHWISE FASHION TO PAVEMENT SURFACE.

2. APPLY SECOND COAT IN CROSS WISE FASHION (90 DEGREES TO DIRECTION OF FIRST COAT).

3. APPLY SEALER AT UNIFORM RATE AS RECOMMENDED BY MANUFACTURER.

f. TRAFFIC AND LANE MARKINGS

f1. CLEANING: SWEEP AND CLEAN SURFACE TO ELIMINATE LOOSE MATERIAL AND DUST.

f2. STRIPPING: USE CHLORINATED RUBBER BASE TRAFFIC LANE-MARKING PAINT, FACTORY-MIXED, QUICK-DRYING, AND NON-BLEEDING.

COLOR: YELLOW.

1. DO NOT APPLY TRAFFIC AND LANE MARKING PAINT UNTIL LAYOUT AND PLACEMENT HAS BEEN VERIFIED WITH ARCHITECT/ENGINEER.

2. APPLY PAINT WITH MECHANICAL EQUIPMENT TO PRODUCE UNIFORM STRAIGHT EDGES. APPLY IN TWO COATS AT MANUFACTURER'S RECOMMENDED RATES.

g. FIELD QUALITY CONTROL

g1. TESTING AND INSPECTION SERVICE:

1. OWNER SHALL EMPLOY A TESTING LABORATORY TO PERFORM PAVEMENT TESTING AND INSPECTION SERVICE FOR QUALITY CONTROL DURING PAVING OPERATIONS.

2. TESTING SERVICE SHALL HAVE REPRESENTATIVE PRESENT TO OBSERVE AND PERFORM TESTS AT ALL TIMES PAVING WORK IS IN PROGRESS.

g2. GENERAL: TESTING SERVICE REPRESENTATIVE SHALL TAKE A MINIMUM OF TWO SAMPLES PER LIFT OF BITUMINOUS AGGREGATE MIX EACH DAY BEFORE PAVING OPERATION. LABORATORY TEST SHALL BE PERFORMED ON THESE SAMPLES TO DETERMINE AGGREGATE GRADATION AND ASPHALT CONTENT.

1. TEST IN-PLACE COMPACTED BITUMINOUS AGGREGATE MIX COURSES FOR COMPLIANCE WITH REQUIREMENTS FOR THICKNESS, DENSITY AND AIR VOIDS AND SURFACE SMOOTHNESS. REPAIR OR REMOVE AND REPLACE UNACCEPTABLE PAVING AS DIRECTED BY ENGINEER.

2. A TEST SECTION AT A MINIMUM SIZE OF 100' X 12' SHALL BE PLACED AT A LOCATION AS DIRECTED BY THE COUNTY PRIOR TO FULL PRODUCTION FOR EACH TYPE OF MIX. THE TEST SECTION SHALL BE COMPACTED TO DETERMINE A TARGET DENSITY FOR THE REMAINDER OF THE PAVEMENT.

g3. THICKNESS: IN-PLACE COMPACTED THICKNESS WILL NOT BE ACCEPTABLE IF EXCEEDING FOLLOWING ALLOWABLE VARIATION FROM REQUIRED THICKNESS:

AGGREGATE BASE COURSE: 1/2", PLUS OR MINUS.
BASE COURSE: 1/2", PLUS OR MINUS.
BINDER COURSE: 1/4", PLUS OR MINUS.
SURFACE COURSE: 1/4", PLUS OR MINUS.

1. A MINIMUM OF TWO PAVEMENT CORES PER COMPACTED LIFT SHALL BE TAKEN. CORES ARE TO BE TAKEN AT LOCATIONS AND AT TIMES OF DAY AS DIRECTED BY THE TESTING SERVICE. THE FOLLOWING TESTS SHALL BE PERFORMED BY THE TESTING SERVICE, ON EACH PAVEMENT CORE:
2. A TEST SECTION AT A MINIMUM SIZE OF 100'x12' SHALL BE PLACED AT A LOCATION AS DIRECTED BY THE COUNTY PRIOR TO FULL PRODUCTION FOR EACH TYPE OF MIX. THE TEST SECTION SHALL BE COMPACTED TO DETERMINE A TARGET DENSITY OF THE REMAINDER OF THE PAVEMENT.

3. TESTING SERVICE SHALL SUBMIT CERTIFIED RESULTS TO THE OWNER AND ARCHITECT/ENGINEER WITHIN 72 HOURS AFTER TESTS ARE MADE, WITH THEIR COMMENTS AND RECOMMENDATIONS FOR ACTION.

4. PAVEMENT WHICH FAILS TO COMPLY WITH APPROVED JOB MIX FORMULA SHALL BE REPLACED AS DIRECTED BY THE ARCHITECT/ENGINEER.

g4. SURFACE SMOOTHNESS: TEST FINISHED SURFACE FOR SMOOTHNESS, USING 10' STRAIGHTEDGE APPLIED PARALLEL WITH, AND AT RIGHT ANGLES TO CENTERLINE OF PAVED AREA. SURFACE WILL NOT BE ACCEPTABLE IF EXCEEDING THE FOLLOWING TOLERANCES FOR SMOOTHNESS.

AGGREGATE BASE COURSE SURFACE: 1/4".
BASE COURSE SURFACE: 1/4".
BINDER COURSE SURFACE: 1/8".

WEARING COURSE SURFACE: 1/8".

1. CHECK SURFACED AREAS AT INTERVALS AS DIRECTED BY TESTING SERVICE.

g5. DENSITY TESTS: DENSITY TESTS SHALL BE MADE AT EACH LIFT. TESTS SHALL BE AS FOLLOWS:

1. TESTS WILL BE REQUIRED AT VARIOUS TIMES AND LOCATIONS FOR SUBGRADE AND BASE COURSES FOR ASPHALT PAVING AREAS.

g6. TESTING SERVICE SHALL SUBMIT CERTIFIED RESULTS TO THE OWNER AND ENGINEER WITHIN 72 HOURS AFTER TESTS ARE MADE WITH THEIR COMMENTS AND RECOMMENDATIONS FOR ACTION.
3. SUBGRADE SHALL BE PREPARED IN ACCORDANCE WITH I.N.D.O.T. STANDARD SPECIFICATIONS, SECTION 207 AND SUBSECTION 501.07. NO TRAFFIC SHALL BE PERMITTED ON THE PREPARED SUBGRADE PRIOR TO PAVING.
4. SEE GRADING, SECTION "E" FOR ADDITIONAL COMPACTION REQUIREMENTS.

L. CONCRETE CURB AND WALKS
1. SEE DETAIL SHEET FOR TYPE AND DETAILS.
2. CONCRETE SHALL BE READY MIXED PORTLAND CEMENT CONFORMING TO A.S.T.M. C-150 AND WATER. AGGREGATE SHALL CONFORM TO A.S.T.M. C-33. CONCRETE SHALL BE 6 BAG CLASS "A" WITH COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS BEING MINIMUM 4000 P.S.I. WHERE REQUIRED.
3. REINFORCEMENT
   a. WELDED WIRE FABRIC SHALL CONFORM TO A.S.T.M. A-185
   b. REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615
4. APPLICATION
   a. PLACE CONCRETE ONLY ON A MOIST, COMPACTED SUBGRADE OR BASE FREE FROM LOOSE MATERIAL. PLACE NO CONCRETE ON MUDDY OR FROZEN SUBGRADE.
   b. CONCRETE SHALL BE DEPOSITED SO AS TO REQUIRE AS LITTLE REHANDLING AS PRACTICABLE. WHEN CONCRETE IS TO BE PLACED AT AN ATMOSPHERIC TEMPERATURE OF 35 DEGREES F OR LESS, CURRENT I.N.D.O.T. SPECIFICATIONS SHALL APPLY.
   c. EXCEPT AS OTHERWISE SPECIFIED, CURE ALL CONCRETE BY ONE OF THE METHODS DESCRIBED IN CURRENT I.N.D.O.T. SPECIFICATIONS

M. FINISH GRADING AND SEEDING

ALL EROSION CONTROL MEASURES ARE REQUIRED TO BE PER INDIANA STORMWATER QUALITY MANUAL SPECIFICATION, DATED OCTOBER 2007, OR MOST CURRENT

1. OVER THE APPROVED ROUGH GRADE (SEE SECTION E), SPREAD 4" MINIMUM OF TOPSOIL OR APPROVED FILL TO SUCH DEPTH AS WILL FINISH TO THE REQUIRED FINISH GRADES AND CONTOURS AFTER ROLLING AND NATURAL SETTLEMENT. NEW GRADES SHALL SLOPE UNIFORMLY BETWEEN LEVELS ESTABLISHED ON THE PLANS AND INTERSECTIONS OF NEW GRADES WITH EXISTING GRADES SHALL BE UNIFORM AND SMOOTH.

2. TEMPORARY SEEDING - THE AREAS WHERE STRIPPING, CUTS OR FILLS HAVE BEEN GRADED SHALL BE SEEDED FOR SILT AND EROSION PROTECTION SHALL BE AS PER I.S.W.Q.M. SPECIFICATIONS (TEMPORARY SEEDING). SEEDING SHALL BE WITH ONE OF THE FOLLOWING METHODS:
   a. EARLY SPRING MIX: 100% SPRING OATS SEEDING RATE: 100 LBS./ACRE
   b. SPRING OR LATE FALL MIX: 100% ANNUAL RYEGRASS SEEDING RATE: 40 LBS./ACRE
   c. FALL MIX: 100% PERENNIAL RYE SEEDING RATE 150 LBS./ACRE

3. MULCHING - MULCHING IS REQUIRED FOR ALL TEMPORARY AND PERMANENT SEEDED AREAS AS TO PREVENT REMOVAL BY WIND OR WATER. MULCHING SHALL BE ANCHORED AS OUTLINED IN I.S.W.Q.M. SPECIFICATIONS (MULCHING), BY A COMBINATION OF THE FOLLOWING:
   a. MULCH ANCHORING TOOL OR FARM DISK b. CLEATING WITH DOZER TRACKS c. WOOD HYDROMULCH FIBERS d. SYNTHETIC TACKIFIERS, BINDER OR SOILD STABLIZERS e. NETTING

4. EROSION CONTROL BLANKET/NETTING - BLANKET IS REQUIRED AT SLOPED AREAS AND CONVEYANCE CHANNELS TO PREVENT EROSION AND PROTECT SOIL AND SEEDING FROM WATER RUNOFF. EROSION CONTROL BLANKETS SHALL BE INSTALLED PER CURRENT I.S.W.Q.M. SPECIFICATIONS (SURFACE STABILIZTATION).

DATE	REVISION	SYMBOL

SCALE NONE | DRAWN JPH | CHECKED JKS | CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
SPECIFICATIONS

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A - Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH REGISTERED No. 19419 STATE OF INDIANA PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008

SHEET
C901

DATE
SEPTEMBER 3, 2021

SECTION 15105
DUCTILE IRON PIPE AND FITTINGS
PART 1: GENERAL
1.01 SCOPE OF WORK
THE WORK UNDER THIS SECTION CONSISTS OF PROVIDING ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND SERVICES REQUIRED TO INSTALL AND TEST ALL DUCTILE IRON (DI) PIPE AND FITTINGS (4 INCH THROUGH 48 INCH NOMINAL DIAMETER) FOR WATER DISTRIBUTION AND TRANSMISSION AS INDICATED ON THE DRAWINGS AND AS SPECIFIED WITHIN THIS SECTION AND RELATED SECTIONS OF THE SPECIFICATION. CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED PIPE RESTRAINT COMPONENTS AND OTHER RELATED COMPONENTS THAT ARE NOT FURNISHED BY THE OWNER. REFER TO SECTIONS 01000, 01011, AND 01075 FOR MATERIALS TO BE FURNISHED BY THE OWNER.

1.02 SUBMITTALS
A. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, MANUFACTURER'S LITERATURE AND PRODUCT DATA, INSTALLATION INSTRUCTIONS, AND CERTIFICATIONS FOR ALL PRODUCTS FURNISHED UNDER THIS SECTION IN ACCORDANCE WITH SECTION 01300.
B. REQUIRED CERTIFICATIONS INCLUDE THOSE SPECIFIED UNDER QUALITY ASSURANCE BELOW.

1.03 QUALITY ASSURANCE
A. DUCTILE IRON PIPE AND FITTINGS SHALL MEET THE MINIMUM QUALITY REQUIREMENTS BY CONFORMING TO THE BELOW-REFERENCED AWWA/ANSI STANDARDS AS MODIFIED HEREIN. DUCTILE IRON PIPE AND FITTINGS WILL BE ACCEPTED ON THE BASIS OF THE MANUFACTURER'S CERTIFICATION THAT THE MATERIALS CONFORM TO THIS SECTION.
B. THE CERTIFICATION FOR DUCTILE IRON FITTINGS SHALL LIST A FITTING DESCRIPTION, QUANTITY, BARE FITTING WEIGHT, SOURCE, AND APPLICABLE AWWA STANDARD (C110 OR C153). THE CERTIFICATION SHALL ACCOMPANY EACH DELIVERY OF THE MATERIAL TO THE PROJECT SITE.
C. OWNER RESERVES THE RIGHT TO SAMPLE AND TEST THESE MATERIALS SUBSEQUENT TO DELIVERY AT THE PROJECT SITE.
D. BOLT MANUFACTURER'S CERTIFICATION OF COMPLIANCE MUST ACCOMPANY EACH SHIPMENT.
E. IF FOREIGN-MANUFACTURED FITTINGS ARE FURNISHED, CONTRACTOR SHALL NOTIFY THE ENGINEER IN THE SHOP DRAWING SUBMITTAL AND PROVIDE THE NECESSARY DOCUMENTATION TO SATISFY THE ENGINEER AND THE OWNER THAT THE MATERIALS FURNISHED MEET THE SPECIFIED AWWA STANDARDS AND, AMONG OTHER DOCUMENTATION THAT MAY BE REQUIRED, PROVIDE CERTIFICATES OF COMPLIANCE ON THE COMPONENTS SUPPLIED.

1.04 RELATED WORK
A. SECTION 01000 SUMMARY OF WORK
B. SECTION 01011 SPECIAL PROVISIONS
C. SECTION 01075 BASIS OF PAYMENT
D. SECTION 01300 SUBMITTALS
E. SECTION 01600 PRODUCTS
F. SECTION 02210 TRENCHING, BACKFILLING AND COMPACTING
G. SECTION 02558 IDENTIFICATION/LOCATION GUIDE
H. SECTION 15000 PIPING – GENERAL PROVISIONS
I. SECTION 15020 DISINFECTING PIPELINES
J. SECTION 15025 FLUSHING AND CLEANING PIPELINES
K. SECTION 15030 PRESSURE AND LEAKAGE TESTS
L. SECTION 15130 PIPING SPECIALTIES
M. SECTION 15150 GATE VALVES
N. SECTION 15155 BUTTERFLY VALVES
O. SECTION 15170 TAPPING SLEEVES, SADDLES, AND VALVES
P. SECTION 15180 FIRE HYDRANTS
Q. SECTION 15185 ABANDONMENT OF MAINS AND HYDRANTS
R. SECTION 15190 AIR VALVES, BLOW-OFF ASSEMBLIES AND SAMPLING TAPS
S. SECTION 15200 SERVICE LINES

1.05 REFERENCE
UNLESS OTHERWISE INDICATED, ALL REFERENCES HEREIN TO OTHER STANDARDS (E.G. AWWA, ASTM, ASME, ANSI ETC.) SHALL MEAN THE MOST CURRENT AVAILABLE REVISION. THE FOLLOWING REFERENCED DOCUMENTS ARE A PART OF THIS SECTION. COMPLY WITH ALL APPLICABLE PROVISIONS AND RECOMMENDATIONS OF THE FOLLOWING DOCUMENTS, EXCEPT AS OTHERWISE SPECIFIED HEREIN. WHERE A REFERENCED DOCUMENT CONTAINS REFERENCES TO OTHER STANDARDS, THOSE OTHER STANDARDS ARE INCLUDED AS REFERENCES UNDER THIS SECTION AS IF REFERENCED DIRECTLY. IN THE EVENT OF A CONFLICT BETWEEN THE REQUIREMENTS OF THIS SECTION AND THOSE OF THE REFERENCED DOCUMENTS, THE REQUIREMENTS OF THIS SECTION SHALL PREVAIL.

A. ASME / ANSI B1.1 – UNIFIED INCH SCREW THREADS
B. ASME / ANSI B16.42 – DUCTILE IRON PIPE FLANGES AND FLANGED FITTINGS, CLASSES 150 AND 300
C. ASME / ANSI B18.2 – SQUARE AND HEX BOLTS AND SCREWS (INCH SERIES)
D. ASTM A307 –STANDARD SPECIFICATION FOR CARBON STEEL BOLTS, STUDS, AND THREADED ROD 60000 PSI TENSILE STRENGTH
E. ASTM A536 – STANDARD SPECIFICATION FOR DUCTILE IRON CASTINGS
F. AWWA C104 / ANSI A21.4 – CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS
G. AWWA C105 / ANSI A21.5 – POLYETHYLENE ENCASEMENT FOR DUCTILE-IRON PIPE SYSTEMS
H. AWWA C110 / ANSI A21.10 – DUCTILE-IRON AND GRAY-IRON FITTINGS
I.AWWA C111 / ANSI A21.11 –RUBBER-GASKET JOINTS FOR DUCTILE-IRON PRESSURE PIPE AND FITTINGS
J.AWWA C115 / ANSI A21.15 – FLANGED DUCTILE-IRON PIPE WITH THREADED FLANGES
K. AWWA C116 / ANSI A21.16 – PROTECTIVE FUSION-BONDED EPOXY COATINGS FOR THE INTERIOR AND EXTERIOR SURFACES OF DUCTILE-IRON AND GRAY-IRON FITTINGS FOR WATER SUPPLY SERVICE
L. AWWA C150 / ANSI A21.50 – THICKNESS DESIGN OF DUCTILE-IRON PIPE
M. AWWA C151 / ANSI A21.51 – DUCTILE-IRON PIPE, CENTRIFUGALLY CAST
N. AWWA C153 / ANSI A21.53 – DUCTILE-IRON COMPACT FITTINGS
O. AWWA C600 –INSTALLATION OF DUCTILE-IRON MAINS AND THEIR APPURTENANCES
P. NSF/ANSI 61 DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS

PART 2: PRODUCTS

2.01 GENERAL
A. NO FOREIGN-MANUFACTURED PIPE OR APPURTENANCES, EXCEPT FOR DUCTILE IRON FITTINGS, SHALL BE ALLOWED. ALL PIPE AND RESTRAINTS SHALL BE PRODUCED SOLELY IN THE UNITED STATES.
B. ALL MATERIALS THAT COME IN CONTACT WITH POTABLE WATER, INCLUDING LUBRICANTS, SHALL BE EVALUATED, TESTED, AND CERTIFIED FOR CONFORMANCE WITH ANSI/NSF STANDARD 61.
2.02 DUCTILE IRON PIPE
A. DUCTILE IRON PIPE SHALL CONFORM TO THE LATEST SPECIFICATIONS AS ADOPTED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE, INC., (ANSI) AND THE AMERICAN WATER WORKS ASSOCIATION (AWWA). SPECIFICALLY, DUCTILE IRON PIPE SHALL CONFORM TO AWWA C151 IN STANDARD SUPPLIED SIZES, EXCEPT AS MODIFIED HEREIN. PIPE SHALL BE SUPPLIED IN 18 OR 20 FOOT NOMINAL LENGTHS OR AS REQUIRED TO MEET THE REQUIREMENTS OF THE DRAWINGS.
B. THE PIPE EXTERIOR SHALL BE COATED WITH AN ASPHALTIC COATING IN ACCORDANCE WITH AWWA C151. THE PIPE INTERIOR SHALL BE CEMENT MORTAR LINED AND ASPHALTIC SEAL COATED IN COMPLIANCE WITH THE LATEST REVISION OF AWWA C104.
C. PIPE CLASS: PIPE WALL THICKNESS SHALL BE THE REQUIRED THICKNESS CLASS BASED ON THE DESIGN CONDITIONS IN ACCORDANCE WITH AWWA C150. THE THICKNESS CLASS OF PIPE TO BE FURNISHED SHALL BE AS REQUIRED ON THE DRAWINGS AND/OR AS SPECIFIED IN SECTION 01011 BUT SHALL NOT BE LESS THAN RECOMMENDED BY THE PIPE MANUFACTURER OR LESS THAN THE MINIMUM REQUIREMENTS INDICATED IN TABLE 1.

TABLE 1
MINIMUM RATED WORKING PRESSURE FOR DUCTILE IRON PIPE MANUFACTURED IN ACCORDANCE WITH AWWA STANDARD C151

PIPE NOMINAL SIZE (INCHES)	THICKNESS CLASS
12 AND SMALLER	52
16 – 20	54
24 AND LARGER	54

NOTE:
1. THE NOTED THICKNESS CLASS IS ADEQUATE TO SUPPORT 3/4 AND 1- INCH CORPORATION STOPS BY DIRECT TAPPING. PROVIDE A FULL TAPPING SLEEVE OR SADDLE IN ACCORDANCE WITH SECTION 15170 AND/OR 15200 (AS APPROPRIATE) FOR TAPS LARGER THAN 1-INCH DUE TO LIMITED WALL THICKNESS.

D. PLAIN ENDS SHALL BE SUITABLY BEVELED TO PERMIT EASY ENTRY INTO THE BELL AND SHALL HAVE HOME MARKS TO INDICATE WHEN THE SPIGOT IT FULLY SEATED IN THE BELL.
E. ALL NON-RESTRAINED JOINTS FOR PIPE TO PIPE CONNECTIONS SHALL BE STANDARD PUSH-ON JOINTS RECOMMENDED BY THE PIPE MANUFACTURER AND CONFORMING TO AWWA C151 AND C111. MECHANICAL JOINTS ARE NOT ALLOWED FOR PIPE TO PIPE CONNECTIONS. PUSH- ON JOINTS SHALL BE OF A TYPE WHICH EMPLOYS A SINGLE ELONGATED GROOVE GASKET TO EFFECT THE JOINT SEAL.
F. RESTRAINED JOINT PIPE (12-INCH AND SMALLER): UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR IN SECTION 01011 OR FURNISHED BY THE OWNER, RESTRAINED JOINTS FOR PIPE TO PIPE CONNECTIONS 12-INCH NOMINAL SIZE AND SMALLER SHALL USE PUSH-ON RESTRAINING GASKETS WITH INTEGRAL STAINLESS STEEL LOCKING SEGMENTS RECOMMENDED BY THE PIPE MANUFACTURER AND CONFORMING TO AWWA C111. RESTRAINT SYSTEM SHALL BE UL-LISTED AND RATED FOR A WORKING PRESSURE OF 350 PSI. RESTRAINING GASKETS SHALL NOT BE USED ON CONNECTIONS TO VALVES OR FITTINGS OR FOR CONNECTIONS TO PIPE MATERIALS OTHER THAN DUCTILE IRON (E.G. GRAY CAST IRON). IF REQUIRED BY THE DRAWINGS OR SECTION 01011 AND/OR IF FURNISHED BY THE OWNER, RESTRAINED-JOINT PIPE SUCH AS SPECIFIED BELOW FOR 16-INCH AND LARGER PIPE SHALL BE USED FOR 12-INCH AND SMALLER PIPING.
G. RESTRAINED JOINT PIPE (16-INCH AND LARGER): RESTRAINED JOINTS FOR PIPE TO PIPE CONNECTIONS (16-INCH AND LARGER) SHALL CONSIST OF FACTORY-WELDED RETAINER BEAD OR RING ON THE PIPE SPIGOT, AND EITHER FACTORY MANUFACTURED BOLTED RETAINER RINGS, DUCTILE IRON LOCKING SEGMENTS HELD IN PLACE BY RUBBER RETAINERS, OR DUCTILE IRON RETAINING RINGS THAT LOCK OVER THE BELL OF THE JOINT AND ARE SECURED TO PREVENT ROTATION. ALL COMPONENTS OF THE BOLTED OR SNAP RINGS ASSEMBLIES SHALL BE CONSTRUCTED OF CORROSION-RESISTANT, HIGH-STRENGTH, LOW-ALLOW STEEL AND SHALL CONFORM TO AWWA C111 AS APPLICABLE. RESTRAINED JOINT PIPE SHALL BE U.S. PIPE TR FLEX, BOLT-LOK, OR HP LOK; CLOW TR FLEX OR SUPER LOCK; AMERICAN FLEX-RING OR LOK-RING. RESTRAINED SYSTEM SHALL BE SUITABLE FOR THE FOLLOWING MINIMUM WORKING PRESSURES:

SIZE (INCH)	PRESSURE (PSI)
LESS THAN 20	350
20 300	350
24 250	350
30 – 48 200	350

GASKETS UTILIZING INTEGRAL LOCKING SEGMENTS SUCH AS FIELD LOK GASKETS ARE NOT PERMITTED FOR RESTRAINT OF PIPE 16-INCH OR LARGER. RESTRAINED JOINT PIPE PER THIS ARTICLE SHALL NOT BE ACCEPTABLE WHERE BALL AND SOCKET PIPE IS REQUIRED BY THE DRAWINGS, SECTION 01000, AND/OR SECTION 01011. RESTRAINED JOINT DUCTILE IRON PIPE INSTALLED BY HORIZONTAL DIRECTIONAL DRILL METHOD SHALL ALSO COMPLY WITH SECTION 02458.
H. BALL AND SOCKET PIPE:
BALL AND SOCKET PIPE SHALL COMPLY WITH AWWA C150 AND C151 AND SHALL BE U.S. PIPE USIFLEX BOLTLESS FLEXIBLE JOINT PIPE, AMERICAN FLEX-LOK BALL JOINT PIPE, MCWANE BALL AND SOCKET JOINT PIPE.
I. FLANGED PIPING SHALL BE THICKNESS CLASS 53 DUCTILE IRON UNLESS OTHERWISE REQUIRED BY THE DRAWINGS OR SECTION 01011.
J. ACCEPTABLE DUCTILE IRON PIPE MANUFACTURERS ARE:
1. UNITED STATES PIPE & FOUNDRY CO. (INCLUDING GRIFFIN PIPE)
2. MCWANE FAMILY OF COMPANIES (CLOW, ATLANTIC STATES, ETC.)
3. AMERICAN CAST IRON PIPE COMPANY.

2.03 FITTINGS
A. DUCTILE IRON FITTINGS: STANDARD FITTINGS SHALL BE DUCTILE IRON CONFORMING TO AWWA C110. COMPACT DUCTILE IRON FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C153.
FITTINGS SHALL BE SUITABLE FOR THE FOLLOWING WORKING PRESSURES UNLESS OTHERWISE NOTED IN AWWA C110 OR C153. NO GRAY CAST IRON FITTINGS ARE PERMITTED.

SIZE (INCH)	WORKING PRESSURE RATING (PSI) MJ FITTINGS	FLANGED FITTINGS
3 – 24	350	250
30 – 48	250	250

B. COATING AND LINING: THE FITTINGS SHALL BE COATED ON THE OUTSIDE WITH EITHER ASPHALTIC COATING IN ACCORDANCE WITH AWWA C110 OR FUSION-BONDED EPOXY IN ACCORDANCE WITH AWWA C116, AND THE FITTINGS SHALL BE LINED INSIDE WITH EITHER CEMENT-MORTAR AND ASPHALTIC SEAL COATING IN ACCORDANCE WITH AWWA C104 OR FUSION-BONDED EPOXY IN ACCORDANCE WITH AWWA C116.
C. ALL FITTINGS SHALL HAVE MECHANICAL JOINT BELL ENDS CONFORMING TO AWWA C111 UNLESS OTHERWISE SHOWN ON THE DRAWINGS. HOWEVER, FOR PIPE 16-INCH AND LARGER, FITTINGS WITH RESTRAINED BELL JOINTS COMPATIBLE WITH THE RESTRAINED JOINT PIPE USED WILL BE PERMITTED WHEN AUTHORIZED BY THE ENGINEER OR OWNER.
D. RESTRAINED MJ JOINTS (ALL SIZES): RESTRAINED JOINTS SHALL BE USED FOR ALL CONNECTIONS TO VALVES AND FITTINGS, AND ALL SUCH CONNECTIONS SHALL BE RESTRAINED MECHANICAL JOINT TYPE USING RETAINER GLANDS AS SPECIFIED IN SECTION 15130. HOWEVER, WHEN RESTRAINED JOINT PIPE (WITH FACTORY-WELDED RETAINER BEAD OR RING ON THE PIPE SPIGOT) IS USED, FITTINGS MANUFACTURED WITH RESTRAINED JOINTS COMPATIBLE WITH THE RESTRAINED JOINT PIPE MAY BE USED IN LIEU OF FITTINGS WITH RESTRAINED MECHANICAL JOINTS. RESTRAINING GASKETS WITH INTEGRAL STAINLESS STEEL LOCKING SEGMENTS (INCLUDING MJ FIELD-LOK GASKETS) ARE NOT PERMITTED ON VALVES OR FITTINGS.
E. NON-RESTRAINED MECHANICAL AND PUSH-ON JOINTS ARE NOT ALLOWED FOR CONNECTIONS TO VALVES, HYDRANTS, OR FITTINGS.
F. ACCEPTABLE DUCTILE IRON FITTINGS MANUFACTURERS ARE:
1. SIGMA THROUGH UNITED STATES PIPE & FOUNDRY CO. (DOMESTIC OR FOREIGN)
2. MCWANE CAST IRON PIPE CO. (TYLER UNION DOMESTIC ONLY)
3. STAR PIPE PRODUCTS (DOMESTIC OR FOREIGN)

2.04 JOINTS – ADDITIONAL REQUIREMENTS
A. ALL GASKETS FOR BURIED PIPE AND FITTINGS SHALL BE OF STYRENE BUTADIENE RUBBER (SBR), UNLESS OTHERWISE REQUIRED BY THE DRAWINGS, SECTION 01011, OR AS DIRECTED BY THE ENGINEER.
B. ANTI-ROTATION T-BOLTS SHALL BE USED ON MECHANICAL JOINTS, EXCEPT WHERE SPECIAL BOLTS ARE SUPPLIED WITH THE APPROVED RESTRAINT DEVICE, AND SHALL BE OF DOMESTIC ORIGIN MEETING THE CURRENT PROVISIONS OF AWWA C111. T-BOLTS AND NUTS SHALL BE HIGH-STRENGTH, CORROSION-RESISTANT LOW-ALLOY STEEL WITH THE CHARACTERISTICS LISTED IN TABLE 6 OF AWWA C111. T-BOLTS SHALL BE XYLAN OR FLUOROKOTE #1 (CORROSION RESISTANT).

C. RETAINER GLANDS OF ANY STYLE ARE NOT ACCEPTABLE FOR PIPE TO PIPE JOINTS.
D. ANCHOR COUPLINGS: ANCHOR COUPLINGS FOR ANCHORING THE HYDRANT VALVE TO PIPELINE TEE'S BRANCH AND FOR ANCHORING THE HYDRANT TO THE VALVE SHALL CONSIST OF A PLAIN END MECHANICAL JOINT PIPE WITH A ROTATING FOLLOWER GLAND, RETAINED BY A WELDED RING, ON ONE OR BOTH ENDS. ANCHOR COUPLINGS SHALL BE INSTALLED FOR EACH HYDRANT BRANCH AND OTHER LOCATIONS WHERE SHOWN ON THE DRAWINGS. ANCHOR COUPLINGS SHALL BE MANUFACTURED FROM THICKNESS CLASS 53 DUCTILE IRON AND SHALL MEET THE APPLICABLE REQUIREMENTS FOR BOTH DUCTILE IRON PIPE AND FITTINGS AS SPECIFIED IN THIS SECTION. STANDARD MJ GASKETS AS SPECIFIED HEREIN SHALL BE USED WITH ANCHOR COUPLINGS.
E. FLANGED: FLANGED JOINTS SHALL CONFORM TO AWWA C110 (FOR FITTINGS) OR AWWA C115 (FOR PIPE) AND ALSO TO ANSI B16.42 CLASS 150. UNLESS OTHERWISE NOTED ON THE DRAWINGS (INCLUDING BRIDGE CROSSINGS), ALL EXPOSED DUCTILE IRON PIPE AND FITTINGS SHALL HAVE FLANGED JOINTS. FLANGED JOINTS ARE NOT PERMITTED IN UNDERGROUND INSTALLATIONS EXCEPT WHERE EXPOSED WITHIN STRUCTURES OR IF ALLOWED FOR TAPPING SLEEVES, SADDLES, AND VALVES AS SPECIFIED IN SECTIONS 15150 AND/OR 15170.
1. GASKETS FOR ALL FLANGED JOINTS SHALL BE 1/8-INCH THICK, STYRENE BUTADIENE RUBBER (SBR) OR EPDM GASKETS. PAPER FLANGE GASKETS ARE NOT PERMITTED.
2. THE BOLTS SHALL HAVE AMERICAN STANDARD HEAVY UNFINISHED HEXAGONAL HEAD AND NUT DIMENSIONS ALL AS SPECIFIED IN ANSI B18.2. BOLTS AND NUTS SHALL BE THREADED IN ACCORDANCE WITH ASME/ANSI B1.1, UNIFIED INCH SCREW THREADS (UN AND UNR THREAD FORM) CLASS 2A EXTERNAL AND CLASS 2B INTERNAL. MATERIAL FOR BOLTS AND NUTS SHALL CONFORM TO ASTM A307, 60,000 PSI TENSILE STRENGTH, GRADE B, UNLESS OTHERWISE SPECIFIED IN SECTION 01011. XYLAN OR FLUOROKOTE #1 HEX BOLTS (CORROSION RESISTANT) SHALL BE USED ON ANY BURIED FLANGE BOLTS USED WITH DUCTILE OR GRAY CAST IRON FLANGES.
3. EACH FLANGE SHALL BE FULLY COMPATIBLE WITH ITS MATING FLANGE.
F. CONNECTIONS TO EXISTING PIPING SHALL COMPLY WITH SECTION 15000. WHEN CONNECTING TO EXISTING DUCTILE IRON PIPE, CONNECTION SHALL BE MADE EITHER AS DESCRIBED IN THIS SECTION OR USING COUPLINGS IN ACCORDANCE WITH SECTION 15130. A RESTRAINED MECHANICAL JOINT SOLID SLEEVE AS SPECIFIED ABOVE FOR DUCTILE IRON FITTINGS MAY BE USED TO CONNECT AN EXISTING PLAIN SPIGOT END TO A NEW PIPE PLAIN SPIGOT END. WHEN CONNECTION IS TO BE MADE TO AN EXISTING PIPE WITH A JOINT TYPE NOT ALLOWED WITHIN THIS SECTION, THE EXISTING PIPE SHALL BE CUT TO A PLAIN SPIGOT END UNLESS OTHERWISE APPROVED BY THE ENGINEER.

PART 3: EXECUTION
3.01 INSTALLATION
INSTALLATION OF DUCTILE IRON PIPE AND APPURTENANCES SHALL BE IN FULL ACCORDANCE WITH AWWA C600 EXCEPT AS MODIFIED HEREIN. CONTRACTOR SHALL FOLLOW THE PROVISIONS OF SECTIONS 02210 AND 15000, OTHER SECTIONS AS APPLICABLE (INCLUDING RELATED SECTIONS LISTED IN PART 1 ABOVE), AND ALL MANUFACTURERS' RECOMMENDATIONS, IN ADDITION TO THE FOLLOWING REQUIREMENTS:

A. ALL JOINT TYPES:
IMMEDIATELY PRIOR TO ASSEMBLY, THOROUGHLY CLEAN THE SURFACES THAT THE GASKET WILL CONTACT USING A BACTERIA-FREE SOLUTION (BLEACH, POTABLE WATER OR NSF-61 COMPLIANT MATERIAL).
B. NON-RESTRAINED PUSH-ON JOINTS:
INSERT THE GASKET INTO THE GROOVE IN THE BELL. APPLY A SUFFICIENT COATING OF MANUFACTURER APPROVED NSF-61 CERTIFIED LUBRICANT TO THE GASKET AND THE SPIGOT END OF THE PIPE BEFORE ASSEMBLING THE JOINT IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS, AWWA C600, AND OTHER REQUIREMENTS OF THIS SECTION. THE USE OF IMPROPER LUBRICANTS CAN DAMAGE GASKETS, SO ENSURE THAT ONLY LUBRICANTS APPROVED BY THE GASKET MANUFACTURER ARE USED. CENTER THE SPIGOT END IN THE BELL, AND PUSH HOME THE SPIGOT END. THE MAXIMUM ALLOWABLE DEFLECTION AT THE JOINTS FOR PUSH-ON JOINT PIPE SHALL BE THE LESSER OF MANUFACTURER'S RECOMMENDATIONS OR AS DESCRIBED IN THE DIPRA GUIDELINE, INSTALLATION GUIDE FOR DUCTILE IRON PIPE, AS FOLLOWS:

SIZE OF PIPE	DEFLECTION ANGLE	MAXIMUM DEFLECTION (18-FT LENGTH)	(20-FT LENGTH)
4" – 12"	5 DEGREES	19"	21"
14" – 42"	3 DEGREES	11"	12"
48" – 64"	3 DEGREES	N/A	12"

C. RESTRAINED PUSH-ON:
ASSEMBLE AND INSTALL THE RESTRAINED PUSH-ON JOINT WITH THE PIPES ALIGNED IN THE SAME AXIS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. USE FEELER GAUGE TO CHECK ALL JOINTS INSTALLED WITH PUSH-ON RESTRAINING GASKETS WITH INTEGRAL STAINLESS STEEL LOCKING SEGMENTS. CONTRACTOR SHALL NOT REUSE RESTRAINING GASKETS ONCE A JOINT IS DISASSEMBLED. CHECK THE RETAINER RING FASTENER WHERE PRESENT. UNLESS OTHERWISE DIRECTED BY THE MANUFACTURER, JOINTS SHALL NOT BE DEFLECTED UNTIL THE JOINT HAS BEEN FULLY ASSEMBLED AND CHECKED FOR PROPER ASSEMBLY; DEFLECTION SHALL NOT EXCEED MANUFACTURER'S RECOMMENDED ALLOWANCES.
D. RESTRAINED MECHANICAL JOINTS:
1. USE APPROVED RESTRAINED JOINT DEVICE ACCORDING TO SECTION 15130. SLIP THE FOLLOWER GLAND AND GASKET OVER THE PIPE PLAIN END MAKING SURE THAT THE SMALL SIDE OF THE GASKET AND LIP OF THE GLAND FACE THE BELL SOCKET. INSERT THE PLAIN END INTO THE BELL SOCKET. PUSH THE GASKET INTO POSITION WITH FINGERS ONLY, AND SEAT GASKET EVENLY. SLIDE GLAND INTO POSITION, INSERT BOLTS, AND TIGHTEN NUTS BY HAND. TIGHTEN MJ FLANGE BOLTS ALTERNATELY PER MANUFACTURER'S RECOMMENDATIONS TO THE MANUFACTURER'S RECOMMENDED TORQUE RATING OR, IF NOT PROVIDED, TO THE FOLLOWING NORMAL TORQUES AS SPECIFIED IN AWWA C111 TABLE A.1:

BOLT SIZE (INCH)	PIPE NOMINAL SIZE (INCHES)	RANGE OF TORQUE IN FOOT-POUNDS
5/8	3	45 –60
3/4	4 – 24	75 – 90
1	30 – 36	100 – 120
1-1/4	42 – 48	120 – 150

2. SECURE RESTRAINED JOINT DEVICE TO PIPE BARREL IN ACCORDANCE WITH SECTION 15130 AND THE RESTRAINT DEVICE MANUFACTURER'S RECOMMENDATIONS.

E. BALL AND SOCKET JOINTS:
ASSEMBLE AND INSTALL THE BALL AND SOCKET JOINT ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THOROUGHLY CLEAN AND LUBRICATE THE JOINT. CHECK THE RETAINER RING FASTENER.
F. PIPE PROTECTION
1. COMPLY WITH REQUIREMENTS OF SECTION 15000. LIFT PIPE IN ACCORDANCE WITH AWWA STANDARDS C600 AND MANUFACTURER'S RECOMMENDATIONS, SUBJECT TO THE RESTRICTIONS HEREIN AND IN SECTION 15000.
2. PROTECT CEMENT-MORTAR LINING FROM DAMAGE DURING TRANSPORTATION (OFF- AND ON- SITE), PREPARATION AND INSTALLATION. TRANSPORTING OR LIFTING PIPE BY INSERTING LIFTING FORKS, CHAINS, HOOKS, OR ANY OTHER DEVICE INSIDE THE PIPE SHALL NOT BE PERMITTED. NO EXCEPTION SHALL BE MADE DURING APPLICATION OF POLYETHYLENE ENCASEMENT OR ANY OTHER TIME.
3. PROTECT ASPHALTIC COATING FROM DAMAGE DURING OFF- AND ON-SITE TRANSPORTATION, PREPARATION AND INSTALLATION. CONTRACTOR SHALL NOT UTILIZE METAL CHAINS, STEEL CABLE, ETC. TO LIFT OR TRANSPORT PIPE. TRANSPORTING OR LIFTING PIPE USING FORKS ON CONSTRUCTION EQUIPMENT SHALL NOT BE PERMITTED UNLESS THE PIPE IS SUPPORTED ON PALLETS OR LUMBER AND LIFTED INDIRECTLY WITH THE FORKS.
4. PROTECT PIPE FROM DAMAGE FROM THE JACKING DEVICE (BACKHOE BUCKET, PIPE JACK, ETC.) WHEN ASSEMBLING EACH PIPE JOINT (I.E. "PUSHING HOME" EVERY PIPE). WOOD OR OTHER SUITABLE (NON-METALLIC) MATERIAL CONSISTENT WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS SHALL BE USED TO PUSH HOME THE PIPE.

SECTION 15120
POLYVINYL CHLORIDE (PVC) PIPE
PART 1: GENERAL
1.01 SCOPE OF WORK
THE WORK UNDER THIS SECTION CONSISTS OF PROVIDING ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND SERVICES REQUIRED TO INSTALL AND TEST ALL POLYVINYL CHLORIDE (PVC) PRESSURE PIPE (4 INCHES THROUGH 12 INCHES NOMINAL DIAMETER ONLY) WITH DUCTILE- IRON-PIPE-EQUIVALENT OUTSIDE DIAMETERS FOR WATER DISTRIBUTION AND TRANSMISSION AS INDICATED ON THE DRAWINGS AND AS SPECIFIED WITHIN THIS SECTION AND RELATED SECTIONS OF THE SPECIFICATIONS. CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED PIPE RESTRAINT COMPONENTS AND OTHER RELATED COMPONENTS THAT ARE NOT FURNISHED BY THE OWNER.
REFER TO SECTIONS 01000, 01011 AND 01075 FOR MATERIALS TO BE FURNISHED BY THE OWNER.

1.02 SUBMITTALS
A. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, MANUFACTURER'S LITERATURE AND PRODUCT DATA, INSTALLATION INSTRUCTIONS, AND CERTIFICATIONS FOR ALL PRODUCTS FURNISHED UNDER THIS SECTION IN ACCORDANCE WITH SECTION 01300.
B. REQUIRED CERTIFICATIONS INCLUDE THOSE SPECIFIED UNDER QUALITY ASSURANCE BELOW.

1.03 QUALITY ASSURANCE
A. PVC PIPE SHALL MEET THE MINIMUM QUALITY REQUIREMENTS BY CONFORMING TO THE BELOW-REFERENCED AWWA/ANSI STANDARDS AS MODIFIED HEREIN. PVC PIPE WILL BE ACCEPTED ON THE BASIS OF THE MANUFACTURER'S CERTIFICATION THAT THE MATERIALS CONFORM TO THIS SECTION.
B. THE OWNER RESERVES THE RIGHT TO SAMPLE AND TEST THESE MATERIALS SUBSEQUENT TO DELIVERY AT THE PROJECT SITE.

1.04 RELATED WORK
A. SECTION 01000 SUMMARY OF WORK
B. SECTION 01011 SPECIAL PROVISIONS
C. SECTION 01075 BASIS OF PAYMENT
D. SECTION 01300 SUBMITTALS INTO T
E. SECTION 01600 PRODUCTS
F. SECTION 02210 TRENCHING, BACKFILLING AND COMPACTING
G. SECTION 02558 IDENTIFICATION/LOCATION GUIDE
H. SECTION 15000 PIPING – GENERAL PROVISIONS
I. SECTION 15020 DISINFECTING PIPELINES
J. SECTION 15025 FLUSHING AND CLEANING PIPELINES
K. SECTION 15030 PRESSURE AND LEAKAGE TESTS
L. SECTION 15105 DUCTILE IRON PIPE AND FITTINGS
M. SECTION 15130 PIPING SPECIALTIES
N. 15150 GATE VALVES
O. SECTION 15170 TAPPING SLEEVES, SADDLES, AND VALVES
P. SECTION 15180 FIRE HYDRANTS
Q. SECTION 15185 ABANDONMENT OF MAINS AND HYDRANTS
R. SECTION 15190 AIR VALVES, BLOW-OFF ASSEMBLIES AND SAMPLING TAPS
S. SECTION 15200 SERVICE LINES

1.05 REFERENCE

UNLESS OTHERWISE INDICATED, ALL REFERENCES HEREIN TO OTHER STANDARDS (E.G. AWWA, ASTM, ASME, ANSI ETC.) SHALL MEAN THE MOST CURRENT AVAILABLE REVISION. THE FOLLOWING REFERENCED DOCUMENTS ARE A PART OF THIS SECTION. COMPLY WITH ALL APPLICABLE PROVISIONS AND RECOMMENDATIONS OF THE FOLLOWING DOCUMENTS, EXCEPT AS OTHERWISE SPECIFIED HEREIN. WHERE A REFERENCED DOCUMENT CONTAINS REFERENCES TO OTHER STANDARDS, THOSE OTHER STANDARDS ARE INCLUDED AS REFERENCES UNDER THIS SECTION AS IF REFERENCED DIRECTLY. IN THE EVENT OF A CONFLICT BETWEEN THE REQUIREMENTS OF THIS SECTION AND THOSE OF THE REFERENCED DOCUMENTS, THE REQUIREMENTS OF THIS SECTION HALL PREVAIL.
A. ASTM D1784 – RIGID POLY (VINYL CHLORIDE) (PVC) COMPOUNDS AND CHLORINATED POLY (VINYL CHLORIDE) (CPVC) COMPOUNDS
B. ASTM D2122 – DETERMINING DIMENSIONS OF THERMOPLASTIC PIPE AND FITTINGS
C. ASTM D2152 POLY(VINYL CHLORIDE) (PVC) PIPE AND MOLDED FITTINGS BY ACETONE IMMERSION
D. ASTM D2241 – STANDARD SPECIFICATION FOR POLY (VINYL CHLORIDE) (PVC) PRESSURE- RATED PIPE (SDR SERIES)
E. ASTM D2412 – STANDARD TEST METHOD FOR DETERMINATION OF EXTERNAL LOADING CHARACTERISTICS OF PLASTIC PIPE BY PARALLEL-PLATE LOADING
F. ASTM D2855 – STANDARD PRACTICE FOR MAKING SOLVENT CEMENTED JOINTS WITH POLY (VINYL CHLORIDE) (PVC) PIPE AND FITTINGS
G. ASTM F412 – STANDARD TERMINOLOGY RELATING TO PLASTIC PIPING SYSTEMS
H. ASTM F477 – STANDARD SPECIFICATION FOR ELASTOMERIC SEALS (GASKETS) FOR JOINING PLASTIC PIPE
I. ASTM F1668 – STANDARD GUIDE FOR CONSTRUCTION PROCEDURES FOR BURIED PLASTIC PIPE
J. AWWA C605 – UNDERGROUND INSTALLATION OF POLYVINYL CHLORIDE (PVC) AND MOLECULARLY ORIENTED POLYVINYL CHLORIDE (PVCO) PRESSURE PIPE AND FITTINGS
K. AWWA C900 – POLYVINYL CHLORIDE (PVC) PRESSURE PIPE, AND FABRICATED FITTINGS, 4 IN. THROUGH 12 IN., FOR WATER TRANSMISSION AND DISTRIBUTION
L. AWWA MANUAL M23 –– PVC PIPE – DESIGN AND INSTALLATION
M. NSF/ANSI 14 PLASTIC PIPING SYSTEM COMPONENTS AND RELATED MATERIALS
N. NSF/ANSI 61 DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS
O. PLASTIC PIPE INSTITUTE TR-2, PVC RANGE COMPOSITION LISTING OF QUALIFIED INGREDIENTS

PART 2: PRODUCTS

2.01 GENERAL
A. NO FOREIGN-MANUFACTURED PIPE SHALL BE ALLOWED. ALL PIPE AND RESTRAINTS SHALL BE PRODUCED SOLELY IN THE UNITED STATES.
B. PVC PIPE SHALL BE USED WHERE SHOWN ON THE DRAWINGS, SPECIFIED IN SECTION 01075, LISTED IN THE BID "SCHEDULE OF PRICES" AND BID TAB, OR WHERE OTHERWISE APPROVED BY THE ENGINEER AND OWNER.
C. ALL MATERIALS THAT COME IN CONTACT WITH POTABLE WATER, INCLUDING LUBRICANTS, SHALL BE EVALUATED, TESTED, AND CERTIFIED FOR CONFORMANCE WITH ANSI/NSF STANDARD 61.

2.02 PIPE MATERIALS
A. ALL PVC PIPE SHALL BE PVC 1120 PRESSURE PIPE MADE FROM CLEAN, VIRGIN CLASS 12454 PVC COMPOUND CONFORMING TO RESIN SPECIFICATION ASTM D1784 WITH OUTSIDE DIAMETER DIMENSIONS OF CAST IRON PIPE AND SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF ASTM D1784 AND D2241. THE PVC COMPOUNDS SHALL BE TREATED OR CERTIFIED SUITABLE FOR POTABLE WATER PRODUCTS BY THE NATIONAL SANITATION FOUNDATION (NSF) TESTING LABORATORY (NSF STANDARD NO. 61). ALL PVC PIPE SHALL BE BLUE IN COLOR.
B. PVC PIPE 4 INCH THROUGH 12 INCH NOMINAL SIZE SHALL MEET THE REQUIREMENTS OF AWWA C900. WHEN AWWA C900 CONFLICTS WITH THE LISTED ASTM STANDARDS, THE REQUIREMENTS OF AWWA C900 SHALL PREVAIL.
C. PIPE CLASS: ALL PVC PIPE INSTALLED SHALL BE DR 14 (305 PSI PRESSURE CLASS PER AWWA C900) UNLESS OTHERWISE INDICATED IN THIS SECTION, ON THE DRAWINGS AND/OR IN SECTION 01011. IN NO CASE SHALL PVC PIPE WITH A WALL THICKNESS LESS THAN DR 14 BE PERMITTED. THE PIPE SHALL BE CAPABLE OF WITHSTANDING THE OVERBURDEN PRESSURE DETERMINED BY THE DEPTH OF BURIAL IN FIELD. WHEN CERTA-LOK AND INTERCHANGEABLE; AND THE COMPLETE RESTRAINED JOINT PIPE SYSTEM SHALL MEET ALL REQUIREMENTS OF AWWA C900. RESTRAINED JOINT "SWEEPS" SHALL NOT BE USED.
I. FITTINGS
NO PVC FITTINGS (INCLUDING "SWEEPS") SHALL BE PERMITTED. ALL FITTINGS FOR PVC PIPE 4" DIAMETER AND LARGER SHALL BE MECHANICAL JOINT DUCTILE IRON FITTINGS CONNECTED TO PVC PIPE WITH MECHANICAL JOINT RESTRAINT DEVICES AS SPECIFIED IN SECTION 15130, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. CONCRETE THRUST BLOCKS SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS.

2.03 MANUFACTURERS

ACCEPTABLE PVC PIPE MANUFACTURERS ARE:

A. JM EAGLE, INC.
5200 WEST CENTURY BOULEVARD
LOS ANGELES, CA 90045
(800) 621-4404
WWW.JMEAGLE.COM

B. NORTH AMERICAN PIPE CORPORATION
2801 POST OAK BLVD., SUITE 600
HOUSTON, TX 77056
(713) 840-7473
WWW.NORTHAMERICANPIPE.COM

C. DIAMOND PLASTICS CORPORATION
1212 JOHNSTOWN ROAD
GRAND ISLAND, NE 68803
(800) PVC-PIPE
WWW.DPCPIPE.COM

D. NORTHERN PIPE PRODUCTS
1302 39 STREET NW
FARGO, ND 58102
800-747-7655
WWW.NORTHERNPIPE.COM

E. SANDERSON PIPE
875 INTERNATIONAL BOULEVARD
CLARKSVILLE, TN 37040
800-669-3553
WWW.SANDERSONPIPE.COM

PART 3: EXECUTION ER FITTINGS
3.01 PACKAGING, HANDLING AND STORAGE

A. THE MANUFACTURER SHALL ENSURE THAT THE INTERIOR OF ALL PIPE IS CLEAN AND INSTALL PLASTIC CLEANLINESS PLUGS IN ALL PIPES TO KEEP THE PIPE INTERIORS CLEAN OR COVER ADEQUATELY TO PREVENT DUST OR TRUCK EXHAUST FROM ENTERING PIPES.
B. SECTIONS OF PIPE HAVING BEEN DISCOVERED WITH CUTS OR GOUGES IN EXCESS OF 10% OF THE PIPE WALL THICKNESS SHALL NOT BE USED.
C. ANY SECTION OF PIPE SHOWING A CRACK OR WHICH HAS RECEIVED A BLOW THAT MAY HAVE CAUSED AN INCIDENT FRACTURE, EVEN THOUGH NO SUCH FRACTURE IS VISIBLE, SHALL BE MARKED AS REJECTED AND REMOVED AT ONCE FROM THE WORK.

3.02 INSTALLATION
EXCEPT AS MODIFIED HEREIN, INSTALLATION OF PVC PIPE SHALL BE IN FULL ACCORDANCE WITH AWWA C605, AWWA MANUAL M23, AND THE UNI-BELL "HANDBOOK OF PVC PIPE DESIGN AND CONSTRUCTION." IN THE EVENT OF CONFLICTING REQUIREMENTS OR GUIDELINES WITHIN THESE REFERENCED PUBLICATIONS, THE REQUIREMENTS OF AWWA C605 SHALL PREVAIL. CONTRACTOR SHALL ALSO FOLLOW THE PROVISIONS OF SECTIONS 02210 AND 15000, OTHER SECTIONS AS APPLICABLE, AND ALL MANUFACTURERS' RECOMMENDATIONS, IN ADDITION TO THE FOLLOWING REQUIREMENTS:

A. ASSEMBLE PIPE USING THE FOLLOWING TYPES OF JOINTS:
1. GASKETED BELL JOINT – INTEGRAL WITH THE PIPE,
2. GASKETED COUPLING – A DOUBLE GASKETED COUPLING AS SPECIFIED IN SECTION 15130, OR
3. RESTRAINED MECHANICAL JOINT (FOR PIPE TO FITTING AND PIPE TO VALVE JOINTS ONLY) – AS SPECIFIED IN SECTION 15105.
4. RESTRAINED JOINT: COUPLING – JOINTS FOR RESTRAINED JOINT PVC PIPE (CERTA-LOK AVOID METAL TO PLASTIC CONTACT. NEITHER DEFLECTION OF PVC PIPE JOINTS NOR BENDING OF PVC PIPE ARE PERMITTED (EXCEPT FOR RESTRAINED JOINT PVC PIPE WHEN INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING METHOD). ALL ANGLES SHALL BE MADE WITH PROPER FITTINGS.
F. PVC PIPE SHALL NOT BE INSTALLED WITH LESS THAN 3 FEET OF COVER. DR 14 PVC PIPE SHALL NOT BE INSTALLED WITH MORE THAN 30 FEET OF COVER.
G. PRESSURE TESTING OF DR 14 PVC PIPE SHALL NOT EXCEED 305 PSI.
H. ONLY DUCTILE IRON FITTINGS PER SPECIFICATION 15105 MAY BE USED WITH PVC PIPE. PVC FITTINGS ARE NOT PERMITTED. SEE DETAIL DRAWINGS AND SECTION 15130 FOR TRANSITIONS BETWEEN DIFFERENT PIPE MATERIALS.
I. RESEARCH HAS DOCUMENTED THAT CERTAIN PIPE MATERIALS (SUCH AS POLYVINYL CHLORIDE, POLYETHYLENE, AND POLYBUTYLENE) AND CERTAIN ELASTOMERS (SUCH AS THOSE USED IN GASKET MATERIAL) MAY BE SUBJECT TO PERMEATION BY LOWER-MOLECULAR WEIGHT ORGANIC SOLVENTS OR PETROLEUM PRODUCTS. PRODUCTS SPECIFIED IN THIS SECTION SHALL ONLY BE INSTALLED IN SOILS THAT ARE FREE OF BOTH PETROLEUM PRODUCTS AND ORGANIC SOLVENTS. IF DURING THE COURSE OF PIPELINE INSTALLATION, THE CONTRACTOR IDENTIFIES OR SUSPECTS THE PRESENCE OF PETROLEUM PRODUCTS OR ANY UNKNOWN CHEMICAL SUBSTANCE IN THE NATIVE SOIL, CONTRACTOR SHALL STOP INSTALLING PIPE IN THE AREA OF SUSPECTED CONTAMINATION AND NOTIFY THE ENGINEER IMMEDIATELY. CONTRACTOR SHALL NOT RESUME INSTALLING PIPING IN THE AREA OF SUSPECTED CONTAMINATION UNTIL DIRECTION IS PROVIDED BY THE ENGINEER.
J. UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR INDICATED IN SECTION 01011, PVC PIPE SHALL NOT BE INSTALLED AT SITES WHERE FREQUENT EXCAVATION CAN BE ANTICIPATED IN THE VICINITY OF THE PIPE (INCLUDING TREATMENT PLANT AND BOOSTER STATION SITES), WHERE THE PIPELINE IS LAID ON A RIVER CHANNEL BOTTOM, OR WITH LESS THAN 3 FEET OF COVER OVER THE TOP OF PIPE. PVC PIPE SHALL NOT BE INSTALLED IN ANY CIRCUMSTANCE WITH LESS THAN 3 FEET OR MORE THAN 30 FEET OF COVER OVER THE CROWN OF THE PIPE. UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR APPROVED IN WRITING BY THE ENGINEER.

3.03 TAPPING
A. USE A TAPPING SLEEVE OR SADDLE IN ACCORDANCE WITH SECTION 15170 AND/OR 15200 (AS APPROPRIATE).

SECTION 15125
HIGH DENSITY POLYETHYLENE (HDPE) PIPE
PART 1: GENERALCOM

1.01 SCOPE OF WORK
A. THE WORK UNDER THIS SECTION CONSISTS OF PROVIDFITTINGS ?ö<"±??ING ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND SERVICES REQUIRED TO PROVIDE AND TEST ALL HIGH DENSITY POLYETHYLENE (HDPE) PRESSURE PIPE AND FITTINGS (4 INCHES THROUGH 48 INCHES NOMINAL DIAMETER) WITH DUCTILE-IRON-PIPE-EQUIVALENT OUTSIDE DIAMETERS FOR WATER DISTRIBUTION AND TRANSMISSION AS INDICATED ON THE DRAWINGS AND AS SPECIFIED WITHIN THIS SECTION AND RELATED SECTIONS OF THE SPECIFICATIONS. THIS SECTION SHALL ALSO APPLY TO INSTALLATION OF HDPE WATER MAINS SMALLER THAN 4-INCH DIAMETER TO THE EXTENT APPLICABLE (MATERIALS FOR HDPE PIPE SMALLER THAN 4-INCH DIAMETER ARE SPECIFIED IN SECTION 15200). CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED PIPE, PIPE RESTRAINT COMPONENTS, AND OTHER RELATED COMPONENTS. HDPE PIPE WILL NOT BE FURNISHED BY THE OWNER. REFER TO SECTIONS 01000, 01011 AND 01075 FOR MATERIALS TO BE FURNISHED BY THE OWNER.
B. WHEN WATER MAINS SMALLER THAN 4-INCH DIAMETER ARE REQUIRED, HIGH DENSITY POLYETHYLENE PIPE IN ACCORDANCE WITH SECTION 15200 SHALL BE USED.

1.02 SUBMITTALS
A. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, MANUFACTURER'S LITERATURE AND PRODUCT DATA, INSTALLATION INSTRUCTIONS, CERTIFICATIONS AND OTHER REQUIRED SUBMITTALS FOR ALL PRODUCTS FURNISHED UNDER THIS SECTION IN ACCORDANCE WITH SECTION 01300.
B. THE FOLLOWING PRODUCT DATA IS REQUIRED FROM THE PIPE MANUFACTURER:
1. PIPE SIZE
2. DIMENSIONALITY
3. PRESSURE CLASS
4. COLOR
5. RECOMMENDED MINIMUM BENDING RADIUS
6. RECOMMENDED MAXIMUM SAFE PULL FORCE (IF PIPE WILL BE USED FOR DIRECTIONAL DRILLING, PIPE BURSTING, OR OTHER TRENCHLESS INSTALLATION METHOD)
7. CERTIFICATE OF COMPLIANCE FROM THE PIPE MANUFACTURER THAT THE PRODUCT PIPE IS IN COMPLIANCE WITH PROJECT REQUIREMENTS.
C. SUBMIT FUSION METHOD(S), QUALITY CONTROL PROCEDURES, AND DOCUMENTATION FOR FUSION PROCESS.
D. FUSION TECHNICIANS CERTIFICATIONS: SUBMIT REQUIRED CERTIFICATIONS, INCLUDING THOSE SPECIFIED UNDER QUALITY ASSURANCE BELOW AND ALL PROPOSED FUSION TECHNICIANS' APPLICABLE CERTIFICATIONS AND QUALIFICATIONS. FUSION TECHNICIANS' CERTIFICATIONS SHALL HAVE BEEN COMPLETED WITHIN THE PAST TWO YEARS.
E. SUBMIT VERIFICATION BY THE PIPE MANUFACTURER THAT THE CONTRACTOR HAS BEEN TRAINED IN THE PROPER METHOD OF HANDLING, JOINING, AND INSTALLING THE NEW PIPE (INCLUDING INSTALLATION BY DIRECTIONAL DRILLING AND/OR PIPE BURSTING WHERE APPLICABLE). CONTRACTOR SHALL HAVE SATISFACTORILY PERFORMED A MINIMUM OF FIVE (5) EQUIVALENT PROJECTS THROUGHOUT THE PAST FIVE YEARS.
F. POST-CONSTRUCTION SUBMITTALS
A FUSION TECHNICIAN'S JOINT REPORT OF AS-RECORDED DATA FOR EVERY FUSION JOINT PERFORMED ON THE PROJECT, INCLUDING JOINTS THAT WERE REJECTED, SHALL BE PROVIDED BY THE CONTRACTOR AND/OR FUSION PROVIDER AND SHALL ALSO BE SUPPLIED TO THE PIPE SUPPLIER OR MANUFACTURER PROMPTLY UPON REQUEST. SPECIFIC REQUIREMENTS OF THE FUSION TECHNICIAN'S JOINT REPORT SHALL INCLUDE:
1. PIPE SIZE AND THICKNESS
2. MACHINE SIZE
3. FUSION TECHNICIAN IDENTIFICATION
4. JOB IDENTIFICATION
5. FUSION JOINT NUMBER
6. FUSION, HEATING, AND DRAG PRESSURE SETTINGS
7. HEAT PLATE TEMPERATURE
8. TIME STAMP
9. HEATING AND COOL DOWN TIME OF FUSION
10. AMBIENT TEMPERATURE.

1.03 QUALITY ASSURANCE
A. HDPE PIPE AND FITTINGS SHALL MEET THE MINIMUM QUALITY REQUIREMENTS BY CONFORMING TO THE BELOW-REFERENCED AWWA/ANSI AND ASTM STANDARDS AS MODIFIED HEREIN. HDPE PIPE AND FITTINGS WILL BE ACCEPTED ON THE BASIS OF THE MANUFACTURER'S CERTIFICATION THAT THE MATERIALS CONFORM TO THIS SECTION.
B. THE CERTIFICATION FOR HDPE FITTINGS SHALL LIST A FITTING DESCRIPTION, QUANTITY, BARE FITTING WEIGHT, SOURCE, AND APPLICABLE AWWA STANDARD (C906). THE CERTIFICATION SHALL ACCOMPANY EACH DELIVERY OF THE MATERIAL TO THE PROJECT SITE.
C. OWNER AND ENGINEER RESERVE THE RIGHT TO WITNESS PIPE MANUFACTURING AT THE MANUFACTURER'S FACILITY WHERE THE PIPE TO BE PROVIDED FOR THE WORK WILL BE PRODUCED. OWNER AND ENGINEER RESERVE THE RIGHT TO INSPECT, SAMPLE, AND TEST THESE MATERIALS SUBSEQUENT TO DELIVERY AT THE PROJECT SITE. SUCH INSPECTIONS SHALL IN NO WAY RELIEVE THE MANUFACTURER OF THE RESPONSIBILITIES TO PROVIDE PRODUCTS THAT COMPLY WITH THE APPLICABLE STANDARDS AND THIS SECTION. SHOULD THE ENGINEER WISH TO WITNESS THE MANUFACTURE OF SPECIFIC PIPES, THE MANUFACTURER SHALL PROVIDE THE ENGINEER WITH ADEQUATE ADVANCE NOTICE OF WHEN AND WHERE THE PRODUCTION OF THOSE SPECIFIC PIPES WILL TAKE PLACE. APPROVAL OF THE PRODUCTS OR TESTS IS NOT IMPLIED BY THE ENGINEER'S DECISION NOT TO INSPECT THE MANUFACTURING, TESTING, OR FINISHED PIPES.
D. HDPE PIPE SHALL BE FUSED ONLY BY CERTIFIED FUSION TECHNICIANS, AS DOCUMENTED BY THE PIPE SUPPLIER OR MANUFACTURER, BY THE FUSION MACHINE MANUFACTURER, OR BY OTHER DOCUMENTATION ACCEPTABLE TO THE ENGINEER. THE FUSION EQUIPMENT OPERATOR SHALL BE FULLY TRAINED IN THE USE OF THE RESPECTIVE EQUIPMENT.
E. OWNER AND ENGINEER RESERVE THE RIGHT TO PERFORM ONSITE CARD CHECKS FOR FUSION TECHNICIANS' QUALIFICATIONS AND TO STOP ANY FUSION WORK BEING PERFORMED BY PERSONNEL UNABLE TO PROMPTLY PROVIDEDOCUMENTATION OF THE REQUIRED QUALIFICATIONS.
F. FOR HDPE INSTALLATIONS 16-INCH DIAMETER AND LARGER, CONTRACTOR SHALL, UPON REQUEST BY THE OWNER OR ENGINEER, AND AT NO ADDITIONAL COST TO THE OWNER, ARRANGE FOR THE PIPE MANUFACTURER'S FIELD REPRESENTATIVE TO BE ON-SITE DURING INSTALLATION OF HDPE TO OVERSEE THE FABRICATION OF FIVE (5) BUTT FUSION JOINTS FOR EACH WORK CREW INSTALLING THIS TYPE OF JOINT.

1.04 RELATED WORK
A. SECTION 01000 SUMMARY OF WORK
B. SECTION 01011 SPECIAL PROVISIONS
C. SECTION 01075 BASIS OF PAYMENT
D. SECTION 01300 SUBMITTALS
E. SECTION 01600 PRODUCTS
F. SECTION 02210 TRENCHING, BACKFILLING AND COMPACTING
G. SECTION 02350 PIPE BURSTING OF WATER MAINS
H. SECTION 02458 HORIZONTAL DIRECTIONAL DRILLING (HDD)
I. SECTION 02558 IDENTIFICATION/LOCATION GUIDE
J. SECTION 15000 PIPING – GENERAL PROVISIONS
K. SECTION 15020 DISINFECTING PIPELINES
L. SECTION 15025 FLUSHING AND CLEANING PIPELINES
M. SECTION 15030 PRESSURE AND LEAKAGE TESTS
N. SECTION 15105 DUCTILE IRON PIPE AND FITTINGS
O. SECTION 15130 PIPING SPECIALTIES
P. SECTION 15150 GATE VALVES
Q. SECTION 15155 BUTTERFLY VALVES
R. SECTION 15170 TAPPING SLEEVES, SADDLES, AND VALVES
S. SECTION 15180 FIRE HYDRANTSP
T. SECTION 15185 ABANDONMENT OF MAINS AND HYDRANTS
U. SECTION 15190 AIR VALVES, BLOW-OFF ASSEMBLIES AND SAMPLING TAPS
V. SECTION 15200 SERVICE LINES

1.05 REFERENCE
UNLESS OTHERWISE INDICATED, ALL REFERENCES HEREIN TO OTHER STANDARDS (E.G. AWWA, ASTM, ASME, ANSI ETC.) SHALL MEAN THE MOST CURRENT AVAILABLE REVISION.THE FOLLOWING REFERENCED DOCUMENTS ARE A PART OF THIS SECTION. COMPLY WITH ALL APPLICABLE PROVISIONS AND RECOMMENDATIONS OF THE FOLLOWING DOCUMENTS, EXCEPT AS OTHERWISE SPECIFIED HEREIN. WHERE A REFERENCED DOCUMENT CONTAINS REFERENCES TO OTHER STANDARDS, THOSE OTHER STANDARDS ARE INCLUDED AS REFERENCES UNDER THIS SECTION AS IF REFERENCED DIRECTLY.IN THE EVENT OF A CONFLICT BETWEEN THE REQUIREMENTS OF THIS SECTION AND THOSE OF THE REFERENCED DOCUMENTS, THE REQUIREMENTS OF THIS SECTION SHALL PREVAIL.

A. ASTM D638 – STANDARD TEST METHOD FOR TENSILE PROPERTIES OF PLASTICS
B. ASTM D790 – STANDARD TEST METHODS FOR FLEXURAL PROPERTIES OF UNREINFORCED AND REINFORCED PLASTICS AND ELECTRICAL INSULATING MATERIALS
C. ASTM: D1238 – STANDARD TEST METHOD FOR MELT FLOW RATES OF THERMOPLASTICS BY EXTRUSION PLASTOMETER
D. ASTM D1505 – STANDARD TEST METHOD FOR DENSITY OF PLASTICS BY THE DENSITY- GRADIENT TECHNIQUE
E. ASTM D2774 – STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PRESSURE PIPING
F. ASTM D2837 – STANDARD TEST METHOD FOR OBTAINING HYDROSTATIC DESIGN BASIS FOR THERMOPLASTIC PIPE MATERIALS OR PRESSURE DESIGN BASIS FOR THERMOPLASTIC PIPE PRODUCTS
G. ASTM D3261 – STANDARD SPECIFICATION FOR BUTT HEAT FUSION POLYETHYLENE (PE) PLASTIC FITTINGS FOR POLYETHYLENE (PE) PLASTIC PIPE AND TUBING
H. ASTM D3350 – STANDARD SPECIFICATION FOR POLYETHYLENE PLASTICS PIPE AND FITTINGS MATERIALS
I. ASTM F412 – STANDARD TERMINOLOGY RELATING TO PLASTIC PIPING SYSTEMS
J. ASTM F714 – STANDARD SPECIFICATION FOR POLYETHYLENE (PE) PIPE (SDR-PR) BASED ON OUTSIDE DIAMETER
K. ASTM F1055 – STANDARD SPECIFICATION FOR ELECTROFUSION TYPE POLYETHYLENE FITTINGS FOR OUTSIDE DIAMETER CONTROLLED POLYETHYLENE AND CROSSLINKED POLYETHYLENE (PEX) PIPE AND TUBING
L. ASTM F1473 – STANDARD TEST METHOD FOR NORTH TENSILE TEST TO MEASURE THE RESISTANCE TO SLOW CRACK GROWTH OF POLYETHYLENE PIPES AND RESINS
M. ASTM F1290 – STANDARD PRACTICE FOR ELECTROFUSION JOINING POLYOLEFIN PIPE AND FITTINGS
N. ASTM F1668 – STANDARD GUIDE FOR CONSTRUCTION PROCEDURES FOR BURIED PLASTIC PIPE
O. ASTM F2206 – STANDARD SPECIFICATION FOR FABRICATED FITTINGS OF BUTT-FUSED POLYETHYLENE (PE) PLASTIC PIPE, FITTINGS, SHEET STOCK, PLATE STOCK OR BLOCK STOCK
P. ASTM F2620 – STANDARD PRACTICE FOR HEAT FUSION JOINING OF POLYETHYLENE PIPE AND FITTINGS
Q. PLASTIC PIPE INSTITUTE TN 34 – INSTALLATION GUIDELINES FOR ELECTROFUSION COUPLINGS 14" AND LARGER
R. AWWA C906 – POLYETHYLENE (PE) PRESSURE PIPE AND FITTINGS, 4 IN. THROUGH 65 IN. (100 MM THROUGH 1,650 MM), FOR WATERWORKS
S. AWWA MANUAL M55 – PE PIPE DESIGN AND INSTALLATION
T. PLASTIC PIPE INSTITUTE (PPI) "HANDBOOK OF POLYETHYLENE PIPE"
U. PPI TR-33 – GENERIC BUTT FUSION JOINING PROCEDURE FOR FIELD JOINING OF POLYETHYLENE PIPE
V. NSF/ANSI 14 PLASTICS PIPING SYSTEM COMPONENTS AND RELATED MATERIALS
W. NSF/ANSI 61 DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS
X. NSF/ANSI 372 DRINKING WATER SYSTEM COMPONENTS – LEAD CONTENTWATER

PART 2: PRODUCTS

2.01 GENERAL
A. NO FOREIGN-MANUFACTURED ITEMS PROVIDED UNDER THIS SECTION SHALL BE ALLOWED. ALL PIPE, FITTINGS, SADDLES, AND OTHER HDPE APPURTENANCES SHALL BE PRODUCED SOLELY IN THE UNITED STATES.
B. HDPEPIPE SHALL BE USED WHERE SHOWN ON THE DRAWINGS AND MAY BE USED WHERE APPROVED BY THE ENGINEER.HDPE PIPE SHALL BE USED BOTH FOR PIPE BURSTING APPLICATIONS INSTALLED IN ACCORDANCE WITH SECTION 02350 AND FOR HORIZONTAL DIRECTIONAL DRILLING APPLICATIONS INSTALLED IN ACCORDANCE WITH SECTION 02458 UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SPECIFIED IN SECTION 01011 OR 01075, LISTED IN THE SCHEDULE OF PRICES, OR OTHERWISE APPROVED BY THE ENGINEER AND OWNER.
C. THE NOMINAL PIPE DIAMETER SHALL BE AS SPECIFIED ON THE CONTRACT DRAWINGS. HDPE PIPE SIZES SHALL BE NOMINAL DIAMETERS OF 4", 6", 8", 12", 16", 20", 24", 30", 36", 42", OR 48" ONLY WITH OUTSIDE DIAMETERS CONFORMING TO DUCTILE IRON PIPE SIZES (DIPS). HDPE PIPE SIZE SHALL BE SELECTED TO PROVIDE THE REQUIRED INSIDE DIAMETER, WHICH MAY REQUIRE PIPE TO BE UPSIZED, AT THE ENGINEER'S DIRECTION, TO THE NEXT SIZE LISTED ABOVE WHEN HDPE PIPE IS USED IN PLACE OF DUCTILE IRON OR PVC PIPE.
D. HDPE FITTINGS SHALL NOT BE USED EXCEPT FOR SADDLES, ADAPTERS AND TEMPORARY CAPS AS SPECIFIED BELOW. ALL OTHER FITTINGS SHALL BE DUCTILE IRON.
E. ALL MATERIALS THAT COME IN CONTACT WITH POTABLE WATER, INCLUDING LUBRICANTS, SHALL BE EVALUATED, TESTED, AND CERTIFIED FOR CONFORMANCE WITH ANSI/NSF STANDARD 61.

2.02 HDPE PIPE AND FITTINGS
A. ALL HDPE PIPE AND FITTINGS SHALL FULLY MEET THE REQUIREMENTS OF AWWA C906 AND SHALL BE MADE FROM THE SAME VIRGIN RESIN MEETING THE REQUIREMENTS OF THE PLASTIC PIPE INSTITUTE (PPI) MATERIAL DESIGNATION PE 3408/3608 OR PE 4710 (WHERE PE 4710 IS REQUIRED ON THE DRAWINGS, IN SECTION 01011, AND/OR IN SECTION 01075, PE 3408/3608 SHALL NOT BE PERMITTED) WITH AN ATSM D3350 MINIMUM CELL CLASSIFICATION OF PE 345464C. A HIGHER NUMBER CELL CLASSIFICATION LIMIT WHICH GIVES A DESIRABLE HIGHER PRIMARY PROPERTY PER ASTM D3350 MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER AND, IF APPROVED, MAY BE USED AT NO EXTRA COST TO THE OWNER.
B. THE PIPE AND FITTINGS SHALL CONTAIN NO RECYCLED COMPOUND EXCEPT FOR REWORK MATERIAL GENERATED IN THE MANUFACTURER'S OWN PLANT THAT HAS THE SAME CELL CLASSIFICATION AS THE MATERIAL TO WHICH IT IS BEING ADDED. THE PIPE SHALL BE HOMOGENEOUS THROUGHOUT AND FREE OF VISIBLE CRACKS, HOLES, VOIDS, FOREIGN INCLUSIONS, OR OTHER DEFECTS THAT MAY AFFECT THE WALL INTEGRITY.
C. THE MATERIAL SHALL HAVE A MINIMUM HYDROSTATIC DESIGN BASIS (HDB) OF 1,600 PSI (11.03 MPA) AT 73 DEGREES F PER ASTM D 2837. THE MATERIAL SHALL BE BLACK WITH MINIMUM 2% CARBON BLACK FOR ULTRAVIOLET PROTECTION. PERMANENT IDENTIFICATION OF WATER PIPING SERVICE SHALL BE PROVIDED BY CO-EXTRUDING LONGITUDINAL BLUE STRIPES INTO THE PIPE OUTSIDE SURFACE AT NO LESS THAN TWO LOCATIONS AROUND THE PIPE'S CIRCUMFERENCE, SO AT LEAST ONE STRIPE IS VISIBLE FROM ANY ANGLE. THE STRIPING MATERIAL SHALL BE THE SAME MATERIAL AS THE PIPE MATERIAL EXCEPT FOR COLOR, WHICHSHALL BE BLUE. STRIPES PRINTED OR PAINTED ON THE OUTSIDE SURFACE SHALL NOT BE ACCEPTABLE.
D. ALL HDPE PIPE AND FITTINGS SHALL BE MINIMUM PRESSURE CLASS 160 PSI WITH WALL THICKNESS NOT LESS THAN DIMENSION RATIO (DR) 11, UNLESS OTHERWISE SHOWN ON THEDRAWINGS OR SPECIFIED IN SECTION 01011, 02458 OR THIS SECTION. HOWEVER, ALL HDPE PIPE INSTALLED WITH MORE THAN 20 FEET OF COVER AND ALL HDPE PIPE INSTALLED BY PIPE BURSTING METHODS SHALL BE MINIMUM PRESSURE CLASS 200 PSI AND WALL THICKNESS NOT LESS THAN DR 9.0, UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR SPECIFIED IN SECTION 02350 OR 01011.HDPE PIPE SHALL NOT BE SUBJECTED TO WORKING PRESSURES EXCEEDING THE PIPE'S PRESSURE CLASS.
E. HDPE ELBOWS/BENDS, TEES, AND CROSSES ARE NOT ALLOWED.

2.03 FITTINGS, SADDLES, ADAPTERS AND TEMPORARY CAPS
A. PLAIN END BUTT FUSED MECHANICAL JOINT ADAPTER FITTINGS SHALL BE USED WHEN JOINING POLYETHYLENE PIPE TO VALVES, DUCTILE IRON FITTINGS, OR OTHER PIPE MATERIALS.BUTT FUSION FITTINGS SHALL COMPLY WITH ASTM D3261. WHEN USING A BUTT-FUSED ADAPTER, ATYPE 316 STAINLESS STEEL STIFFENER SHALL BE USED.
B. BUTT FUSED IPS TO DIPS ADAPTERS SHALL BE USED TO CONNECT DIPS-SIZE HDPE PIPE TO IPS-SIZE HDPE PIPE.
C. SADDLES FOR BRANCH/SERVICE CONNECTIONS 2-INCH DIAMETER AND SMALLER SHALL BE CONVENTIONAL FUSION TYPE, SIDE FUSION (SIDEWALL FUSED) TAPPING SADDLES IN CONFORMANCE WITH ASTM D1598, D1599, AND AWWA C906, RATED FOR AT LEAST 200 PSI WORKING PRESSURE WITH NSF-61- AND NSF-372-COMPLIANT FEMALE THREADED BRASS ALLOY INSERT PER AWWA C800 (CC THREADS UNLESS OTHERWISE SPECIFIED IN SECTION 01011) TO RECEIVE A CORPORATION STOP. SADDLE BRANCH SHALL BE PE 3408/3608 OR PE 4710 HDPE PER ASTM D3350 WITH CELL CLASSIFICATION 345454C OR HIGHER. A TYPE 304 OR 316 STAINLESS STEEL COMPRESSION RING SHALL BE PROVIDED AROUND THE OUTER DIAMETER OF THE BRANCH OUTLET OPPOSING THE THREADED INSERT.
D. HDPE BRANCH SADDLES FOR 3-INCH DIAMETER BRANCH/SERVICE CONNECTIONS SHALL BE CONVENTIONAL FUSION OR ELECTROFUSION TYPE AS DIRECTED AND/OR APPROVED BY THE OWNER OR ENGINEER. 3-INCH SADDLES SHALL BE DR 11 OR DR 9 PE 3408/3608 OR PE 4710 WITH A PRESSURE RATING THAT EQUALS OR EXCEEDS THE WATER MAIN PRESSURE CLASS. NO HDPE SADDLES SHALL BE PERMITTED FOR BRANCH/SERVICE CONNECTIONS LARGER THAN 3-INCH.
E. ELECTROFUSION FITTINGS, COUPLINGS, AND SADDLES SHALL ONLY BE USED WHERE PERMITTED BY THE ENGINEER AND SHALL NOT BE PERMITTED FOR USE WITH HDD.ELECTROFUSION FITTINGS SHALL COMPLY WITH ASTM F1055.
F. MECHANICAL (COMPRESSION) FITTINGS AND COUPLINGS SHALL BE AS SPECIFIED IN SECTIONS 15105 AND 15130 AND SHALL USE GASKETS AND RESTRAINING DEVICES SPECIFICALLY DESIGNED FOR, OR TESTED AND FOUND TO BE ACCEPTABLE FOR, USE WITH POLYETHYLENE PIPE. TYPE 316 STAINLESS STEEL STIFFENERS SHALL BE UTILIZED IN THE HDPE PIPE WITH ALL MECHANICAL JOINT (COMPRESSION) DUCTILE IRON FITTINGS, COUPLINGS, AND VALVES. COMPRESSION-TYPE HDPE OR PVC FITTINGS SHALL NOT BE USED. T-BOLTS AND NUTS SHALL BE HIGH-STRENGTH, CORROSION-RESISTANT LOW-ALLOY STEEL WITH THE CHARACTERISTICS LISTED IN TABLE 6 OF AWWA C111. T-BOLTS SHALL BE XYLAN OR FLUOROKOTE #1 (CORROSION RESISTANT). OTHER BOLTS AND NUTS SHALL BE AS SPECIFIED IN SECTION 15130.

2.04 PIPE ROLLERS
A. PIPE ROLLERS SHALL BE DESIGNED FOR THE PURPOSE OF SUPPORTING AND GUIDING PIPE WITH MINIMAL FRICTION.
B. PIPE ROLLERS SHALL BE OF SUFFICIENT SIZE TO FULLY SUPPORT THE WEIGHT OF THE PIPE DURING HANDLING AND INSTALLATION AND SHALL NOT DAMAGE THE PIPE IN ANY WAY. SPACING SHALL BE AS RECOMMENDED BY THE HDPE PIPE MANUFACTURER AND SHALL PREVENT PIPE ABRASIONS AND ADDITIONAL STRESS ON THE PIPING.

2.05 ACCEPTABLE MANUFACTURERS––HDPE PIPEAND FITTINGS
A. PERFORMANCE PIPE

A DIVISION OF CHEVRON PHILLIPS
CHEMICAL COMPANY
5085 WEST PARK BLVD., SUITE 500
P.O. BOX 269006
PLANO, TEXAS 75093

B. JM EAGLE
5200 WEST CENTURY BOULEVARD
LOS ANGELES, CALIFORNIA 90045

C. WL PLASTICS CORPORATION
CORPORATION
3575 LONE START CIRCLE, SUITE 300
FORT WORTH, TX 76177

D. POLY-CAM (SERIES 415 SIDE
FUSION SADDLES ONLY)
1101 MCKINLEY ST.
ANOKA, MN 55303

E. ISCO INDUSTRIES (ADAPTERS
AND FITTINGS ONLY*)
926 BAXTER AVE.
LOUISVILLE, KY 40204

*PIPE MANUFACTURED BY
PERFORMANCE PIPE OR JM
EAGLE MAY BE SUPPLIED THROUGH
ISCO.

F. GEORG FISCHER CENTRAL PLASTICS
LLC PIPE & FABRICATED PRODUCTS R
(FORMERLY
INDEPENDENT PIPE PRODUCTS
INC.) (ADAPTERS AND FITTINGS ONLY)
39605 INDEPENDENCE
SHAWNEE, OK 74804

G. NUPI AMERICANS INC.
(ADAPTERS AND FITTINGS ONLY)
1511 SUPERIOR WAY
HOUSTON, TX 77039

H. IMPROVED PIPING PRODUCTS, INC.
(ADAPTERS AND FITTINGS ONLY)
4311 DIRECTOR DRIVE
SAN ANTONIO, TX 78219

I. IMPROVED PIPING PRODUCTS, INC.
(ADAPTERS AND FITTINGS ONLY)
4311 DIRECTOR DRIVE
SAN ANTONIO, TX 78219

PART 3: EXECUTION

3.01 PACKAGING, HANDLING, AND STORAGE
A. THE MANUFACTURER SHALL ENSURE THAT THE INTERIOR OF ALL PIPE IS CLEAN AND INSTALL PLASTIC CLEANLINESS PLUGS IN ALL PIPES TO KEEP THE PIPE INTERIORS CLEAN OR COVER

ADEQUATELY TO PREVENT DUST OR TRUCK EXHAUST FROM ENTERING PIPES.

B. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE ANY HDPE PIPE. ALL PIPES SHALL BE VISUALLY INSPECTED FOR GOUGES. GOUGES IN EXCESS OF TEN PERCENT (10%) OF THE PIPE WALL THICKNESS ARE CONSIDERED EXCESSIVE AND ARE NOT ACCEPTABLE. IN AREAS WHERE EXCESSIVE GOUGES OR OTHER DAMAGE IS PRESENT, THE AFFECTED PIPE SECTION SHALL BE CUT OUT AND REMOVED. THE REMAINING, UNDAMAGED PORTIONS OF THE PIPE SHALL BE REJOINED BY BUTT FUSION TO MAKE A CONTINUOUS SECTION.

3.02 PIPE INSTALLATION
INSTALLATION OF HDPE PIPE AND FITTINGS SHALL BE IN FULL ACCORDANCE WITH AWWA MANUAL M55, EXCEPT AS MODIFIED HEREIN. CONTRACTOR SHALL FOLLOW THE PROVISIONS OF SECTIONS 02210, 02350, 02458, AND 15000; OTHER SECTIONS AS APPLICABLE; AND ALL MANUFACTURERS' RECOMMENDATIONS, IN ADDITION TO THE FOLLOWING REQUIREMENTS:
A. TRENCHING, BEDDING, AND BACKFILLING SHALL BE COMPLY WITH SECTION 02210. TRENCHING SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D2774.
B. UNLESS AUTHORIZED IN WRITING BY THE ENGINEER ON A CASE-BY-CASE BASIS, CHANGES IN DIRECTION SHALL BE ACCOMPLISHED BY BENDING THE PIPE IN LIEU OF INSTALLING A FITTING, SUBJECT TO APPROVAL BY THE ENGINEER. MAXIMUM PIPE BENDING RADIUS SHALL BE IN CONFORMANCE WITH AWWA MANUAL M55 AND THE MANUFACTURER'S RECOMMENDATION FOR THE SPECIFIC DIAMETER AND DIMENSION RATIO (DR) OF THE PIPE. THE FOLLOWING TABLE SHOWS MINIMUM BENDING RADIUS BASED UPON THE ALLOWABLE STRAIN OF THE PIPE WALL. POTENTIAL FLOW RESTRICTIONS, SURGE AND OTHER NON-TRENCH STABILITY AND PIPE STRAIN ISSUES MAY REDUCE THE VALUES SHOWN HERE PER THE ENGINEER'S AND/OR MANUFACTURER'S RECOMMENDATIONS. THE MINIMUM BEND RADIUS MULTIPLIER DETERMINES THE MINIMUM (COLD) RADIUS OF THE PIPE CURVATURE, WHICH IS CALCULATED BY MULTIPLYING THE OUTSIDE DIAMETER OF THE PIPE BY THE MULTIPLIER FOR THE APPROPRIATE DR USED. BENDING RADIUS ALLOWED BY THE MANUFACTURER CAN VARY, SO CONTRACTOR SHALL VERIFY THE MULTIPLIER WITH THE MANUFACTURER PRIOR TO ORDERING THE PIPE. IN NO CASE SHALL THE INSTALLED RADIUS BE LESS THAN 125% OF THE MANUFACTURER'S PERMITTED BENDING RADIUS.

PE PIPE DIMENSION RATIO (DR)	MINIMUM BENDING RADIUS MULTIPLIER*
11.0	25 TIMES PIPE O.D.
9.0	20 TIMES PIPE O.D.

*WHEN INSTALLED BY HDD, MINIMUM BENDING RADIUS SHALL BE AS SPECIFIED IN SECTION 02458.
C. THE HDPE PIPE SHALL BE CONTINUOUSLY OR PARTIALLY SUPPORTED ON ROLLERS OR OTHER ENGINEER-APPROVED FRICTION-DECREASING IMPLEMENTS DURING JOINING AND INSTALLATION, SUCH THAT THE PIPE IS NOT OVER-STRESSED OR CRITICALLY ABRADED PRIOR TO OR DURING INSTALLATION. A SUFFICIENT QUANTITY OF ROLLERS OR OTHER APPROVED IMPLEMENTS, SPACED PER THE PIPE MANUFACTURER'S GUIDELINES, SHALL BE USED TO ASSURE ADEQUATE SUPPORT AND RESIST EXCESSIVE SAGGING OF THE PIPE DURING INSTALLATION.CONTRACTOR SHALL ENSURE THAT PIPE IS NOT PERMITTED TO SLIDE SIDEWAYS ON THE ROLLERS OR OTHER IMPLEMENTS.
D. TRACER WIRES SHALL BE INSTALLED WITH THE HDPE PIPE AS SPECIFIED IN SECTION 02458 AND 02558.
E. HDPE PIPE SHALL NOT BE EMPLOYED WITH DIRECTIONAL DRILLING THROUGH ROCK OR OTHER ABRASIVE CONDITIONS UNLESS IT IS ENCASED AND ONLY WITH APPROVAL OF THE ENGINEER.
F. RESEARCH HAS DOCUMENTED THAT CERTAIN PIPE MATERIALS (SUCH AS POLYETHYLENE, POLYBUTYLENE, POLYVINYL CHLORIDE, AND ASBESTOS CEMENT) AND CERTAIN ELASTOMERS, SUCH AS USED IN JOINTING GASKETS AND PACKING GLANDS, MAY BE SUBJECT TO PERMEATION BY LOWER-MOLECULAR WEIGHT ORGANIC SOLVENTS OR PETROLEUM PRODUCTS. PRODUCTS SUPPLIED IN THIS SECTION SHALL ONLY BE INSTALLED IN SOILS THAT ARE FREE OF BOTH PETROLEUM PRODUCTS AND ORGANIC SOLVENTS. IF DURING THE COURSE OF PIPELINE INSTALLATION THE CONTRACTOR IDENTIFIES OR SUSPECTS THE PRESENCE OF PETROLEUM PRODUCTS OR ANY UNKNOWN CHEMICAL SUBSTANCE IN THE NATIVE SOIL, CONTRACTOR SHALL STOP INSTALLING PIPING IN THE AREA OF SUSPECTED CONTAMINATION AND NOTIFY THE ENGINEER IMMEDIATELY. CONTRACTOR SHALL NOT RESUME INSTALLING PIPING IN THE AREA OF SUSPECTED CONTAMINATION UNTIL DIRECTION IS PROVIDED BY THE ENGINEER.
G. UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR INDICATED IN SECTION 01011, HDPE PIPE SHALL NOT BE INSTALLED AT SITES WHERE FREQUENT EXCAVATION CAN BE ANTICIPATED IN THE VICINITY OF THE PIPE (INCLUDING TREATMENT PLANT AND BOOSTER STATION SITES) OR WHERE THE PIPELINE IS LAID ON A RIVER CHANNEL BOTTOM (EXCEPT WHEN INSTALLED BY HDD). HDPE PIPE SHALL NOT BE INSTALLED IN ANY CIRCUMSTANCE WITH LESS THAN 3 FEET OR MORE THAN 25 FEET OF COVER OVER THE CROWN OF THE PIPE.

3.03 PIPE AND FITTING JOINING
A. ALL HDPE PIPE JOINING SHALL BE BY BUTT FUSION PROCEDURES. ELECTROFUSION SHALL BE USED ONLY AS PERMITTED BY THE ENGINEER.SERVICE CONNECTIONS SHALL BE AS SPECIFIED IN ARTICLE 3.04 BELOW.
B. HDPE PIPE THERMAL BUTT FUSION WELDING IS TO BE PERFORMED IN ACCORDANCE WITH THE PLASTIC PIPE INSTITUTE "HANDBOOK OF POLYETHYLENE PIPE," POLYETHYLENE JOINING PROCEDURES, AND 49 CFR 192, SUBPART F, LATEST EDITION.
C. BUTT FUSION AND ELECTROFUSION PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE REQUIREMENTS HEREIN. SURFACES MUST BE CLEAN AND DRY BEFORE JOINING. THE WALL THICKNESSES OF THE ADJOINING PIPES SHALL HAVE THE SAME DR AT THE POINT OF FUSION UNLESS A SPECIFIC FITTING IS SPECIFIED.
D. EACH BUTT-FUSED JOINT SHALL BE PRECISELY ALIGNED AND SHALL HAVE UNIFORM ROLL BACK BEADS RESULTING FROM THE USE OF PROPER TEMPERATURE AND PRESSURE. THE JOINT INTERIOR SURFACES SHALL BE SMOOTH. INTERNAL BEAD PROJECTIONS SHALL NOT BE GREATER THAN 3/16-INCH, OR THEY SHALL BE REMOVED. THE FUSED JOINT SHALL BE WATERTIGHT. THE TENSILE STRENGTH AT YIELD OF THE BUTT-FUSION JOINTS SHALL NOT BE LESS THAN THAT OF THE PIPE. A SPECIMEN OF PIPE CUT ACROSS THE BUTT-FUSION JOINT SHALL BE TESTED IN ACCORDANCE WITH ASTM D-638.
E. ONLY APPROPRIATELY SIZED AND OUTFITTED FUSION MACHINES THAT HAVE BEEN APPROVED BY THE PIPE MANUFACTURER SHALL BE USED FOR THE FUSION PROCESS. FUSION MACHINES MUST INCORPORATE THE FOLLOWING PROPERTIES, INCLUDING THE FOLLOWING ELEMENTS:
1. HEAT PLATE – HEAT PLATES SHALL BE IN GOOD CONDITION WITH NO DEEP GOUGES OR SCRATCHES. PLATES SHALL BE CLEAN AND FREE OF ANY DEBRIS OR CONTAMINATION. HEATER CONTROLS SHALL FUNCTION PROPERLY; CORD AND PLUG SHALL BE IN GOOD CONDITION. THE APPROPRIATELY SIZED HEAT PLATE SHALL BE CAPABLE OF MAINTAINING A UNIFORM AND CONSISTENT HEAT PROFILE AND TEMPERATURE FOR THE SIZE OF PIPE BEING FUSED, PER THE PIPE MANUFACTURER'S GUIDELINES.
2. CARRIAGE – CARRIAGE SHALL TRAVEL SMOOTHLY WITH NO BINDING AT LESS THAN 50 PSI. JAWS SHALL BE IN GOOD CONDITION WITH PROPER INSERTS FOR THE PIPE SIZE BEING FUSED. INSERT PINS SHALL BE INSTALLED WITH NO INTERFERENCE TO CARRIAGE TRAVEL.
3. GENERAL MACHINE – OVERVIEW OF MACHINE BODY SHALL YIELD NO OBVIOUS DEFECTS, MISSING PARTS, OR POTENTIAL SAFETY ISSUES DURING FUSION.
4. DATA LOGGING DEVICE – THE CURRENT VERSION OF THE PIPE MANUFACTURER'S RECOMMENDED AND COMPATIBLE SOFTWARE SHALL BE USED. DATA LOGGING DEVICE OPERATIONS AND MAINTENANCE MANUAL SHALL BE WITH THE UNIT AT ALL TIMES. IF FUSING FOR EXTENDED PERIODS OF TIME, AN INDEPENDENT 110V POWER SOURCE SHALL BE AVAILABLE TO EXTEND BATTERY LIFE.
F. INTEGRITY OF HEATING PLATE IN THE FUSION EQUIPMENT SHALL BE CHECKED A MINIMUM OF TWICE PER EACH 8 HOUR WORK SHIFT FOR TEMPERATURE UNIFORMITY.
G. OTHER EQUIPMENT SPECIFICALLY REQUIRED FOR THE FUSION PROCESS SHALL INCLUDE THE FOLLOWING:
1. PIPE ROLLERS SHALL BE USED FOR SUPPORT OF PIPE TO EITHER SIDE OF THE MACHINE
2. A WEATHER PROTECTION CANOPY THAT ALLOWS FULL MACHINE MOTION OF THE HEAT PLATE, FUSION ASSEMBLY AND CARRIAGE SHALL BE PROVIDED FOR FUSION IN INCLEMENT AND /OR WINDY WEATHER.
3. FUSION MACHINE OPERATIONS AND MAINTENANCE MANUAL SHALL BE KEPT WITH THE FUSION MACHINE AT ALL TIMES.
4. FACING BLADES SHALL BE APPROPRIATE FOR CUTTING HDPE PIPE.
H. JOINT RECORDING
1. BUTT FUSION EQUIPMENT SHALL BE EQUIPPED WITH A DATALOGGER. RECORDS OF EACH WELD (INCLUDING, AS A MINIMUM, HEATER TEMPERATURE, FUSION PRESSURE, AND A GRAPH OF THE FUSION CYCLE) SHALL BE APPROPRIATELY IDENTIFIED AND PROVIDED TO THE ENGINEER DAILY.
2. EACH FUSION JOINT SHALL BE RECORDED AND LOGGED BY AN ELECTRONIC MONITORING DEVICE (DATA LOGGER) CONNECTED TO THE FUSION MACHINE. THE FUSION DATA LOGGING AND JOINT REPORT SHALL BE GENERATED BY SOFTWARE DEVELOPED SPECIFICALLY FOR THE BUTT-FUSION OF THERMOPLASTIC PIPE. THE SOFTWARE SHALL REGISTER AND/OR RECORD THE PARAMETERS REQUIRED BY THE PIPE MANUFACTURER AND THESE SPECIFICATIONS. DATA NOT LOGGED BY THE DATA LOGGER SHALL BE RECORDED MANUALLY AND BE INCLUDED IN THE FUSION TECHNICIAN'S JOINT REPORT.
I. ELECTROFUSION REPORTS OF EACH WELD SHALL BE APPROPRIATELY IDENTIFIED AND PROVIDED TO THE ENGINEER. THE REPORTS SHALL INCLUDE, AS A MINIMUM, THE FUSION DATE, TIME, AMBIENT TEMPERATURE, FITTING TYPE AND SIZE, USER ID, AND THE MANUFACTURER OF THE PART.
J. QUALITY CONTROL OF HDPE FUSION PROCESS (BOTH BUTT FUSION AND ELECTROFUSION, AS APPLICABLE) SHALL BE ADHERED TO AND MONITORED BY CONTRACTOR WITH ALL RELATED DOCUMENTATION SUBMITTED TO THE ENGINEER.
K. ALL FUSED JOINTS WILL BE SUBJECT TO ACCEPTANCE BY THE ENGINEER PRIOR TO PIPE INSTALLATION.ALL DEFECTIVE JOINTS SHALL BE CUT OUT AND REPLACED AT NO COST TO THE OWNER. ANY SECTION OF THE PIPE WITH A GASH, BLISTER, ABRASION, NICK, SCAR, OR OTHER DELETERIOUS FAULT GREATER IN DEPTH THAN TEN PERCENT (10%) OF THE WALL THICKNESS SHALL NOT BE USED AND MUST BE REMOVED FROM THE SITE. HOWEVER, A DEFECTIVE AREA OF THE PIPE MAY BE CUT OUT AND THE JOINT FUSED IN ACCORDANCE WITH THE PROCEDURES STATED ABOVE. IN ADDITION, IF IN THE OPINION OF THE ENGINEER ANY SECTION OF PIPE HAS OTHER DEFECTS, INCLUDING THOSE HEREINAFTER LISTED, THAT MAY INDICATE DAMAGED, IMPROPERLY MANUFACTURED, FAULTY, OR SUBSTANDARD PIPE, SAID PIPE SHALL BE DISCARDED OR RETURNED TO THE MANUFACTURER AND NOT USED. DEFECTS WARRANTING PIPE REJECTION INCLUDE THE FOLLOWING: CONCENTRATED RIDGES, DISCOLORATION, EXCESSIVE SPOT ROUGHNESS, AND PITTING; INSUFFICIENT OR VARIABLE WALL THICKNESS; PIPE DAMAGE FROM BENDING, CRUSHING, STRETCHING OR OTHER STRESS; PIPE DAMAGE THAT IMPACTS THE PIPE STRENGTH, THE INTENDED USE, THE INTERNAL DIAMETER OF THE PIPE, INTERNAL ROUGHNESS CHARACTERISTICS; OR ANY OTHER DEFECT OF MANUFACTURING OR HANDLING.
L. UNLESS OTHERWISE APPROVED IN WRITING BY THE OWNER AND ENGINEER, MECHANICAL (COMPRESSION) FITTINGS SHALL BE USED ONLY WHEN JOINING POLYETHYLENE MATERIALS TO OTHER PIPING MATERIALS OR VALVES AND SHALL BE INSTALLED AS SPECIFIED IN SECTIONS 15105 AND 15130. BLOCKING MUST BE PROVIDED AT CHANGES IN DIRECTION FOR ANY MECHANICAL FITTINGS.
M. ELECTROFUSION
1. ELECTROFUSION JOINING SHALL BE DONE IN ACCORDANCE WITH THE FITTING AND PIPE MANUFACTURERS' RECOMMENDED PROCEDURES AND ASTM F 1290 AND PPI TN 34. THE PROCESS OF ELECTROFUSION REQUIRES AN ELECTRICITY SOURCE, A TRANSFORMER (COMMONLY CALLED AN ELECTROFUSION BOX) THAT HAS WIRE LEADS, A METHOD TO READ ELECTRONICALLY (BY LASER OR OTHERWISE) INPUT FROM THE BARCODE OF THE FITTING, AND A FITTING THAT IS COMPATIBLE WITH THE TYPE OF ELECTROFUSION BOX USED. THE ELECTROFUSION BOX SHALL BE CAPABLE OF READING AND STORING THE INPUT PARAMETERS AND THE FUSION RESULTS FOR LATER DOWNLOAD TO A RECORD FILE.
2. QUALIFICATION OF THE FUSION TECHNICIAN SHALL BE DEMONSTRATED BY EVIDENCE OF ELECTROFUSION TRAINING WITHIN THE PAST YEAR ON THE EQUIPMENT TO BE UTILIZED FOR THIS APPLICATION. FOR A PIPE SURFACE TO BE PROPERLY PREPARED FOR ELECTROFUSION, THE OUTER LAYER OR "SKIN" OF THE PIPE SHALL BE REMOVED TO EXPOSE A CLEAN, VIRGIN PIPE MATERIAL. THIS CAN BE ACHIEVED BY USING ONE OF SEVERAL TYPES OF APPROVED SCRAPING TOOLS.WOOD RASPS OR METAL FILES ARE NOT ACCEPTABLE METHODS. IT IS VERY IMPORTANT TO NOTE THAT ABRASIVE MATERIALS, SUCH AS SANDPAPER OR EMERY CLOTH, SHOULD NEVER BE USED IN PLACE OF A SCRAPING TOOL. A MINIMUM OF 0.007 TO 0.010 INCH OF THE PIPE'S SURFACE MATERIAL SHALL BE REMOVED DURING THE SCRAPING PROCESS IN ORDER TO EXPOSE A CLEAN VIRGIN MATERIAL. THE PIPE SURFACE SHALL BE CLEAN AND FREE FROM ANY TYPE OF CONTAMINANTS THAT MAY BE SPREAD BEFORE SCRAPING BEGINS. SHOULD THE PIPE SURFACE BE CONTAMINATED WITH DIRT, MUD OR DRILLING FLUIDS BEFORE SCRAPING, PLAIN WATER SHALL BE USED TO REMOVE THE SURFACE LEVEL OF THESE CONTAMINATES. HOWEVER, WATER SHALL NOT BE USED TO CLEAN THE PIPE SURFACES ONCE THE VIRGIN MATERIAL HAS BEEN EXPOSED. IN THOSE INSTANCES, A MINIMUM 70% ISOPROPYL ALCOHOL CONCENTRATION, WITH NO ADDITIONAL ADDITIVES, SHALL BE USED AS A CLEANING AGENT. FOR APPLICATIONS WHERE A FITTING WILL BE MOVED AROUND ON THE PIPE, SUCH AS A REPAIR APPLICATION WHERE A COUPLING WILL BE PUSHED COMPLETELY OVER ONE END OF THE PIPE, THE PIPE SHALL BE SCRAPED FOR THE ENTIRE LENGTH OF THE COUPLING TO PREVENT A CLEAN FITTING FROM BEING CONTAMINATED BY UNSCRAPED PIPE.
3. MARKS MAY BE MADE ON THE OUTER SURFACE OF THE PIPE AS A VISUAL AID TO HELP INDICATE THE REQUIRED SCRAPER COVERAGE. MARKS MADE ON THE PIPE SHALL NOT BE MADE WITH A "GREASE PENCIL" OR OTHER TYPE OF PETROLEUM BASED MARKER THAT WILL LEAVE A CONTAMINANT BEHIND.
4. CARE SHALL BE TAKEN TO ENSURE THAT THE POLYETHYLENE PIPE IS NOT OUT-OF-ROUND BEFORE ATTEMPTING THE ELECTROFUSION PROCESS. OUT OF ROUND PIPE SHALL BE REMOVED OR CORRECTED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S INSTRUCTIONS.
5. ALL PIPE THAT SHALL BE FITTED WITH ELECTROFUSION COUPLINGS SHALL BE RESTRAINED OR SUFFICIENTLY SUPPORTED ON EACH SIDE OF THE PIPE TO RESTRICT MOVEMENT DURING THE FUSION AND COOLING PROCESS AND ALLEVIATE OR ELIMINATE SOURCES OF STRESS AND/OR STRAIN UNTIL BOTH THE FUSION CYCLE AND THE COOLING CYCLE ARE COMPLETED. ELECTROFUSED FITTINGS SHALL BE COOLED FOR THE TIME REQUIRED BY THE MANUFACTURER. 6. ELECTROFUSION FITTINGS SHALL ONLY BE RE-FUSED IN THE EVENT OF AN INPUT POWER INTERRUPTION, I.E. FUSION LEADS WERE DETACHED DURING FUSION, GENERATOR RUNS OUT OF FUEL, PROCESSOR MALFUNCTION, OR OTHER CIRCUMSTANCE THAT RESULTS IN PROCESSOR INPUT POWER INTERRUPTION.
N. POLYETHYLENE PIPE SHALL BE JOINED TO DUCTILE IRON PIPE BY THE USE OF BUTT-FUSED MECHANICAL JOINT ADAPTERS AS SPECIFIED IN PART 2.WHEN USING A BUTT-FUSED ADAPTER TO CONNECT TO A VALVE OR TO ANOTHER PIPE MATERIAL, A TYPE 316 STAINLESS STEEL STIFFENER SHALL BE USED.
O. FLANGE ADAPTERS, WHEN REQUIRED, SHALL BE BUTT FUSED TO THE POLYETHYLENE PIPE AND SHALL USE TYPE 316 STAINLESS STEEL STIFFENER RINGS. FLANGE BOLTS MUST SPAN THE ENTIRE WIDTH OF THE FLANGE JOINT, AND PROVIDE SUFFICIENT THREAD LENGTH TO FULLY ENGAGE THE NUT. MJ ADAPTER KIT SHALL INCLUDE HDPE ANCHOR FITTING, STANDARD RUBBER GASKET, EXTRA LENGTH CORROSION RESISTANT T-BOLTS, INTERNAL TYPE 316 STAINLESS STEEL STIFFENER, AND C-153 (2"-12") OR C-110 (14"-24") HEAVY BODY DUCTILE IRON GLAND RING.

3.04 SERVICE CONNECTIONS AND TAPPING
A. UNLESS SPECIFICALLY INDICATED ON THE CONTRACT DRAWINGS, NO MECHANICAL SERVICE SADDLES OR TAPS ARE PERMITTED ON HDPE PIPE WITHOUT WRITTEN APPROVAL BY THE OWNER.
B. SIDE-FUSION (SIDEWALL FUSED) POLYETHYLENE HOT TAPPING SADDLES SHALL BE PROVIDED FOR EACH 2-INCH NOMINAL DIAMETER AND SMALLER BRANCH/SERVICE CONNECTION TO HDPE MAINS AS SPECIFIED IN PART 2 ABOVE, AND BRANCH SADDLES FOR 3-INCH BRANCH/SERVICE CONNECTIONS TO HDPE MAINS SHALL BE PROVIDED AS SPECIFIED IN PART 2 ABOVE. HDPE MAIN SHALL BE TAPPED WITH A TAPPING TOOL OR MACHINE THAT MEETS THE PIPE AND SADDLE MANUFACTURERS' REQUIREMENTS. INSTALLATION OF SIDEWALL FUSED POLYETHYLENE SADDLES AND HDPE BRANCH SADDLES SHALL BE IN ACCORDANCE WITH AWWA MANUAL M55, PPI TR-33, ASTM F2620 AND SHALL BE BY THE CONVENTIONAL SADDLE FUSION METHOD UNLESS OTHERWISE APPROVED IN WRITING BY THE OWNER.
C. CONNECTIONS TO NEW MAINS LARGER THAN 3-INCH NOMINAL DIAMETER SHALL BE MADE WITH DUCTILE IRON TEES IN ACCORDANCE WITH SECTION 15105 AND 15130.
D. FOR CONNECTIONS LARGER THAN 3-INCH NOMINAL DIAMETER TO EXISTING HDPE MAINS, MECHANICAL CLAMPS OR TAPPING SLEEVES OR SADDLES DESIGNED FOR HDPE PIPE (OF THE CORRECT OUTSIDE DIAMETER) AND MEETING THE REQUIREMENTS OF SECTION 15170 SHALL BE USED UNLESS OTHERWISE INDICATED ON THE DRAWINGS AND/OR SPECIFIED IN SECTION 01011 AND/OR 01075.

3.05 ANCHOR RESTRAINTS
A. CONCRETE ANCHOR COLLARS LOCATED AT EACH END OF THE WATERMAIN SHALL BE PROVIDED.

3.06 TESTING
A. PRESSURE TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES AND SECTION 15030, OR AS OTHERWISE RECOMMENDED IN WRITING BY THE ENGINEER.
B. STREAM CROSSINGS SHALL BE PRESSURE TESTING PRIOR TO CHLORINATION AND DISINFECTION.
C. A ?-INCH NPT TEST NIPPLE AND PLUG SHALL BE PROVIDED ON EACH TAPPING SADDLE TO ALLOW PRE-TESTING OF THE SADDLE ASSEMBLY BEFORE MAKING THE TAP.
D. ANY THIRD PARTY INSPECTIONS WILL BE PAID FOR BY THE OWNER.

DATE	REVISION	SYMBOL

SCALE NONE
DRAWN JPH
CHECKED JKS
CERTIFIED JKS

PROJECT
PATRIOT DEFENSE RESEARCH PARK
BUILDINGS #1 AND #2
CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA

TITLE
WATER SPECIFICATIONS

PROJECTS plus
GREENWOOD SURVEYING COMPANY
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A – Greenwood, Indiana 46143
(317)-882-5003

SEAL
JEFFERY K. SMITH
REGISTERED
No. 19419
STATE OF INDIANA
PROFESSIONAL ENGINEER
9/3/21

JOB NUMBER
21008
SHEET
C902

DATE
SEPTEMBER 3, 2021