SATISFYING VOLUME CONTROL REQUIREMENTS FOR RYAN FIELD WEST PARKING LOT RECONSTRUCTION

IAFSM 2017 CONFERENCE

MARCH 8, 2017

PRESENTED BY:

GEWALT HAMILTON ASSOCIATES, INC.

PRESENTATION OVERVIEW

- MWRD VOLUME CONTROL REQUIREMENTS
- EXAMPLES OF VOLUME CONTROL FACILITIES
- RYAN FIELD CASE STUDY

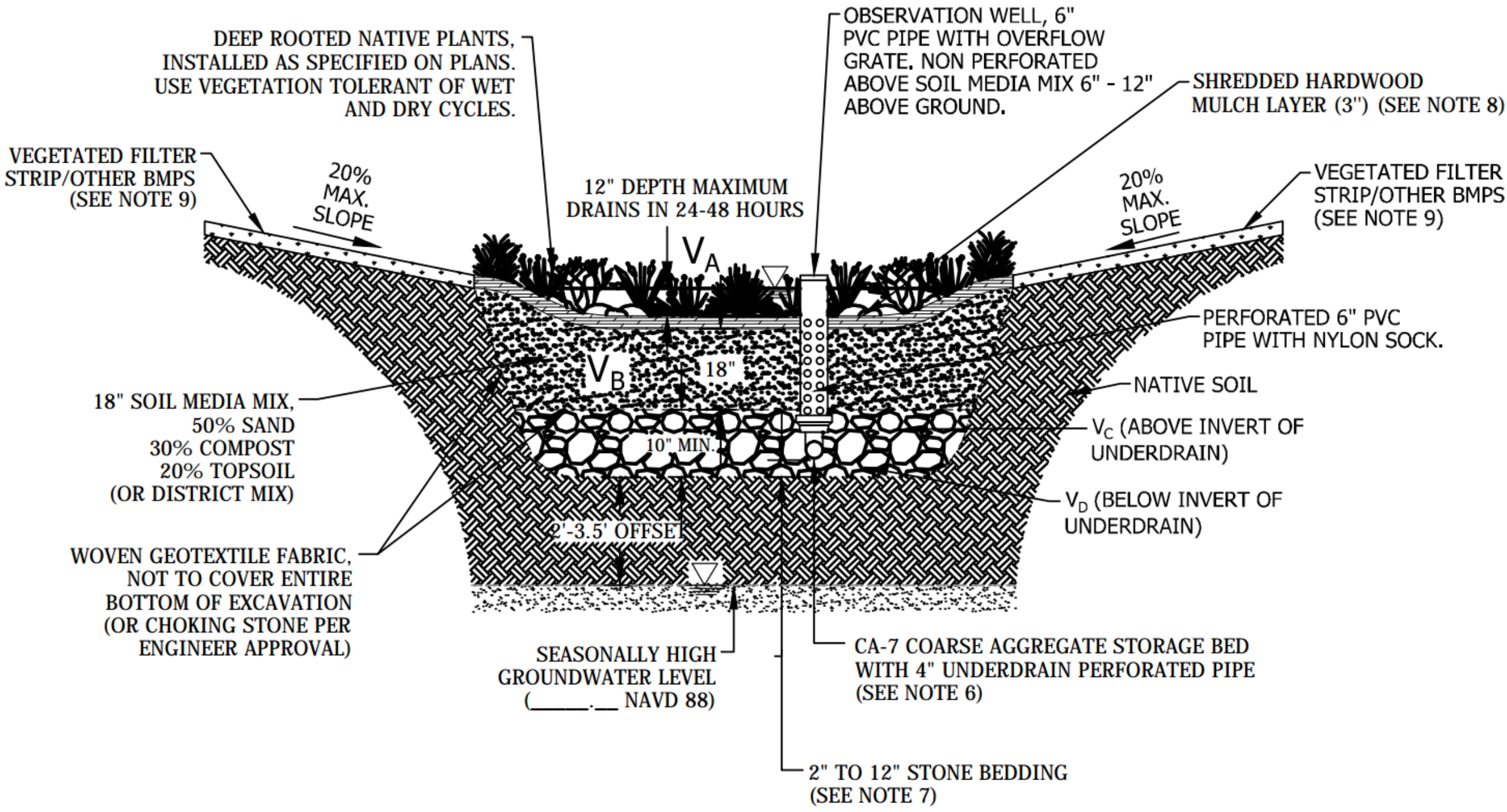
WMO VOLUME CONTROL REQUIREMENTS

"503.2: THE FIRST INCH OF RUNOFF FROM THE IMPERVIOUS AREA OF DEVELOPMENT ON THE SITE SHALL BE THE VOLUME CONTROL STORAGE"

- PERMEABLE PAVEMENT, SYNTHETIC FIELD, RUBBERIZED SURFACE PLAYFIELD, AND OTHER POROUS SURFACES NOT CONSIDERED IMPERVIOUS
- UNDERDRAINS ARE REQUIRED IF INFILTRATION RATE < 0.5 IN/HR
- PRETREATMENT REQUIREMENTS
- IMPERVIOUS AREAS TRIBUTARY TO VOLUME CONTROL FACILITY
- SITE CONSTRAINTS REVIEWED BY MWRD ON A CASE BY CASE BASIS
- OBSERVATION WELL
- THE TGM IS A VERY GOOD RESOURCE

VOLUME CONTROL FACILITIES

- STONE VOIDS UNDER PAVEMENT (PERMEABLE OR TRADITIONAL)
- DRY WELLS
- BIO-RETENTION SYSTEM
- WATER REUSE SYSTEMS
- GREEN ROOFS
- BIOSWALE
- CONSTRUCTED WETLANDS
- INFILTRATION TRENCH
- STORAGE BELOW DETENTION BASIN OUTLET
- UNDERGROUND VAULT SPACE
- VEGETATED FILTER STRIP (FLOW-THROUGH)
- PERFORATED PIPES (INCLUDING ARCH-PIPE CHAMBERS)


DEEP ROOTED NATIVE PLANTS, INSTALLED AS SPECIFIED ON PLANS. USE VEGETATION TOLERANT OF WET AND DRY CYCLES.
OBSERVATION WELL, 6" PVC PIPE WITH OVERFLOW GRATE. NON PERFORATED ABOVE SOIL MEDIA MIX 6" - 12" ABOVE GROUND.
SHREDDED HARDWOOD MULCH LAYER (3") (SEE NOTE 8)
VEGETATED FILTER STRIP/OTHER BMPS (SEE NOTE 9)
20% MAX. SLOPE
12" DEPTH MAXIMUM DRAINS IN 24-48 HOURS
V_A
20% MAX. SLOPE
VEGETATED FILTER STRIP/OTHER BMPS (SEE NOTE 9)
PERFORATED 6" PVC PIPE WITH NYLON SOCK.
V_B
18"
NATIVE SOIL
18" SOIL MEDIA MIX, 50% SAND 30% COMPOST 20% TOPSOIL (OR DISTRICT MIX)
10" MIN.
V_C (ABOVE INVERT OF UNDERDRAIN)
V_D (BELOW INVERT OF UNDERDRAIN)
2'-3.5' OFFSET
WOVEN GEOTEXTILE FABRIC, NOT TO COVER ENTIRE BOTTOM OF EXCAVATION (OR CHOKING STONE PER ENGINEER APPROVAL)
SEASONALLY HIGH GROUNDWATER LEVEL (_____.__ NAVD 88)
CA-7 COARSE AGGREGATE STORAGE BED WITH 4" UNDERDRAIN PERFORATED PIPE (SEE NOTE 6)
2" TO 12" STONE BEDDING (SEE NOTE 7)

SEASONALLY HIGH GROUNDWATER TABLE

- BOTTOM OF STORAGE MUST BE ABOVE SEASONALLY HIGH GROUND WATER LEVEL
  - AT LEAST 2’ SEPARATION WHEN V.C. FACILITY IS TRIBUTARY TO WATERWAY
  - AT LEAST 3.5’ SEPARATION WHEN V.C. FACILITY IS TRIBUTARY TO COMBINED SEWER
- SEASONALLY HIGH GROUND WATER LEVEL ESTABLISHED THROUGH SOIL BORINGS
  - ENSURE SOIL BORINGS ARE DEEP ENOUGH FOR YOUR PROJECT
  - DISCUSS WITH THE GEOTECHNICAL ENGINEER PRIOR TO THE STORM WATER DESIGN TO AVOID DELAYS DURING DESIGN
- INFILTRATION TEST
  - K VALUE CAN BE ESTIMATED DURING PRELIMINARY DESIGN FOR UNDERDRAIN APPLICABILITY
- PERCHED WATER TABLE

RYAN FIELD WEST PARKING LOT IMPROVEMENTS

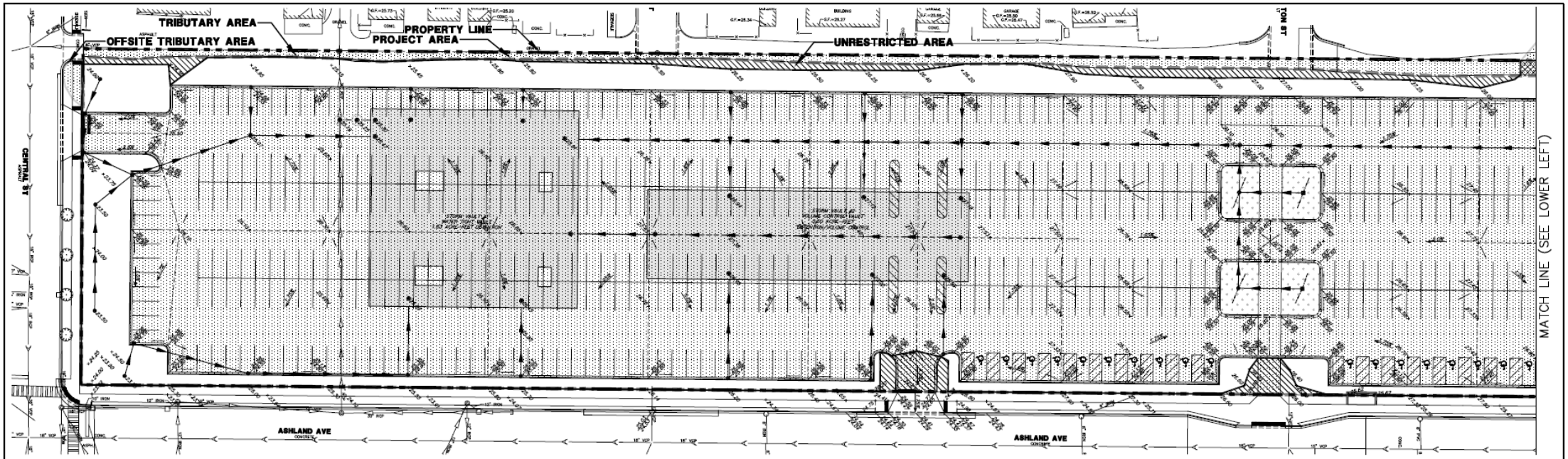
EXISTING CONDITIONS

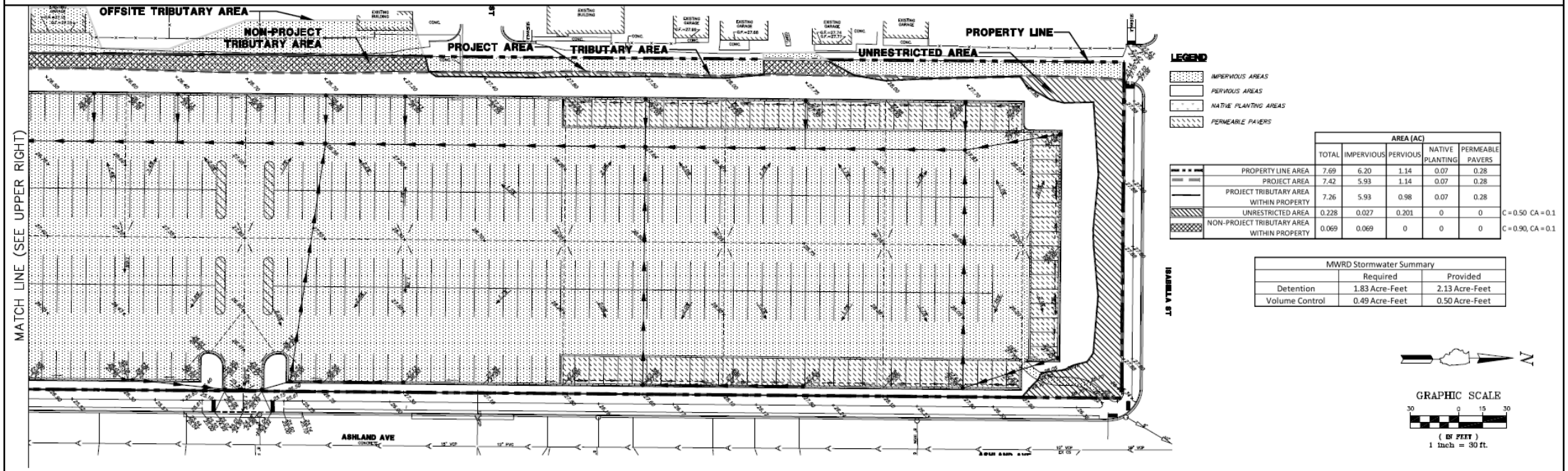
- LOCATED WEST OF RYAN FIELD
- POORLY DRAINED SILTY CLAY SOIL
- SEASONALLY HIGH GROUNDWATER LEVEL AT 6’ BELOW EXISTING GROUND
- NO EXISTING DRAINAGE
- LOCATED IN COMBINED SEWER AREA
- TRIBUTARY TO WATERWAY

RYAN FIELD WEST PARKING LOT IMPROVEMENTS

PROPOSED IMPROVEMENTS

- PARKING LOT RECONSTRUCTION
- PERMEABLE PAVEMENT AT NORTH END PERIMETER
- RAIN GARDENS WITHIN ISLANDS
- TWO STORMTRAP UNDERGROUND DETENTION/VOLUME CONTROL VAULTS
- PRETREATMENT: SNOUTS INSTALLED IN CATCH BASINS UPSTREAM OF VAULTS
- CITY OF EVANSTON DETENTION
- MWRD DETENTION & VOLUME CONTROL





	AREA (AC)					
	TOTAL	IMPERVIOUS	PERVIOUS	NATIVE PLANTING	PERMEABLE PAVERS	
PROPERTY LINE AREA	7.69	6.20	1.14	0.07	0.28	
PROJECT AREA	7.42	5.93	1.14	0.07	0.28	
PROJECT TRIBUTARY AREA WITHIN PROPERTY	7.26	5.93	0.98	0.07	0.28	
UNRESTRICTED AREA	0.228	0.027	0.201	0	0	C = 0.50 CA = 0.1
NON-PROJECT TRIBUTARY AREA WITHIN PROPERTY	0.069	0.069	0	0	0	C = 0.90, CA = 0.1

MWRD Stormwater Summary		
	Required	Provided
Detention	1.83 Acre-Feet	2.13 Acre-Feet
Volume Control	0.49 Acre-Feet	0.50 Acre-Feet

N

GRAPHIC SCALE

30 0 15 30

(IN FEET)

1 inch = 30 ft.

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DRAINAGE AREA EXHIBIT

RYAN FIELD WEST PARKING LOT
NORTHWESTERN UNIVERSITY
EVANSTON, ILLINOIS

NO.	BY	DATE	REVISION
3	MZ	5/25/16	MWRD REVIEW #2
2	MXH	5/10/16	MWRD REVIEW #1

NO.	BY	DATE	REVISION

FILE: 4550.040_Drainage.dwg

DRAWN BY: MXH
DATE: 4/8/16

GHA PROJECT #: 4550.040

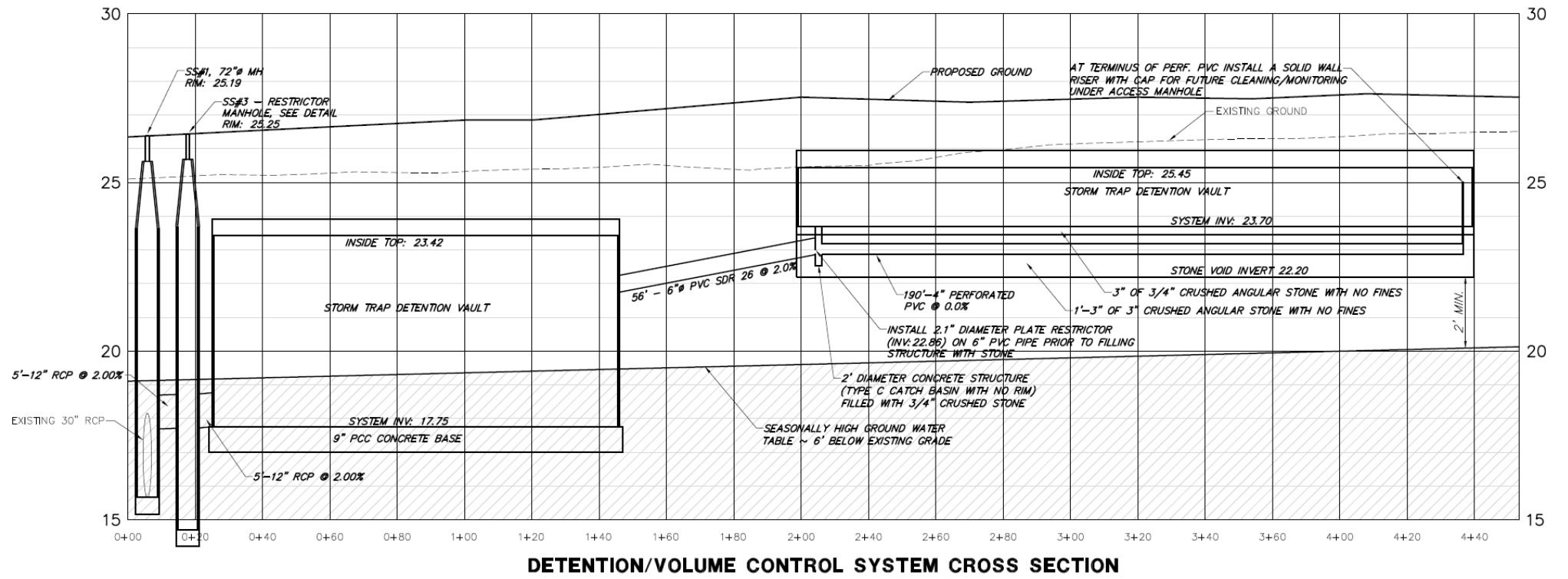
CHECKED BY: MZ
DATE: 4/8/16

SCALE: 1"=30'

SHEET NUMBER: 38
OF 38 SHEETS

RYAN FIELD WEST PARKING LOT IMPROVEMENTS:

UNDERGROUND VAULTS



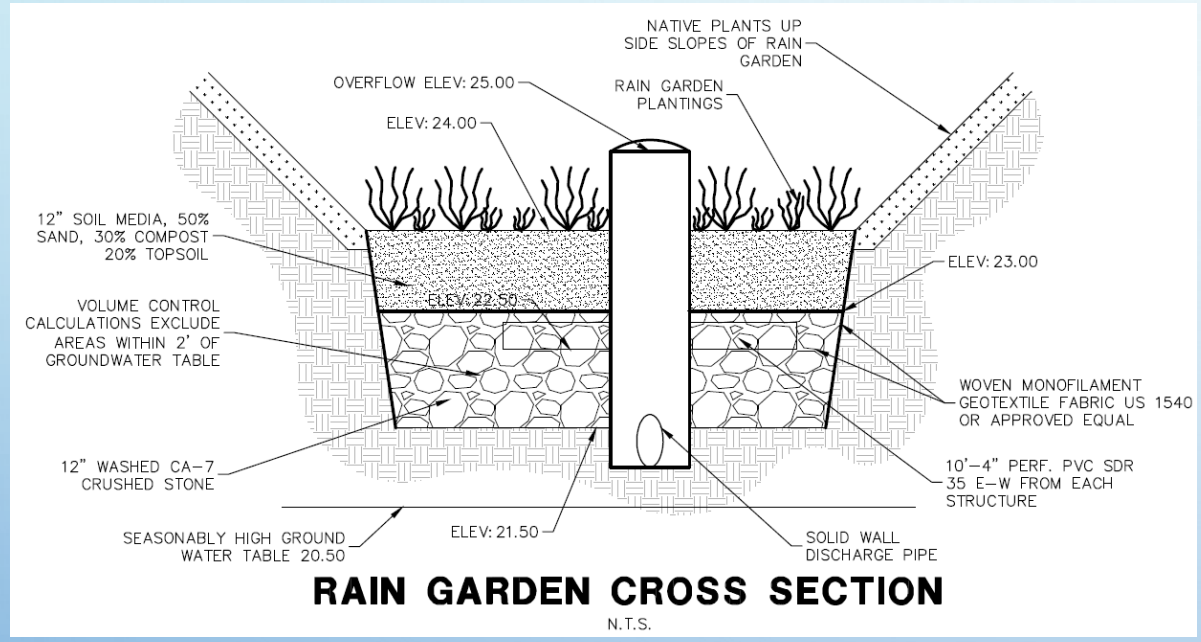
DETENTION/VOLUME CONTROL SYSTEM CROSS SECTION

RYAN FIELD WEST PARKING LOT IMPROVEMENTS:

UNDERGROUND VAULTS

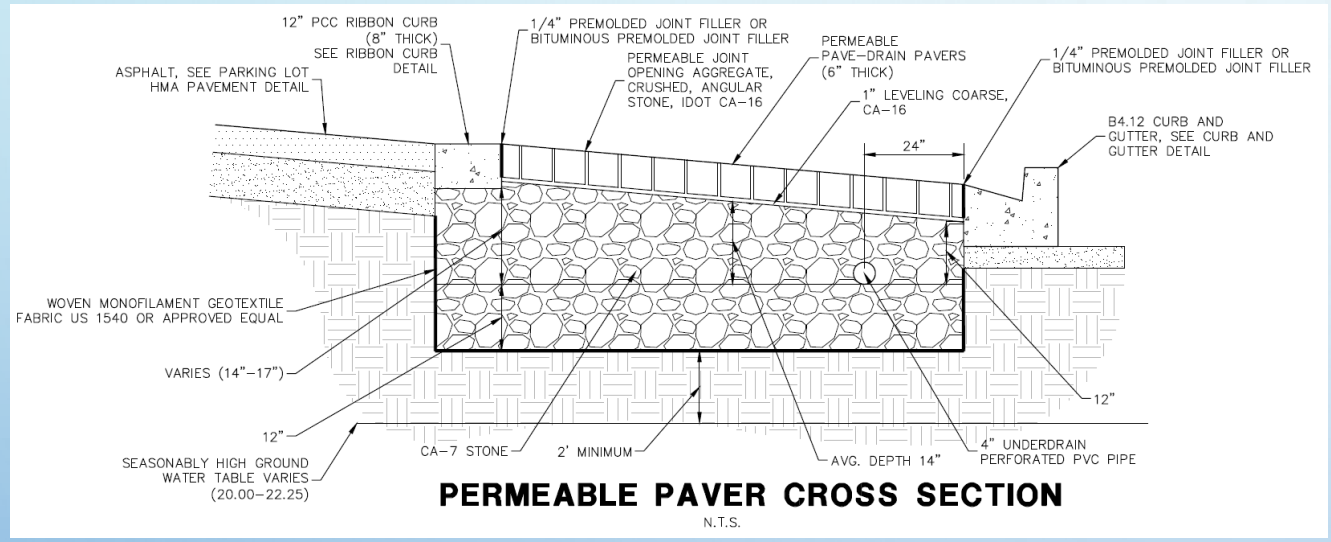
RYAN FIELD WEST PARKING LOT IMPROVEMENTS:

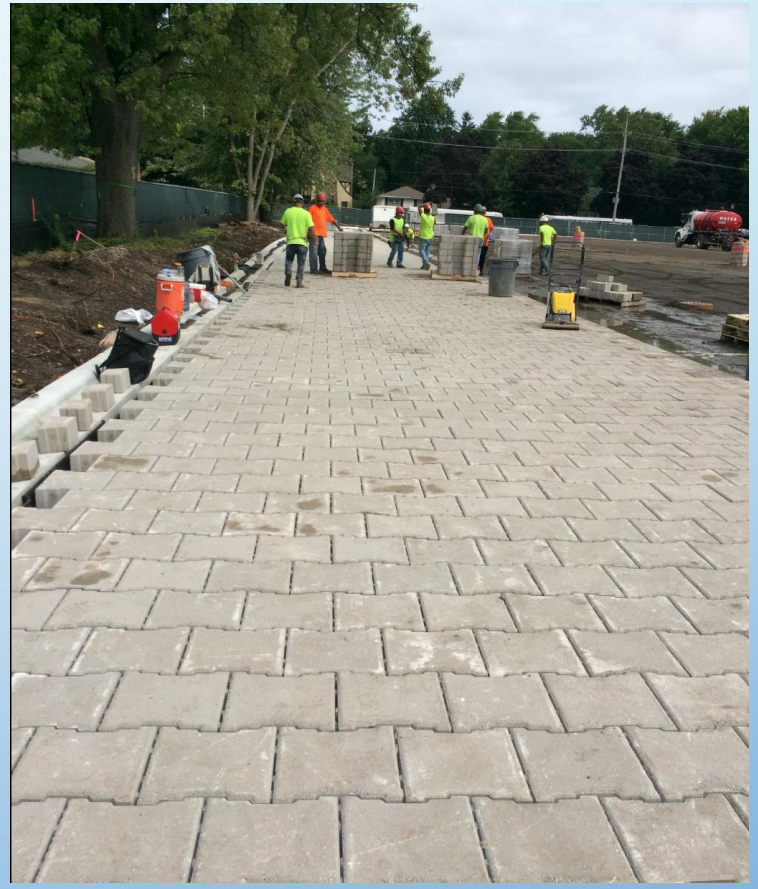
RAIN GARDENS

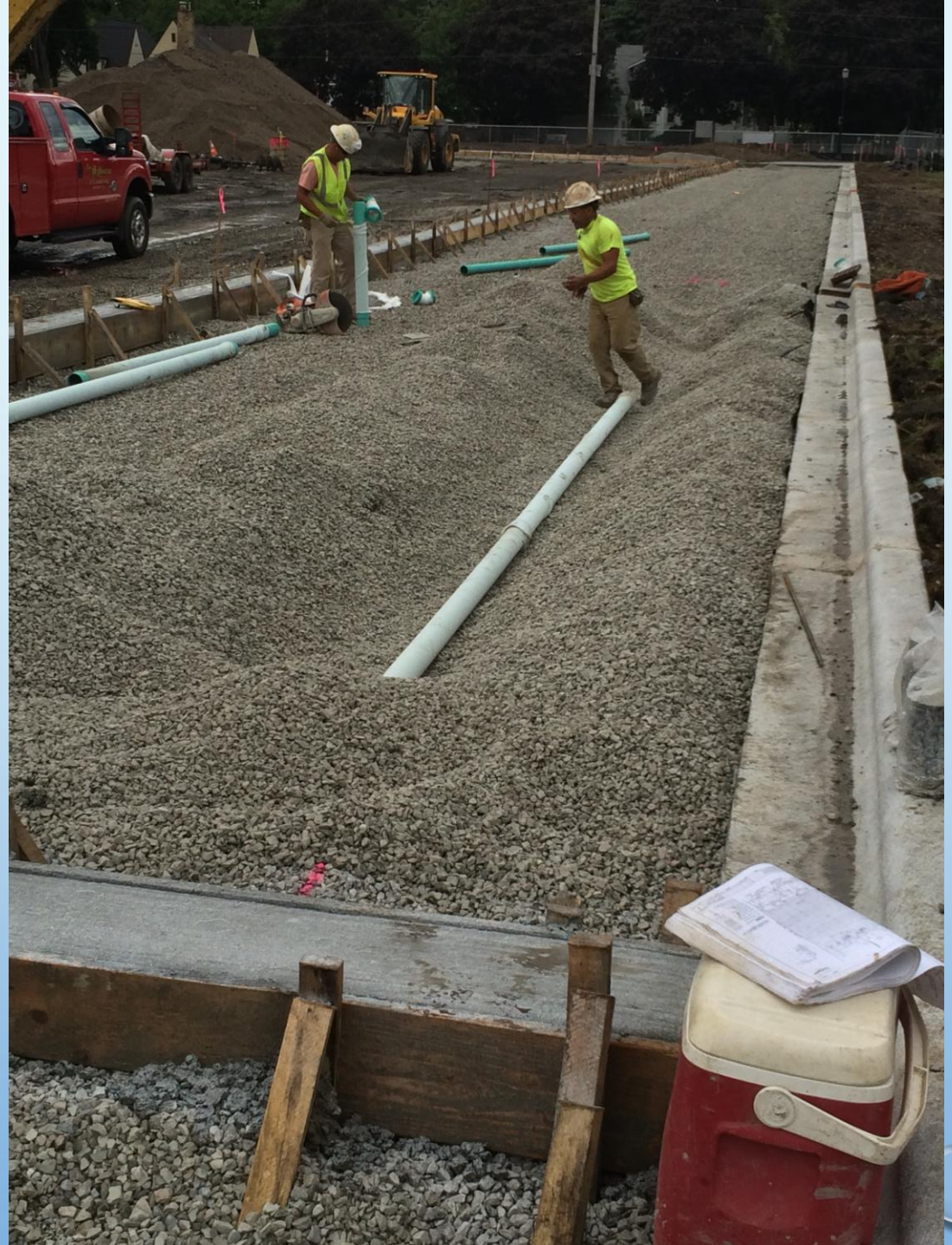


RYAN FIELD WEST PARKING LOT IMPROVEMENTS:

PERMEABLE PAVEMENT







RYAN FIELD WEST PARKING LOT IMPROVEMENTS:

CHALLENGES

- VOLUME CONTROL STRUCTURAL ISSUES
  - SEASONALLY HIGH GROUNDWATER LEVEL ENCOUNTERED AT 6’ BELOW GROUND
    - SHALLOW UNDERGROUND VAULT
  - WORKED WITH MANUFACTURER
  - AVOIDED CONCRETE FOOTINGS
- NO PARKING LOT SURFACE STORAGE
- DRAINING IMPERVIOUS AREAS TO VC FACILITIES

RYAN FIELD WEST PARKING LOT IMPROVEMENTS:

COMPLETION OF PROJECT IN TIMELY MANNER

- OBTAINING WMO PERMIT
  - COMMUNICATED WITH MWRD DURING DESIGN AND PERMIT REVIEW PERIOD
  - INCORPORATED A VARIETY OF GREEN INFRASTRUCTURES WITH “GOOD FAITH EFFORT”
- CONSTRUCTION COMPLETED IN 12 WEEKS, IN TIME FOR 2016 FOOTBALL SEASON

QUESTIONS?

CONTACT INFORMATION

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