

ILLINOIS STATE TOLL HIGHWAY AUTHORITY



2700 Ogden Ave., Downers Grove, IL 60515

VOLUME 1 PART 2

CONCEPT DRAINAGE REPORT

FOR

CENTRAL TRI-STATE TOLLWAY (I-294)

ROADWAY STUDY

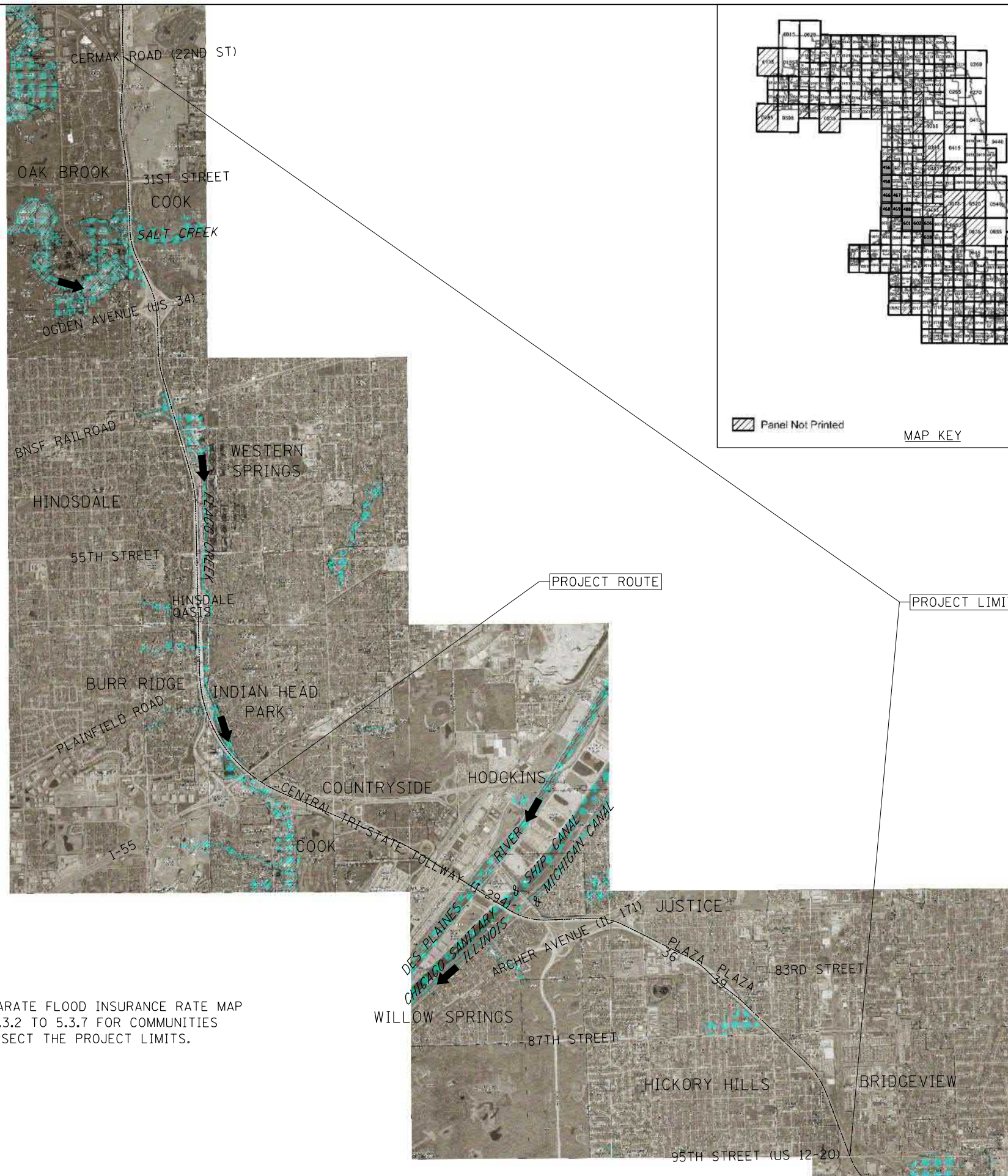
95TH STREET (M.P. 17.5) TO

CERMAK ROAD (M.P. 29.5)

CONTRACT RR-14-4223

PREPARED BY: Exp / TranSystems / SE3 TEAM
DATE: DECEMBER 22, 2017

5.3 IDENTIFIED BASE FLOODPLAIN MAPS



NOTES
 1. SEE SEPARATE FLOOD INSURANCE RATE MAP EXHIBITS 5.3.2 TO 5.3.7 FOR COMMUNITIES THAT INTERSECT THE PROJECT LIMITS.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
 The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Basic Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelictified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from the annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
 The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)
 CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
 0.2% annual chance floodplain boundary
 Floodway boundary
 Zone D boundary
 CBRS and OPA boundary
 Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
 Base Flood Elevation line and value; elevation in feet
 Base Flood Elevation value where uniform within zone; elevation in feet

*Referenced to the North American Vertical Datum of 1988:
 Cross section line
 Transsect line
 Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
 1000-meter universal Transverse Mercator grid values; zone 16
 5000-foot grid tick; Illinois State Plane East Coordinate System, 3776 zone (FIPS/CONE L2012) Transverse Mercator
 Bench mark (see explanation in Notes to Users section of this FRM panel)
 River Mile

FEDERAL EMERGENCY MANAGEMENT AGENCY
 FLOOD INSURANCE RATE MAP
 COOK AND DUPAGE COUNTIES; ILLINOIS
 AND INCORPORATED AREAS

PANELS
 181, 183 (DUPAGE COUNTY PRELIMINARY)
 456, 458, 466, 467, 468, 469, 488, 601, 602, 606, 608 } COOK COUNTY
 EFF. AUG 19, 2008

COMMUNITIES
 HICKORY HILLS, BRIDGEVIEW, JUSTICE, COOK COUNTY, WILLOW SPRINGS, HODGKINS, COUNTRYSIDE, INDIAN HEAD PARK, HINDSDALE, BURR RIDGE, WESTERN SPRINGS, OAK BROOK

MAP REVISED
 AUGUST 19, 2008 (COOK)
 TBD (DUPAGE)

EXHIBIT 5.3

7/13/2017
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DRAWN BY MRK SCALE AS SHOWN
 CHECKED BY SLH DATE 9/19/16

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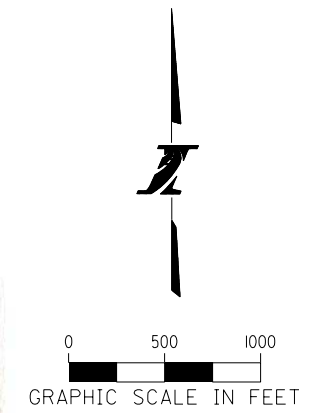
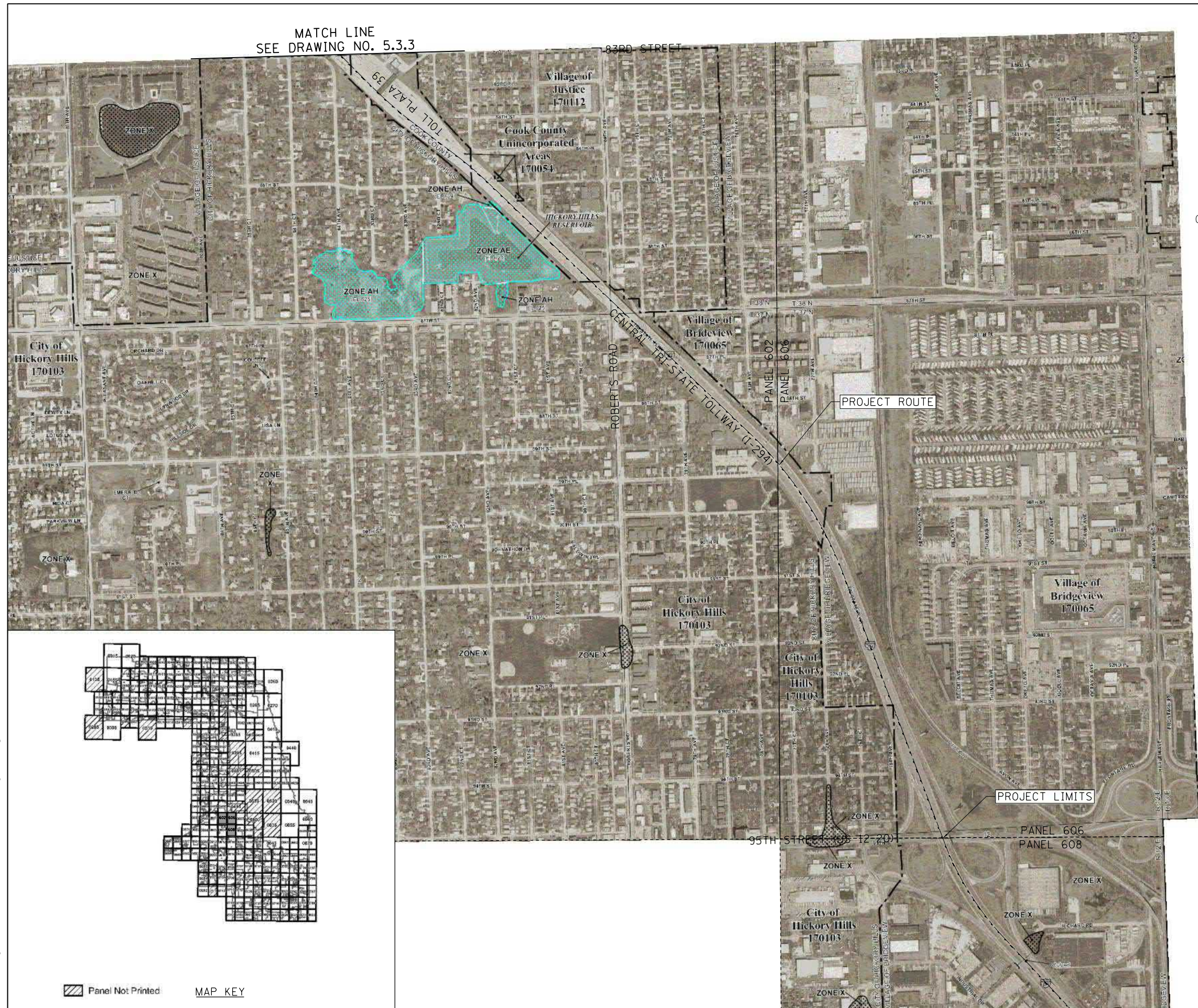
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 EXHIBIT 5.3
 FLOOD INSURANCE RATE MAP

SHEET NO.
 DRAWING NO.
 5.3.1 OF 5.3.7

MATCH LINE
SEE DRAWING NO. 5.3.3



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A:** No Base Flood Elevations determined; Basic Flood Elevations determined.
- ZONE AE:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AH:** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelict. Zone AH indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE AR:** Areas to be protected from the annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined; Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE A99:** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE V:** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE:** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X:** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X:** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D:** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet
- Base Flood Elevation value where uniform within zone; elevation in feet

*Referenced to the North American Vertical Datum of 1988:

- Cross section line
- Transsect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter universal Transverse Mercator grid values; zone 16
- 5000-foot grid ticks; Illinois State Plane East Coordinate System, 3776 zone (FIPS CODE L210); Transverse Mercator
- Bench mark (see explanation in Notes to Users section of this FRM panel)
- M 15
- River Mile

FEDERAL EMERGENCY MANAGEMENT AGENCY
FLOOD INSURANCE RATE MAP

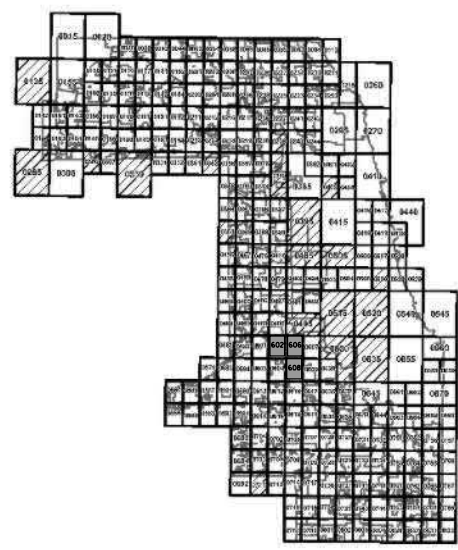
COOK COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANELS 602, 606 AND 608

COMMUNITY	NUMBER	PANELS	SUFFIX
HICKORY HILLS, CITY OF	170103	602, 606	J
BRIDGEVIEW, VILLAGE OF	170065	602, 606	J
COOK COUNTY, VILLAGE OF	170054	602	J
JUSTICE, VILLAGE OF	170112	602	J

MAP REVISED
AUGUST 19, 2008

EXHIBIT 5.3



Panel Not Printed MAP KEY

DRAWN BY MRK SCALE AS SHOWN
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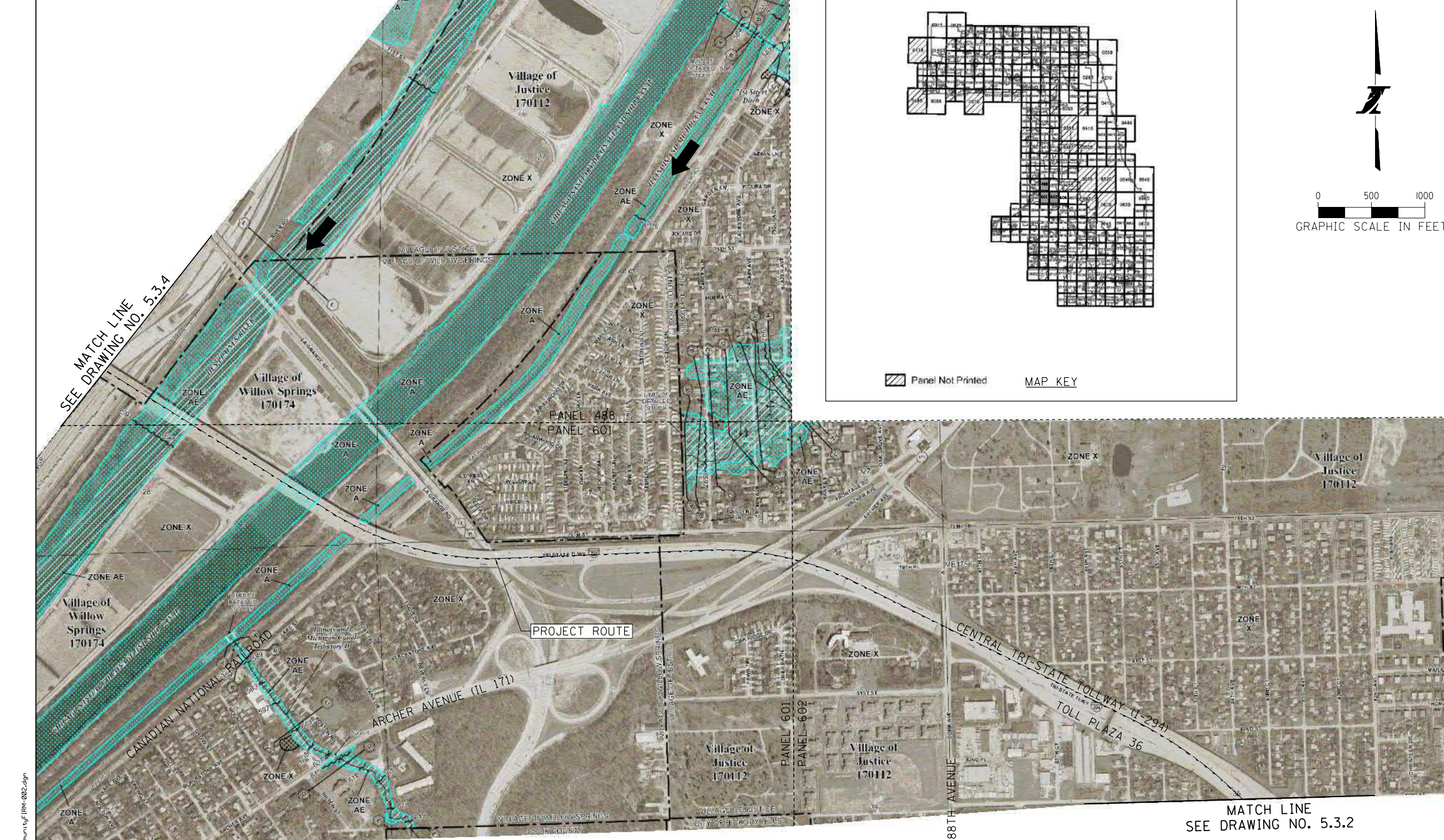


NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
EXHIBIT 5.3
FLOOD INSURANCE RATE MAP

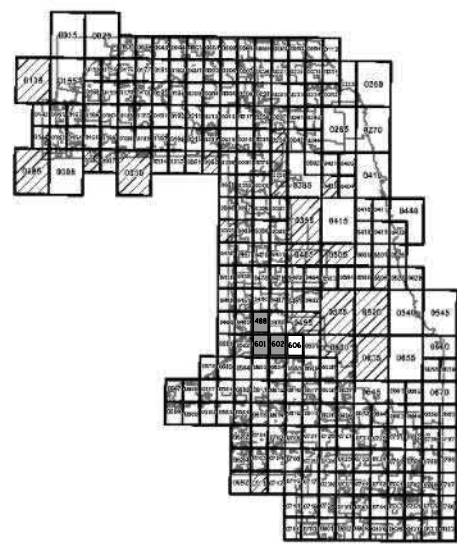
SHEET NO.
DRAWING NO.
5.3.2 OF 5.3.7

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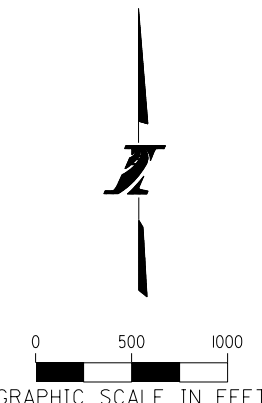


SEE MATCH LINE
DRAWING NO. 5.3.4

MATCH LINE
SEE DRAWING NO. 5.3.2



Panel Not Printed MAP KEY



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
 The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Basic Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AR Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99 Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone A99 indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE V Area to be protected from the annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
 The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)
 CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
 0.2% annual chance floodplain boundary
 Floodway boundary
 Zone D boundary
 CBRS and OPA boundary
 Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
 Base Flood Elevation line and value; elevation in feet
 Base Flood Elevation value where uniform within zone; elevation in feet

Referenced to the North American Vertical Datum of 1988:
 Cross section line
 Transsect line
 48° 02' 08" 83° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
 48° 02' 08" N 156° 50' 00" W 1000-meter Universal Transverse Mercator grid values; zone 18
 5000-foot grid tick; Illinois State Plane East Coordinate System, 3776 zone (FIPSZONE 1201); Transverse Mercator
 Benchmark (see explanation in Notes to Users section of this FRM panel)
 M 1.5
 River Mile

FEDERAL EMERGENCY MANAGEMENT AGENCY
FLOOD INSURANCE RATE MAP

COOK COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANELS 488, 601 AND 602

COMMUNITY	NUMBER	PANELS	SUFFIX
JUSTICE, VILLAGE OF	170112	601, 602	J
WILLOW SPRINGS, VILLAGE OF	170174	601	J
COOK COUNTY	170054	601	J

MAP REVISED
AUGUST 19, 2008

EXHIBIT 5.3
SHEET NO.

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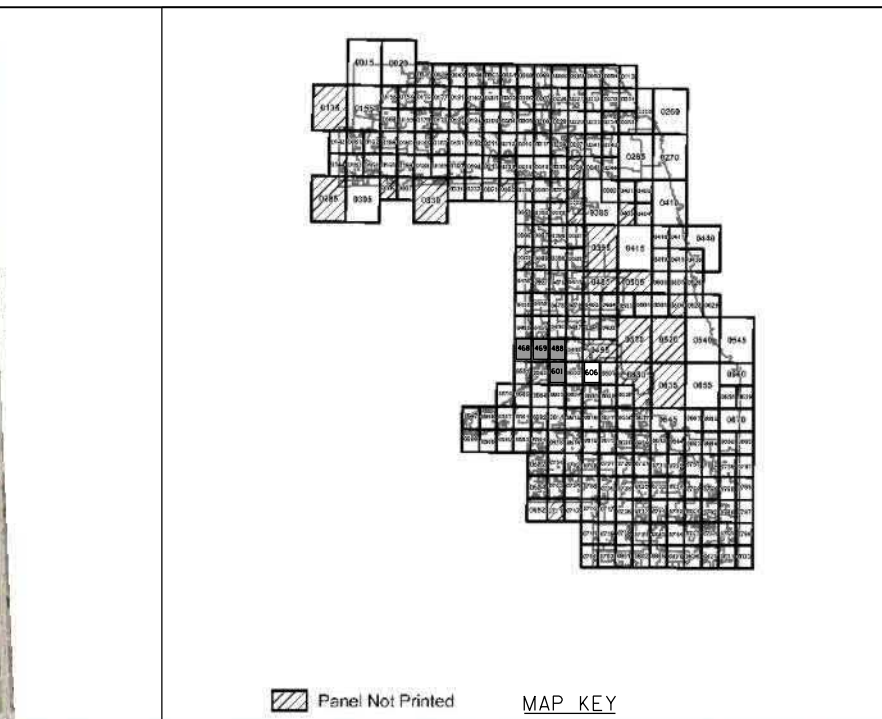
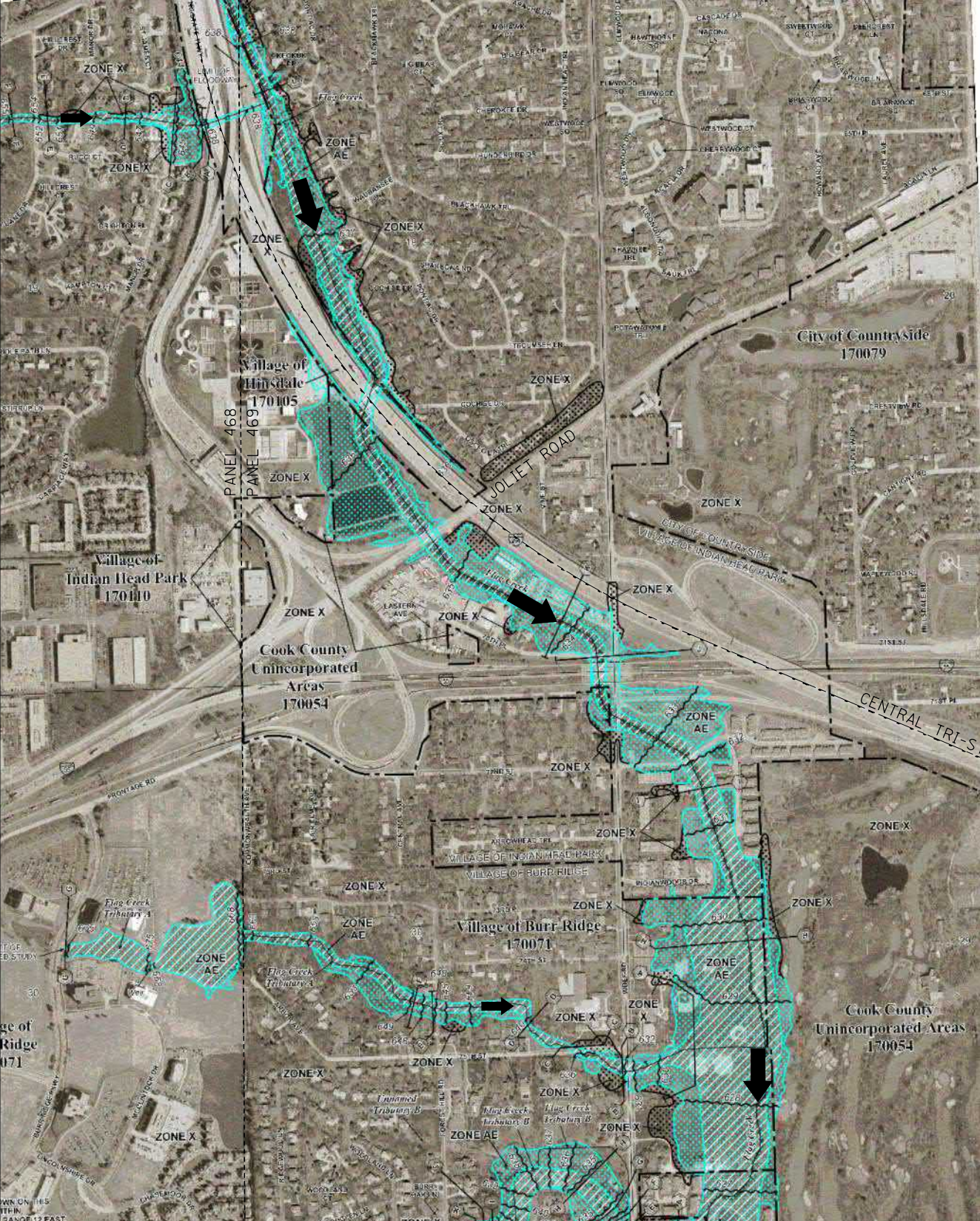
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2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
EXHIBIT 5.3
FLOOD INSURANCE RATE MAP

DRAWING NO.
5.3.3 OF 5.3.7

MATCH LINE
SEE DRAWING NO. 5.3.5



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
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ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelict. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from the 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
 The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)
 CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
 1% annual chance floodplain boundary
 0.2% annual chance floodplain boundary
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 Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
 Basic Flood Elevation line and value; elevation in feet.
 (EL 587)
 Base Flood Elevation value where uniform within zone; elevation in feet.

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 ⊕ ⊖ Transsect line
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 5000-foot grid ticks: Illinois State Plane East Coordinate System, 3776 zone (FIPSZONE L201) Transverse Mercator
 Bench mark (see explanation in Notes to Users section of this FIRM panel)
 M 1.5
 River Mile



FEDERAL EMERGENCY MANAGEMENT AGENCY
FLOOD INSURANCE RATE MAP

COOK COUNTY, ILLINOIS
AND INCORPORATED AREAS

PANELS 468, 469, 488 AND 601

COMMUNITY	NUMBER	PANELS	SUFFIX
HODKINS, VILLAGE OF	170106	469, 488	J
WILLOW SPRINGS, VILLAGE OF	170174	469	J
COUNTRYSIDE, VILLAGE OF	170079	469, 488	J
INDIAN HEADPARK, VILLAGE OF	170110	468, 469	J
BURR RIDGE, VILLAGE OF	170071	468, 469	J
HINDSDALE, VILLAGE OF	170105	468, 469	J
COOK COUNTY	170054	469, 488	J

MAP REVISED
AUGUST 19, 2008
EXHIBIT 5.3

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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

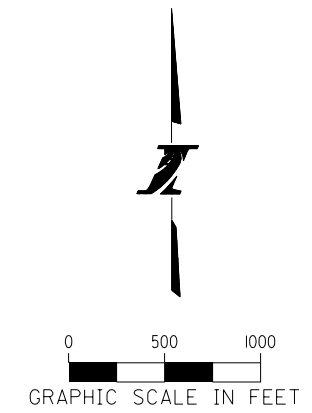
CONTRACT NO. RR-14-4223
EXHIBIT 5.3
FLOOD INSURANCE RATE MAP

SHEET NO.
DRAWING NO.
5.3.4 OF 5.3.7

MATCH LINE
SEE DRAWING NO. 5.3.6

PROJECT ROUTE

MATCH LINE
SEE DRAWING NO. 5.3.4



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
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OTHER FLOOD AREAS
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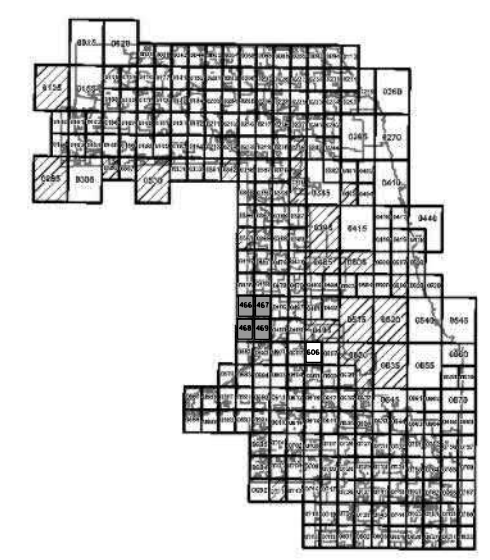
OTHER AREAS
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

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 Bench mark (see explanation in Notes to Users section of this FIRM panel)
 M 1 S
 River Mile



FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP

COOK COUNTY, ILLINOIS AND INCORPORATED AREAS

PANELS 466, 467, 468 AND 469

COMMUNITY	NUMBER	PANELS	SUFFIX
INDIAN HEADPARK, 170110		468, 469	J
VILLAGE OF BURR RIDGE, 170071		468, 469	J
WESTERN SPRINGS, 170171		466, 468	J
VILLAGE OF HINSDALE, 170105		466, 468	J
COOK COUNTY, 170054		469, 488	J

MAP REVISED
AUGUST 19, 2008
EXHIBIT 5.3

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 CHECKED BY SLH DATE 9/19/16

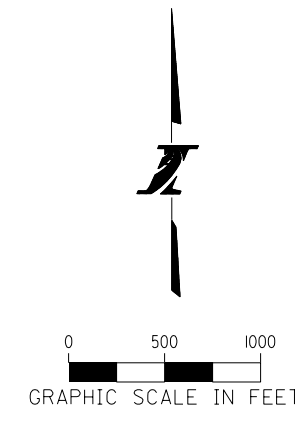
exp. exp U.S. Services Inc.
 Chicago, IL
 BUILDINGS • EARTH & ENVIRONMENT • ENERGY
 INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
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NO.	DATE	REVISIONS DESCRIPTION

CONTRACT NO. RR-14-4223
 EXHIBIT 5.3
 FLOOD INSURANCE RATE MAP

SHEET NO.
 DRAWING NO.
 5.3.5 OF 5.3.7



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

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OTHER AREAS

- ZONE X:** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D:** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

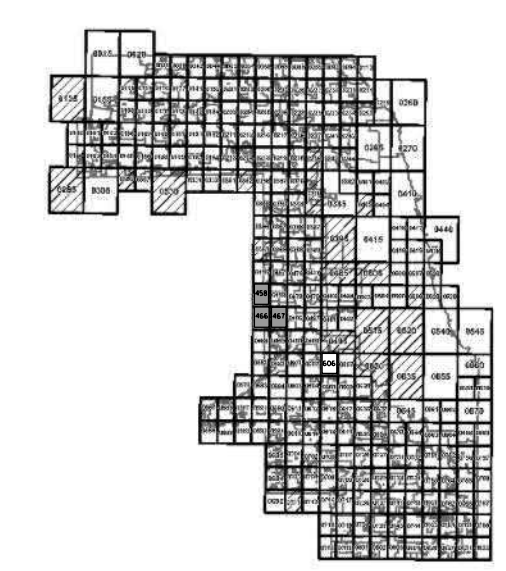
OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet
- Base Flood Elevation value where uniform within zone; elevation in feet

Referenced to the North American Vertical Datum of 1988:

- Cross section line
- Transsect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter universal Transverse Mercator grid values; zone 18
- 5000-foot grid ticks; Illinois State Plane East Coordinate System, 3776 zone (FIPS CODE L201) Transverse Mercator
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile



FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP
 COOK COUNTY, DUPAGE COUNTY; ILLINOIS AND INCORPORATED AREAS
 PANELS 183, 458, 466 AND 467

COMMUNITY	NUMBER	PANELS	SUFFIX
WESTERN SPRINGS,	170171	458, 466,	J
VILLAGE OF		467	
HINDSDALE,	170105	183, 458,	J
VILLAGE OF		466	
COOK COUNTY	170054	458	J

MAP REVISED
 AUGUST 19, 2008 (COOK)
 TBD (DUPAGE)
EXHIBIT 5.3

DRAWN BY MRK SCALE AS SHOWN
 CHECKED BY SLH DATE 9/19/16

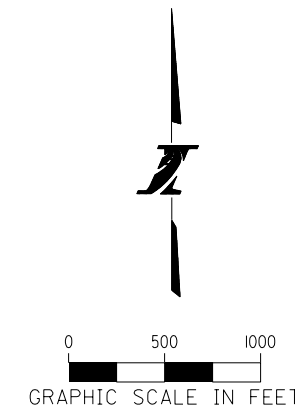
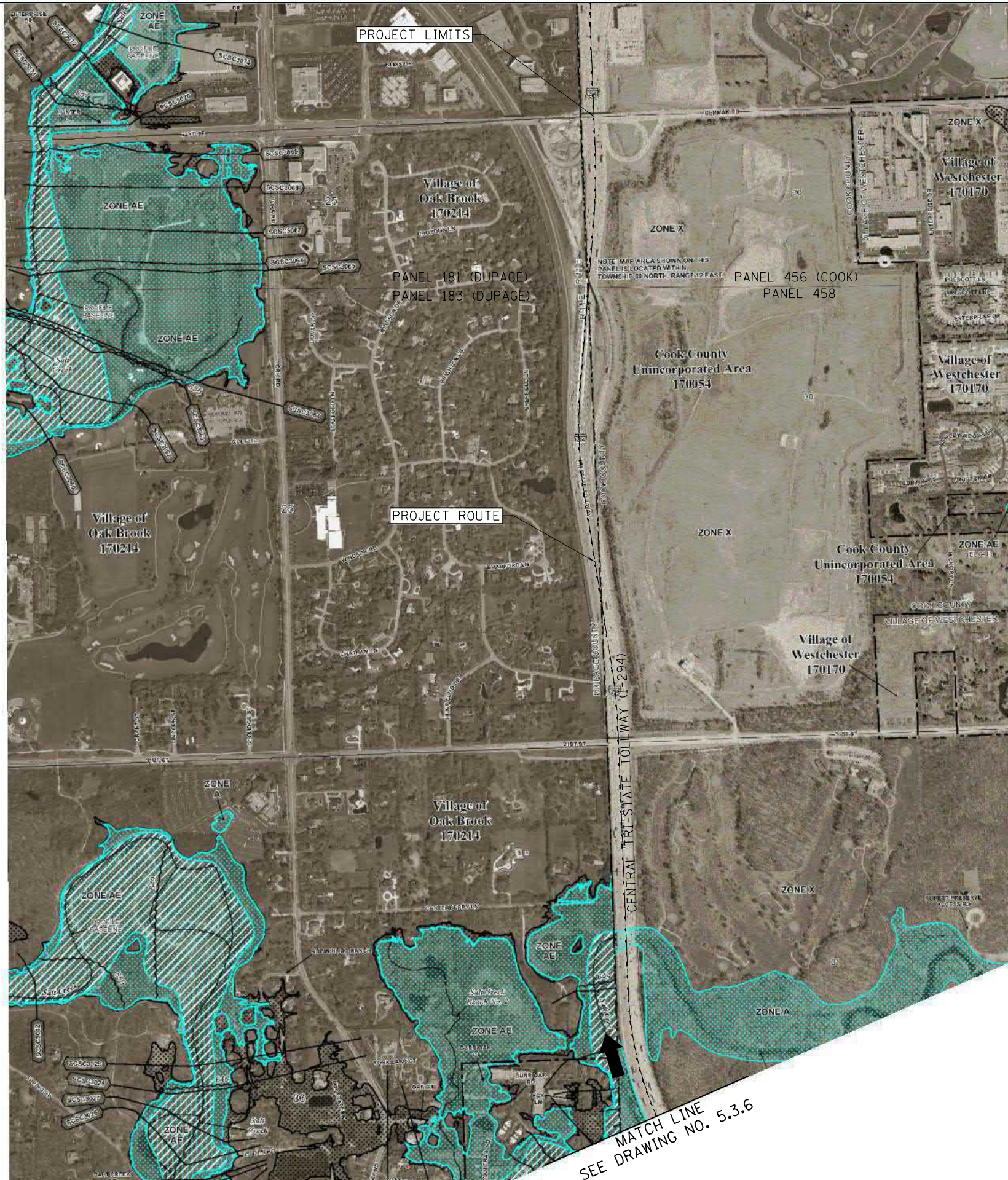
exp. U.S. Services Inc.
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS DESCRIPTION

CONTRACT NO. RR-14-4223
EXHIBIT 5.3
 FLOOD INSURANCE RATE MAP
 SHEET NO.
 DRAWING NO. 5.3.6 OF 5.3.7

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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A: No Base Flood Elevations determined; Basic Flood Elevations determined.

ZONE AE: Basic Flood Elevations determined; Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AH: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR: Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelict. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99: Area to be protected from the annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V: Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE: Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X: Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D: Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

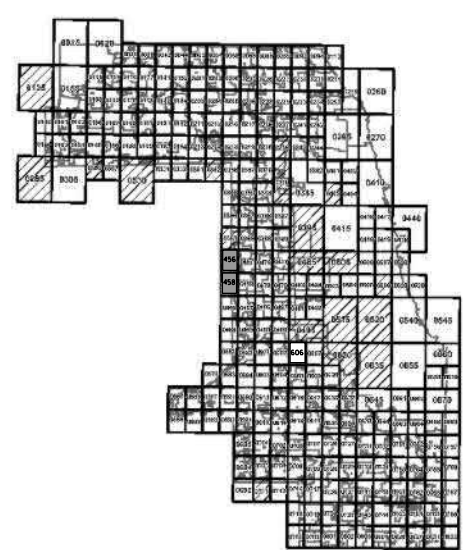
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
 0.2% annual chance floodplain boundary
 Floodway boundary
 Zone D boundary
 CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
 Base Flood Elevation (line and value); elevation in feet.
 (EL 587)
 Base Flood Elevation value where uniform within zone; elevation in feet.

*Referenced to the North American Vertical Datum of 1988.

(A) - (A) Cross section line
 (23) - (23) Transsect line
 48° 02' 08" 83° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
 48° 02' 08" 83° 02' 12" 1000-meter universal Transverse Mercator grid values; zone 18
 5000-foot grid tick: Illinois State Plane East Coordinate System, 3776 zone (FIPSZONE L211); Transverse Mercator
 15665000 FT
 DMS10x Bench mark (see explanation in Notes to Users section of this FRM panel)
 M15 River Mile



FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP
 COOK COUNTY, DUPAGE COUNTY; ILLINOIS AND INCORPORATED AREAS
 PANELS 181, 183, 456 AND 458

COMMUNITY	NUMBER	PANELS	SUFFIX
HINDSDALE, VILLAGE OF	170105	183	J
OAK BROOK, VILLAGE OF	170214	181, 183	J
COOK COUNTY	170054	456, 458	J

MAP REVISED
 AUGUST 19, 2008 (COOK)
 TBD (DUPAGE)
EXHIBIT 5.3

DRAWN BY MRK SCALE AS SHOWN
 CHECKED BY SLH DATE 9/19/16

exp. exp U.S. Services Inc.
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
EXHIBIT 5.3
 FLOOD INSURANCE RATE MAP
 SHEET NO.
 DRAWING NO.
5.3.7 OF 5.3.7

7/25/2017
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5.4 WATERWAY INFORMATION TABLE



MAJOR CULVERT (WC # 2) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1007+20

S.N. Exist: RCP 42"
 S.N. Prop: RCP 42"
 Waterway: Storm System East of I-294

Computed by: EL Date: 7/20/2017
 Checked by: JC Date: 7/21/2017

Drainage Area =		0.0079 sq. mi	Existing Overtopping Elevation:			628.50	ft. @ Sta.	1010+65	
		5.07 ac	Proposed Overtopping Elevation:			627.71	ft. @ Sta.	1010+15	
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	15.10	7.70	7.70	624.09	0.00	0.00	624.09	624.09
Design	50	16.10	8.92	8.92	624.51	0.00	0.00	624.51	624.51
Base	100	17.00	9.49	9.49	624.67	0.00	0.00	624.67	624.67
OVT (E)	> 500 - Yr	-	-	-	-	-	-	-	-
OVT (P)	> 500 - Yr	-	-	-	-	-	-	-	-
Max. Calc.	500	18.00	10.47	10.47	624.79	0.00	0.00	624.79	624.79

10-Year Velocity through Existing Culvert = 1.68 fps
 10-Year Velocity through Proposed Culvert = 1.67 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

SCOPE OF WORK:

EXISTING CULVERT
 Bridge or Culvert Type: 42" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 224
 U/S Flowline: 621.31
 D/S Flowline: 620.62
 Skew: 0
 Low EOP: 628.5 @ 1010+65 SB SIDE

EXISTING DROPBOX
 Dimensions: _____
 Drop: _____
 Weir Elevation: _____

PROPOSED CULVERT
 Culvert Type: 42" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 232
 U/S Flowline: 621.31
 D/S Flowline: 620.61
 Skew: 0
 Low EOP: 627.71 @ 1010+15 SB SIDE

PROPOSED DROPBOX
 Dimensions: _____
 Drop: _____
 Weir Elevation: _____

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS
Circular Culvert (42") under I-294 (@Station 1007+20)



Route: Tri-State Tollway (I-294)
Section: 4223
County: Cook
Station: 1007+20

S.N. Exist: RCP 42"
S.N. Prop: RCP 42"
Waterway: Storm System East of I-294

Computed by: EL
Checked by: JC

Date: 7/20/2017
Date: 7/21/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head (ft) @ Approach Section	
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	624.09	624.09	624.09	0.00	0.00
Design	50	624.51	624.51	624.51	0.00	0.00
Base	100	624.67	624.67	624.67	0.00	0.00
Max. Calc.	500	624.79	624.79	624.79	0.00	0.00

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
628.50	627.71			10	624.09	624.09	4.41	3.62		
Low Road Station:		Low Beam Station:		50	624.51	624.51	3.99	3.20		
Existing	Proposed	Existing	Proposed	100	624.67	624.67	3.83	3.04		
1010+65	1010+15			500	624.79	624.79	3.71	2.92		

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50 year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50 year natural high water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	624.09	624.09	621.31	621.31	2.78	2.78			7.70	7.70
Design	50	624.51	624.51	621.31	621.31	3.20	3.20			8.92	8.92
Base	100	624.67	624.67	621.31	621.31	3.36	3.36			9.49	9.49
Max. Calc.	500	624.79	624.79	621.31	621.31	3.48	3.48			10.47	10.47

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 14) WATERWAY INFORMATION TABLE



Route: Iri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1231+53.

S.N. Exist: CMP 54" (HDPE Lined Culvert Opening 40")
 S.N. Prop: RCP 54"
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: SB
 Checked by: KS

Date: 6/27/2017
 Date: 6/27/2017

Drainage Area = 0.0671 sq. mi (42.97 acres)		Existing Overtopping Elevation: 656.41 ft. @ Sta. 1233+09							
		Proposed Overtopping Elevation: 658.15 ft. @ Sta. 1233+00							
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	17	2	1	631.1	1.0	0.9	632.1	632.0
Design	50	35	9	12	633.2	0.6	0.2	633.9	633.5
Base	100	43	9	16	634.1	1.0	0.3	635.1	634.4
OVT (E)	> 500 - Yr								
OVT (P)	> 500 - Yr								
Max. Calc.	500	80	9	16	635.3	3.8	1.4	639.1	636.7

10-Year Velocity through Existing Culvert = 5.54 fps
 10-Year Velocity through Proposed Culvert = 5.18 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

SCOPE OF WORK:

EXISTING CULVERT
 Bridge or Culvert Type: CMP Circular Culvert
 Cell Dimensions (W x H): Dia 54" (Lined Culvert Opening 40")
 # of span \ cells: 1
 Length: 305'
 U/S Flowline: 630.15
 D/S Flowline: 628.72
 Skew: 5'
 Low EOP: 656.41

EXISTING DROPBOX
 Dimensions: N/A
 Drop: N/A
 Weir Elevation: N/A

PROPOSED CULVERT
 Culvert Type: RCP Circular Culvert
 Cell Dimensions (W x H): Dia 54"
 # of span \ cells: 1
 Length: 321'
 U/S Flowline: 630.23
 D/S Flowline: 628.72
 Skew: 5'
 Low EOP: 658.15

PROPOSED DROPBOX
 Dimensions: N/A
 Drop: N/A
 Weir Elevation: N/A

NOTES:

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS (WC # 14)

Circular Culvert (54") under I-294 (@Station 1231+53)



Route: Tri-State Tollway (I-294)
 Section:
 County: Cook
 Station: 1231+53.

S.N. Exist: 54" CMP (HDPE Lined Culvert, Opening - 40")
 S.N. Prop: 54" RCP
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: SB
 Checked by: KS

Date: 6/27/2017
 Date: 6/27/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)		Proposed Headwater Elev. (ft)		Created Head Elev. (ft)	
			U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	Year	U/S Face of structure/Approach section Sta. 835						
	10	631.11	632.12	632.00	1.01	0.89		
Design	50	633.22	633.86	633.45	0.64	0.23		
Base	100	634.13	635.12	634.44	0.99	0.31		
Max. Calc.	500	635.29	639.05	636.72	3.76	1.43		

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating or eated head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
656.41	658.15	NA	NA	10	632.12	632.00	24.29	26.15	NA	NA
Low Road Station:		Low Beam Station:		50	633.86	633.45	22.55	24.70	NA	NA
Existing	Proposed	Existing	Proposed	100	635.12	634.44	21.29	23.71	NA	NA
1233+09	1233+00	NA	NA	500	639.05	636.72	17.36	21.43	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Circular Culvert Dia. (inch)		Opening Area (ft ²)	
		Existing @ 835	Proposed @ 835	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	Year										
	10	631.11	631.11	630.15	630.23	0.96	0.88	54" (Opening - 40")	54"	1.57	1.27
Design	50	633.22	633.22	630.15	630.23	3.07	2.99	54" (Opening - 40")	54"	8.70	12.40
Base	100	634.13	634.13	630.15	630.23	3.98	3.90	54" (Opening - 40")	54"	8.70	15.90
Max. Calc.	500	635.29	635.29	630.15	630.23	5.14	5.06	54" (Opening - 40")	54"	8.70	15.90

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 15) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1239+52.

S.N. Exist: CMP 54" (HDPE Lined Culvert Opening 40")
 S.N. Prop: RCP 54"
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: SB
 Checked by: KS

Date: 6/27/2017
 Date: 6/27/2017

Drainage Area =		0.0253 sq. mi (16.2 acres)		Existing Overtopping Elevation:		653.50 ft. @ Sta. 1238+02			
				Proposed Overtopping Elevation:		654.16 ft. @ Sta. 1238+00			
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	13	9	16	632.0	0.1	0.0	632.1	632.0
Design	50	22	9	16	633.9	0.2	0.1	634.2	634.0
Base	100	25	9	16	634.8	0.3	0.1	635.1	634.9
OVT (E)	> 500 - Yr								
OVT (P)	> 500 - Yr								
Max. Calc.	500	40	9	16	636.0	0.8	0.3	636.8	636.3

10-Year Velocity through Existing Culvert = 1.48 fps
 10-Year Velocity through Proposed Culvert = 0.87 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: CMP Circular Culvert
 Cell Dimensions (W x H): Dia 54" (Lined Culvert Opening 40")
 # of span \ cells: 1
 Length: 233'
 U/S Flowline: 628.04
 D/S Flowline: 626.40
 Skew: 0°
 Low EOP: 653.5

EXISTING DROPBOX

Dimensions: N/A
 Drop: N/A
 Weir Elevation: N/A

PROPOSED CULVERT

Culvert Type: RCP Circular Culvert
 Cell Dimensions (W x H): Dia 54"
 # of span \ cells: 1
 Length: 266'
 U/S Flowline: 628.27
 D/S Flowline: 626.4
 Skew: 0°
 Low EOP: 654.16

PROPOSED DROPBOX

Dimensions: N/A
 Drop: N/A
 Weir Elevation: N/A

NOTES:

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS (WC # 15)

Circular Culvert (54") under I-294 (@Station 1239+52)



Route: Tri-State Tollway (I-294)
 Section:
 County: Cook
 Station: 1239+52.

S.N. Exist: 54" CMP (HDPE Lined Culvert, Opening - 40")
 S.N. Prop: 54" RCP
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: SB
 Checked by: KS

Date: 6/27/2017
 Date: 6/27/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)		Proposed Headwater Elev. (ft)		Created Head Elev. (ft)	
			U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	Year	U/S Face of structure/Approach section Sta. 453						
	10	631.99	632.07	632.07	632.02	632.02	0.08	0.03
Design	50	633.93	634.15	634.15	634.00	634.00	0.22	0.07
Base	100	634.76	635.06	635.06	634.86	634.86	0.30	0.10
Max. Calc.	500	636.01	636.80	636.80	636.27	636.27	0.79	0.26

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
653.50	654.16	NA	NA	10	632.07	632.02	21.43	22.14	NA	NA
Low Road Station:		Low Beam Station:		50	634.15	634.00	19.35	20.16	NA	NA
Existing	Proposed	Existing	Proposed	100	635.06	634.86	18.44	19.30	NA	NA
1238+02	1238+00	NA	NA	500	636.80	636.27	16.70	17.89	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Circular Culvert Dia. (inch)		Opening Area (ft ²)	
		Existing @ 453	Proposed @ 453	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	Year										
	10	631.99	631.99	628.04	628.27	3.95	3.72	54" (Opening - 40")	54"	8.70	15.90
Design	50	633.93	633.93	628.04	628.27	5.89	5.66	54" (Opening - 40")	54"	8.70	15.90
Base	100	634.76	634.76	628.04	628.27	6.72	6.49	54" (Opening - 40")	54"	8.70	15.90
Max. Calc.	500	636.01	636.01	628.04	628.27	7.97	7.74	54" (Opening - 40")	54"	8.70	15.90

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



BRIDGE (WC # 16) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
Section: North of BNSF RR
County: Cook
Station: 1257+00

S.N. Exist: BN 243 (NB) & BN 244 (SB)
S.N. Prop: BN 243 (NB) & BN 244 (SB)
Waterway: Flagg Creek

Computed by: KS Date: 5/2/2017
Checked by: SH Date: 5/2/2017

Drainage Area =		13.969 sq. mi	Existing Overtopping Elevation:			642.47	@ Sta.		1264+00
			Proposed Overtopping Elevation:			642.33	@ Sta.		1264+00
Flood Event	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
	10	1073.1	600.53	621.40	633.48	0.41	0.35	633.89	633.83
Design	50	1833.1	845.98	872.51	635.72	0.45	0.38	636.17	636.10
Base	100	2236.5	920.88	949.27	636.34	0.46	0.40	636.80	636.74
Scour Design Check									
Overtop Existing	> 500 - Yr								
Overtop Proposed	> 500 - Yr								
Max. Calc.	500	3226.9	1064.60	1091.20	637.43	0.49	0.41	637.92	637.84

10-Year Velocity through Existing Bridge = 1.79 fps
10-Year Velocity through Proposed Bridge = 1.73 fps

DATUM: NAVD 88
ALL-TIME H.W.E. & DATE: 637.41 (October 1954)

SCOPE OF WORK:

EXISTING STRUCTURE

TYPE: 2-span PCC girder bridge
LENGTH: 163'-3" (Bk. To Bk. of Abutments)
SPANS: 2
LOW BEAM: 642.91
SKEW: 30°
LOW EOP: 642.47

PROPOSED STRUCTURE

TYPE: - Single span PCC girder bridge
LENGTH: - 123'-8" (Bk. To Bk. of Abutments)
SPANS: - 1
LOW BEAM: - 640.61
SKEW: - 30°
LOW EOP: - 642.33

NOTES: Existing and proposed bridge meet Tollway's freeboard and clearance criteria.
Proposed Structure (Alternative 8R) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

I-294 Bridge over the Flagg Creek (@Station 1257+00)



Route:	Tri-State Tollway (I-294)	S.N. Exist:	BN 243 (NB) & BN 244 (SB)
Section:	North of BNSF RR	S.N. Prop:	BN 243 (NB) & BN 244 (SB)
County:	Cook	Waterway:	Flagg Creek
Station:	1257+00		

Computed by: KS Date: 5/2/2017

Checked by: SH Date: 5/2/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)		Existing Headwater Elev. (ft)		Proposed Headwater Elev. (ft)		Created Head (ft) @ Approach Section	
		U/S Face of Structure @ 23305.6	Approach section U/S @ 23365.6	U/S Face of Structure @ 23305.6	Approach section U/S @ 23365.6	U/S Face of Structure @ 23305.6	Approach section U/S @ 23365.6	Existing	Proposed
	10	633.48	633.49	633.89	633.90	633.83	633.84	0.41	0.35
Design	50	635.72	635.74	636.17	636.19	636.10	636.12	0.45	0.38
Base	100	636.34	636.36	636.80	636.82	636.74	636.76	0.46	0.40
Max. Calc.	500	637.43	637.46	637.92	637.95	637.84	637.87	0.49	0.41

(1) The natural highwater elevation is the water surface elevation at the upstream end of the crossing, as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the approach section, and not at the U/S face of the bridge/culvert. The difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head.

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
642.47	642.33	642.91	640.61	10	633.89	633.83	8.58	8.50	9.02	6.78
Low Road Station:		Low Beam Station:		50	636.17	636.10	6.30	6.23	6.74	4.51
Existing	Proposed	Existing	Proposed	100	636.80	636.74	5.67	5.59	6.11	3.87
1264+00	1264+00	1257+00	1257+00	500	637.92	637.84	4.55	4.49	4.99	2.77

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		Stream Bottom Elev.		Depth of Water		**Opening Area (ft ²)	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	633.48	633.48	624.12	624.12	9.36	9.36	600.53	621.40
Design	50	635.72	635.72	624.12	624.12	11.60	11.60	845.98	872.51
Base	100	636.34	636.34	624.12	624.12	12.22	12.22	920.88	949.27
Max. Calc.	500	637.43	637.43	624.12	624.12	13.31	13.31	1064.60	1091.20

** *Proposed structure waterway opening is larger than existing due to absense of pier.

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

WSEL Summary Table - Created Head Calculations WC16

10-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
24186.93	633.85	634.21	634.15	0.36	0.30	-0.06
23915.05	633.69	634.07	634.01	0.38	0.32	-0.06
23864.58	633.69	634.07	634.01	0.38	0.32	-0.06
23606.53	633.58	633.98	633.92	0.40	0.34	-0.06
23476.6	633.55	633.95	633.88	0.40	0.33	-0.07
23365.6	633.49	633.90	633.84	0.41	0.35	-0.06
23305.6	633.48	633.89	633.82	0.41	0.34	-0.07
23201.92/Bridge						

50-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
24186.93	636.17	636.55	636.49	0.38	0.32	-0.06
23915.05	636.01	636.42	636.36	0.41	0.35	-0.06
23864.58	636.00	636.41	636.34	0.41	0.34	-0.07
23606.53	635.86	636.30	636.23	0.44	0.37	-0.07
23476.6	635.80	636.25	636.18	0.45	0.38	-0.07
23365.6	635.74	636.19	636.12	0.45	0.38	-0.07
23305.6	635.72	636.18	636.11	0.46	0.39	-0.07
23201.92/Bridge						

100-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
24186.93	636.84	637.22	637.16	0.38	0.32	-0.06
23915.05	636.67	637.07	637.02	0.40	0.35	-0.05
23864.58	636.65	637.06	637.00	0.41	0.35	-0.06
23606.53	636.50	636.94	636.88	0.44	0.38	-0.06
23476.6	636.44	636.89	636.82	0.45	0.38	-0.07
23365.6	636.36	636.82	636.76	0.46	0.40	-0.06
23305.6	636.34	636.81	636.74	0.47	0.40	-0.07
23201.92/Bridge						

500-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
24186.93	638.06	638.44	638.38	0.38	0.32	-0.06
23915.05	637.86	638.28	638.21	0.42	0.35	-0.07
23864.58	637.85	638.27	638.20	0.42	0.35	-0.07
23606.53	637.65	638.11	638.03	0.46	0.38	-0.08
23476.6	637.57	638.04	637.96	0.47	0.39	-0.08
23365.6	637.46	637.95	637.87	0.49	0.41	-0.08
23305.6	637.43	637.92	637.84	0.49	0.41	-0.08
23201.92/Bridge						



MAJOR CULVERT (WC # 17) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1279+66

S.N. Exist: RCBC 2-10' X 5'
 S.N. Prop: RCBC 2-10' X 5'
 Waterway: Plainfield Road Ditch

Computed by: KS Date: 12/14/2017
 Checked by: SLH Date: 12/14/2017

Drainage Area = 1.69 sq. mi			Existing Overtopping Elevation: 643.64 ft. @ Sta. 1279+88		Proposed Overtopping Elevation: 645.98 ft. @ Sta. 1279+00				
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	197	30	37	637.8	0.2	0.0	638.0	637.8
Design	50	310	40	52	638.5	0.3	0.0	638.9	638.5
Base	100	367	44	58	638.9	0.4	0.0	639.3	638.9
OVT (E)	> 500 - Yr								
OVT (P)	> 500 - Yr								
Max. Calc.	500	510	57	74	639.6	0.7	0.0	640.3	639.7

10-Year Velocity through Existing Culvert = 6.8 fps
 10-Year Velocity through Proposed Culvert = 6.8 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: 639.7 (October 1954)

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: Concrete Box Culvert
 Cell Dimensions (W x H): Double 10' (W) x 5' (H)
 # of span \ cells: 2
 Length: 462.33'
 U/S Flowline: 635.65
 D/S Flowline: 631.18
 Skew: _____
 Low EOP: 643.64

EXISTING DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

PROPOSED CULVERT

Culvert Type: Concrete Box Culvert (extension)
 Cell Dimensions (W x H): Double 10' (W) x 5' (H)
 # of span \ cells: 2
 Length: 491.33'
 U/S Flowline: 635.93
 D/S Flowline: 631.18
 Skew: _____
 Low EOP: 645.98

PROPOSED DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

NOTES: Proposed Structure (Alt 8R) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

Double Box Culvert (10' x 5') under I-294 (@Station 1279+66)



Route: Tri-State Tollway (I-294)
 Section:
 County: Cook
 Station: 1279+66

S.N. Exist: RCBC 2-10' X 5'
 S.N. Prop: RCBC 2-10' X 5'
 Waterway: Plainfield Road Ditch

Computed by: KS
 Checked by: SLH

Date: 12/14/2017
 Date: 12/14/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head Elev. (ft)	
					Existing	Proposed
	Year	U/S Face of structure Sta. 537.79	U/S Face of Structure	U/S Face of Structure		
	10	637.76	637.97	637.81	0.21	0.05
Design	50	638.51	638.85	638.54	0.34	0.03
Base	100	638.85	639.25	638.87	0.40	0.02
Max. Calc.	500	639.62	640.29	639.65	0.67	0.03

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
643.64	645.98	NA	NA	10	637.97	637.81	5.67	8.17	NA	NA
Low Road Station:		Low Beam Station:		50	638.85	638.54	4.79	7.44	NA	NA
Existing	Proposed	Existing	Proposed	100	639.25	638.87	4.39	7.11	NA	NA
1279+88	1279+00	NA	NA	500	640.29	639.65	3.35	6.33	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
		Existing @ 509	Proposed @ 537.79	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	Year										
	10	637.16	637.76	635.65	635.93	1.51	1.83	2- 10' (W) x 5' (H)	2- 10' (W) x 5' (H)	30.20	36.60
Design	50	637.64	638.51	635.65	635.93	1.99	2.58	2- 10' (W) x 5' (H)	2- 10' (W) x 5' (H)	39.80	51.60
Base	100	637.87	638.85	635.65	635.93	2.22	2.92	2- 10' (W) x 5' (H)	2- 10' (W) x 5' (H)	44.40	58.40
Max. Calc.	500	638.51	639.62	635.65	635.93	2.86	3.69	2- 10' (W) x 5' (H)	2- 10' (W) x 5' (H)	57.20	73.80

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

WSEL Summary Table - Created Head Calculations WC17

10-Year						
X-sect	Natural WSE	Exist WSE	Prop WSE	Exist - Nat	Prop - Nat	PR WSE - EX WSE
739	642.51	642.51	642.51	0.00	0.00	0.00
700	642.52	642.52	642.52	0.00	0.00	0.00
675	642.52	642.52	642.52	0.00	0.00	0.00
650	642.52	642.52	642.52	0.00	0.00	0.00
625	642.52	642.52	642.52	0.00	0.00	0.00
603.4	642.52	642.52	642.52	0.00	0.00	0.00
598.75	638.53	638.53	638.53	0.00	0.00	0.00
588.026*	638.25	638.25	638.25	0.00	0.00	0.00
577.303*	638.19	638.19	638.19	0.00	0.00	0.00
566.58	637.68	637.92	637.98	0.24	0.30	0.06
556.983*	637.72	637.95	638.02	0.23	0.30	0.07
547.386*	637.75	637.96	638.02	0.21	0.27	0.06
537.79*	637.76	637.97	637.81	0.21	0.05	-0.16
528.193	637.78	637.98		0.20		
518.596	637.78	637.99		0.21		
509	637.16	637.71		0.55		
385.75/culvert						

50-Year						
X-sect	Natural WSE	Exist WSE	Prop WSE	Exist - Nat	Prop - Nat	PR WSE - EX WSE
739	643.01	643.01	643.01	0.00	0.00	0.00
700	643.04	643.04	643.04	0.00	0.00	0.00
675	643.04	643.04	643.04	0.00	0.00	0.00
650	643.04	643.04	643.04	0.00	0.00	0.00
625	643.04	643.04	643.04	0.00	0.00	0.00
603.4	643.04	643.04	643.04	0.00	0.00	0.00
598.75	638.78	638.78	638.78	0.00	0.00	0.00
588.026*	638.77	638.77	638.77	0.00	0.00	0.00
577.303*	638.49	638.89	638.89	0.40	0.40	0.00
566.58	638.45	638.81	638.81	0.36	0.36	0.00
556.983*	638.48	638.83	638.84	0.35	0.36	0.01
547.386*	638.49	638.84	638.84	0.35	0.35	0.00
537.79*	638.51	638.85	638.54	0.34	0.03	-0.31
528.193	638.52	638.86		0.34		
518.596	638.53	638.86		0.33		
509	637.64	638.49		0.85		
385.75/culvert						

100-Year						
X-sect	Natural WSE	Exist WSE	Prop WSE	Exist - Nat	Prop - Nat	PR WSE - EX WSE
739	643.21	643.21	643.21	0.00	0.00	0.00
700	643.25	643.26	643.25	0.01	0.00	-0.01
675	643.25	643.26	643.25	0.01	0.00	-0.01
650	643.25	643.26	643.25	0.01	0.00	-0.01
625	643.25	643.25	643.25	0.00	0.00	0.00
603.4	643.25	643.25	643.25	0.00	0.00	0.00
598.75	638.97	638.97	638.97	0.00	0.00	0.00
588.026*	638.96	639.00	638.96	0.04	0.00	-0.04
577.303*	638.92	639.33	639.30	0.41	0.38	-0.03
566.58	638.79	639.22	639.19	0.43	0.40	-0.03
556.983*	638.82	639.23	639.22	0.41	0.40	-0.01
547.386*	638.83	639.24	639.22	0.41	0.39	-0.02
537.79*	638.85	639.25	638.87	0.40	0.02	-0.38
528.193	638.86	639.26		0.40		
518.596	638.86	639.26		0.40		
509	637.87	638.85		0.98		
385.75/culvert						

500-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
739	643.51	643.54	643.53	0.03	0.02	-0.01
700	643.59	643.62	643.61	0.03	0.02	-0.01
675	643.59	643.62	643.61	0.03	0.02	-0.01
650	643.59	643.62	643.61	0.03	0.02	-0.01
625	643.59	643.62	643.60	0.03	0.01	-0.02
603.4	643.58	643.61	643.60	0.03	0.02	-0.01
598.75	639.48	640.25	640.04	0.77	0.56	-0.21
588.026*	639.45	640.30	640.10	0.85	0.65	-0.20
577.303*	639.78	640.39	640.22	0.61	0.44	-0.17
566.58	639.58	640.27	640.09	0.69	0.51	-0.18
556.983*	639.60	640.28	640.10	0.68	0.50	-0.18
547.386*	639.61	640.29	640.1	0.68	0.49	-0.19
537.79*	639.62	640.29	639.65	0.67	0.03	-0.64
528.193	639.63	640.29		0.66		
518.596	639.64	640.30		0.66		
509	638.51	639.82		1.31		
385.75/culvert						



MAJOR CULVERT (WC # 18) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1306+54

S.N. Exist: RCBC 3-15' X 5'
 S.N. Prop: RCBC 3-15' X 5'
 Waterway: 63rd St. Ditch

Computed by: KS Date: 12/14/2017
 Checked by: SLH Date: 12/14/2017

Drainage Area = 5.38 sq. mi		Existing Overtopping Elevation: 644.91 ft. @ Sta. 1307+66		Proposed Overtopping Elevation: 643.57 ft. @ Sta. 1312+00					
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	272	40	40	637.4	0.6	0.6	638.0	638.0
Design	50	447	91	90	638.5	0.3	0.3	638.8	638.8
Base	100	547	132	131	639.4	0.1	0.1	639.5	639.5
OVT (E)	> 500 - Yr								
OVT (P)	> 500 - Yr								
Max. Calc.	500	893	212	212	641.2	0.2	0.2	641.4	641.4

10-Year Velocity through Existing Culvert = 5.79 fps
 10-Year Velocity through Proposed Culvert = 5.79 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: 641.5 (October 1954)

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: Concrete Box Culvert
 Cell Dimensions (W x H): Triple 15' (W) x 5' (H)
 # of span \ cells: 3
 Length: 233.5'
 U/S Flowline: 636.5
 D/S Flowline: 635.51
 Skew: no
 Low EOP: 644.91

EXISTING DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

PROPOSED CULVERT

Culvert Type: Concrete Box Culvert (extension)
 Cell Dimensions (W x H): Triple 15' (W) x 5' (H)
 # of span \ cells: 3
 Length: 291.92'
 U/S Flowline: 636.52
 D/S Flowline: 635.27
 Skew: no
 Low EOP: 643.57

PROPOSED DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS
Triple Box Culvert (15' x 5') under I-294 (@Station 1306+50)



Route: Tri-State Tollway (I-294)
Section:
County: Cook
Station: 1306+54

S.N. Exist: RCBC 3-15' X 5'
S.N. Prop: RCBC 3-15' X 5'
Waterway: 63rd St. Ditch

Computed by: KS
Checked by: SLH

Date: 12/14/2017
Date: 12/14/2017

Calculated Created Head

Flood	Freq.	Natural H.W.E. ⁽¹⁾ (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head Elev. (ft)	
					Existing	Proposed
	Year	U/S Face of structure Sta. 530	U/S Face of Structure	U/S Face of Structure		
	10	637.40	637.95	637.97	0.55	0.57
Design	50	638.52	638.78	638.80	0.26	0.28
Base	100	639.44	639.54	639.54	0.10	0.10
Max. Calc.	500	641.22	641.39	641.42	0.17	0.20

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft) ⁽³⁾		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
644.91	643.57	NA	NA	10	637.95	637.97	6.96	5.60	NA	NA
Low Road Station:		Low Beam Station:		50	638.78	638.80	6.13	4.77	NA	NA
Existing	Proposed	Existing	Proposed	100	639.54	639.54	5.37	4.03	NA	NA
1307+66	1312+00	NA	NA	500	641.39	641.42	3.52	2.15	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
		Existing @ 530	Proposed @ 530	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	637.40	637.40	636.50	636.52	0.90	0.88	3- 15' (W) x 5' (H)	3- 15' (W) x 5' (H)	40	40
Design	50	638.52	638.52	636.50	636.52	2.02	2.00	3- 15' (W) x 5' (H)	3- 15' (W) x 5' (H)	91	90
Base	100	639.44	639.44	636.50	636.52	2.94	2.92	3- 15' (W) x 5' (H)	3- 15' (W) x 5' (H)	132	131
Max. Calc.	500	641.22	641.22	636.50	636.52	4.72	4.70	3- 15' (W) x 5' (H)	3- 15' (W) x 5' (H)	212	212

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

WSEL Summary Table - Created Head Calculations WC18

10-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
776	639.37	639.37	639.37	0.00	0.00	0.00
726.75	639.00	639.00	639.00	0.00	0.00	0.00
677.5	638.61	638.61	638.61	0.00	0.00	0.00
628.25	638.22	638.27	638.28	0.05	0.06	0.01
579	637.93	638.12	638.13	0.19	0.20	0.01
569	637.66	638.08	638.10	0.42	0.44	0.02
540	637.47	638.07	638.1	0.60	0.63	0.03
530	637.40	637.95	637.97	0.55	0.57	0.02
412/culvert						

50-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
776	639.66	639.66	639.66	0.00	0.00	0.00
726.75	639.33	639.36	639.37	0.03	0.04	0.01
677.5	638.96	639.13	639.14	0.17	0.18	0.01
628.25	638.70	639.01	639.03	0.31	0.33	0.02
579	638.58	638.96	638.98	0.38	0.40	0.02
569	638.54	638.95	638.97	0.41	0.43	0.02
540	638.53	638.93	638.95	0.40	0.42	0.02
530	638.52	638.78	638.8	0.26	0.28	0.02
412/culvert						

100-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
776	639.84	639.92	639.93	0.08	0.09	0.01
726.75	639.69	639.84	639.84	0.15	0.15	0.00
677.5	639.58	639.77	639.77	0.19	0.19	0.00
628.25	639.52	639.73	639.73	0.21	0.21	0.00
579	639.49	639.71	639.71	0.22	0.22	0.00
569	639.48	639.70	639.70	0.22	0.22	0.00
540	639.45	639.67	639.67	0.22	0.22	0.00
530	639.44	639.54	639.54	0.10	0.10	0.00
412/culvert						

500-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
776	641.27	641.57	641.60	0.30	0.33	0.03
726.75	641.31	641.61	641.64	0.30	0.33	0.03
677.5	641.29	641.60	641.63	0.31	0.34	0.03
628.25	641.28	641.59	641.62	0.31	0.34	0.03
579	641.28	641.59	641.62	0.31	0.34	0.03
569	641.27	641.59	641.62	0.32	0.35	0.03
540	641.22	641.54	641.57	0.32	0.35	0.03
530	641.22	641.39	641.42	0.17	0.20	0.03
412/culvert						



MAJOR CULVERT (WC # 20) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1338+54

S.N. Exist: RCBC 7' X 5'
 S.N. Prop: RCBC 7' X 5'
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: MRK Date: 6/27/2017
 Checked by: KS Date: 6/27/2017

Drainage Area =		0.0235 sq. mi (150.43 acres)		Existing Overtopping Elevation:		648.20 ft. @ Sta. 1336+92			
				Proposed Overtopping Elevation:		649.1 ft. @ Sta. 1337+00			
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	55	3	3	640.2	1.6	1.6	641.8	641.8
Design	50	83	4	4	640.4	1.6	1.6	642.1	642.1
Base	100	100	5	5	640.5	1.9	1.9	642.4	642.4
OVT (E)	> 500 - Yr								
OVT (P)	> 500 - Yr								
Max. Calc.	500	175	23	23	643.1	0.9	0.9	643.9	643.9

10-Year Velocity through Existing Culvert = 6.31 fps
 10-Year Velocity through Proposed Culvert = 6.31 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: 643.3 (October 1954)

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: Concrete Box Culvert
 Cell Dimensions (W x H): 7' (W) x 5' (H)
 # of span \ cells: 1
 Length: 388'
 U/S Flowline: 639.83
 D/S Flowline: 637.50
 Skew: no
 Low EOP: 648.20

EXISTING DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

PROPOSED CULVERT

Culvert Type: Concrete Box Culvert
 Cell Dimensions (W x H): 7' (W) x 5' (H)
 # of span \ cells: 1
 Length: 388'
 U/S Flowline: 639.83
 D/S Flowline: 637.50
 Skew: no
 Low EOP: 649.1

PROPOSED DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

NOTES:

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

Box Culvert (7' x 5') under I-294 (@Station 1338+54)



Route: Tri-State Tollway (I-294)
 Section:
 County: Cook
 Station: 1338+54

S.N. Exist: RCBC 7' X 5'
 S.N. Prop: RCBC 7' X 5'
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: MRK
 Checked by: KS

Date: 6/27/2017
 Date: 6/27/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head Elev. (ft)	
		U/S Face of structure/Approach section Sta. 469	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	640.21	641.81	641.81	1.60	1.60
Design	50	640.40	642.05	642.05	1.65	1.65
Base	100	640.50	642.35	642.35	1.85	1.85
Max. Calc.	500	643.08	643.94	643.94	0.86	0.86

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
648.20	649.1	NA	NA	10	641.81	641.81	6.39	7.29	NA	NA
Low Road Station:		Low Beam Station:		50	642.05	642.05	6.15	7.05	NA	NA
Existing	Proposed	Existing	Proposed	100	642.35	642.35	5.85	6.75	NA	NA
1336+92	1337+00	NA	NA	500	643.94	643.94	4.26	5.16	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
		Existing @ 469	Proposed @ 469	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	640.21	640.21	639.83	639.83	0.38	0.38	7' (W) x 5' (H)	7' (W) x 5' (H)	2.66	2.66
Design	50	640.40	640.40	639.83	639.83	0.57	0.57	7' (W) x 5' (H)	7' (W) x 5' (H)	3.99	3.99
Base	100	640.50	640.50	639.83	639.83	0.67	0.67	7' (W) x 5' (H)	7' (W) x 5' (H)	4.69	4.69
Max. Calc.	500	643.08	643.08	639.83	639.83	3.25	3.25	7' (W) x 5' (H)	7' (W) x 5' (H)	22.75	22.75

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 21) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1386+54

S.N. Exist: RCBC 8' X 8'
 S.N. Prop: RCBC 8' X 8'
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: MRK Date: 6/27/2017
 Checked by: KS Date: 6/27/2017

Drainage Area = 0.72 sq. mi		Existing Overtopping Elevation: 646.93 ft. @ Sta. 1388+00							
		Proposed Overtopping Elevation: 646.97 ft. @ Sta. 1385+50							
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	157	44	44	639.7	0.0	0.0	639.4	639.4
Design	50	238	61	61	641.8	0.0	0.0	641.8	641.7
Base	100	284	64	64	642.8	0.4	0.4	643.2	643.2
OVT (E)	> 500 - Yr								
OVT (P)	> 500 - Yr								
Max. Calc.	500	486	64	64	644.9	1.2	1.2	646.1	646.1

10-Year Velocity through Existing Culvert = 3.8 fps
 10-Year Velocity through Proposed Culvert = 3.8 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: 644.1 (October 1954)

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: Concrete Box Culvert
 Cell Dimensions (W x H): 8' (W) x 8' (H)
 # of span \ cells: 1
 Length: 287'
 U/S Flowline: 634.14
 D/S Flowline: 633.18
 Skew: no
 Low EOP: 646.93

EXISTING DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

PROPOSED CULVERT

Culvert Type: Concrete Box Culvert (extension)
 Cell Dimensions (W x H): 8' (W) x 8' (H)
 # of span \ cells: 1
 Length: 313'
 U/S Flowline: 634.20
 D/S Flowline: 633.18
 Skew: no
 Low EOP: 646.97

PROPOSED DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

Box Culvert (8' x 8') under I-294 (@Station 1386+54)



Route: Tri-State Tollway (I-294)
 Section:
 County: Cook
 Station: 1386+54

S.N. Exist: RCBC 8' X 8'
 S.N. Prop: RCBC 8' X 8'
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: MRK
 Checked by: KS

Date: 6/27/2017
 Date: 6/27/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)		Proposed Headwater Elev. (ft)		Created Head Elev. (ft)	
			U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	639.65	639.44	639.39	639.39	639.39	0.00	0.00
Design	50	641.78	641.77	641.67	641.67	641.67	0.00	0.00
Base	100	642.82	643.24	643.18	643.18	643.18	0.42	0.36
Max. Calc.	500	644.91	646.07	646.11	646.11	646.11	1.16	1.20

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Year	Existing	Proposed	Existing	Proposed	Existing
646.93	646.97	NA	NA	10	639.44	639.39	7.49	7.58	NA	NA
Low Road Station:		Low Beam Station:		50	641.77	641.67	5.16	5.30	NA	NA
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
1388+00	1385+50	NA	NA	500	646.07	646.11	0.86	0.86	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
		Existing @ 802	Proposed @ 829	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	Year	Existing @ 802	Proposed @ 829	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	639.65	639.65	634.14	634.2	5.51	5.45	8' (W) x 8' (H)	8' (W) x 8' (H)	44.08	43.60
Design	50	641.78	641.78	634.14	634.2	7.64	7.58	8' (W) x 8' (H)	8' (W) x 8' (H)	61.12	60.64
Base	100	642.82	642.82	634.14	634.2	8.68	8.62	8' (W) x 8' (H)	8' (W) x 8' (H)	64.00	64.00
Max. Calc.	500	644.91	644.91	634.14	634.2	10.77	10.71	8' (W) x 8' (H)	8' (W) x 8' (H)	64.00	64.00

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (CREEK DRIVE CULVERT) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1386+54, 425' RT

S.N. Exist: CMP_ARCH 7.33' X 11.6'
 S.N. Prop: RCBC 12' X 6'
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: SB Date: 6/27/2017
 Checked by: KS Date: 6/27/2017

Drainage Area = 0.72 sq. mi		Existing Overtopping Elevation: 641.78 ft. @ Sta.		Proposed Overtopping Elevation: 641.78 ft. @ Sta.				
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed	Existing	Proposed	Existing	Proposed
Ten-Year	10	157	50	50	0.2	0.1	639.3	639.2
Design	50	238	66	70	0.4	0.3	641.7	641.5
Base	100	284	66	72	0.3	0.3	642.7	642.6
OVT (E)	> 500 - Yr							
OVT (P)	> 500 - Yr							
Max. Calc.	500	486	66	72	0.1	0.1	644.4	644.4

10-Year Velocity through Existing Culvert = 2.6 fps
 10-Year Velocity through Proposed Culvert = 2.2 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: 644.1 (October 1954)

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: CMP Arch Culvert
 Cell Dimensions (W x H): 11.6' (W) x 7.33' (H)
 # of span \ cells: 1
 Length: 50'
 U/S Flowline: 632.87
 D/S Flowline: 632.86
 Skew: no
 Low EOP: 641.78

EXISTING DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

PROPOSED CULVERT

Culvert Type: Concrete Box Culvert
 Cell Dimensions (W x H): 12' (W) x 6' (H)
 # of span \ cells: 1
 Length: 50'
 U/S Flowline: 632.87
 D/S Flowline: 632.86
 Skew: no
 Low EOP: 641.78

PROPOSED DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS (WC @ Creek Drive)
Box Culvert (12' x 6') under Creek Drive (@Station 1386+54 RT, 425' RT)



Route: Creek Drive
 Section:
 County: Cook
 Station: 1386+54, 425' RT

S.N. Exist: CMP_ARCH 7.33' X 11.6'
 S.N. Prop: RCBC 12' X 6'
 Waterway: Unnamed ditch tributary to Flagg Creek

Computed by: SB Date: 6/27/2017
 Checked by: KS Date: 6/27/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)		Created Head Elev. (ft)		
		Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Existing	Proposed	
	Year	U/S Face of structure/Approach section Sta. 302	U/S Face of Structure	U/S Face of Structure		
	10	639.15	639.31	639.24	0.16	0.09
Design	50	641.29	641.65	641.54	0.36	0.25
Base	100	642.37	642.70	642.63	0.33	0.26
Max. Calc.	500	644.37	644.44	644.44	0.07	0.07

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq. Year	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
641.78	641.78	NA	NA	10	639.31	639.24	2.47	2.54	NA	NA
Low Road Station:		Low Beam Station:		50	641.65	641.54	0.13	0.24	NA	NA
Existing	Proposed	Existing	Proposed	100	642.70	642.63	-0.92	-0.85	NA	NA
-	-	NA	NA	500	644.44	644.44	-2.66	-2.66	NA	NA

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Culvert Size (ft x ft)		Opening Area (ft ²)	
		Existing @ 302	Proposed @ 302	Existing	Proposed	Existing	Proposed	Existing (Arch)	Proposed (Box)	Existing	Proposed
	10	639.15	639.18	632.87	632.87	6.28	6.31	11.6' (W) x 7.33' (H)	12' (W) x 6' (H)	50.24	50.48
Design	50	641.29	641.58	632.87	632.87	8.42	8.71	11.6' (W) x 7.33' (H)	12' (W) x 6' (H)	66.20	69.68
Base	100	642.37	642.62	632.87	632.87	9.50	9.75	11.6' (W) x 7.33' (H)	12' (W) x 6' (H)	66.20	72.00
Max. Calc.	500	644.37	644.41	632.87	632.87	11.50	11.54	11.6' (W) x 7.33' (H)	12' (W) x 6' (H)	66.20	72.00

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

WSEL Summary Table - Created Head Calculations- Creek Drive Culvert

10-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
497	639.24	639.30	639.24	0.06	0.00	-0.06
412	639.27	639.34	639.28	0.07	0.01	-0.06
357	639.23	639.31	639.24	0.08	0.01	-0.07
302	639.15	639.23	639.16	0.08	0.01	-0.07
261/culvert						
50-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
497	641.33	641.59	641.48	0.26	0.15	-0.11
412	641.42	641.67	641.56	0.25	0.14	-0.11
357	641.39	641.65	641.54	0.26	0.15	-0.11
302	641.29	641.55	641.44	0.26	0.15	-0.11
261/culvert						
100-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
497	642.29	642.62	642.54	0.33	0.25	-0.08
412	642.40	642.72	642.64	0.32	0.24	-0.08
357	642.38	642.70	642.62	0.32	0.24	-0.08
302	642.37	642.70	642.62	0.33	0.25	-0.08
261/culvert						
500-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
497	644.17	644.22	644.22	0.05	0.05	0.00
412	644.40	644.45	644.45	0.05	0.05	0.00
357	644.38	644.44	644.43	0.06	0.05	-0.01
302	644.37	644.42	644.42	0.05	0.05	0.00
261/culvert						



BRIDGE (WC # 22) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
Section:
County: Cook
Station: 1405+00

S.N. Exist: BN 259 & BN 260
S.N. Prop: BN 259 & BN 260
Waterway: Flagg Creek

Computed by: KS
Checked by: SH

Date: 12/20/2017
Date: 12/20/2017

Drainage Area =		3.536 sq. mi	Existing Overtopping Elevation:		646.48	@ Sta.	1407+50		
			Proposed Overtopping Elevation:		645.94	@ Sta.	1401+00		
Flood Event	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
	10	302.0	281.28	279.51	639.06	0.03	0.00	639.09	639.06
Design	50	520.0	454.09	445.71	641.51	0.02	0.03	641.53	641.54
Base	100	640.0	550.09	519.20	642.59	0.09	0.02	642.68	642.61
Scour Design Check									
Overtop Existing	> 500 - Yr								
Overtop Proposed	> 500 - Yr								
Max. Calc.	500	945.0	745.86	649.47	644.50	0.01	0.03	644.51	644.53

10-Year Velocity through Existing Bridge = 1.15 fps
10-Year Velocity through Proposed Bridge = 1.08 fps

DATUM: NAVD 88
ALL-TIME H.W.E. & DATE: 645.51 (October 1954)

SCOPE OF WORK:

EXISTING STRUCTURE

TYPE: 3-span 36" PCC girder bridge
LENGTH: 121' (face to face abutments along the girder)
SPANS: 3
LOW BEAM: 642.50
SKEW: 45°
LOW EOP: 646.48

PROPOSED STRUCTURE

TYPE: - Single-span 27" PCC girder bridge
LENGTH: - 70' (face to face abutments along the girder)
SPANS: - 1
LOW BEAM: - 643.79
SKEW: - 45°
LOW EOP: - 645.94

NOTES:

- Existing bridge does meet Tollway's freeboard criteria but not the clearance criteria.
- Proposed bridge does meet Tollway's freeboard and clearance criteria.
- Proposed Structure (Alternative 8R) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

I-294 Bridge over the Flagg Creek (@Station 1405+00)



Route: Tri-State Tollway (I-294)
 Section:
 County: Cook
 Station: 1405+00

S.N. Exist: BN 259 (IDOT SN 016-9813) & BN 260 (IDOT SN 016-9812)
 S.N. Prop: BN 259 (IDOT SN 016-9813) & BN 260 (IDOT SN 016-9812)
 Waterway: Flagg Creek

Computed by: KS
 Checked by: SH

Date: 12/20/2017
 Date: 12/20/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)		Existing Headwater Elev. (ft)		Proposed Headwater Elev. (ft)		Created Head (ft) @ Approach Section	
		U/S Face of Structure @ 38526	Approach section U/S @ 38642.07	U/S Face of Structure @ 38526	Approach section U/S @ 38642.07	U/S Face of Structure @ 38526	Approach section U/S @ 38642.07	Existing	Proposed
	10	639.06	639.02	639.09	639.05	639.06	639.02	0.03	0.00
Design	50	641.51	641.49	641.53	641.51	641.54	641.52	0.02	0.03
Base	100	642.59	642.57	642.68	642.66	642.61	642.59	0.09	0.02
Max. Calc.	500	644.50	644.47	644.51	644.48	644.53	644.50	0.01	0.03

(1) The natural highwater elevation is the water surface elevation at the upstream end of the crossing, as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the approach section, and not at the U/S face of the bridge/culvert. The difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head.

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq. Year	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
646.48	645.94	642.50	643.68	10	639.09	639.06	7.39	6.88	3.44	4.62
Low Road Station:		Low Beam Station:		50	641.53	641.54	4.95	4.40	0.99	2.17
Existing	Proposed	Existing	Proposed	100	642.68	642.61	3.80	3.33	-0.09	1.09
1407+50	1401+00	1405+00	1405+00	500	644.51	644.53	1.97	1.41	-2.00	-0.82

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) @ U/S Face of Structure		Stream Bottom Elev.		Depth of Water		Opening Area (ft ²)	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	639.06	639.06	632.00	632.00	7.06	7.06	281.28	279.51
Design	50	641.51	641.51	632.00	632.00	9.51	9.51	454.09	445.71
Base	100	642.59	642.59	632.00	632.00	10.59	10.59	550.09	519.20
Max. Calc.	500	644.50	644.50	632.00	632.00	12.50	12.50	745.86	649.47

Bottom width (ft) 45
 Full flow (sq ft) 745 (Existing Bridge Open Area)
 Full flow (sq ft) 649 (Proposed Bridge Open Area)

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

WSEL Summary Table - Created Head Calculations WC22

10-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
38785.00	639.20	639.22	639.16	0.02	-0.04	-0.06
38726.00	639.19	639.21	639.18	0.02	-0.01	-0.03
38689.80	639.18	639.20	639.18	0.02	0.00	-0.02
38642.07	639.02	639.05	639.02	0.03	0.00	-0.03
38526.00	639.06	639.08	639.05	0.02	-0.01	-0.03
38355/Bridge						

3

50-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
38785.00	641.62	641.64	641.55	0.02	-0.07	-0.09
38726.00	641.61	641.63	641.59	0.02	-0.02	-0.04
38689.80	641.60	641.62	641.59	0.02	-0.01	-0.03
38642.07	641.49	641.51	641.52	0.02	0.03	0.01
38526.00	641.51	641.54	641.52	0.03	0.01	-0.02
38355/Bridge						

3

100-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
38785.00	642.69	642.77	642.60	0.08	-0.09	-0.17
38726.00	642.68	642.76	642.65	0.08	-0.03	-0.11
38689.80	642.67	642.76	642.65	0.09	-0.02	-0.11
38642.07	642.57	642.66	642.59	0.09	0.02	-0.07
38526.00	642.59	642.68	642.59	0.09	0.00	-0.09
38355/Bridge						

3

500-Year						
	Natural	Exist	Prop (No Pier, Single Span)	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
38785.00	644.59	644.61	644.45	0.02	-0.14	-0.16
38726.00	644.58	644.60	644.54	0.02	-0.04	-0.06
38689.80	644.57	644.59	644.54	0.02	-0.03	-0.05
38642.07	644.47	644.48	644.50	0.01	0.03	0.02
38526.00	644.50	644.51	644.49	0.01	-0.01	-0.02
38355/Bridge						

3



MAJOR CULVERT (WC # 23) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: _____
 County: Cook
 Station: 1410+80

S.N. Exist: RCBC 6' W X 5' H
 S.N. Prop: RCBC 14' W X 6' H (with 1' of Embedment)
 Waterway: Western Spring Ditch (Tributary to Flagg Creek)

Computed by: KS Date: 12/14/2017
 Checked by: SH Date: 12/14/2017

Drainage Area =		0.251 sq. mi (160.6 acres)		Existing Overtopping Elevation:		646.62 ft. @ Sta. 1410+85			
				Proposed Overtopping Elevation:		645.59 ft. @ Sta. 1409+94			
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	145	15	51	640.4	0.2	0.0	640.5	639.9
Design	50	265	28	70	642.5	0.3	0.0	642.8	642.2
Base	100	317	30	70	643.6	0.9	0.0	644.5	643.4
OVT (E)	> 500 - Yr								
OVT (P)	< 500 - Yr								
Max. Calc.	500	540	30	70	646.1	1.0	0.0	647.1	645.4

10-Year Velocity through Existing Culvert = 6.4 fps
 10-Year Velocity through Proposed Culvert = 2.1 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: TBD

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: Reinforced Concrete Box Culvert
 Cell Dimensions (W x H): 6' (W) x 5' (H)
 # of span \ cells: 1
 Length: 165'
 U/S Flowline: 637.22
 D/S Flowline: 636.63
 Skew: no
 Low EOP: 646.62

EXISTING DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

PROPOSED CULVERT

Culvert Type: Reinforced Concrete Box Culvert
 Cell Dimensions (W x H): 14' (W) x 6' (H) with 1.0' of Embedment
 # of span \ cells: 1
 Length: 225'
 U/S Flowline: 636.72 (Invert = 635.72)
 D/S Flowline: 635.96 (Invert = 634.96)
 Skew: no
 Low EOP: 645.59

PROPOSED DROPBOX

Dimensions: n/a
 Drop: n/a
 Weir Elevation: n/a

NOTES: Proposed Structure (Alt 8R) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS (WC # 23)

Box Culvert (6' x 5') under I-294 (@Station 1410+80)



Route: Tri-State Tollway (I-294) S.N. Exist: RCBC 6' W X 5' H
 Section: S.N. Prop: RCBC 14' W X 6' H (with 1' of Embedment)
 County: Cook Waterway: Western Spring Ditch (Tributary to Flagg Creek)
 Station: 1410+80

Computed by: KS Date: 12/14/2017
 Checked by: SH Date: 12/14/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head Elev. (ft)	
					Existing	Proposed
	Year	U/S Face of structure/Approach section Sta. 5000	U/S Face of Structure	U/S Face of Structure		
	10	640.35	640.51	639.87	0.16	0.00
Design	50	642.49	642.83	642.19	0.34	0.00
Base	100	643.59	644.46	643.42	0.87	0.00
Max. Calc.	500	646.09	647.07	645.36	0.98	0.00

- (1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.
- (2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
646.62	645.59	NA	NA	10	640.51	639.87	6.11	5.72	NA	NA
Low Road Station:		Low Beam Station:		50	642.83	642.19	3.79	3.40	NA	NA
Existing	Proposed	Existing	Proposed	100	644.46	643.42	2.16	2.17	NA	NA
1410+85	1409+94	NA	NA	500	647.07	645.36	-0.45	0.23	NA	NA

- (3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.
- (4) Freeboard is calculated from the 50-year design headwater elevation to the proposed low road elevation in the floodplain.
- (5) Vertical clearance is calculated from the 50-year natural high-water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
		Existing @ 4969	Proposed @ 5000	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	Year										
	10	639.72	640.35	637.22	636.72	2.50	3.63	6' (W) x 5' (H)	14' (W) x 6' (H)	15.00	50.82
Design	50	641.85	642.49	637.22	636.72	4.63	5.77	6' (W) x 5' (H)	14' (W) x 6' (H)	27.78	70.00
Base	100	642.99	643.59	637.22	636.72	5.77	6.87	6' (W) x 5' (H)	14' (W) x 6' (H)	30.00	70.00
Max. Calc.	500	646.12	646.09	637.22	636.72	8.90	9.37	6' (W) x 5' (H)	14' (W) x 6' (H)	30.00	70.00

- (6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

WSEL Summary Table - Created Head Calculations WC23

10-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
5039	640.72	640.72	640.72	0.00	0.00	0.00
5000	640.35	640.51	639.87	0.16	-0.48	-0.64
4959/culvert						
50-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
5039	642.47	642.81	642.12	0.34	-0.35	-0.69
5000	642.49	642.83	642.19	0.34	-0.30	-0.64
4959/culvert						
100-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
5039	643.59	644.46	643.42	0.87	-0.17	-1.04
5000	643.59	644.46	643.42	0.87	-0.17	-1.04
4959/culvert						
500-Year						
	Natural	Exist	Prop	Exist - Nat	Prop - Nat	PR WSE - EX WSE
X-sect	WSE	WSE	WSE			
5039	646.09	647.06	645.44	0.97	-0.65	-1.62
5000	646.09	647.07	645.36	0.98	-0.73	-1.71
4959/culvert						



BRIDGE (WC # 25) WATERWAY INFORMATION TABLE

From 2IM Group

Route: Tri-State Tollway (I-294)
Section: 4223
County: Dupage
Station: 1492+50

S.N. Exist: BN 267 & BN 268
S.N. Prop: TBD
Waterway: Salt Creek

Computed by: Date: 11/17/2017
Checked by: Date: 11/17/2014

Drainage Area =		114 sq. mi	Existing Overtopping Elevation:		645.36	ft @ Sta.	1471+00		
			Proposed Overtopping Elevation:		647.84	ft @ Sta.	1476+50.51		
Flood Event	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
	10	2903	634.40	755.40	640.17	0.22	0.09	640.39	640.26
Design	50	4193	777.00	901.50	641.32	0.46	0.40	641.78	641.72
Base	100	4782	804.50	929.40	641.54	0.60	0.55	642.14	642.09
Scour Design Check	200								
Overtop Existing	> 500 - Yr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Overtop Proposed	> 500 - Yr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Max. Calc.	500	6230	915.90	1038.60	642.40	0.91	0.88	643.31	643.28

10-Year Velocity through Existing Bridge = 3.00 fps
10-Year Velocity through Proposed Bridge = 3.00 fps

DATUM:
ALL-TIME H.W.E. & DATE:

SCOPE OF WORK:

EXISTING STRUCTURE
TYPE: 3-Span PCC Girder Bridge
LENGTH: 155'
SPANS: 3
LOW BEAM: 645.56
SKEW: 0 (relative to road)
LOW EOP: 645.15

PROPOSED STRUCTURE
TYPE: Single Span
LENGTH: 130'
SPANS: 1
LOW BEAM: 645.20
SKEW: 0 (relative to road)
LOW EOP: 647.84

NOTES: Proposed structure are preliminary; subject to refinement in TSL stage.
Model From 2IM Group



MAJOR CULVERT (WC # 24) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1464+55

S.N. Exist: RCP 60"
 S.N. Prop: RCP 60"
 Waterway: Tributary Ditch to Salt Creek

Computed by: EL Date: 12/21/2017
 Checked by: JC Date: 12/21/2017

Drainage Area =		0.490 sq. mi		Existing Overtopping Elevation:		644.40 ft. @ Sta. 1476+72			
				Proposed Overtopping Elevation:		644.42 ft. @ Sta. 1479+00			
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.*	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	100.0	19.63	19.63	644.98	0.00	0.00	644.98	644.98
Design	50	139.0	19.63	19.63	644.98	0.33	0.33	645.31	645.31
Base	100	155.0	19.63	19.63	644.98	0.82	0.82	645.80	645.80
OVT (E)	10	100.0	19.63	19.63	644.98	0.00	-	644.98	-
OVT (P)	> 500 - Yr	-	-	-	-	-	-	-	-
Max. Calc.	500	190.0	19.63	19.63	644.98	1.33	2.10	646.31	647.08

10-Year Velocity through Existing Culvert = 5.12 fps
 10-Year Velocity through Proposed Culvert = 5.12 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

*Natural HWE = $643.26 + 0.006 * 287 = 644.98$ (where 643.26=10YR WSE in Salt Creek)

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: 60" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 287
 U/S Flowline: 635.77
 D/S Flowline: 634.06
 Skew: 30 degrees
 Low EOP: 644.40 @ 1476+72 (NB Side)

EXISTING DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

PROPOSED CULVERT

Culvert Type: 60" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 287
 U/S Flowline: 635.77
 D/S Flowline: 634.06
 Skew: 30 degrees
 Low EOP: 647.71 @ 1458+86 (SB Side)

PROPOSED DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS
Circular Culvert (60") under I-294 (@Station 1464+55)



Route: Tri-State Tollway (I-294)
Section: 4223
County: Cook
Station: 1464+55

S.N. Exist: RCP 60"
S.N. Prop: RCP 60"
Waterway: Tributary Ditch to Salt Creek

Computed by: EL
Checked by: JC

Date: 12/21/2017
Date: 12/21/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head (ft) @ Approach Section	
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	644.98	644.98	644.98	0.00	0.00
Design	50	644.98	645.31	645.31	0.33	0.33
Base	100	644.98	645.80	645.80	0.82	0.82
Max. Calc.	500	644.98	646.31	647.08	1.33	2.10

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
644.40	647.71			10	644.98	644.98	-0.58	2.73		
Low Road Station:		Low Beam Station:		50	645.31	645.31	-0.91	2.40		
Existing	Proposed	Existing	Proposed	100	645.80	645.80	-1.40	1.91		
1476+72	1458+86			500	646.31	647.08	-1.91	0.63		

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50 year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50 year natural high water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	644.98	644.98	635.77	635.77	9.21	9.21			19.63	19.63
Design	50	644.98	644.98	635.77	635.77	9.21	9.21			19.63	19.63
Base	100	644.98	644.98	635.77	635.77	9.21	9.21			19.63	19.63
Max. Calc.	500	644.98	644.98	635.77	635.77	9.21	9.21			19.63	19.63

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 26) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1532+05

S.N. Exist: CMP 54"/BCCMP 44" Liner
 S.N. Prop: RCP 54"
 Waterway: Box Culvert that drains to Outlet 28A-2

Computed by: EL Date: 7/15/2017
 Checked by: JC Date: 7/18/2017

Drainage Area =		0.0773 sq. mi	Existing Overtopping Elevation:			671.44	ft. @ Sta.	1526+00	
		49.46 ac	Proposed Overtopping Elevation:			670.49	ft. @ Sta.	1526+00	
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	17.9	2.17	2.45	662.85	0.81	0.68	663.66	663.53
Design	50	41.3	3.96	4.51	663.37	1.40	1.15	664.77	664.52
Base	100	56.4	4.94	5.68	663.64	1.80	1.44	665.44	665.08
OVT (E)	> 500 - Yr	-	-	-	-	-	-	-	-
OVT (P)	> 500 - Yr	-	-	-	-	-	-	-	-
Max. Calc.	500	65.5	5.53	6.38	663.80	2.06	1.59	665.86	665.39

10-Year Velocity through Existing Culvert = 6.03 fps
 10-Year Velocity through Proposed Culvert = 5.92 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

*Shorter length in proposed conditions as it will tie-in to proposed box culvert on NB side.

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: CMP 54"/ 44" BCCMP Liner
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 250
 U/S Flowline: 661.90
 D/S Flowline: 660.06
 Skew: 0
 Low EOP: 671.44 @ 1526+00 (NB Side)

EXISTING DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

PROPOSED CULVERT

Culvert Type: 54" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 225*
 U/S Flowline: 661.90
 D/S Flowline: 660.24
 Skew: 0
 Low EOP: 670.49 @ 1526+00 (NB Side)

PROPOSED DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS
Circular Culvert (44") under I-294 (@Station 1532+05)



Route: Tri-State Tollway (I-294)
Section: 4223
County: Cook
Station: 1532+05

S.N. Exist: CMP 54"/ BCCMP 44" Liner
S.N. Prop: RCP 54"
Waterway: Box Culvert that drains to Outlet 28A-2

Computed by: EL
Checked by:

Date: 7/15/2017
Date:

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head (ft) @ Approach Section	
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	662.85	663.66	663.53	0.81	0.68
Design	50	663.37	664.77	664.52	1.40	1.15
Base	100	663.64	665.44	665.08	1.80	1.44
Max. Calc.	500	663.80	665.86	665.39	2.06	1.59

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
671.44	670.49			10	663.66	663.53	7.78	6.96		
Low Road Station:		Low Beam Station:		50	664.77	664.52	6.67	5.97		
Existing	Proposed	Existing	Proposed	100	665.44	665.08	6.00	5.41		
1526+00	1526+00			500	665.86	665.39	5.58	5.10		

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50 year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50 year natural high water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	662.85	662.85	661.90	661.90	0.95	0.95			2.17	2.45
Design	50	663.37	663.37	661.90	661.90	1.47	1.47			3.96	4.51
Base	100	663.64	663.64	661.90	661.90	1.74	1.74			4.94	5.68
Max. Calc.	500	663.80	663.80	661.90	661.90	1.90	1.90			5.53	6.38

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 27) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1553+70

S.N. Exist: RCP 42"
 S.N. Prop: RCP 42"
 Waterway: Box Culvert that Drains to 28A-2

Computed by: EL Date: 7/19/2017
 Checked by: JC Date: 7/20/2017

Drainage Area =		0.0307 sq. mi	Existing Overtopping Elevation:		668.50	ft. @ Sta.	1557+00		
		19.64 ac	Proposed Overtopping Elevation:		668.50	ft. @ Sta.	1557+00		
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.*	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	1.11	0.20	0.20	660.69	3.52	0.12	664.21	660.81
Design	50	13.84	0.92	0.92	661.03	5.89	1.39	666.92	662.42
Base	100	23.26	3.59	3.59	661.90	5.39	1.13	667.29	663.03
OVT (E)	> 500 - Yr	-	-	-	-	-	-	-	-
OVT (P)	> 500 - Yr	-	-	-	-	-	-	-	-
Max. Calc.	500	32.11	9.62	9.62	664.46	3.16	0.14	667.62	664.60

10-Year Velocity through Existing Culvert = 0.12 fps
 10-Year Velocity through Proposed Culvert = 1.70 fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

*For WC #27, natural headwater taken as WSE at node 159+02.42infromWestPond from SWMM model projected up slope of WC # 27 pipe (proposed model from Cermak Interchange Flood Impact Reduction project - tailwater condition relieved with proposed model). The existing condition tailwater was taken from Node 7R in the existing conditions SWMM model. The 9'x4' and 10'x4' culverts from the Cermak Interchange Flood Impact Reduction project are shown on the Proposed Drainage Plan and are to be constructed with this project and lowers the created head at WC # 27. Existing pipes to remain are to be televised to determine condition during Phase 2.

SCOPE OF WORK:

EXISTING CULVERT
 Bridge or Culvert Type: 42" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 214
 U/S Flowline: 660.50
 D/S Flowline: 660.07
 Skew: 0
 Low EOP: 668.50 @ 1557+00 SB Side

EXISTING DROPBOX
 Dimensions: _____
 Drop: _____
 Weir Elevation: _____

PROPOSED CULVERT
 Culvert Type: 42" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 1
 Length: 217 (extend to prop box culvert)
 U/S Flowline: 660.50
 D/S Flowline: 660.06
 Skew: 0
 Low EOP: 668.50 @ 1557+00 SB Side

PROPOSED DROPBOX
 Dimensions: _____
 Drop: _____
 Weir Elevation: _____

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS
Circular Culvert (42") under I-294 (@Station 1553+70)



Route: Tri-State Tollway (I-294)
Section: 4223
County: Cook
Station: 1553+70

S.N. Exist: RCP 42"
S.N. Prop: RCP 42"
Waterway: Box Culvert that Drains to 28A-2

Computed by: EL
Checked by: JC

Date: 7/19/2017
Date: 7/20/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head (ft) @ Approach Section	
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	660.69	664.21	660.81	3.52	0.12
Design	50	661.03	666.92	662.42	5.89	1.39
Base	100	661.90	667.29	663.03	5.39	1.13
Max. Calc.	500	664.46	667.62	664.60	3.16	0.14

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
668.50	668.5			10	664.21	660.81	4.29	7.69		
Low Road Station:		Low Beam Station:		50	666.92	662.42	1.58	6.08		
Existing	Proposed	Existing	Proposed	100	667.29	663.03	1.21	5.47		
1557+00	1557+00			500	667.62	664.60	0.88	3.90		

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50 year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50 year natural high water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	660.69	660.69	660.50	660.50	0.19	0.19			0.20	0.20
Design	50	661.03	661.03	660.50	660.50	0.53	0.53			0.92	0.92
Base	100	661.90	661.90	660.50	660.50	1.40	1.40			3.59	3.59
Max. Calc.	500	664.46	664.46	660.50	660.50	3.96	3.96			9.62	9.62

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 28) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1563+63

S.N. Exist: 2-RCP 60"
 S.N. Prop: _____
 Waterway: NB I-294 Ditch

Computed by: EL Date: 7/16/2017
 Checked by: JC Date: 7/18/2017

Drainage Area =		0.1224 sq. mi	Existing Overtopping Elevation:		671.35	ft. @ Sta.	1562+84		
		78.36 ac	Proposed Overtopping Elevation:			ft. @ Sta.			
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.*	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year Design Base	10	83.3	23.47	-	666.39	0.03	-	666.42	-
	50	134.4	35.89	-	667.31	0.52	-	667.83	-
	100	174.9	39.27	-	667.90	1.27	-	669.17	-
OVT (E)	< 500 - Yr	-	-	-	-	-	-	-	-
OVT (P)	> 500 - Yr	-	-	-	-	-	-	-	-
Max. Calc.	500	218.4	39.27	-	668.37	2.22	-	670.59	-

10-Year Velocity through Existing Culvert = 3.51 fps
 10-Year Velocity through Proposed Culvert = fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

*For WC #28 and #29, natural headwater taken as WSE at node J11 from SWMM model projected up slope of WC # 29 pipe. WC#28 natural headwater calculated by continuing natural headwater from WC#29 up slope of WC#28 pipe. The existing condition assumes that the 9' x 4' box culvert from the Cermak Interchange Flood Impact Reduction project downstream is in place. The 9'x4' and 10'x4' culverts from the Cermak Interchange Flood Impact Reduction project are shown on the Proposed Drainage Plan and are to be constructed with this project. Existing pipes to remain are to be televised to determine condition during Phase 2.

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: 2-60" RCP
 Cell Dimensions (W x H): _____
 # of span \ cells: 2
 Length: 268
 U/S Flowline: 663.54, 663.53
 D/S Flowline: 663.05, 662.88
 Skew: 0
 Low EOP: 671.35 @ 1562+84

EXISTING DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

PROPOSED CULVERT

Culvert Type: _____
 Cell Dimensions (W x H): _____
 # of span \ cells: _____
 Length: _____
 U/S Flowline: _____
 D/S Flowline: _____
 Skew: _____
 Low EOP: _____

PROPOSED DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS
Circular Culvert (2 - 60") under I-294 (@Station 1563+63)



Route: Tri-State Tollway (I-294)
Section: 4223
County: Cook
Station: 1563+63

S.N. Exist: RCP 2-60"
S.N. Prop: RCP 2-60"
Waterway: NB I-294 Ditch

Computed by: EL
Checked by: JC

Date: 7/17/2017
Date: 7/18/2017

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head (ft) @ Approach Section	
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	666.39	666.42		0.03	
Design	50	667.31	667.83		0.52	
Base	100	667.90	669.17		1.27	
Max. Calc.	500	668.37	670.59		2.22	

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
671.35				10	666.42		4.93			
Low Road Station:		Low Beam Station:		50	667.83		3.52			
Existing	Proposed	Existing	Proposed	100	669.17		2.18			
1562+84				500	670.59		0.76			

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50 year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50 year natural high water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	666.39		663.53		2.86				23.47	
Design	50	667.31		663.53		3.78				35.89	
Base	100	667.90		663.53		4.37				39.27	
Max. Calc.	500	668.37		663.53		4.84				39.27	

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.



MAJOR CULVERT (WC # 29) WATERWAY INFORMATION TABLE



Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1562+30

S.N. Exist: 60" Lined 24", 60" Lined 38", & 48" RCP
 S.N. Prop: _____
 Waterway: NB-I294 Ditch

Computed by: EL Date: 7/17/2017
 Checked by: JC Date: 7/18/2017

Drainage Area =		0.1668 sq. mi	Existing Overtopping Elevation:		671.60	ft. @ Sta.		1559+29	
		106.75 ac	Proposed Overtopping Elevation:			ft. @ Sta.			
Flood	Frequency Year	Discharge (cfs)	Waterway Opening (sq. ft)		Natural H.W.E.*	Head (ft)		Headwater Elev. (ft)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Ten-Year	10	116.6	22.86	-	666.05	0.21	-	666.26	-
Design	50	175.2	23.58	-	666.97	0.58	-	667.55	-
Base	100	212.0	23.58	-	667.56	1.12	-	668.68	-
OVT (E)	< 500 - Yr	-	-	-	-	-	-	-	-
OVT (P)	> 500 - Yr	-	-	-	-	-	-	-	-
Max. Calc.	500	250.2	23.58	-	667.46	2.41	-	669.87	-

10-Year Velocity through Existing Culvert = 5.24 fps
 10-Year Velocity through Proposed Culvert = fps

OVT = Overtopping Event
 (E) Existing (P) Proposed

DATUM: NAVD 88
 ALL-TIME H.W.E. & DATE: N/A

*For WC #28 and #29, natural headwater taken as WSE at node J11 from SWMM model projected up slope of WC # 29 pipe. WC#28 natural headwater calculated by continuing natural headwater from WC#29 up slope of WC#28 pipe. The existing condition assumes that the 9' x 4' box culvert from the Cermak Interchange Flood Impact Reduction project downstream is in place. The 9'x4' and 10'x4' culverts from the Cermak Interchange Flood Impact Reduction project are shown on the Proposed Drainage Plan and are to be constructed with this project. Existing pipes to remain are to be televised to determine condition during Phase 2.

SCOPE OF WORK:

EXISTING CULVERT

Bridge or Culvert Type: 60" lined to 24", 60" lined to 38", 48"
 Cell Dimensions (W x H): _____
 # of span \ cells: 3
 Length: 195
 U/S Flowline: 663.15, 663.17, 662.67
 D/S Flowline: 662.15, 661.84, 662.11
 Skew: 0
 Low EOP: 671.60 @ 1559+29 ON RAMP B

EXISTING DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

PROPOSED CULVERT

Culvert Type: _____
 Cell Dimensions (W x H): _____
 # of span \ cells: _____
 Length: _____
 U/S Flowline: _____
 D/S Flowline: _____
 Skew: _____
 Low EOP: _____

PROPOSED DROPBOX

Dimensions: _____
 Drop: _____
 Weir Elevation: _____

NOTES: Proposed Structure (Alt 8) Details are preliminary. Subject to Refinement in TSL stage.

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

Circular Culvert (24"/38"/48") under I-294 (@Station 1562+30)



Computed by: EL

Date: 7/17/2017

Checked by: JC

Date: 7/18/2017

Route: Tri-State Tollway (I-294)
 Section: 4223
 County: Cook
 Station: 1562+30

S.N. Exist: CMP 60" with 24" Liner/CMP 60" with 38" Liner/RCP 48"
 S.N. Prop: RCP 2-54"/RCP 48"
 Waterway: NB I-294 Ditch

Created Head Calculations

Flood	Freq.	Natural H.W.E. (ft)	Existing Headwater Elev. (ft)	Proposed Headwater Elev. (ft)	Created Head (ft) @ Approach Section	
	Year	U/S Face of structure/Approach section	U/S Face of Structure	U/S Face of Structure	Existing	Proposed
	10	666.05	666.26	-	0.21	-
Design	50	666.97	667.55	-	0.58	-
Base	100	667.56	668.68	-	1.12	-
Max. Calc.	500	667.46	669.87	-	2.41	-

(1) The natural highwater elevation is the water surface elevation at the upstream side of the crossing as modeled in the stream natural condition, without the structure.

(2) The created head is calculated at the cross section upstream of the bridge/culvert which has the greatest difference between the natural and proposed conditions. This difference in elevation is then added to the Natural H.W.E. at the U/S face of the structure. This method of calculating created head is only required for bridges and some major culvert crossings. Also, the preferred created head should never be negative. Headwater elevations = The natural highwater elevation + the created head

Freeboard and Clearance Calculations

Low EOP Elevation (ft)		Low Beam Elevation (ft)		Freq.	Headwater Elev. (ft)		Freeboard (ft)		Clearance (ft)	
Existing	Proposed	Existing	Proposed	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed
671.60				10	666.26	-	5.34	-		
Low Road Station:		Low Beam Station:		50	667.55	-	4.05	-		
Existing	Proposed	Existing	Proposed	100	668.68	-	2.92	-		
1559+29 (on Ramp B)				500	669.87	-	1.73	-		

(3) Low road elevation is calculated at the edge of pavement, and on the low side of the roadway.

(4) Freeboard is calculated from the 50 year design headwater elevation to the proposed low road elevation in the floodplain.

(5) Vertical clearance is calculated from the 50 year natural high water elevation to the proposed low chord (beam) bridge elevation (2 ft minimum requirement)

Waterway Opening Area Calculations

Flood	Freq.	Natural H.W.E. (ft) - U/S Face of Structure		U/S Invert Elevation (ft)		Depth of Water		Box Culvert Size (ft x ft)		Opening Area (ft ²)	
	Year	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
	10	666.05		662.67		3.38				22.86	
Design	50	666.97		662.67		4.30				23.58	
Base	100	667.56		662.67		4.89				23.58	
Max. Calc.	500	667.46		662.67		4.79				23.58	

(6) The waterway opening area is computed using the NHWE at the U/S face of the culvert, and not the headwater elevation. The maximum opening area should be less or equal to the cross sectional area of the box culvert or circular/elliptical pipe. If the culvert is embedded to meet permit requirements, the embedded depth should not be included in the opening area calculations.

5.5 DRAINAGE DESIGN CRITERIA

3 DRAINAGE DESIGN CRITERIA

The Drainage Criteria is based upon the criteria established in the Tollway Drainage Design Manual dated March 2016. Within the Tollway's right-of-way, the Tollway criteria will govern over the MWRD criteria per coordination with the Tollway and MWRD.

Table 1: Drainage Design Criteria

	Task	Description
A - HYDROLOGY		
A-1	Rainfall Intensity and Distribution	ISWS Bulletin 70 (Isohyetal Values) with Huff Distributions will be used for bridges, culverts, channels, and detention basin design. ISWS Bulletin 70 (Sectional Values) will be used for storm sewers and roadway ditch design. If a hydrograph method is used, rainfall should be distributed using the appropriate ISWS Circular 173 Huff rainfall distribution (Huff, 1990) and a critical duration analysis must be utilized.
A-2	Peak Discharge for Major Waterway Crossings	FIS and MWRD discharge will be used for major waterway structures when available. If storm gage data are available, they may be used for design purposes. Otherwise, a hydrograph method shall be used to calculate peak flows. Regression equations may be used for watersheds ≥ 450 -ac in urban area.
A-3	Peak Discharge for Storm Sewers, Ditches, and Minor Culverts	Rational Method for watersheds less than 200-ac. However, a hydrograph method is preferred for complex facilities and larger watersheds.
A-4	Runoff coefficients C	C = 0.95 (impervious), C = 0.30 (pervious)
A-5	Runoff curve numbers CN	CN = 74 (open spaces with grass cover on 75% - lawns, parks, golf courses, cemeteries, for hydrologic soil group C)
B - HYDRAULICS		
B-1	Bridge	Design frequency is 50-yr storm; the calculated design headwater elevation (HW) shall be minimum 3 ft. below the low edge of pavement. The low chord shall be at least 2 ft. above the 50-yr natural highwater surface elevation and also above recorded high water at site. Check for the 500-yr storm, HW shall not encroach onto the roadway edge of pavement on the low side of the roadway. If the structure is located in designated floodway or floodplain, see item B-2 below for additional design criteria.
B-2	Major Waterway Crossings Located in Designated Floodway or Floodplains	Required for all designated floodways and floodplains with greater than 1 sq.mile (640-ac) watershed area. For structures in designated floodways, the structure shall meet the 17 ILL. ADM. CODE-Part 3708 rules for Bridge and Culvert Reconstruction or Modification, which may involve determining the feasibility of reducing the created head to 0.1 ft.

	Task	Description
		<p>over natural for events up to and including the 100-yr storm, if the structure is a source of flood damage. If the structure is not a source of flood damage, minimum design criteria is to not increase the flood profile by more than 0.1 ft. over existing, for flood profiles up to and including the 100-yr storm.</p> <p>When no designated floodway exists, the proposed structure shall meet the Part 3700 rules for Bridge and Culvert Reconstruction. In general, replacement structures should reduce created head to 0.5 ft. for floods up to and including the 100-yr event.</p> <p>See also App. K to the Tollway's Drainage Manual Dated March 2016.</p>
B-3	Storm Sewers	<p>Design frequency is 50-yr storm; the maximum highwater elevation shall be kept at least 2 ft. below the manhole/inlet rim elevation.</p> <p>Zero encroachment on traveled way and no closer than 3 ft. from the edge of the traveled way. Maximum water depth on pavement of 0.35 ft.</p> <p>Minimum size shall be 15" dia. RCP under traveled way, or 12" dia. RCP outside of traveled way. Minimum 6-in cover between bottom of subbase and crest of the pipe.</p> <p>Maximum structure spacing is 350 ft. (15" to 24" dia.), 400 ft. (27" to 36" dia.), 500 ft. (42" to 54" dia.) and 1,000 ft. (over 60" dia.).</p> <p>Maximum inlet spacing is 1,000 ft. The first inlet spacing may be as great as 1,200 ft. from crest vertical curve. Minimum three structures at sag locations.</p>
B-4	Cross Road Culvert	<p>Design frequency is 50-yr storm; the calculated design headwater shall be minimum 3 ft. below the low edge of pavement, $HW/D \leq 1$ ratio or maximum 0.5 ft. of created head.</p> <p>Check for 100-yr storm, no encroachment on any adjacent properties. Check for 500-yr storm, no overtopping of roadway.</p> <p>Minimum size for roadway or ramp crossings is 24" dia. RCP for lengths less than 200 ft. and 30" dia. RCP for longer than 200 ft.</p> <p>Minimum size for ditch culverts is 18" dia. RCP.</p> <p>No CMP will be allowed.</p> <p>Use HY-8 for non floodplain areas and HECRAS for floodplain areas.</p>
B-5	Ditch Design Requirements	<p>Design frequency is 50-yr storm. The ditch depth shall be a minimum of 3 ft., or the water surface elevation (WSEL) in the ditch shall be 2 ft. below the edge of pavement, or 1 ft. below the adjacent right-of-way, whichever is controlling.</p> <p>The minimal longitudinal slope shall be 0.3% (with 0.5% preferred by IDOT District One). Longitudinal slope less than 0.3% is allowable with the approval of the Tollway, if special consideration is provided.</p> <p>The velocities shall be generally between 3 to 5 fps. Ditches with more than 5-fps will need to be lined. Ditch lining recommendations will</p>

	Task	Description
		consider velocity and soil types. Check for 100-yr storm, the WSEL shall not encroach onto the roadway.
B-6	Ditch Cross Section Requirements	For new ditches, 6:1 foreslopes, 4-ft. bottom and 4:1 backslopes are desirable, but 4:1 foreslopes, 2-ft bottom and 3:1 backslopes are acceptable. When existing ditches are to remain or to be re-established, use 4:1 foreslopes, 2-ft bottom, and 3:1 backslopes. The ditch check crest must be a minimum of 1 ft. above grated inlets and 2 ft. below the edge of pavement.
B-7	Pump Station	Design frequency is 50-yr storm; the design hydraulic gradeline shall have a 2 ft. freeboard below the top of the inlet. Check for 100-yr, the hydraulic gradeline shall not be above the top of the inlet.
B-8	Interchange and Expressway	The proposed interchange and expressway in the floodplain shall have a minimum of 3 ft. of freeboard against the 50-yr storm WSEL, or 2 ft. of freeboard against the 100-yr WSEL, whichever is higher.
C - FLOODPLAIN		
C-1	Compensatory Storage	For fill in the regulatory floodplain, 17 ILL. ADM. CODE-Part 3708 rules will need to be followed. The Compensatory Storage Volume, for any fill due to roadway widening and structures in the regulatory floodplain, shall be provided incrementally between the normal elevation and the 10-yr flood elevation and between the 10-yr flood elevation and the base flood elevation (BFE) (100-yr flood elevation) as follows: (i) at a 1:1.0 ratio for Cook County (ii) at a 1:1.0 or 1:1.5 ratio for DuPage County. For details, see DuPage County Countywide Stormwater and Flood Plain Ordinance, dated April 2013, section 15-81.D
D - DETENTION		
D-1	General Considerations	Detention volume shall be provided to compensate for the effect of increased peak discharges resulting from the additional impervious areas. The proposed construction shall not increase the existing peak runoff from Tollway property and shall comply with the maximum allowable release rate criteria (see section D3). Offsite drainage shall be bypassed rather than detained. Detention in ditches can be provided if it does not cause a hazard to traffic. Detention in pipes is acceptable only if no other alternate is feasible. A 2-fps cleansing velocity must be provided for upsized pipes used for conveyance and storage purpose. Detention facilities and floodplain compensatory storage site shall be provided separately.
D-2	Design Storm	100-yr storm event for the critical storm duration (Cook County facilities) and for the 24-hr storm duration (DuPage County facilities), using the ISWS Bulletin 70 rainfall depth.

	Task	Description
D-3	Maximum Allowable Release Rates	<p>The maximum allowable release rates are estimated, for the added impervious area only, as follows:</p> <p>(i) 0.04-cfs/acre, for the 2-yr storm and for the critical storm duration (Cook County facilities) and for the 24-hr storm duration (DuPage County facilities).</p> <p>(ii) 0.10-cfs/acre, for the 100-yr storm and 24-hr storm duration (DuPage County facilities).</p> <p>(iii) 0.15-cfs/acre, for the 100-yr storm and for the critical storm duration (Cook County facilities).</p> <p>The offsite post-development release rates shall be less than or equal to the pre-developed condition release rates, for the 2-yr and 100-yr storm events, for the critical storm duration (Cook County facilities) and for the 24-hr storm duration (DuPage County facilities). The above release rates should be estimated using an appropriate hydrograph routing method such as HEC-HMS, xpSWMM, Win TR-20, or Pond-Pack.</p>
D-4	Required Volume	<p>The volume of required detention storage (acre-feet) can be initially estimated using the maximum allowable release rates (see section D-3) and as shown in Appendix G1 (for Cook County facilities) and Appendix G2 (for DuPage County facilities).</p> <p>The final detention volumes and the outlet control structure (restrictor) will be designed according to section D-5 and section D-6.</p>
D-5	Water Quality Volume	<p>The required volume control shall include the capture of the first flush, a runoff volume equal to 1.00" (Cook County), or 1.25" (DuPage County) of rainfall times the added impervious area.</p> <p>The runoff from the first flush rainfall shall be stored below the elevation of the primary gravity outlet of detention facility, or within roadside ditches located upstream of the proposed detention facility. A control structure or underdrain may be used, provided that the draw down time is between 48 and 96 hours.</p> <p>According to USACOE (Oct 2016), the applicants for Regional Permit 3 shall be required to make a reasonable attempt to retain the runoff from the 1.00" rainfall event. Where project constraints make it impracticable to fully meet the stormwater performance standard, applicants shall be allowed to implement practices according with the following hierarchy: (i) retention facilities, (ii) use of bioswales, (iii) detention facilities, (iv) use of catch basins with sumps or other inlet controls, and (v) runoff design practices for bridge deck runoff crossing waters to minimize stormwater impacts.</p>
D-6	Methodology	<p>Detention shall be designed using an appropriate hydrograph routing method such as HEC-HMS, xpSWMM, Win TR-20, or Pond-Pack.</p> <p>Proposed condition release rates, at the main outfall (outlet), must be less than or equal to existing condition release rates, for the 2-yr and 100-yr storm events for the critical storm duration.</p> <p>Within the same watershed, some shifting of required detention between</p>

	Task	Description
		outfalls (outlets) is allowable (regional detention). The proposed release rates, at the main outfalls (outlets) included in the regional detention analysis, must be less than or equal to existing release rates, for the 2-yr and 100-yr storm events for the critical storm durations.
D-7	Detention Basin	<p>Dry detention basins are preferred. Wet basins are allowed for water quality, if they are not a hazard or are shielded by guardrail, and only with the Tollway approval.</p> <p>A minimum of 2 ft. freeboard above the maximum water surface elevation (100-yr) to the top of berm and a minimum of 3 inches above the maximum water surface elevation (100-yr) over emergency spillway to the top of berm shall be provided.</p> <p>The control structure in and out pipes should have the same size. The minimum restrictor plate orifice size is 4" dia.</p>
D-8	Detention in Ditches	<p>Maximum water surface elevation (100-yr) shall be at least 2 ft. below the edge of pavement.</p> <p>A maximum detention depth of 4 ft. is recommended.</p> <p>Minimum ditch check outlet pipe shall be 12" dia. and a minimum 4" dia. restrictor plate orifice.</p> <p>A minimum of 1 ft. freeboard shall be provided between the maximum water surface elevation (100-yr) and the existing right-of-way ground elevation.</p>
D-9	Detention in Infield Areas	Maximum water surface elevation (100-yr) shall be at least 2 ft. below the edge of pavement.

For flex lane drainage requirements (previously referred to as Lane 0), the criteria for allowable storm water spread within the flex lane is still in progress. For the proposed drainage plans included in this report, we have assumed that the flex lane is treated similar to a shoulder where spread requirements must be met for Lane 1, not the flex lane, which were the criteria that were followed on the Jane Addams I-90 Projects for Lane 0. For reference, please see Appendix B, Section 6.7 for the technical memorandum submitted to the Tollway in draft form.

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5.6 PROPOSED DRAINAGE PLAN



DRAINAGE LEGEND		
BOUNDARY LINES/SYMBOLS	EXISTING DRAINAGE	PROPOSED DRAINAGE
SLOTTED DRAIN	MANHOLE	MANHOLE
USGS DRAINAGE DIVIDE	CATCH BASIN	CATCH BASIN
DRAINAGE BOUNDARY	INLET	INLET
STREAM	HEADWALL	HEADWALL/END SECTION
FLOODPLAIN BOUNDARY	FLARED END SECTION	SUMMIT
FLOODWAY BOUNDARY	SUMMIT	DITCH FLOW
WATER OF US - WOUS / WETLAND / STORMWATER CONVEYANCE	DITCH FLOW	SWALE
	SWALE	STORM SEWER
	STORM SEWER	CULVERT
	CULVERT	CULVERT
	POND-19A DETENTION POND- ID	POND-PR-19A DETENTION POND- ID
	RIPRAP	RIPRAP
	CONCRETE REVETMENT MAT	CONCRETE REVETMENT MAT

NOTE: EXISTING SYSTEM TO REMAIN IN PLACE SHALL BE CLEANED AND TELEVIEWED

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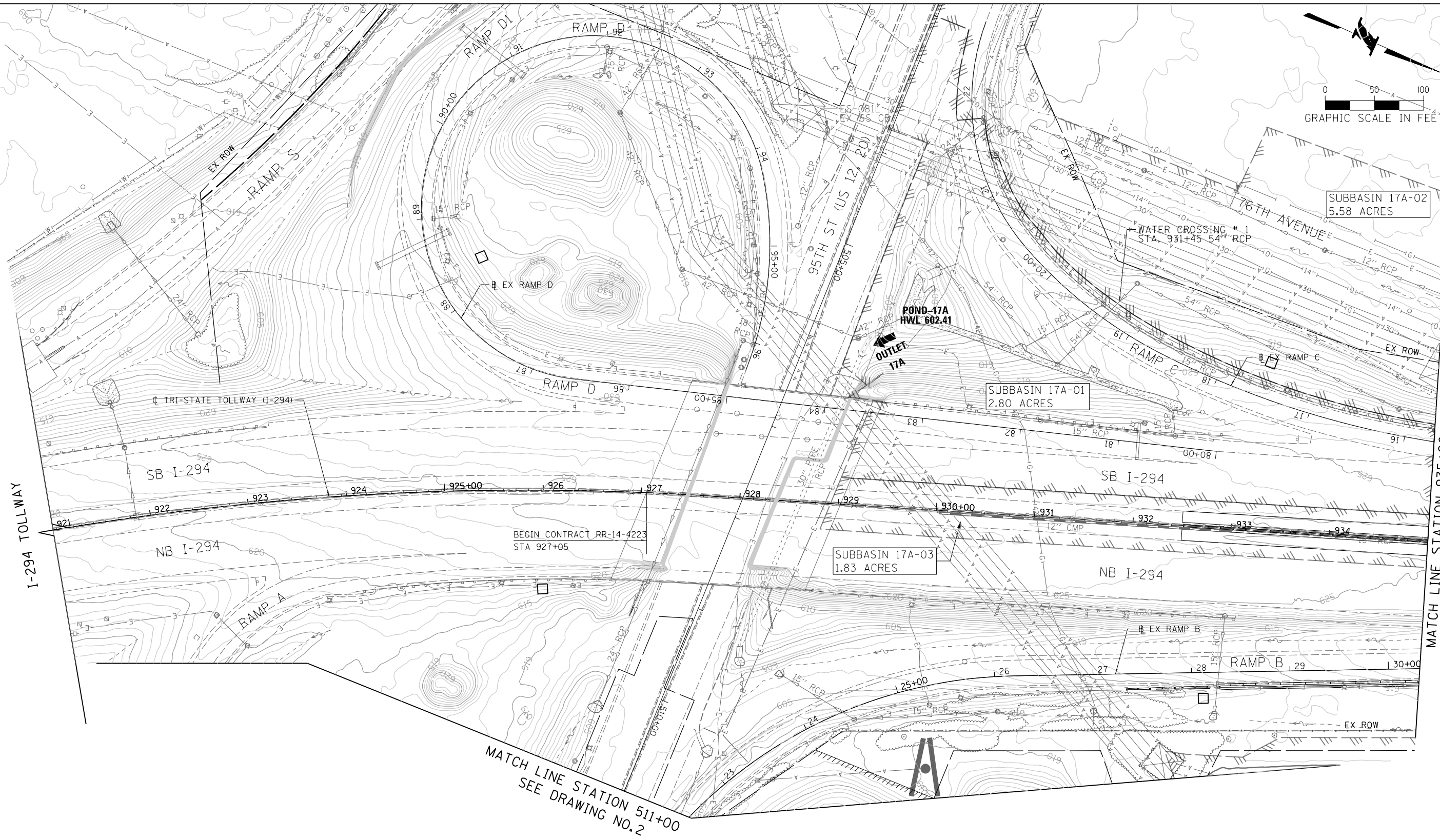
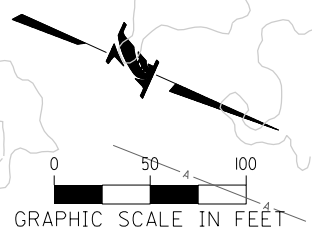


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 DRAINAGE LEGEND AND SHEET PLAN

SHEET NO.
 IN-1
 DRAWING NO.
 1 OF 1



SUBBASIN 17A-02
5.58 ACRES

SUBBASIN 17A-01
2.80 ACRES

SUBBASIN 17A-03
1.83 ACRES

POND-17A
HWL 602.41

WATER CROSSING # 1
STA. 931+45 54" RCP

BEGIN CONTRACT RR-14-4223
STA 927+05

I-294 TOLLWAY

MATCH LINE STATION 935+00
SEE DRAWING NO.3

MATCH LINE STATION 511+00
SEE DRAWING NO.2

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Drain-111

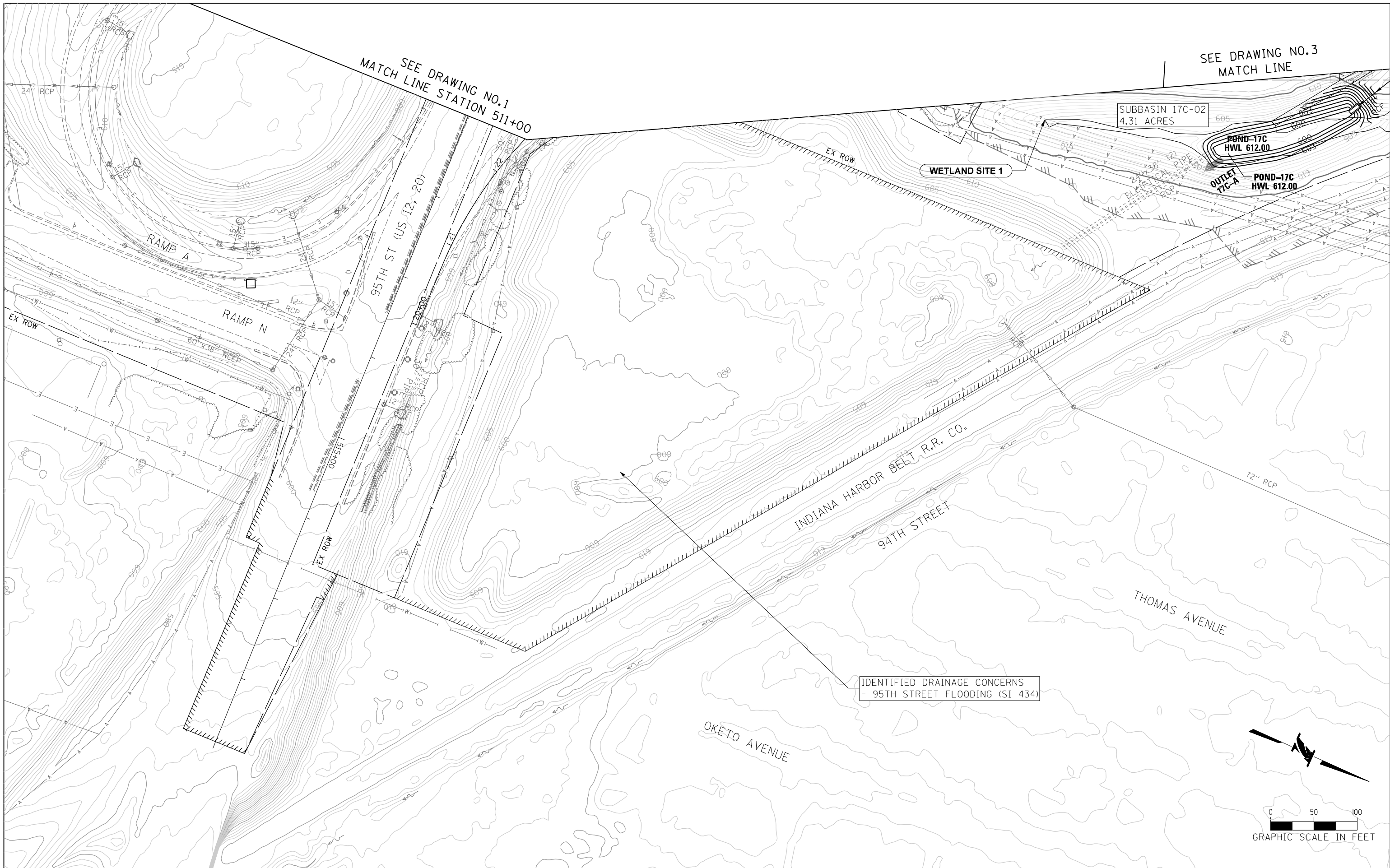
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PROPOSED DRAINAGE PLAN
STA 921+00 TO STA 935+00

SHEET NO. PD-1
DRAWING NO. 1 OF 52



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 12/22/2017

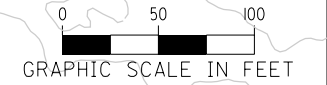
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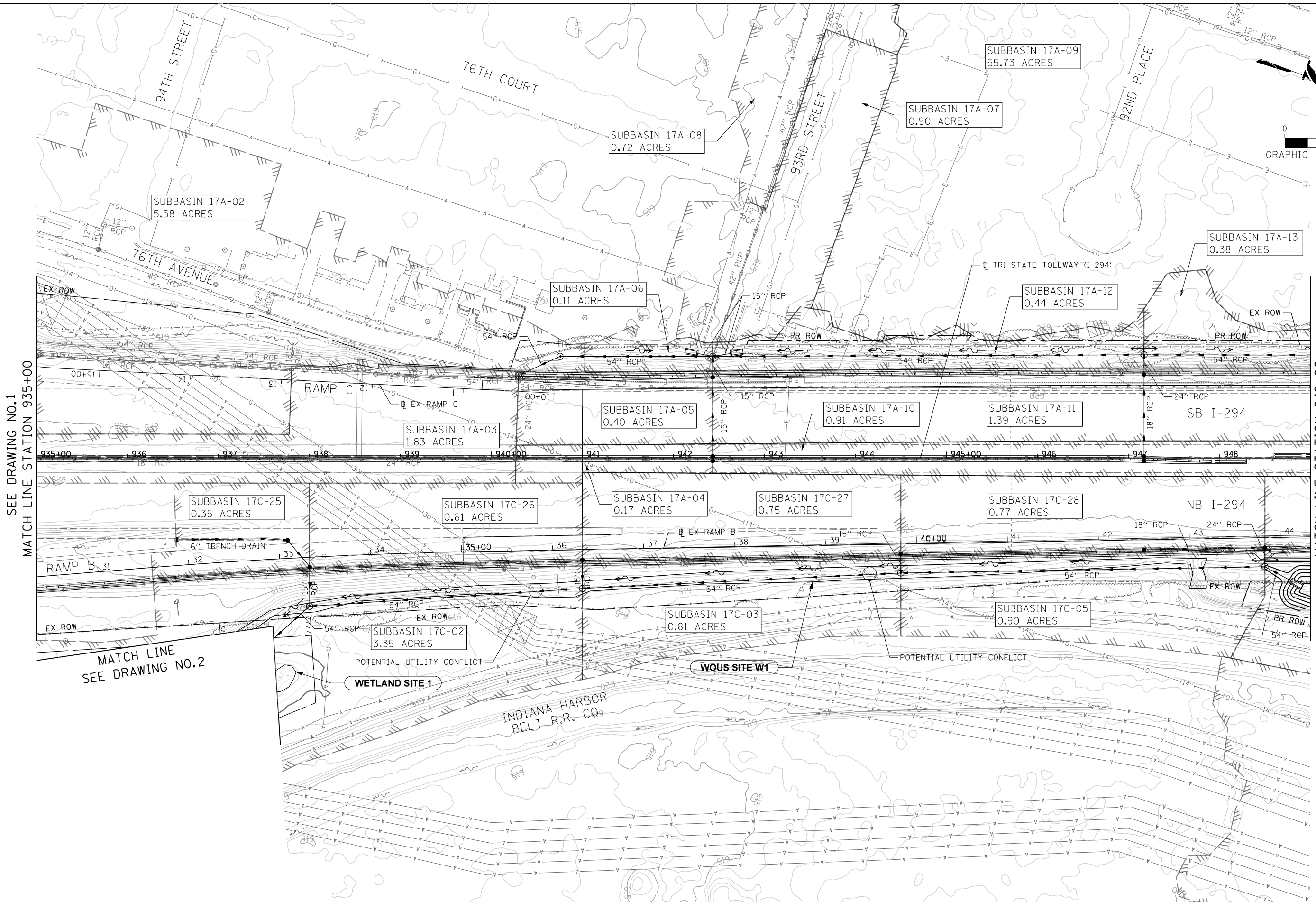


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 STA 921+00 TO STA 935+00

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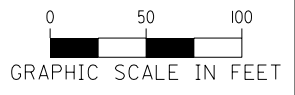




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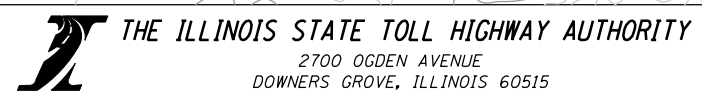
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SEE DRAWING NO.4

MATCH LINE
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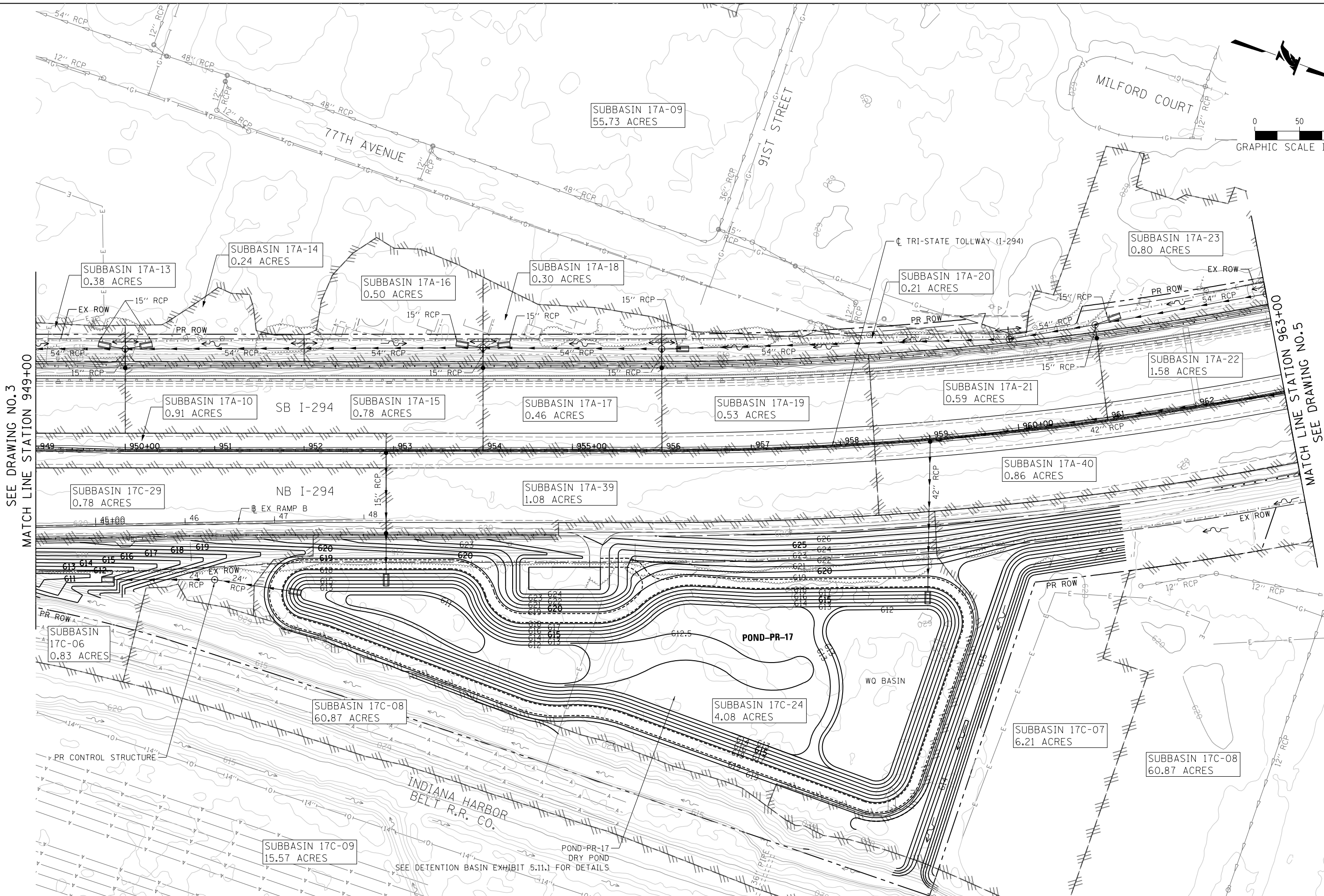
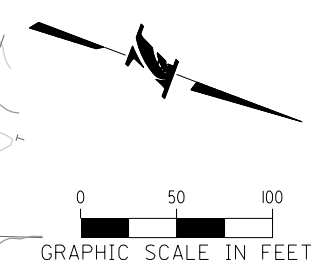
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NO.		REVISIONS	
NO.	DATE	DESCRIPTION	

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 935+00 TO STA 949+00

SHEET NO. PD-3
 DRAWING NO. 3 OF 52



SEE DRAWING NO.3
MATCH LINE STATION 949+00

MATCH LINE STATION 963+00
SEE DRAWING NO.5

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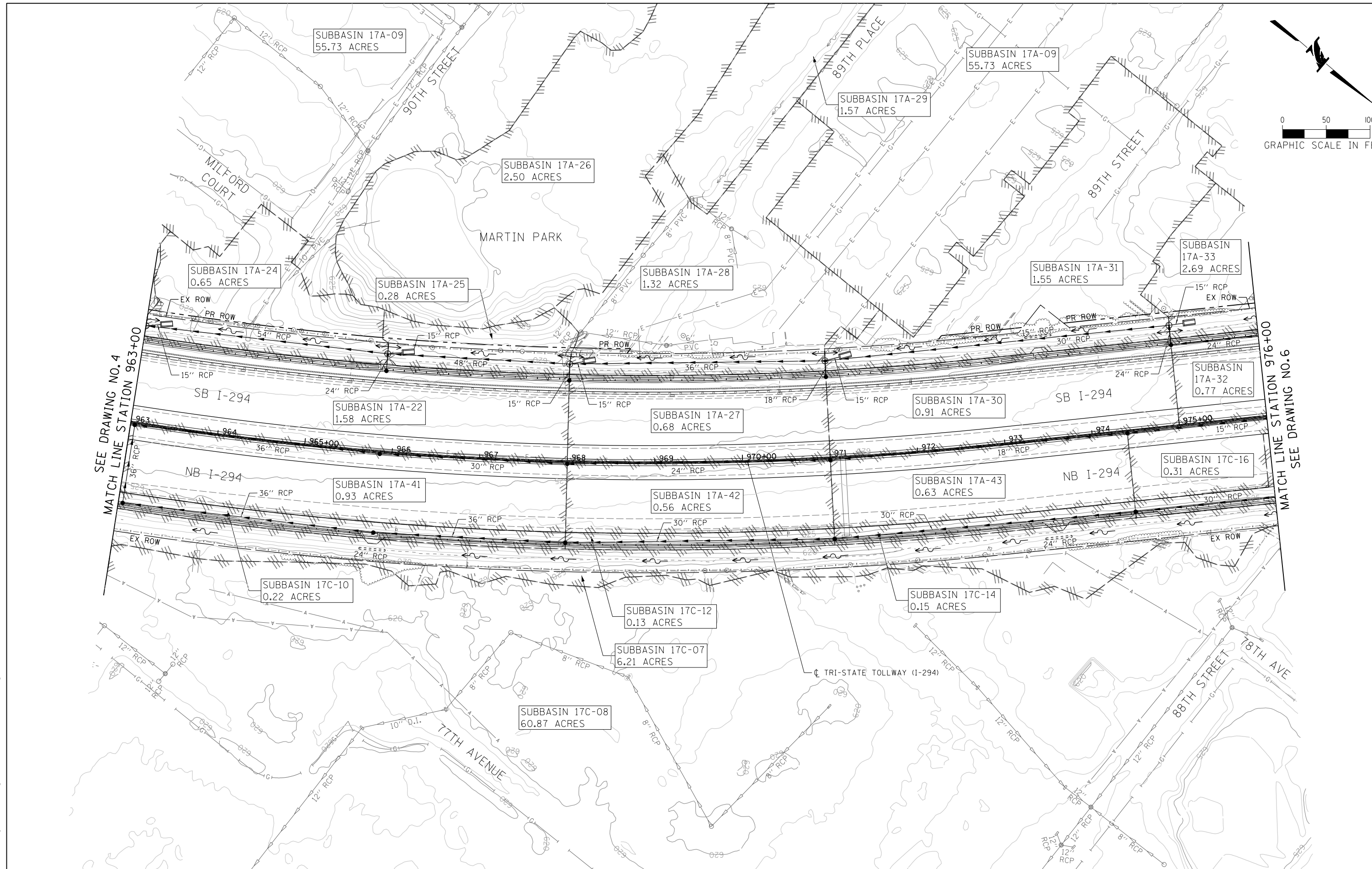
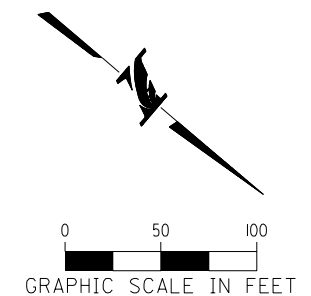
SE3
 3041 WOODCREEK DRIVE, SUITE 211 - DOWNERS GROVE, IL 60515
 (630) 641-9900

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 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 949+00 TO STA 963+00

SHEET NO. PD-4
 DRAWING NO. 4 OF 52



SEE DRAWING NO. 4
MATCH LINE STATION 963+00

MATCH LINE STATION 976+00
SEE DRAWING NO. 6

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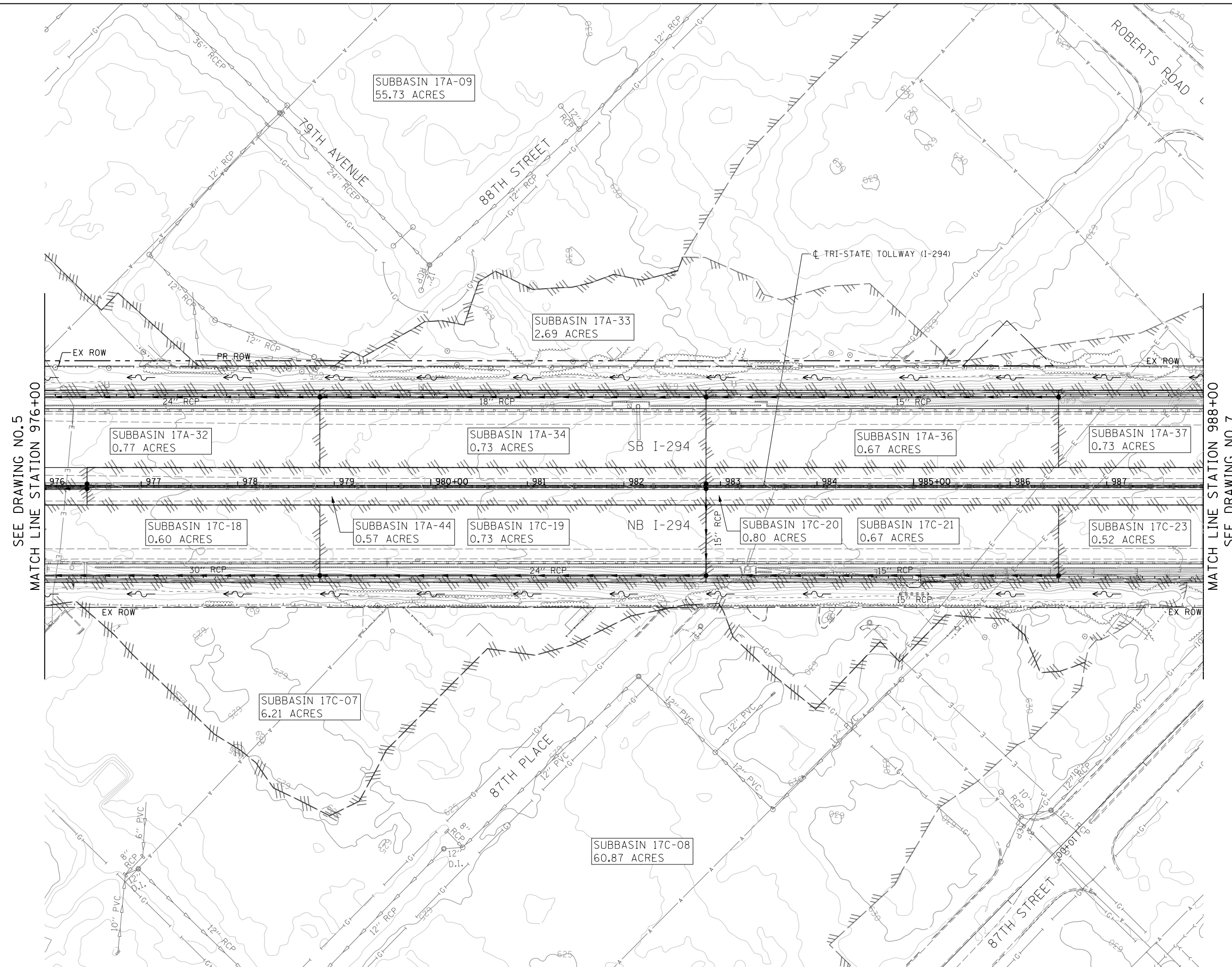
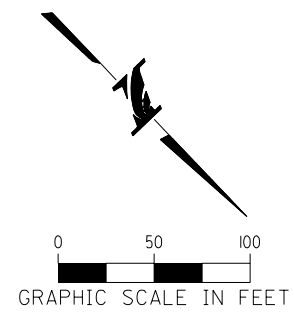
SEC
 3041 WOODCREEK DRIVE, SUITE 211 - DOWNERS GROVE, IL 60515
 (630) 641-9900

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 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 963+00 TO STA 976+00

SHEET NO. PD-5
 DRAWING NO. 5 OF 52



SEE DRAWING NO.5
MATCH LINE STATION 976+00

MATCH LINE STATION 988+00
SEE DRAWING NO.7

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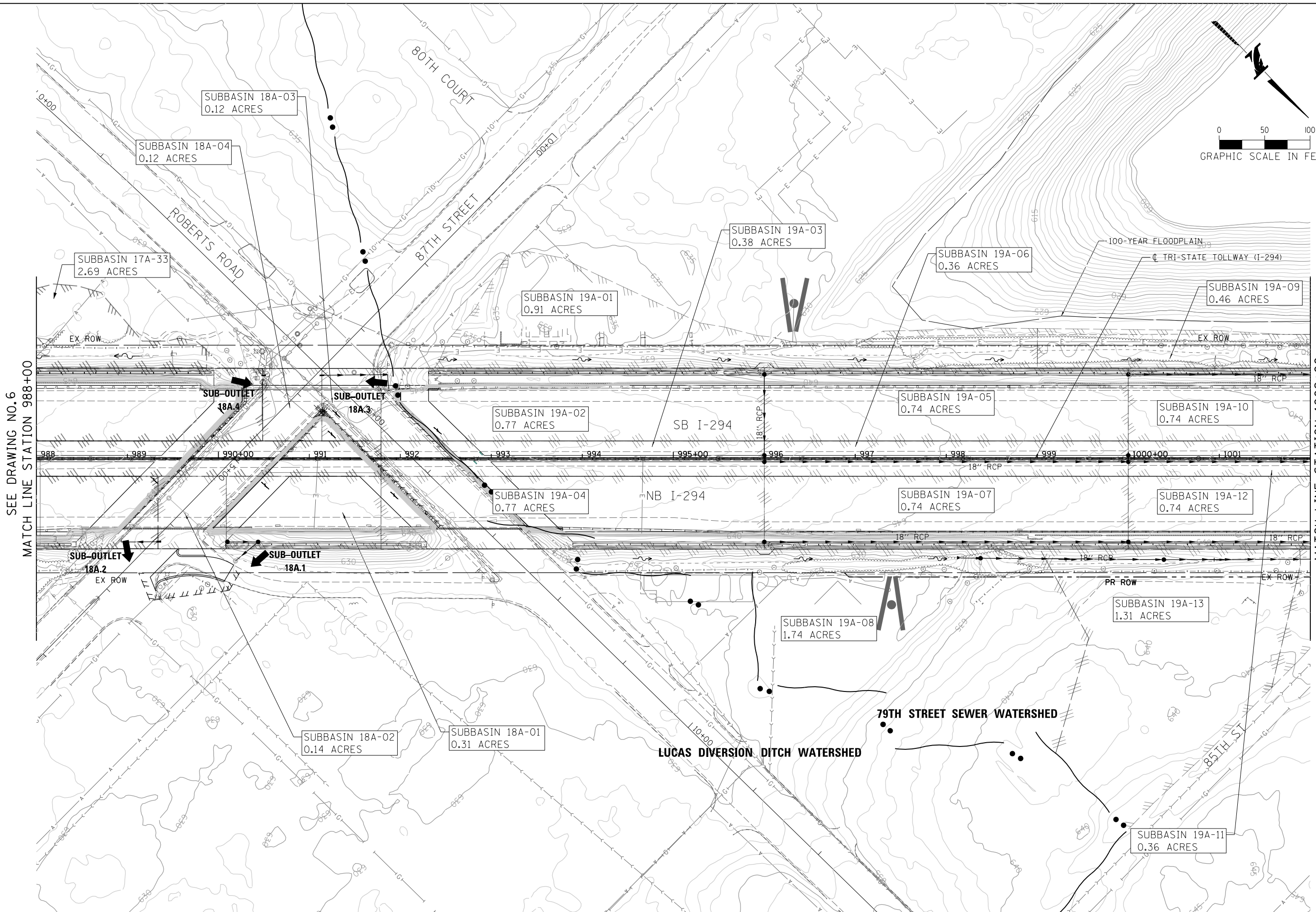
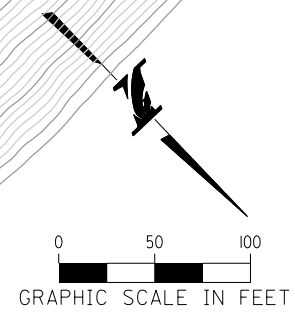
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CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 976+00 TO STA 988+00

SHEET NO. PD-6
DRAWING NO. 6 OF 52



SEE DRAWING NO. 6
MATCH LINE STATION 988+00

MATCH LINE STATION 1002+00
SEE DRAWING NO. 8

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 Chicago, IL
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 INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY

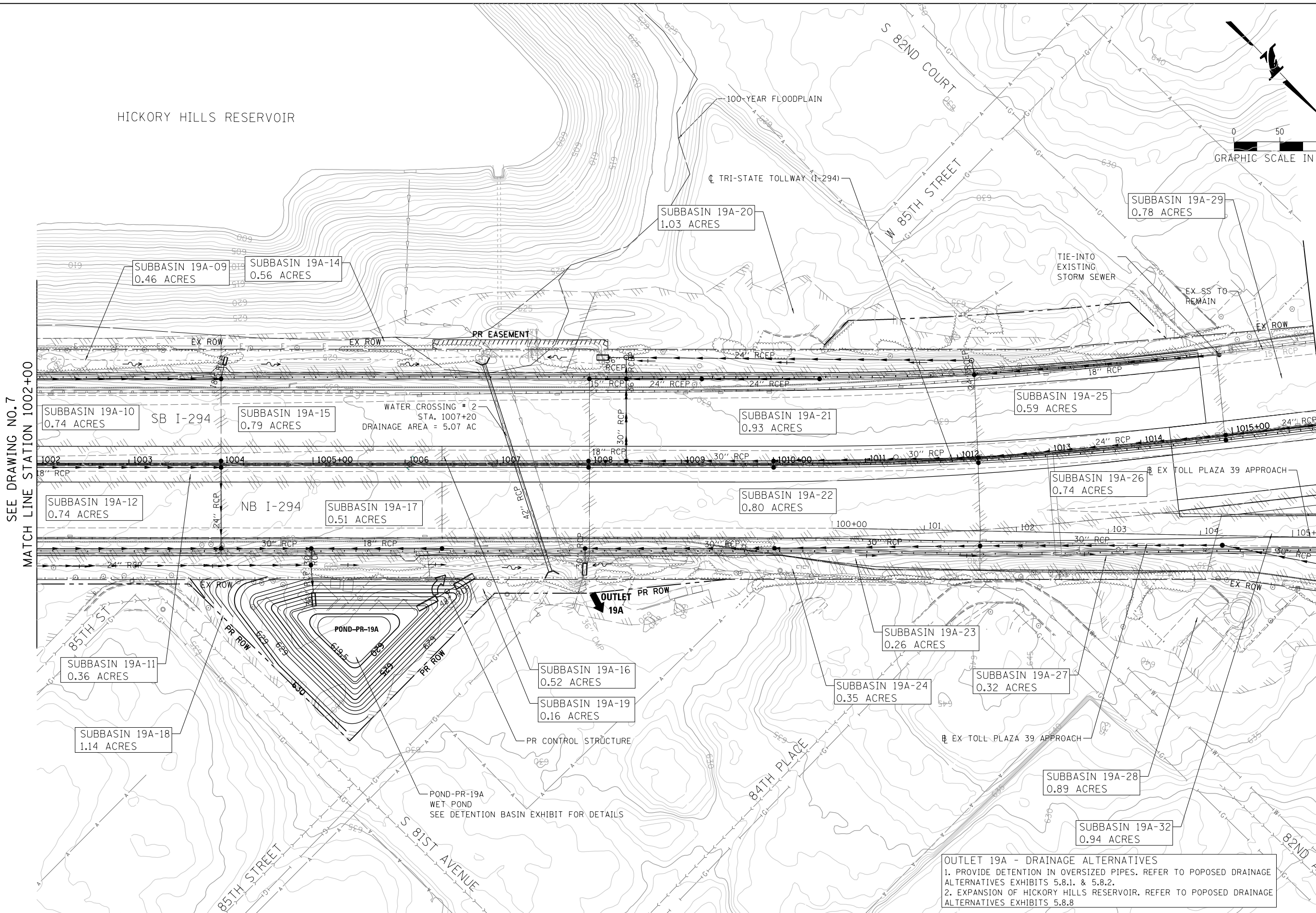
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 988+00 TO STA 1002+00

SHEET NO.
 PD-7
 DRAWING NO.
 7 OF 52

HICKORY HILLS RESERVOIR



SEE DRAWING NO. 7
MATCH LINE STATION 1002+00

MATCH LINE STATION 1016+00
SEE DRAWING NO. 9

OUTLET 19A - DRAINAGE ALTERNATIVES
1. PROVIDE DETENTION IN OVERSIZED PIPES. REFER TO POPOSED DRAINAGE ALTERNATIVES EXHIBITS 5.8.1. & 5.8.2.
2. EXPANSION OF HICKORY HILLS RESERVOIR. REFER TO POPOSED DRAINAGE ALTERNATIVES EXHIBITS 5.8.8

12/22/2017
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CHECKED BY KS DATE 12/22/17

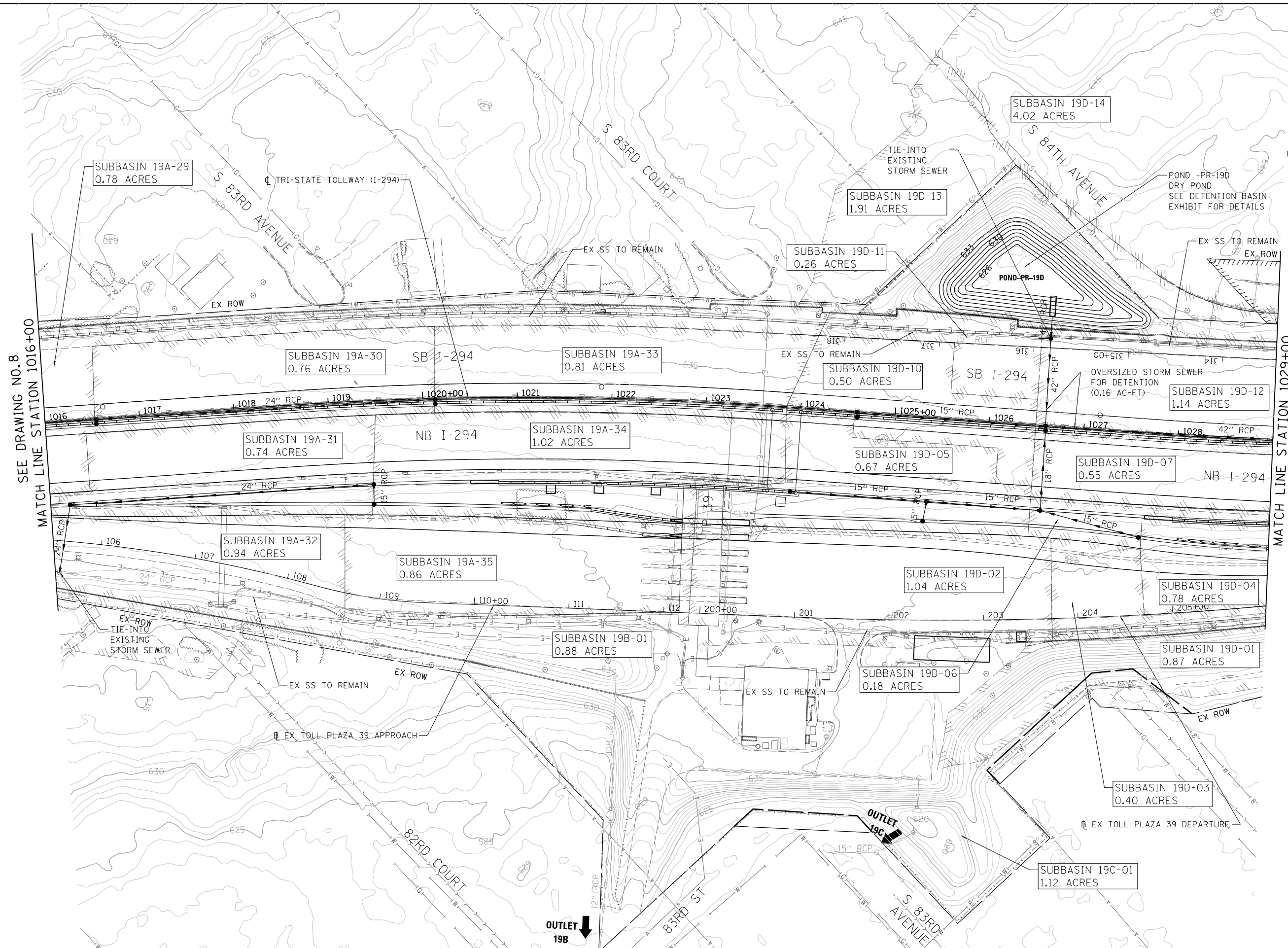
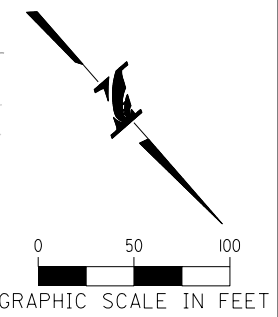
exp. U.S. Services Inc.
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1002+00 TO STA 1016+00

SHEET NO. PD-8
DRAWING NO. 8 OF 52



12/22/2017
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 12/22/2017

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 CHECKED BY KS DATE 12/22/17

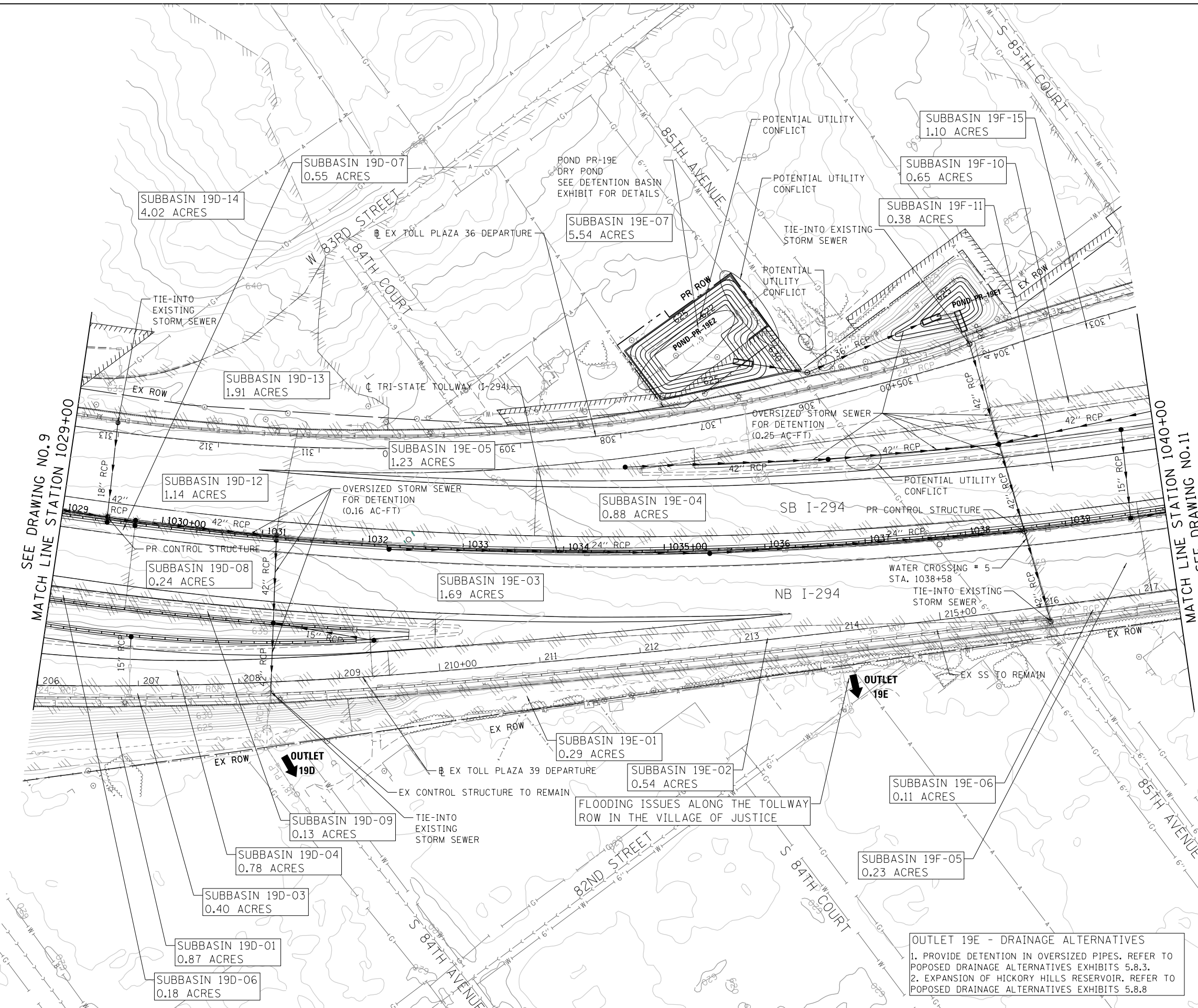
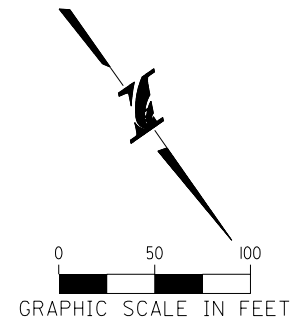
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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1016+00 TO STA 1029+00

SHEET NO.
 PD-9
 DRAWING NO.
 9 OF 52



12/22/2017
 C:\Users\jgarcia\Documents\Projects\RR-14-4223\Drawings\19D.dgn
 12/22/2017

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 INDUSTRIAL-INFRASTRUCTURE-SUSTAINABILITY

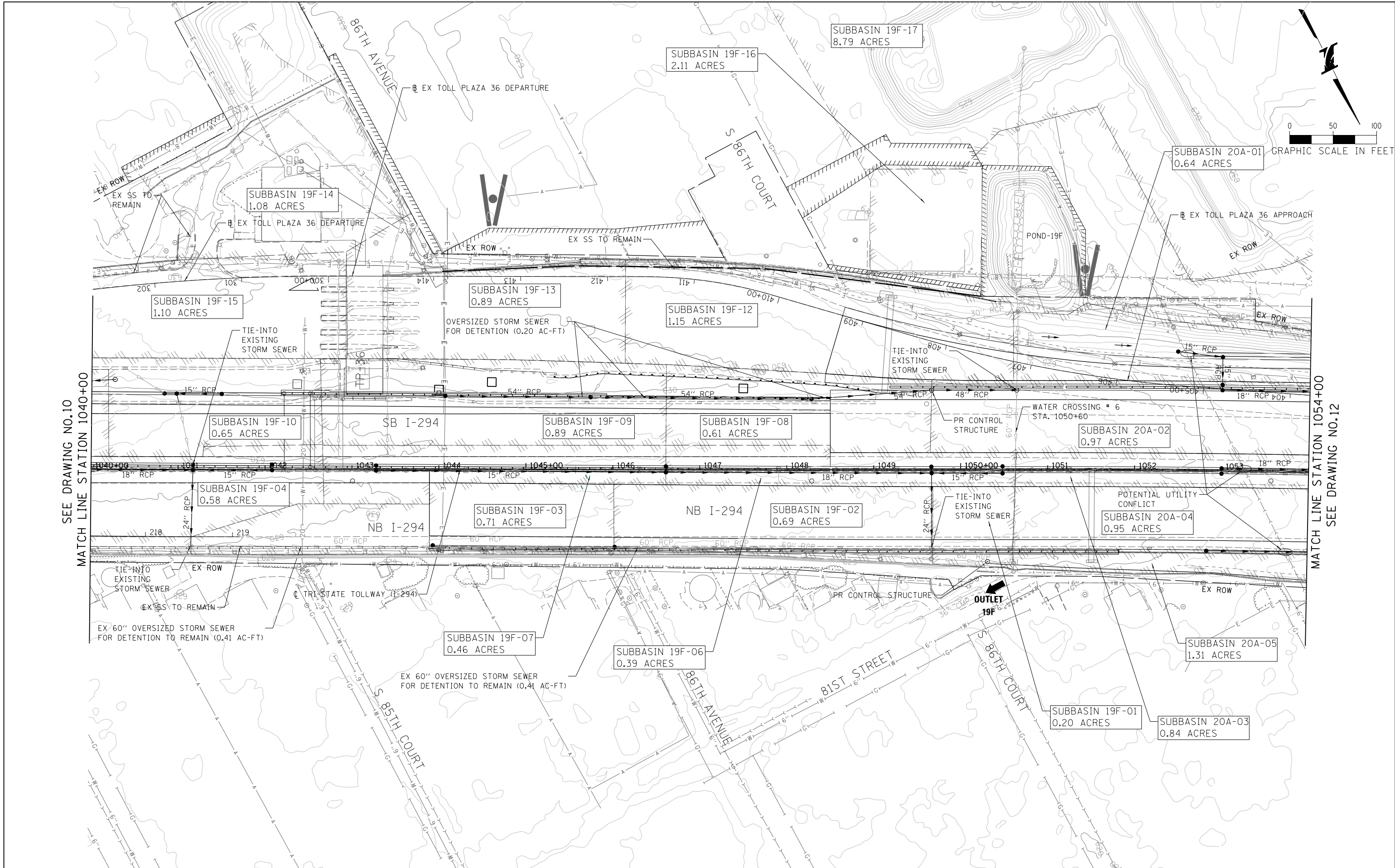
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
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REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1029+00 TO STA 1040+00

SHEET NO. PD-10
 DRAWING NO. 10 OF 52

OUTLET 19E - DRAINAGE ALTERNATIVES
 1. PROVIDE DETENTION IN OVERSIZED PIPES. REFER TO POPOSED DRAINAGE ALTERNATIVES EXHIBITS 5.8.3.
 2. EXPANSION OF HICKORY HILLS RESERVOIR. REFER TO POPOSED DRAINAGE ALTERNATIVES EXHIBITS 5.8.8



SEE DRAWING NO.10
MATCH LINE STATION 1040+00

MATCH LINE STATION 1054+00
SEE DRAWING NO.12

12/22/2017
 C:\Users\jstevens\OneDrive\Documents\Projects\RR-14-4223\Drawings\128.dgn
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DRAWN BY SB SCALE 1"=50'
 CHECKED BY KS DATE 12/22/17

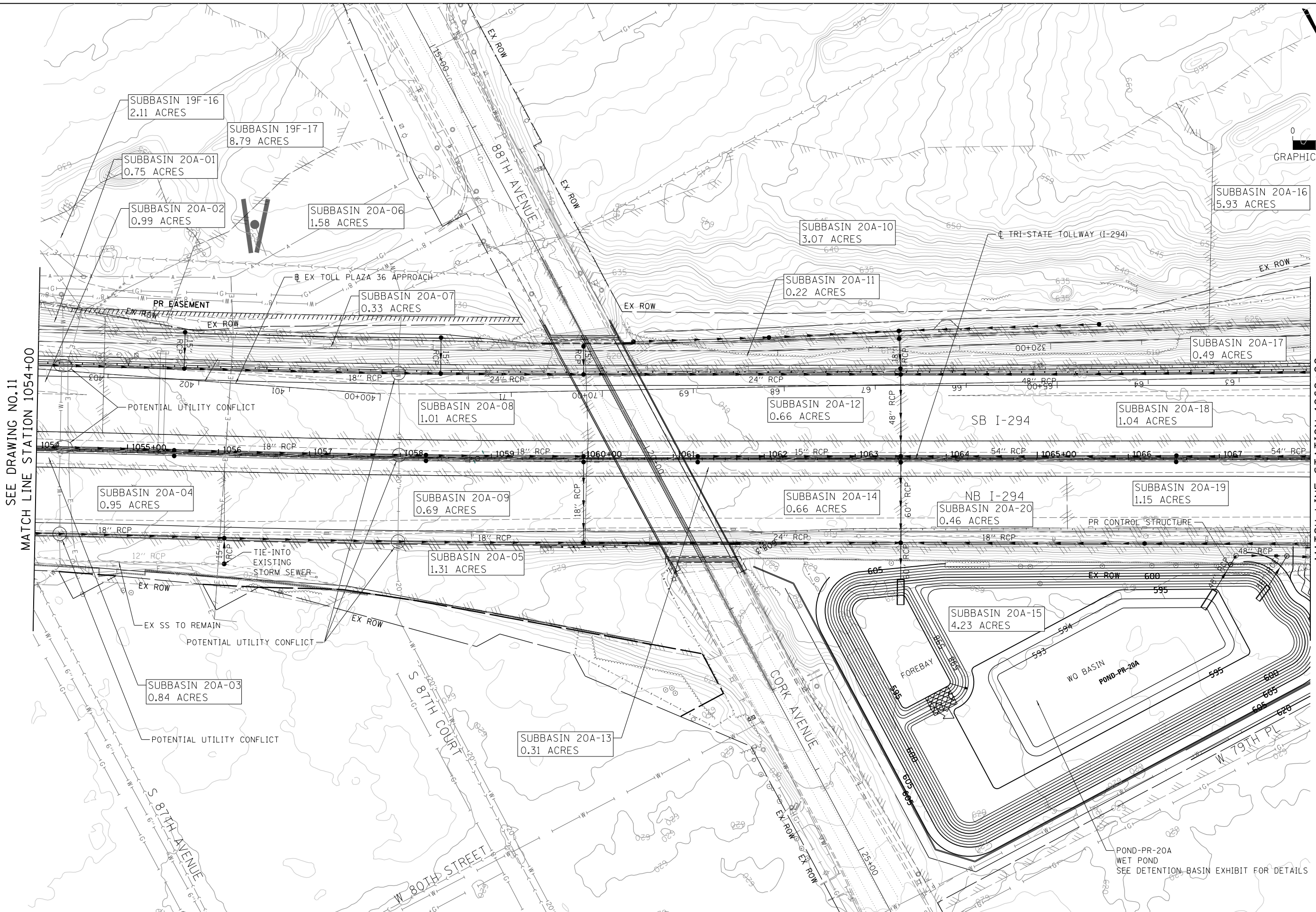
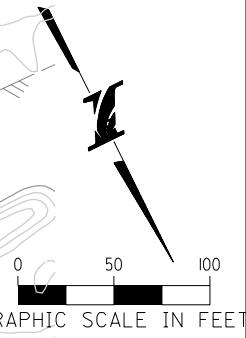

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REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1040+00 TO STA 1054+00

SHEET NO.
 PD-11
 DRAWING NO.
 11 OF 52



SEE DRAWING NO.11
MATCH LINE STATION 1054+00

MATCH LINE STATION 1068+00
SEE DRAWING NO.13

12/22/2017
 C:\Users\jstevens\OneDrive\Documents\exp\projects\rr14\4223\shd\drain-121.dgn
 jstevens

DRAWN BY SB SCALE 1"=50'
 CHECKED BY KS DATE 12/22/17

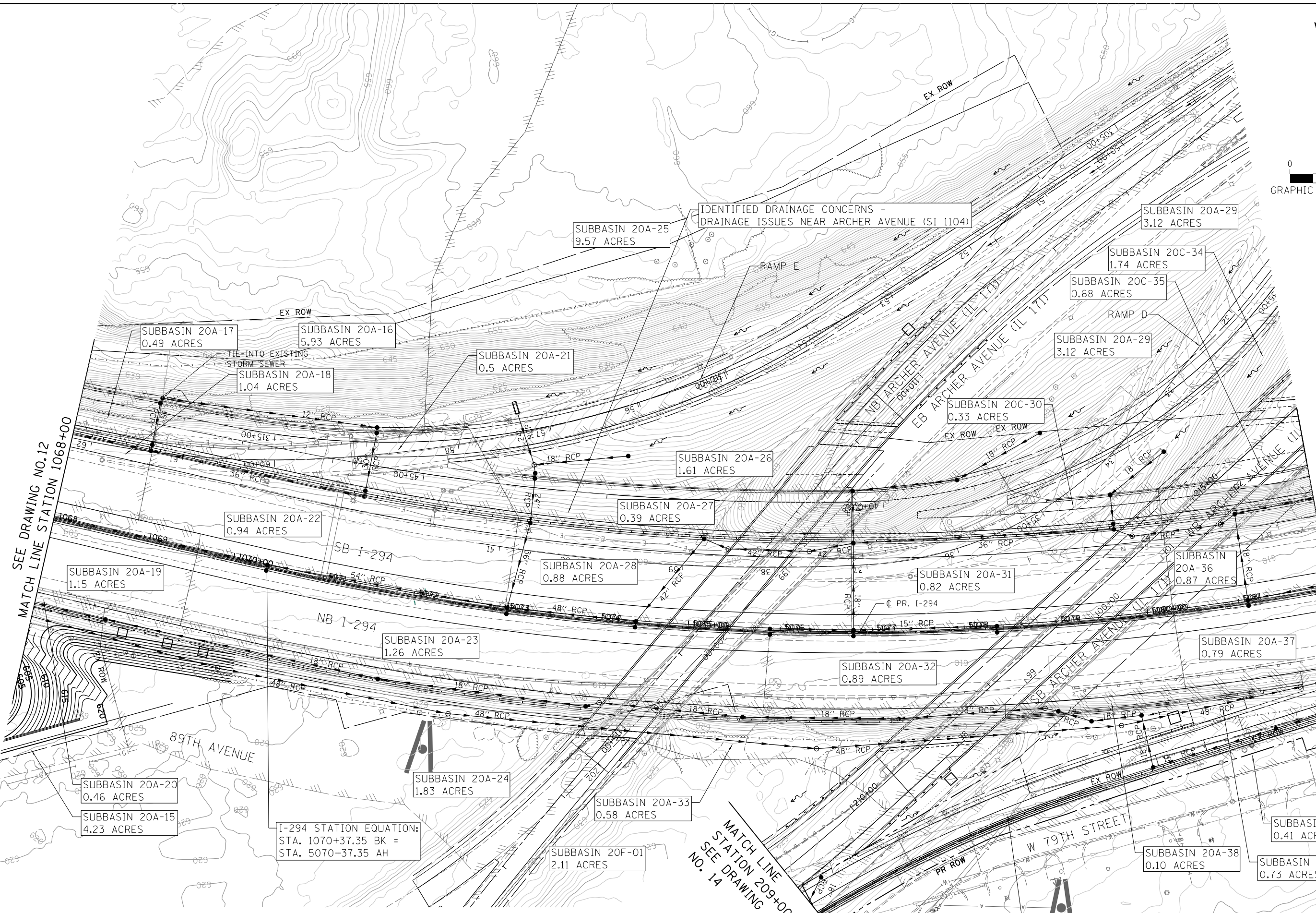
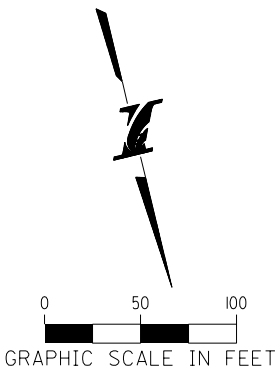
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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1054+00 TO STA 1068+00

SHEET NO.
 PD-12
 DRAWING NO.
 12 OF 52



IDENTIFIED DRAINAGE CONCERNS -
DRAINAGE ISSUES NEAR ARCHER AVENUE (SI 1104)

I-294 STATION EQUATION:
STA. 1070+37.35 BK =
STA. 5070+37.35 AH

SEE DRAWING NO.12
MATCH LINE STATION 1068+00

MATCH LINE STATION 5082+00
SEE DRAWING NO.15

MATCH LINE
STATION 209+00
SEE DRAWING
NO. 14

12/22/2017
 C:\Users\jstevens\OneDrive\Documents\Projects\12222017\12222017.dwg
 12/22/2017

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CHECKED BY KS DATE 12/22/17

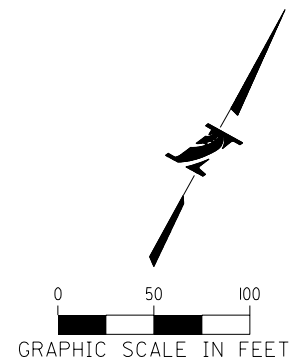
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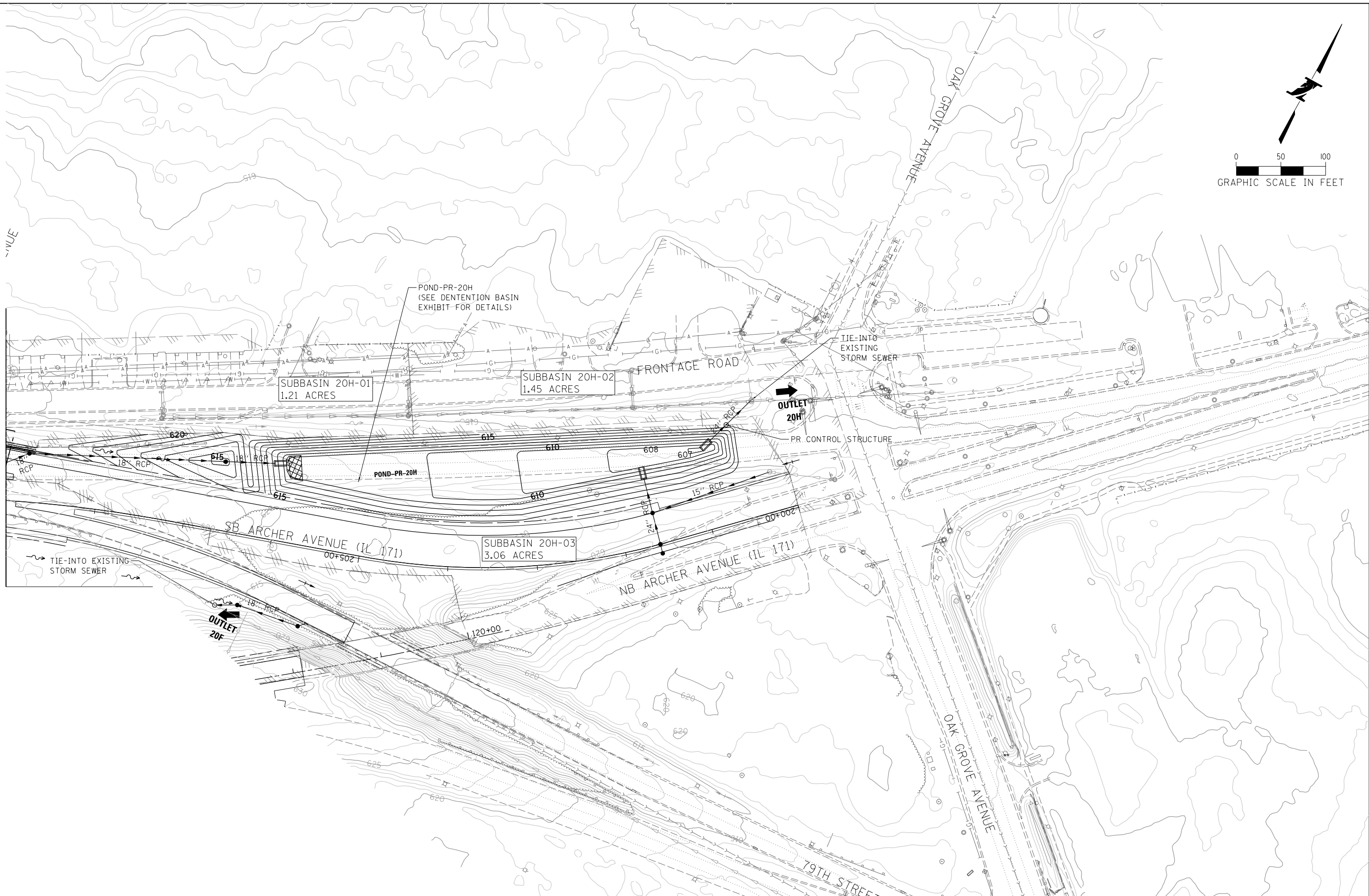
NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1068+00 TO STA 5082+00

SHEET NO. PD-13
DRAWING NO. 13 OF 52



MATCH LINE STATION 209+00
SEE DRAWING NO.13



12/22/2017
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CHECKED BY KS DATE 12/22/17

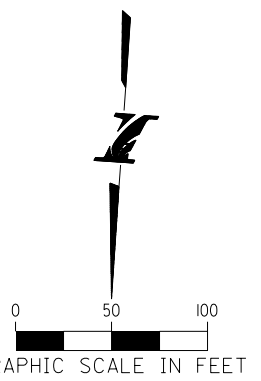
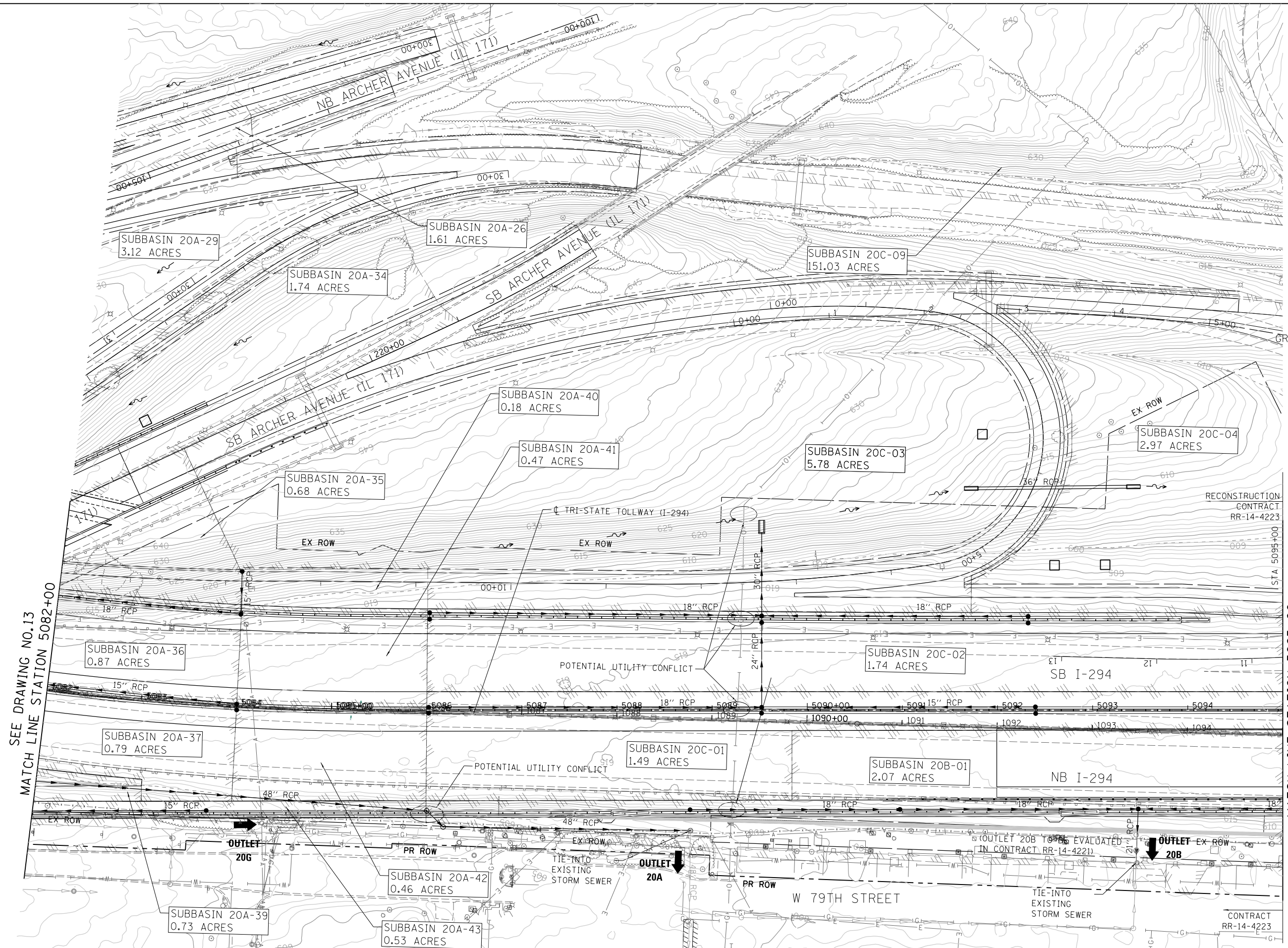
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REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 216+00 TO STA 215+00

SHEET NO. PD-14
DRAWING NO. 14 OF 52



SEE DRAWING NO.13
MATCH LINE STATION 5082+00

MATCH LINE STATION 5095+00
SEE DRAWING NO.16

12/22/2017
 C:\Users\james\OneDrive\Documents\Projects\RR-14-4223\Drawings\123.dgn
 User: james

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 CHECKED BY KS DATE 12/22/17

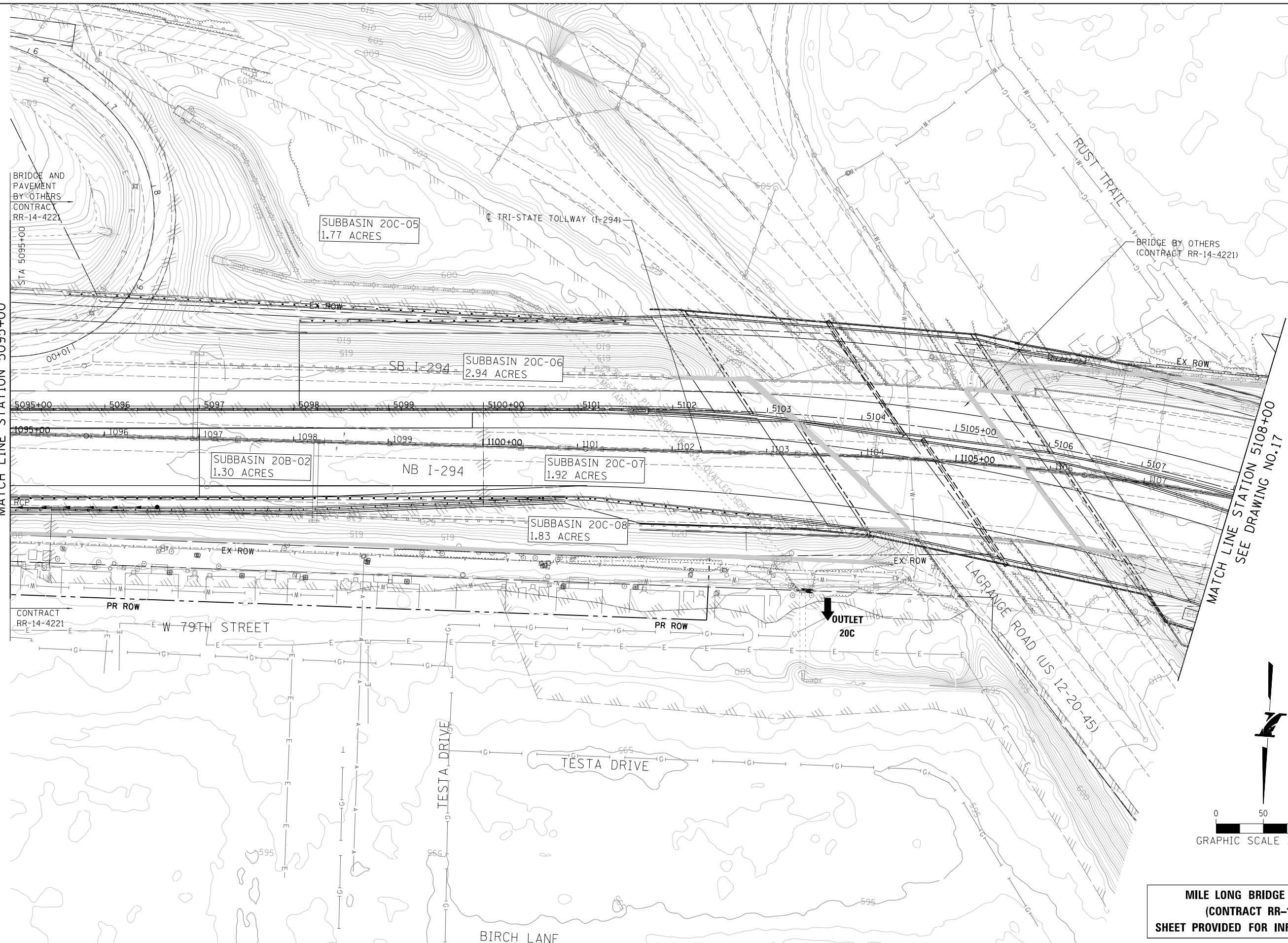
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 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		DESCRIPTION
NO.	DATE	

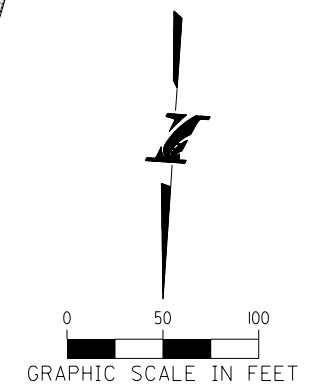
CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5082+00 TO STA 5095+00

SHEET NO. PD-15
 DRAWING NO. 15 OF 52



SEE DRAWING NO.15
MATCH LINE STATION 5095+00

MATCH LINE STATION 5108+00
SEE DRAWING NO.17



MILE LONG BRIDGE BY OTHERS
(CONTRACT RR-14-4221)
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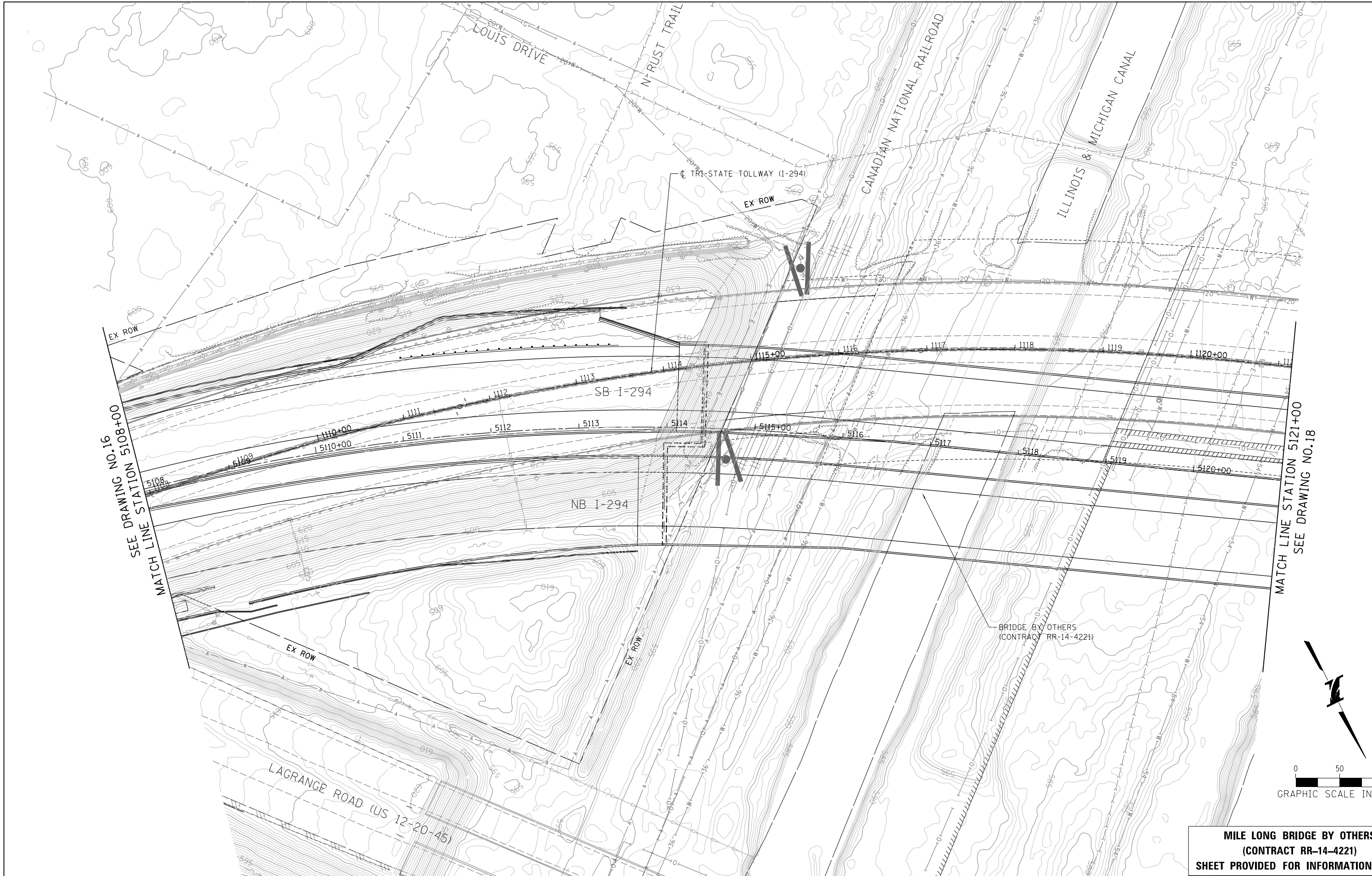
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		REVISIONS	
NO.	DATE	DESCRIPTION	

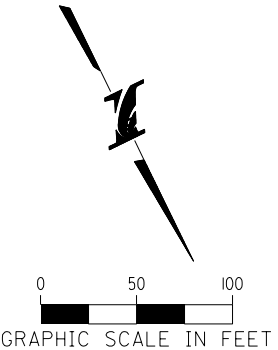
CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5095+00 TO STA 5108+00

SHEET NO.
 PD-16
 DRAWING NO.
 16 OF 52



SEE DRAWING NO.16
MATCH LINE STATION 5108+00

MATCH LINE STATION 5121+00
SEE DRAWING NO.18



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(CONTRACT RR-14-4221)
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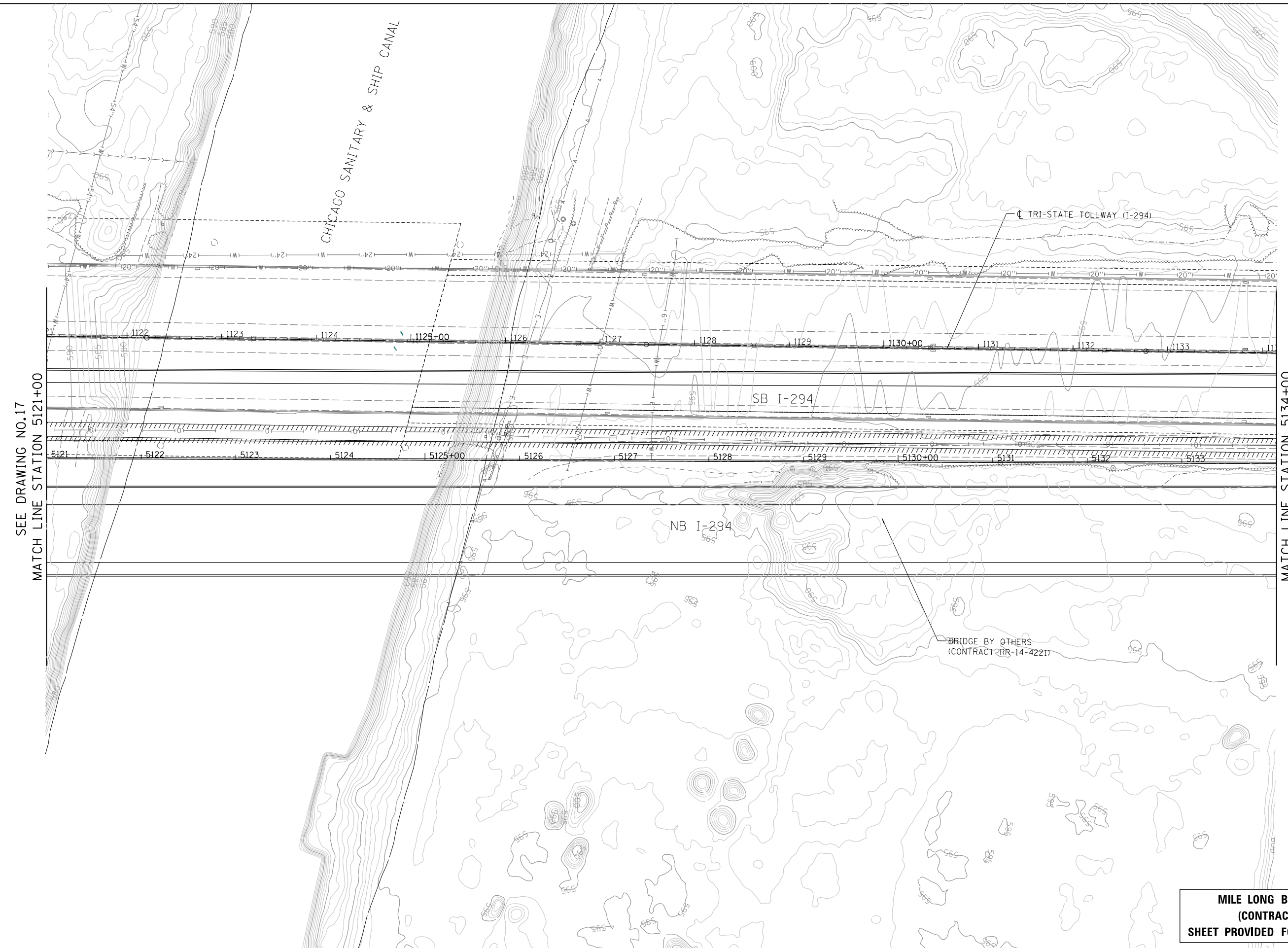
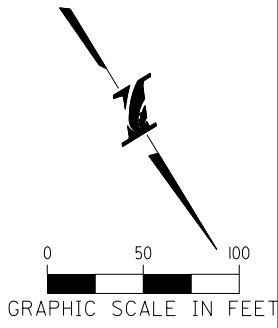
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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5108+00 TO STA 5121+00

SHEET NO.
 PD-17
 DRAWING NO.
 17 OF 52



SEE DRAWING NO.17
MATCH LINE STATION 5121+00

MATCH LINE STATION 5134+00
SEE DRAWING NO.19

**MILE LONG BRIDGE BY OTHERS
(CONTRACT RR-14-4221)
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 CHECKED BY KS DATE 12/22/17

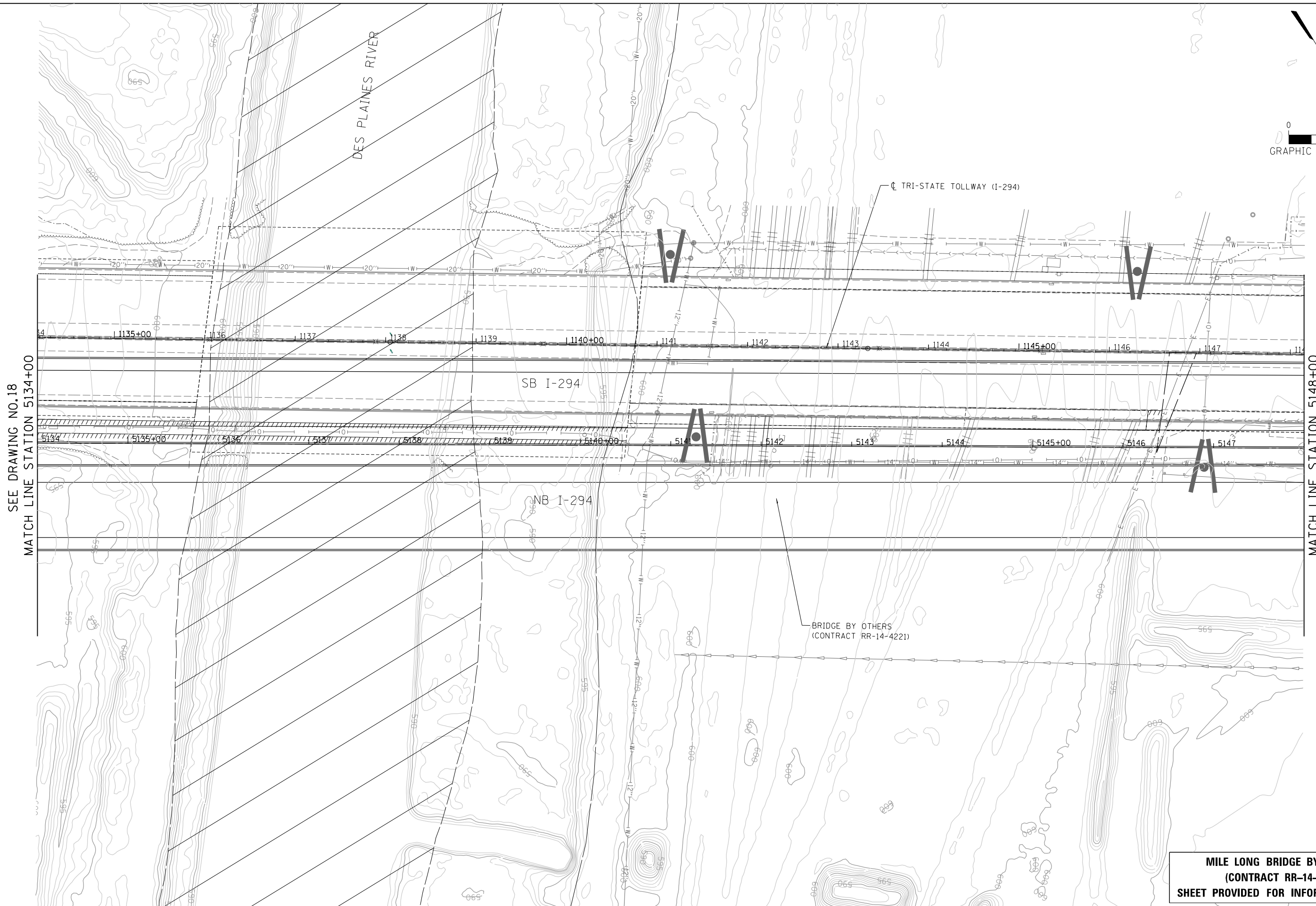
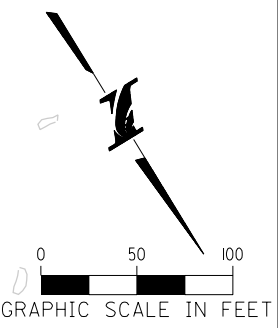

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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5121+00 TO STA 5134+00


SHEET NO.
 PD-18
 DRAWING NO.
 18 OF 52



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 CHECKED BY KS DATE 12/22/17

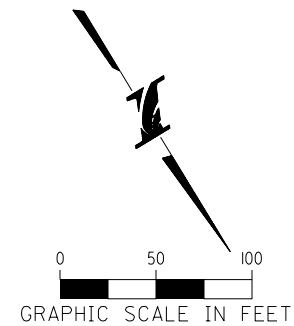

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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5134+00 TO STA 5148+00

SHEET NO.
 PD-19
 DRAWING NO.
 19 OF 52



SEE DRAWING NO.19
MATCH LINE STATION 5148+00

MATCH LINE STATION 5160+00
SEE DRAWING NO.21

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(CONTRACT RR-14-4221)
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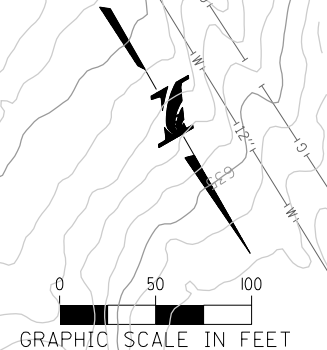
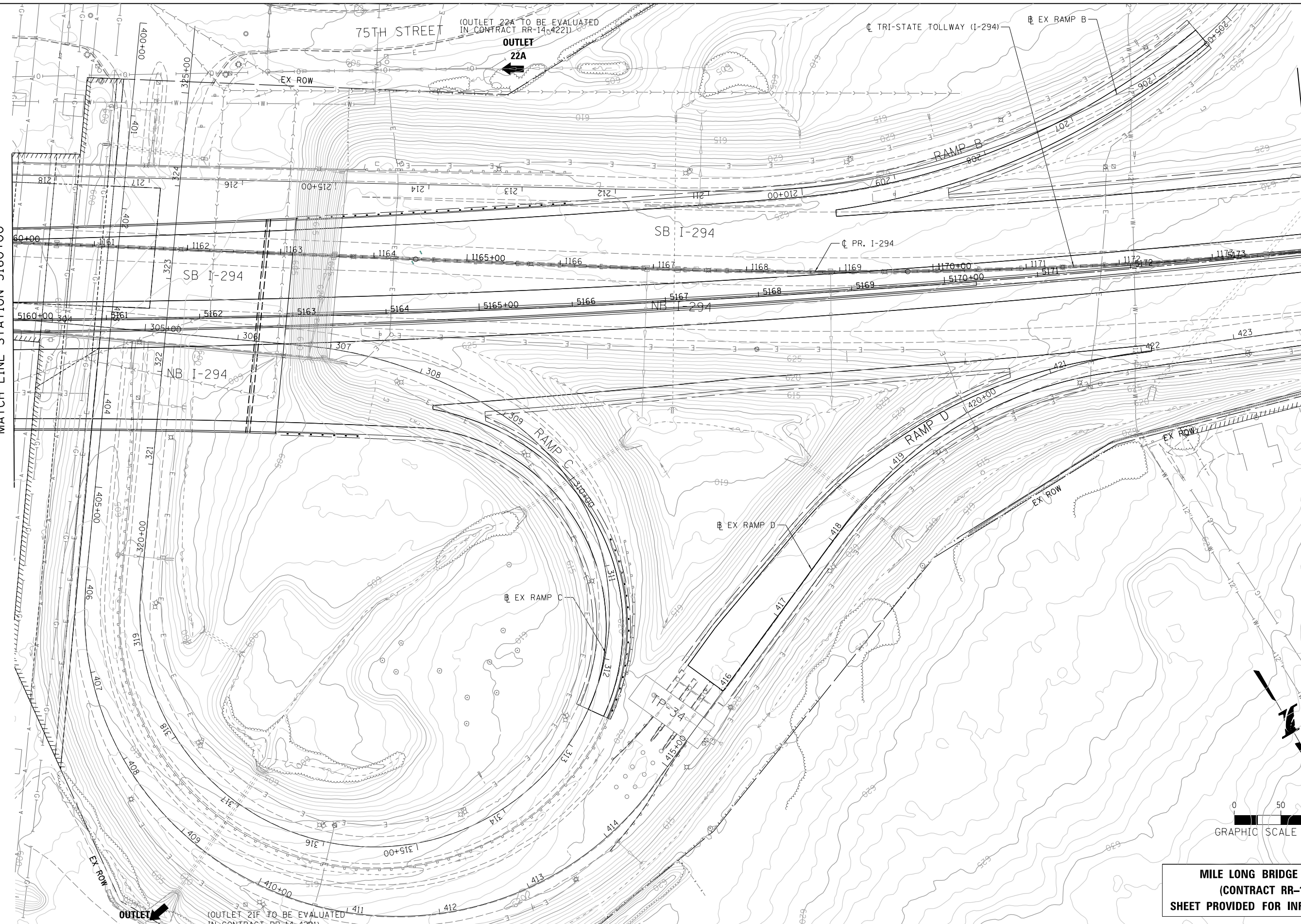
		REVISIONS	
NO.	DATE		DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5148+00 TO STA 5160+00

SHEET NO.
 PD-20
 DRAWING NO.
 20 OF 52

SEE DRAWING NO.20
MATCH LINE STATION 5160+00

MATCH LINE STATION 5174+00
SEE DRAWING NO.22



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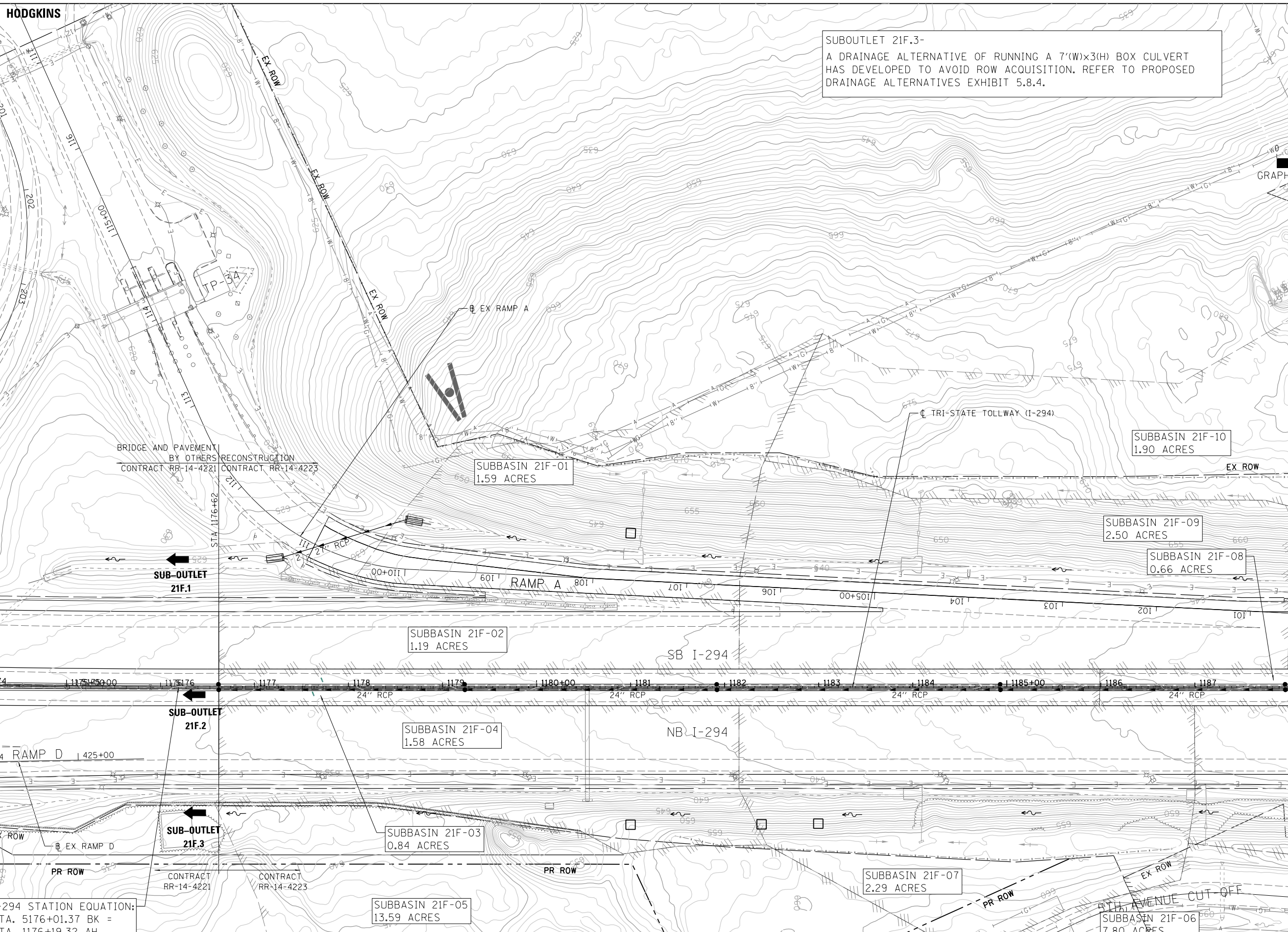
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

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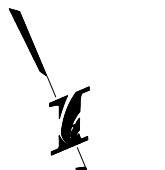
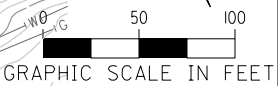
CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 5160+00 TO STA 5174+00

SHEET NO. PD-21
DRAWING NO. 21 OF 52

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 12/22/2017



SUBOUTLET 21F.3-
 A DRAINAGE ALTERNATIVE OF RUNNING A 7'(W)X3(H) BOX CULVERT HAS DEVELOPED TO AVOID ROW ACQUISITION. REFER TO PROPOSED DRAINAGE ALTERNATIVES EXHIBIT 5.8.4.



SEE DRAWING NO. 21
 MATCH LINE STATION 5174+00

MATCH LINE STATION 1188+00
 SEE DRAWING NO. 23

I-294 STATION EQUATION:
 STA. 5176+01.37 BK =
 STA. 1176+19.32 AH

SUBBASIN 21F-05
 13.59 ACRES

SUBBASIN 21F-06
 7.80 ACRES

DRAWN BY SB SCALE 1"=50'
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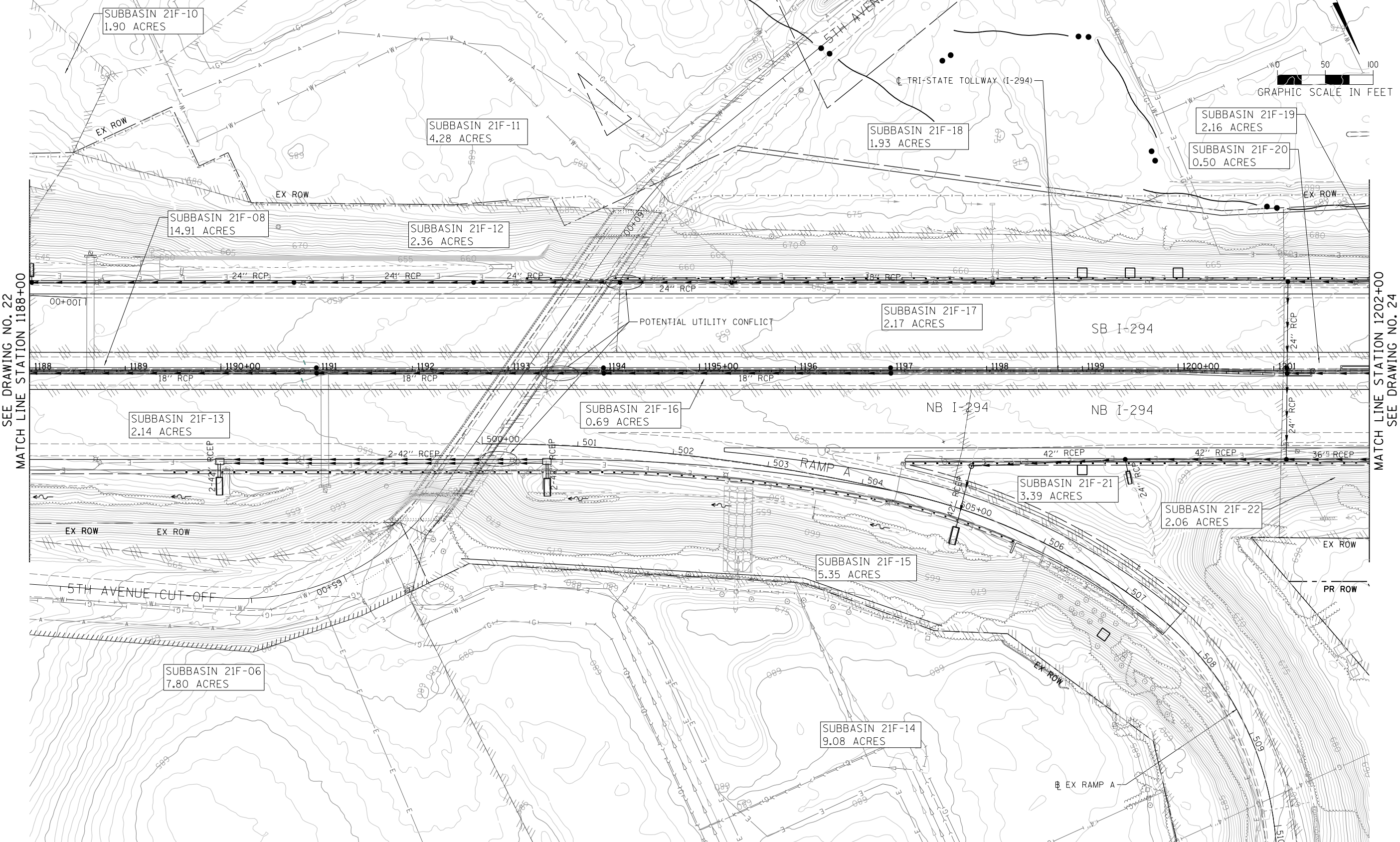
NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 5174+00 TO STA 1188+00

SHEET NO. PD-22
 DRAWING NO. 22 OF 52

12/22/2017
 C:\Users\james\OneDrive\Documents\exp\rr14\rr14-4223\shd-drain-138.dgn
 james

DES PLAINES RIVER(S) WATERSHED FLAGG CREEK WATERSHED



SEE DRAWING NO. 22
MATCH LINE STATION 1188+00

MATCH LINE STATION 1202+00
SEE DRAWING NO. 24

12/22/2017
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 CHECKED BY KS DATE 12/22/17

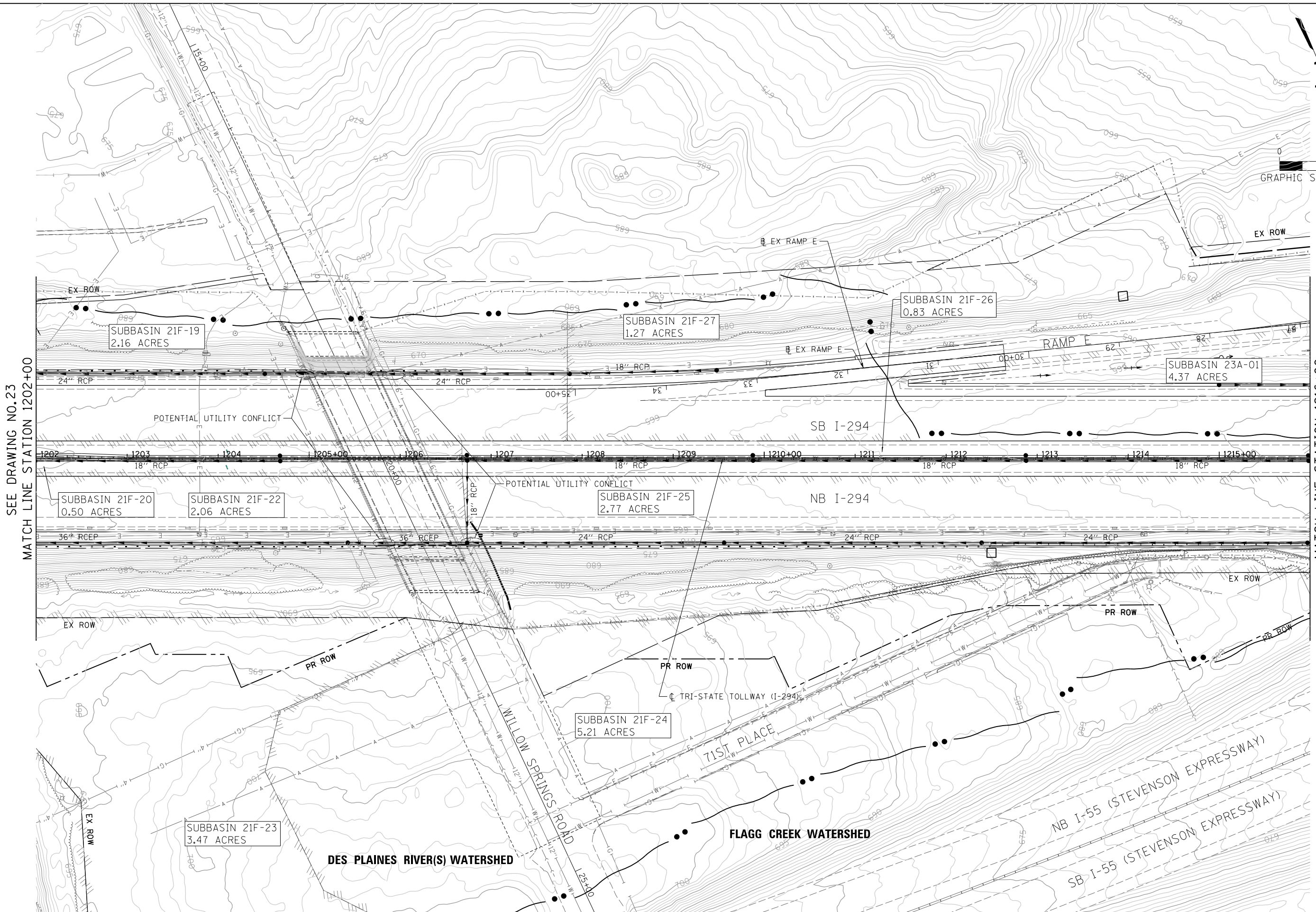
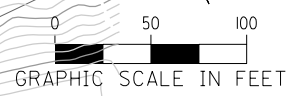
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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1188+00 TO STA 1202+00

SHEET NO. PD-23
 DRAWING NO. 23 OF 52



SEE DRAWING NO.23
MATCH LINE STATION 1202+00

MATCH LINE STATION 1216+00
SEE DRAWING NO.25

12/22/2017
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CHECKED BY KS DATE 12/22/17

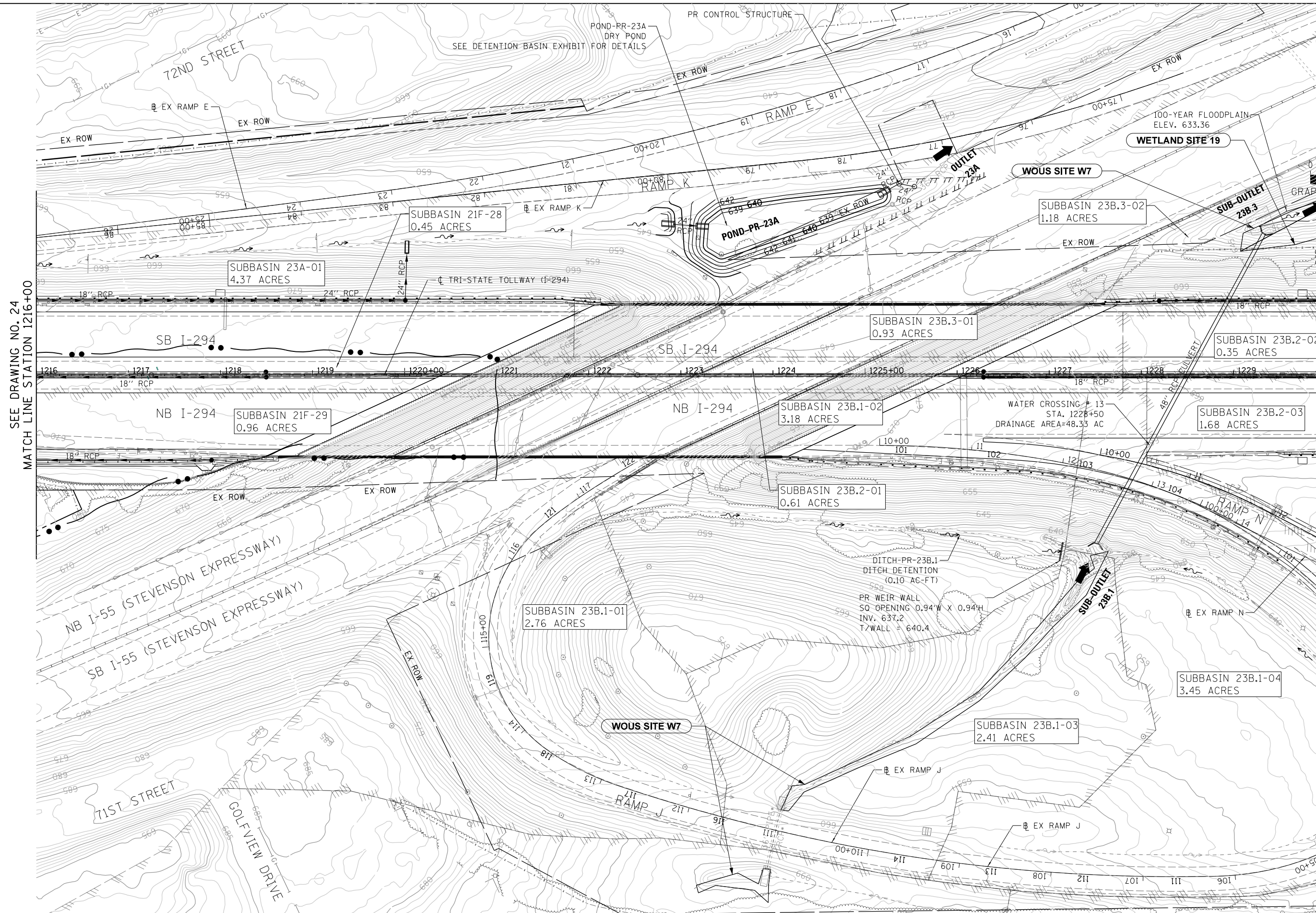
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NO.	DATE	REVISIONS	DESCRIPTION

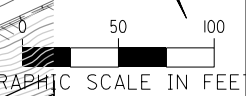
CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1202+00 TO STA 1216+00

SHEET NO. PD-24
DRAWING NO. 24 OF 52



SEE DRAWING NO. 24
MATCH LINE STATION 1216+00

MATCH LINE STATION 1230+00
SEE DRAWING NO. 26



12/22/2017
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DRAWN BY SB SCALE 1"=50'
 CHECKED BY KS DATE 12/22/17

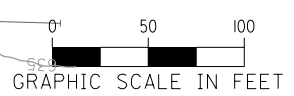
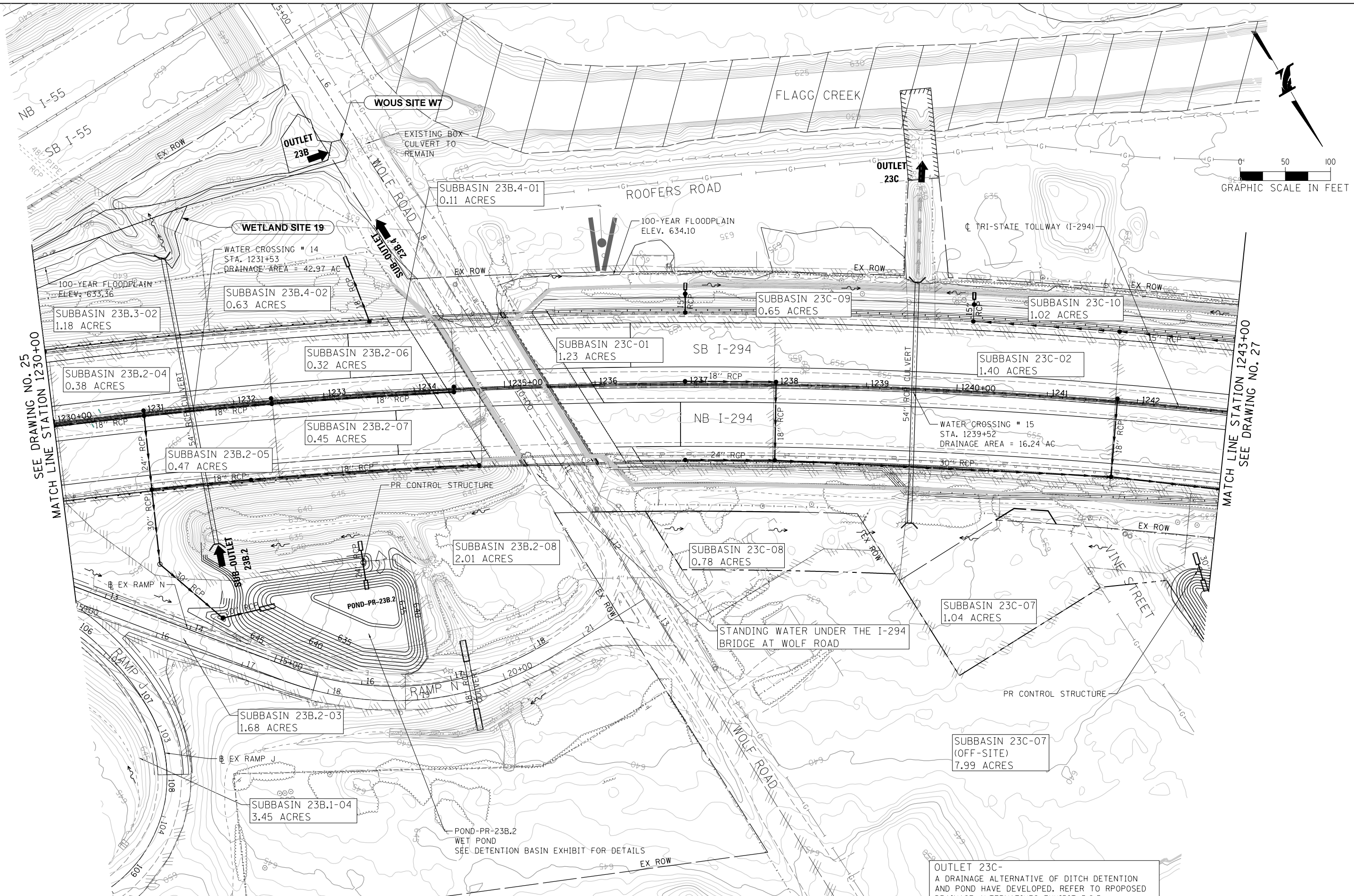
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 BUILDINGS • EARTH & ENVIRONMENT • ENERGY
 INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1216+00 TO STA 1230+00

SHEET NO. PD-25
 DRAWING NO. 25 OF 52



SEE DRAWING NO. 25
MATCH LINE STATION 1230+00

MATCH LINE STATION 1243+00
SEE DRAWING NO. 27

OUTLET 23C-
A DRAINAGE ALTERNATIVE OF DITCH DETENTION
AND POND HAVE DEVELOPED. REFER TO PROPOSED
DRAINAGE ALTERNATIVES EXHIBIT 5.8.5.

STANDING WATER UNDER THE I-294
BRIDGE AT WOLF ROAD

SUBBASIN 23B.1-04
3.45 ACRES

SUBBASIN 23B.2-03
1.68 ACRES

SUBBASIN 23B.2-05
0.47 ACRES

SUBBASIN 23B.2-07
0.45 ACRES

SUBBASIN 23B.2-06
0.32 ACRES

SUBBASIN 23B.3-02
1.18 ACRES

SUBBASIN 23B.4-02
0.63 ACRES

SUBBASIN 23B.4-01
0.11 ACRES

SUBBASIN 23C-01
1.23 ACRES

SUBBASIN 23C-02
1.40 ACRES

SUBBASIN 23C-09
0.65 ACRES

SUBBASIN 23C-10
1.02 ACRES

SUBBASIN 23C-07
1.04 ACRES

SUBBASIN 23C-07
(OFF-SITE)
7.99 ACRES

SUBBASIN 23C-08
0.78 ACRES

SUBBASIN 23B.2-08
2.01 ACRES

12/22/2017
 C:\Users\jstevens\OneDrive\Documents\Projects\RR-14-4223\Drawings\23B.dgn
 134.dgn

DRAWN BY SB SCALE 1"=50'
CHECKED BY KS DATE 12/22/17

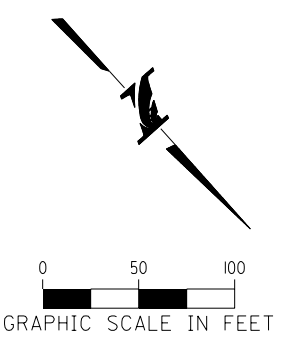
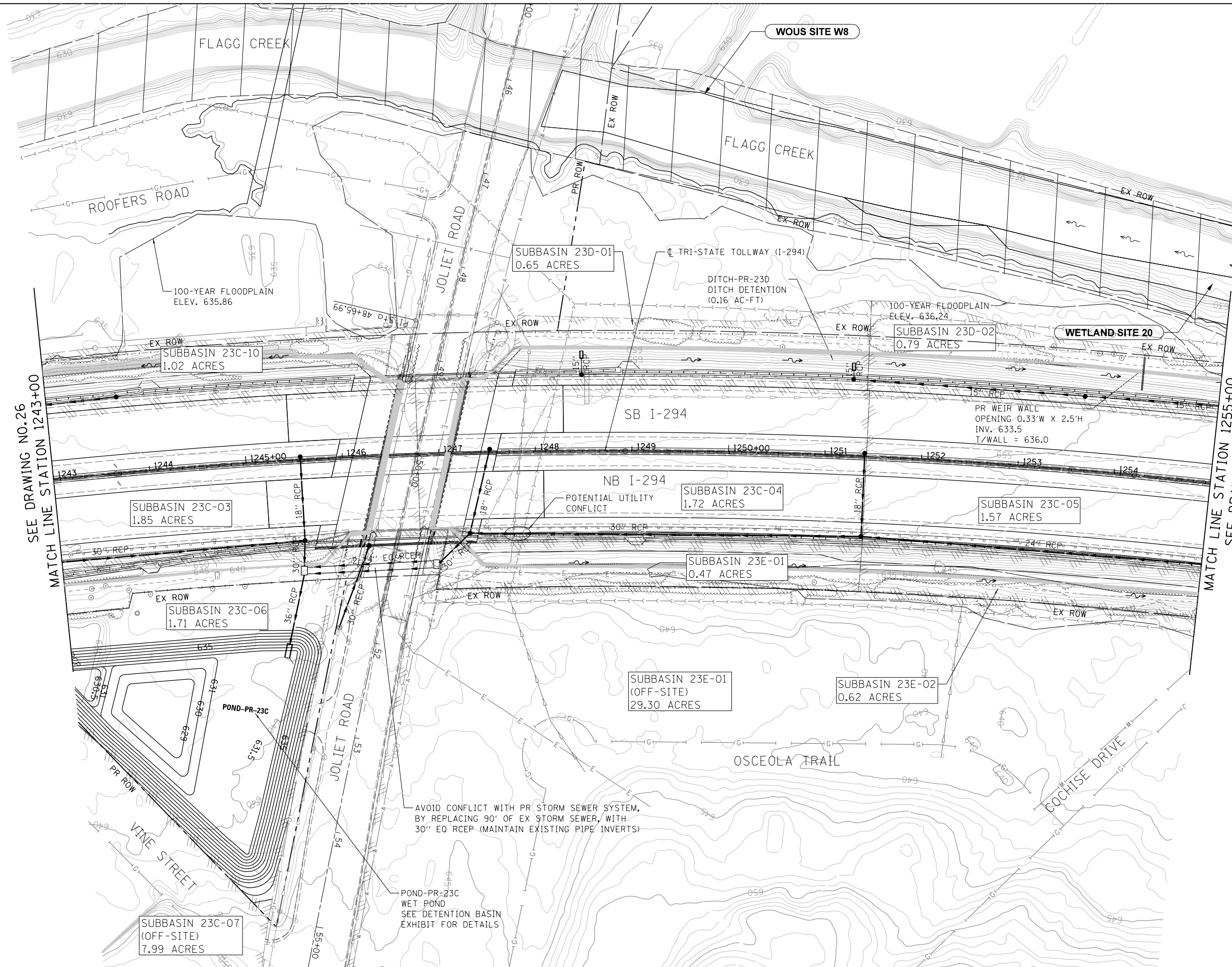
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1230+00 TO STA 1243+00

SHEET NO. PD-26
DRAWING NO. 26 OF 52



SEE DRAWING NO.26
MATCH LINE STATION 1243+00

MATCH LINE STATION 1255+00
SEE DRAWING NO.28

12/22/2017
C:\Users\jstevens\OneDrive\Documents\Projects\RR-14-4223\1255-1243\1255-1243.dgn

DRAWN BY SB SCALE 1"=50'
CHECKED BY KS DATE 12/22/17

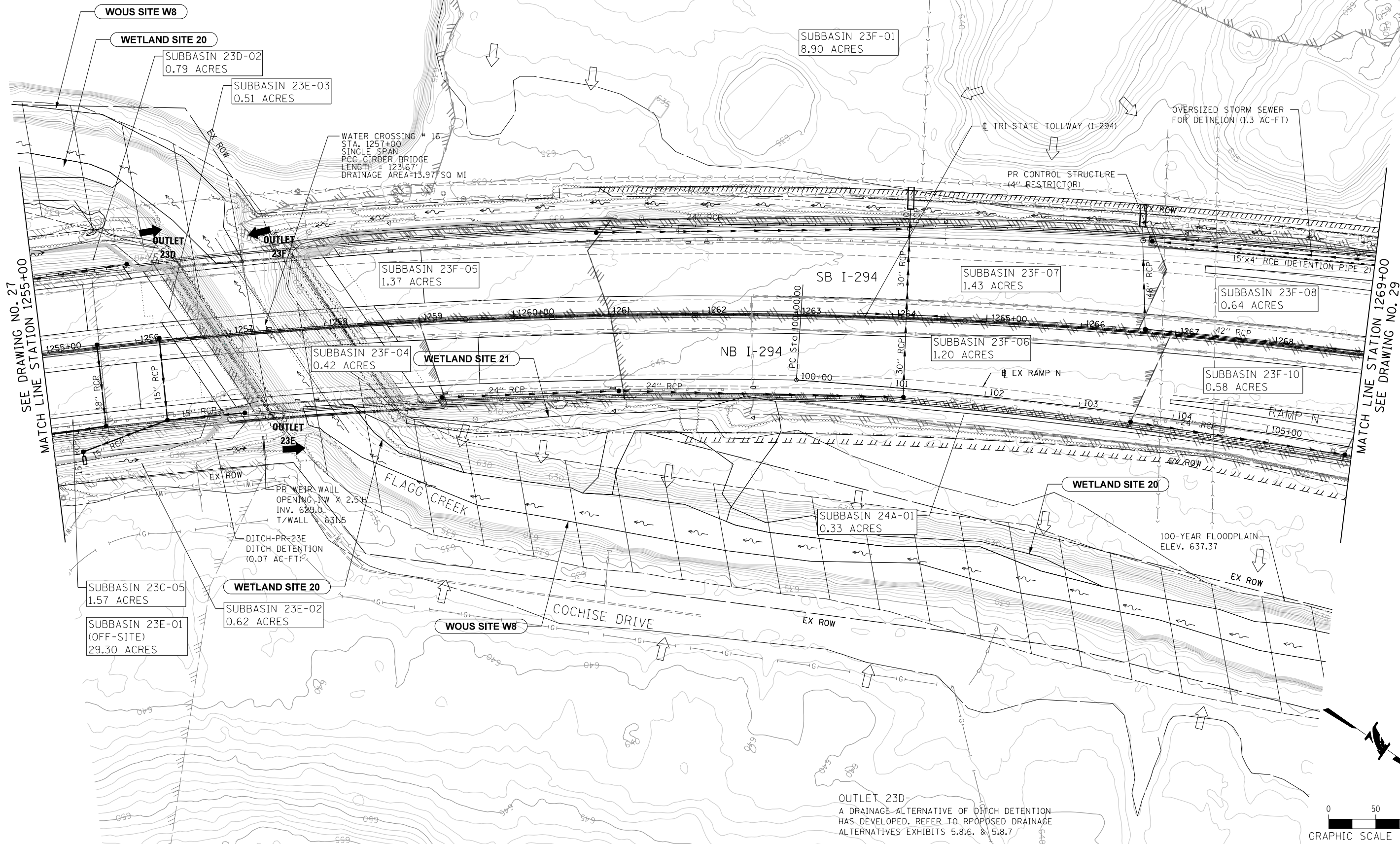
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1243+00 TO STA 1255+00

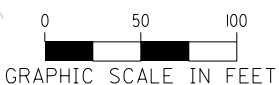
SHEET NO.
PD-27
DRAWING NO.
27 OF 52



SEE DRAWING NO. 27
MATCH LINE STATION 1255+00

MATCH LINE STATION 1269+00
SEE DRAWING NO. 29

OUTLET 23D - A DRAINAGE ALTERNATIVE OF DITCH DETENTION HAS DEVELOPED. REFER TO PROPOSED DRAINAGE ALTERNATIVES EXHIBITS 5.8.6. & 5.8.7



12/22/2017
 C:\Users\james\OneDrive\Documents\Projects\RR-14-4223\Drawings\136.dgn
 136.dgn

DRAWN BY SB SCALE 1"=50'
 CHECKED BY KS DATE 12/22/17

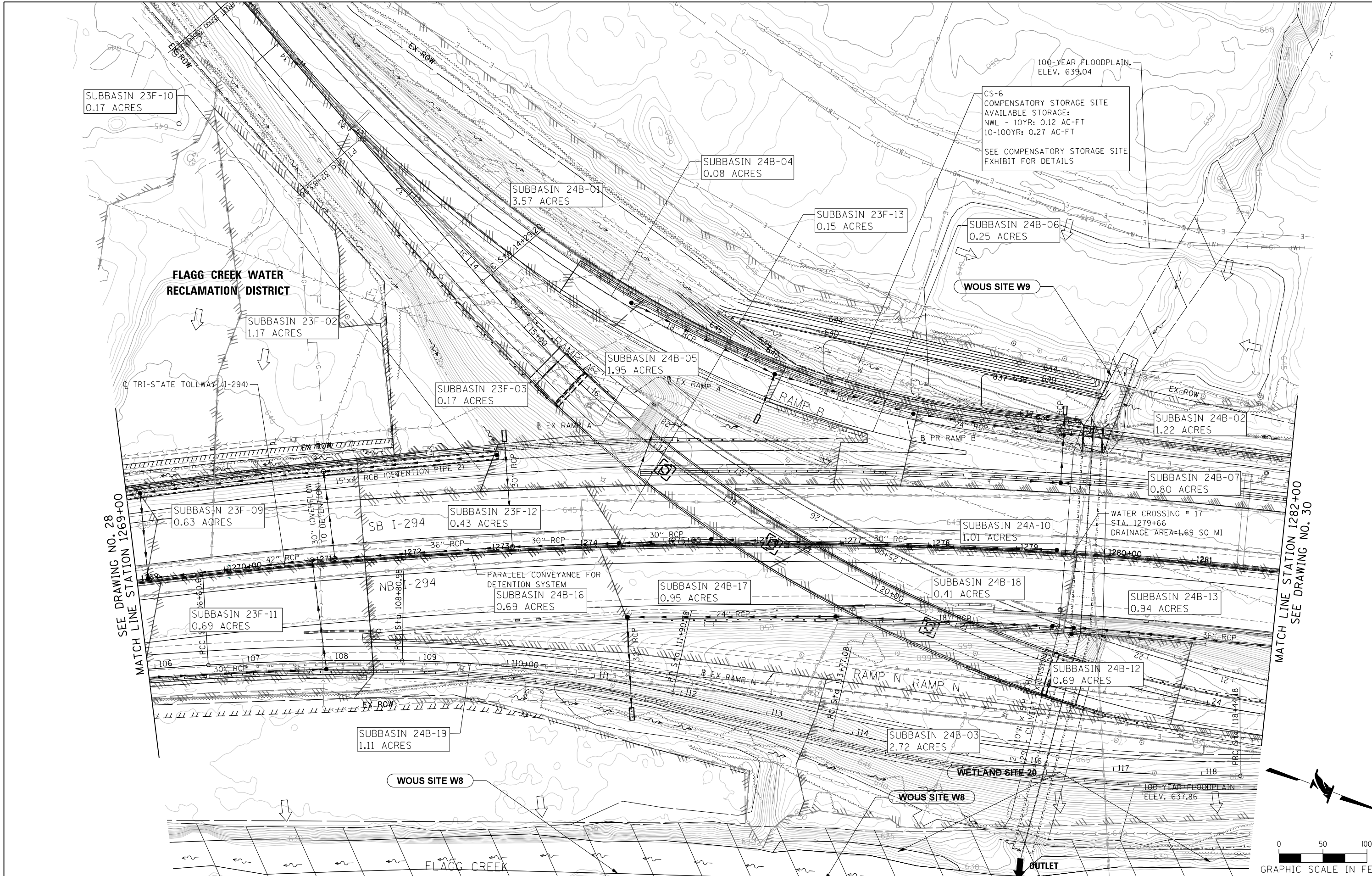


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1255+00 TO STA 1269+00

SHEET NO. PD-28
 DRAWING NO. 28 OF 52



SUBBASIN 23F-10
0.17 ACRES

FLAGG CREEK WATER
RECLAMATION DISTRICT

SUBBASIN 23F-02
1.17 ACRES

SUBBASIN 24B-04
0.08 ACRES

SUBBASIN 24B-01
3.57 ACRES

SUBBASIN 23F-13
0.15 ACRES

CS-6
COMPENSATORY STORAGE SITE
AVAILABLE STORAGE:
NWL - 10YR: 0.12 AC-FT
10-100YR: 0.27 AC-FT
SEE COMPENSATORY STORAGE SITE
EXHIBIT FOR DETAILS

SUBBASIN 24B-06
0.25 ACRES

WOUS SITE W9

SUBBASIN 24B-02
1.22 ACRES

SUBBASIN 24B-05
1.95 ACRES

SUBBASIN 23F-03
0.17 ACRES

SUBBASIN 24B-07
0.80 ACRES

SUBBASIN 23F-09
0.63 ACRES

SUBBASIN 23F-12
0.43 ACRES

SUBBASIN 24A-10
1.01 ACRES

WATER CROSSING # 17
STA. 1279+66
DRAINAGE AREA=1.69 SQ MI

SEE DRAWING NO. 28
MATCH LINE STATION 1269+00

SUBBASIN 23F-11
0.69 ACRES

SUBBASIN 24B-16
0.69 ACRES

SUBBASIN 24B-17
0.95 ACRES

SUBBASIN 24B-18
0.41 ACRES

SUBBASIN 24B-13
0.94 ACRES

MATCH LINE STATION 1282+00
SEE DRAWING NO. 30

SUBBASIN 24B-19
1.11 ACRES

WOUS SITE W8

WOUS SITE W8

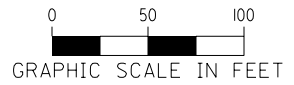
SUBBASIN 24B-03
2.72 ACRES

SUBBASIN 24B-12
0.69 ACRES

WETLAND SITE 20

100-YEAR FLOODPLAIN
ELEV. 637.86

OUTLET
24B



12/22/2017
 C:\Users\jwong\Documents\Projects\RR14\Drawings\1269+00\1269+00.dwg
 12/22/2017
 C:\Users\jwong\Documents\Projects\RR14\Drawings\1269+00\1269+00.dwg

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CHECKED BY JWC DATE 12/22/17

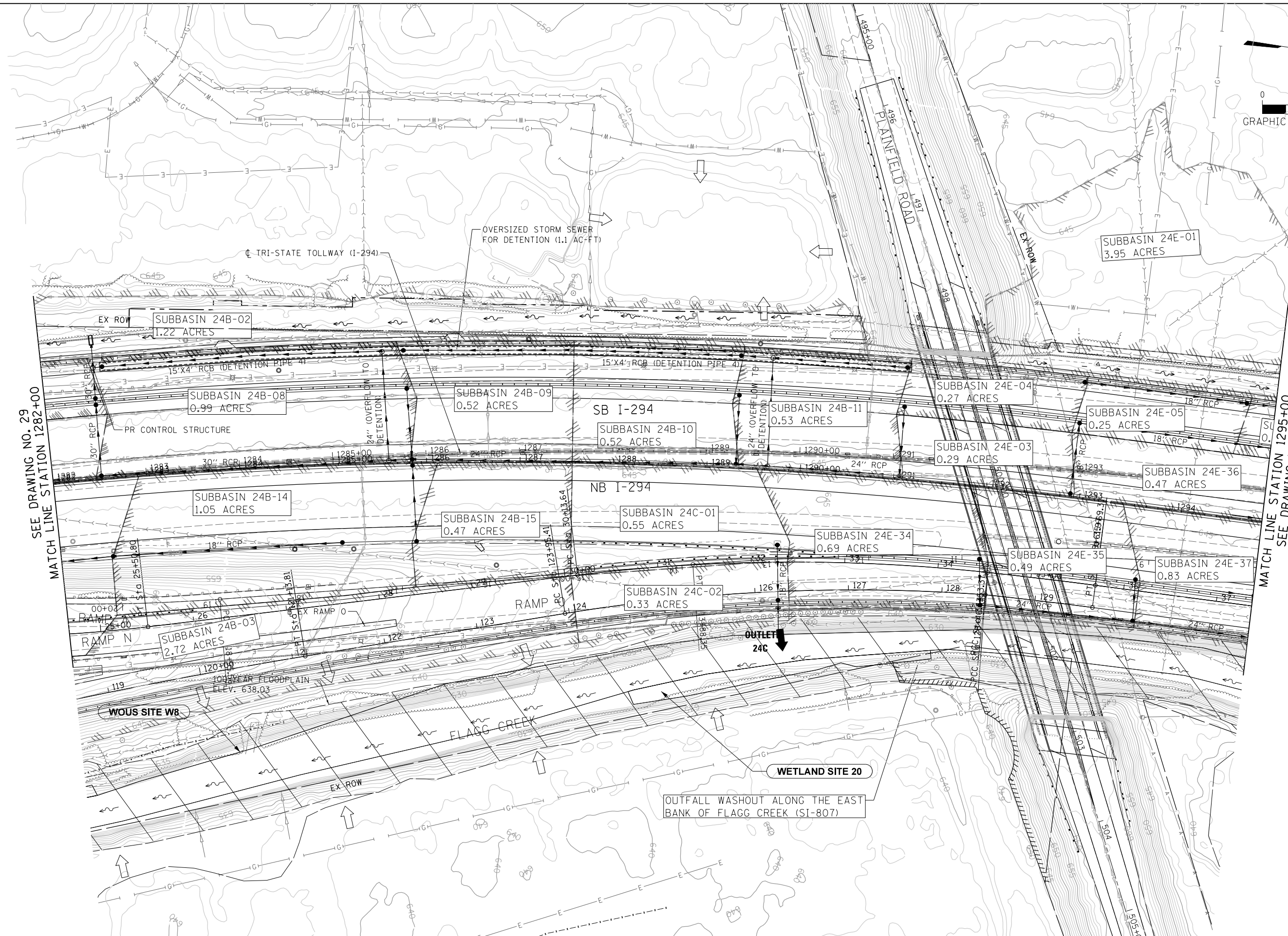
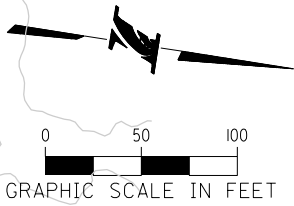


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1269+00 TO STA 1282+00

SHEET NO. PD-29
 DRAWING NO. 29 OF 52



SEE DRAWING NO. 29
MATCH LINE STATION 1282+00

MATCH LINE STATION 1295+00
SEE DRAWING NO. 31

12/22/2017
C:\Users\jwong\Documents\Projects\14223-RR-14-4223-DRN-138.dgn

DRAWN BY SED SCALE 1"=50'
CHECKED BY JWC DATE 12/22/17

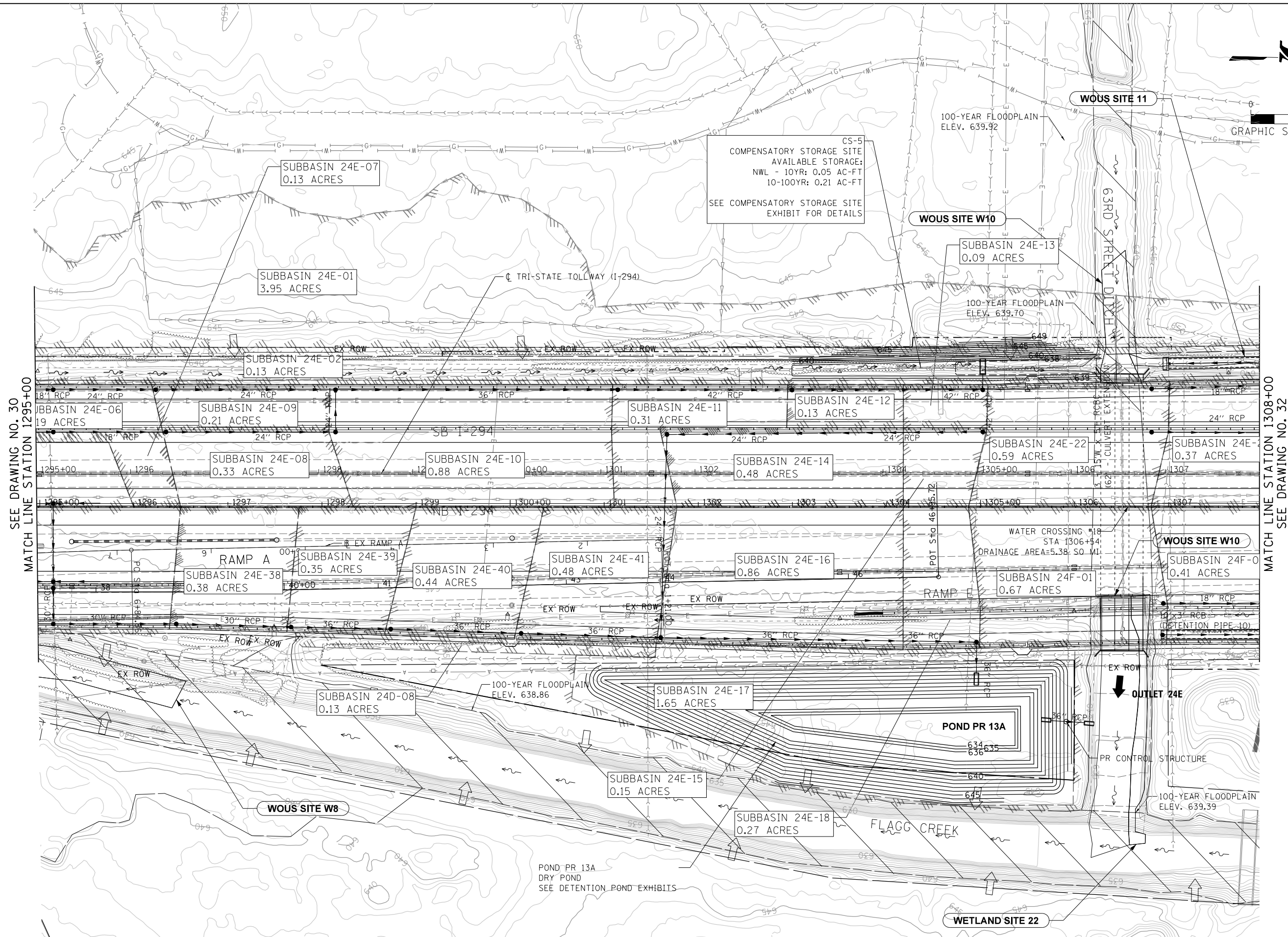
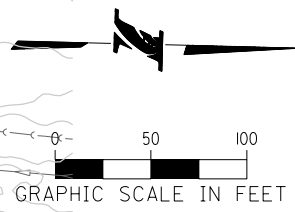


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1282+00 TO STA 1295+00

SHEET NO. PD-30
DRAWING NO. 30 OF 52



SEE DRAWING NO. 30
MATCH LINE STATION 1295+00

MATCH LINE STATION 1308+00
SEE DRAWING NO. 32

12/22/2017
C:\Users\jstevens\OneDrive\Documents\Projects\RR-14-4223\Drawings\13.dgn

DRAWN BY SED SCALE 1"=50'
CHECKED BY JWC DATE 12/22/17

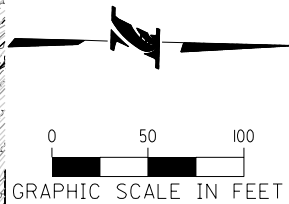
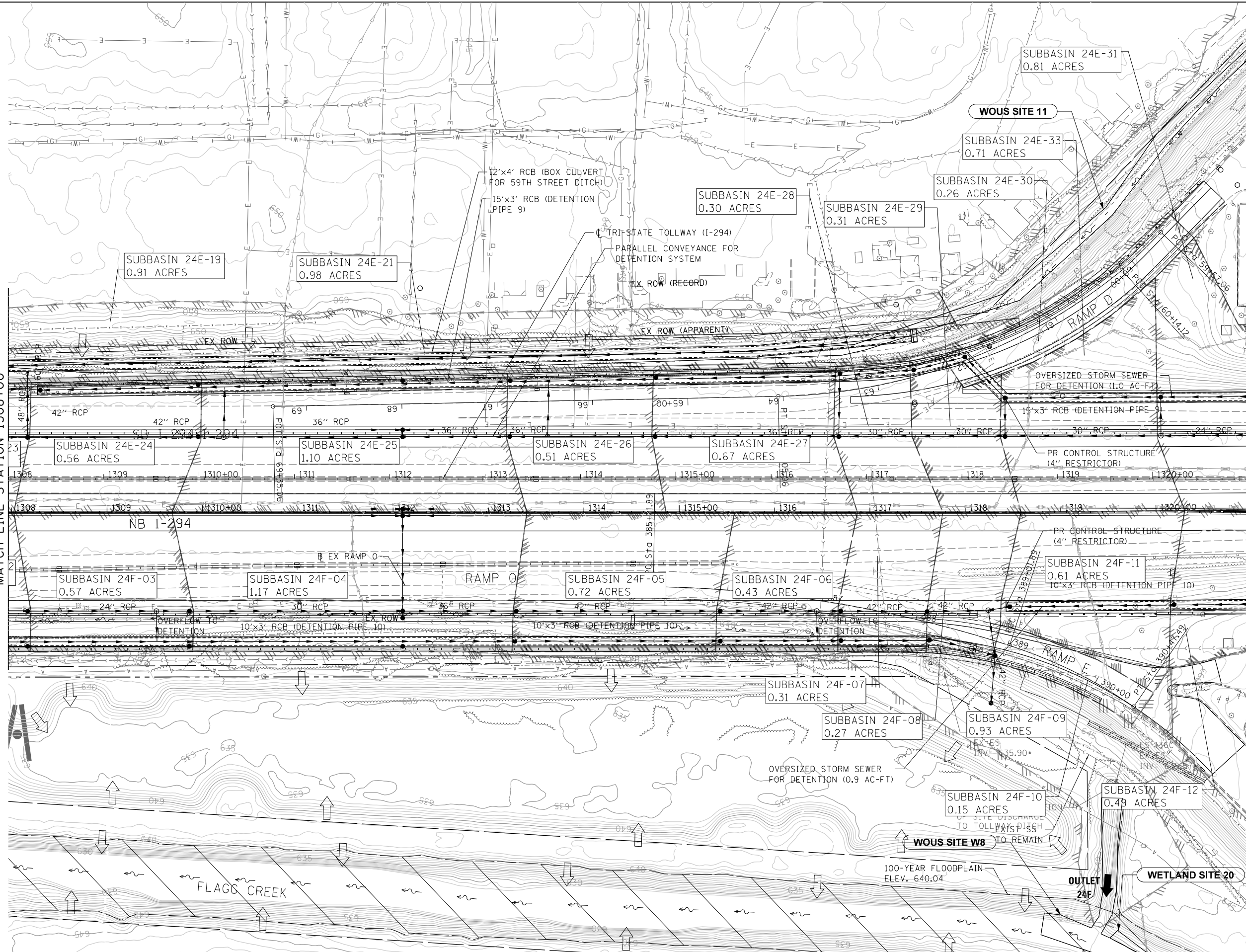


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1295+00 TO STA 1308+00

SHEET NO. PD-31
DRAWING NO. 31 OF 52



SEE DRAWING NO. 31
MATCH LINE STATION 1308+00

MATCH LINE STATION 1321+00
SEE DRAWING NO. 33

12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\14-4223-shr-drain-14.dgn
 J. Wong

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

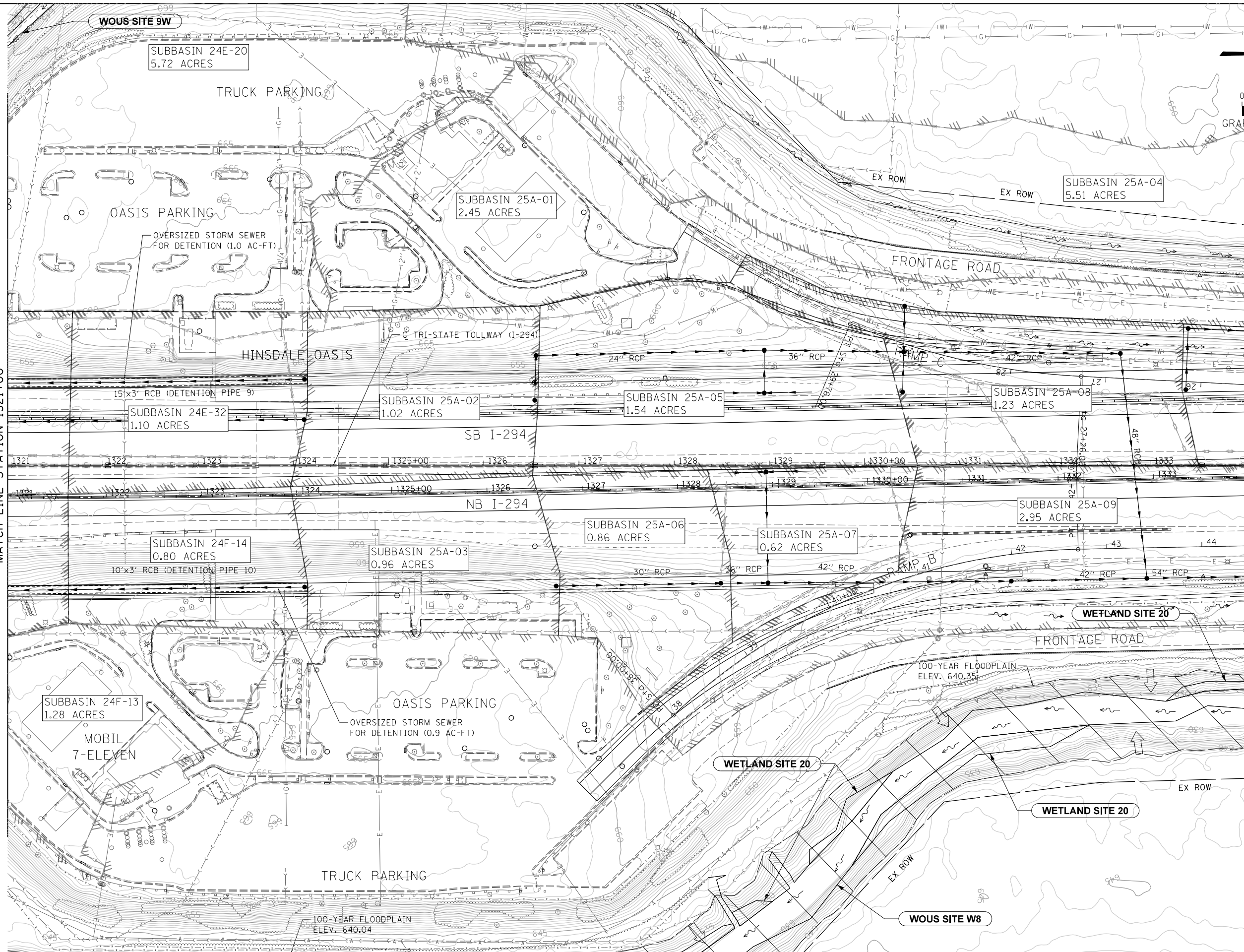


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

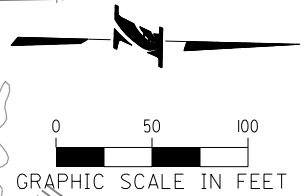
CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1308+00 TO STA 1321+00

SHEET NO.
 PD-32
 DRAWING NO.
 32 OF 52



SEE DRAWING NO. 32
MATCH LINE STATION 1321+00

MATCH LINE STATION 1334+00
SEE DRAWING NO. 34



12/22/2017
 C:\Users\jwong\Documents\Projects\14111\14111.dwg
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DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

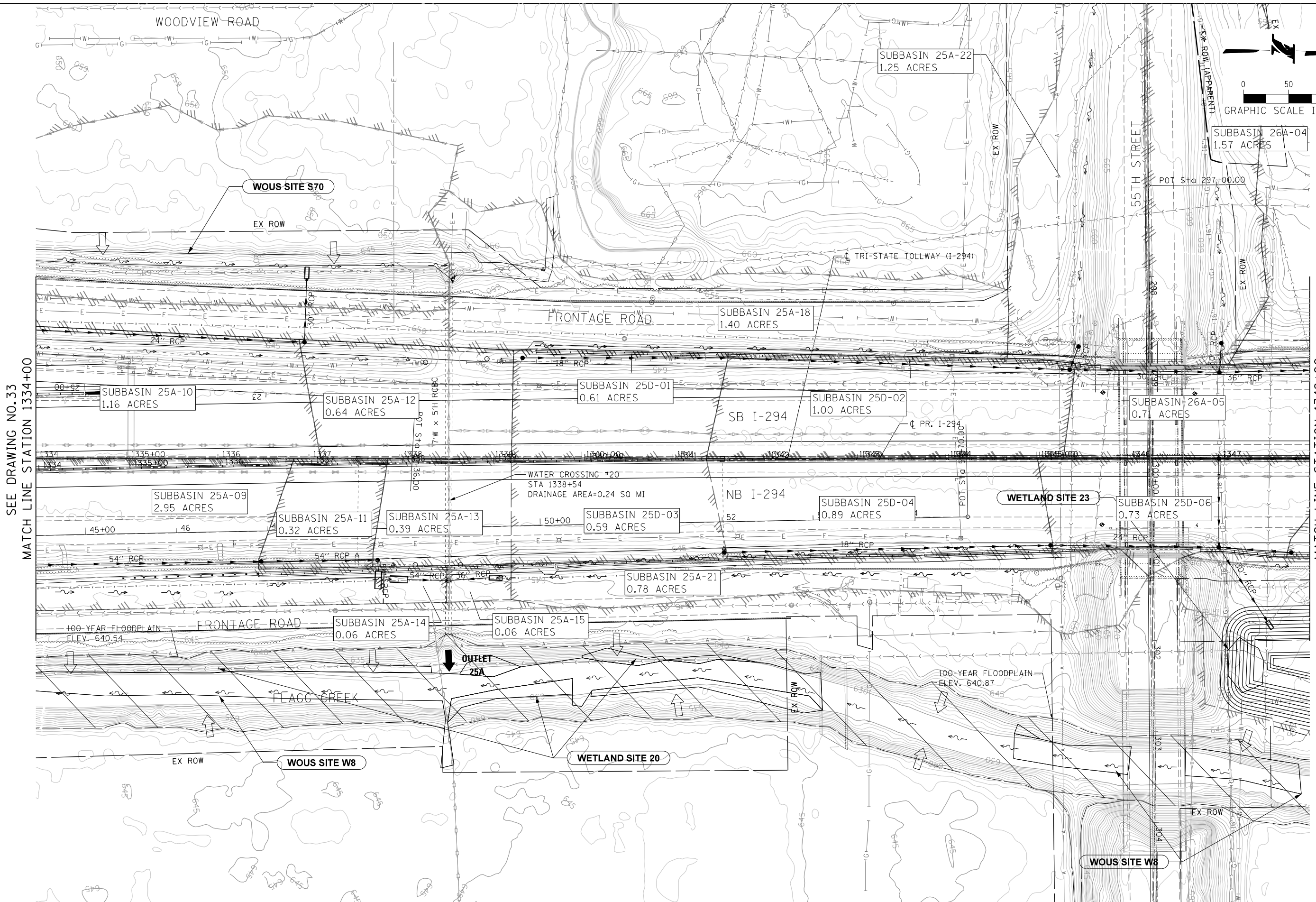


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		DESCRIPTION
NO.	DATE	

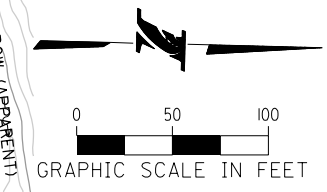
CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1321+00 TO STA 1334+00

SHEET NO. PD-33
 DRAWING NO. 33 OF 52



SEE DRAWING NO.33
MATCH LINE STATION 1334+00

MATCH LINE STATION 1348+00
SEE DRAWING NO.35



12/22/2017
 C:\Users\jstevens\OneDrive\Work\Projects\RR-14-4223\Drawings\14223-shr-drain-142.dgn
 JST

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

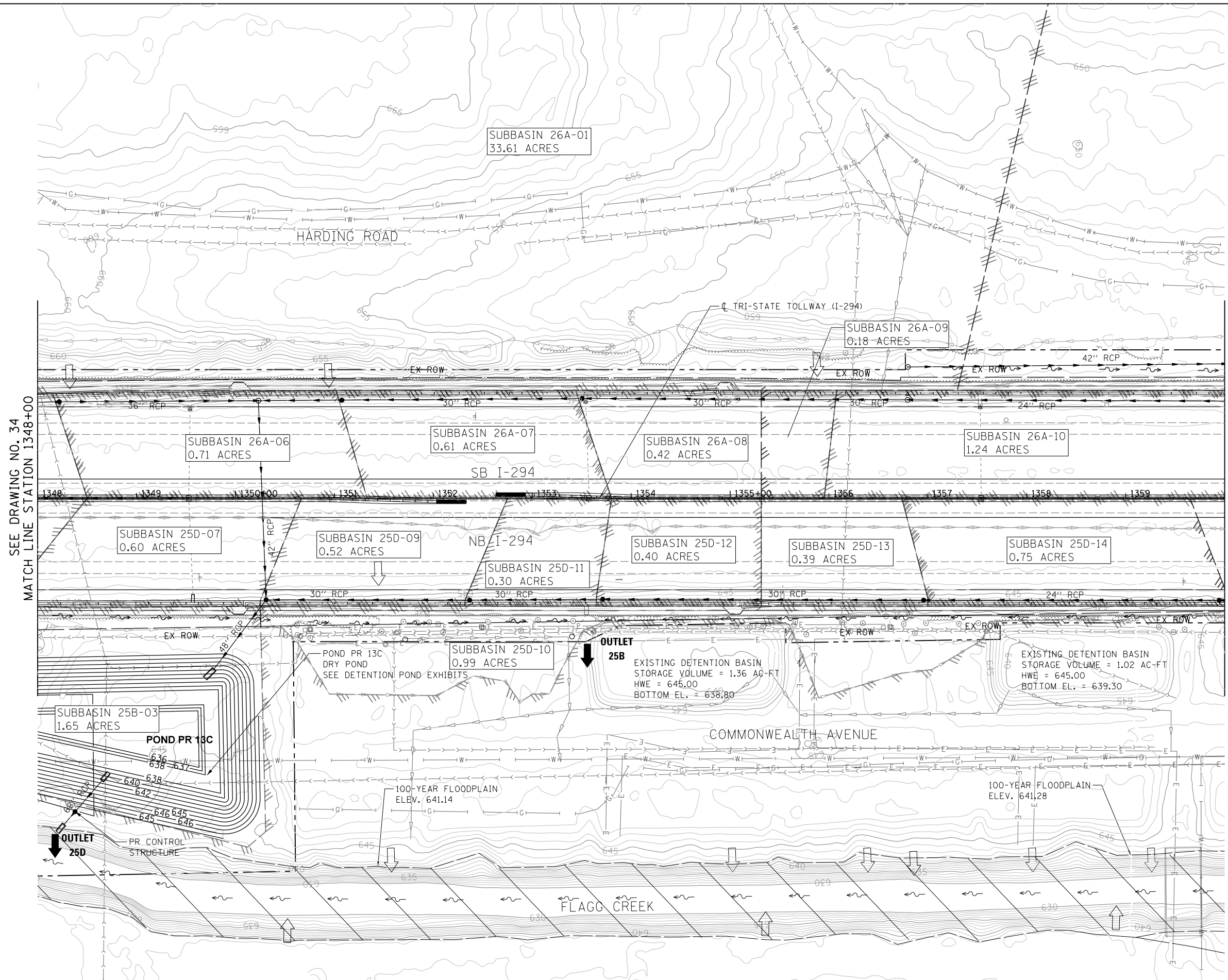
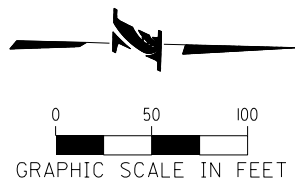


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1334+00 TO STA 1348+00

SHEET NO. PD-34
 DRAWING NO. 34 OF 52



SEE DRAWING NO. 34
MATCH LINE STATION 1348+00

MATCH LINE STATION 1360+00
SEE DRAWING NO. 36

12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\143.dgn
 J. Wong

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

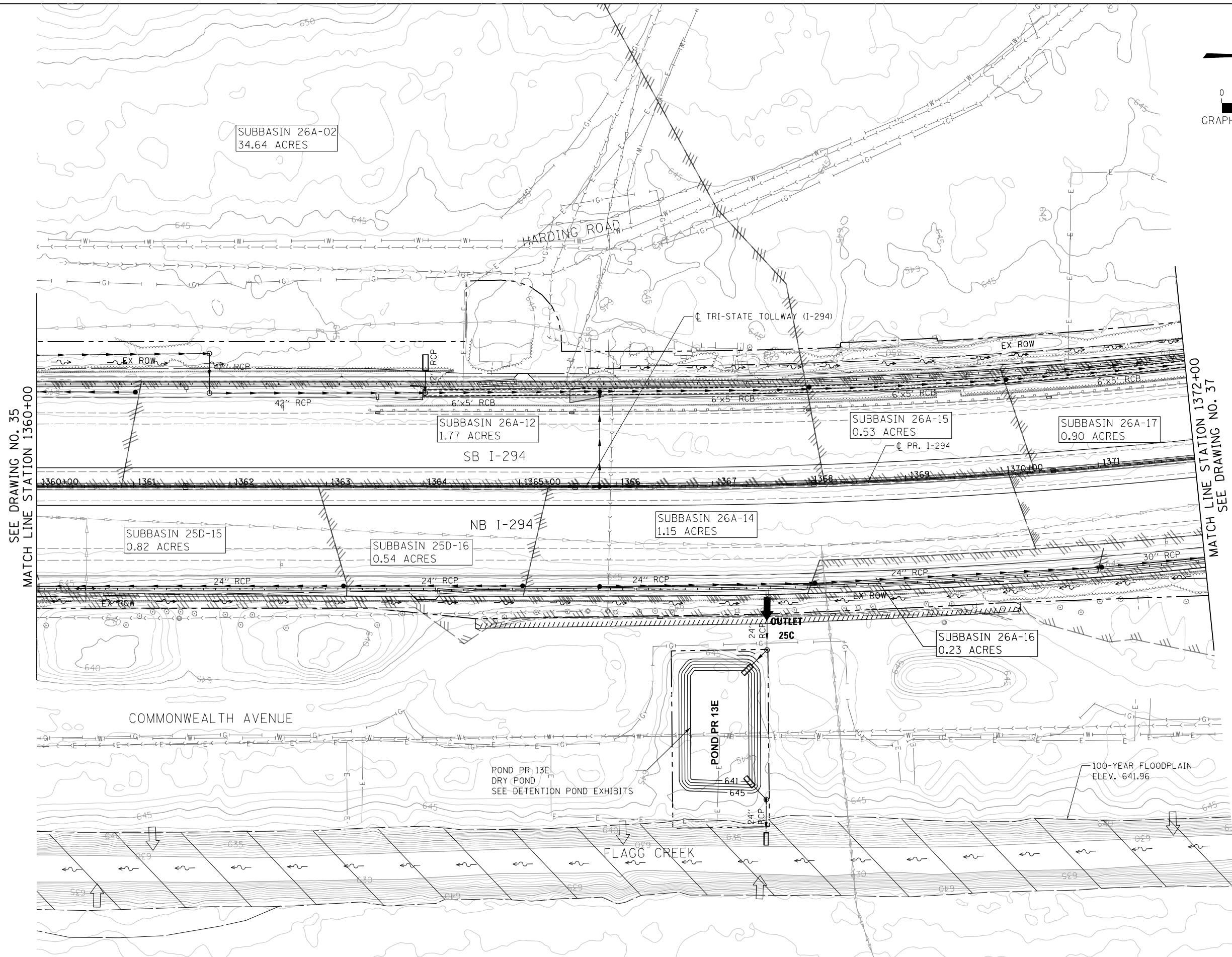
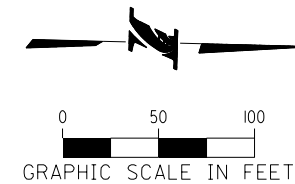


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1348+00 TO STA 1360+00

SHEET NO. PD-35
 DRAWING NO. 35 OF 52



12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\144.dgn
 J. Wong

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 CHECKED BY JWC DATE 12/22/17

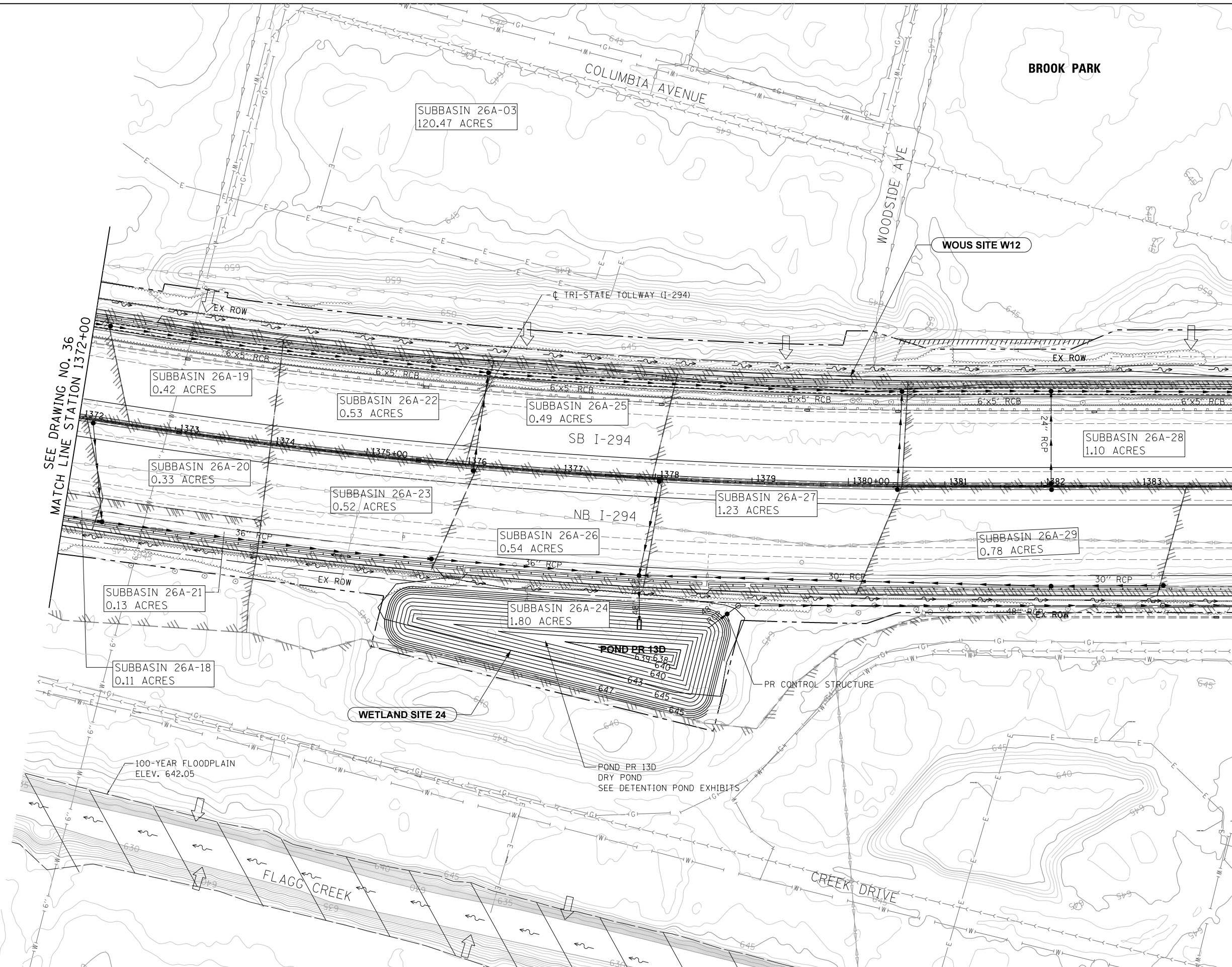
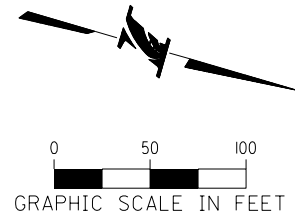


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1360+00 TO STA 1372+00

SHEET NO. PD-36
 DRAWING NO. 36 OF 52



SEE DRAWING NO. 36
MATCH LINE STATION 1372+00

MATCH LINE STATION 1384+00
SEE DRAWING NO. 38

12/22/2017
 C:\Users\jwong\Documents\Projects\14522178_4223_sht-drain-145.dgn
 J.Wong

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

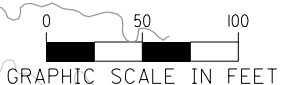


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

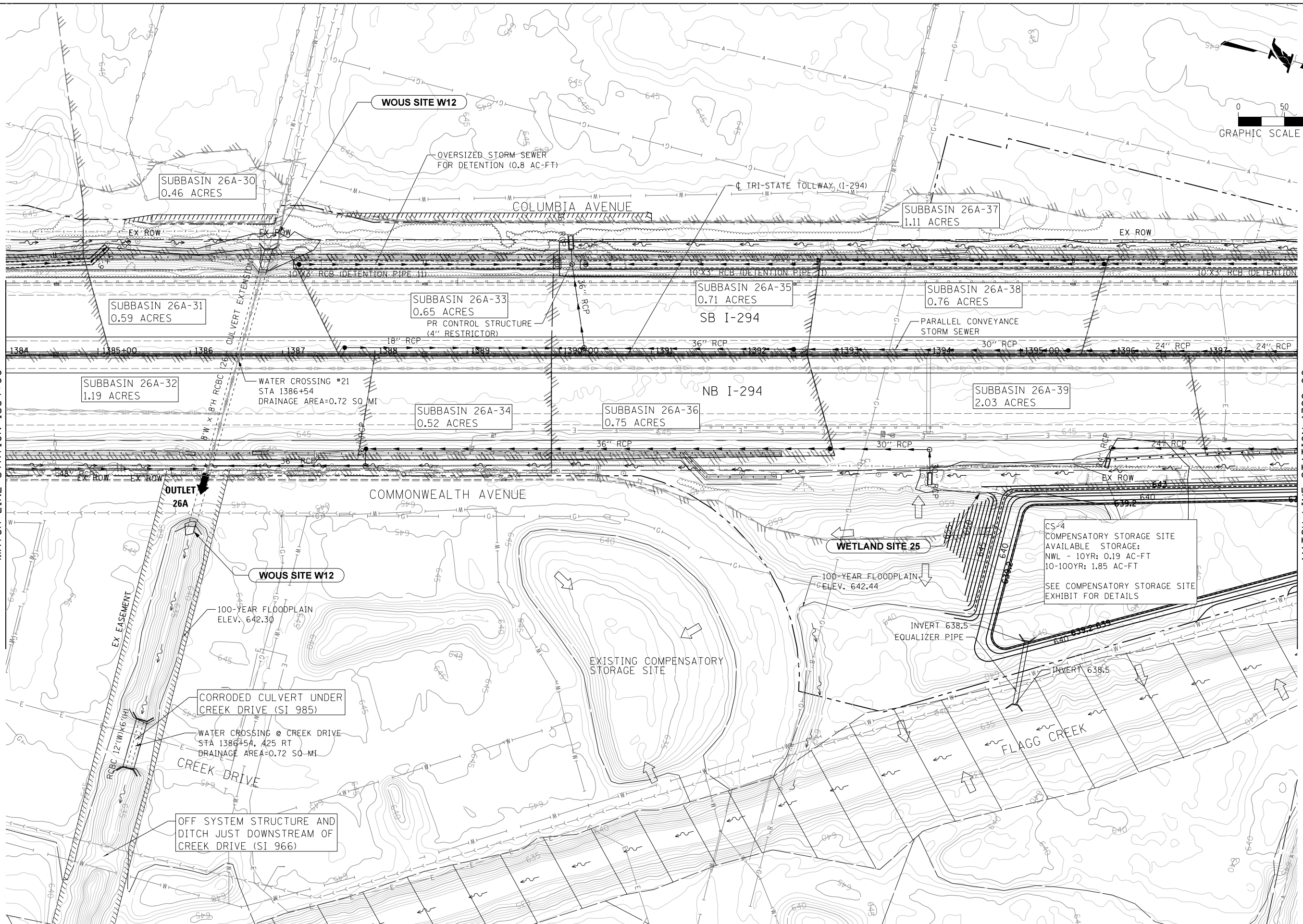
CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1372+00 TO STA 1384+00

SHEET NO. PD-37
 DRAWING NO. 37 OF 52



SEE DRAWING NO. 37
MATCH LINE STATION 1384+00

MATCH LINE STATION 1398+00
SEE DRAWING NO. 39



12/22/2017
 C:\Users\jwong\OneDrive\Documents\Projects\146223\146223-shr-drain-146.dgn
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DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

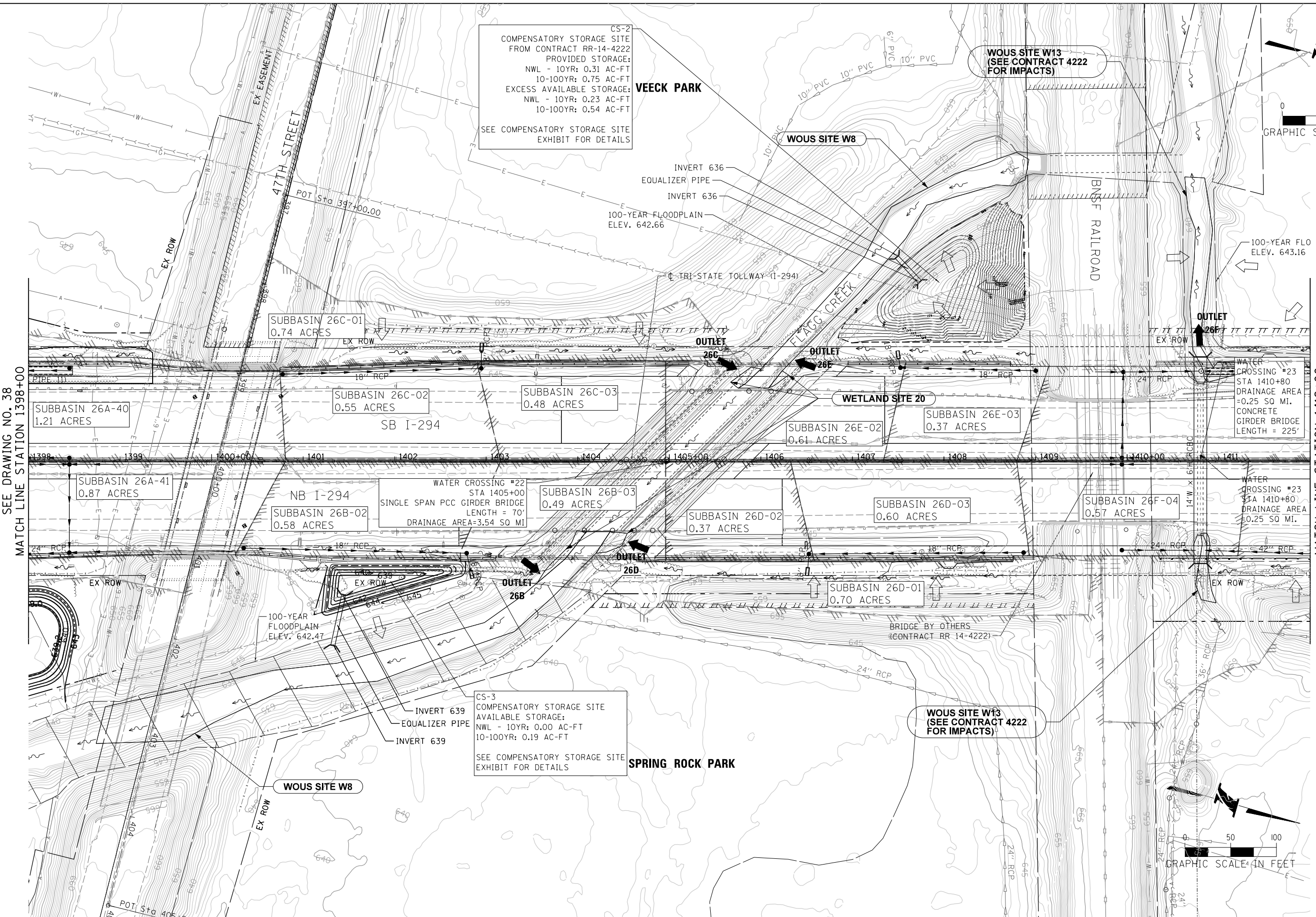


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1384+00 TO STA 1398+00

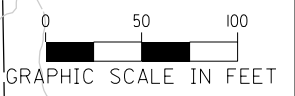
SHEET NO. PD-38
 DRAWING NO. 38 OF 52



CS-2
 COMPENSATORY STORAGE SITE
 FROM CONTRACT RR-14-4222
 PROVIDED STORAGE:
 NWL - 10YR: 0.31 AC-FT
 10-100YR: 0.75 AC-FT
 EXCESS AVAILABLE STORAGE:
 NWL - 10YR: 0.23 AC-FT
 10-100YR: 0.54 AC-FT
 SEE COMPENSATORY STORAGE SITE
 EXHIBIT FOR DETAILS

WOUS SITE W13
 (SEE CONTRACT 4222
 FOR IMPACTS)

WOUS SITE W8



SEE DRAWING NO. 38
 MATCH LINE STATION 1398+00

MATCH LINE STATION 1412+00
 SEE DRAWING NO. 40

12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\147.dgn
 JWC

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

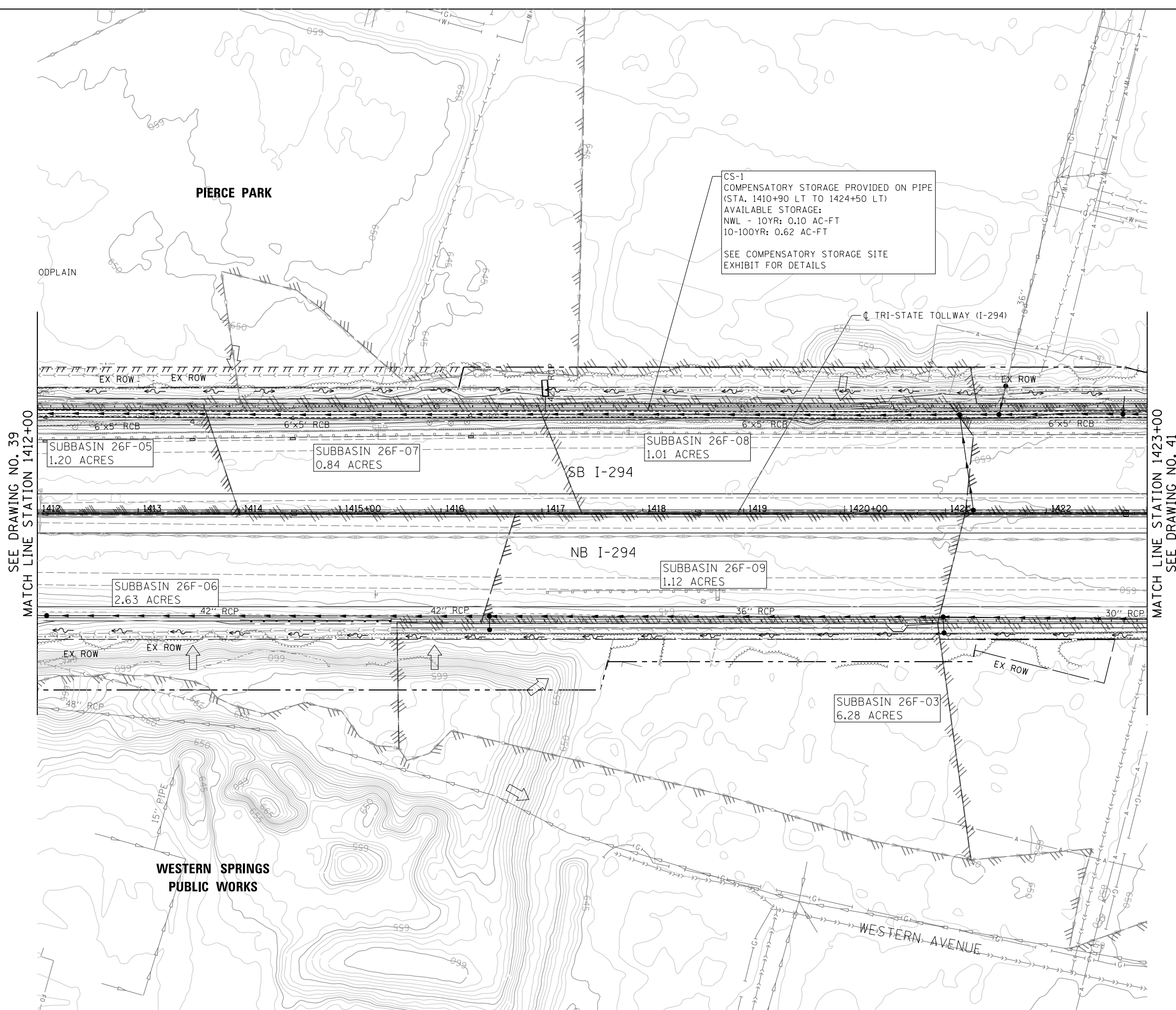
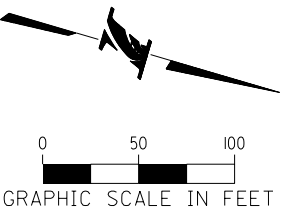


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1398+00 TO STA 1412+00

SHEET NO. PD-39
 DRAWING NO. 39 OF 52



CS-1
 COMPENSATORY STORAGE PROVIDED ON PIPE
 (STA. 1410+90 LT TO 1424+50 LT)
 AVAILABLE STORAGE:
 NWL - 10YR: 0.10 AC-FT
 10-100YR: 0.62 AC-FT
 SEE COMPENSATORY STORAGE SITE
 EXHIBIT FOR DETAILS

SEE DRAWING NO. 39
 MATCH LINE STATION 1412+00

MATCH LINE STATION 1423+00
 SEE DRAWING NO. 41

12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\1412-41.dgn
 JWC

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

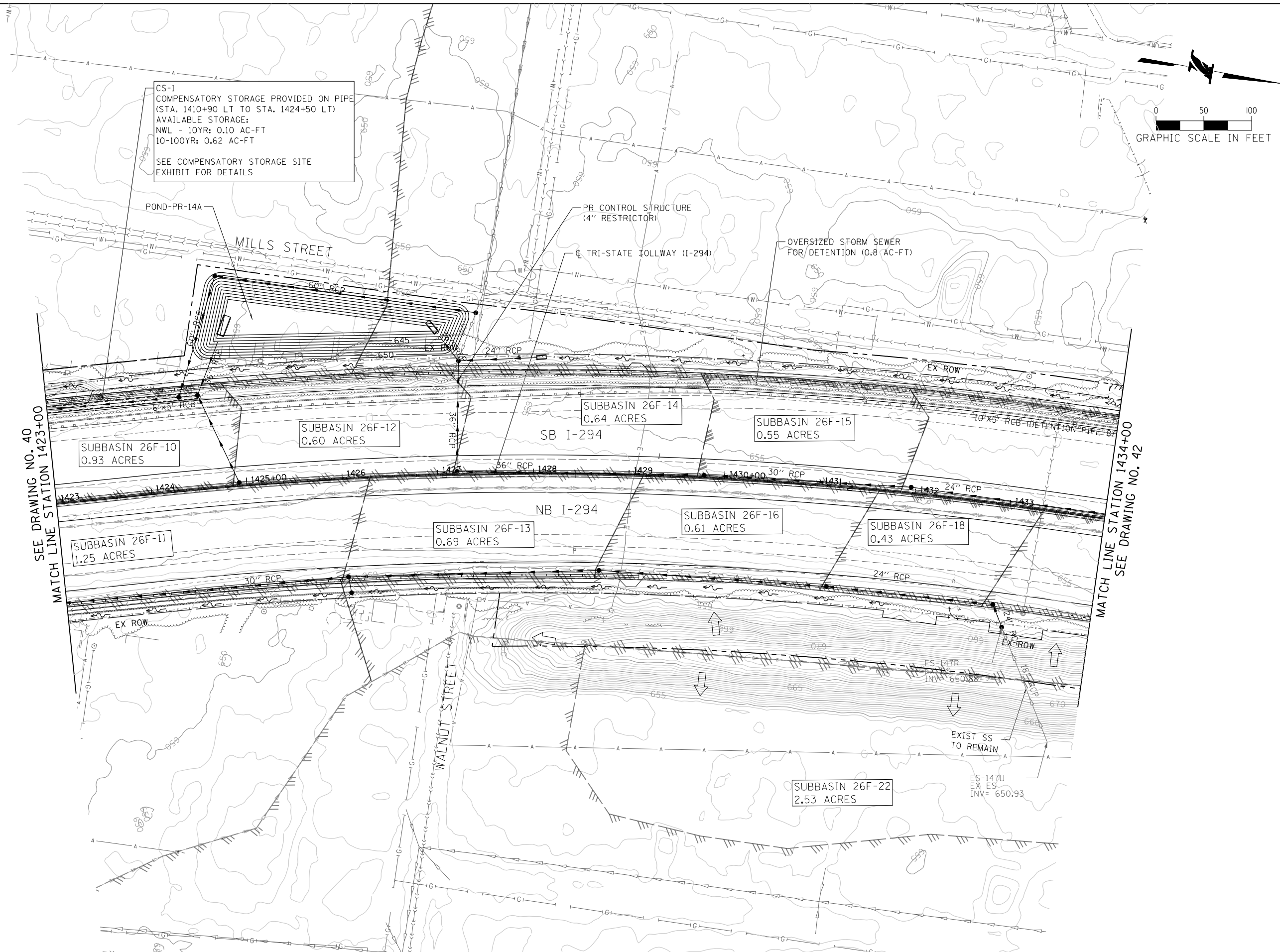


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		DESCRIPTION
NO.	DATE	

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1412+00 TO STA 1423+00

SHEET NO. PD-40
 DRAWING NO. 40 OF 52



12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\1423-1434.dgn
 JWC

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

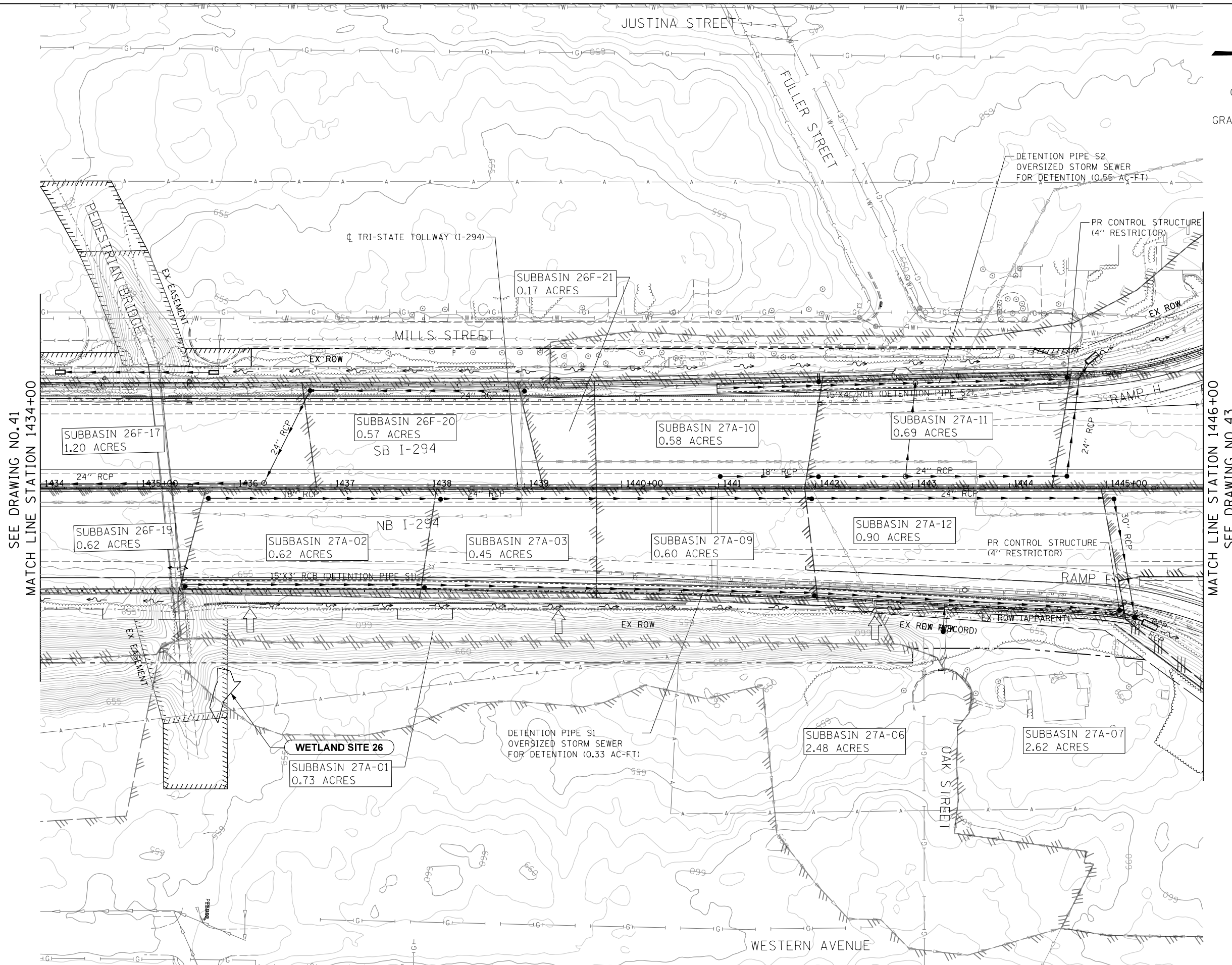
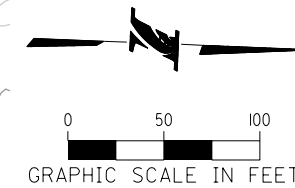


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1423+00 TO STA 1434+00

SHEET NO. PD-41
 DRAWING NO. 41 OF 52



SEE DRAWING NO. 41
MATCH LINE STATION 1434+00

MATCH LINE STATION 1446+00
SEE DRAWING NO. 43

12/22/2017
 C:\Users\jwong\Documents\Projects\TranSystems\144622178\4223-shr-drawn-156.dgn
 JWC

DRAWN BY SED
 CHECKED BY JWC
 SCALE 1"=50'
 DATE 12/22/17

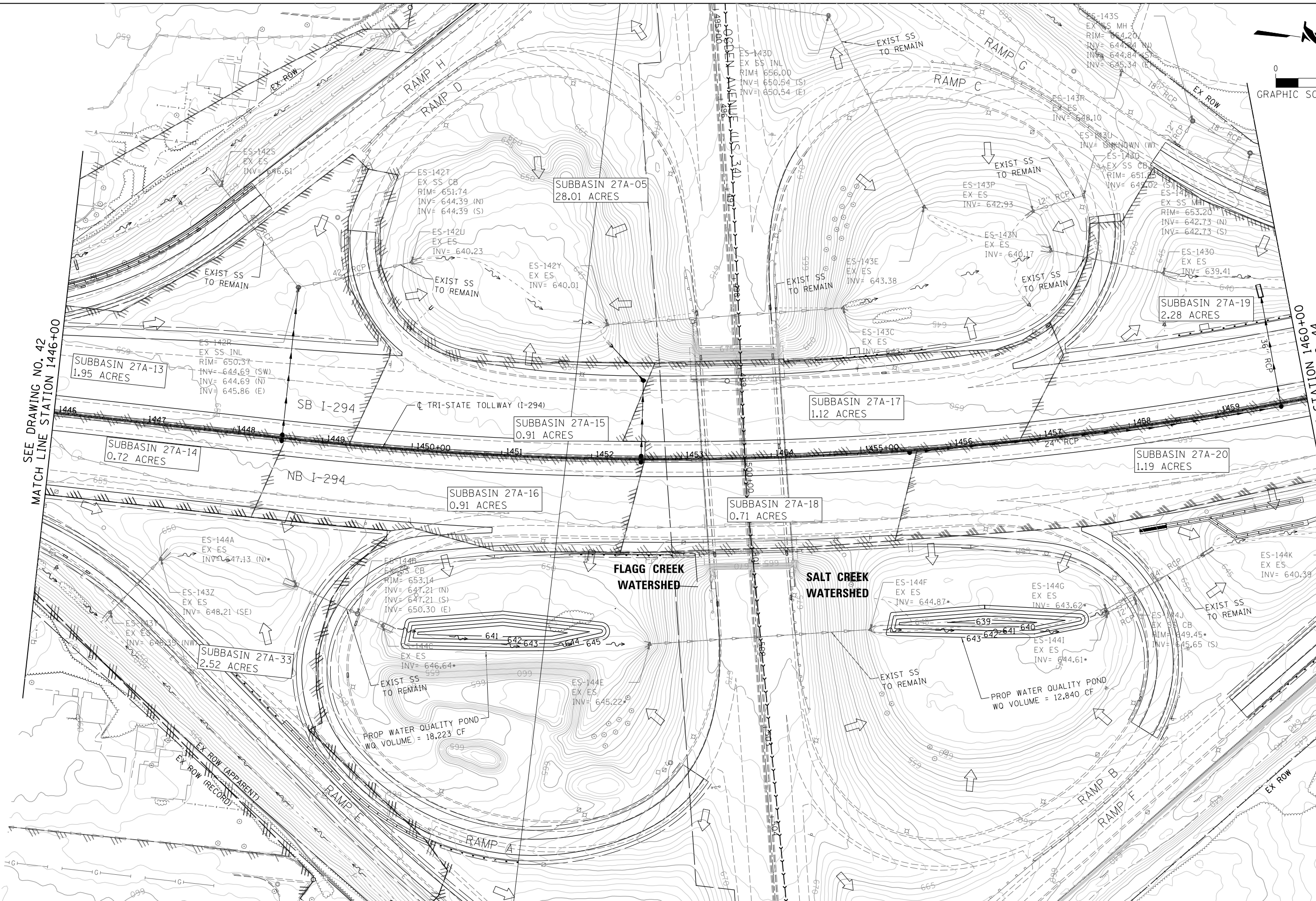
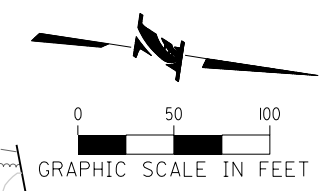


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS	
NO.	DATE

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1434+00 TO STA 1446+00

SHEET NO. PD-42
 DRAWING NO. 42 OF 52



SEE DRAWING NO. 42
MATCH LINE STATION 1446+00

MATCH LINE STATION 1460+00
SEE DRAWING NO. 44

12/22/2017
 C:\Users\jwong\Documents\Projects\1446\1446.dwg
 1446.dwg

DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

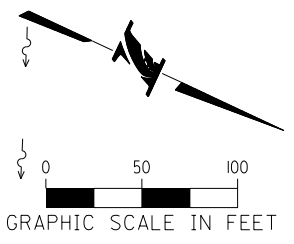
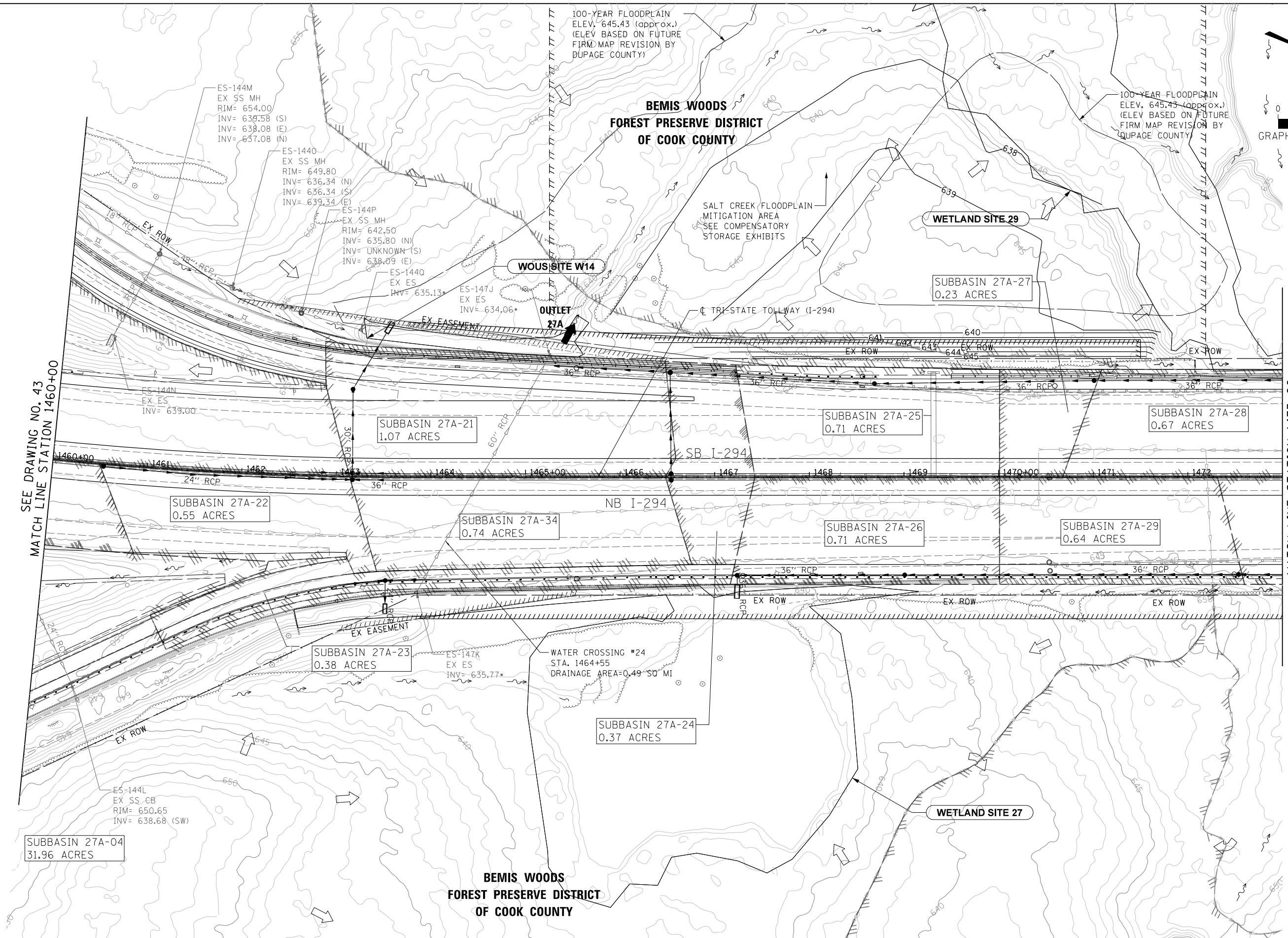


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1446+00 TO STA 1460+00

SHEET NO. PD-43
 DRAWING NO. 43 OF 52



SEE DRAWING NO. 43
MATCH LINE STATION 1460+00

MATCH LINE STATION 1473+00
SEE DRAWING NO. 45

12/22/2017 12:22:20 PM C:\Users\jwong\Documents\Projects\14622178_4223_sht-drain-15.dgn

DRAWN BY SED SCALE 1"=50'
CHECKED BY JWC DATE 12/22/17

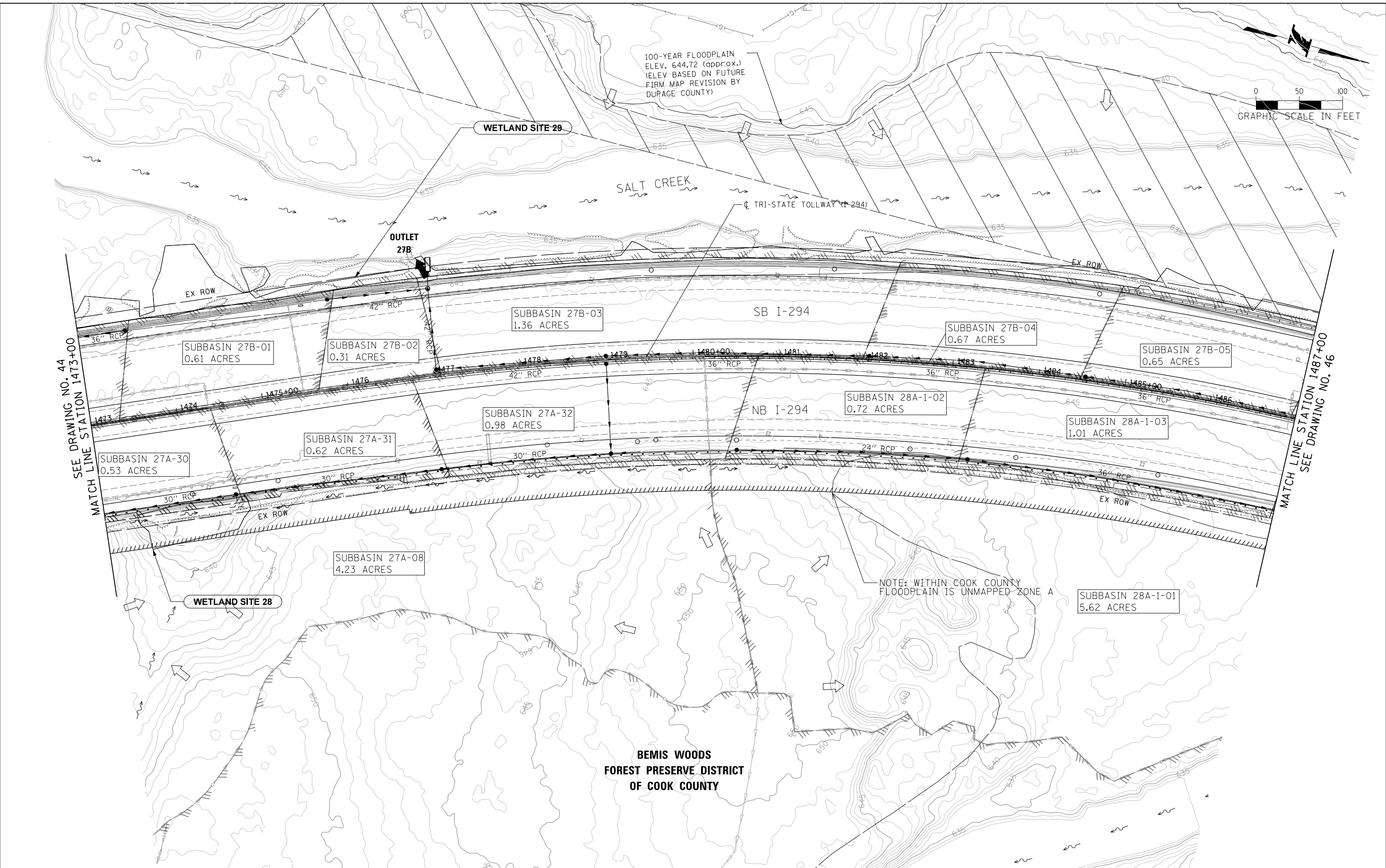


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.		REVISIONS	
NO.	DATE	DESCRIPTION	

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1460+00 TO STA 1473+00

SHEET NO. PD-44
 DRAWING NO. 44 OF 52



100-YEAR FLOODPLAIN
ELEV. 644.72 (approx.)
(ELEV. BASED ON FUTURE
FIRM MAP REVISION BY
DUPAGE COUNTY)



SEE DRAWING NO. 44
MATCH LINE STATION 1473+00

MATCH LINE STATION 1487+00
SEE DRAWING NO. 46

**BEMIS WOODS
FOREST PRESERVE DISTRICT
OF COOK COUNTY**

NOTE: WITHIN COOK COUNTY
FLOODPLAIN IS UNMAPPED ZONE A

12/22/2017
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 1487+00.dwg

DRAWN BY SED SCALE 1"=50'
CHECKED BY JWC DATE 12/22/17

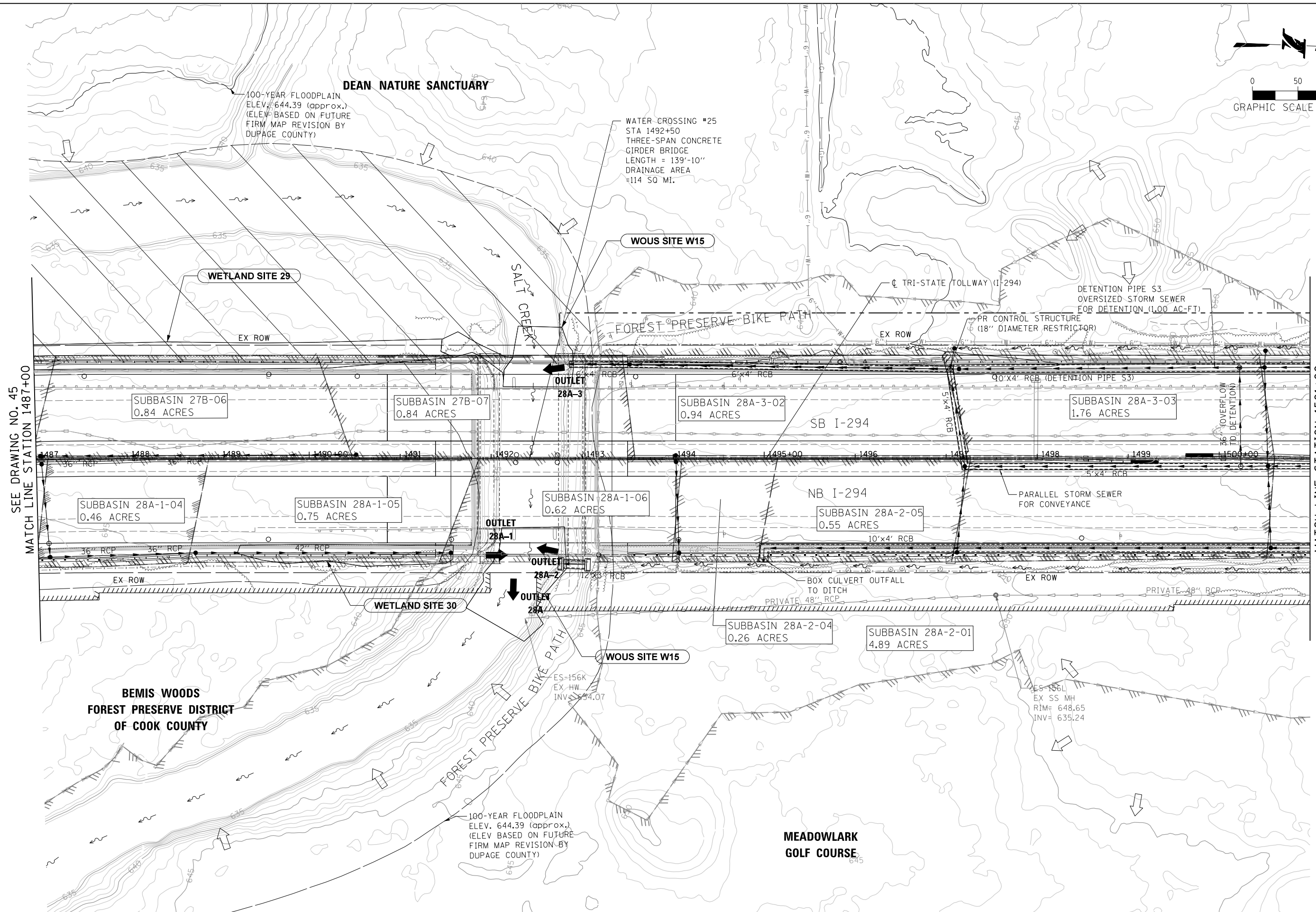
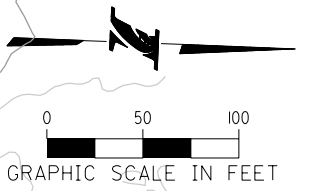


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

REVISIONS		DESCRIPTION
NO.	DATE	

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1473+00 TO STA 1487+00

SHEET NO. PD-45
DRAWING NO. 45 OF 52



SEE DRAWING NO. 45
MATCH LINE STATION 1487+00

MATCH LINE STATION 1501+00
SEE DRAWING NO. 47

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 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\154.dgn
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DRAWN BY SED SCALE 1"=50'
 CHECKED BY JWC DATE 12/22/17

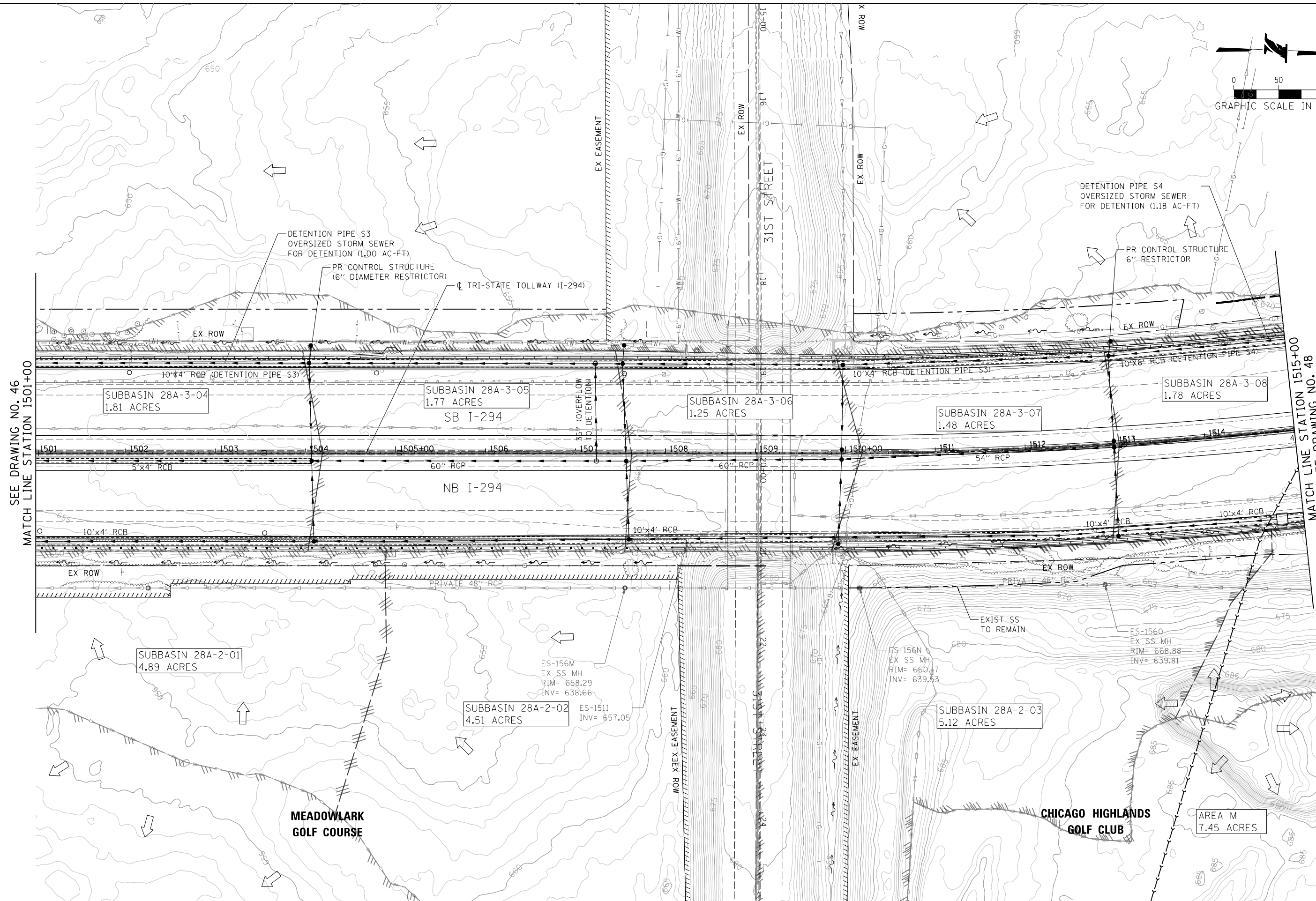
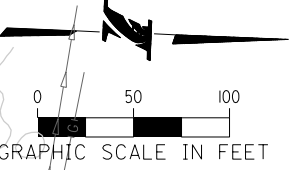


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.		REVISIONS	
NO.	DATE	DESCRIPTION	

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1487+00 TO STA 1501+00

SHEET NO. PD-46
 DRAWING NO. 46 OF 52



SEE DRAWING NO. 46
MATCH LINE STATION 1501+00

MATCH LINE STATION 1515+00
SEE DRAWING NO. 48

12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\28A-3-04.dwg
 J. Wong

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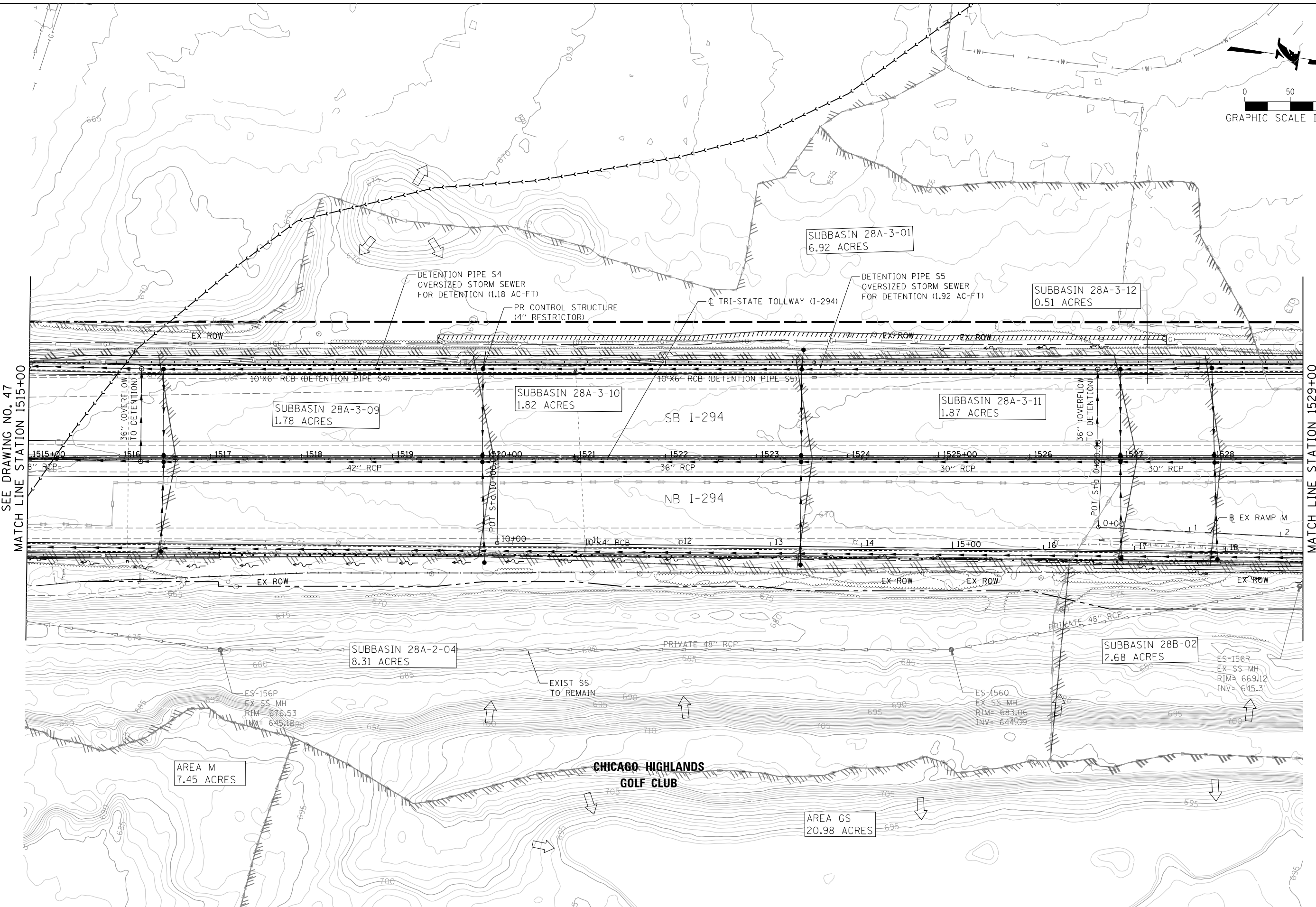


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1501+00 TO STA 1515+00

SHEET NO. PD-47
 DRAWING NO. 47 OF 52



SEE DRAWING NO. 47
MATCH LINE STATION 1515+00

MATCH LINE STATION 1529+00
SEE DRAWING NO. 49

12/22/2017
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 J. Wong

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 CHECKED BY JWC DATE 12/22/17

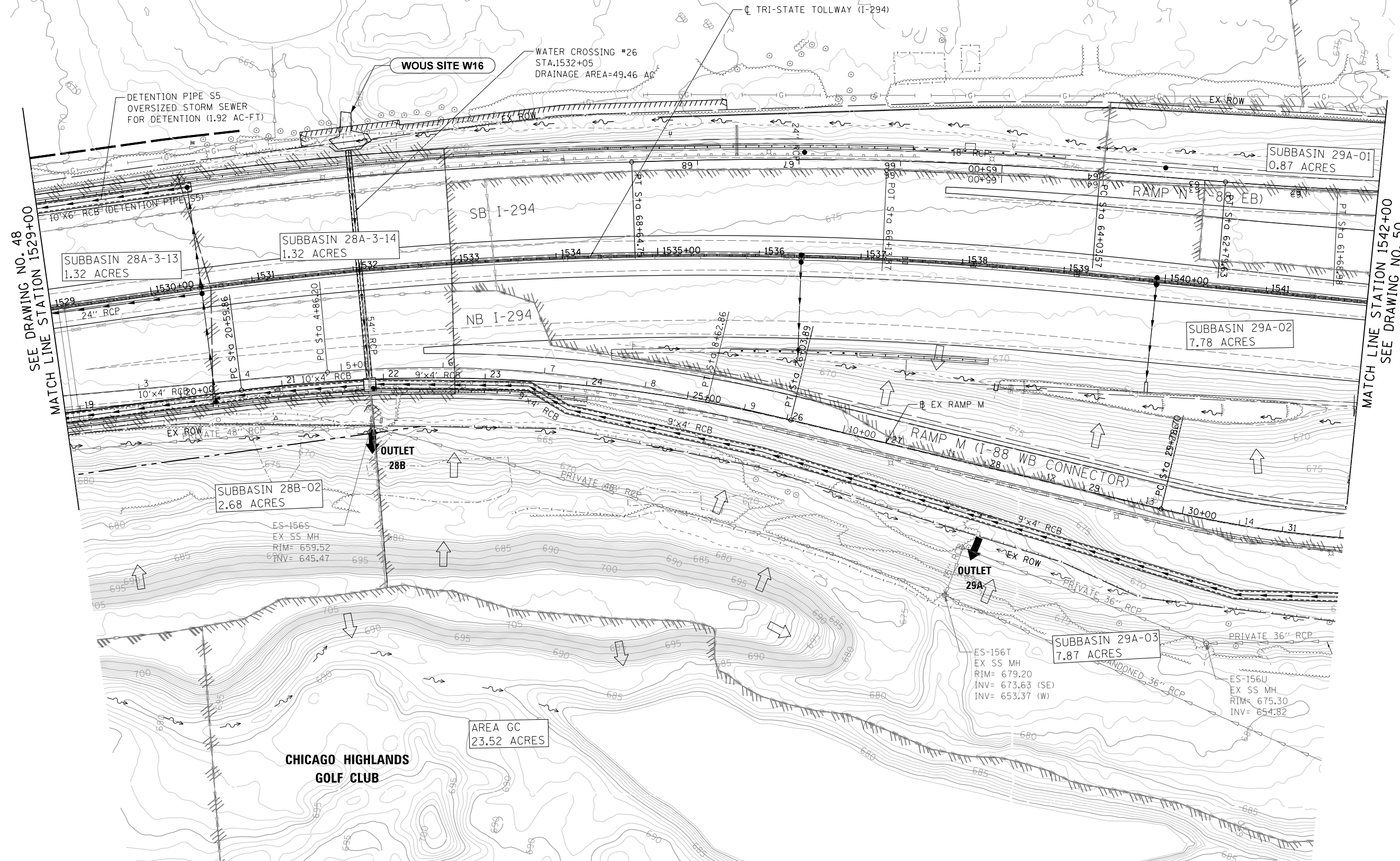
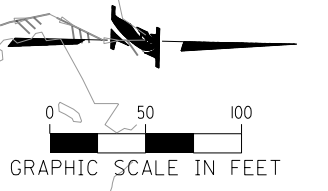


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1515+00 TO STA 1529+00

SHEET NO. PD-48
 DRAWING NO. 48 OF 52



SEE DRAWING NO. 48
MATCH LINE STATION 1529+00

MATCH LINE STATION 1542+00
SEE DRAWING NO. 50

12/22/2017
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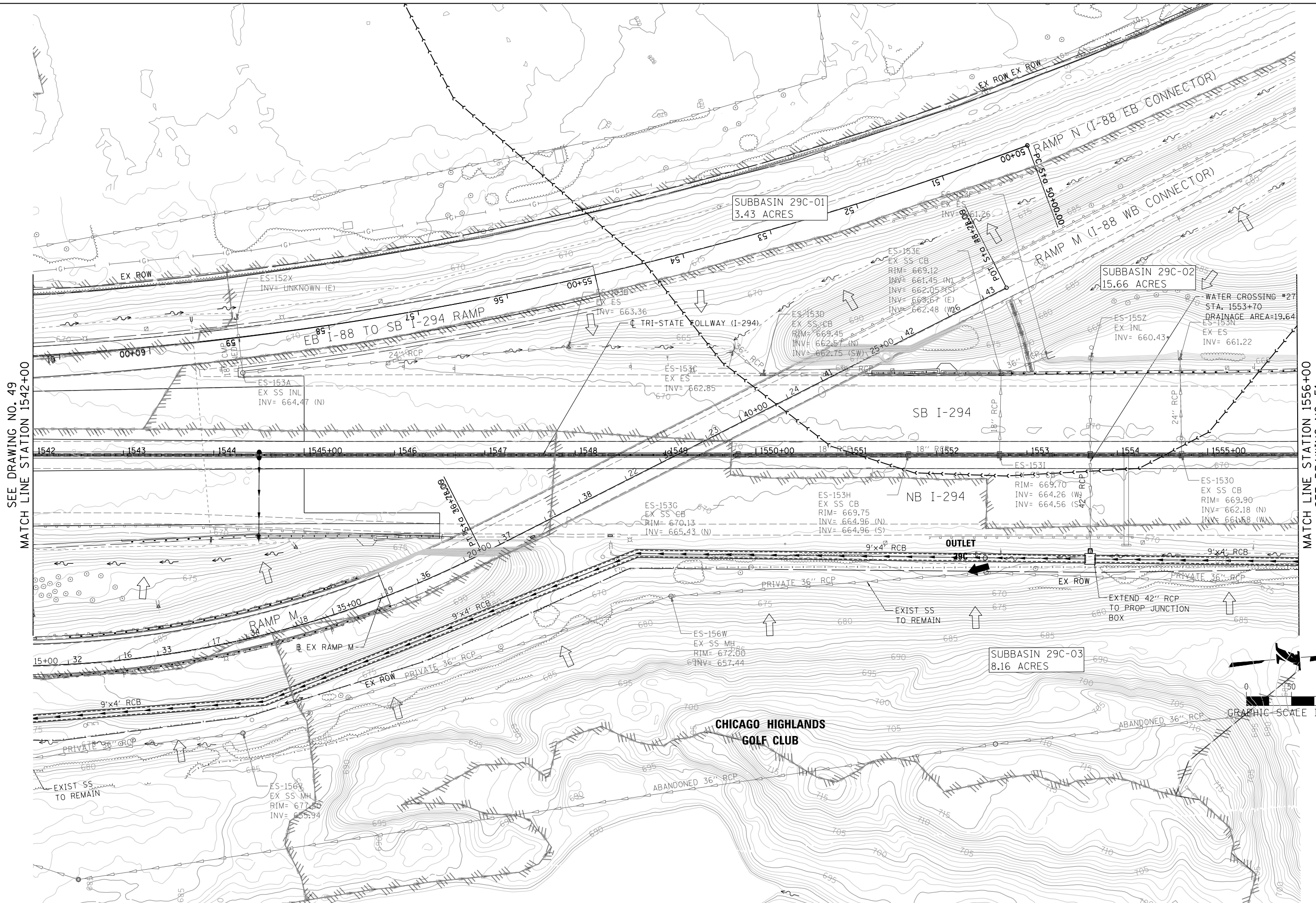


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1529+00 TO STA 1542+00

SHEET NO. PD-49
 DRAWING NO. 49 OF 52



SEE DRAWING NO. 49
MATCH LINE STATION 1542+00

MATCH LINE STATION 1556+00
SEE DRAWING NO. 51

12/22/2017
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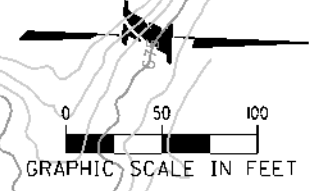
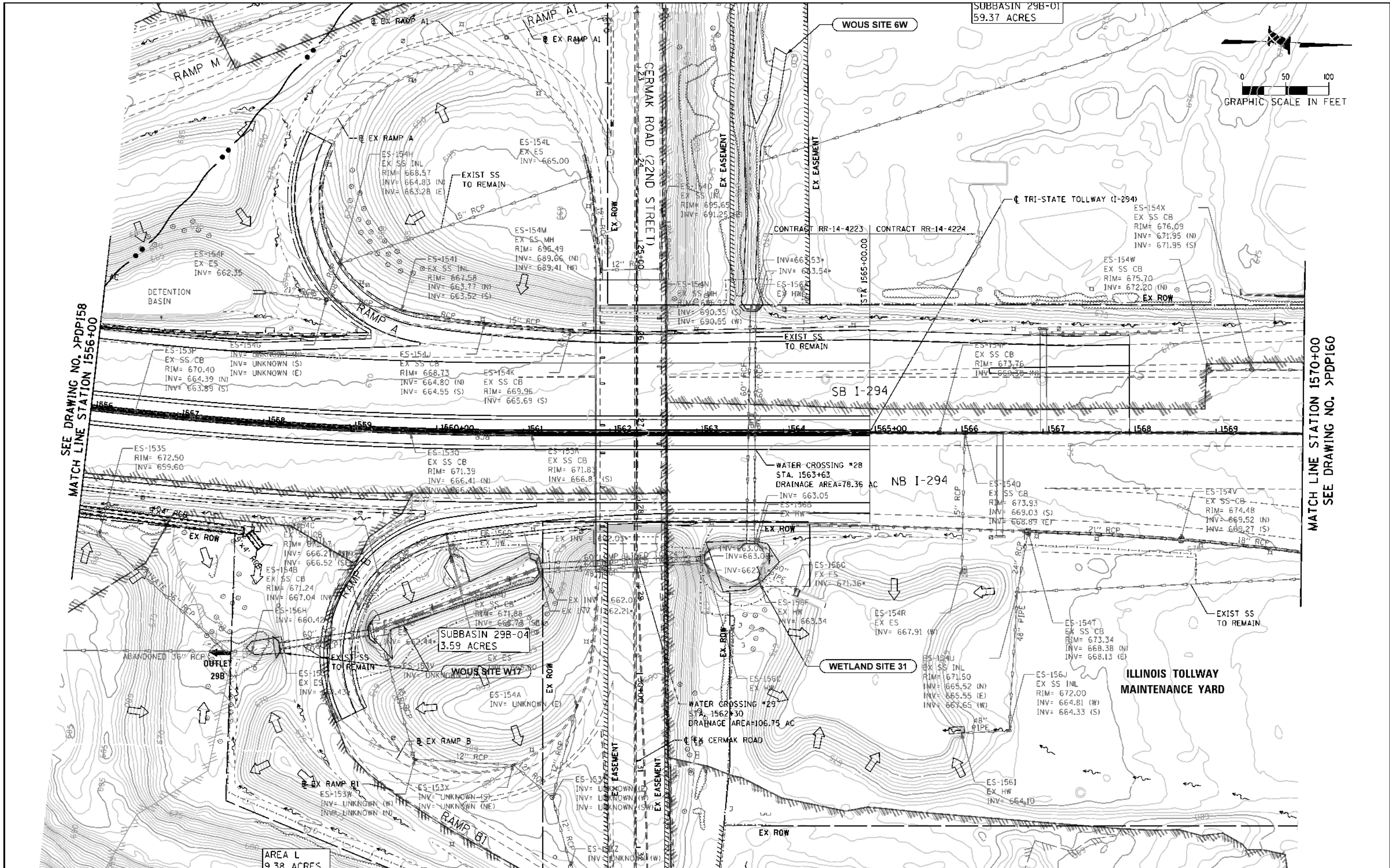


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1542+00 TO STA 1556+00

SHEET NO. PD-50
 DRAWING NO. 50 OF 52



SEE DRAWING NO. >PDP158
MATCH LINE STATION 1556+00

MATCH LINE STATION 1570+00
SEE DRAWING NO. >PDP160

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9.38 ACRES

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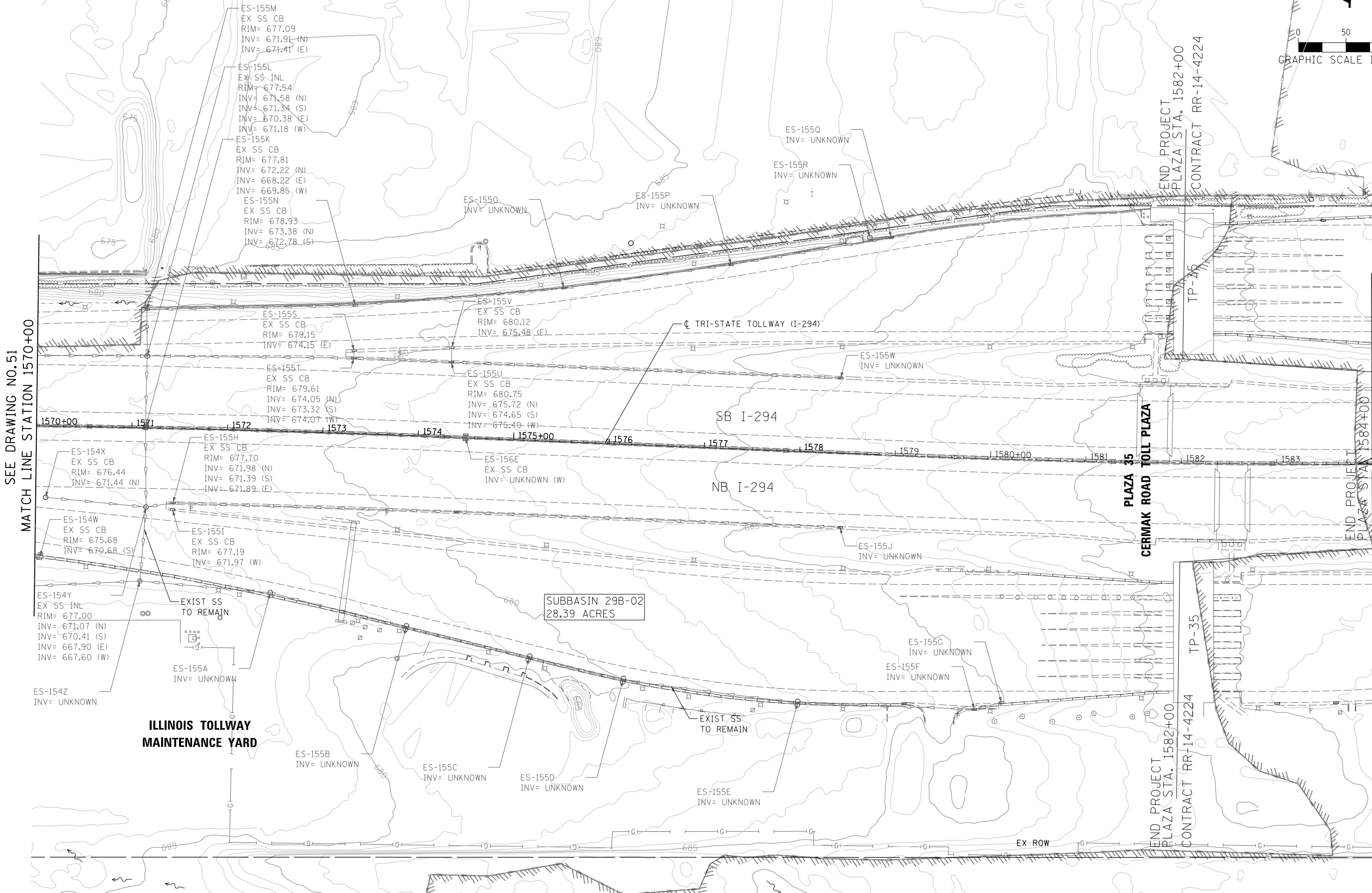
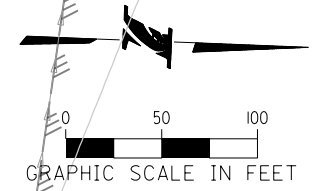


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DRAINAGE PLAN
STA 1556+00 TO STA 1570+00

SHEET NO. PD-51
DRAWING NO. 51 OF 52



SEE DRAWING NO. 51
MATCH LINE STATION 1570+00

I-294 TOLLWAY

12/22/2017
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

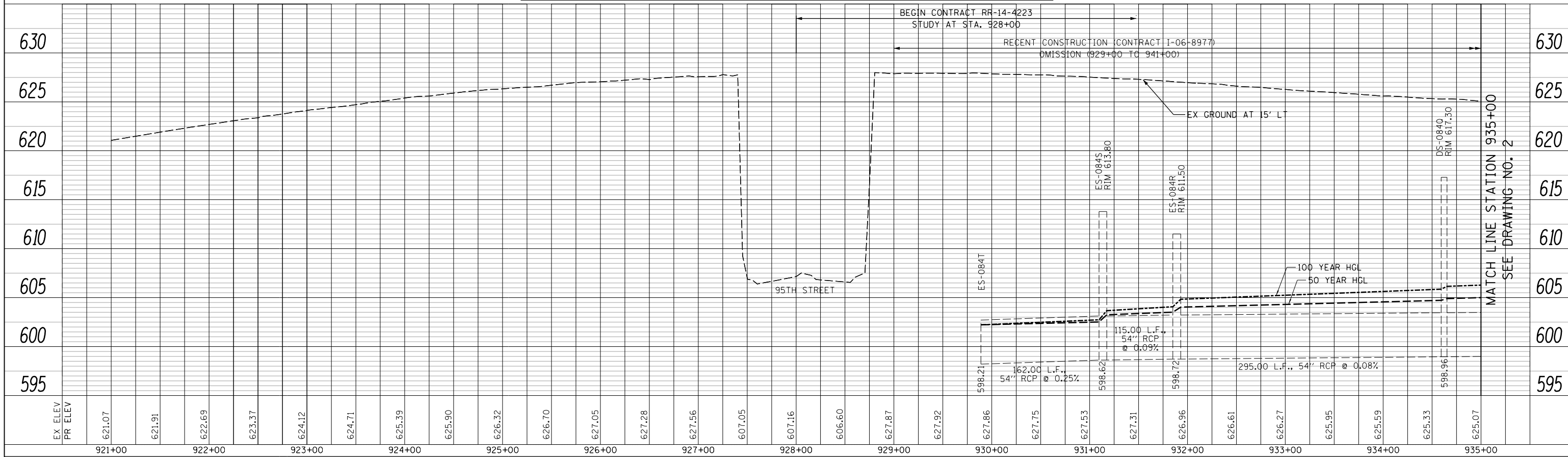
REVISIONS		DESCRIPTION
NO.	DATE	

CONTRACT NO. RR-14-4223
 PROPOSED DRAINAGE PLAN
 STA 1570+00 TO STA 1584+00

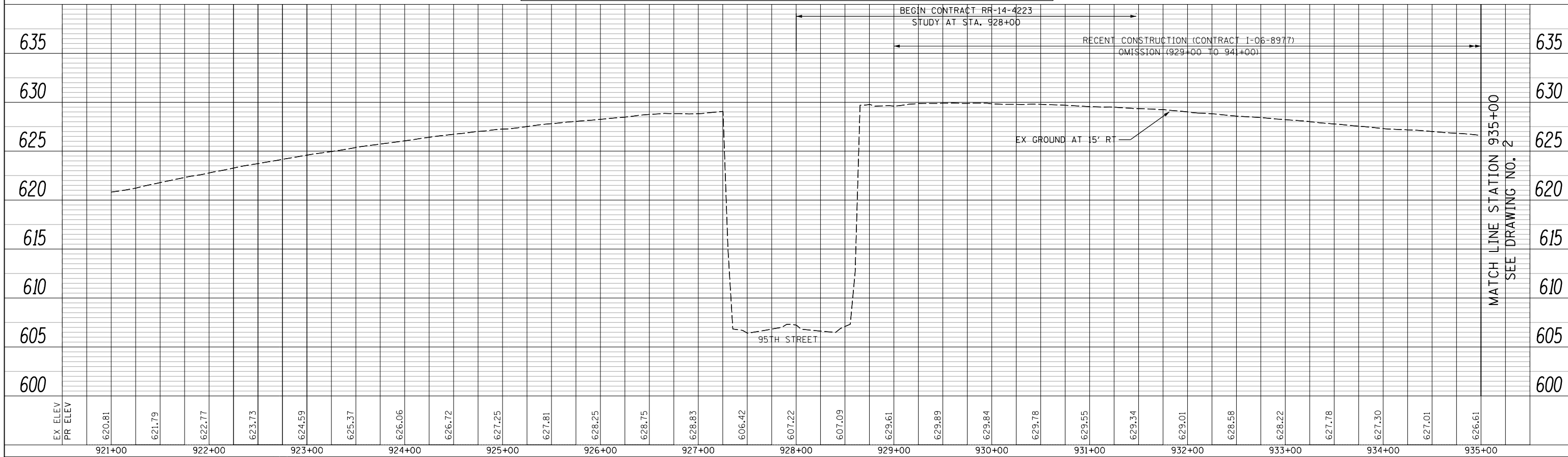
SHEET NO. PD-52
 DRAWING NO. 52 OF 52

5.7 DRAINAGE PROFILE

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



12/22/2017
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 12/22/2017

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3041 WOODCREEK DRIVE, SUITE 211
 DOWNERS GROVE, IL 60515
 (630) 641-9900



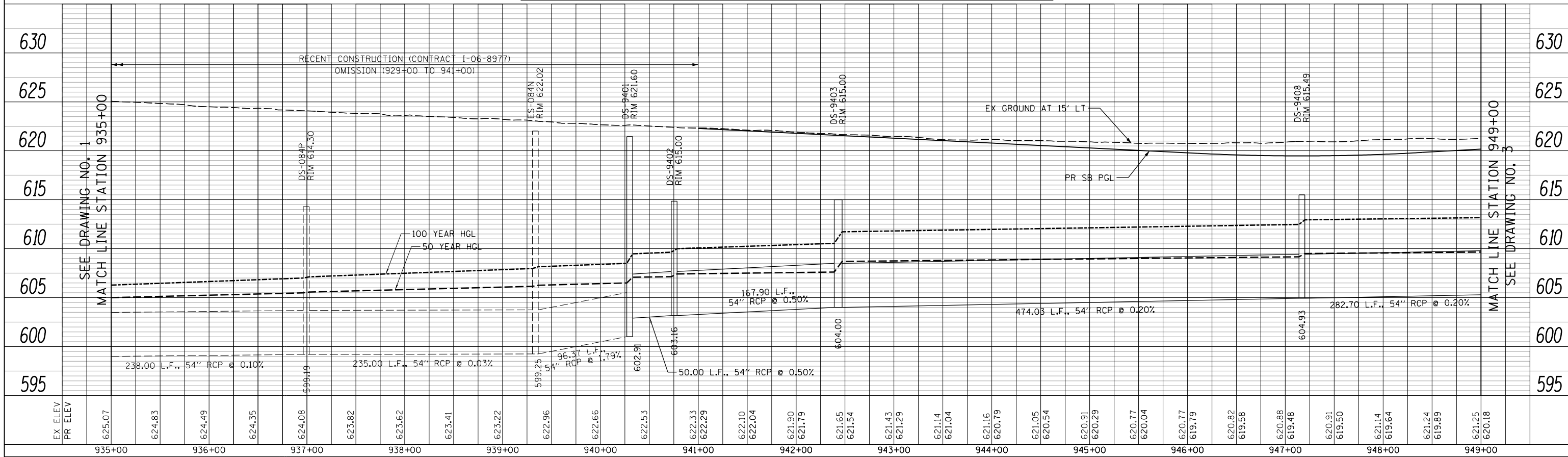
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 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

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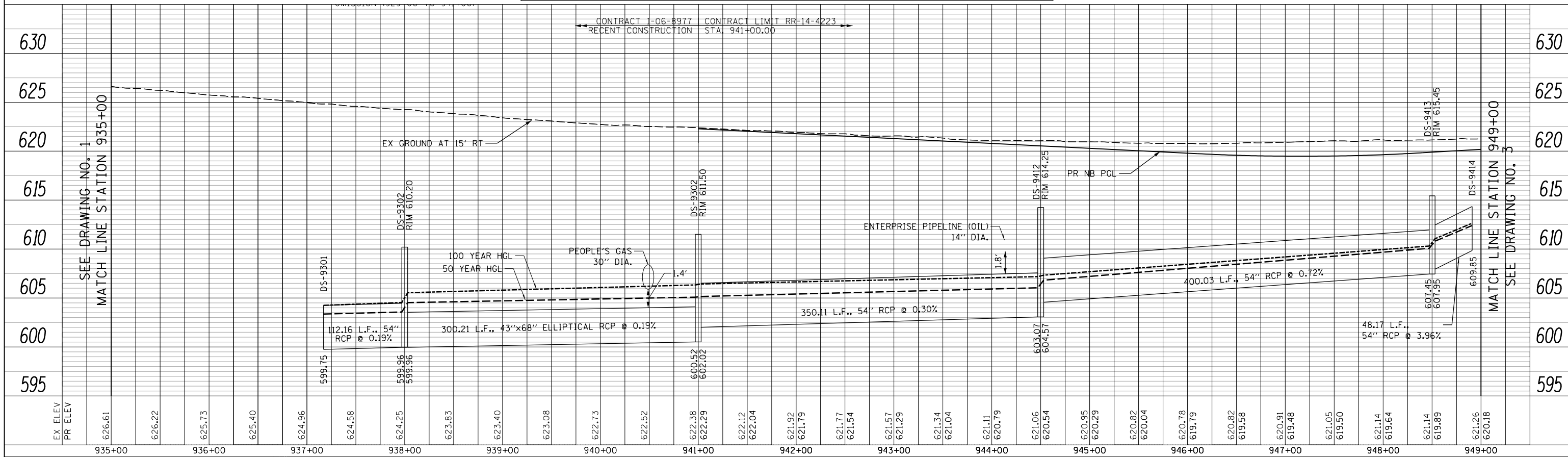
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 DRAINAGE PROFILE
 STA. 921+00 - STA. 935+00

SHEET NO. DP-1
 DRAWING NO. 1 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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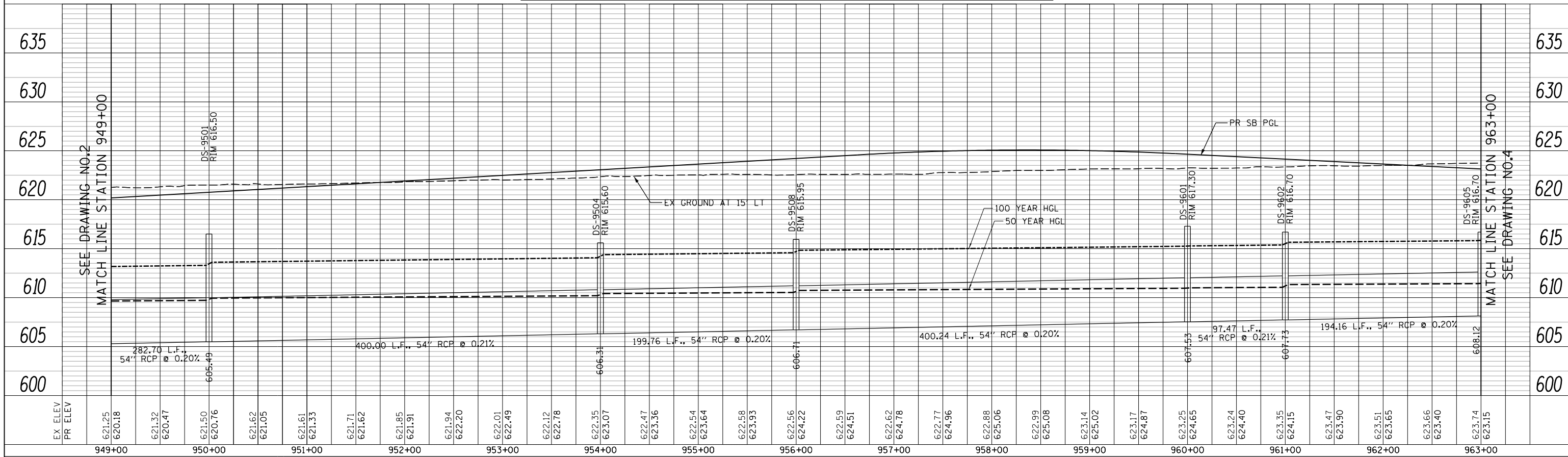


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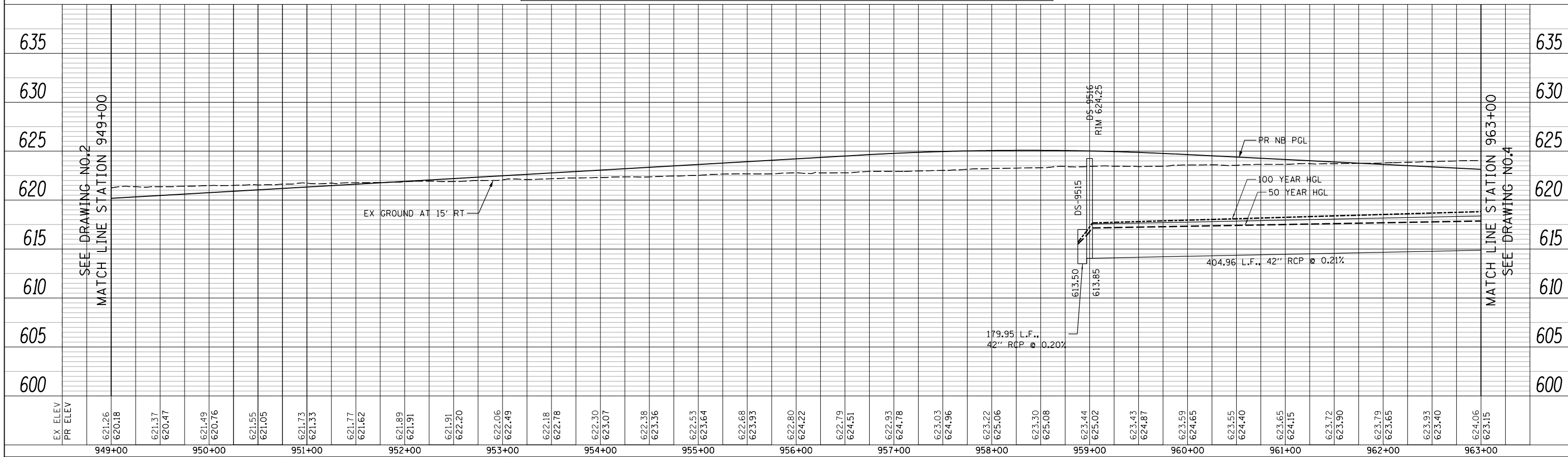
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 DRAINAGE PROFILE
 STA. 935+00 - STA. 949+00

SHEET NO. DP-2
 DRAWING NO. 2 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 CHECKED BY SS DATE 12/20/17



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 DOWNERS GROVE, IL 60515
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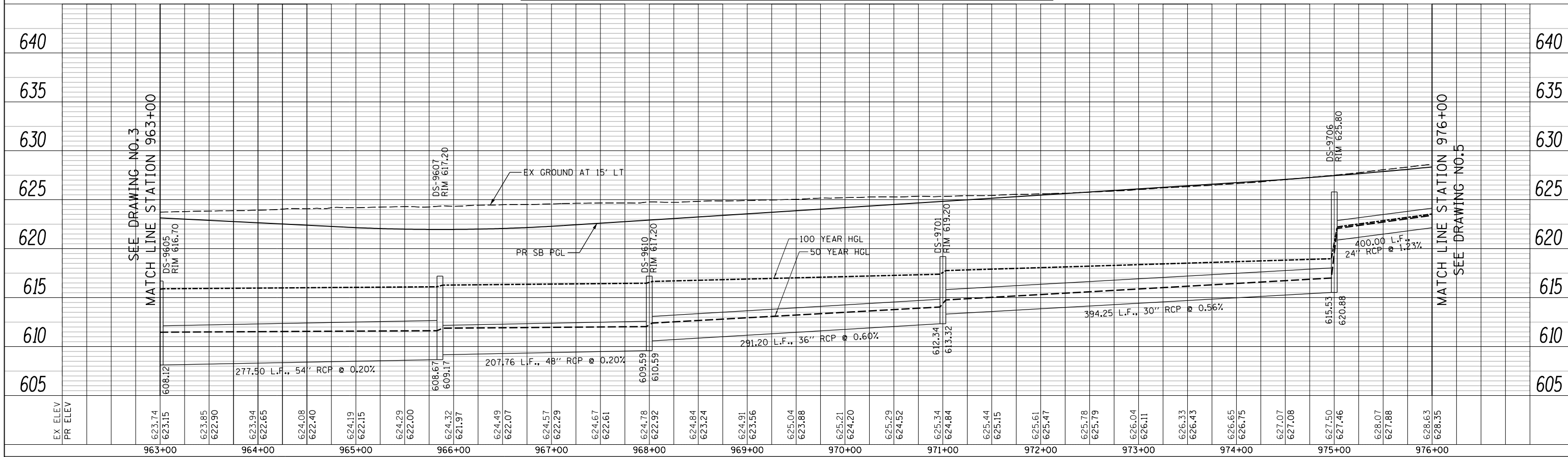
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

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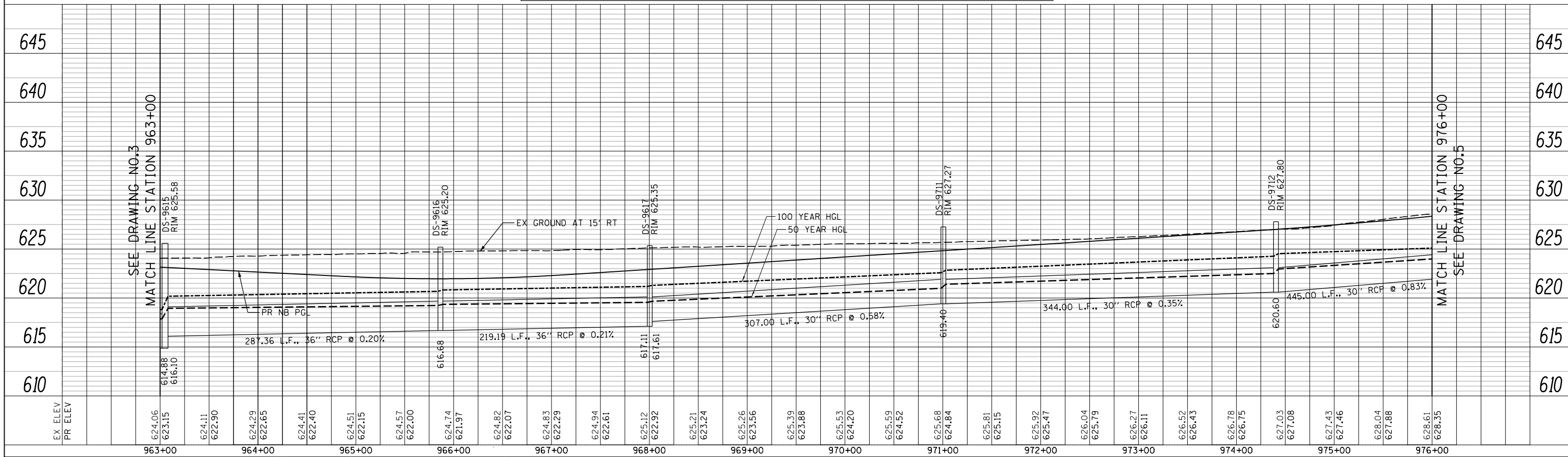
CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE
 STA. 949+00 - STA. 963+00

SHEET NO. DP-3
 DRAWING NO. 3 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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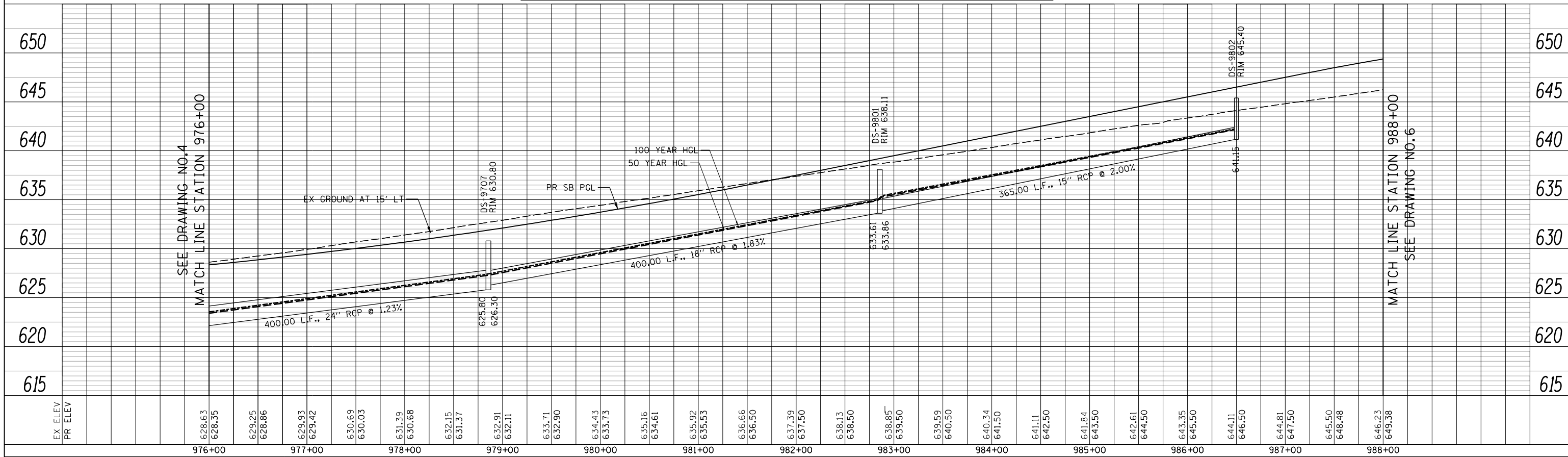
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NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE
 STA. 963+00 - STA. 976+00

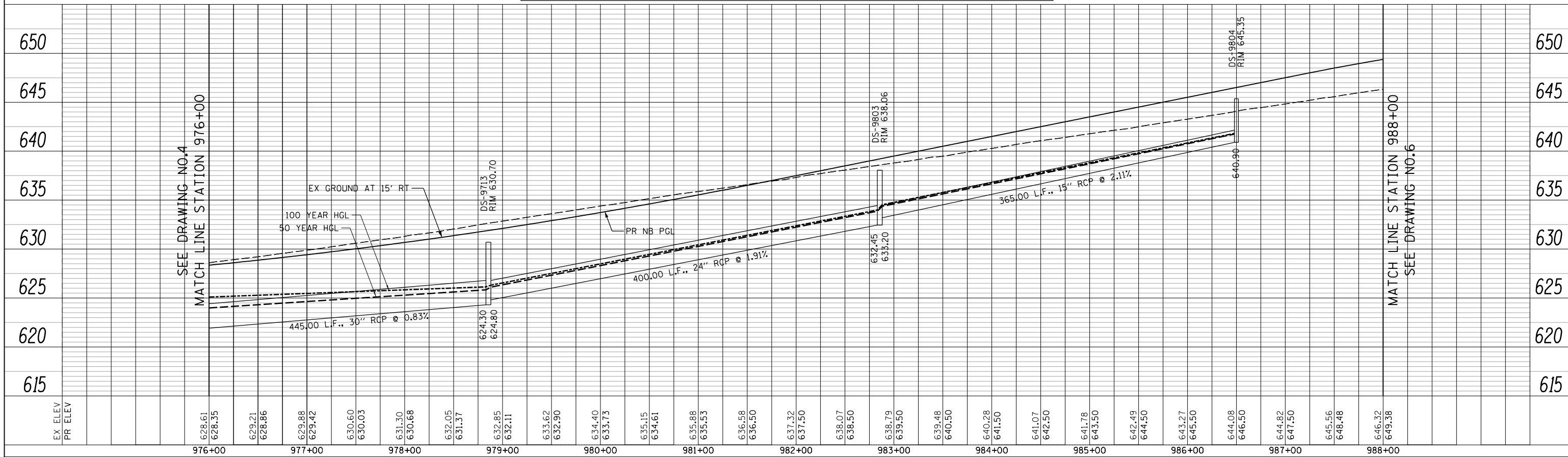
SHEET NO. DP-4
 DRAWING NO. 4 OF 56

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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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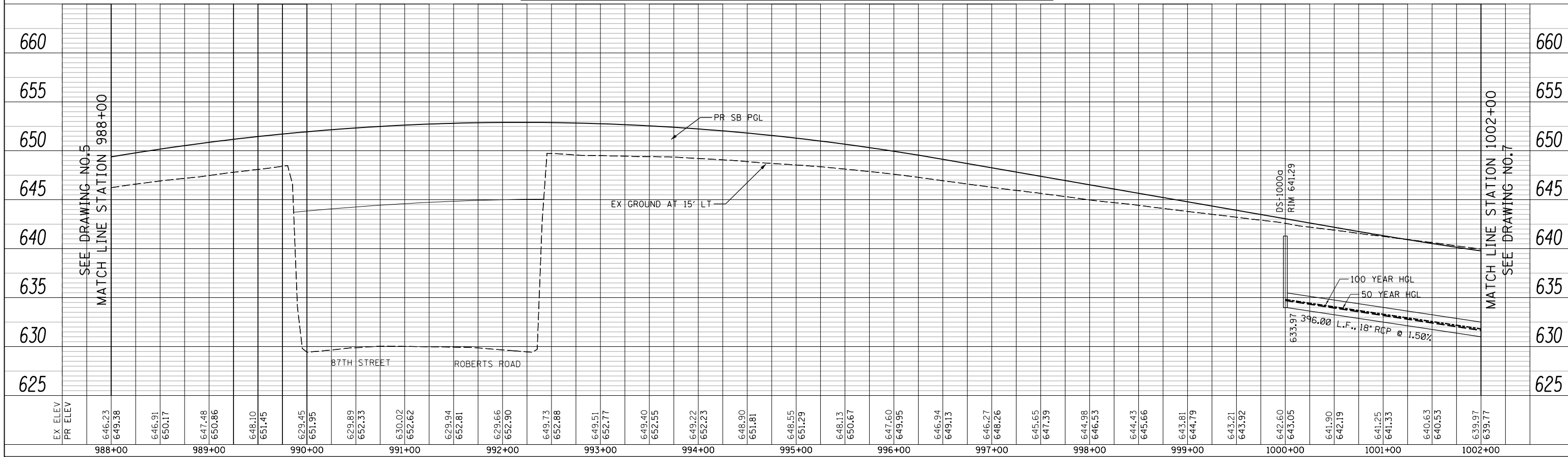
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

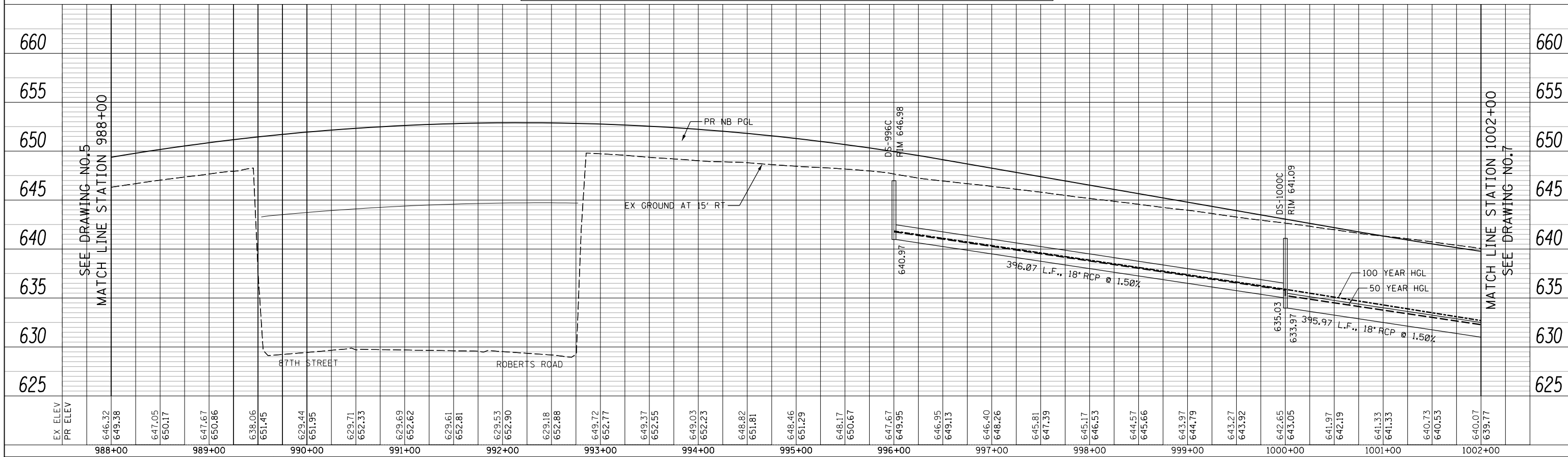
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 DRAINAGE PROFILE
 STA. 976+00 - STA. 988+00

SHEET NO. DP-5
 DRAWING NO. 5 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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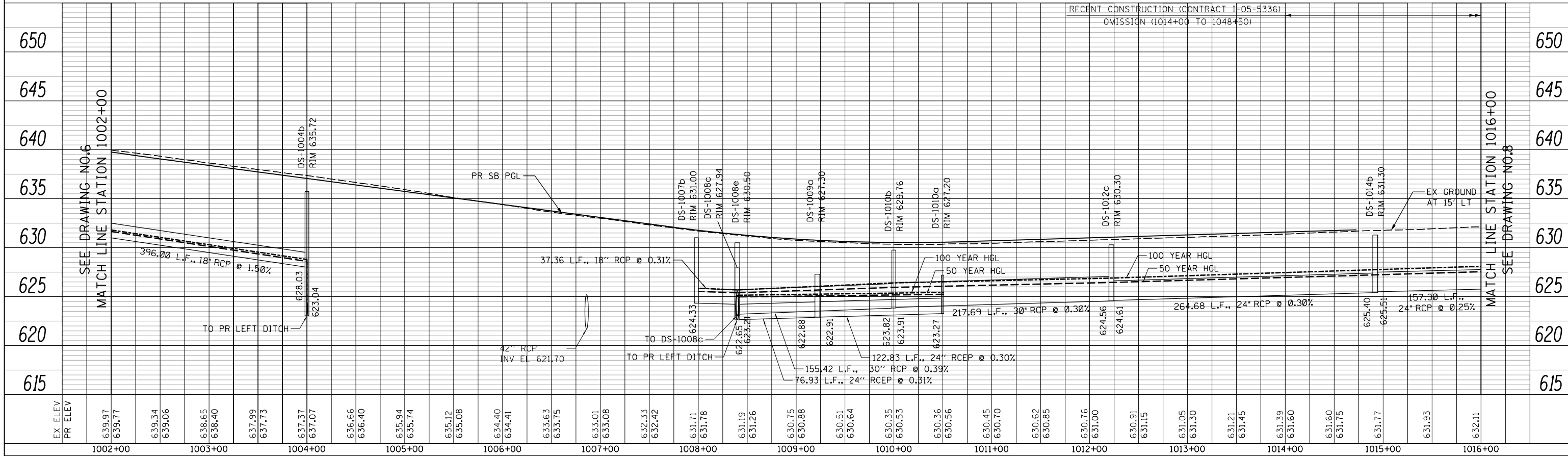
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
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NO.	DATE	DESCRIPTION

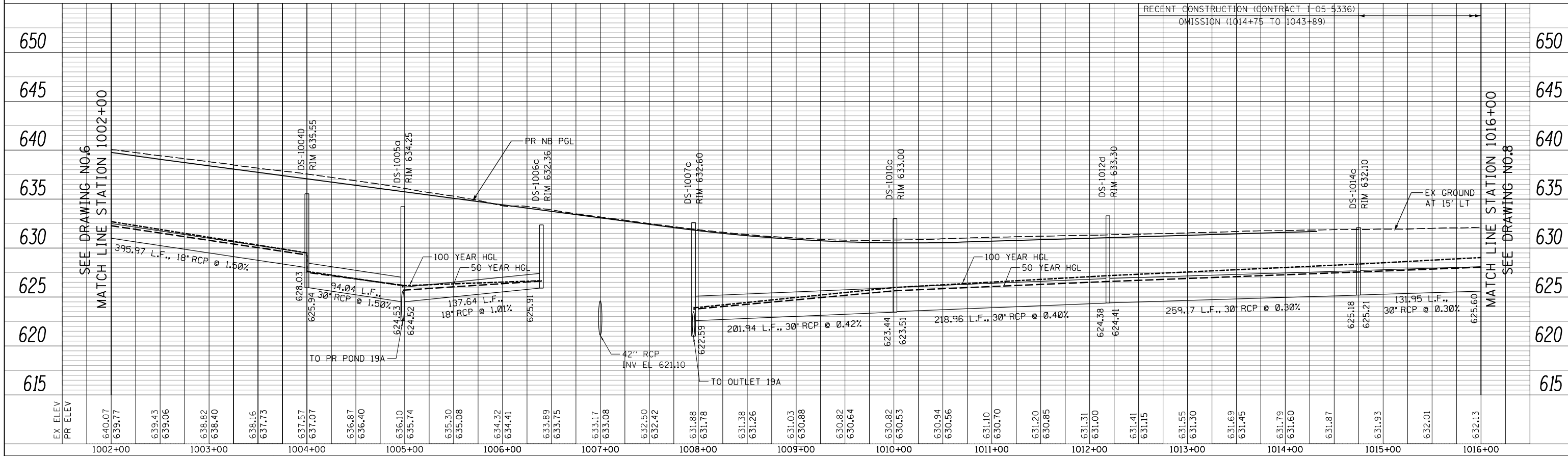
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 DRAINAGE PROFILE
 STA. 988+00 - STA. 1002+00

SHEET NO. DP-6
 DRAWING NO. 6 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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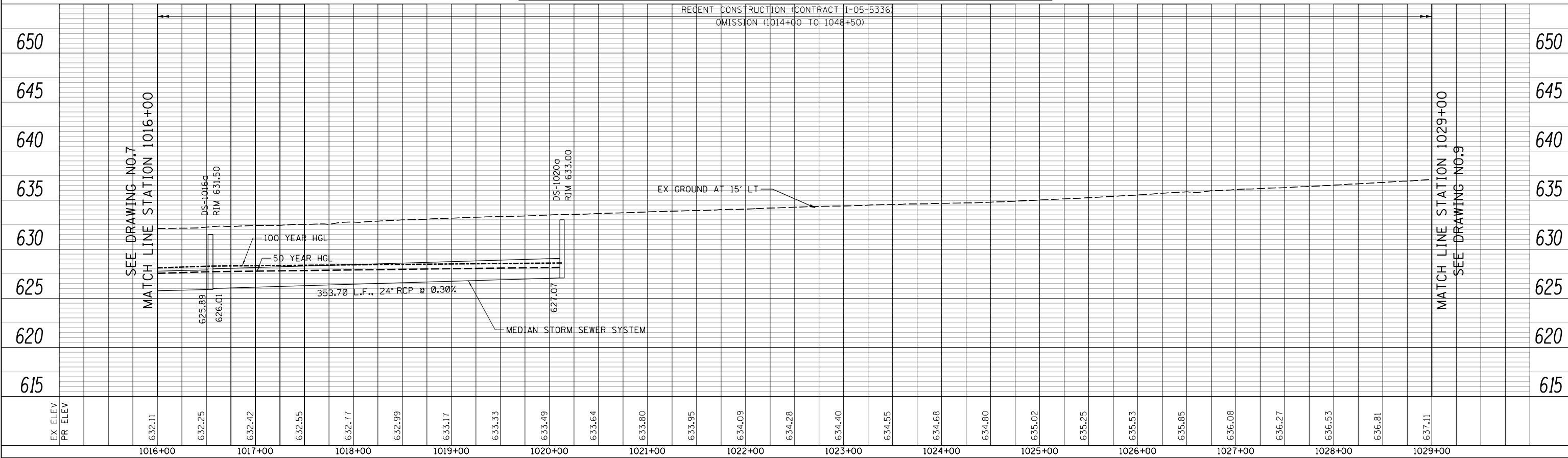
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

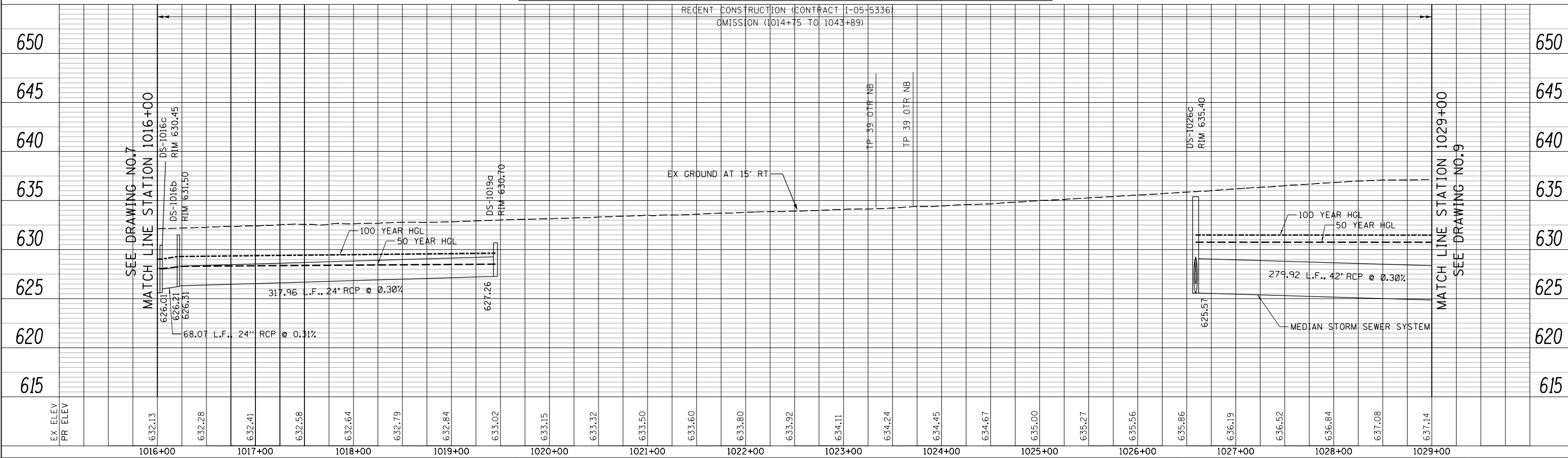
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 DRAINAGE PROFILE
 STA. 1002+00 - STA. 1016+00

SHEET NO. DP-7
 DRAWING NO. 7 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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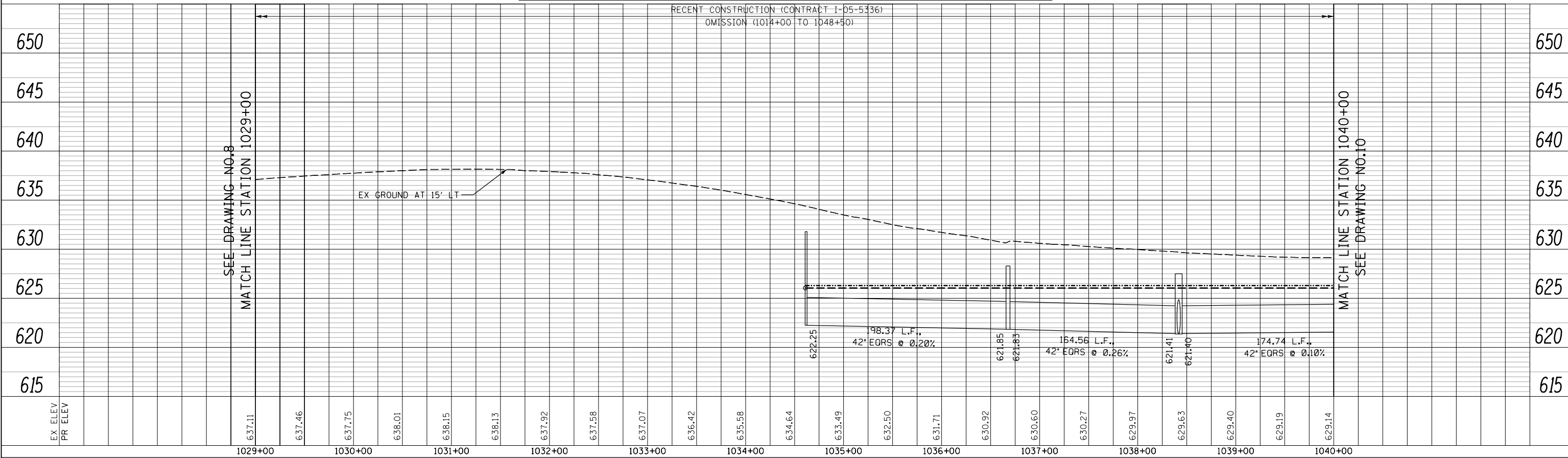
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
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REVISIONS		
NO.	DATE	DESCRIPTION

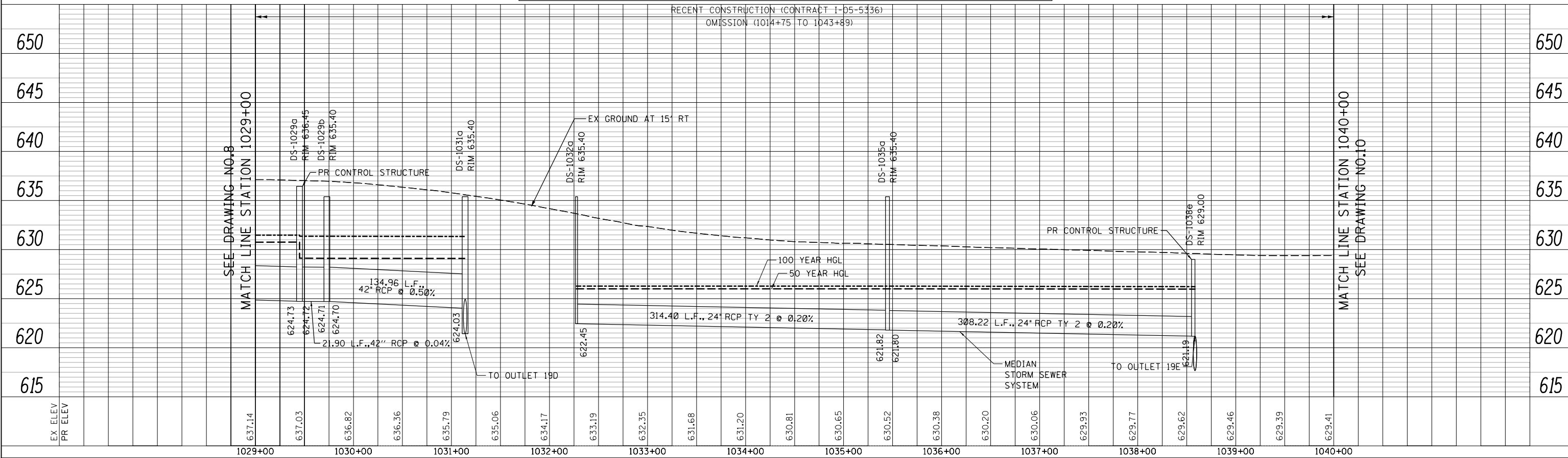
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 DRAINAGE PROFILE
 STA. 1016+00 - STA. 1029+00

SHEET NO. DP-8
 DRAWING NO. 8 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 jstevens

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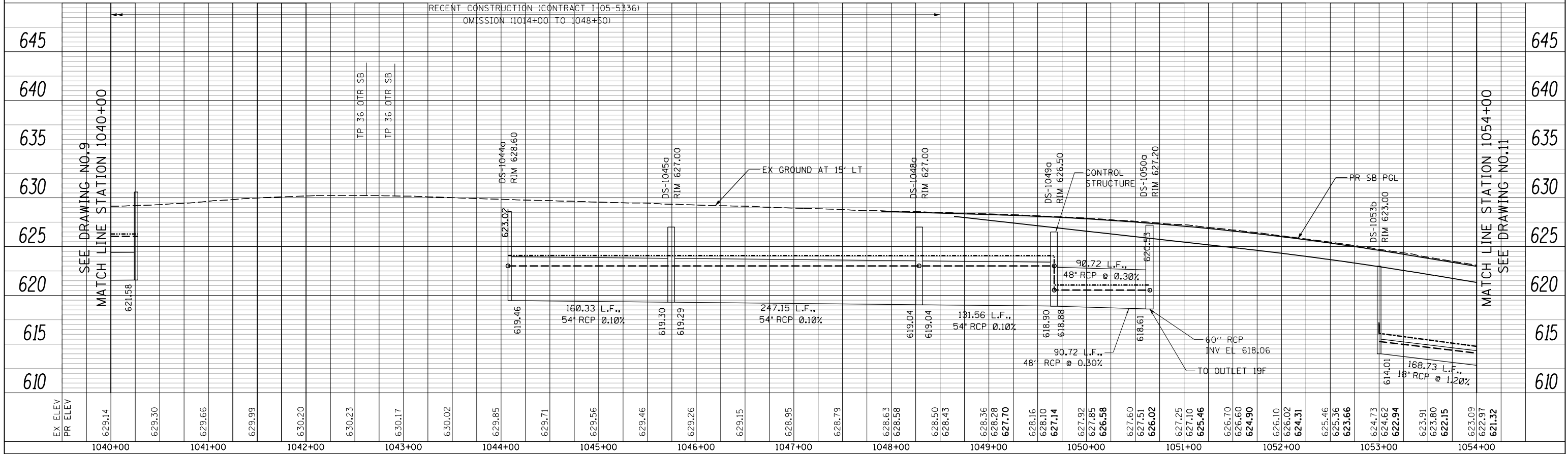
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
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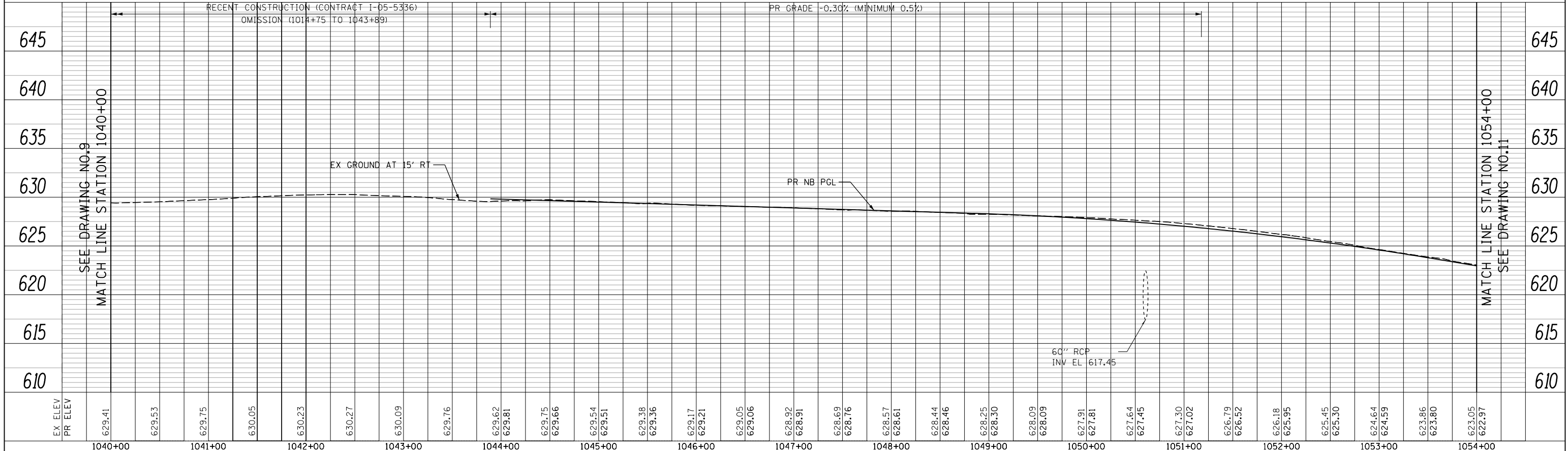
CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE
 STA. 1029+00 - STA. 1040+00

SHEET NO. DP-9
 DRAWING NO. 9 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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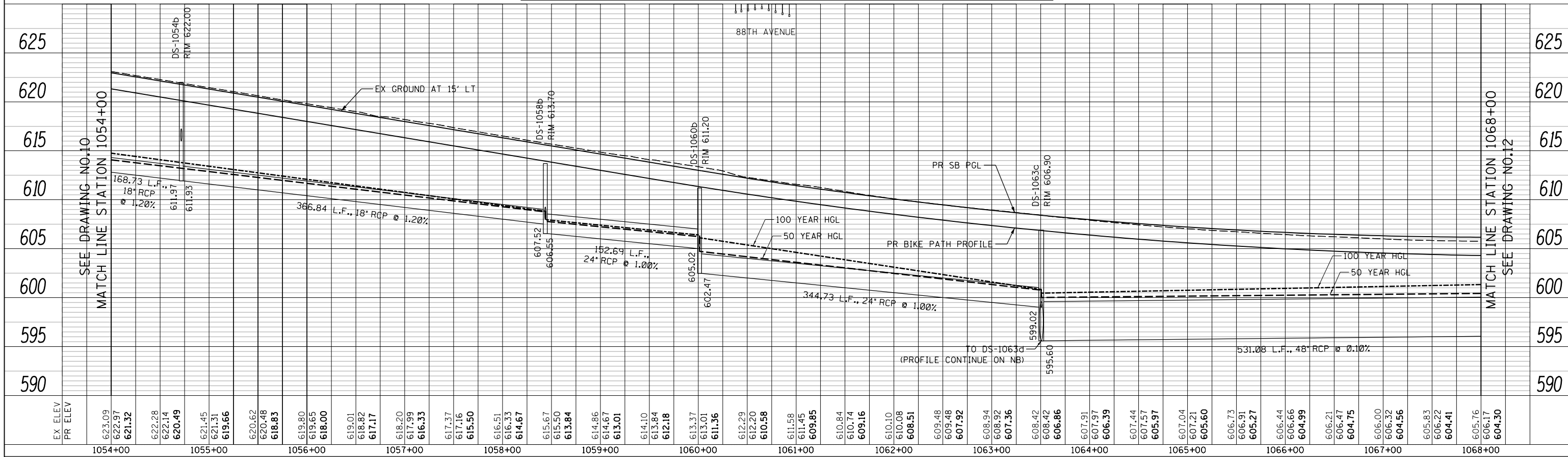
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

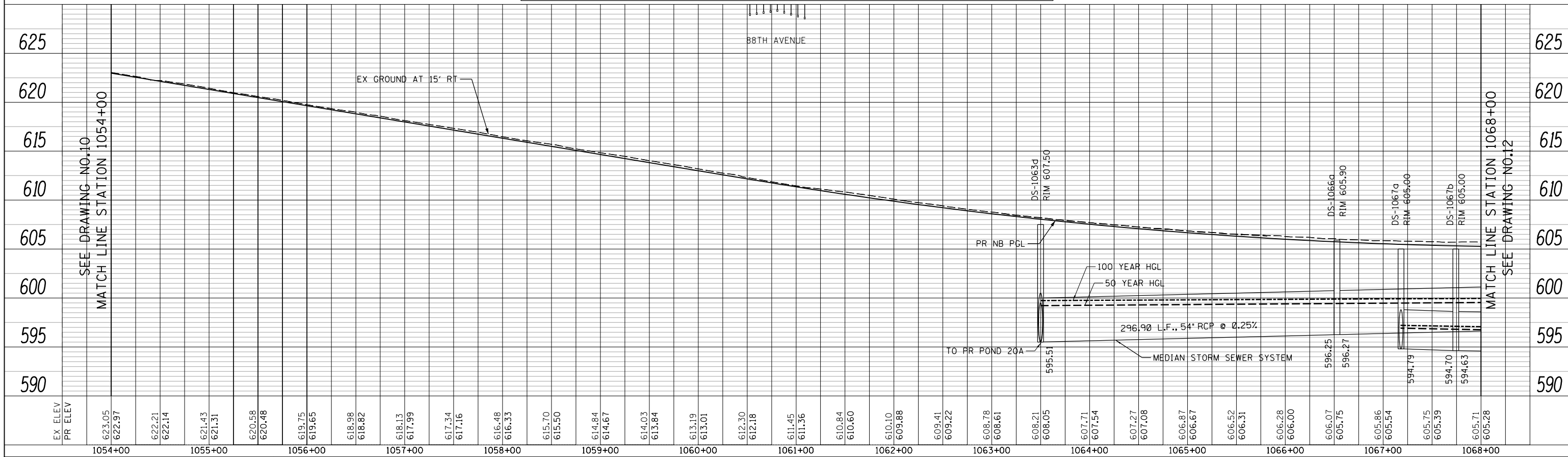
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DRAINAGE PROFILE
STA. 1040+00 - STA. 1054+00

SHEET NO. DP-10
DRAWING NO. 10 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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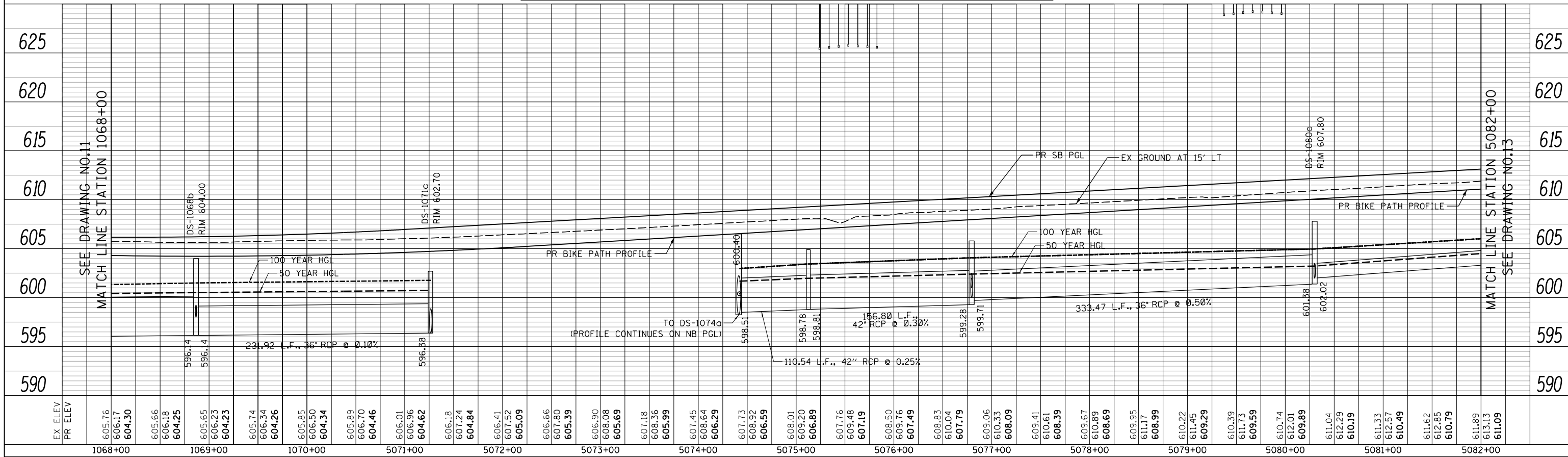
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 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

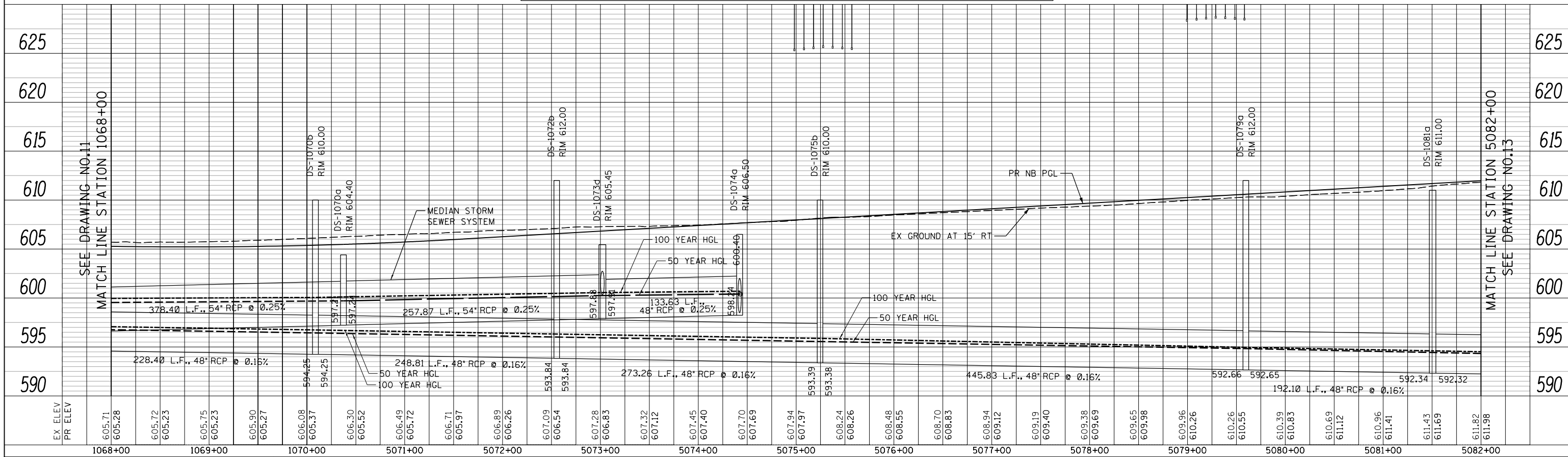
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SHEET NO. DP-11
 DRAWING NO. 11 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 12/22/2017
 jgarcia

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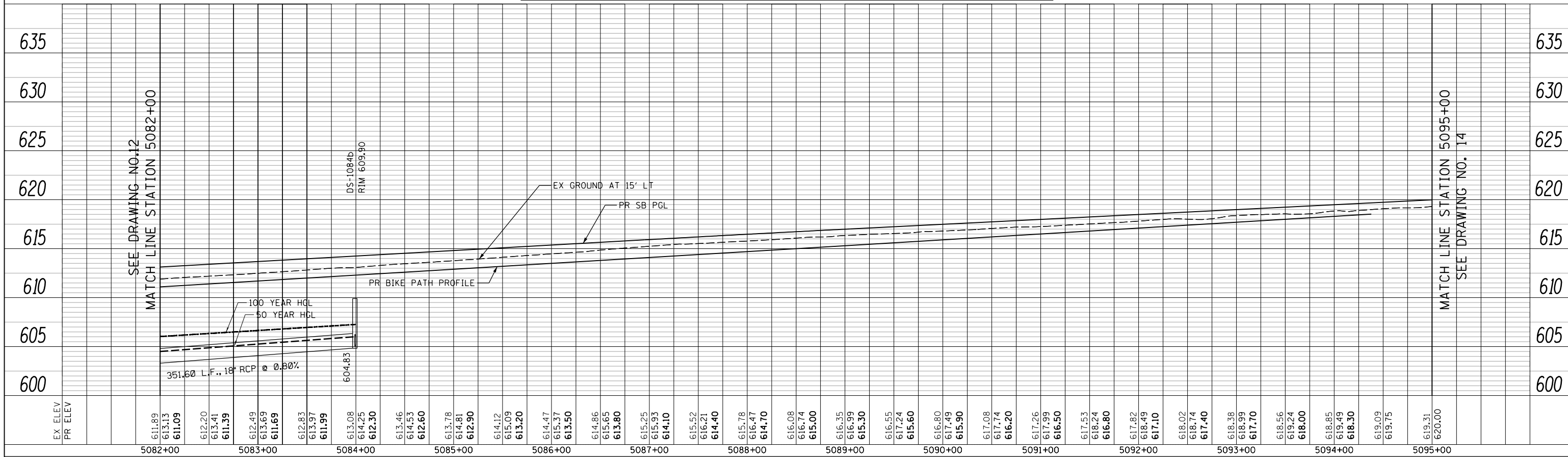
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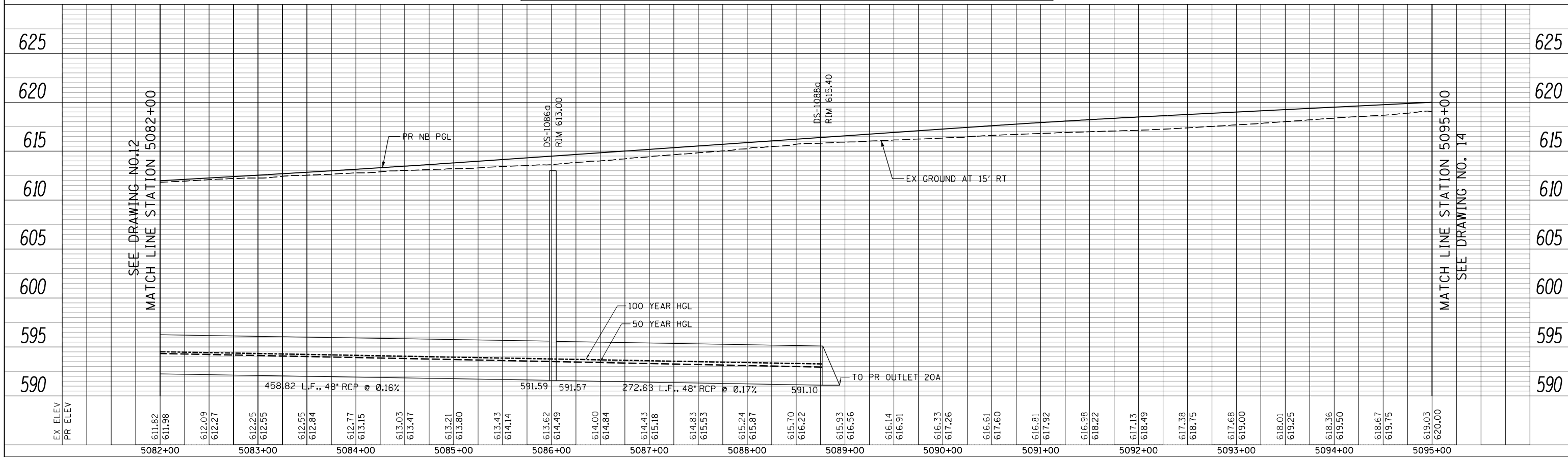
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SHEET NO. DP-12
 DRAWING NO. 12 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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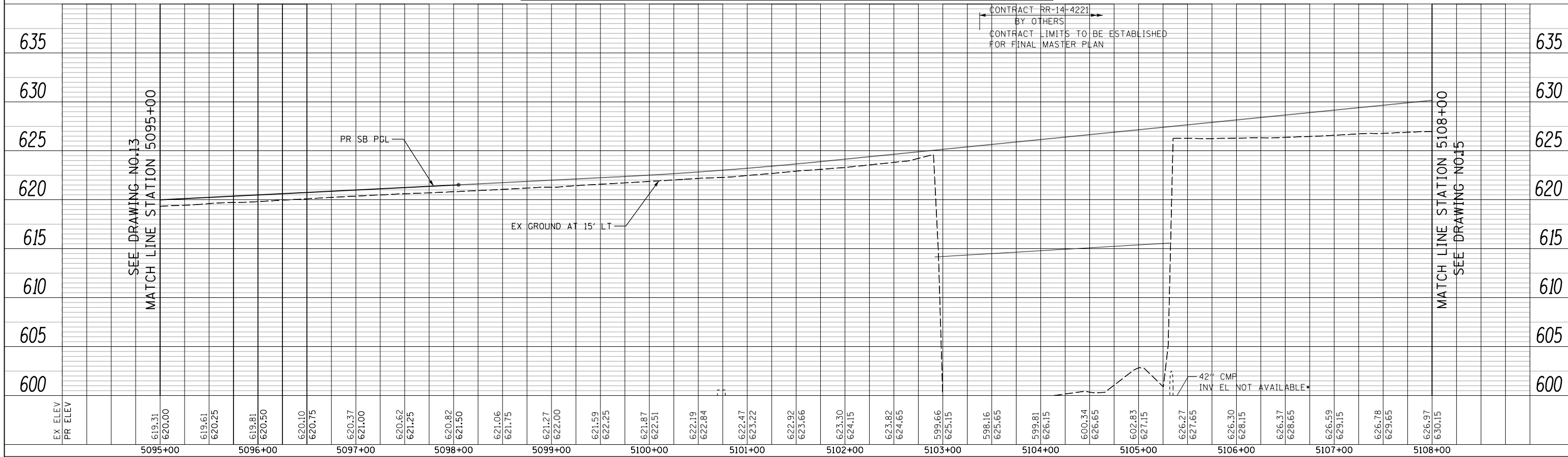
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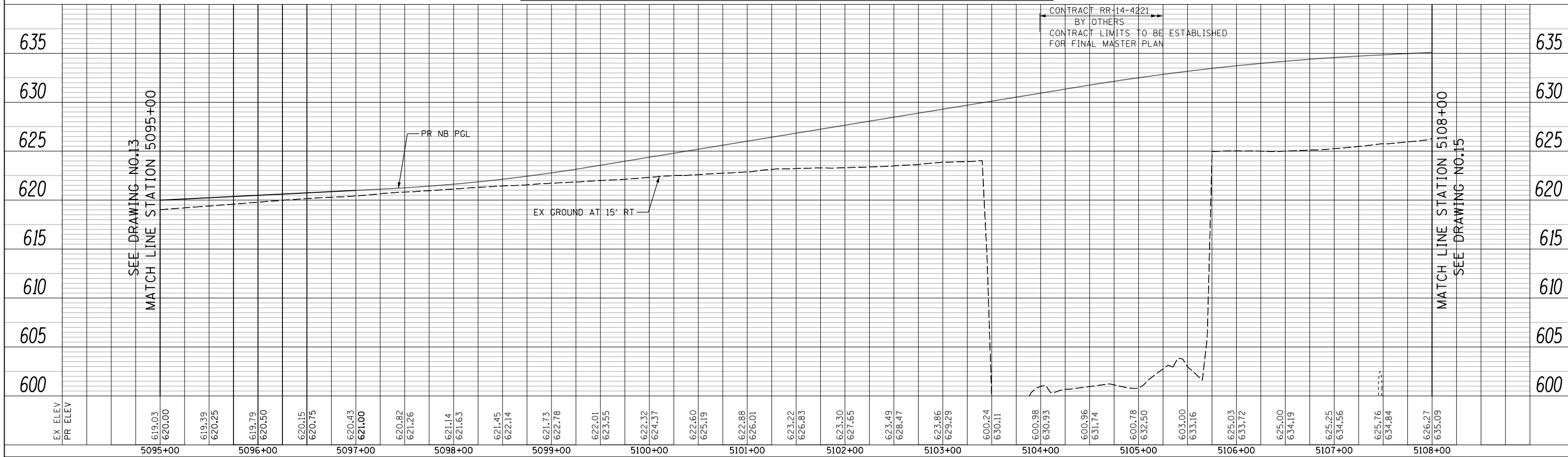
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SHEET NO.
 DP-13
 DRAWING NO.
 13 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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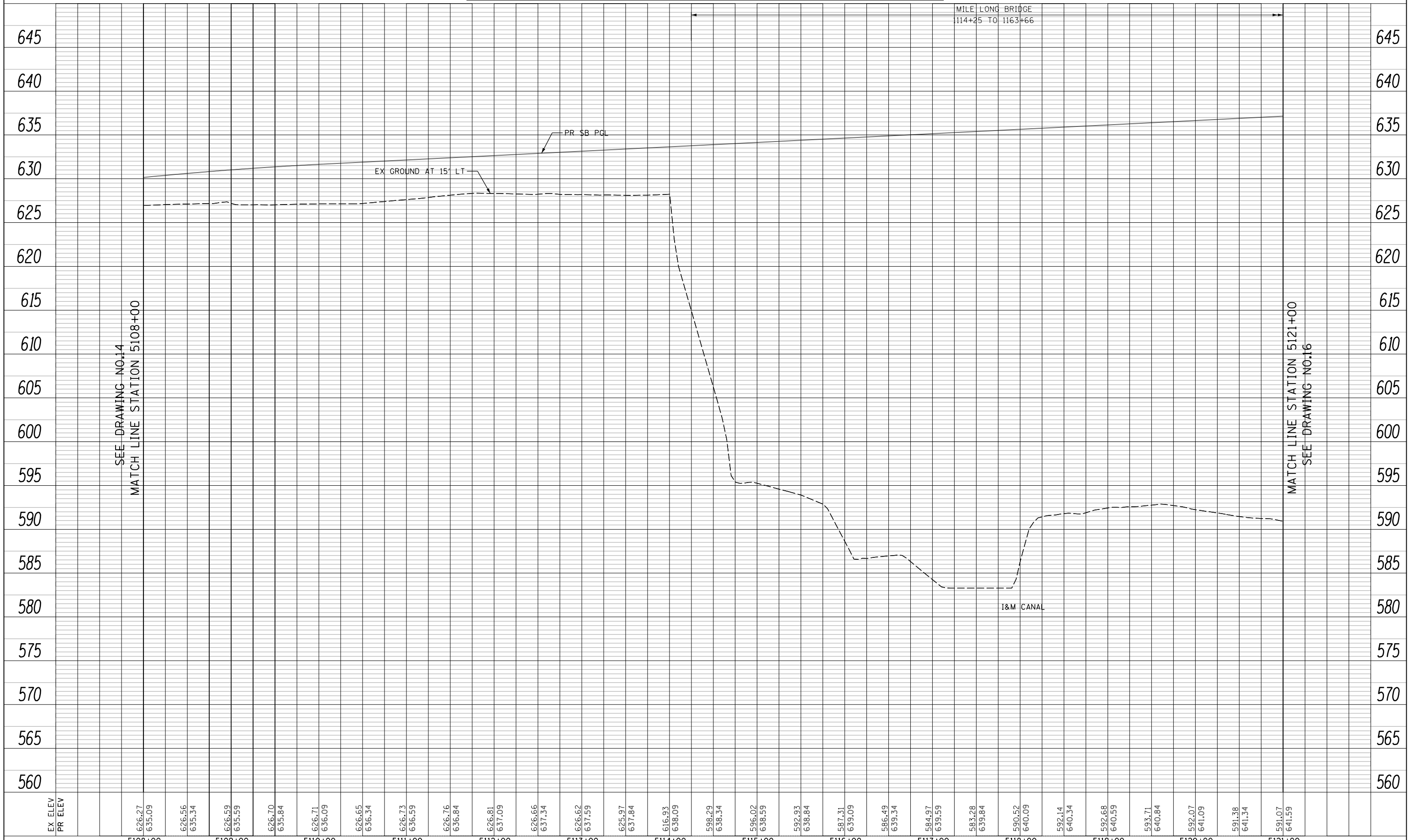
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SHEET NO.
 DP-14
 DRAWING NO.
 14 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



SEE DRAWING NO.14
MATCH LINE STATION 5108+00

MATCH LINE STATION 5121+00
SEE DRAWING NO.16

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REVISIONS		
NO.	DATE	DESCRIPTION

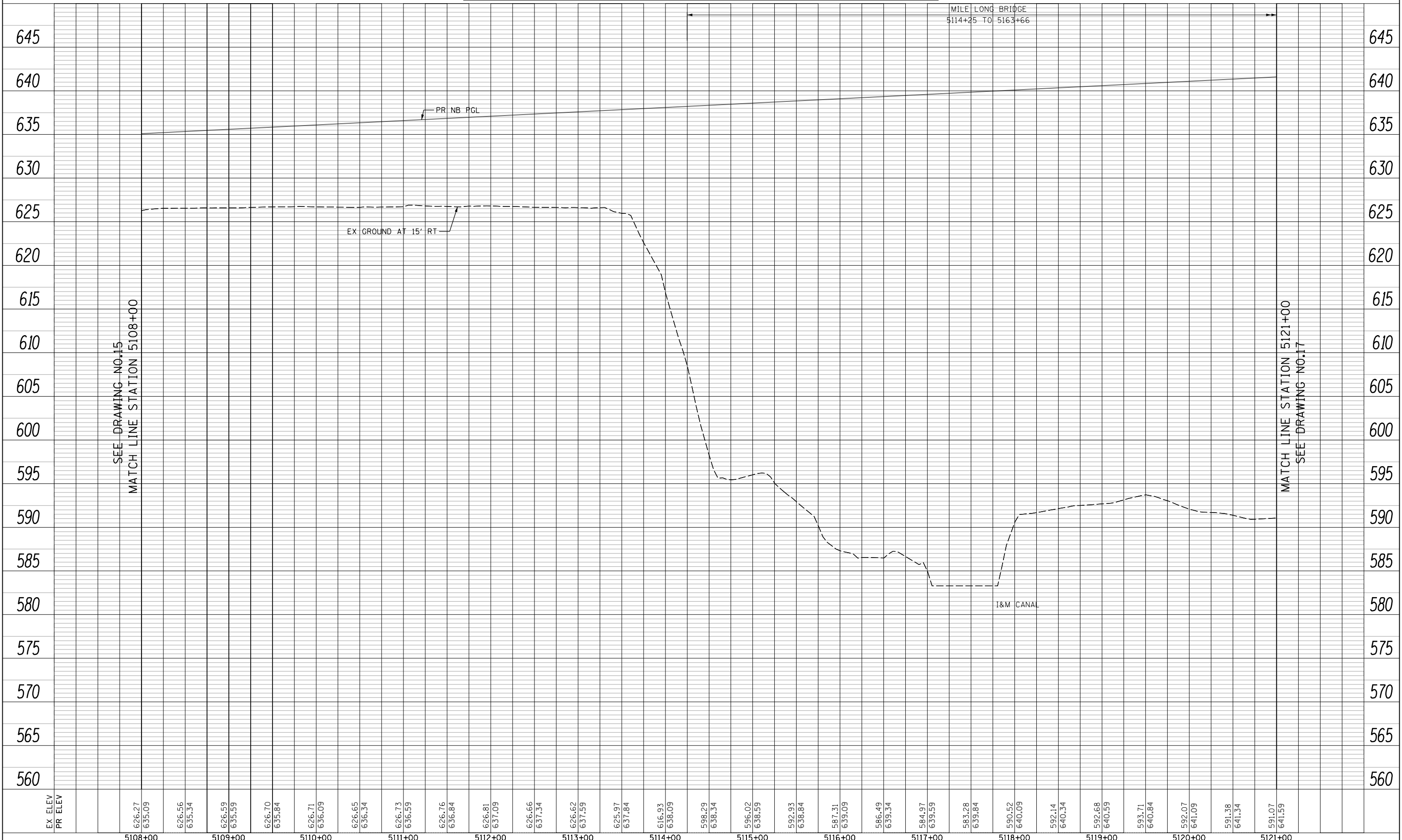
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SHEET NO. DP-15
DRAWING NO. 15 OF 56

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NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
DRAINAGE PROFILE NB
STA. 5108+00 - STA. 5121+00

SHEET NO.
DP-16
DRAWING NO.
16 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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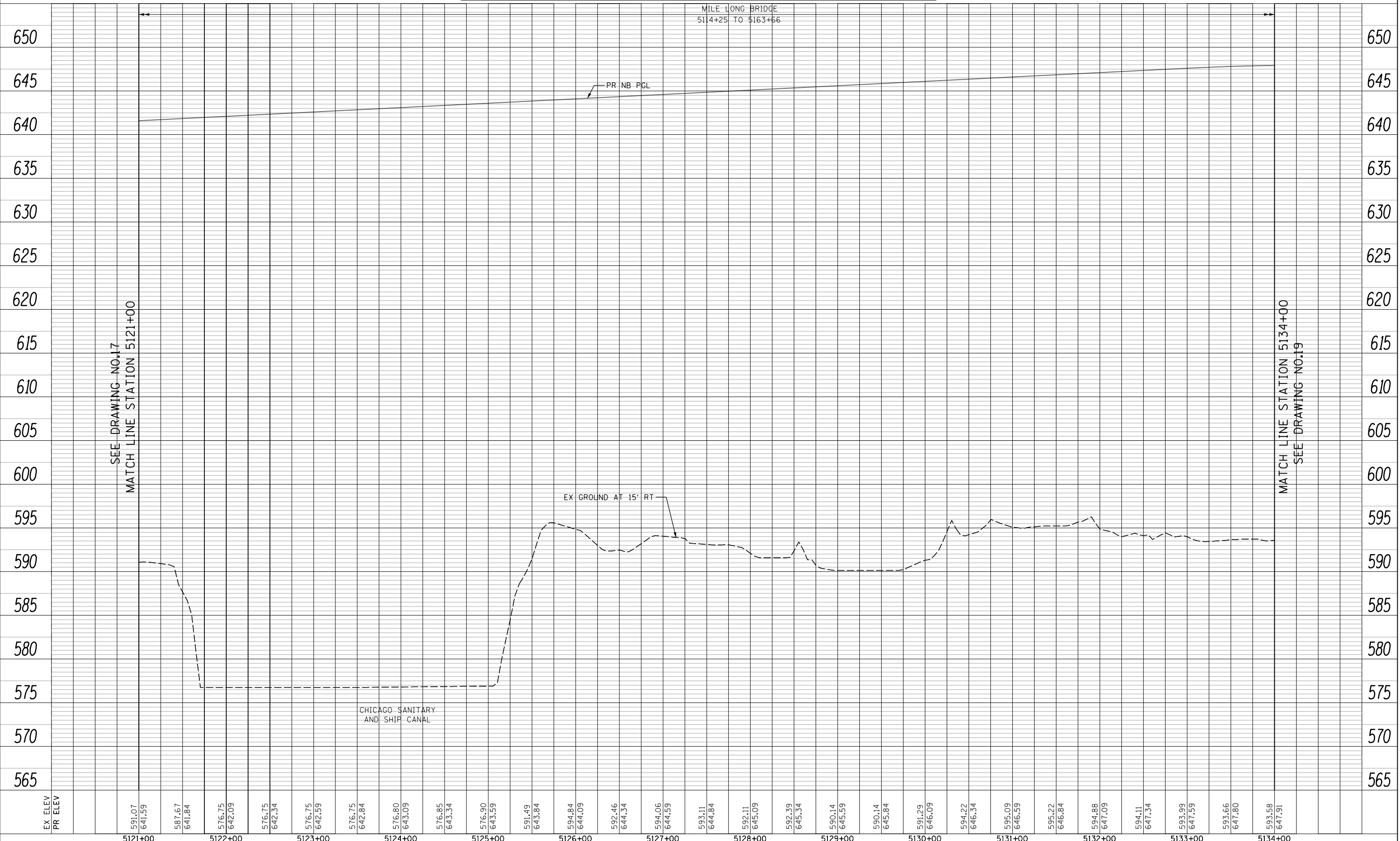
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NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE SB
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SHEET NO.
 DP-17
 DRAWING NO.
 17 OF 56

NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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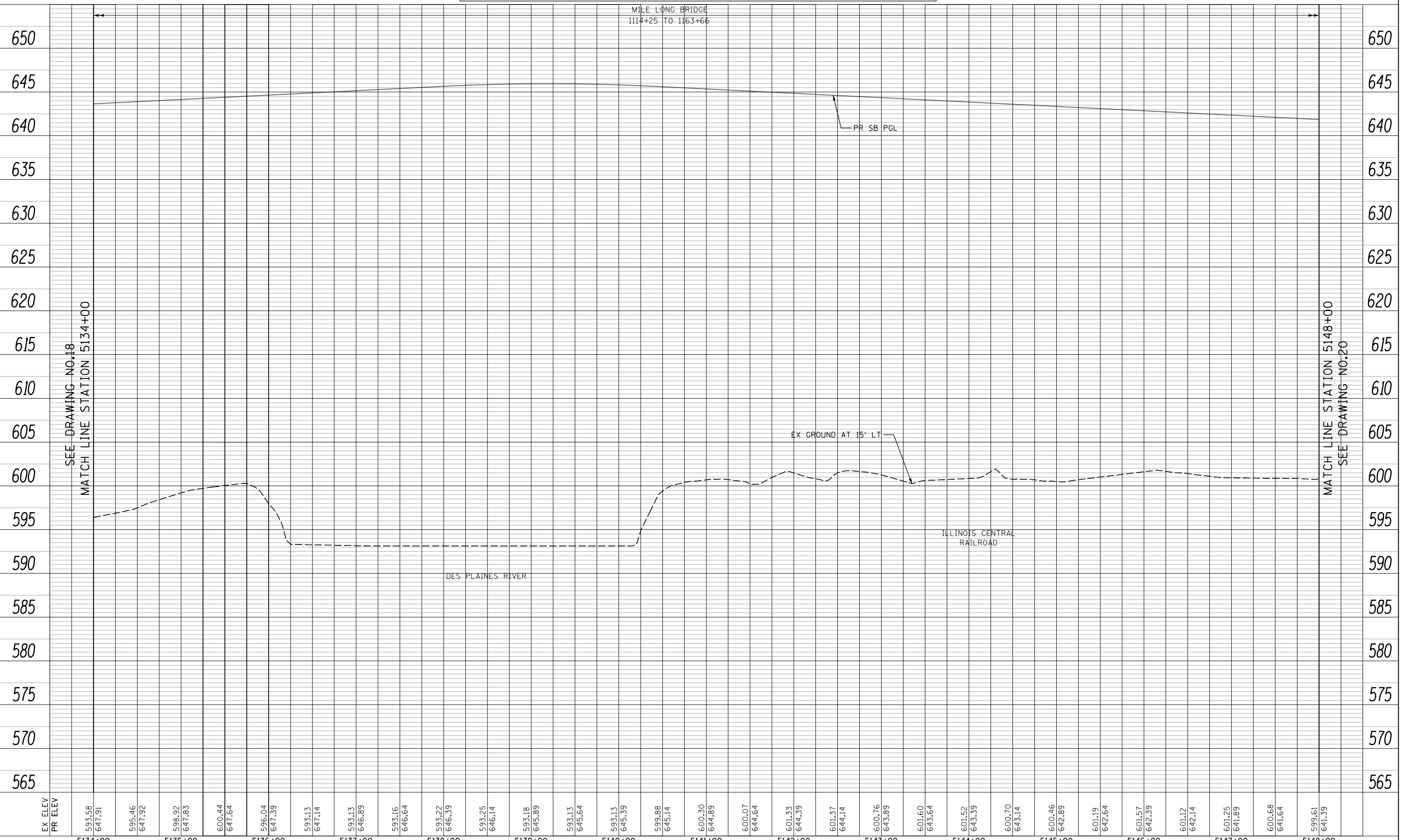
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SHEET NO.
 DP-18
 DRAWING NO.
 18 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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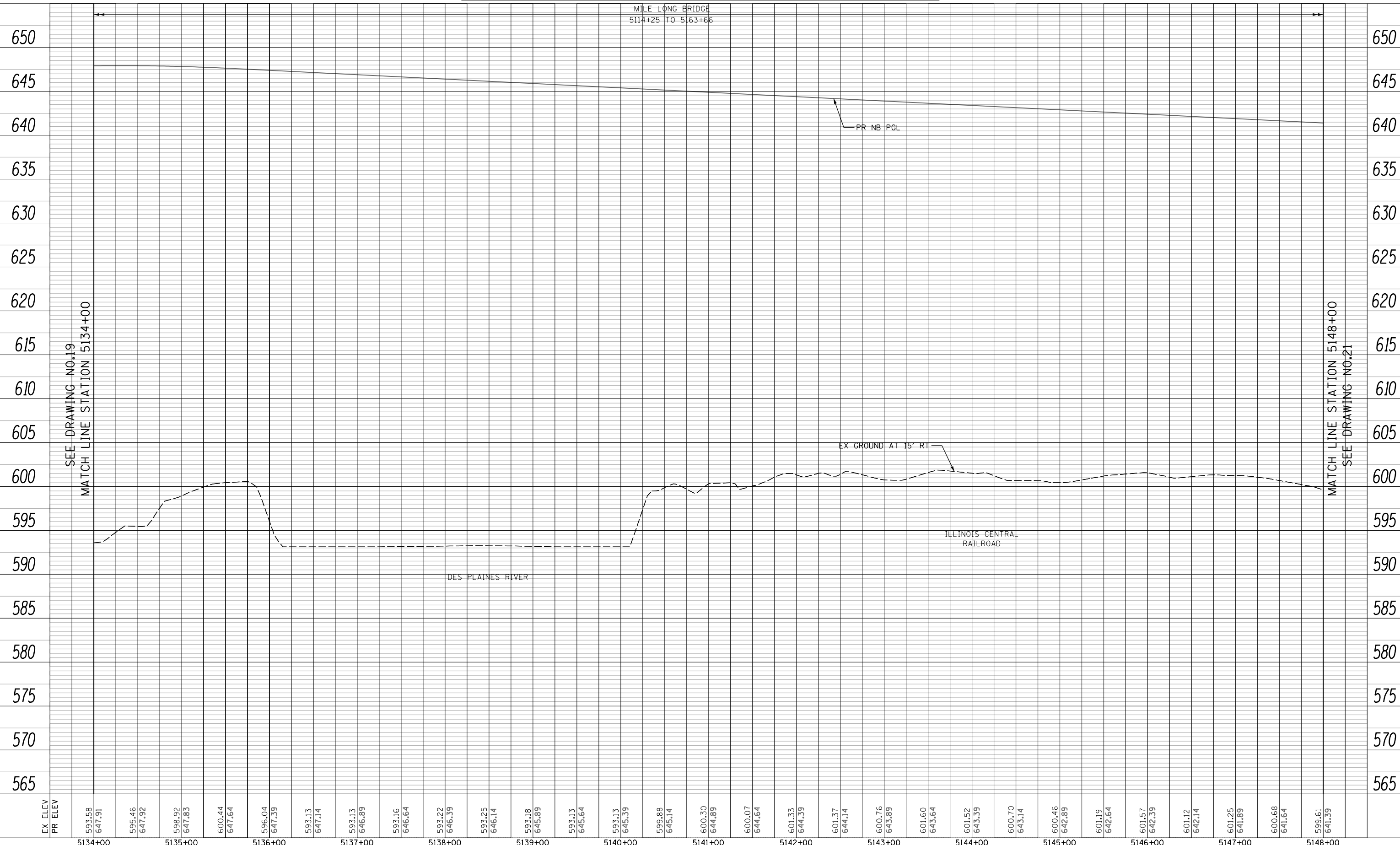
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CONTRACT NO. RR-14-4223
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SHEET NO.
 DP-19
 DRAWING NO.
 19 OF 56

NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



EX ELEV	PR ELEV	5134+00	5135+00	5136+00	5137+00	5138+00	5139+00	5140+00	5141+00	5142+00	5143+00	5144+00	5145+00	5146+00	5147+00	5148+00														
		593.58 647.91	595.46 647.92	598.92 647.83	600.44 647.64	596.04 647.39	593.13 647.14	593.13 646.89	593.16 646.64	593.22 646.39	593.25 646.14	593.18 645.89	593.13 645.64	593.13 645.39	599.88 645.14	600.30 644.89	600.07 644.64	601.33 644.39	601.37 644.14	600.76 643.89	601.60 643.64	601.52 643.39	600.70 643.14	600.46 642.89	601.19 642.64	601.57 642.39	601.12 642.14	601.25 641.89	600.68 641.64	599.61 641.39

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NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
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 STA. 5134+00 - STA. 5148+00

SHEET NO.
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 DRAWING NO.
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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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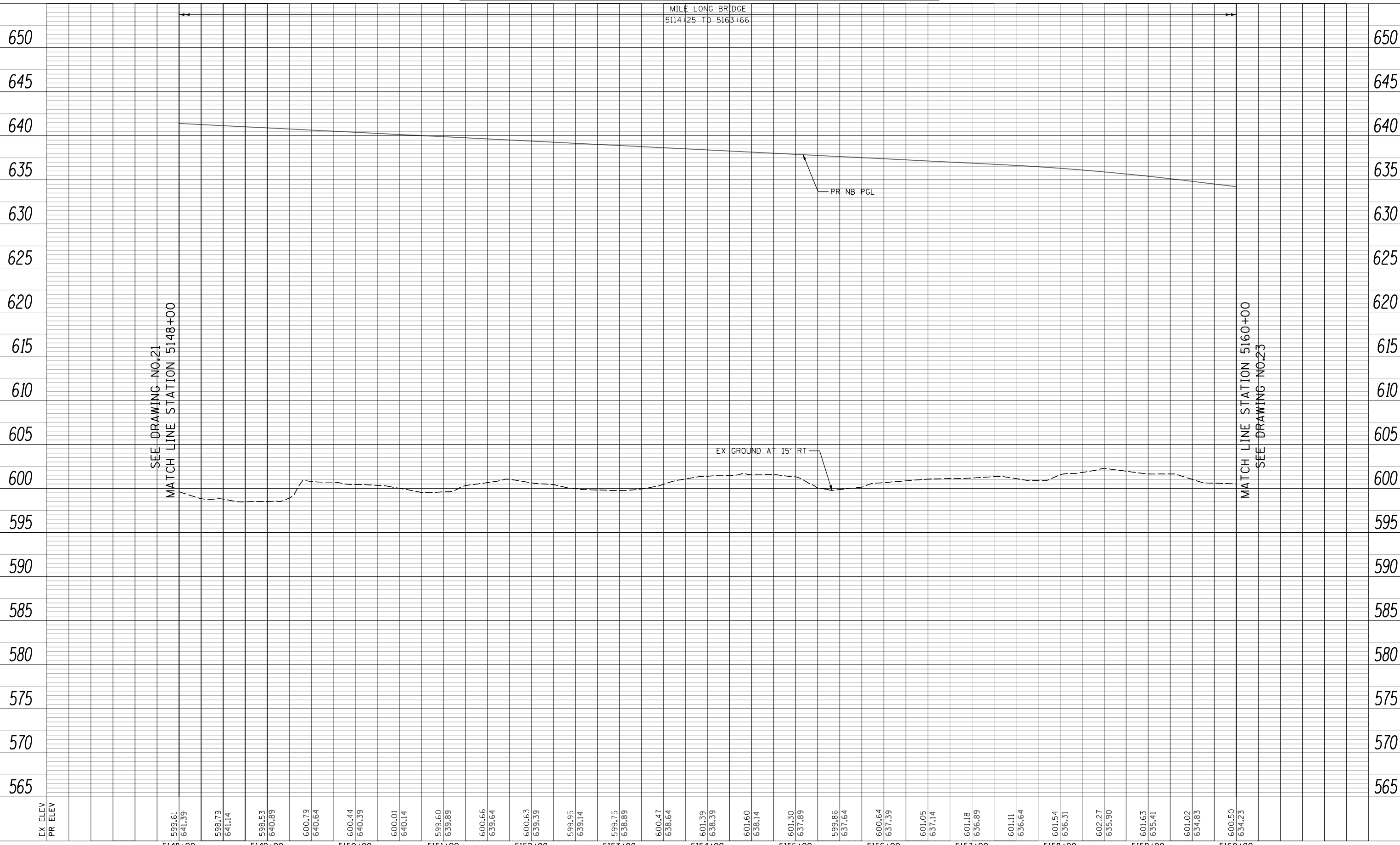
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NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE SB
 STA. 5148+00 - STA. 5160+00

SHEET NO.
 DP-21
 DRAWING NO.
 21 OF 56

NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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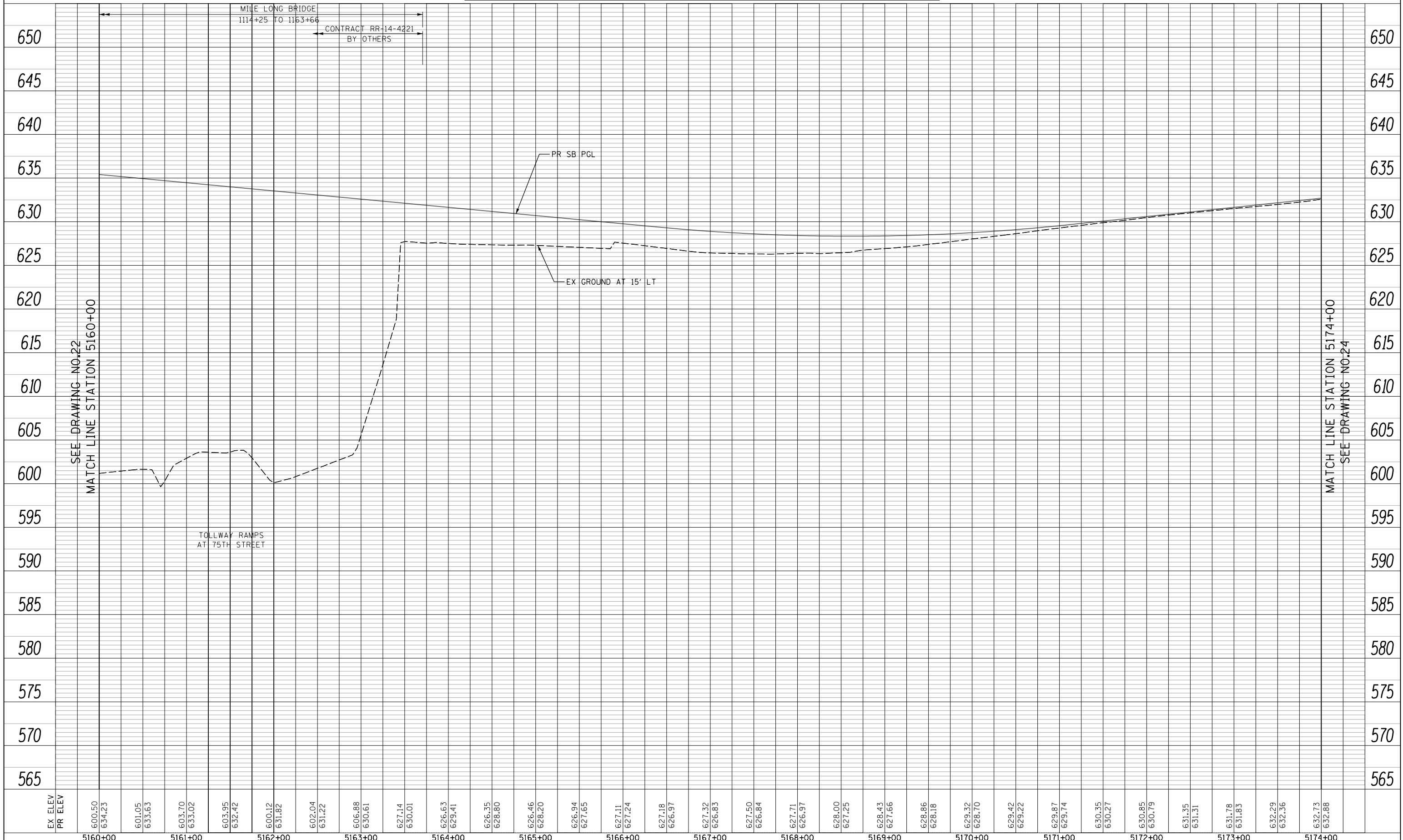
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CONTRACT NO. RR-14-4223
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SHEET NO. DP-22
 DRAWING NO. 22 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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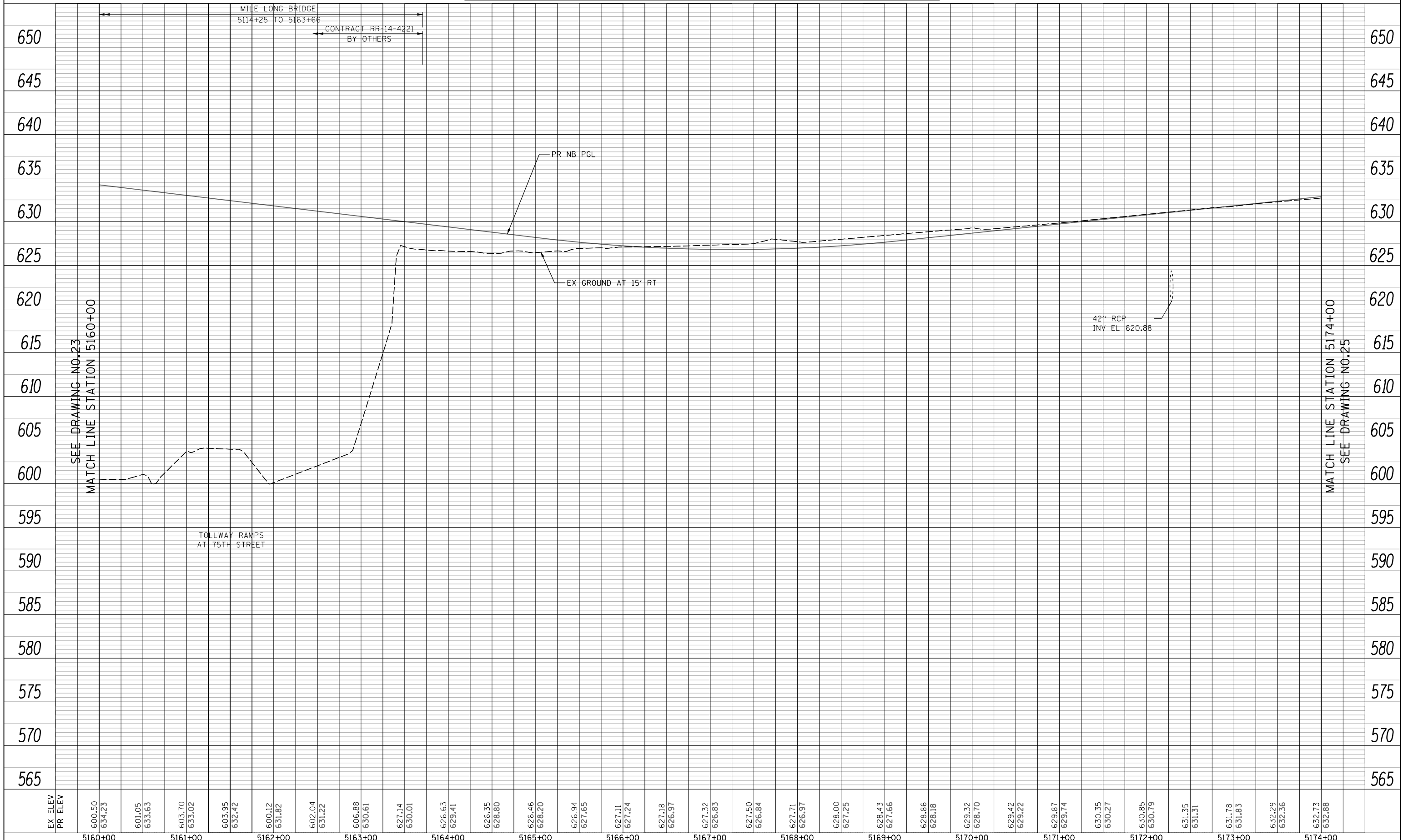
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CONTRACT NO. RR-14-4223
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SHEET NO.
 DP-23
 DRAWING NO.
 23 OF 56

NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



	5160+00	5161+00	5162+00	5163+00	5164+00	5165+00	5166+00	5167+00	5168+00	5169+00	5170+00	5171+00	5172+00	5173+00	5174+00														
EX ELEV	600.50	601.05	603.70	603.95	600.12	602.04	606.88	627.14	626.63	626.35	626.46	626.94	627.11	627.18	627.32	627.50	627.71	628.00	628.43	628.86	629.32	629.42	629.87	630.35	630.85	631.35	631.78	632.29	632.73
PR ELEV	634.23	633.63	633.02	632.42	631.82	631.22	630.61	630.01	629.41	628.80	628.20	627.65	627.24	626.97	626.83	626.84	626.97	627.25	627.66	628.18	628.70	629.22	629.74	630.27	630.79	631.31	631.83	632.36	632.88

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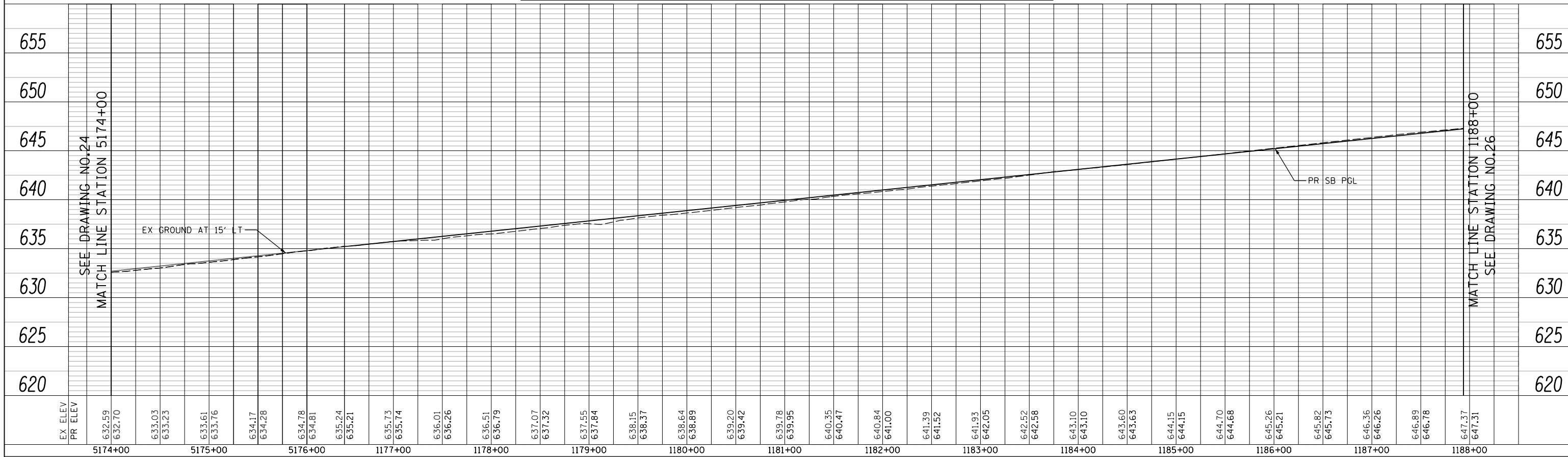
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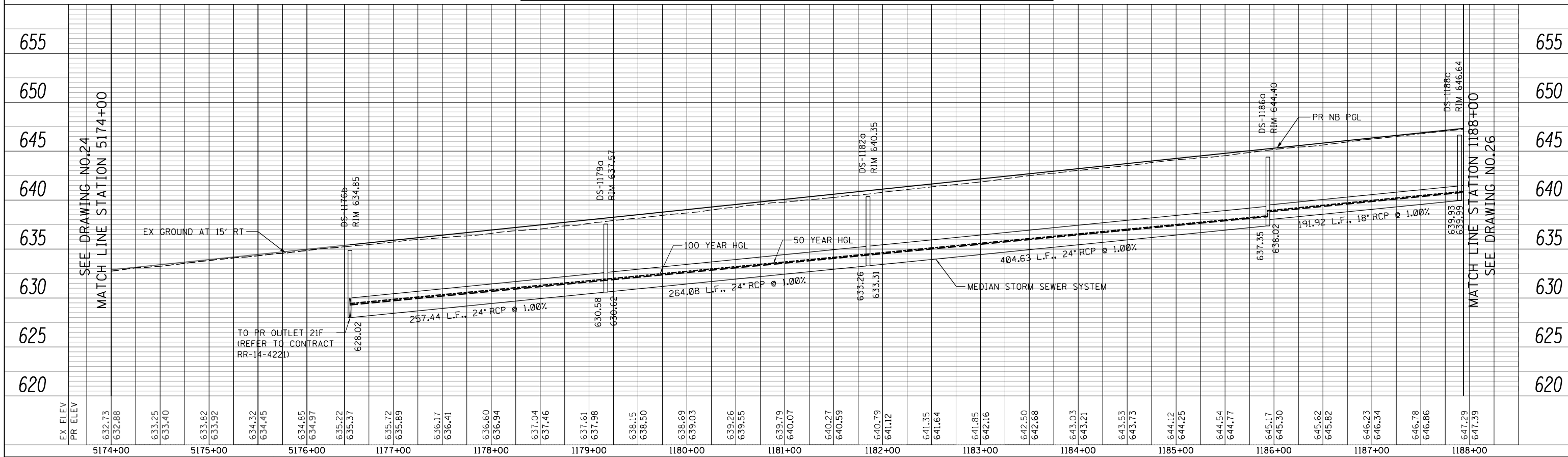
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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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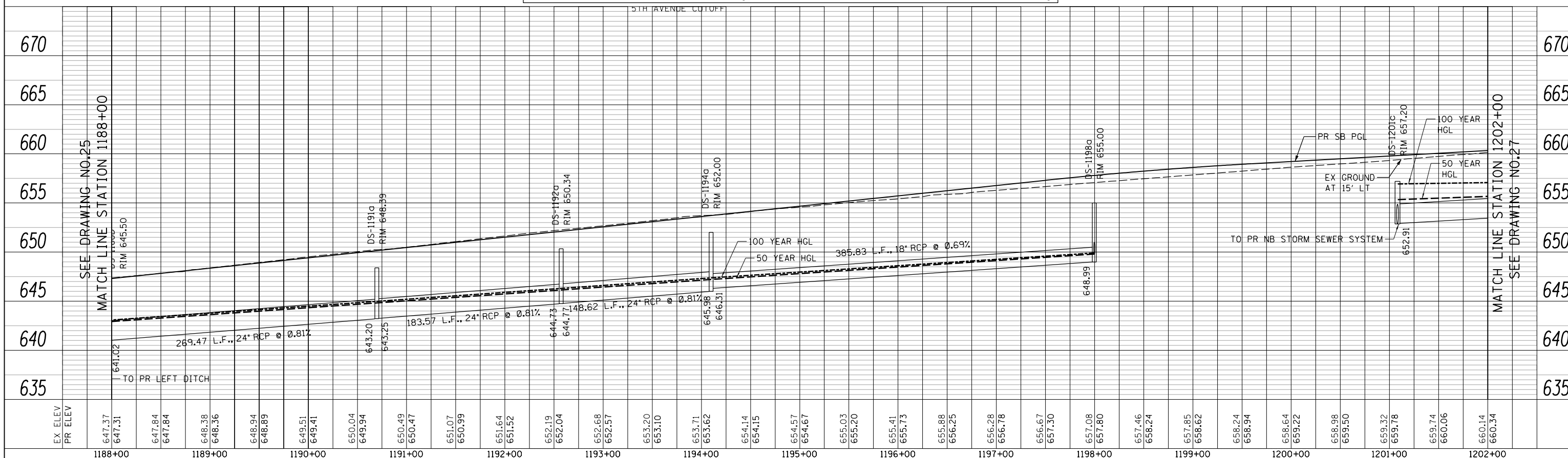
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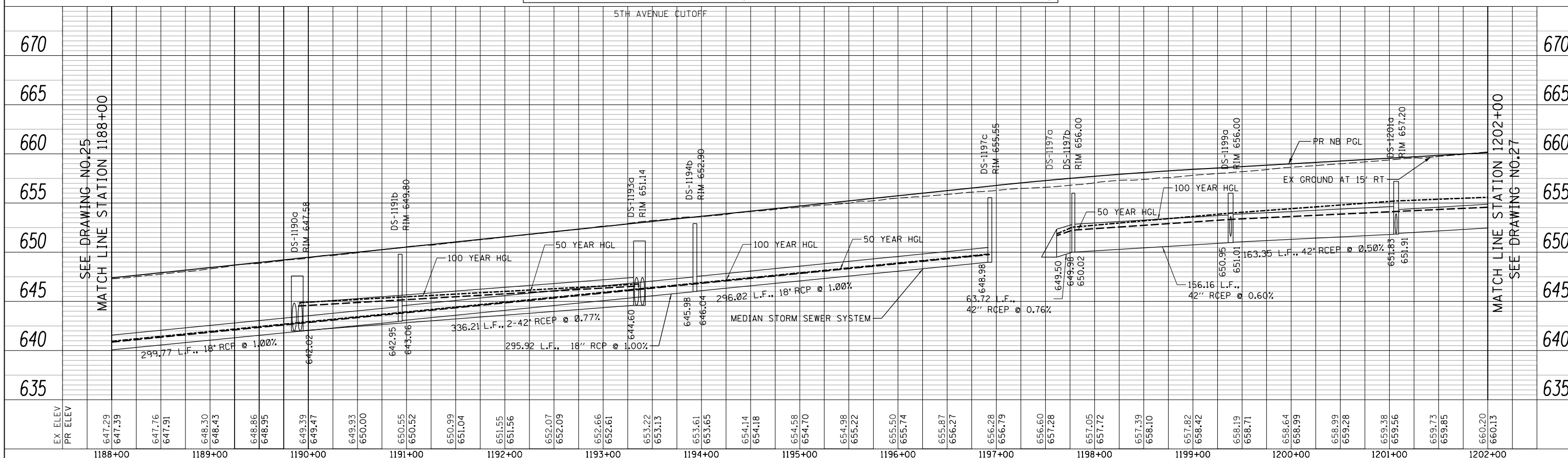
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 DP-25
 DRAWING NO.
 25 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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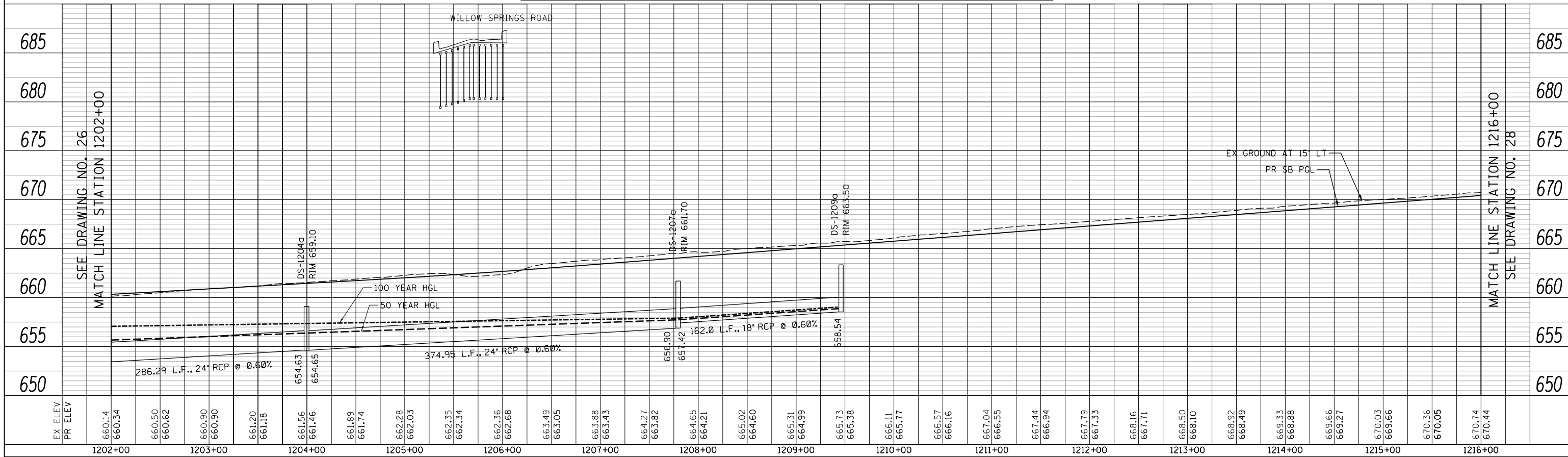
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
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 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
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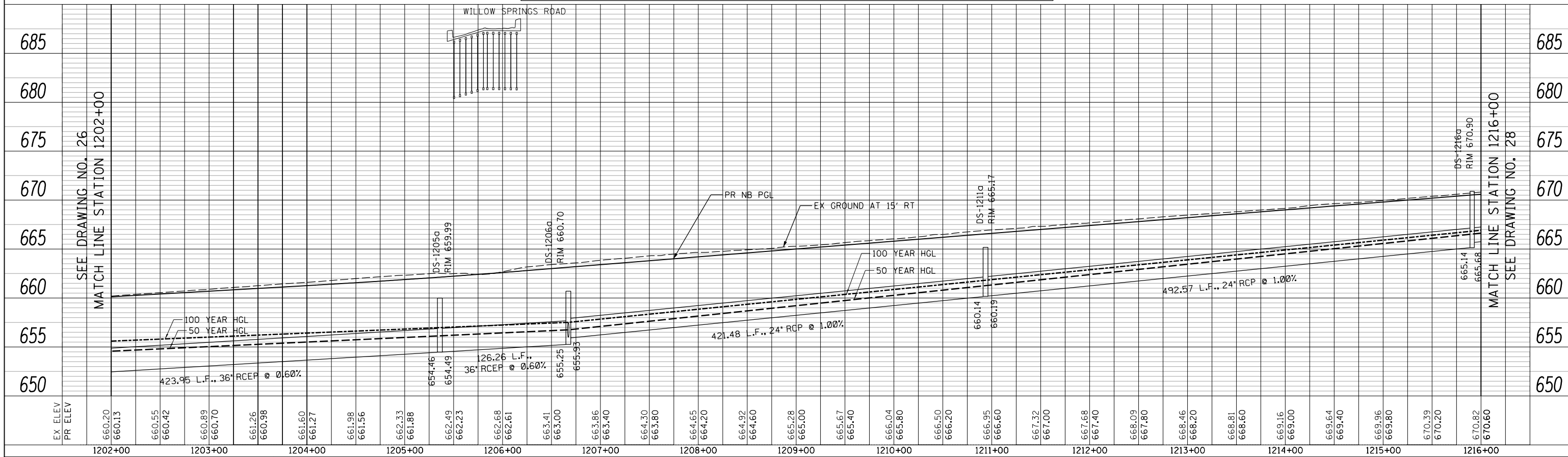
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SHEET NO.
 DP-26
 DRAWING NO.
 26 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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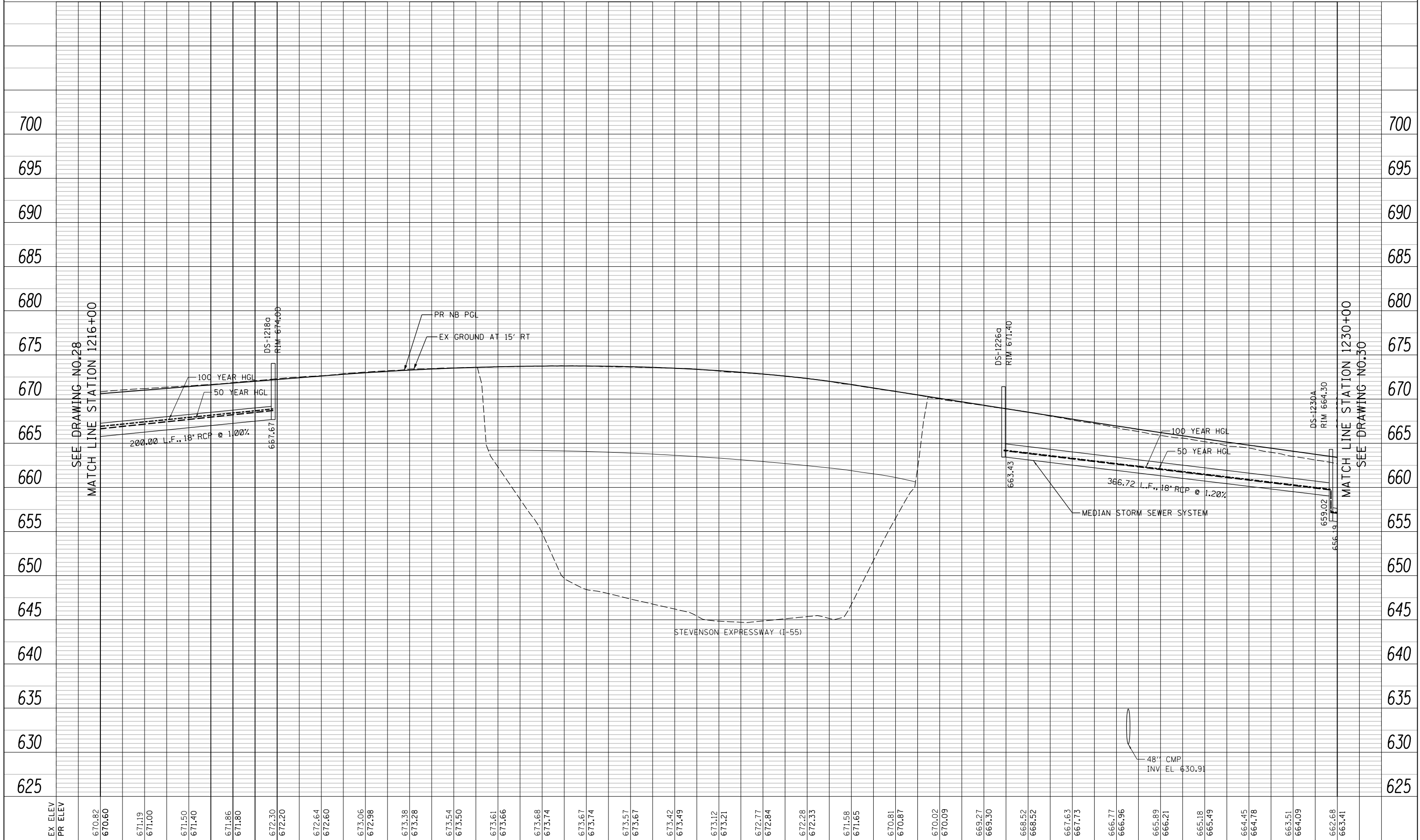
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REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE
 STA. 1202+00 - STA. 1216+00

SHEET NO.
 DP-27
 DRAWING NO.
 27 OF 56

NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



EX ELEV PR ELEV	670.82 670.60	671.19 671.00	671.50 671.40	671.86 671.80	672.30 672.20	672.64 672.60	673.06 672.98	673.38 673.28	673.54 673.50	673.61 673.66	673.68 673.74	673.67 673.74	673.57 673.67	673.42 673.49	673.12 673.21	672.77 672.84	672.28 672.33	671.58 671.65	670.81 670.87	670.02 670.09	669.27 669.30	668.52 668.52	667.63 667.73	666.77 666.96	665.89 666.21	665.18 665.49	664.45 664.78	663.51 664.09	662.68 663.41	
	1216+00	1217+00	1218+00	1219+00	1220+00	1221+00	1222+00	1223+00	1224+00	1225+00	1226+00	1227+00	1228+00	1229+00	1230+00															

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REVISIONS		
NO.	DATE	DESCRIPTION

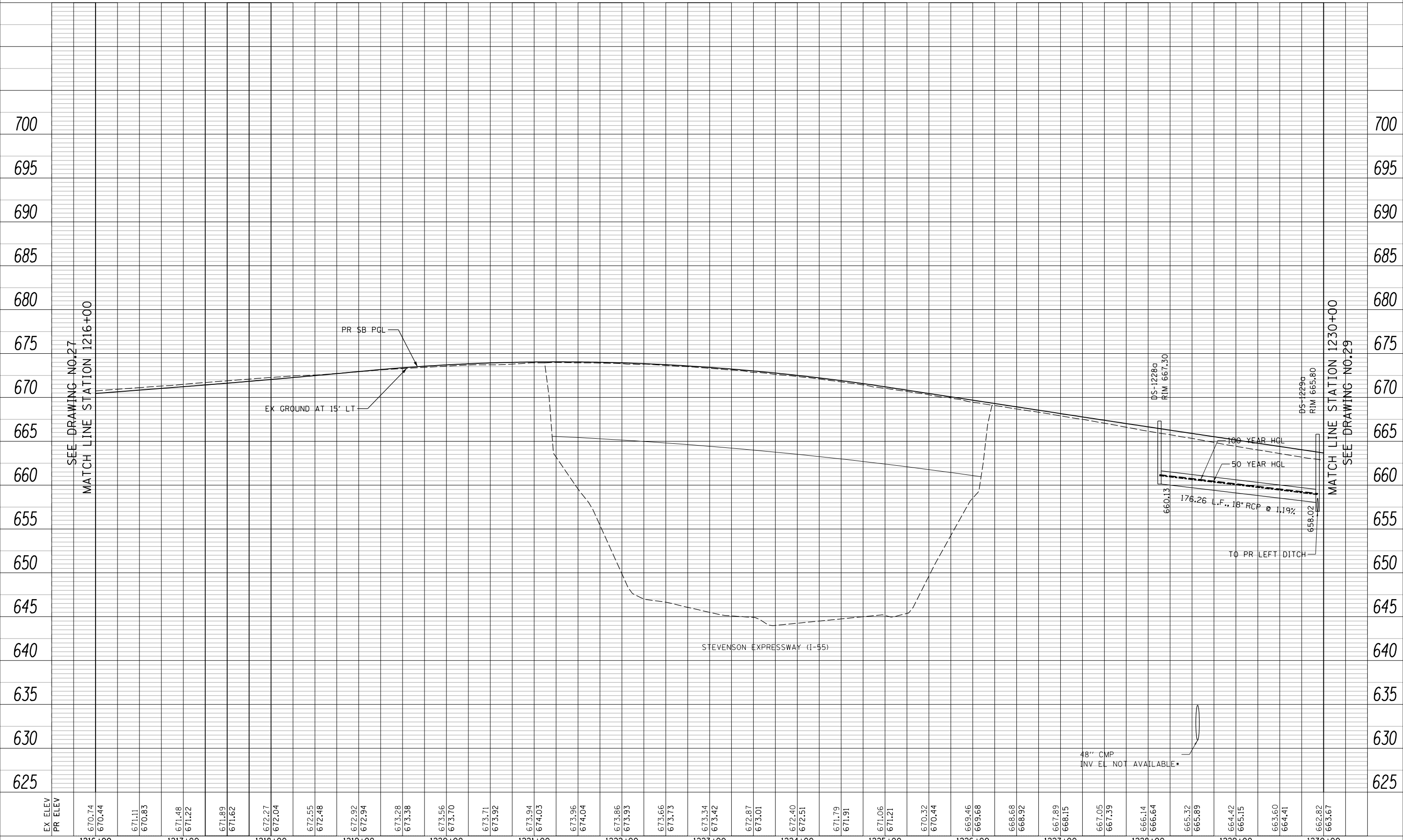
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STA. 1216+00 - STA. 1230+00

SHEET NO. DP-28
DRAWING NO. 28 OF 56

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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



EX ELEV	670.74	671.11	671.48	671.89	672.27	672.55	672.92	673.28	673.56	673.71	673.94	673.96	673.86	673.66	673.34	672.87	672.40	671.79	671.06	670.32	669.46	668.68	667.89	667.05	666.14	665.32	664.42	663.60	662.82
PR ELEV	670.44	670.83	671.22	671.62	672.04	672.48	672.94	673.38	673.70	673.92	674.03	674.04	673.95	673.73	673.42	673.01	672.51	671.91	671.21	670.44	669.68	668.92	668.15	667.39	666.64	665.89	665.15	664.41	663.67
	1216+00	1217+00	1218+00	1219+00	1220+00	1221+00	1222+00	1223+00	1224+00	1225+00	1226+00	1227+00	1228+00	1229+00	1230+00														

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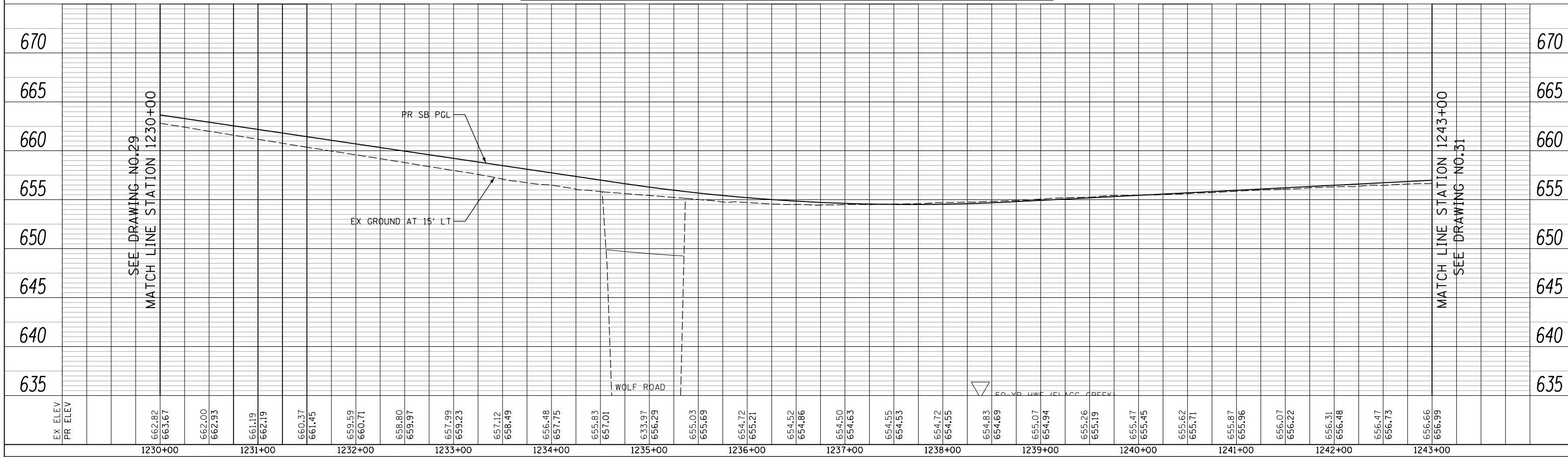
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NO.	DATE	DESCRIPTION

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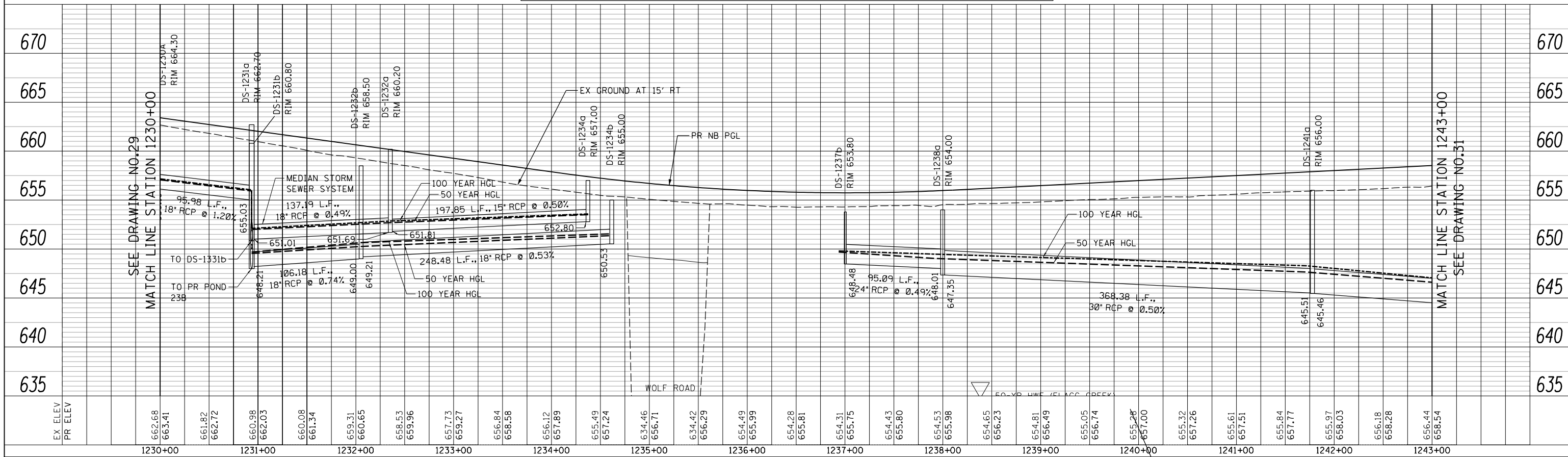
SHEET NO.
 DP-29
 DRAWING NO.
 29 OF 56

12/22/2017
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 139.dgn

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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DRAWN BY SB SCALE 1"=50'
 CHECKED BY KS DATE 12/20/17

exp. U.S. Services Inc.
 Chicago, IL
 BUILDINGS • EARTH & ENVIRONMENT • ENERGY
 INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY

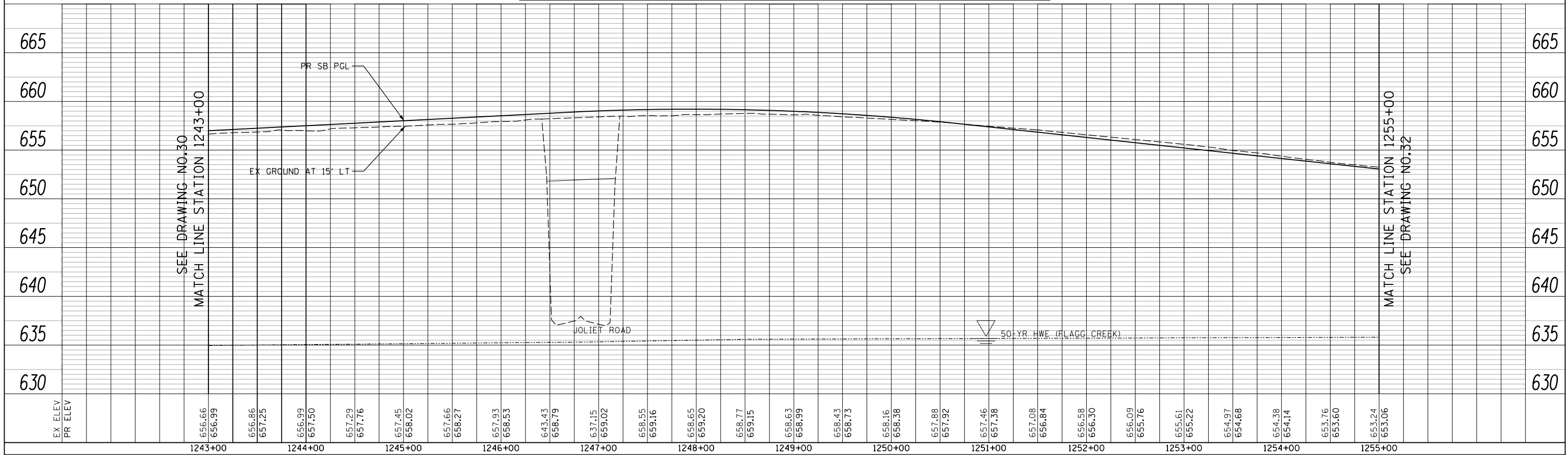
THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

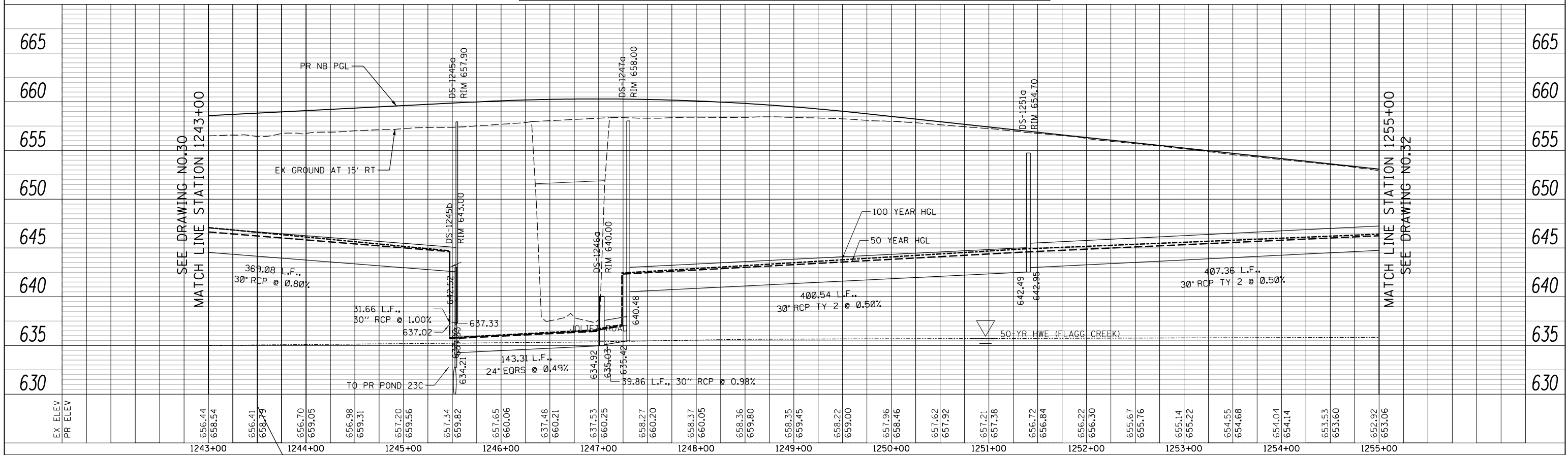
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SHEET NO. DP-30
 DRAWING NO. 30 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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exp U.S. Services Inc. Chicago, IL BUILDINGS-EARTH & ENVIRONMENT-ENERGY INDUSTRIAL-INFRASTRUCTURE-SUSTAINABILITY

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY 2700 OGDEN AVENUE DOWNERS GROVE, ILLINOIS 60515

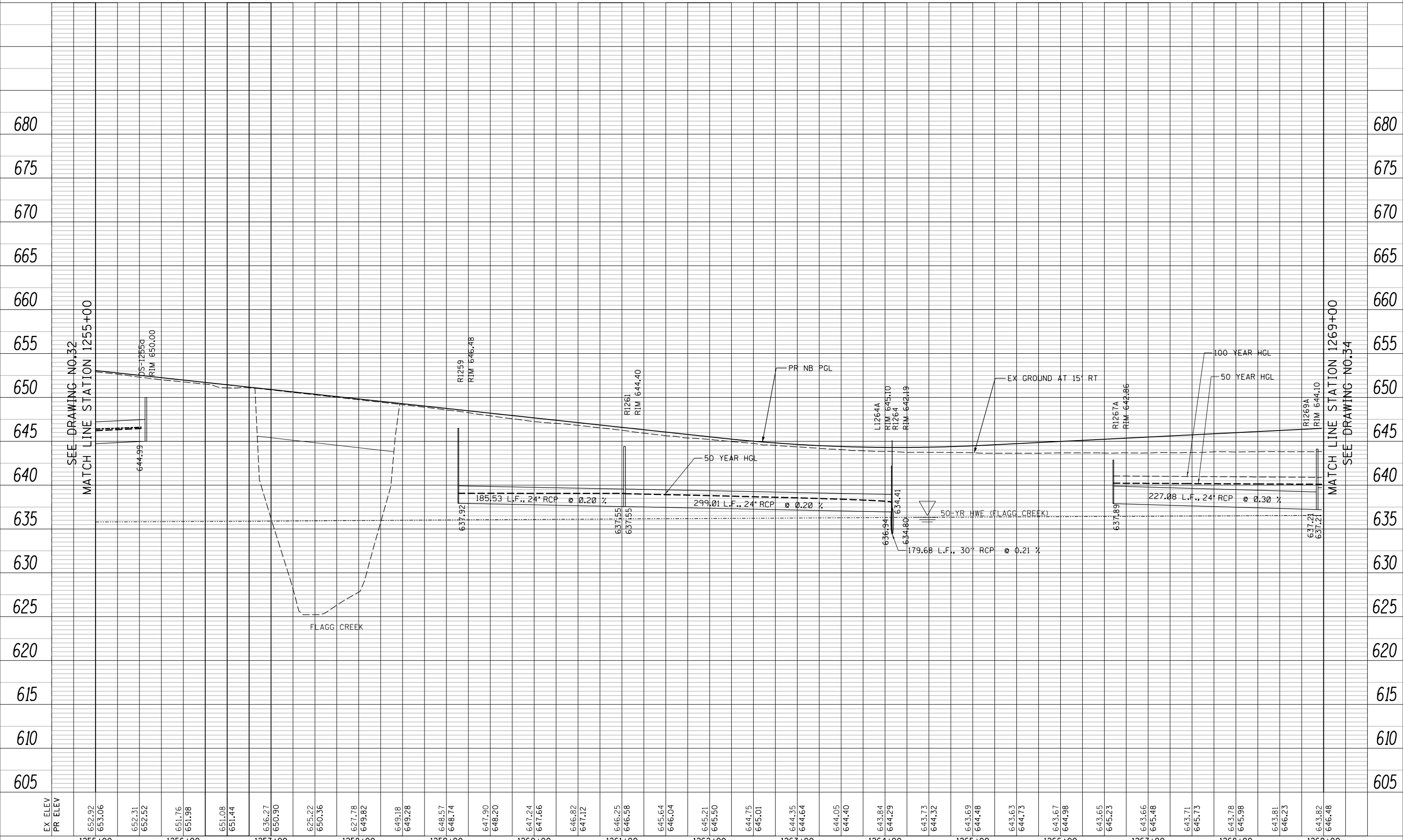
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NO.	DATE	DESCRIPTION

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SHEET NO. DP-31 DRAWING NO. 31 OF 56

NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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 CHECKED BY JW DATE 12/20/17



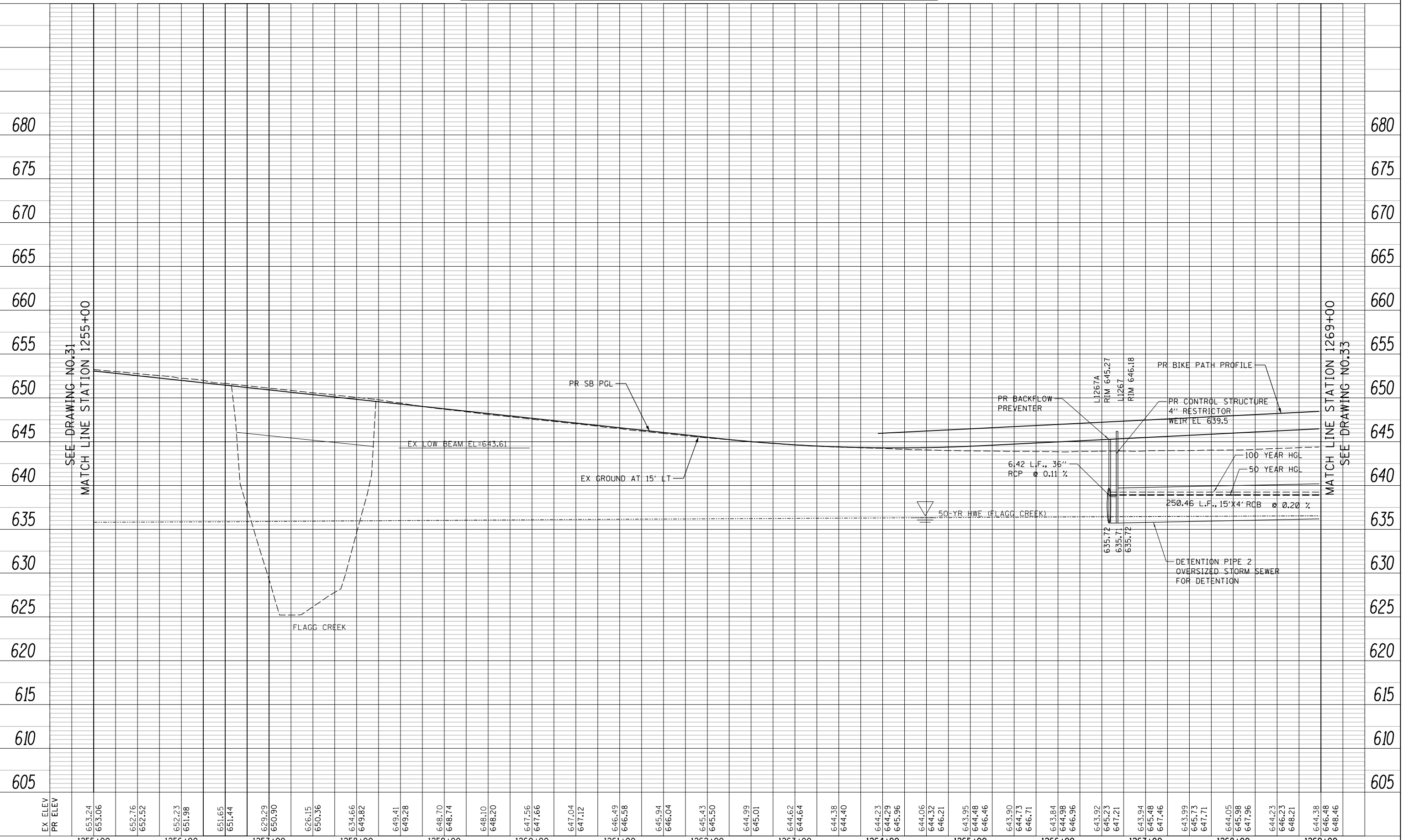
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NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 DRAINAGE PROFILE NB
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SHEET NO. DP-32
 DRAWING NO. 32 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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653.24	653.06	1255+00	1255+00	1256+00	1256+00	1257+00	1257+00	1258+00	1258+00	1259+00	1259+00	1260+00	1260+00	1261+00	1261+00	1262+00	1262+00	1263+00	1263+00		
652.76	652.52																				
652.23	651.98																				
651.65	651.44																				
629.29	650.90																				
626.15	650.36																				
634.66	649.82																				
649.41	649.28																				
648.70	648.74																				
648.10	648.20																				
647.56	647.66																				
647.04	647.12																				
646.49	646.58																				
645.94	646.04																				
645.43	645.50																				
644.99	645.01																				
644.62	644.64																				
644.38	644.40																				
644.23	644.29																				
644.23	645.96																				
644.06	644.32																				
644.32	646.21																				
643.95	643.95																				
644.48	646.46																				
643.90	646.71																				
643.84	643.84																				
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648.21	648.21																				
644.38	646.48																				
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 CHECKED BY: JW DATE: 12/20/17



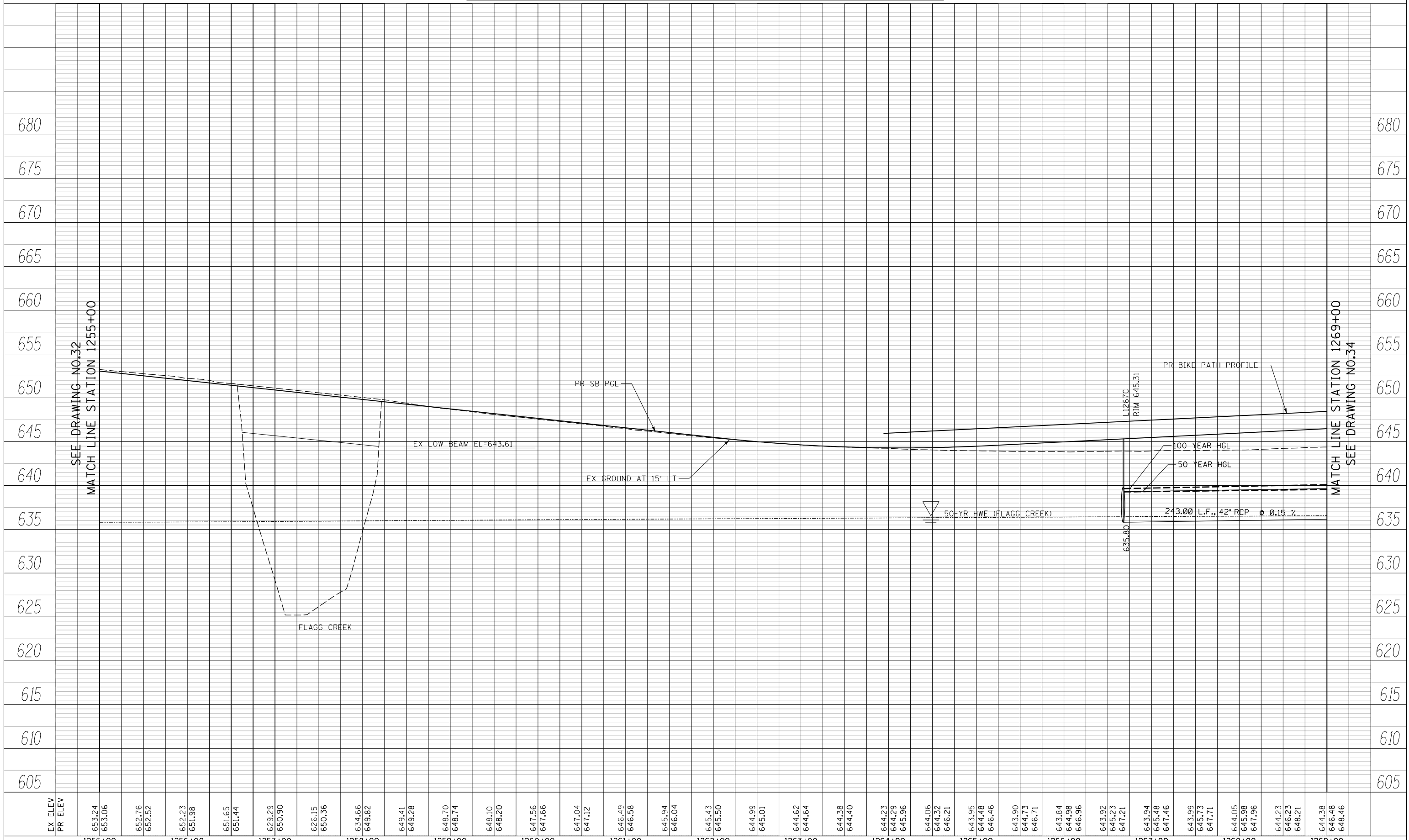
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CONTRACT NO. RR-14-4223
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SHEET NO. DP-33
 DRAWING NO. 33 OF 56

MEDIAN I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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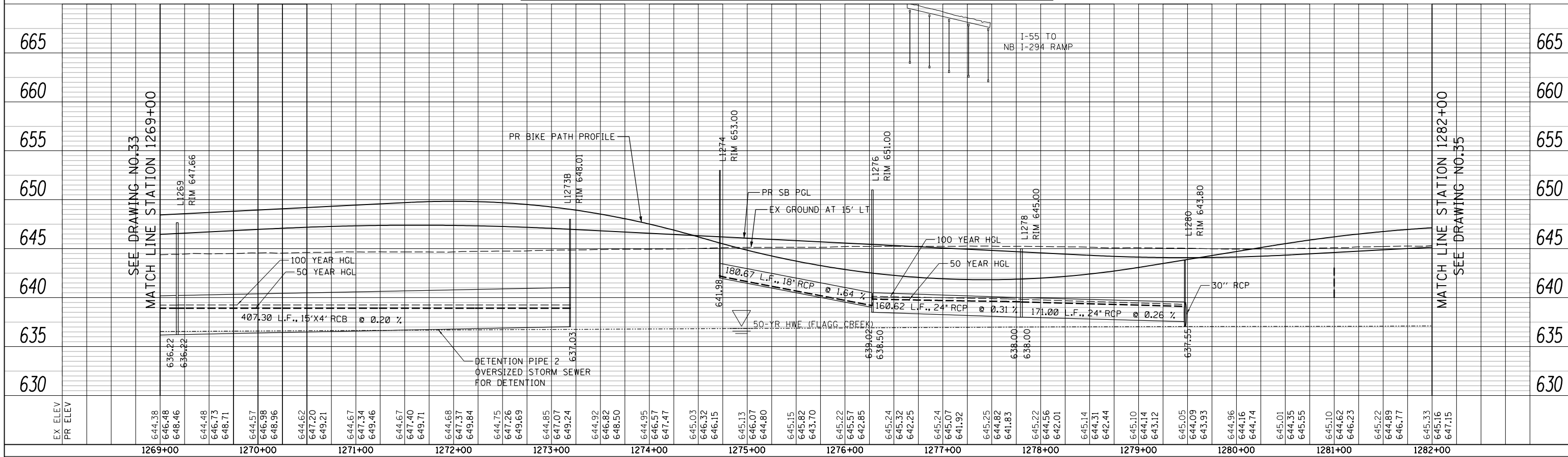


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NO.	DATE	DESCRIPTION

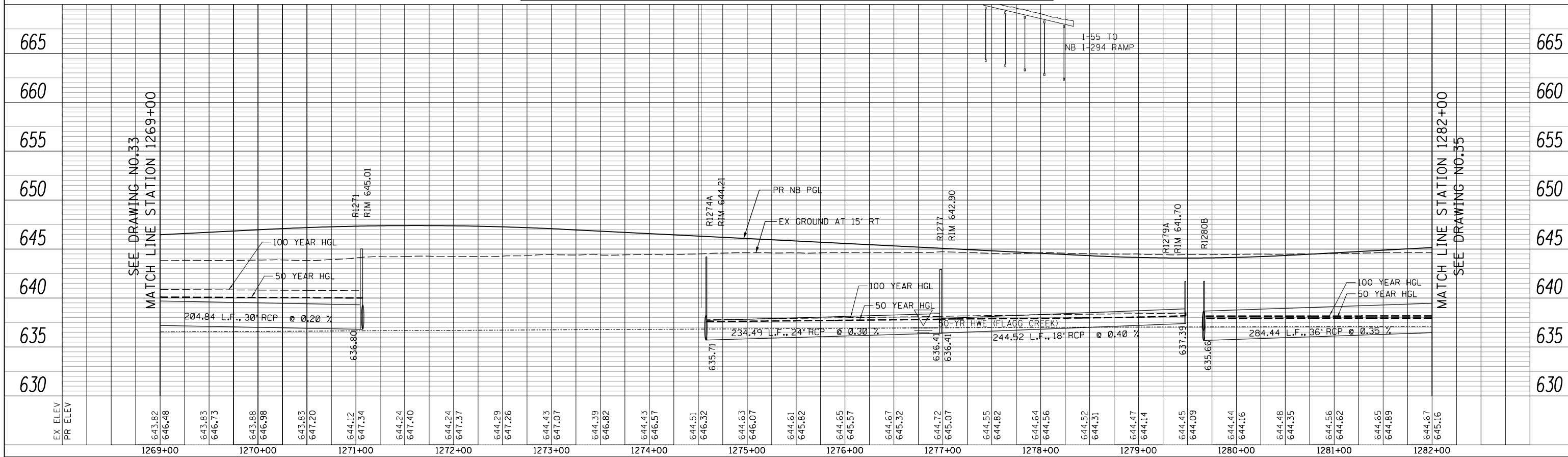
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SHEET NO.
DP-33A
 DRAWING NO.
33A OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 CHECKED BY JW DATE 12/20/17

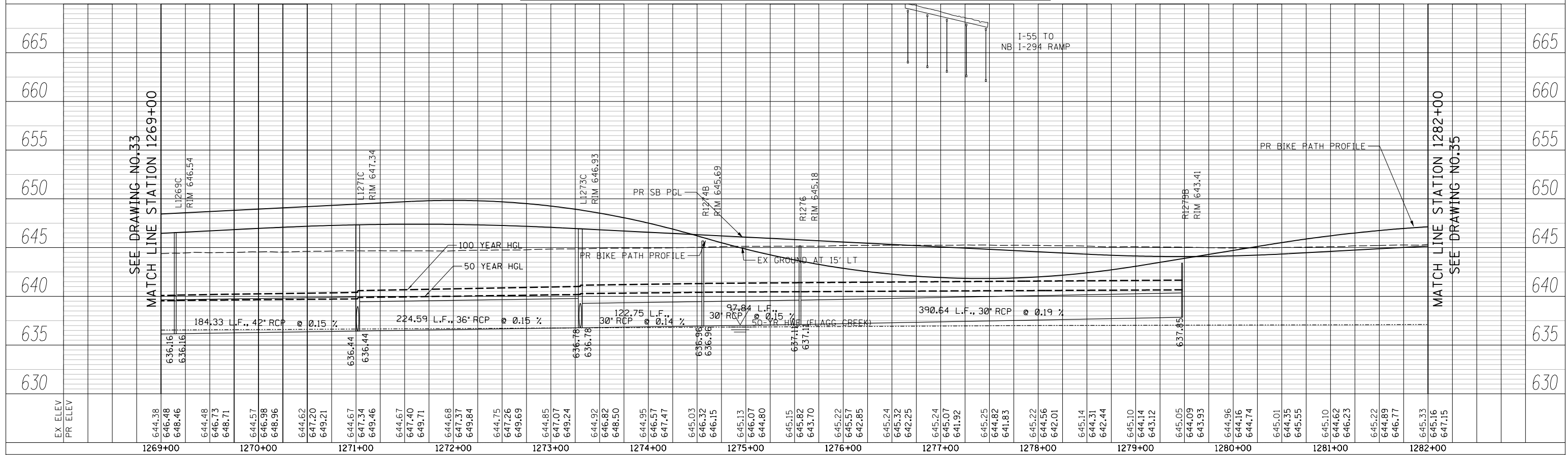


REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
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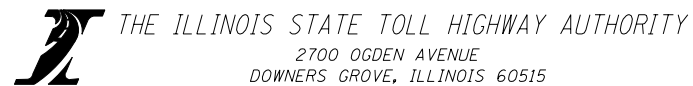
SHEET NO. DP-34
 DRAWING NO. 34 OF 56

MEDIAN I-294 (CENTRAL TRI-STATE TOLLWAY)



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 CHECKED BY JW DATE 12/20/17

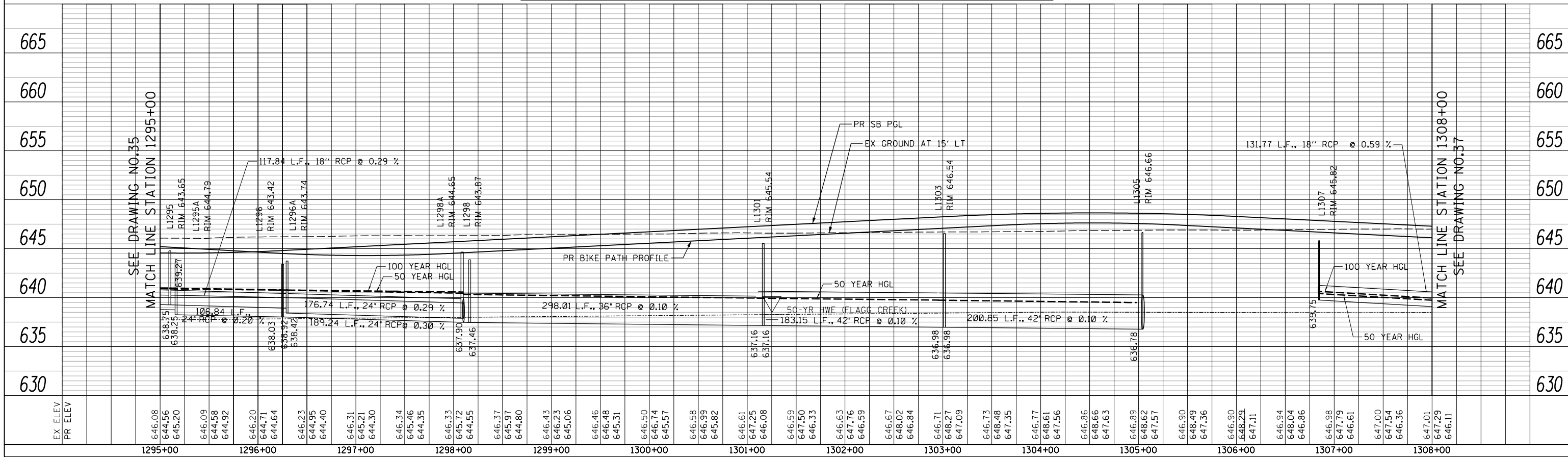


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		DESCRIPTION	

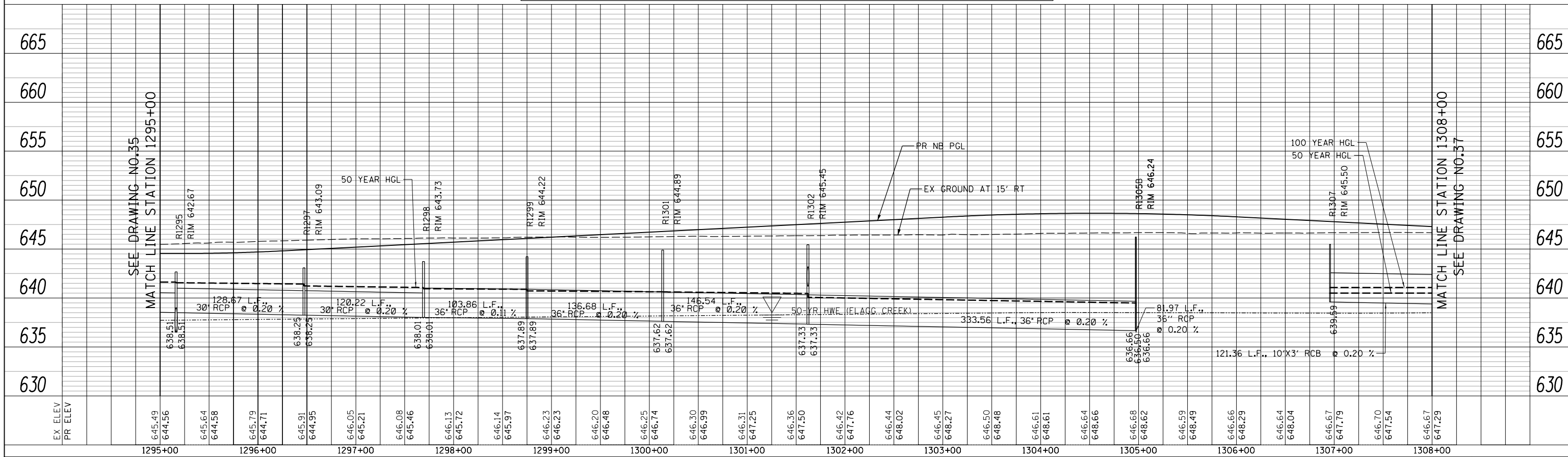
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SHEET NO. DP-34A
 DRAWING NO. 34A OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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CHECKED BY JW DATE 12/20/17

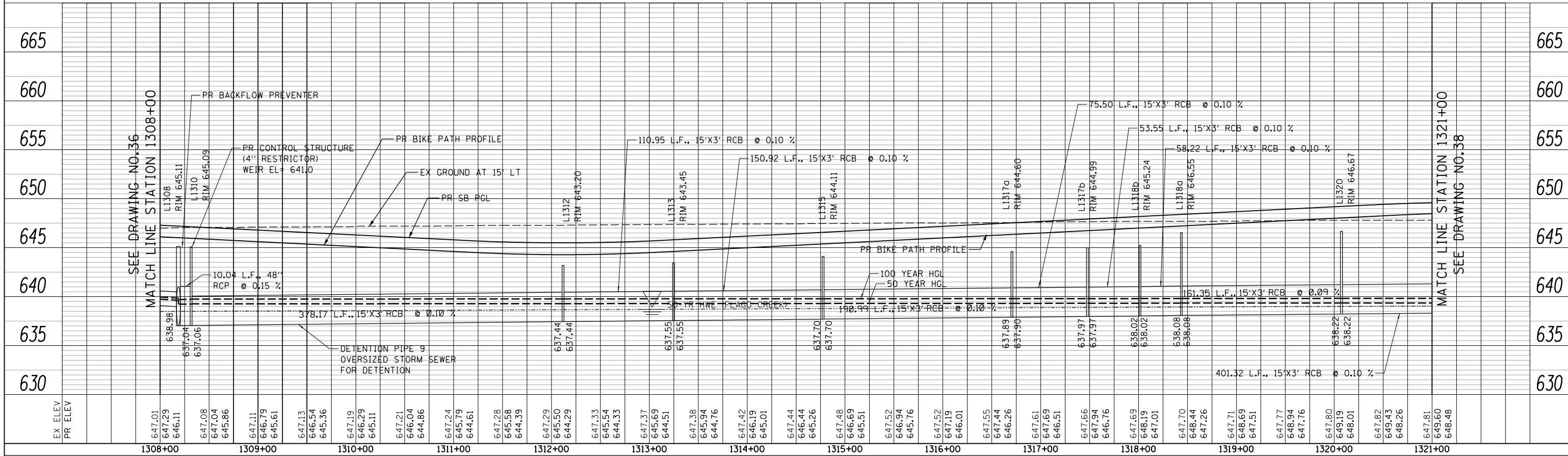


REVISIONS		
NO.	DATE	DESCRIPTION

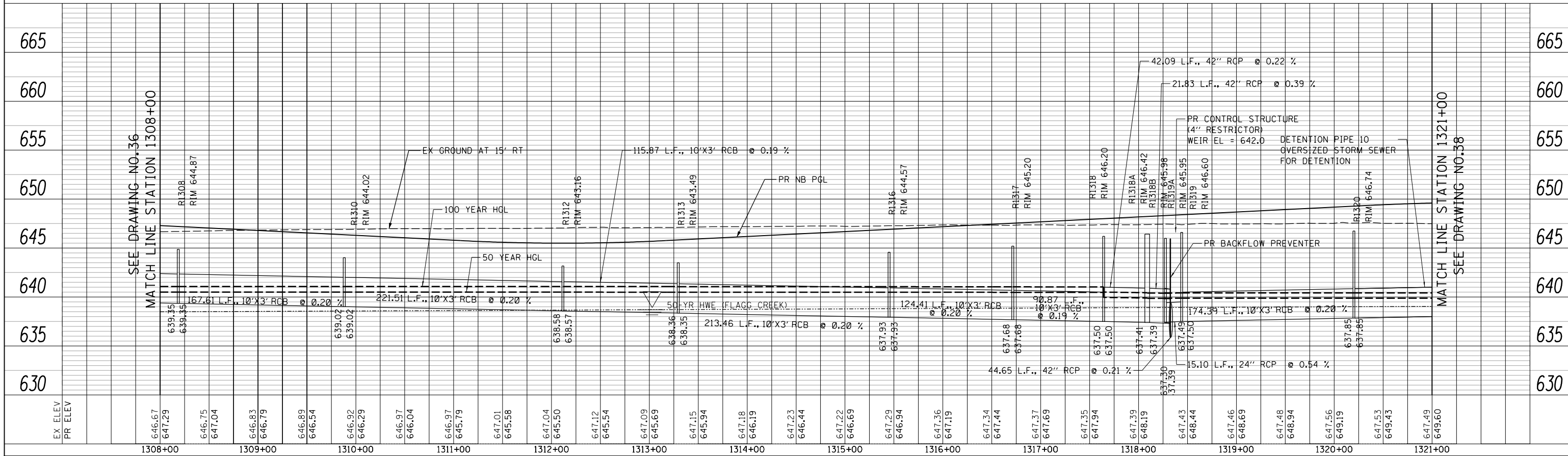
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SHEET NO. DP-36
DRAWING NO. 36 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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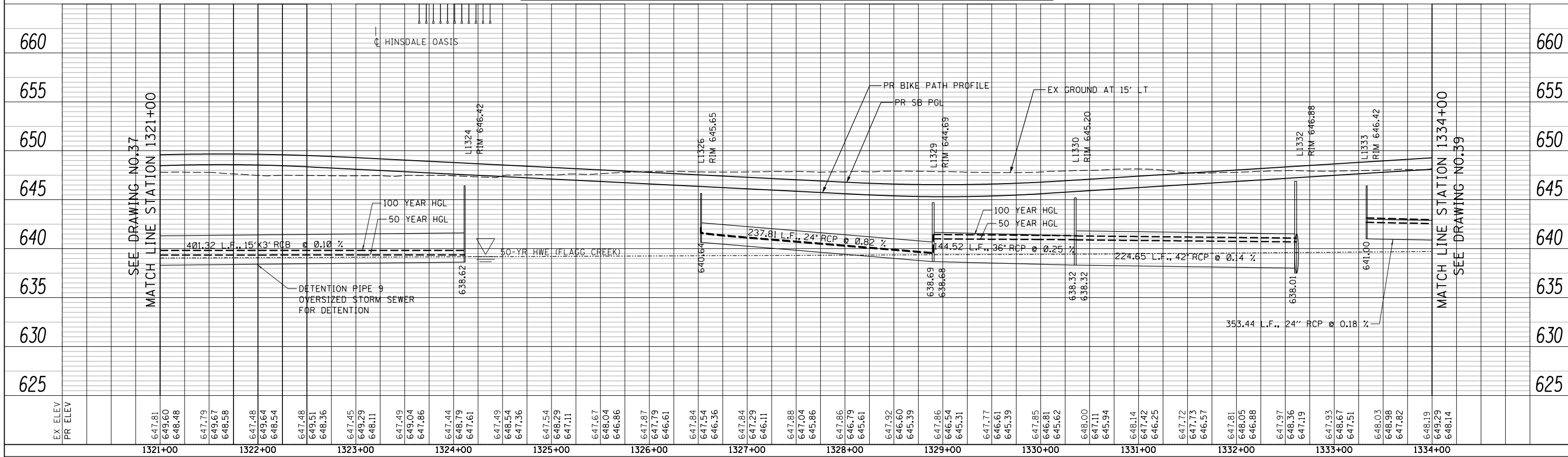


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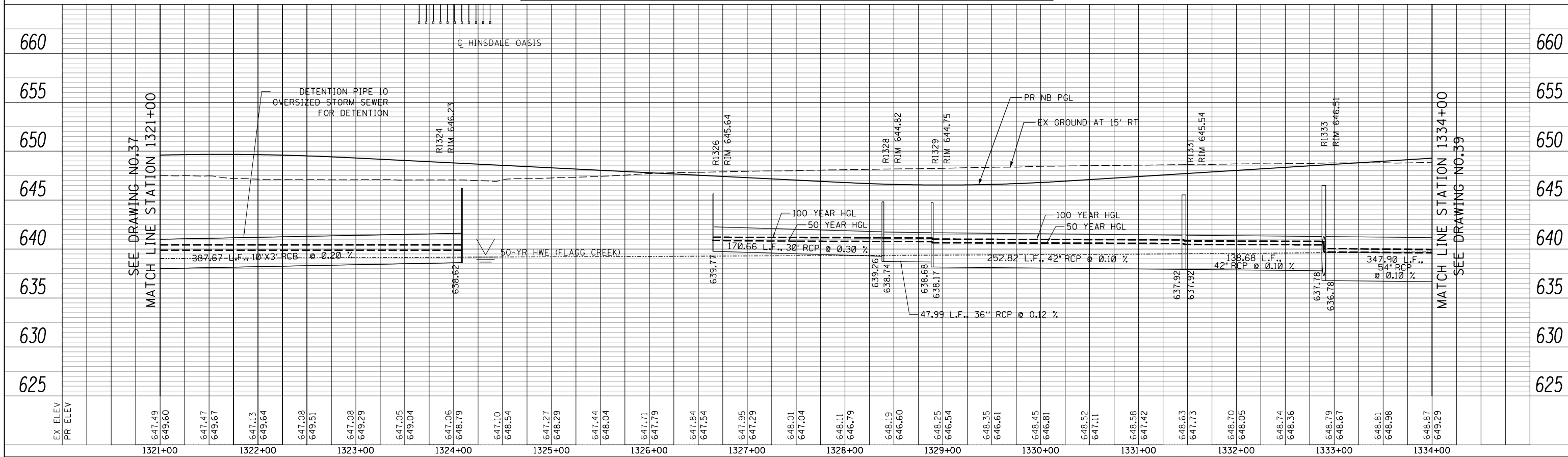
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SHEET NO. DP-37
 DRAWING NO. 37 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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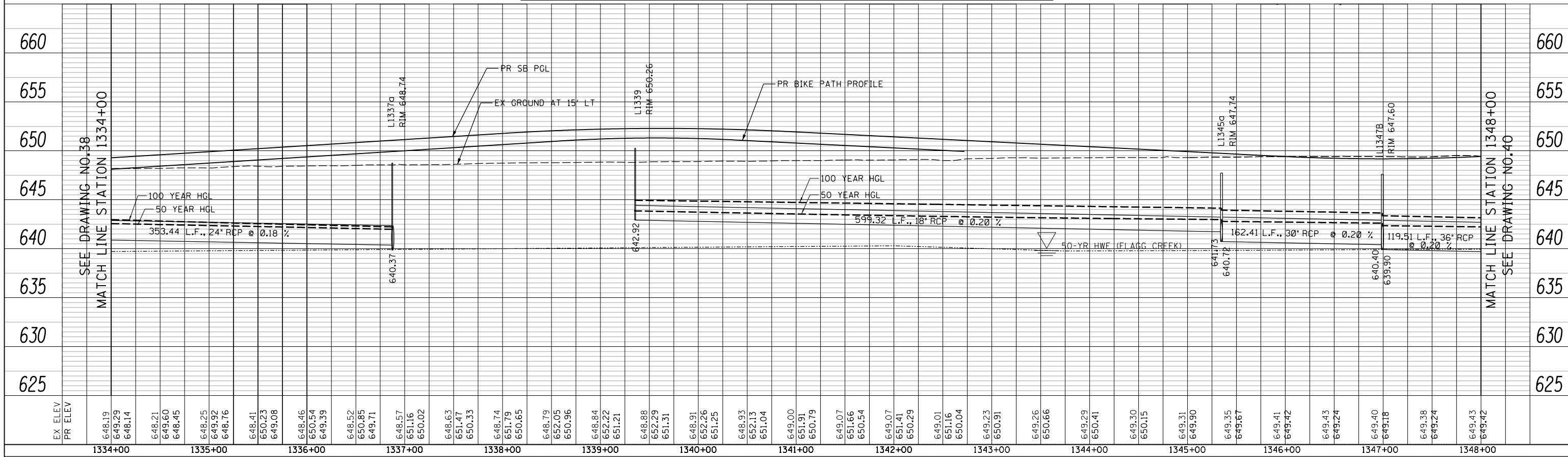


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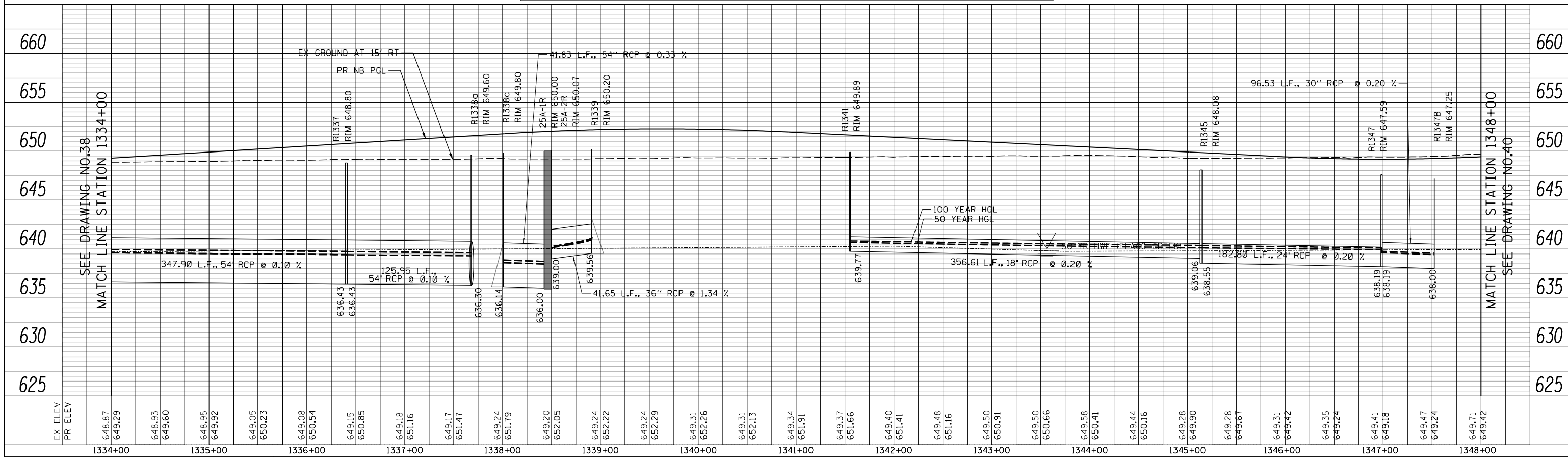
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SHEET NO. DP-38
 DRAWING NO. 38 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 CHECKED BY JW DATE 12/20/17

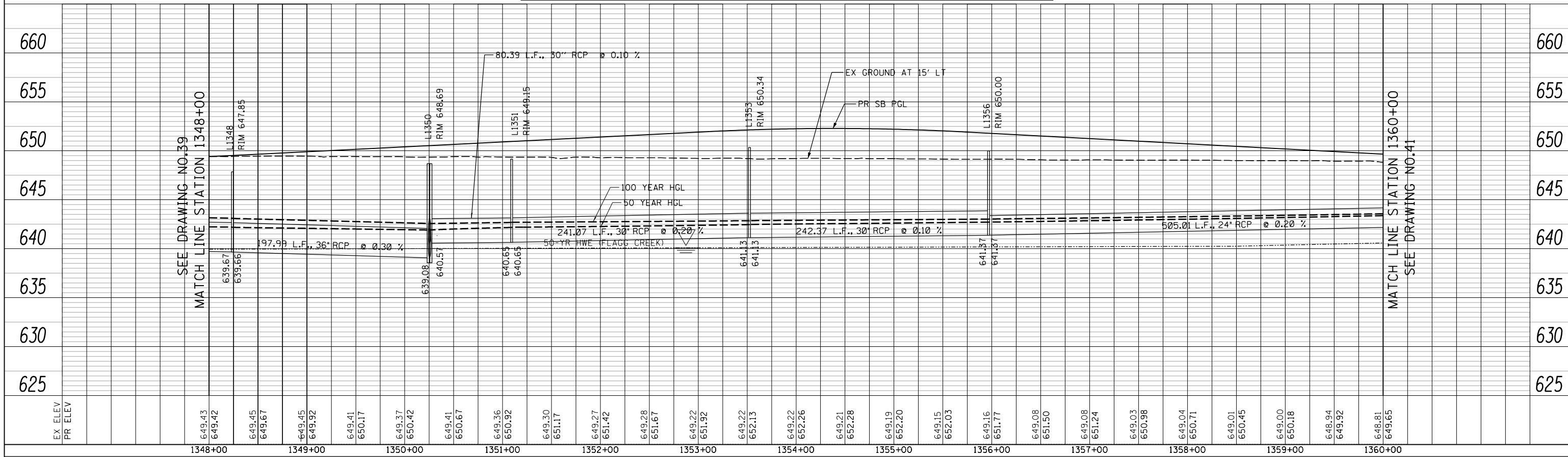


REVISIONS		
NO.	DATE	DESCRIPTION

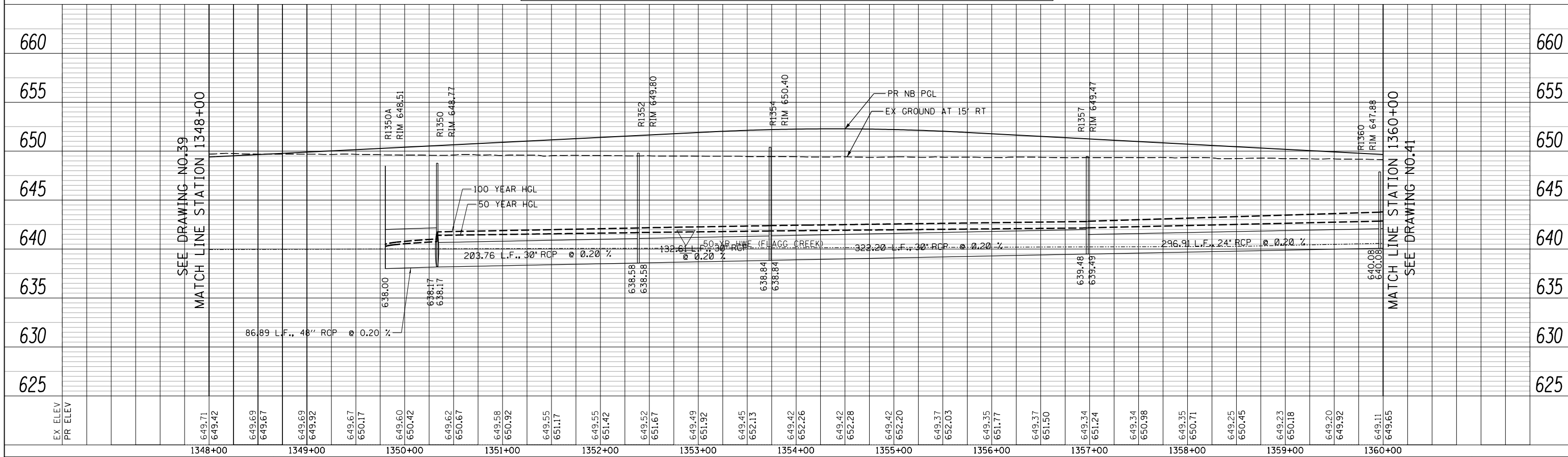
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SHEET NO. DP-39
 DRAWING NO. 39 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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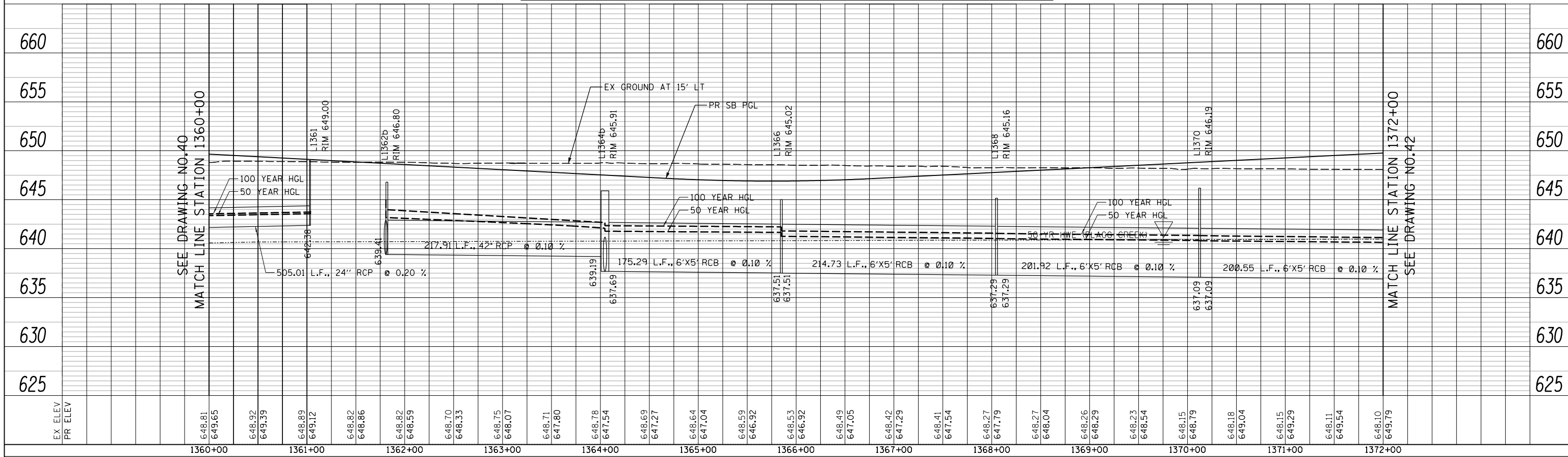


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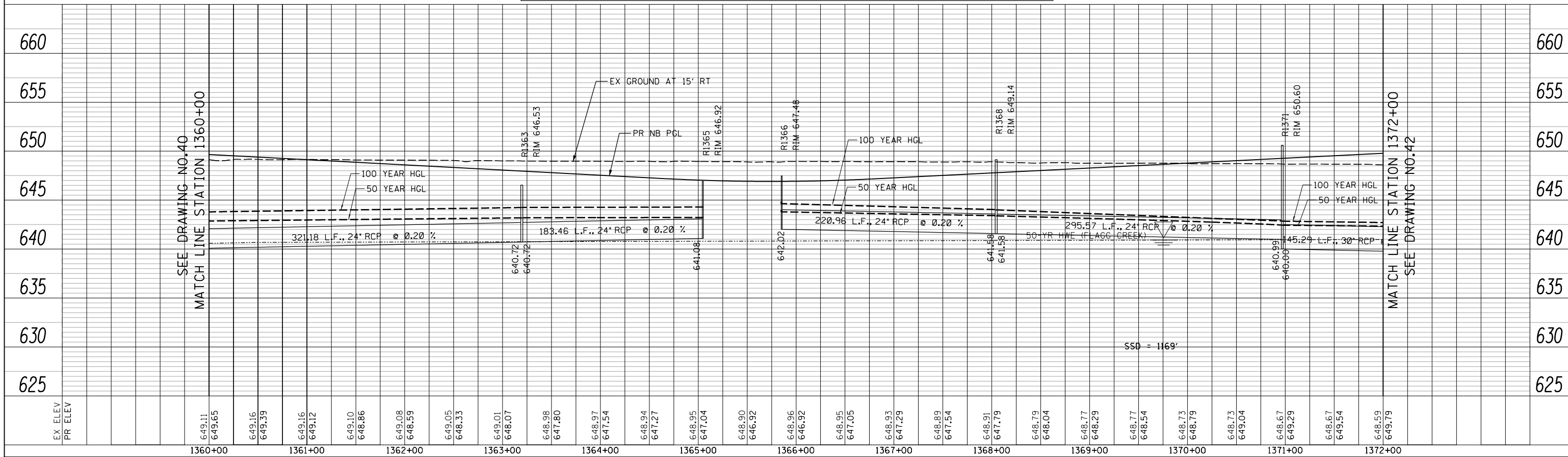
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SHEET NO. DP-40
 DRAWING NO. 40 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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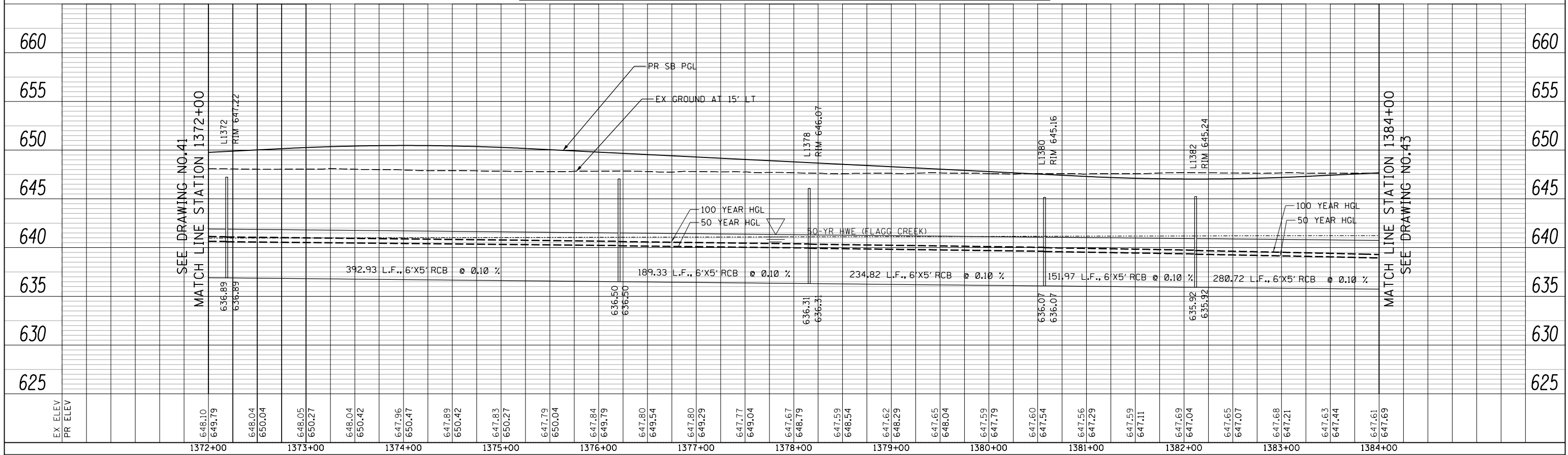


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NO.	DATE	DESCRIPTION

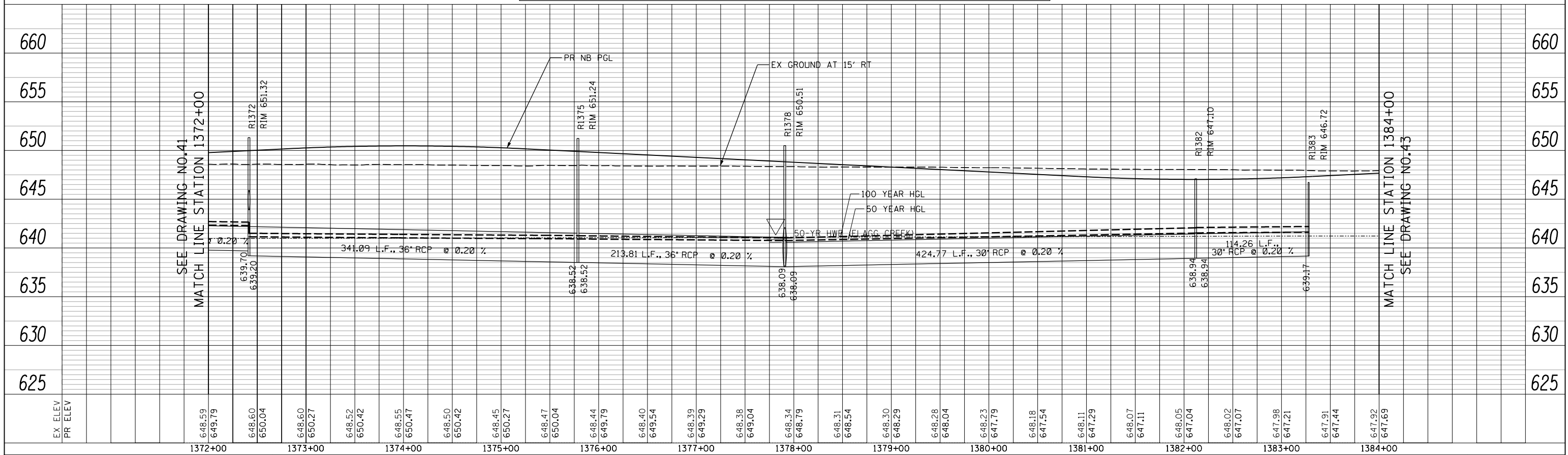
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SHEET NO. DP-41
 DRAWING NO. 41 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 CHECKED BY JW DATE 12/20/17

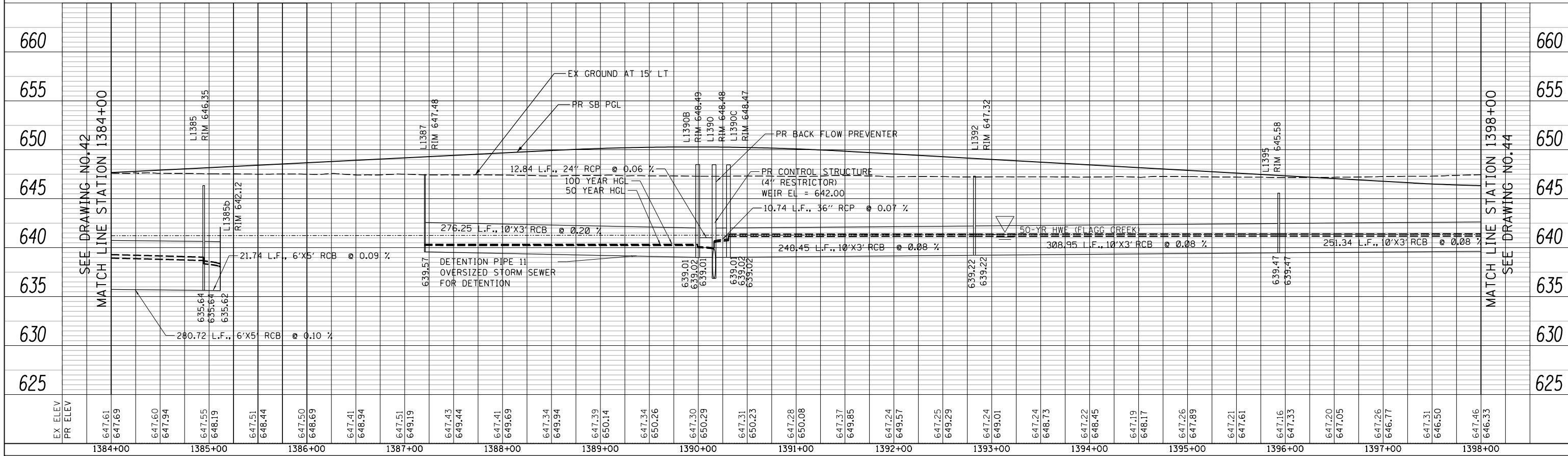


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NO.	DATE	DESCRIPTION

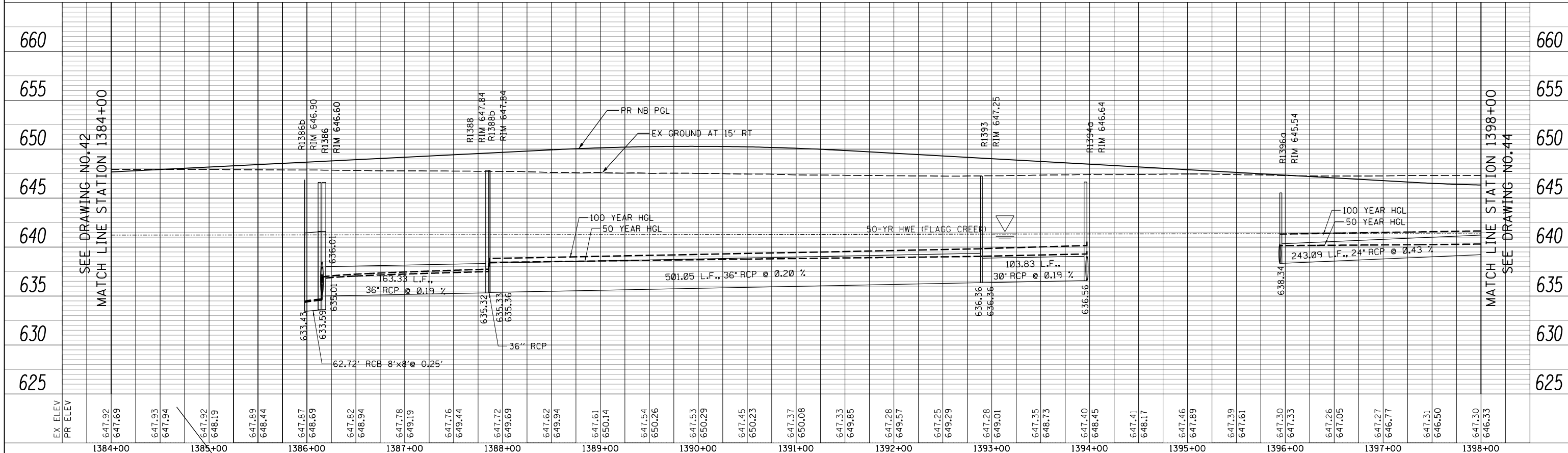
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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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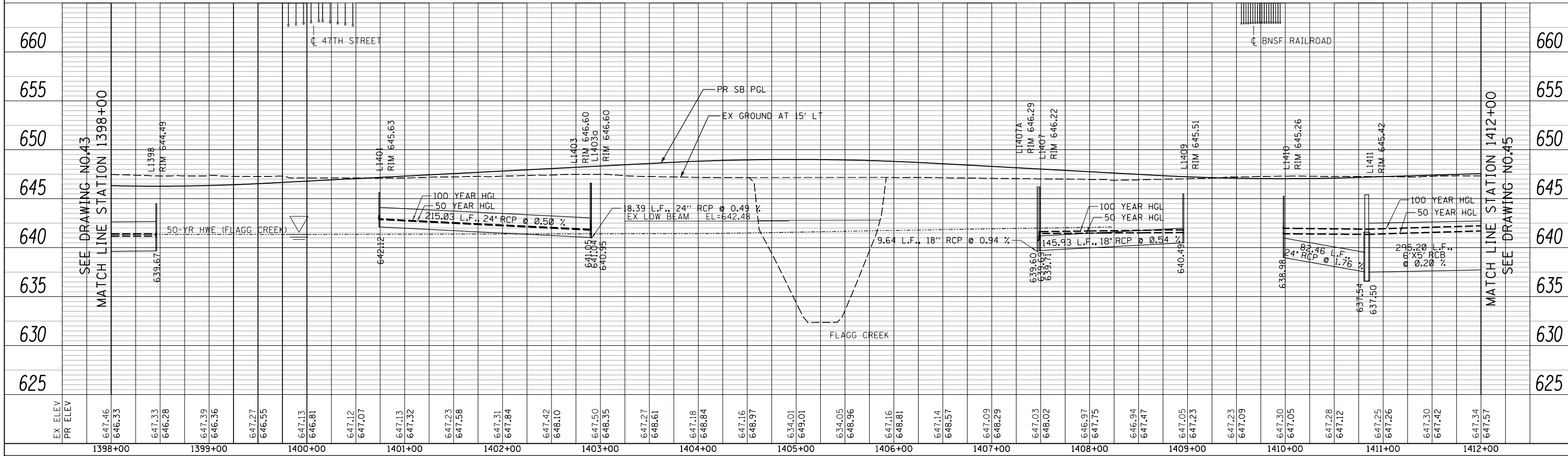


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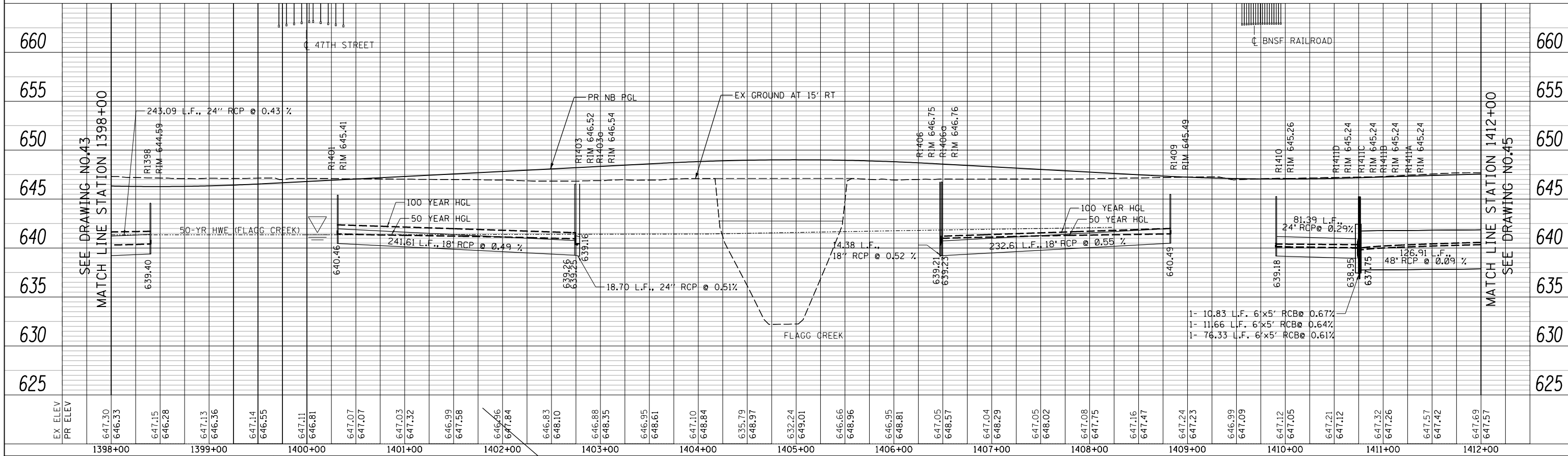
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SHEET NO. DP-43
 DRAWING NO. 43 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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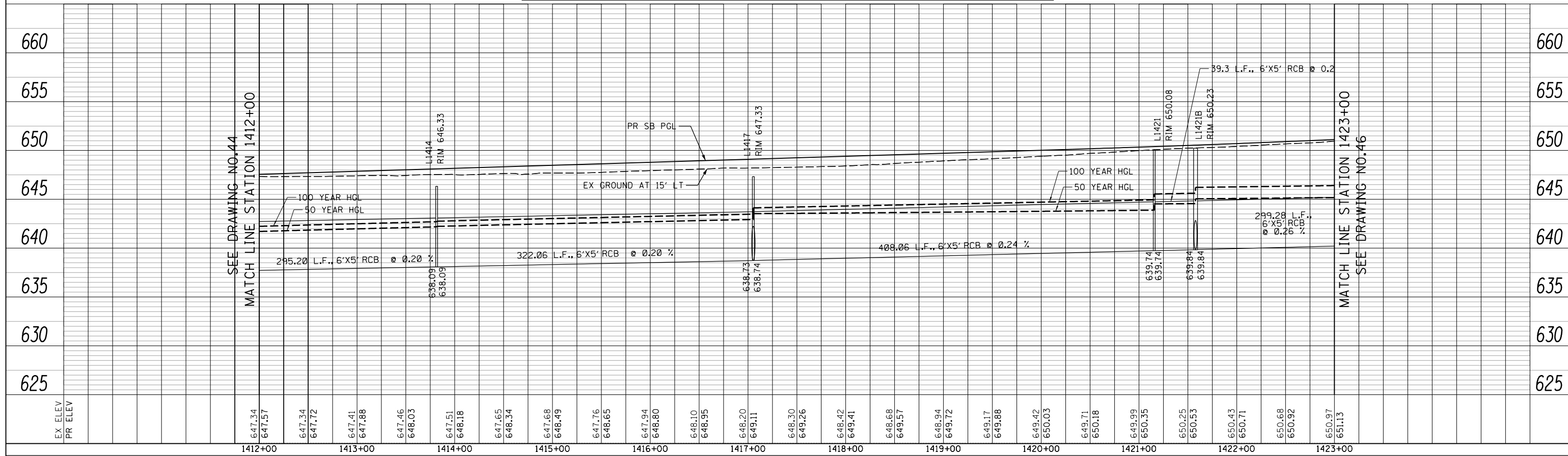


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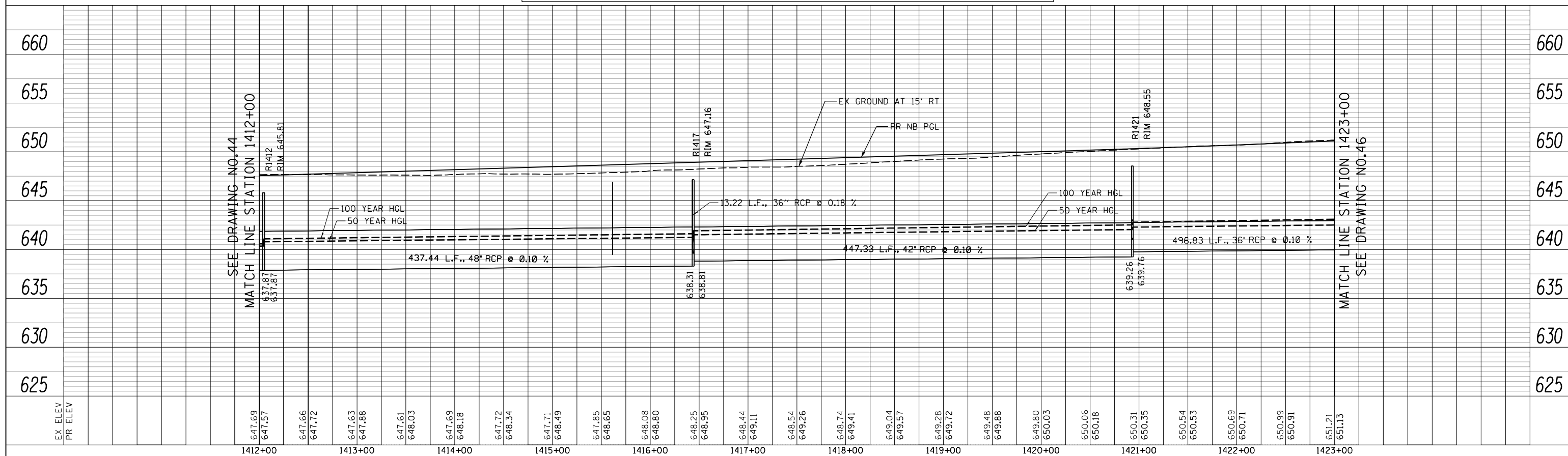
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SHEET NO. DP-44
 DRAWING NO. 44 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 CHECKED BY JW DATE 12/20/17

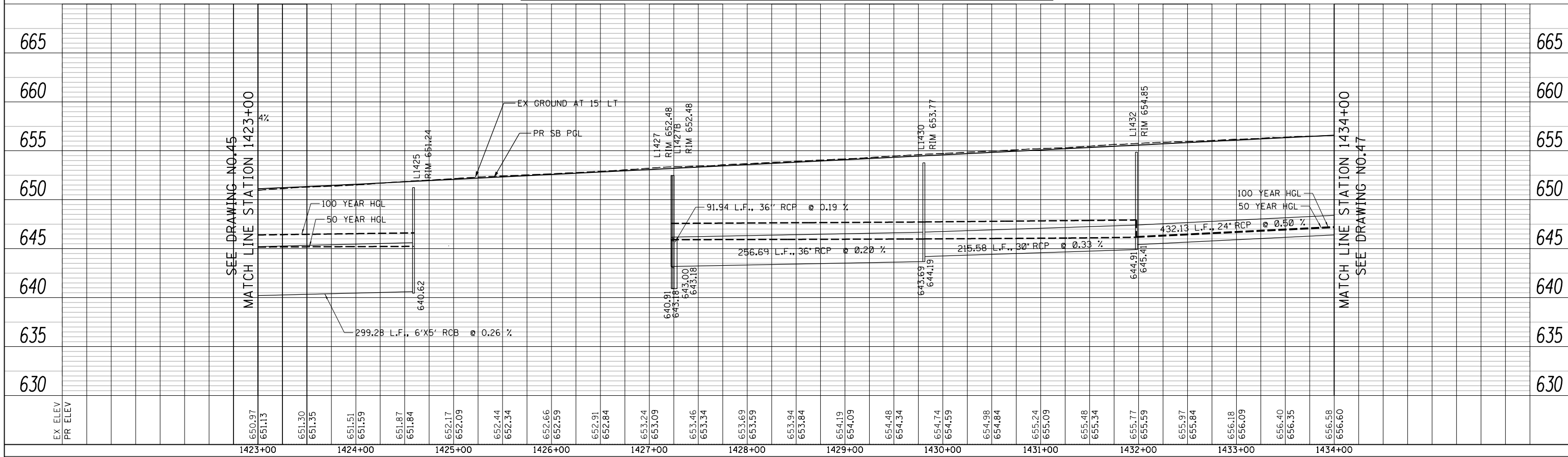


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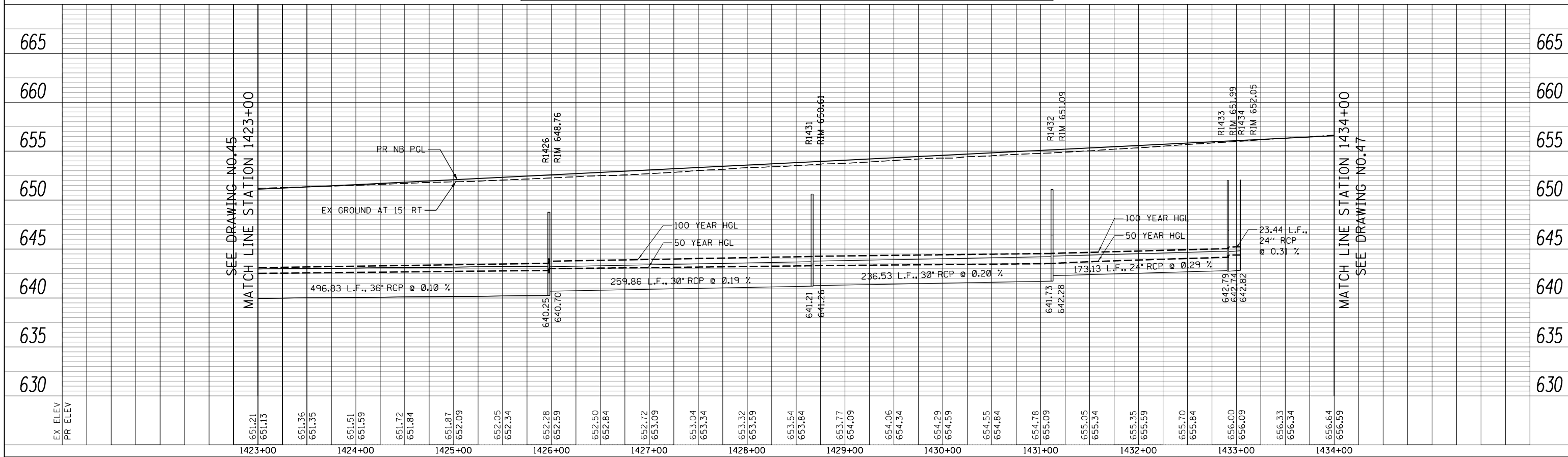
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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



DRAWN BY EL SCALE 1"=50'
CHECKED BY JW DATE 12/20/17

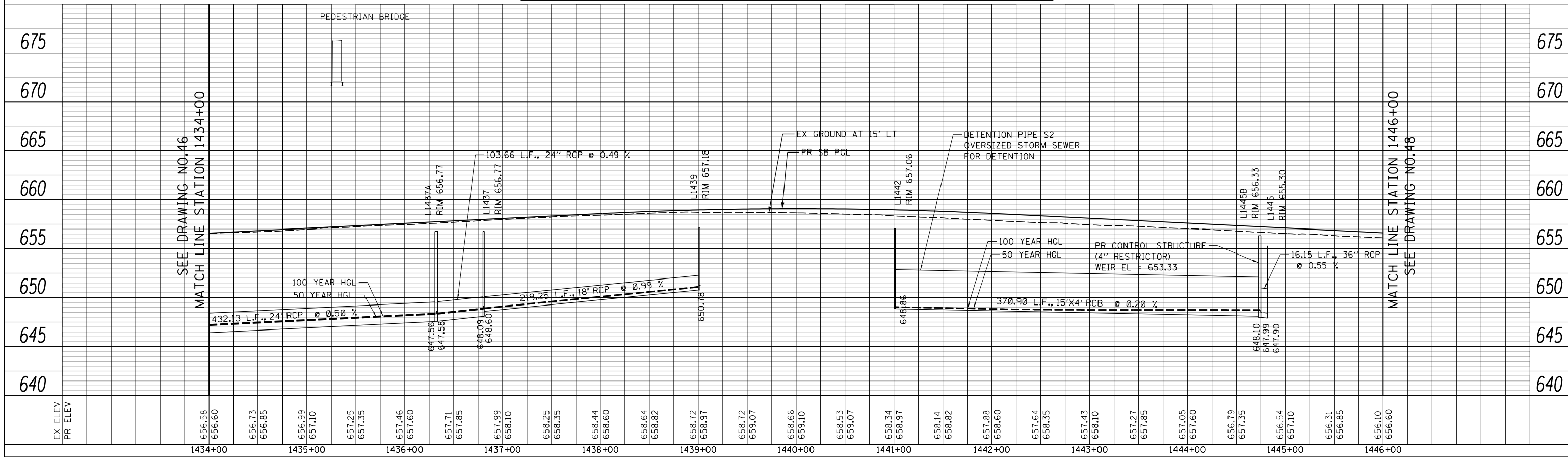


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NO.	DATE	DESCRIPTION

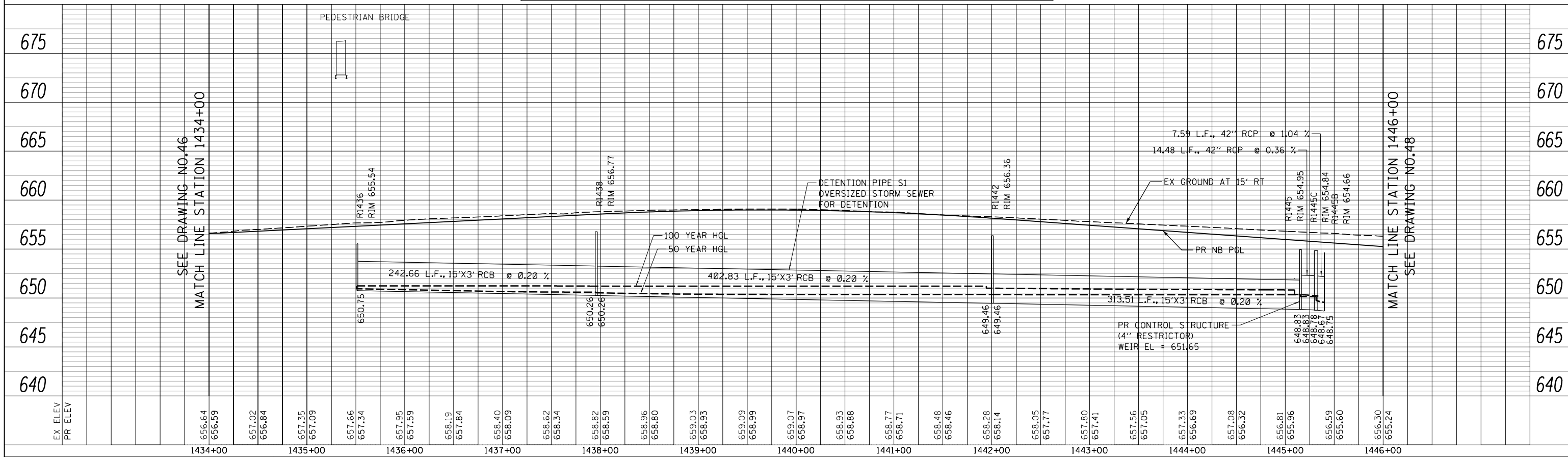
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SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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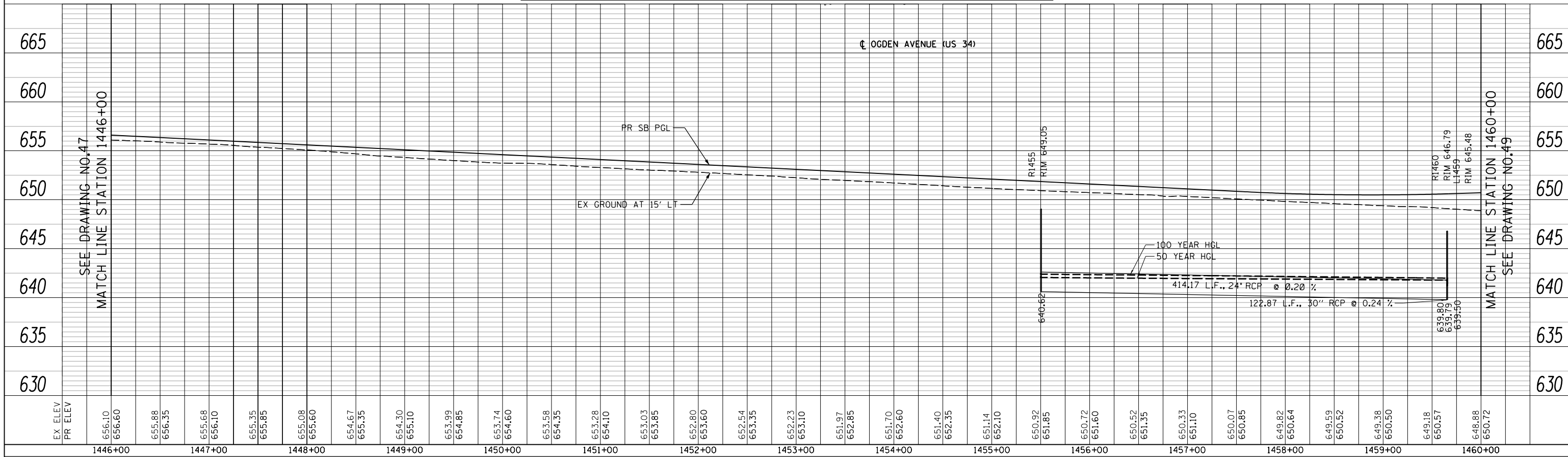


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NO.	DATE	DESCRIPTION

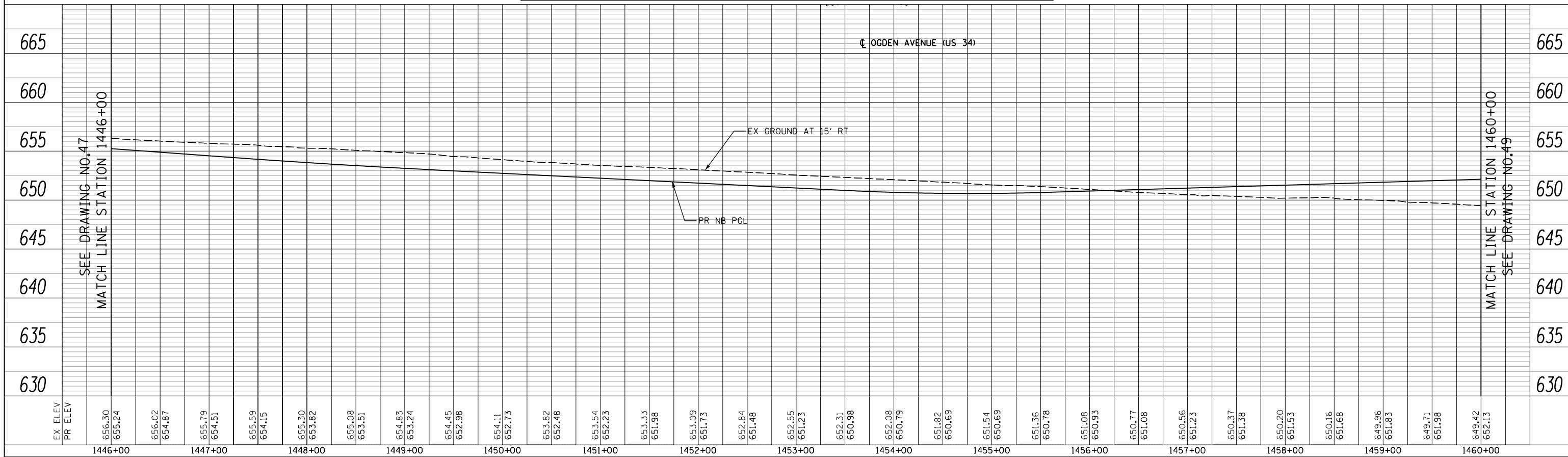
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SHEET NO. DP-47
 DRAWING NO. 47 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



12/22/2017
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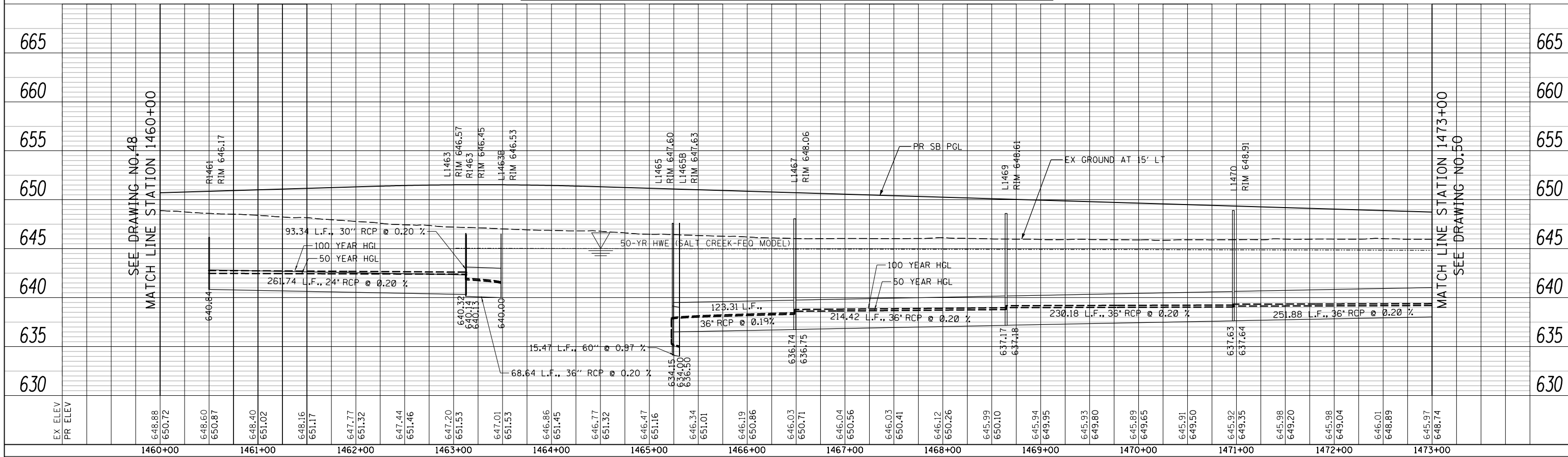


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NO.	DATE	DESCRIPTION

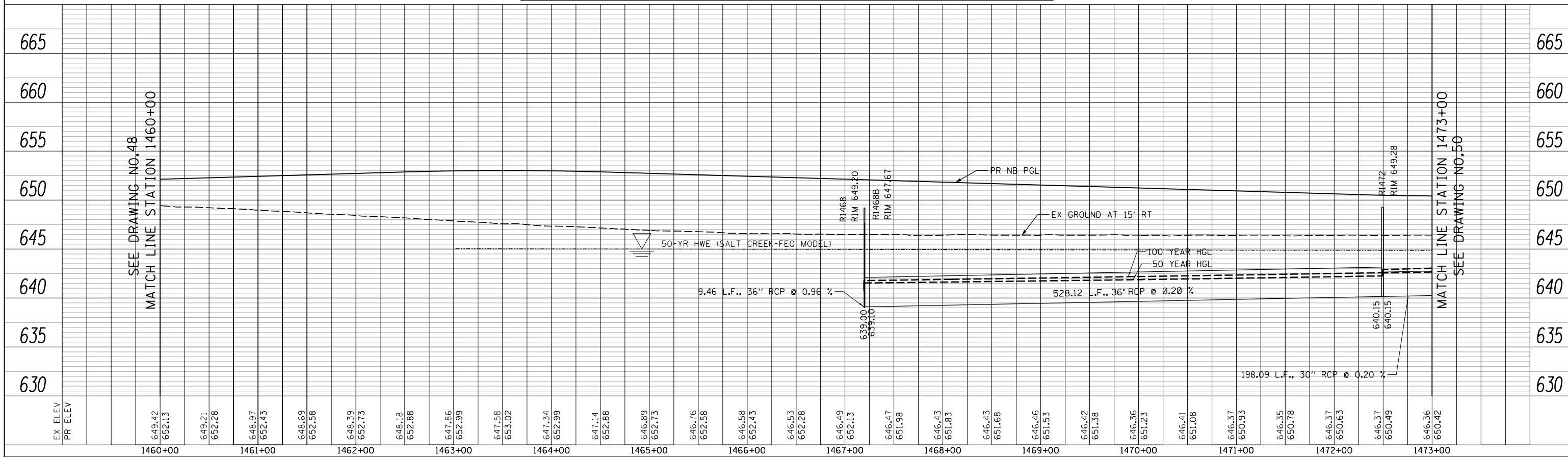
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SHEET NO. DP-48
 DRAWING NO. 48 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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CHECKED BY JW DATE 12/20/17

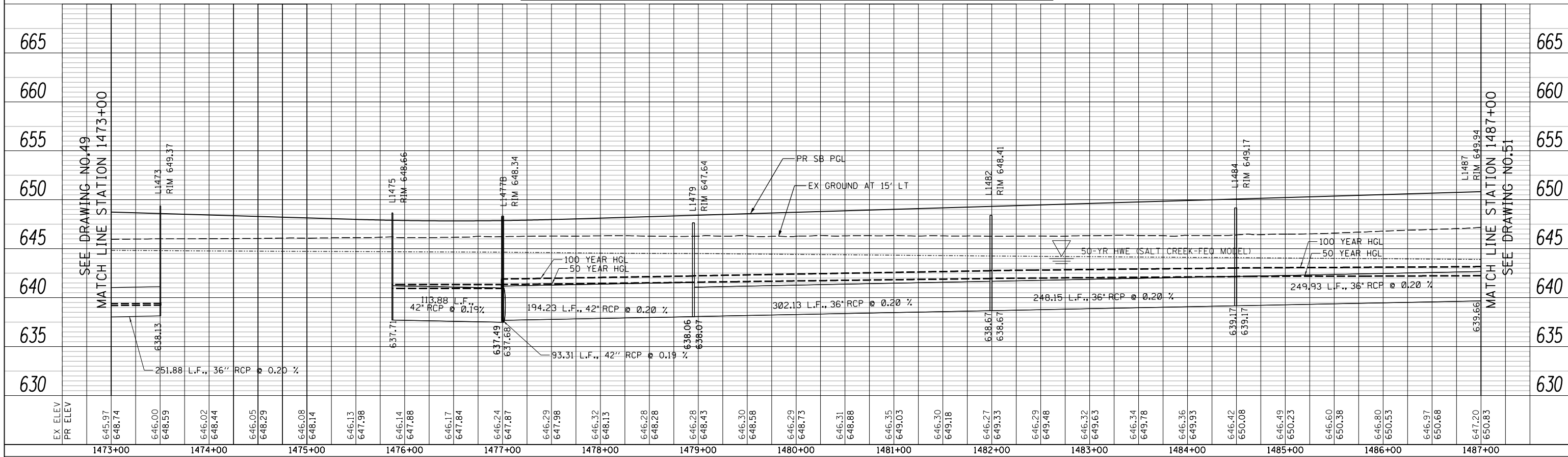


REVISIONS		
NO.	DATE	DESCRIPTION

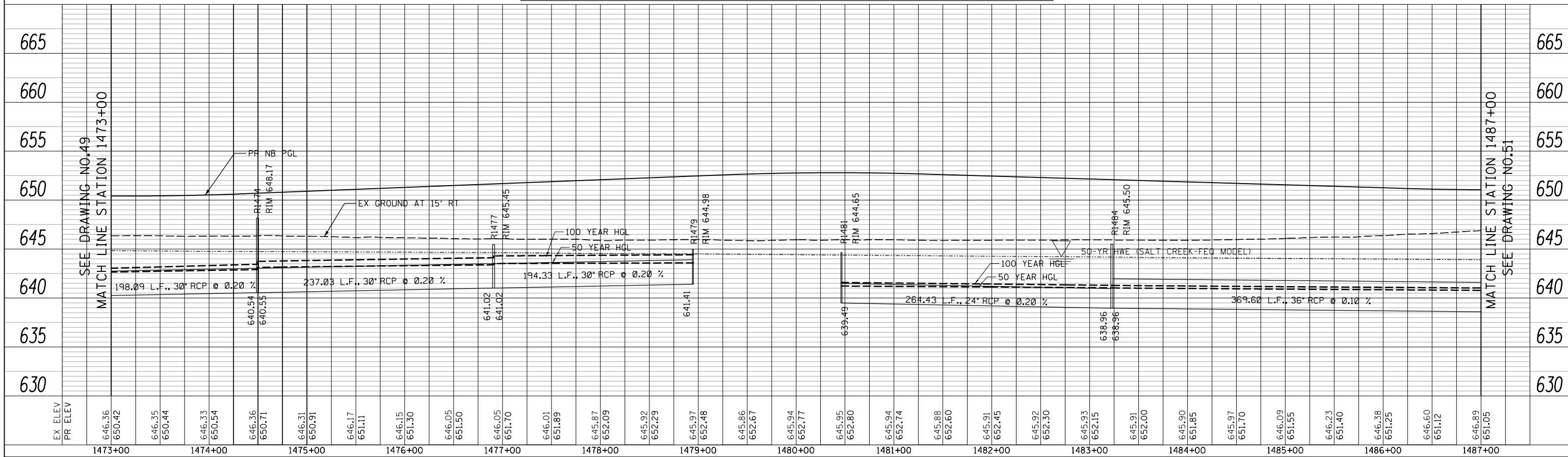
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SHEET NO. DP-49
DRAWING NO. 49 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



12/22/2017
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DRAWN BY EL SCALE 1"=50'
 CHECKED BY JW DATE 12/20/17



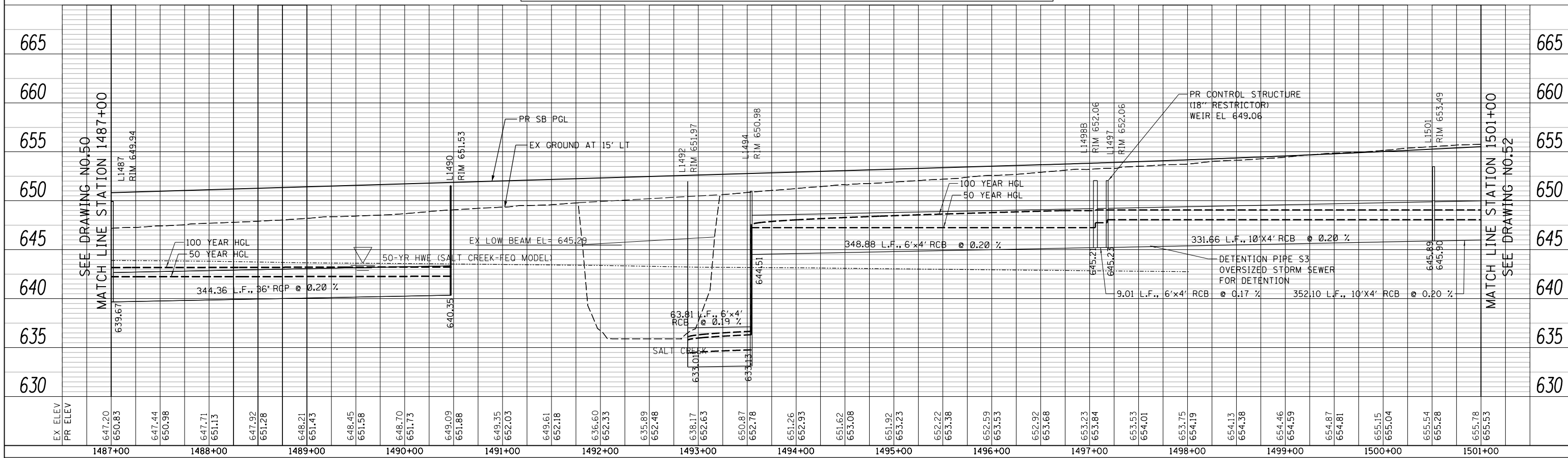
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NO.	DATE	DESCRIPTION

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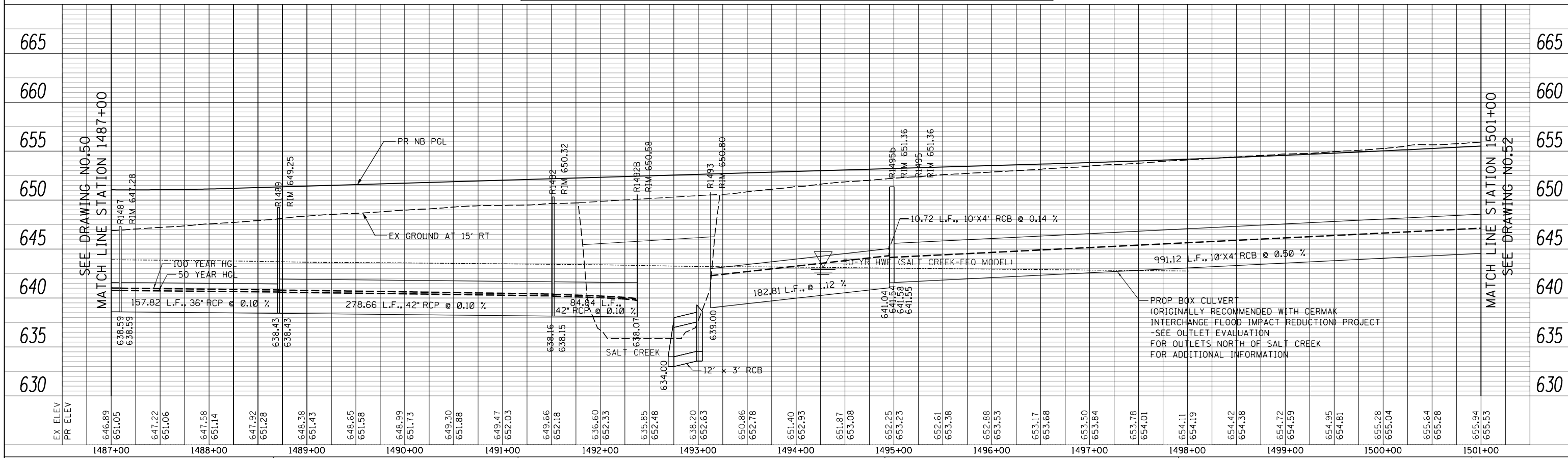
SHEET NO. DP-50
 DRAWING NO. 50 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



12/22/2017 10:51:10 AM C:\Users\jw\Documents\Projects\I-294\Drawings\DRN\DRN\DRN.dwg

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CHECKED BY JW DATE 12/20/17



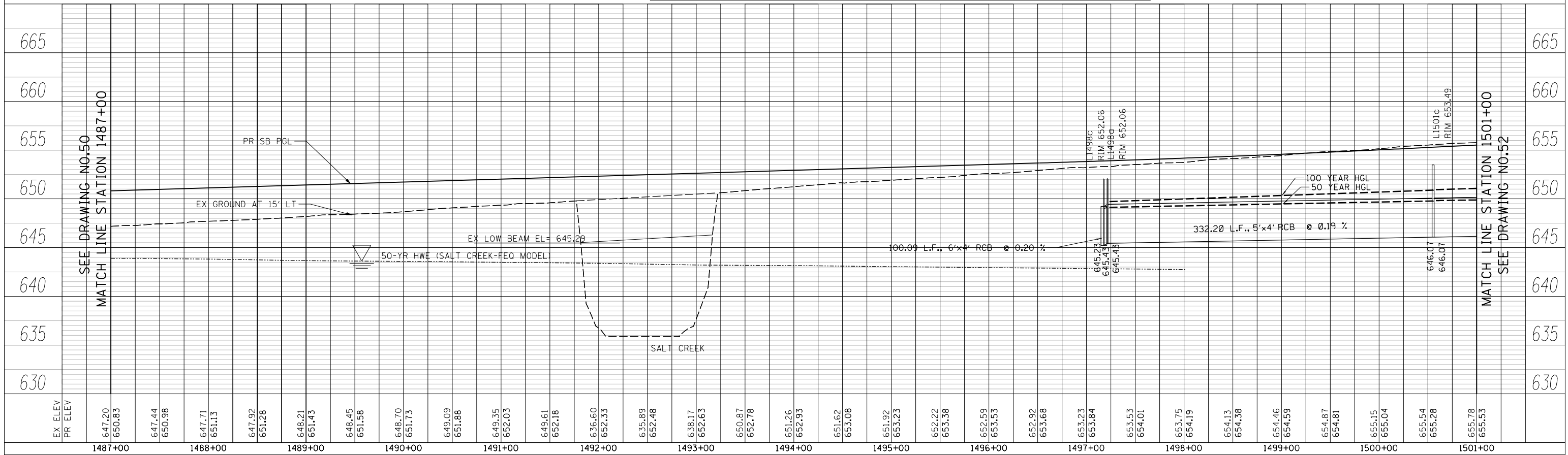
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NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
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SHEET NO. DP-51
DRAWING NO. 51 OF 56

MEDIAN I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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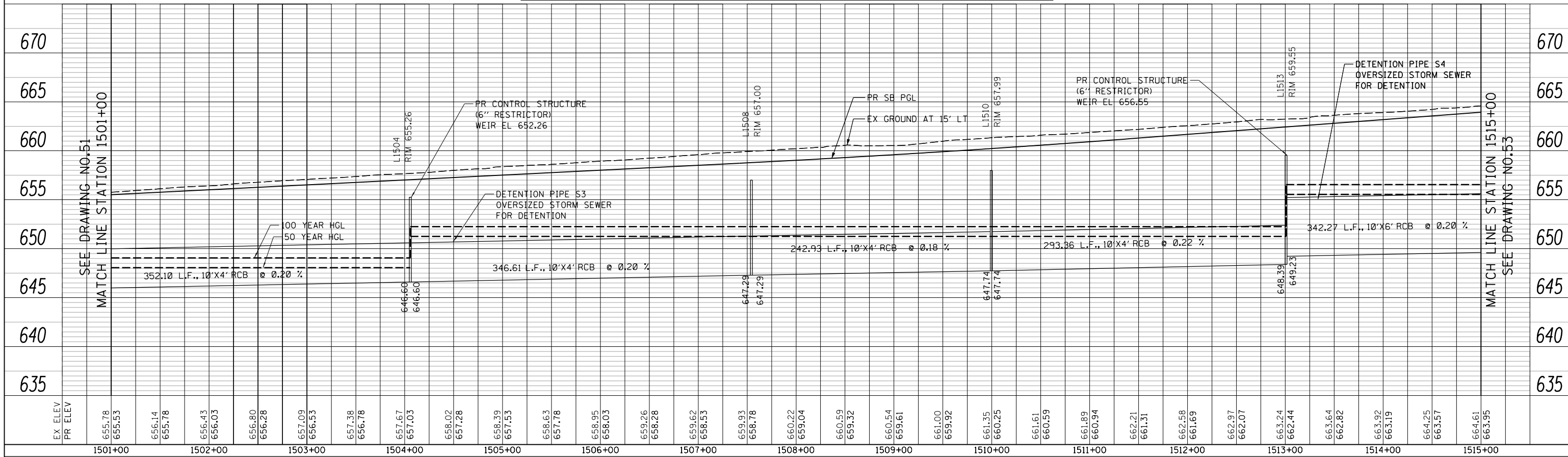


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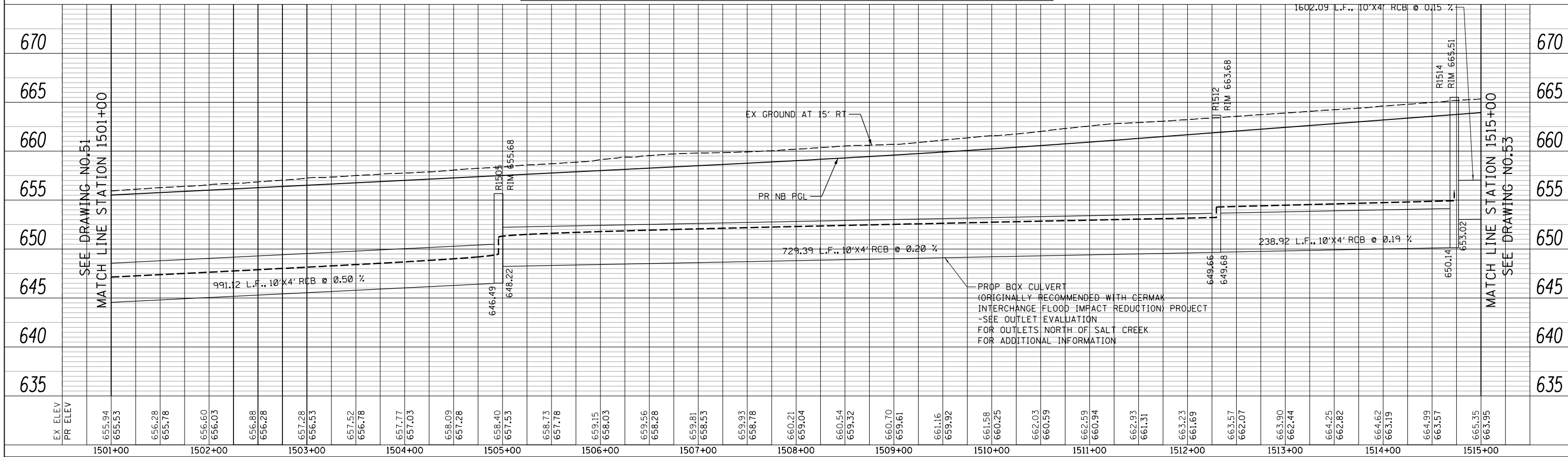
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SHEET NO.
DP-51A
 DRAWING NO.
51A OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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 12/22/2017
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CHECKED BY JW DATE 12/20/17



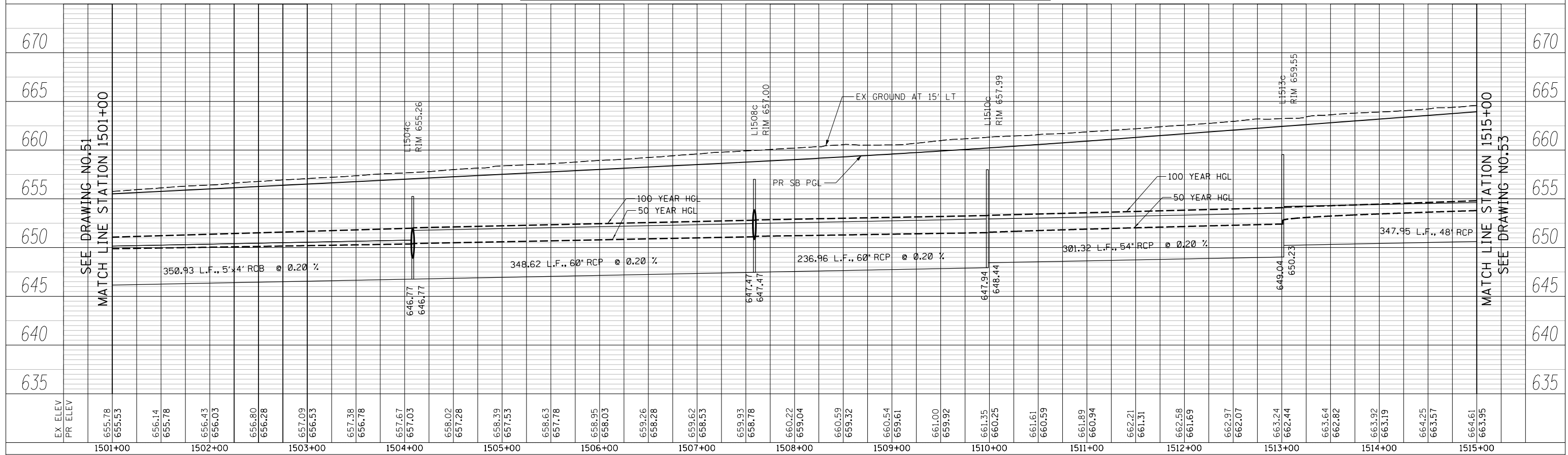
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SHEET NO. DP-52
DRAWING NO. 52 OF 56

MEDIAN I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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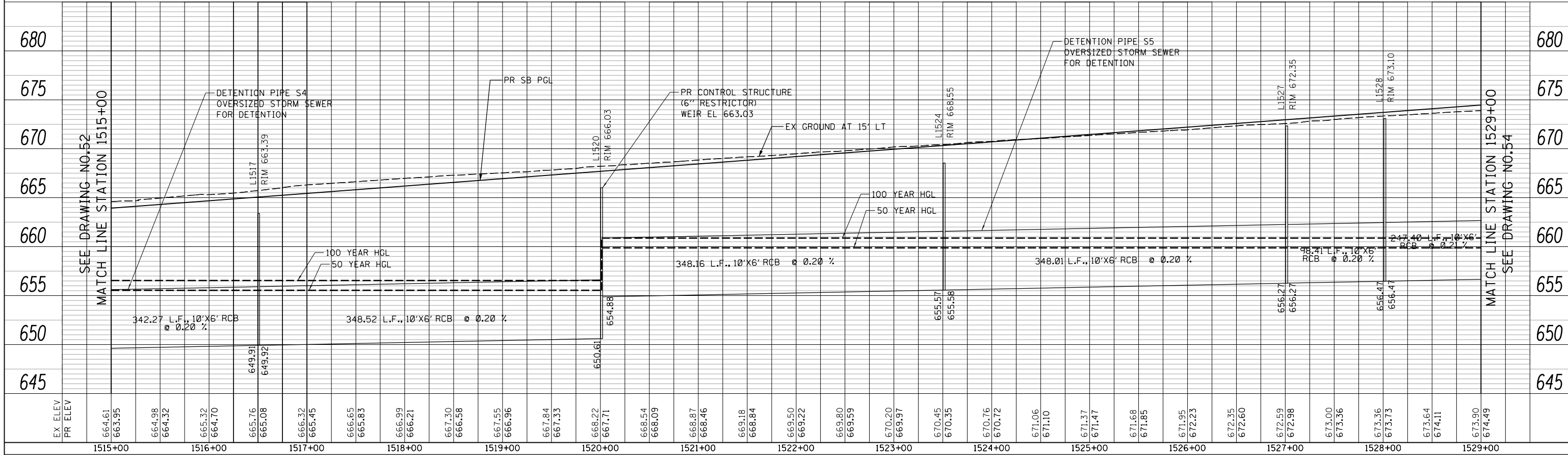


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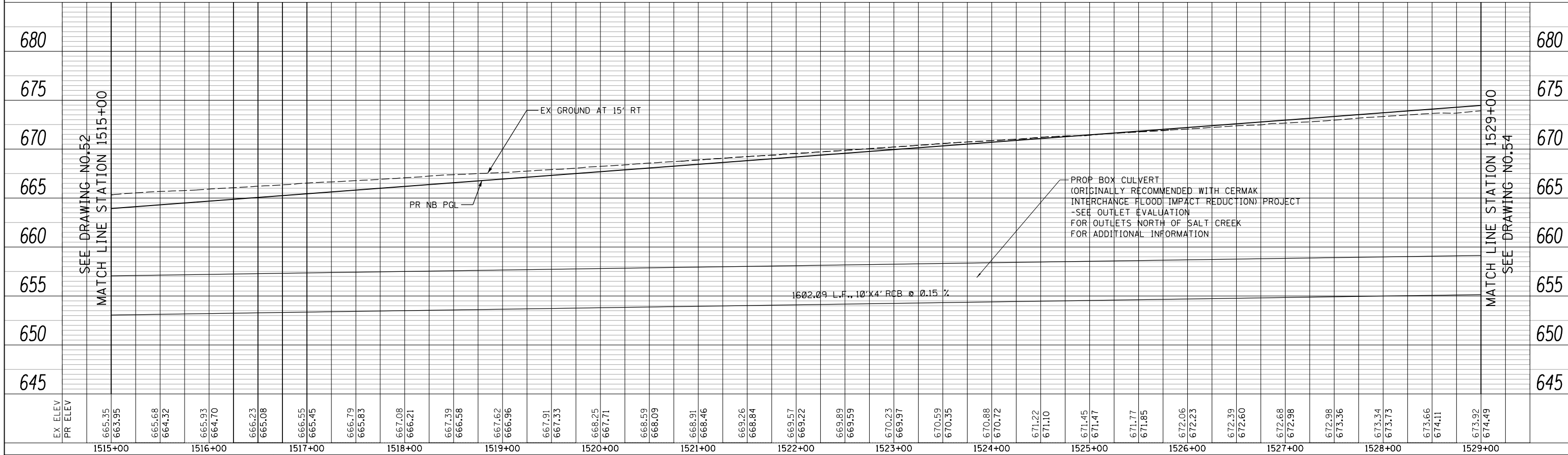
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SHEET NO. DP-52A
 DRAWING NO. 52A OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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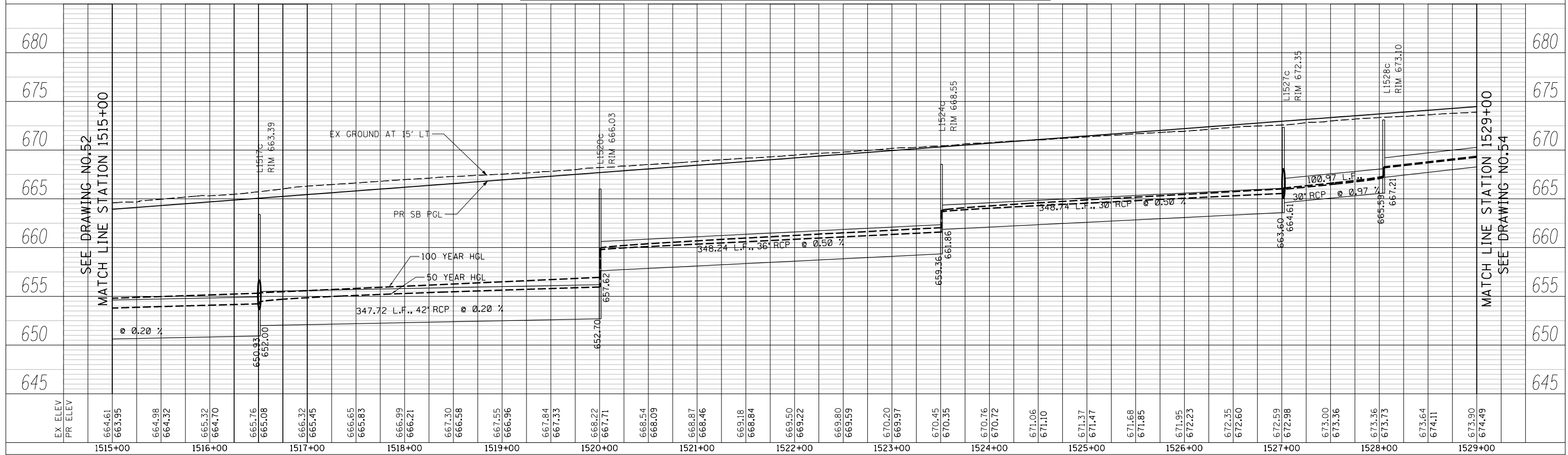
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SHEET NO. DP-53
 DRAWING NO. 53 OF 56

MEDIAN I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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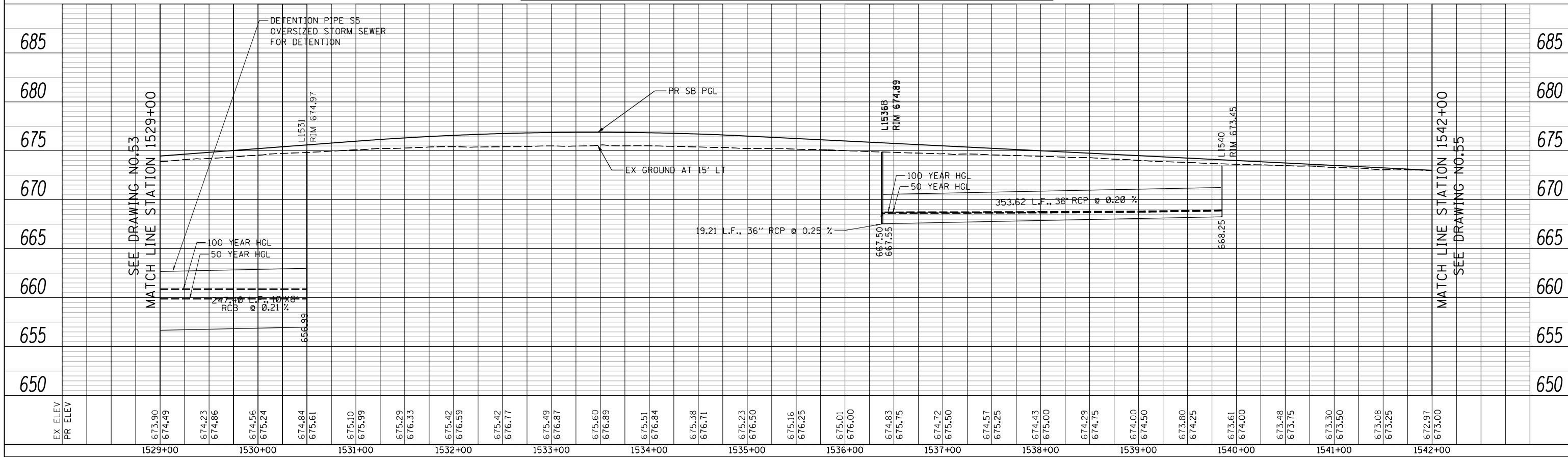


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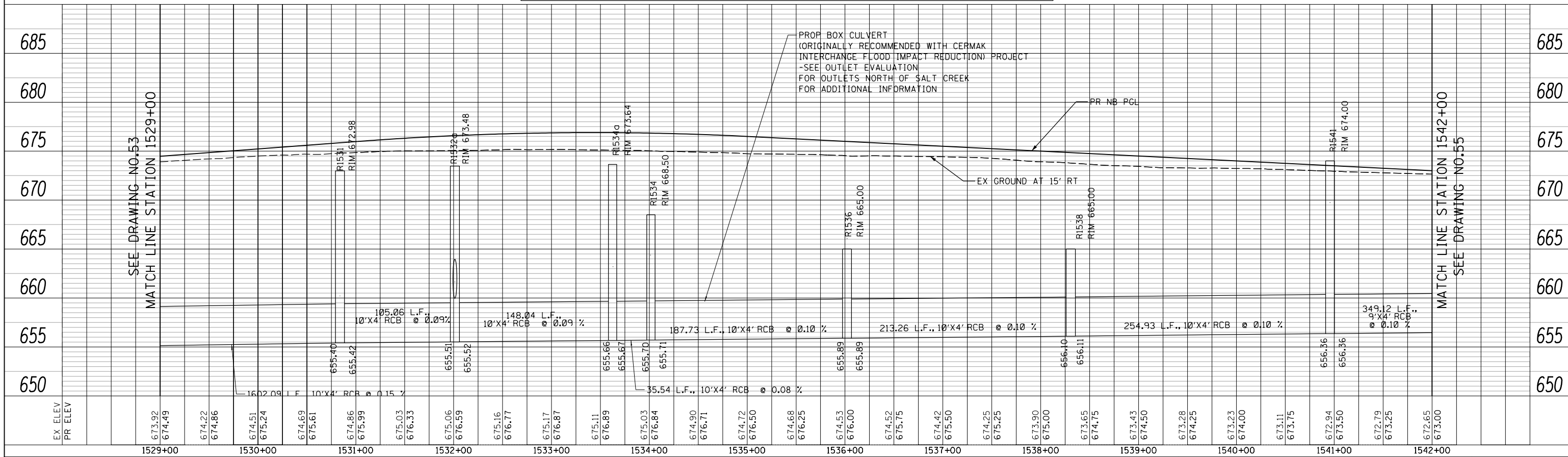
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SHEET NO. **DP-53A**
 DRAWING NO. **53A** OF **56**

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



DRAWN BY EL SCALE 1"=50'
CHECKED BY JW DATE 12/20/17



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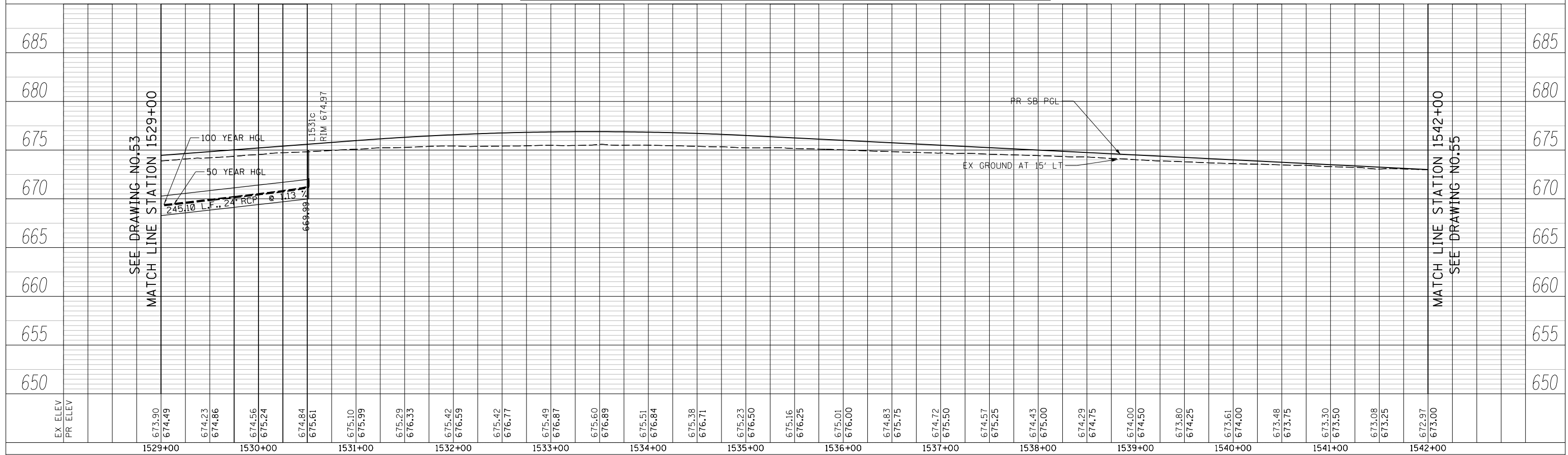
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SHEET NO. DP-54
DRAWING NO. 54 OF 56

12/22/2017
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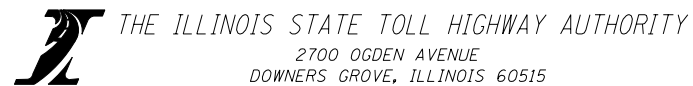
MEDIAN I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



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 CHECKED BY JW DATE 12/20/17



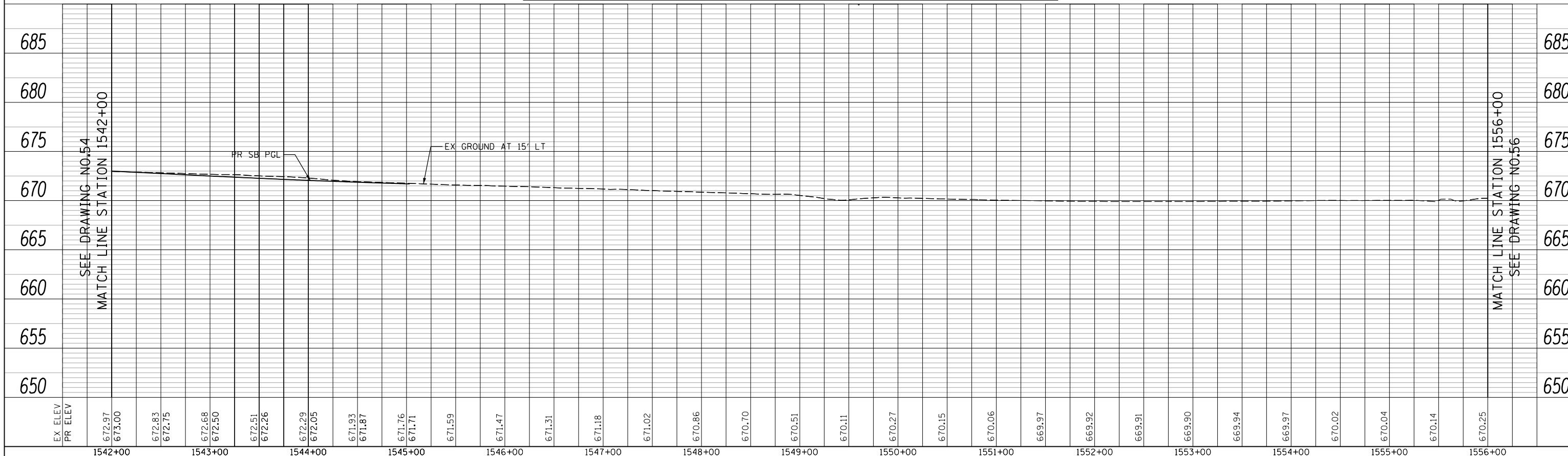
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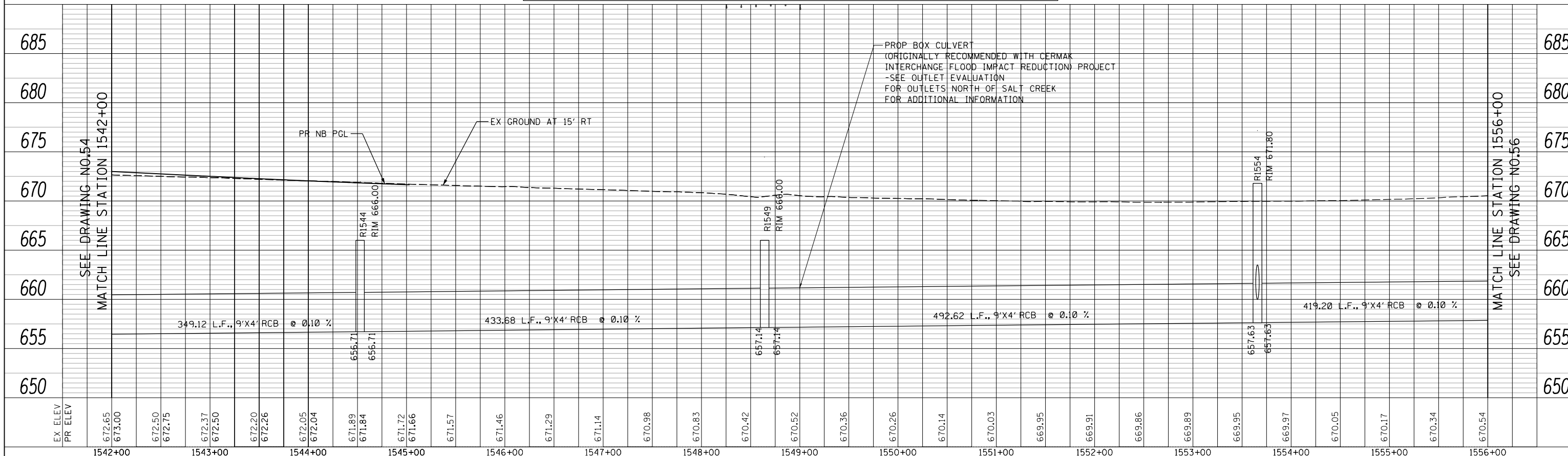
SHEET NO. DP-54A
 DRAWING NO. 54A OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)

EXHIBIT 5.7



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



12/22/2017
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 CHECKED BY JW DATE 12/20/17

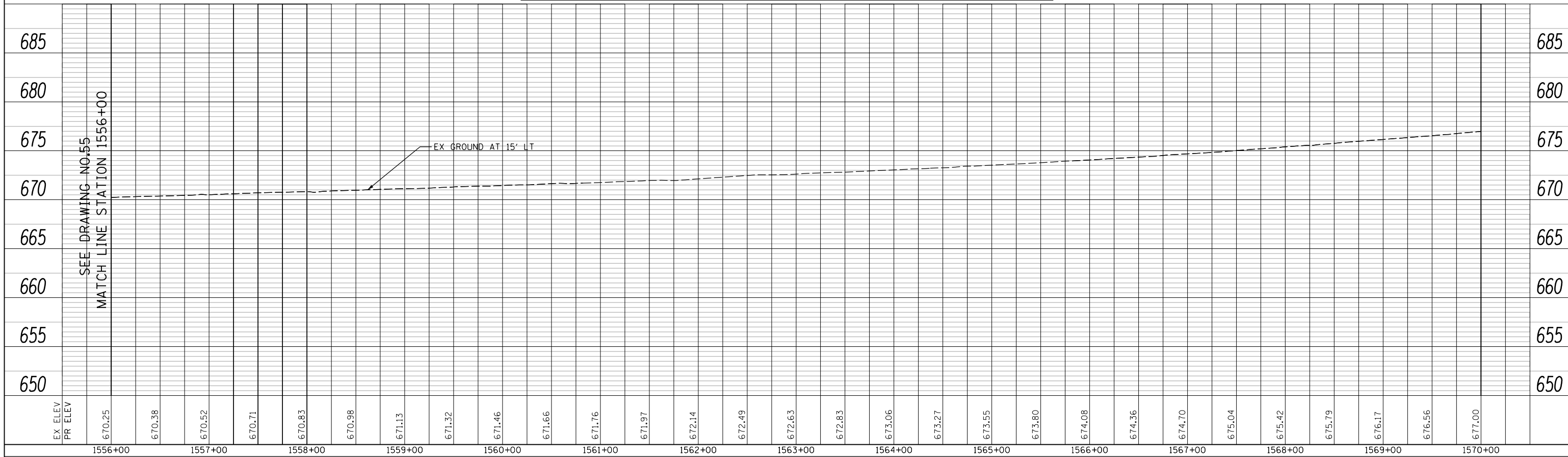


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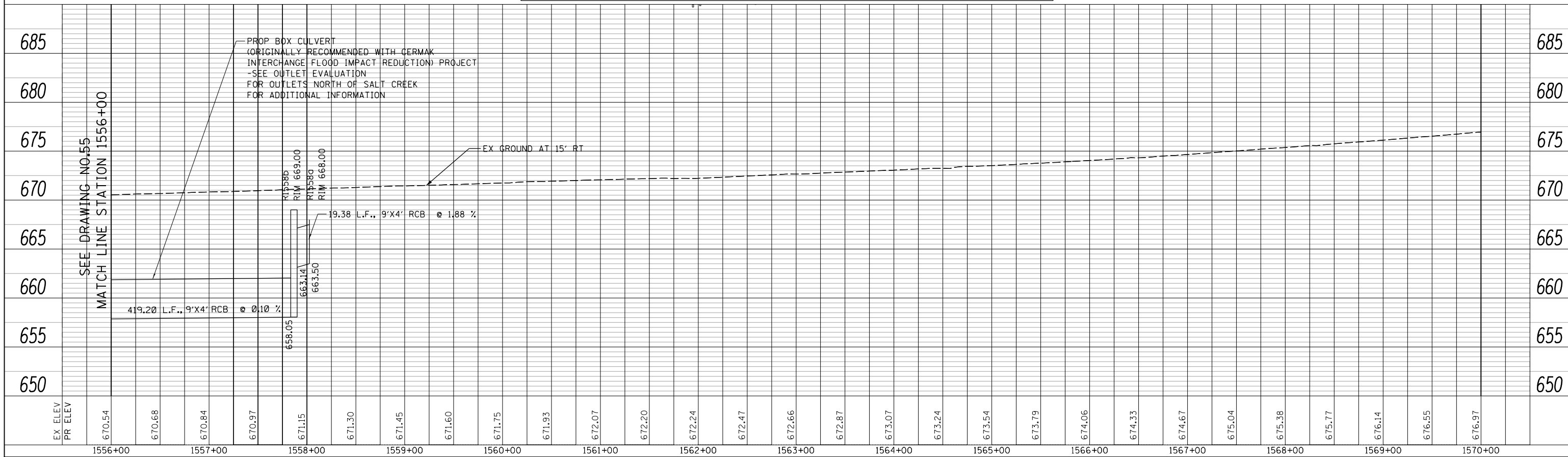
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SHEET NO. DP-55
 DRAWING NO. 55 OF 56

SOUTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



NORTHBOUND I-294 (CENTRAL TRI-STATE TOLLWAY)



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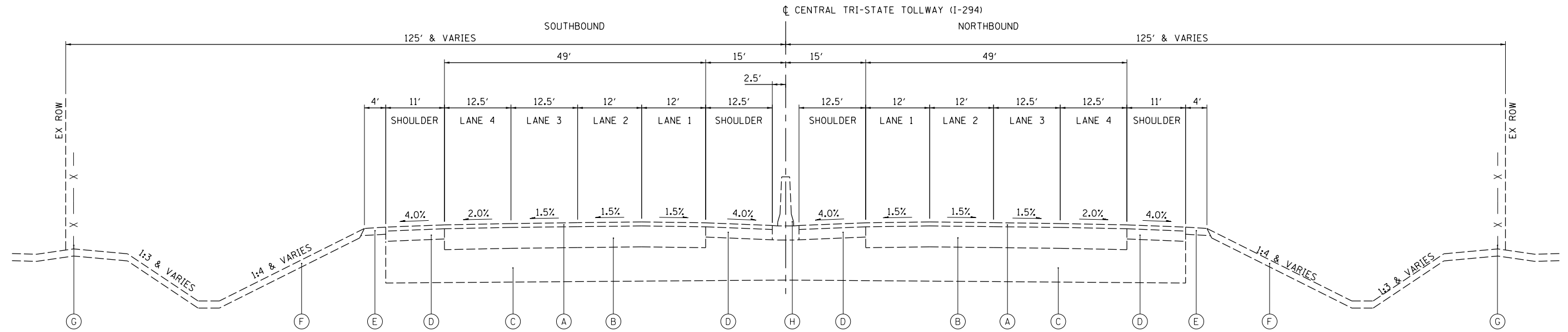


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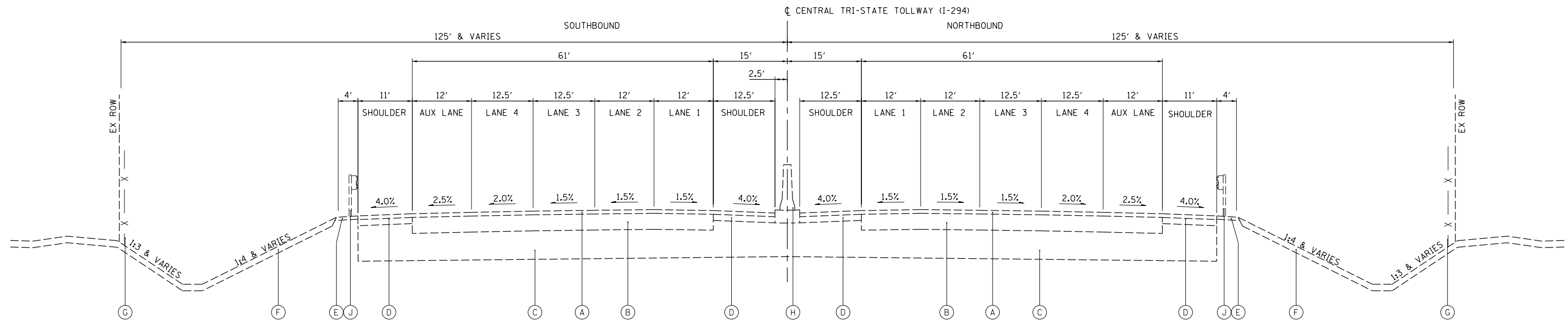
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SHEET NO. DP-56
 DRAWING NO. 56 OF 56

5.9 EXISTING TYPICAL CROSS SECTIONS



EXISTING I-294 TOLLWAY
8 LANE TANGENT SECTION



EXISTING I-294 TOLLWAY
TANGENT SECTION WITH AUX LANE(S)

EXISTING LEGEND

- | | | |
|--|---|-----------------------|
| (A) EXISTING ASPHALT OVERLAY | (H) EXISTING CONCRETE MEDIAN BARRIER AND BASE | (O) EXISTING SIDEWALK |
| (B) EXISTING PCC PAVEMENT | (I) EXISTING SINGLE FACE BARRIER AND BASE | (P) EXISTING BEAMS |
| (C) EXISTING SUBGRADE AGGREGATE | (J) EXISTING GUARDRAIL | |
| (D) EXISTING BITUMINOUS CONCRETE SHOULDERS | (K) EXISTING NOISE ABATEMENT WALL | |
| (E) EXISTING AGGREGATE SHOULDERS | (L) EXISTING BRIDGE DECK | |
| (F) EXISTING TOPSOIL | (M) EXISTING PARAPET | |
| (G) EXISTING RIGHT-OF-WAY FENCE | (N) EXISTING BRIDGE FENCE RAILING | |

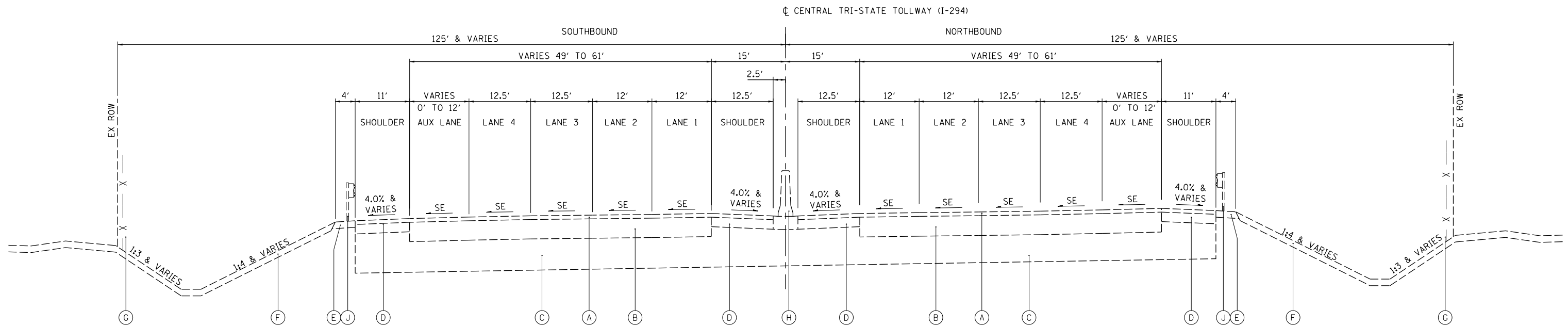
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CHECKED BY JRS DATE 12-22-17



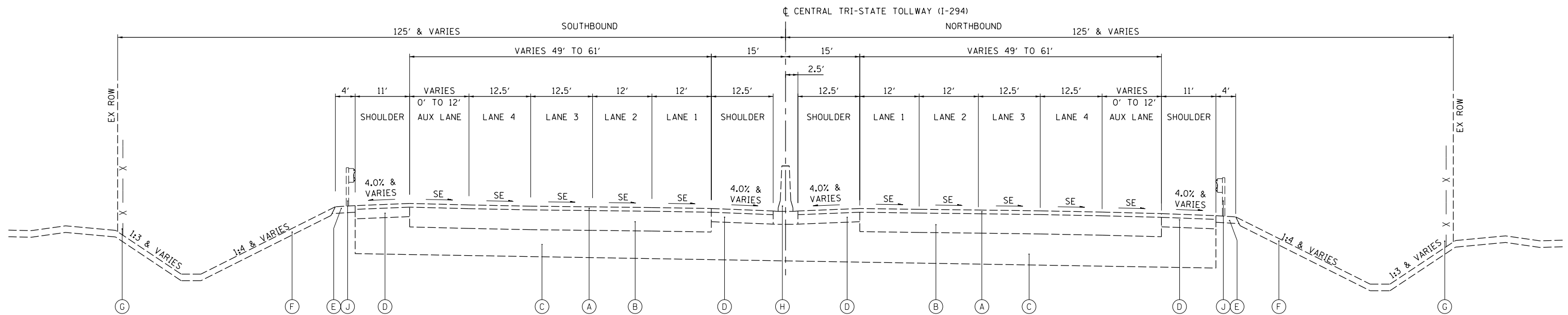
REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
EXISTING TYPICAL SECTIONS

SHEET NO. 5.9.1
DRAWING NO. 1 OF 6



EXISTING I-294 TOLLWAY
SUPERELEVATED SECTION



EXISTING I-294 TOLLWAY
SUPERELEVATED SECTION

EXISTING LEGEND

- (A) EXISTING ASPHALT OVERLAY
- (B) EXISTING PCC PAVEMENT
- (C) EXISTING SUBGRADE AGGREGATE
- (D) EXISTING BITUMINOUS CONCRETE SHOULDERS
- (E) EXISTING AGGREGATE SHOULDERS
- (F) EXISTING TOPSOIL
- (G) EXISTING RIGHT-OF-WAY FENCE
- (H) EXISTING CONCRETE MEDIAN BARRIER AND BASE
- (I) EXISTING SINGLE FACE BARRIER AND BASE
- (J) EXISTING GUARDRAIL
- (K) EXISTING NOISE ABATEMENT WALL
- (L) EXISTING BRIDGE DECK
- (M) EXISTING PARAPET
- (N) EXISTING BRIDGE FENCE RAILING
- (O) EXISTING SIDEWALK
- (P) EXISTING BEAMS

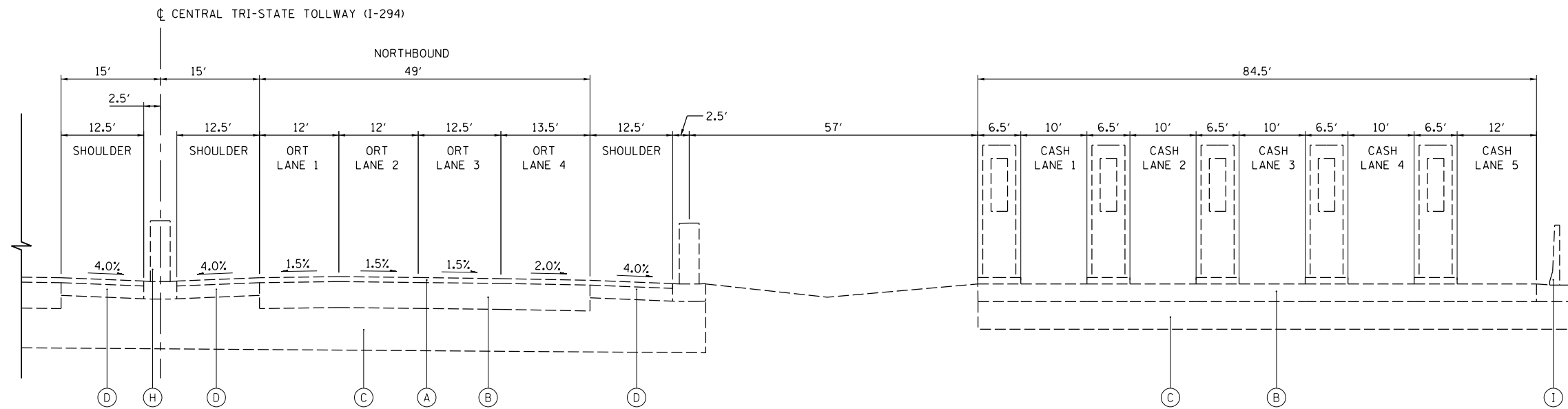
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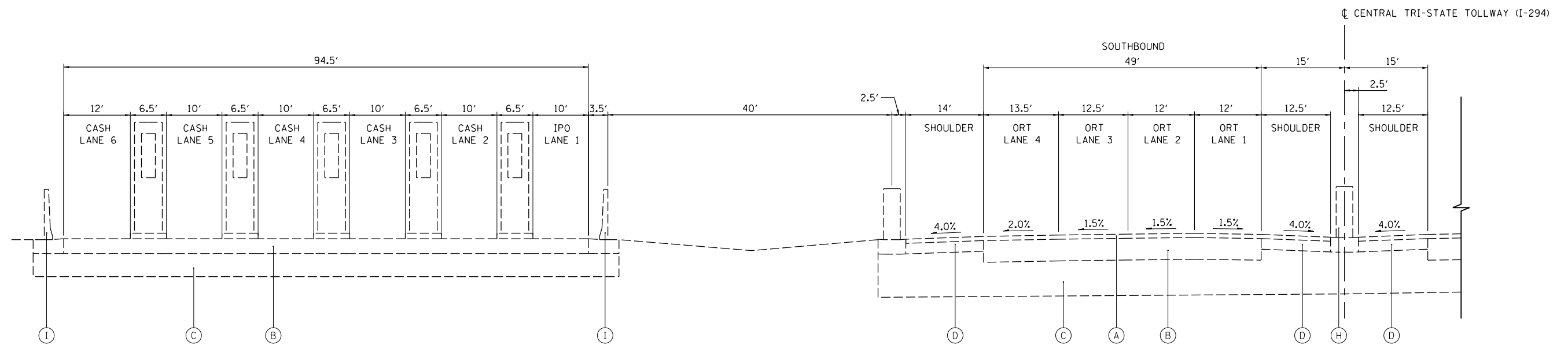
REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
EXISTING TYPICAL SECTIONS

SHEET NO. 5.9.2
DRAWING NO. 2 OF 6



EXISTING I-294 TOLLWAY
TOLL PLAZA 39 (83RD STREET PLAZA)



EXISTING I-294 TOLLWAY
TOLL PLAZA 36 (82ND STREET PLAZA)

EXISTING LEGEND

- (A) EXISTING ASPHALT OVERLAY
- (B) EXISTING PCC PAVEMENT
- (C) EXISTING SUBGRADE AGGREGATE
- (D) EXISTING BITUMINOUS CONCRETE SHOULDERS
- (E) EXISTING AGGREGATE SHOULDERS
- (F) EXISTING TOPSOIL
- (G) EXISTING RIGHT-OF-WAY FENCE
- (H) EXISTING CONCRETE MEDIAN BARRIER AND BASE
- (I) EXISTING SINGLE FACE BARRIER AND BASE
- (J) EXISTING GUARDRAIL
- (K) EXISTING NOISE ABATEMENT WALL
- (L) EXISTING BRIDGE DECK
- (M) EXISTING PARAPET
- (N) EXISTING BRIDGE FENCE RAILING
- (O) EXISTING SIDEWALK
- (P) EXISTING BEAMS

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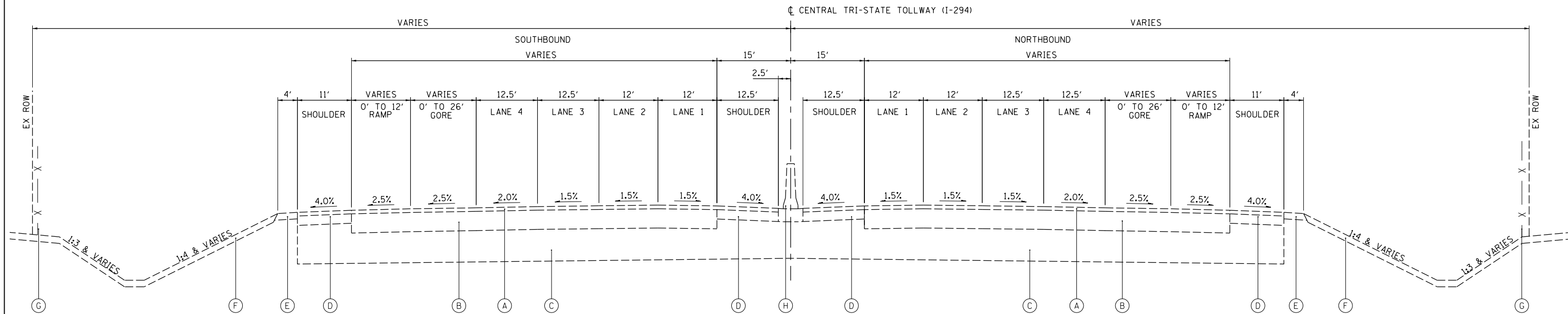
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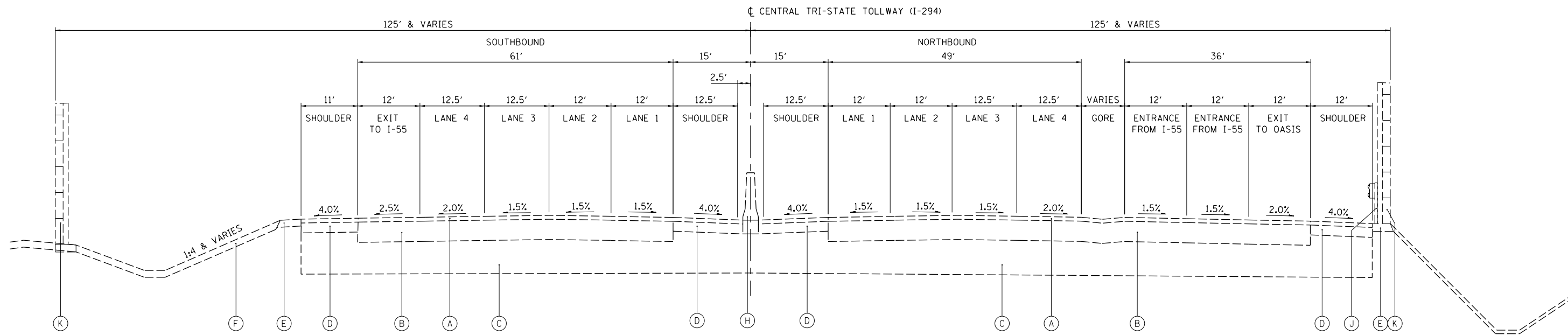
NO.		DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
EXISTING TYPICAL SECTIONS

SHEET NO. 5.9.3
DRAWING NO. 3 OF 6



EXISTING I-294 TOLLWAY
ENTRANCE AND EXIT RAMP LANES



EXISTING I-294 TOLLWAY
STA 1292+00 TO STA 1305+00

EXISTING LEGEND

- (A) EXISTING ASPHALT OVERLAY
- (B) EXISTING PCC PAVEMENT
- (C) EXISTING SUBGRADE AGGREGATE
- (D) EXISTING BITUMINOUS CONCRETE SHOULDERS
- (E) EXISTING AGGREGATE SHOULDERS
- (F) EXISTING TOPSOIL
- (G) EXISTING RIGHT-OF-WAY FENCE
- (H) EXISTING CONCRETE MEDIAN BARRIER AND BASE
- (I) EXISTING SINGLE FACE BARRIER AND BASE
- (J) EXISTING GUARDRAIL
- (K) EXISTING NOISE ABATEMENT WALL
- (L) EXISTING BRIDGE DECK
- (M) EXISTING PARAPET
- (N) EXISTING BRIDGE FENCE RAILING
- (O) EXISTING SIDEWALK
- (P) EXISTING BEAMS

DRAWN BY KMD SCALE N.T.S.
CHECKED BY JRS DATE 12-22-17

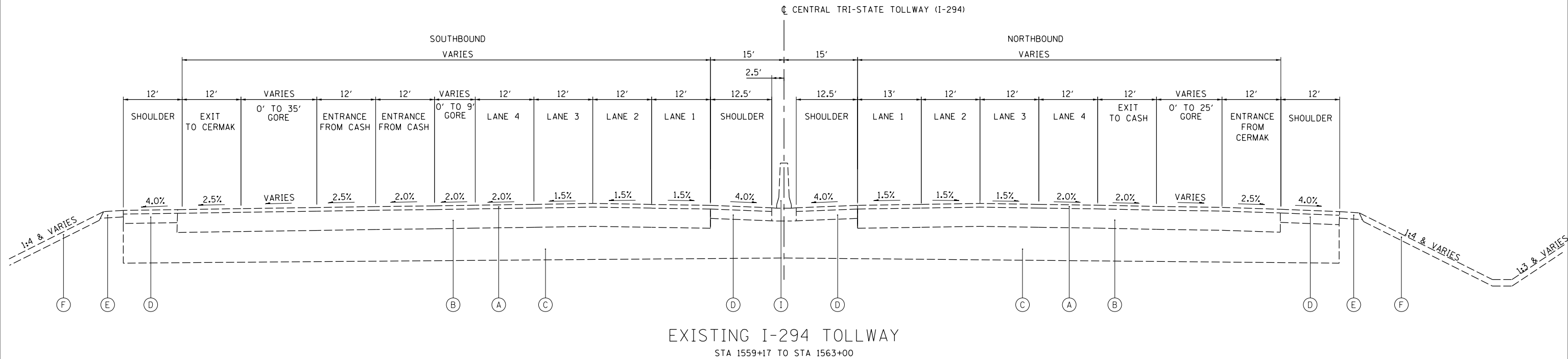


NO.		DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
EXISTING TYPICAL SECTIONS

SHEET NO. 5.9.4
DRAWING NO. 4 OF 6

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EXISTING LEGEND

- | | | |
|--|---|-----------------------|
| (A) EXISTING ASPHALT OVERLAY | (H) EXISTING CONCRETE MEDIAN BARRIER AND BASE | (O) EXISTING SIDEWALK |
| (B) EXISTING PCC PAVEMENT | (I) EXISTING SINGLE FACE BARRIER AND BASE | (P) EXISTING BEAMS |
| (C) EXISTING SUBGRADE AGGREGATE | (J) EXISTING GUARDRAIL | |
| (D) EXISTING BITUMINOUS CONCRETE SHOULDERS | (K) EXISTING NOISE ABATEMENT WALL | |
| (E) EXISTING AGGREGATE SHOULDERS | (L) EXISTING BRIDGE DECK | |
| (F) EXISTING TOPSOIL | (M) EXISTING PARAPET | |
| (G) EXISTING RIGHT-OF-WAY FENCE | (N) EXISTING BRIDGE FENCE RAILING | |

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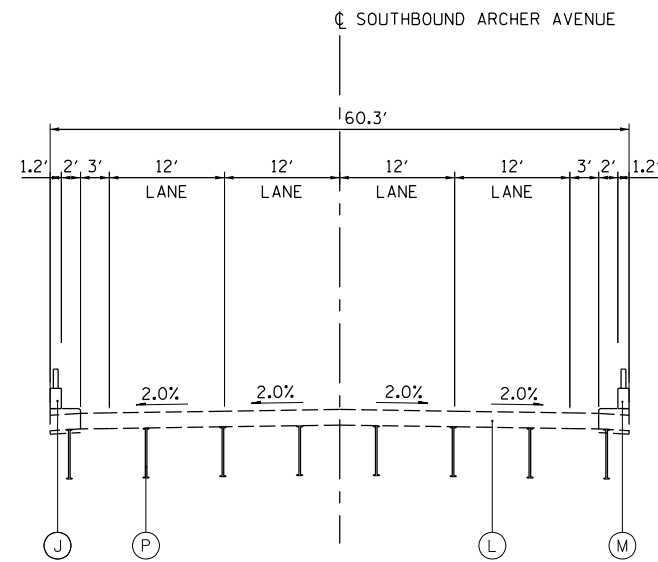
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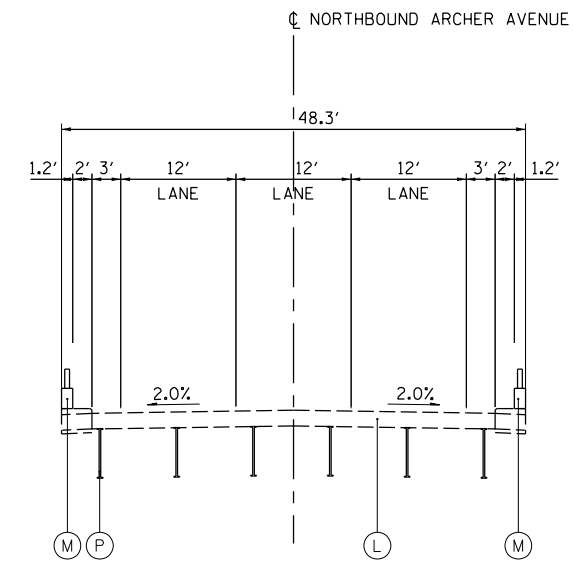
NO.		DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 EXISTING TYPICAL SECTIONS

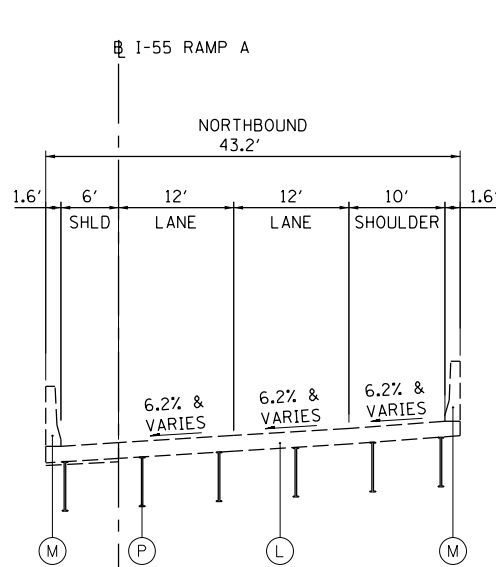
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 DRAWING NO. 5 OF 6



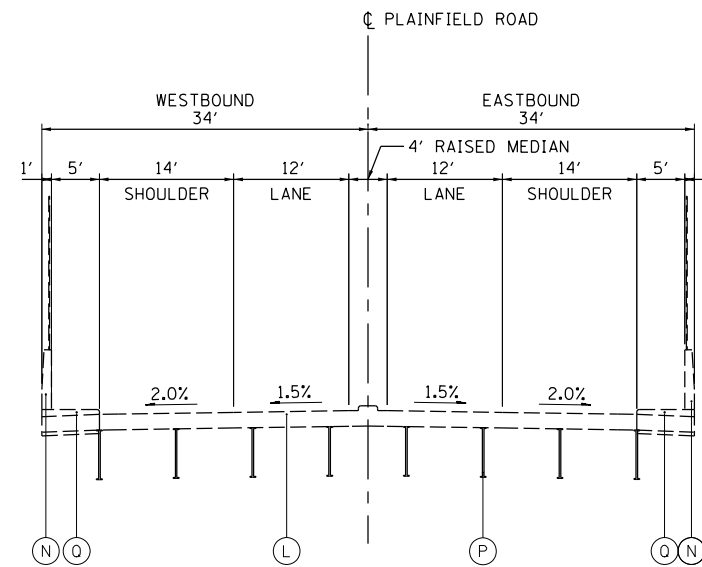
EXISTING
SOUTHBOUND ARCHER AVENUE (ILLINOIS ROUTE 171) OVER I-294
(LOOKING SOUTH)



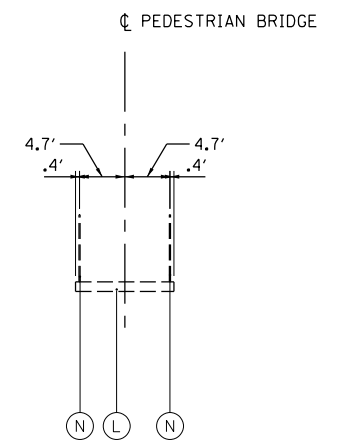
EXISTING
NORTHBOUND ARCHER AVENUE (ILLINOIS ROUTE 171) OVER I-294
(LOOKING NORTH)



EXISTING
I-55 (STEVENSON EXPY) RAMP A OVER I-294
(LOOKING NORTH)



EXISTING
PLAINFIELD ROAD OVER I-294



EXISTING
PEDESTRIAN BRIDGE OVER I-294

EXISTING LEGEND

- (A) EXISTING ASPHALT OVERLAY
- (B) EXISTING PCC PAVEMENT
- (C) EXISTING SUBGRADE AGGREGATE
- (D) EXISTING BITUMINOUS CONCRETE SHOULDERS
- (E) EXISTING AGGREGATE SHOULDERS
- (F) EXISTING TOPSOIL
- (G) EXISTING RIGHT-OF-WAY FENCE
- (H) EXISTING CONCRETE MEDAIN BARRIER AND BASE
- (I) EXISTING SINGLE FACE BARRIER AND BASE
- (J) EXISTING GUARDRAIL
- (K) EXISTING NOISE ABATEMENT WALL
- (L) EXISTING BRIDGE DECK
- (M) EXISTING PARAPET
- (N) EXISTING BRIDGE FENCE RAILING
- (O) EXISTING SIDEWALK
- (P) EXISTING BEAMS

DRAWN BY KMD SCALE N.T.S.
CHECKED BY JRS DATE 12-22-17



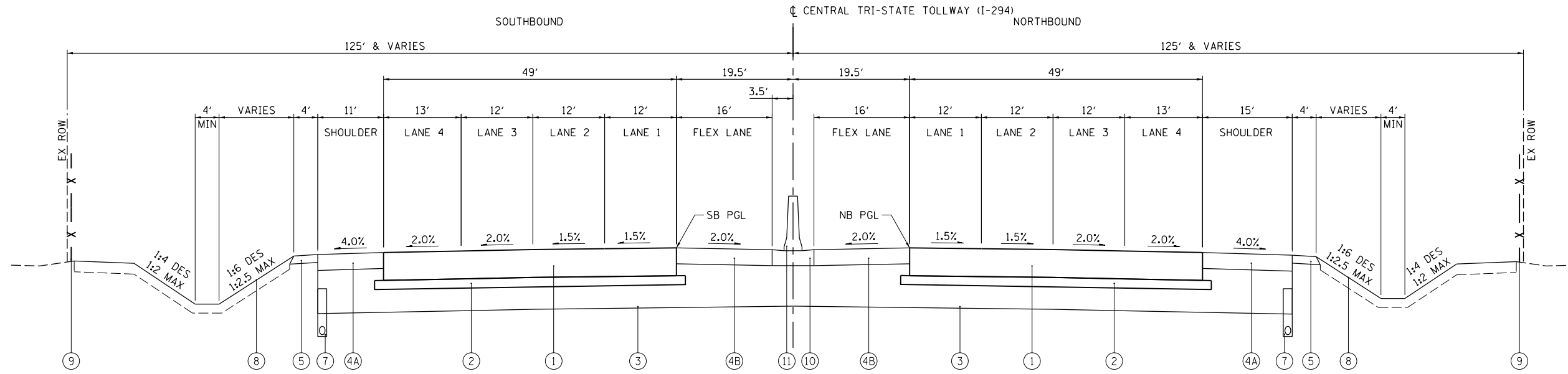
NO.		DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
EXISTING TYPICAL SECTIONS
CROSSROADS AND RAMPS

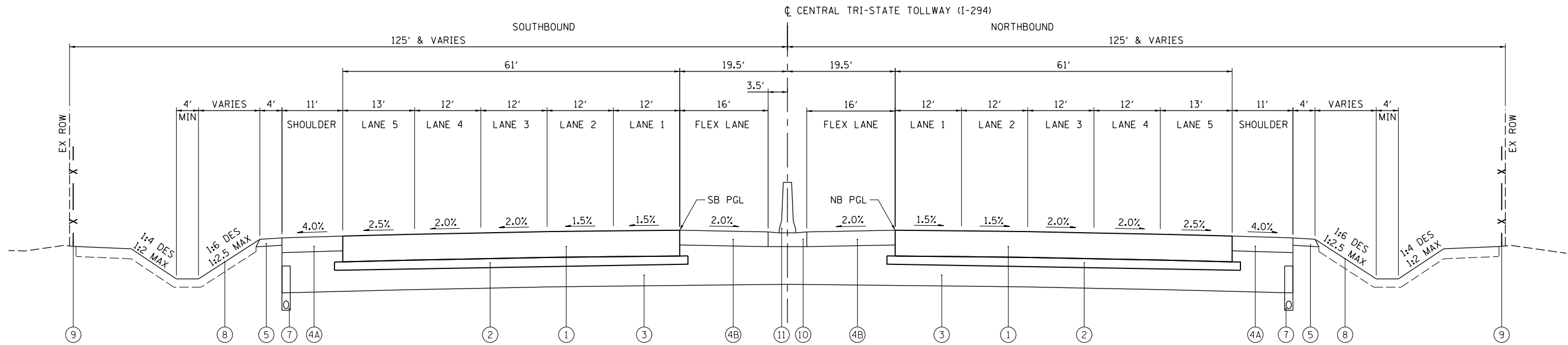
SHEET NO. 5.9.6
DRAWING NO. 6 OF 6

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5.10 PROPOSED TYPICAL CROSS SECTIONS



PROPOSED I-294 TOLLWAY
8 LANE TANGENT SECTION



PROPOSED I-294 TOLLWAY
10 LANE TANGENT SECTION

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

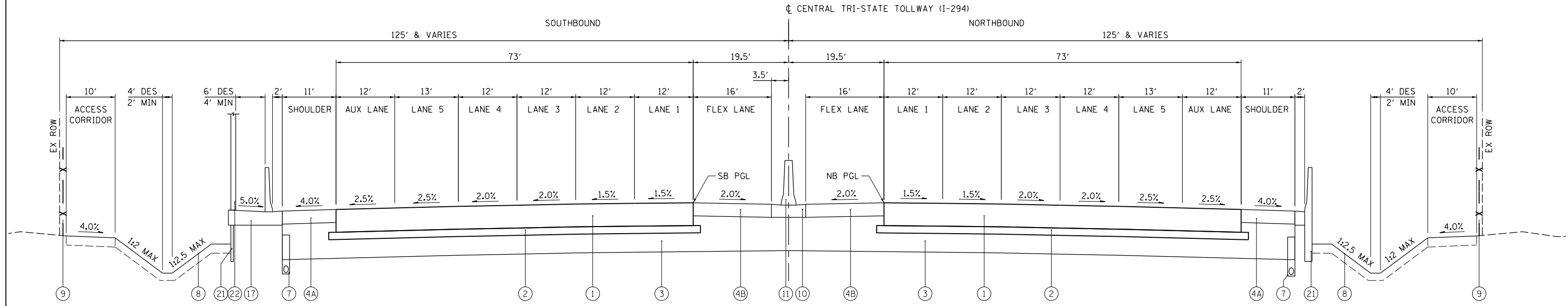
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CHECKED BY JRS DATE 12-22-17



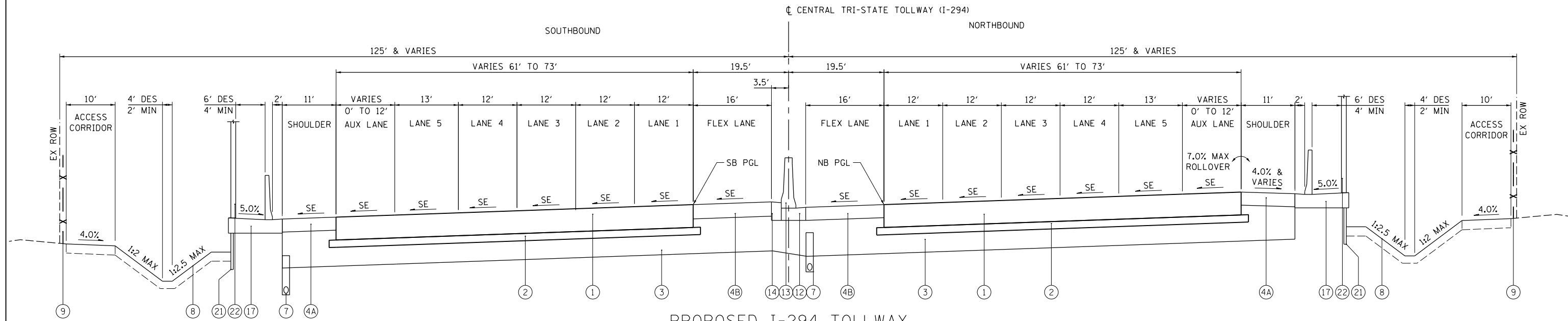
REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.1
DRAWING NO. 1 OF 13



PROPOSED I-294 TOLLWAY
10 LANE TANGENT SECTION WITH AUX LANES



PROPOSED I-294 TOLLWAY

STA 955+90 TO 972+95 (CURVE 6) SE= 4.6% STA 1448+63 TO 1463+78 (CURVE 47) SE= 4.6%
 STA 1009+97 TO 1014+32 (CURVE 9) SE= 4.6% STA 1509+85 TO 1515+85 (CURVE 53) SE= 3.8%
 STA 1366+21 TO 1381+07 (CURVE 41) SE= 3.4%

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

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 CHECKED BY JRS DATE 12-22-17

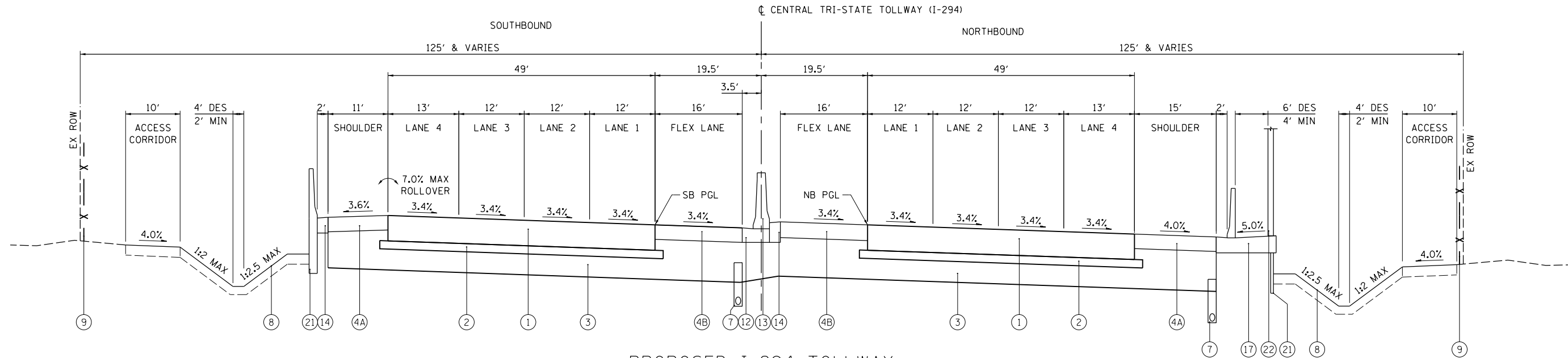


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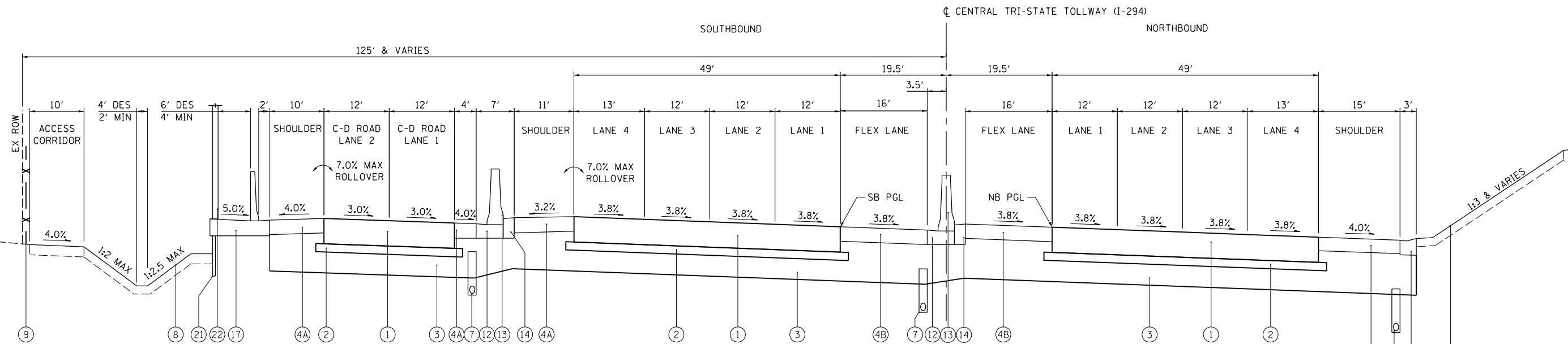
CONTRACT NO. RR-14-4223
 PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.2
 DRAWING NO. 2 OF 13

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PROPOSED I-294 TOLLWAY
STA 1230+00 TO STA 1278+41 (CURVE 31) SE= 3.4%



PROPOSED I-294 TOLLWAY
STA 1278+41 TO 1293+29 (CURVE 32) SE= 3.8%

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

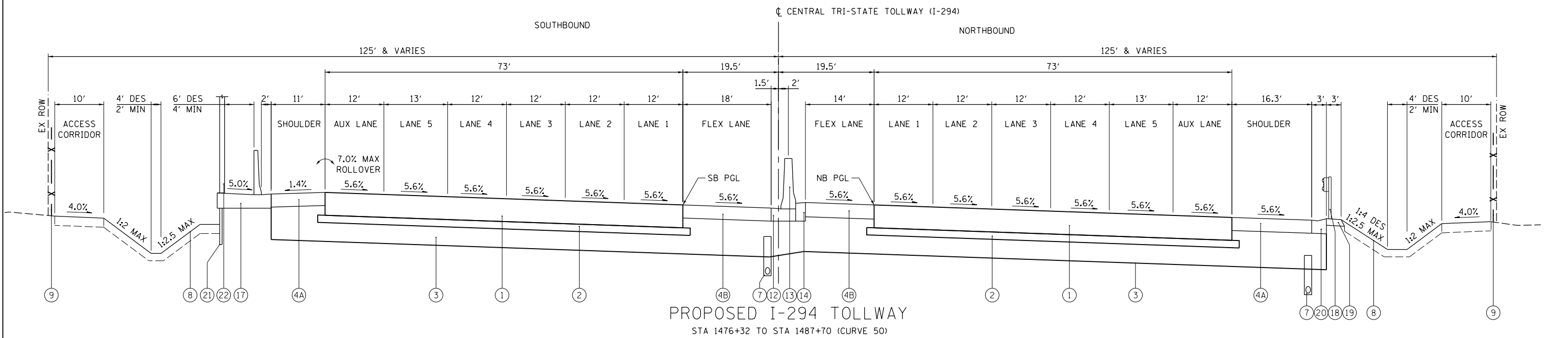
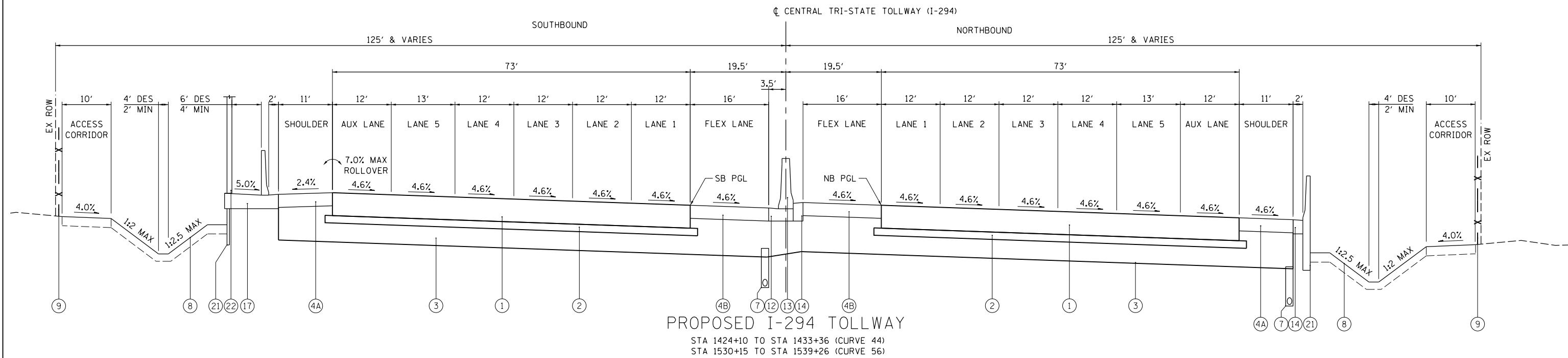
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REVISIONS	
NO.	DATE

CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.4
DRAWING NO. 4 OF 13



PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ⑳ GUTTER, TYPE G-3 | ㉑ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉒ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉓ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉔ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉕ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉖ BRIDGE FENCE RAILING | |

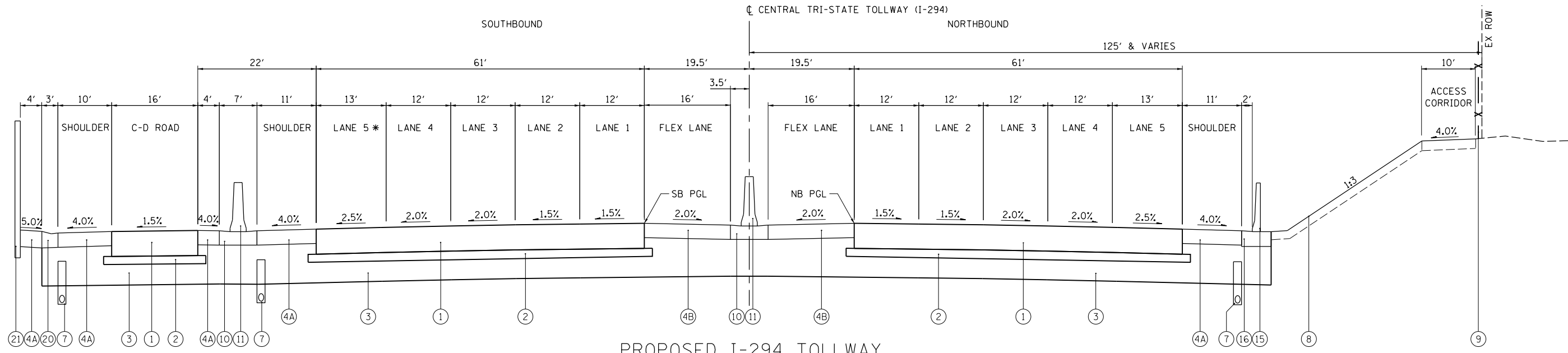
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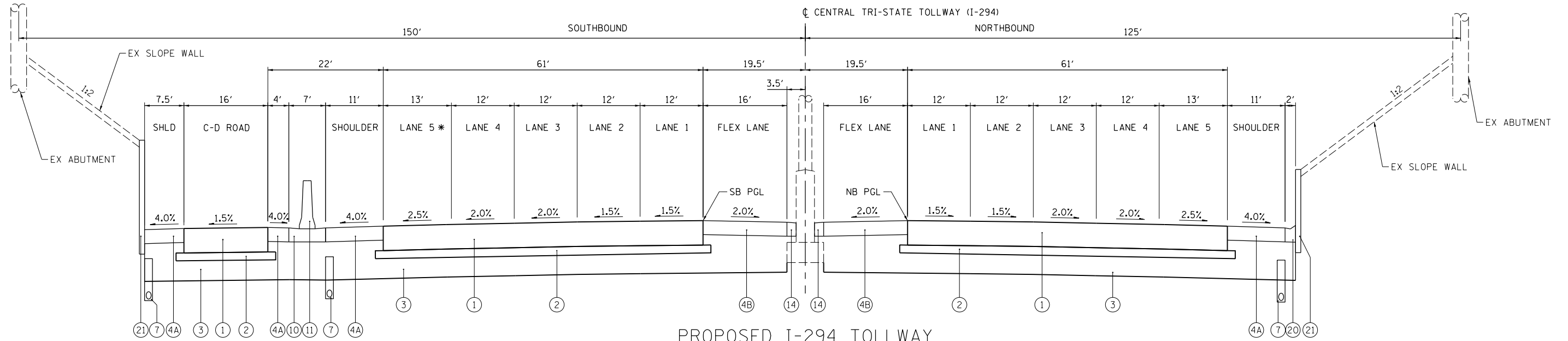
REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED TYPICAL SECTIONS

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PROPOSED I-294 TOLLWAY
SOUTHBOUND C-D ROAD
STA 1052+00 TO STA 5094+00



PROPOSED I-294 TOLLWAY
88TH AVENUE
STA 1060+50

* SOUTHBOUND LANE 5 IS TO BE STRIPED AS A SHOULDER

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

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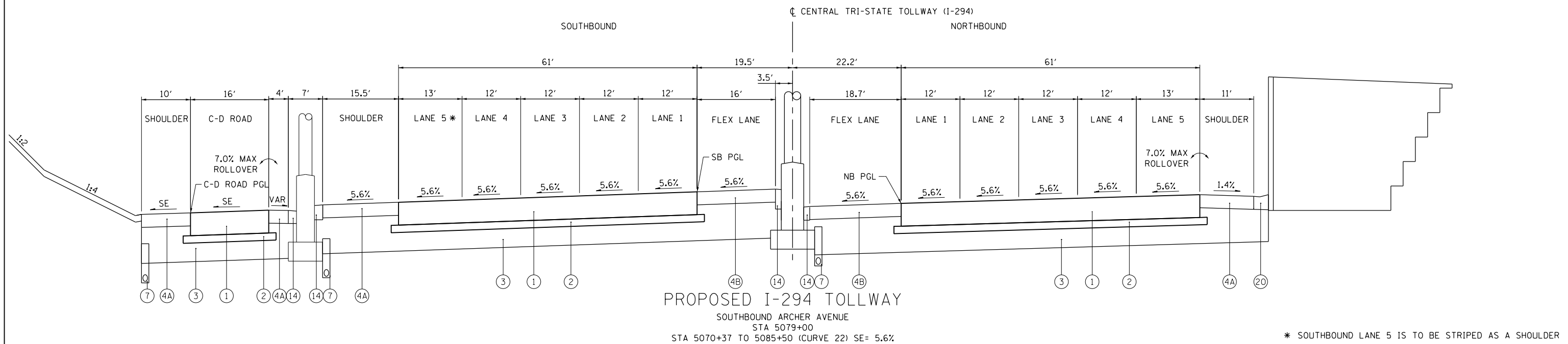
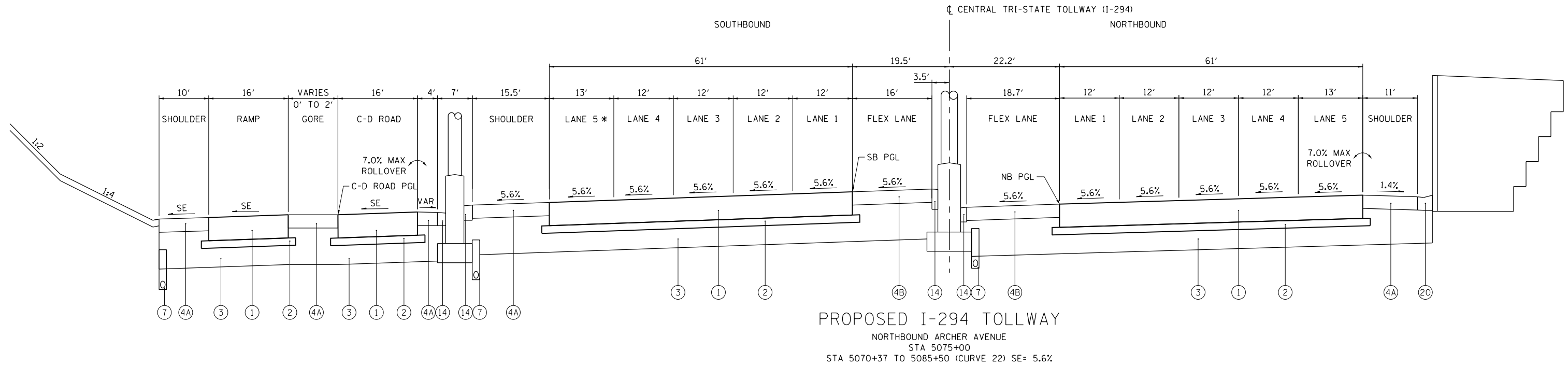


REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.6
DRAWING NO. 6 OF 13

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* SOUTHBOUND LANE 5 IS TO BE STRIPED AS A SHOULDER

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

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CHECKED BY **JRS** DATE **12-22-17**

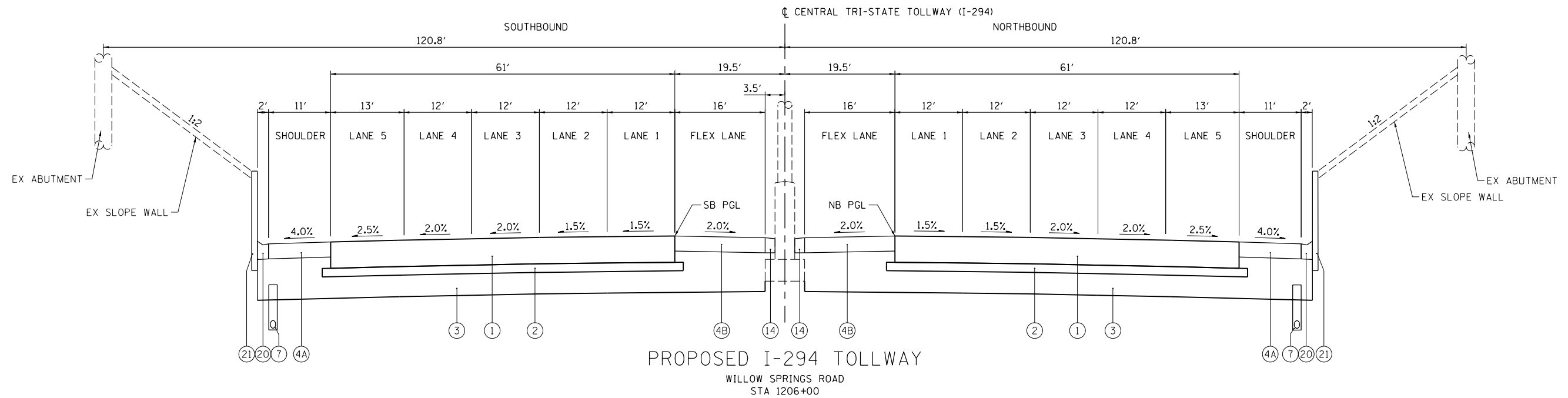
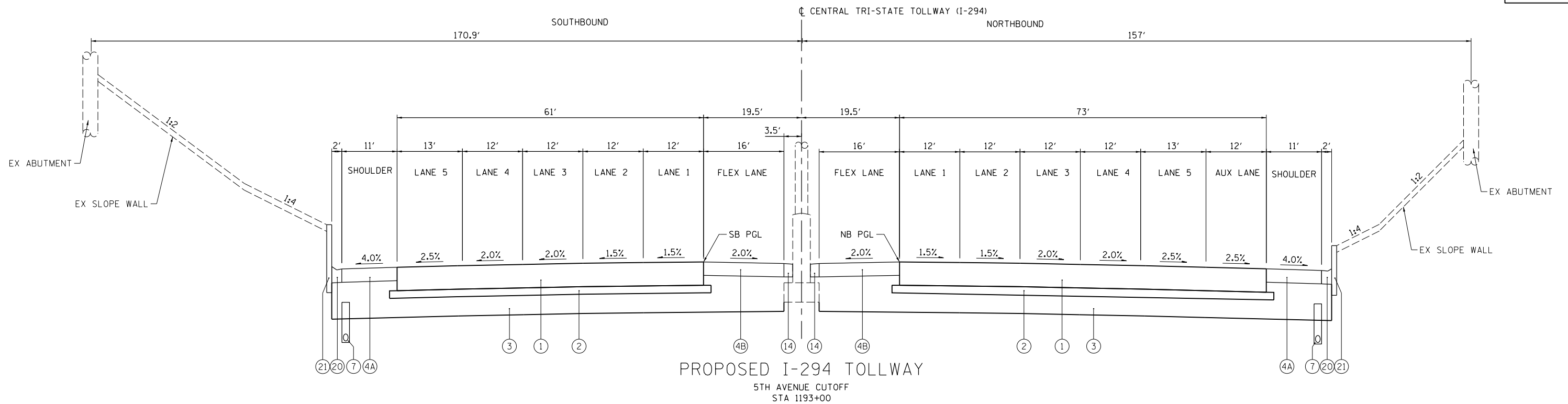


REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. **RR-14-4223**
PROPOSED TYPICAL SECTIONS

SHEET NO. **5.10.7**
DRAWING NO. **7 OF 13**

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PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

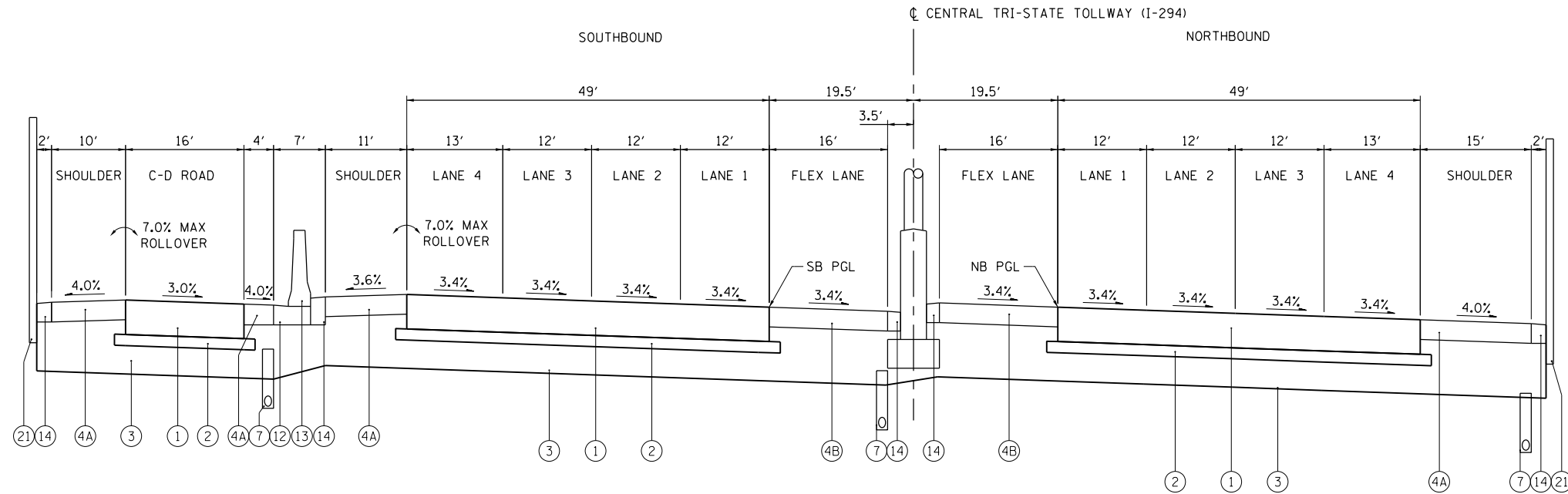
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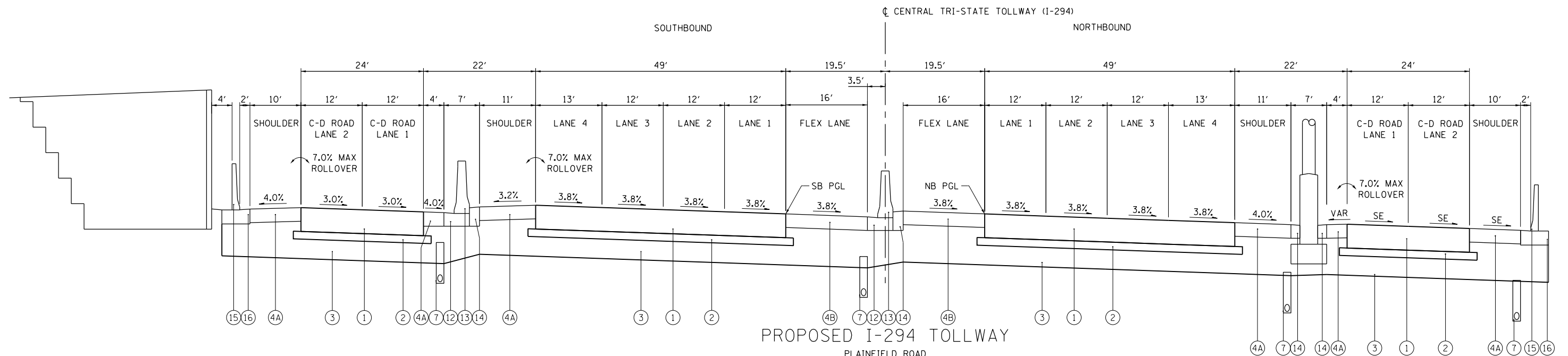
REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. **RR-14-4223**
PROPOSED TYPICAL SECTIONS

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PROPOSED I-294 TOLLWAY
INTERSTATE 55 RAMP A
STA 1277+00



PROPOSED I-294 TOLLWAY
PLAINFIELD ROAD
STA 1292+00

PROPOSED LEGEND

- | | | | |
|--|--|--|--|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ⑳ GUTTER, TYPE G-3 |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉑ RETAINING WALL |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉒ NOISE ABATEMENT WALL |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉓ BRIDGE DECK |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉔ PARAPET |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉕ BRIDGE FENCE RAILING |
| | | | ㉖ SIDEWALK |
| | | | ㉗ BEAMS |

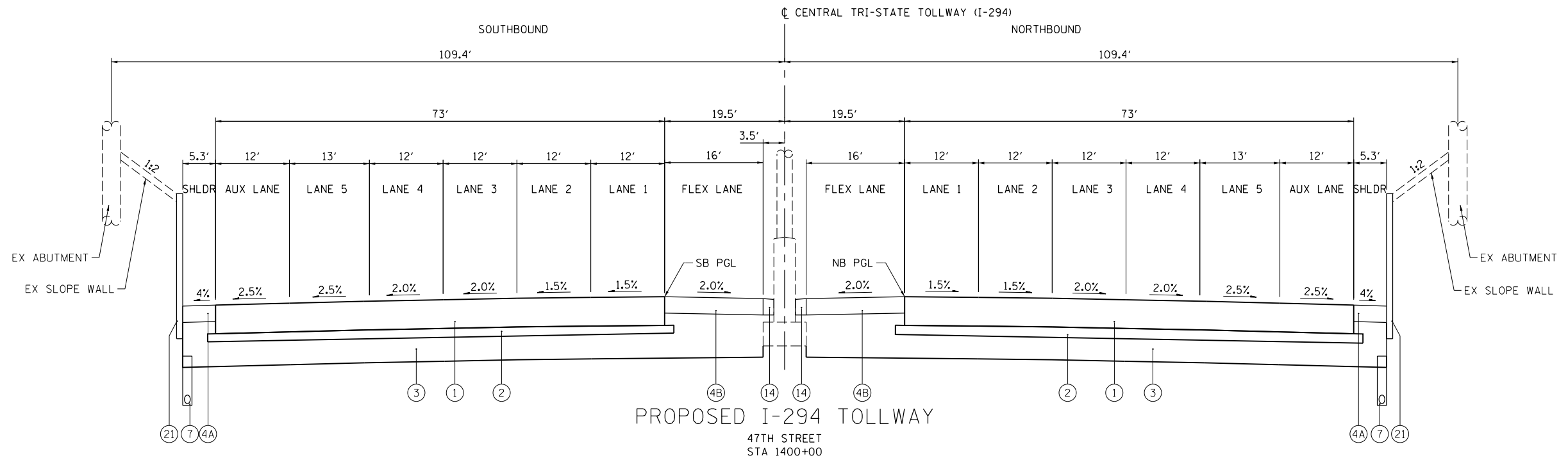
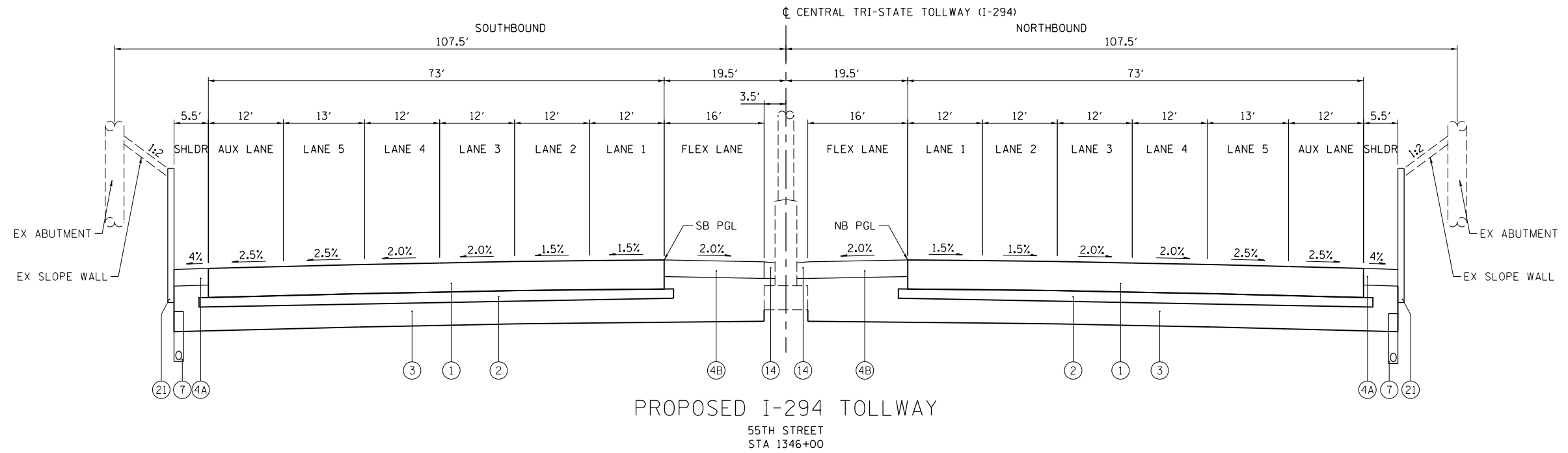
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CHECKED BY JRS DATE 12-22-17



REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.9
DRAWING NO. 9 OF 13



PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

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 CHECKED BY JRS DATE 12-22-17

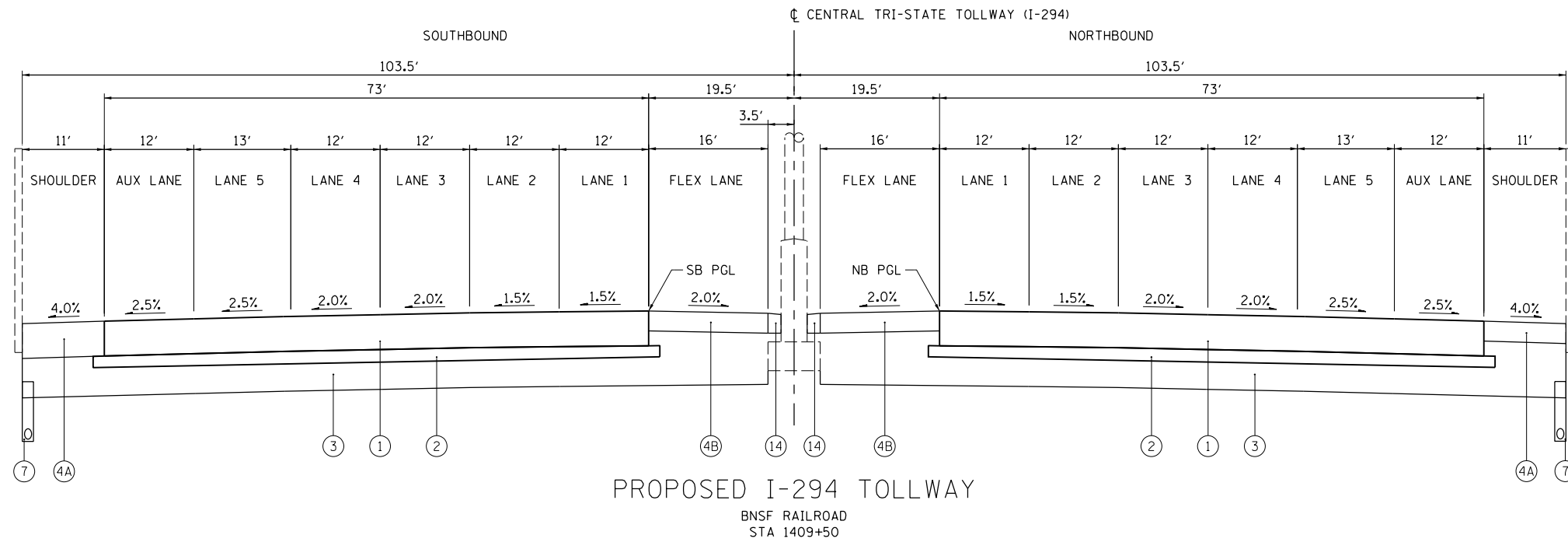


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NO.	DATE

CONTRACT NO. RR-14-4223
 PROPOSED TYPICAL SECTIONS

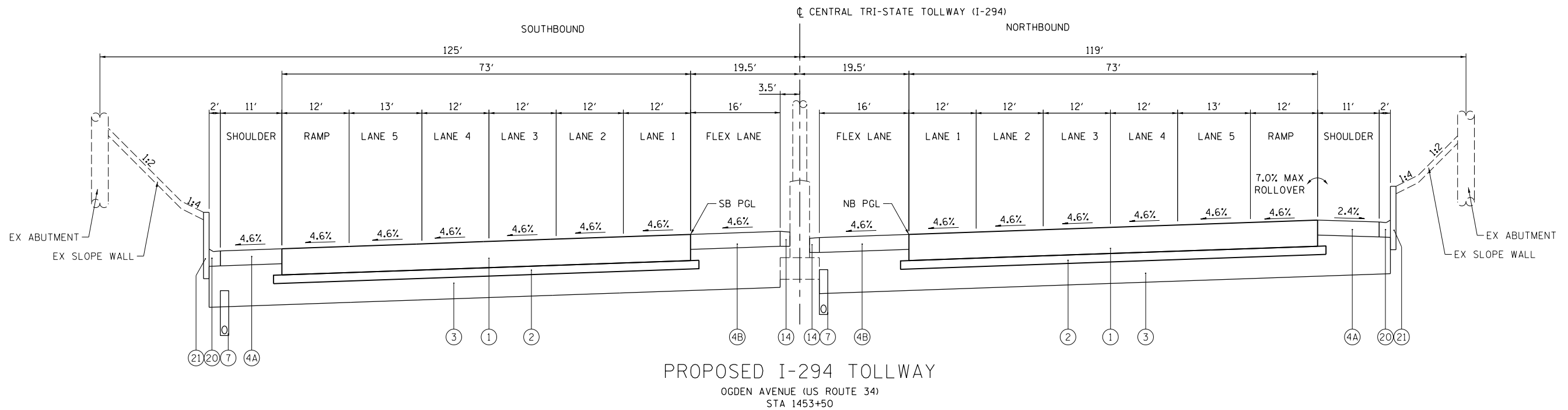
SHEET NO. 5.10.10
 DRAWING NO. 10 OF 13

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PROPOSED I-294 TOLLWAY

BNSF RAILROAD
STA 1409+50



PROPOSED I-294 TOLLWAY

OGDEN AVENUE (US ROUTE 34)
STA 1453+50

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑪ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

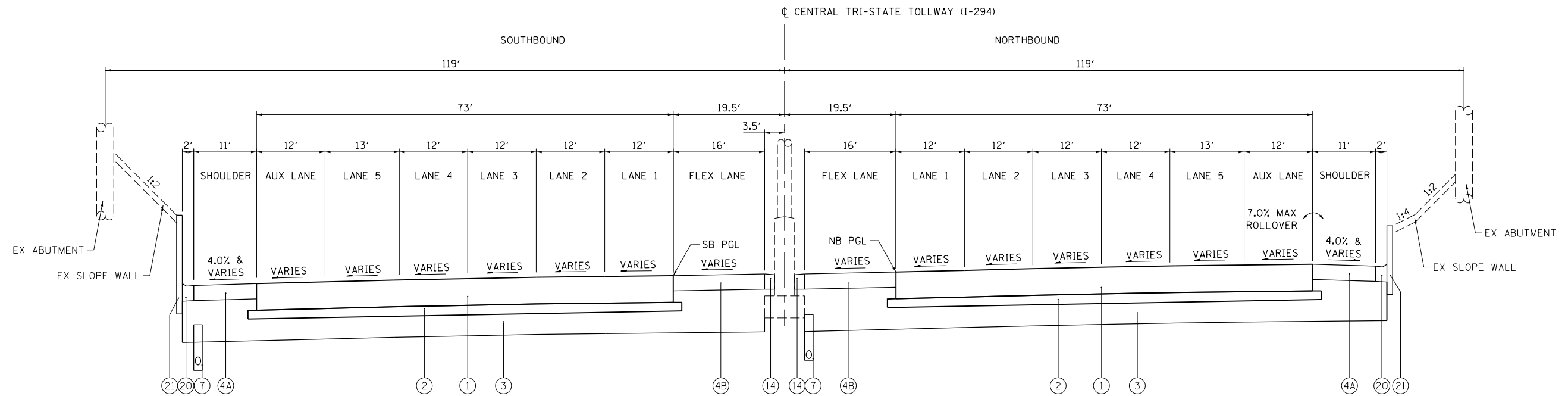
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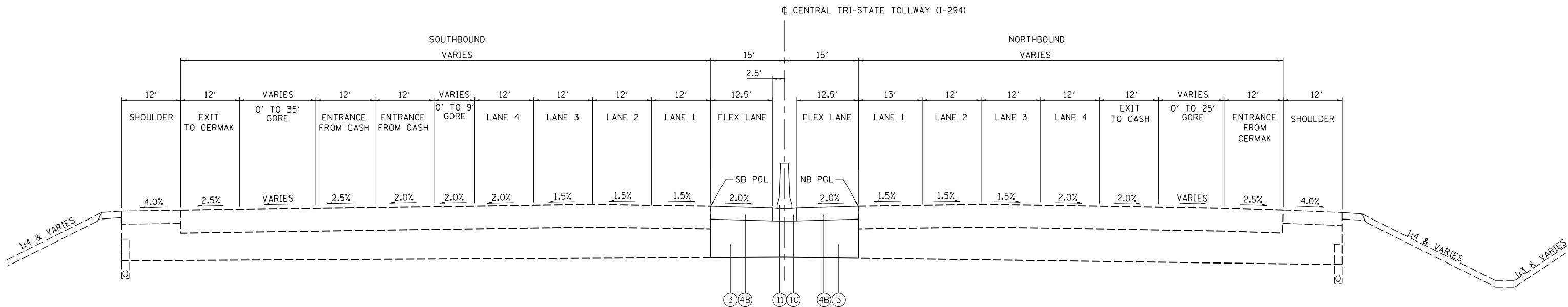
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CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.11
DRAWING NO. 11 OF 13



PROPOSED I-294 TOLLWAY
31ST STREET
STA 1509+00



PROPOSED I-294 TOLLWAY
STA 1545+00 TO STA 1565+00
MP 29.1 TO 29.5

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

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CHECKED BY JRS DATE 12-22-17

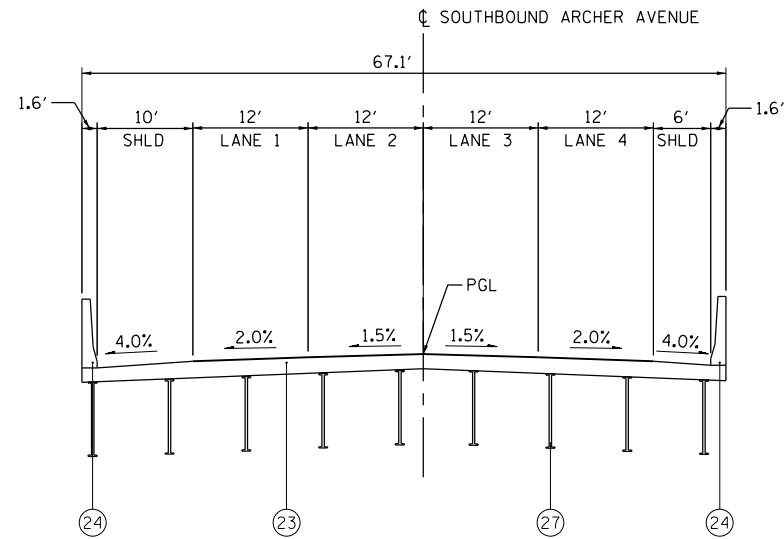


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NO.	DATE

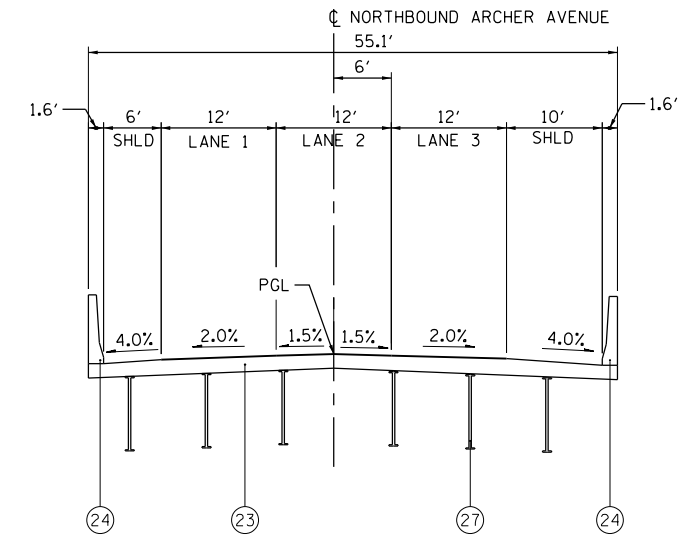
CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS

SHEET NO. 5.10.12
DRAWING NO. 12 OF 13

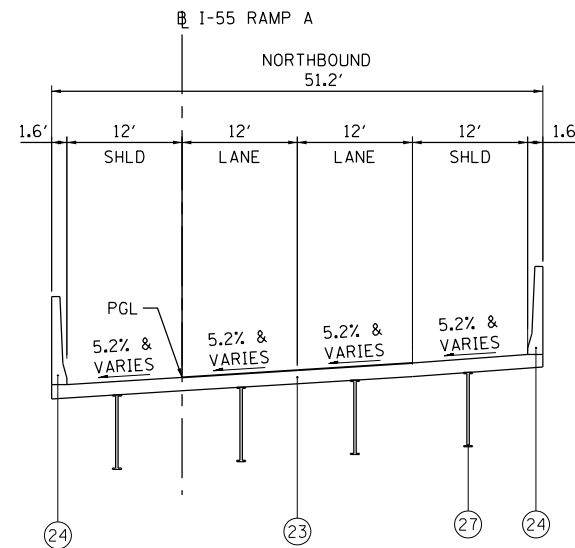
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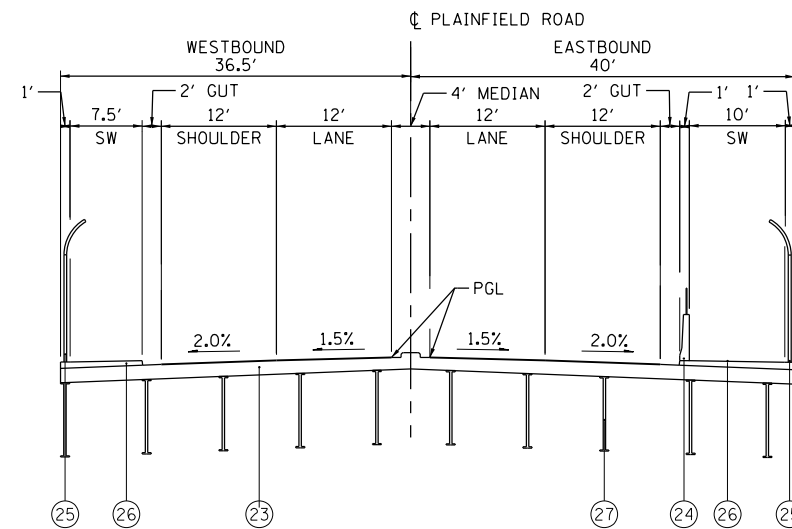
PROPOSED
SB ARCHER AVENUE OVER I-294
(LOOKING NORTH)



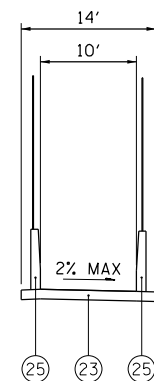
PROPOSED
NB ARCHER AVENUE OVER I-294
(LOOKING NORTH)



PROPOSED
I-55 RAMP A OVER I-294
(LOOKING NORTH)



PROPOSED
PLAINFIELD ROAD OVER I-294
(LOOKING EAST)



PROPOSED
PEDESTRIAN BRIDGE OVER I-294
(LOOKING EAST)

PROPOSED LEGEND

- | | | | | |
|--|--|--|--|------------|
| ① PCC PAVEMENT | ⑥ TIE BARS | ⑫ CONCRETE BARRIER BASE, VARIABLE HEIGHT | ⑲ AGGREGATE SHOULDERS, SPECIAL, TYPE C | ⑳ SIDEWALK |
| ② STABILIZED SUBBASE - WMA | ⑦ PIPE UNDERDRAINS, FABRIC LINED TRENCH | ⑬ CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT | ㉑ GUTTER, TYPE G-3 | ㉒ BEAMS |
| ③ SUBGRADE AGGREGATE | ⑧ TOPSOIL EXCAVATION AND PLACEMENT | ⑭ CONCRETE GUTTER (SPECIAL) | ㉓ RETAINING WALL | |
| ④ WMA SHOULDERS | ⑨ SEEDING OF THE TYPE SPECIFIED ON LANDSCAPING PLANS | ⑮ CONCRETE BARRIER, SINGLE FACE, 42 INCH | ㉔ NOISE ABATEMENT WALL | |
| ④A WMA SHOULDERS (6 IN.) | ⑩ RIGHT-OF-WAY FENCE | ⑯ CONCRETE BARRIER BASE FOR SINGLE FACE BARRIER | ㉕ BRIDGE DECK | |
| ④B WMA SHOULDERS (9 IN.) | ⑪ CONCRETE BARRIER BASE, 7' | ⑰ CONCRETE MOMENT SLAB | ㉖ PARAPET | |
| ⑤ AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B | ⑫ CONCRETE BARRIER, DOUBLE FACE, 42 INCH | ⑱ GALVANIZED STEEL PLATE BEAM GUARDRAIL | ㉗ BRIDGE FENCE RAILING | |

DRAWN BY **SGK** SCALE **N.T.S.**
CHECKED BY **WBL** DATE **12-22-17**



REVISIONS		
NO.	DATE	DESCRIPTION

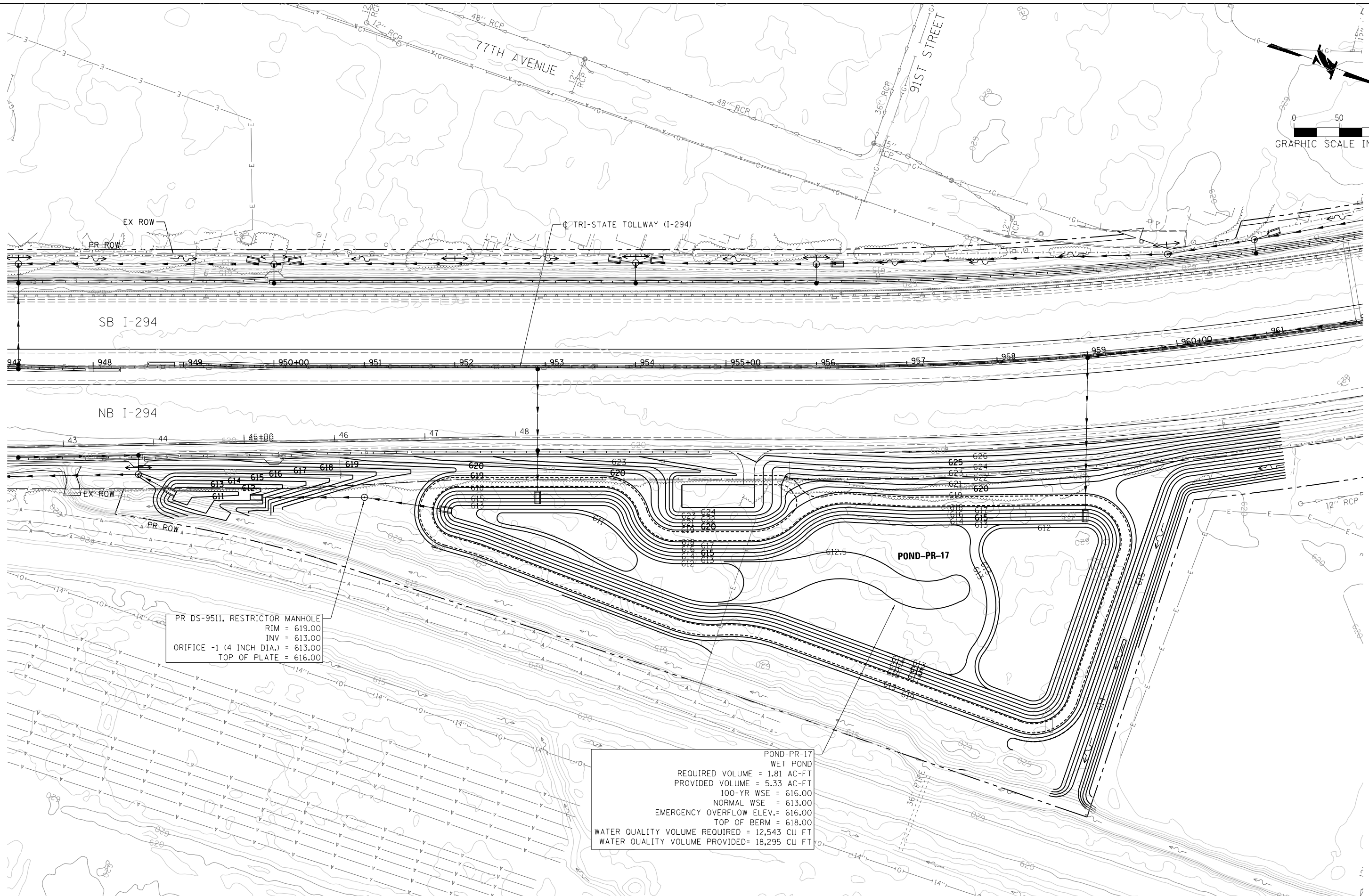
CONTRACT NO. RR-14-4223
PROPOSED TYPICAL SECTIONS
CROSS ROADS AND RAMPS

SHEET NO.
5.10.13
DRAWING NO.
13 OF 13

Inventor
Invalid expression
Invalid expression
Default

5.11 CONCEPTUAL DETENTION BASIN LAYOUTS

GRAPHIC SCALE IN FEET



PR DS-9511, RESTRICTOR MANHOLE
RIM = 619.00
INV = 613.00
ORIFICE -1 (4 INCH DIA.) = 613.00
TOP OF PLATE = 616.00

POND-PR-17
WET POND
REQUIRED VOLUME = 1.81 AC-FT
PROVIDED VOLUME = 5.33 AC-FT
100-YR WSE = 616.00
NORMAL WSE = 613.00
EMERGENCY OVERFLOW ELEV. = 616.00
TOP OF BERM = 618.00
WATER QUALITY VOLUME REQUIRED = 12,543 CU FT
WATER QUALITY VOLUME PROVIDED = 18,295 CU FT

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CHECKED BY DW DATE 10/27/17

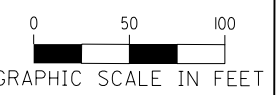
SE3
3041 WOODCREEK DRIVE, SUITE 211 - DOWNERS GROVE, IL 60515
(630) 641-9900

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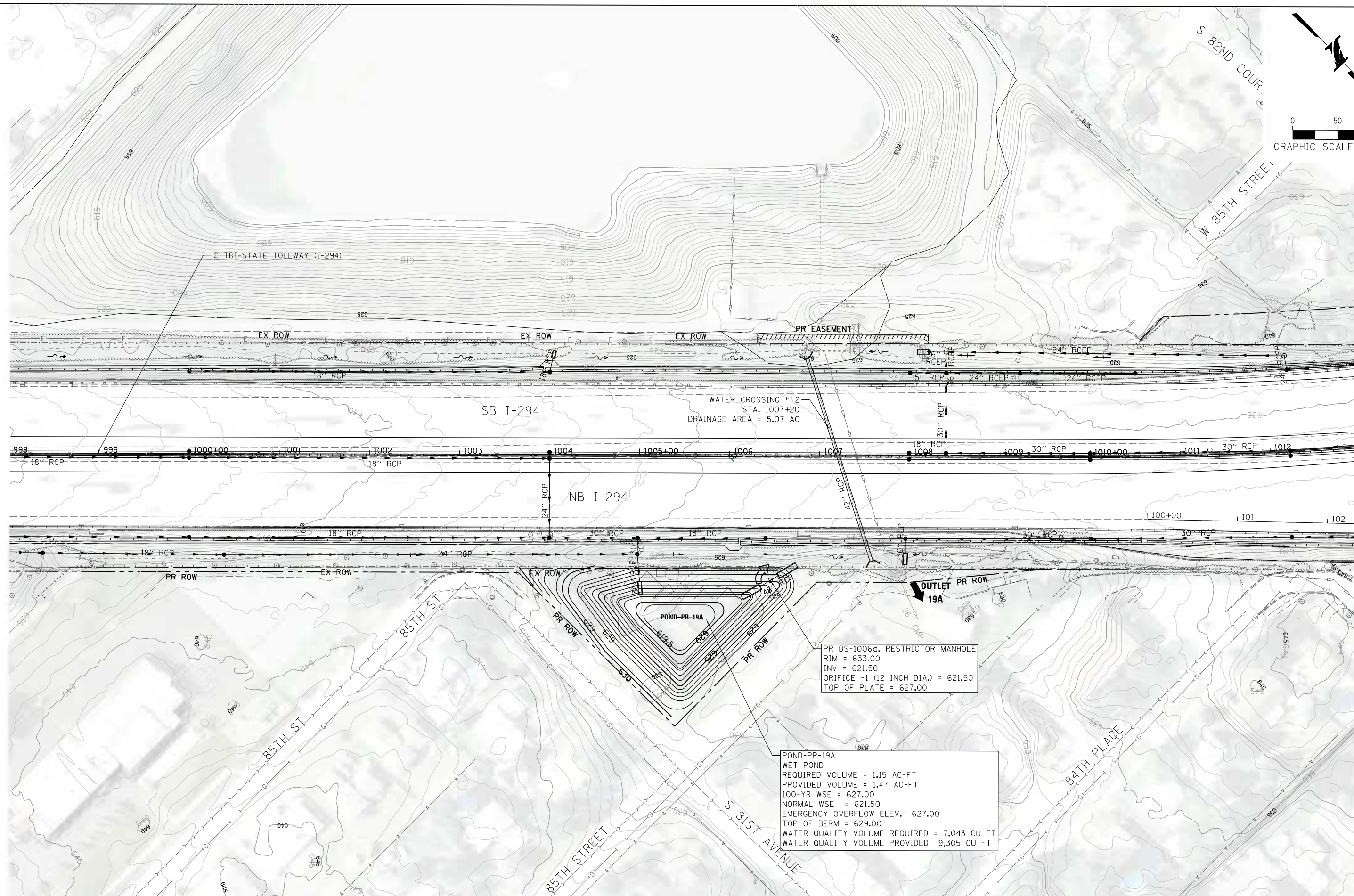
NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DETENTION BASIN 17

SHEET NO. EXHIBIT 5.11.1
DRAWING NO. 1 OF 14



GRAPHIC SCALE IN FEET



WATER CROSSING # 2
STA. 1007+20
DRAINAGE AREA = 5.07 AC

PR DS-1006d, RESTRICTOR MANHOLE
RIM = 633.00
INV = 621.50
ORIFICE -1 (12 INCH DIA.) = 621.50
TOP OF PLATE = 627.00

POND-PR-19A
WET POND
REQUIRED VOLUME = 1.15 AC-FT
PROVIDED VOLUME = 1.47 AC-FT
100-YR WSE = 627.00
NORMAL WSE = 621.50
EMERGENCY OVERFLOW ELEV. = 627.00
TOP OF BERM = 629.00
WATER QUALITY VOLUME REQUIRED = 7,043 CU FT
WATER QUALITY VOLUME PROVIDED = 9,305 CU FT

12/29/2017
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 DeFault

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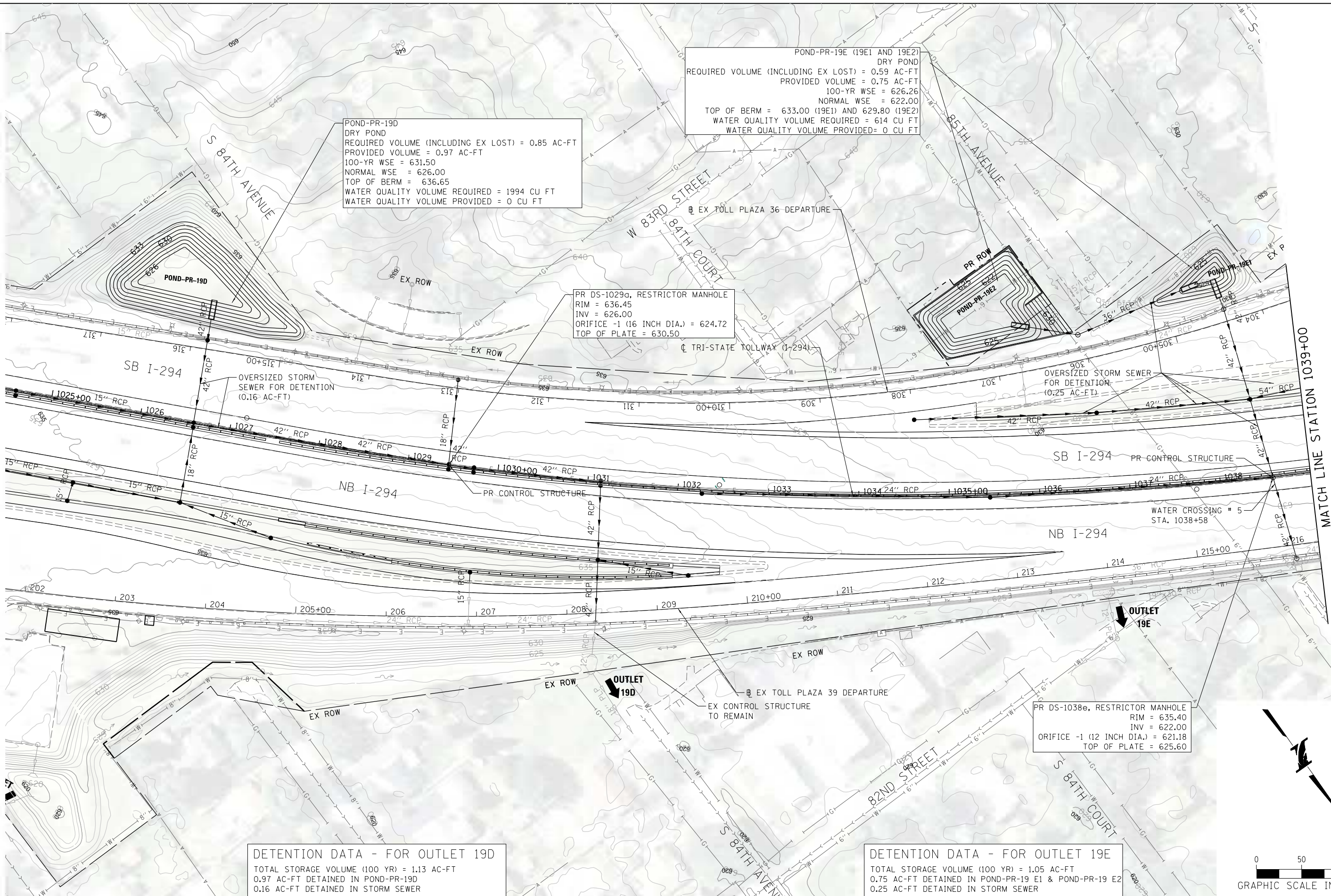
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NO.		DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
PROPOSED DETENTION BASIN 19A

SHEET NO.
EXHIBIT 5.11.2
DRAWING NO.
2 OF 14



POND-PR-19D
 DRY POND
 REQUIRED VOLUME (INCLUDING EX LOST) = 0.85 AC-FT
 PROVIDED VOLUME = 0.97 AC-FT
 100-YR WSE = 631.50
 NORMAL WSE = 626.00
 TOP OF BERM = 636.65
 WATER QUALITY VOLUME REQUIRED = 1994 CU FT
 WATER QUALITY VOLUME PROVIDED = 0 CU FT

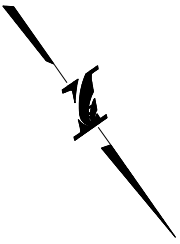
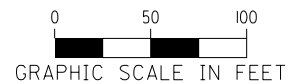
POND-PR-19E (19E1 AND 19E2)
 DRY POND
 REQUIRED VOLUME (INCLUDING EX LOST) = 0.59 AC-FT
 PROVIDED VOLUME = 0.75 AC-FT
 100-YR WSE = 626.26
 NORMAL WSE = 622.00
 TOP OF BERM = 633.00 (19E1) AND 629.80 (19E2)
 WATER QUALITY VOLUME REQUIRED = 614 CU FT
 WATER QUALITY VOLUME PROVIDED = 0 CU FT

PR DS-1029a, RESTRICTOR MANHOLE
 RIM = 636.45
 INV = 626.00
 ORIFICE -1 (16 INCH DIA.) = 624.72
 TOP OF PLATE = 630.50

PR DS-1038e, RESTRICTOR MANHOLE
 RIM = 635.40
 INV = 622.00
 ORIFICE -1 (12 INCH DIA.) = 621.18
 TOP OF PLATE = 625.60

DETENTION DATA - FOR OUTLET 19D
 TOTAL STORAGE VOLUME (100 YR) = 1.13 AC-FT
 0.97 AC-FT DETAINED IN POND-PR-19D
 0.16 AC-FT DETAINED IN STORM SEWER

DETENTION DATA - FOR OUTLET 19E
 TOTAL STORAGE VOLUME (100 YR) = 1.05 AC-FT
 0.75 AC-FT DETAINED IN POND-PR-19 E1 & POND-PR-19 E2
 0.25 AC-FT DETAINED IN STORM SEWER



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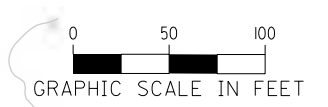
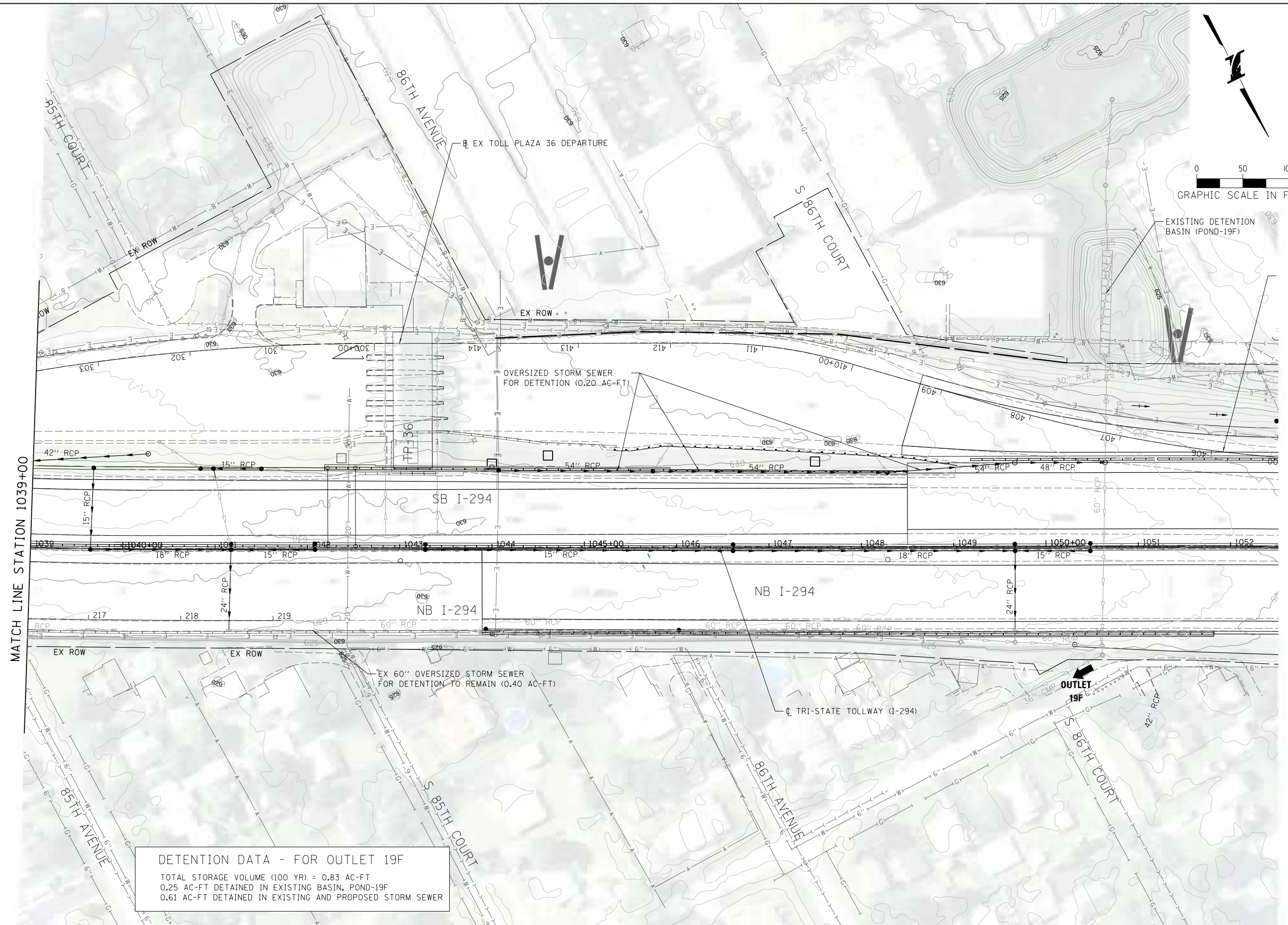
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CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASINS 19D AND 19E

SHEET NO. EXHIBIT 5.11.3
 DRAWING NO. 3 OF 14



EXISTING DETENTION BASIN (POND-19F)

MATCH LINE STATION 1039+00

DETENTION DATA - FOR OUTLET 19F
 TOTAL STORAGE VOLUME (100 YR) = 0.83 AC-FT
 0.25 AC-FT DETAINED IN EXISTING BASIN, POND-19F
 0.61 AC-FT DETAINED IN EXISTING AND PROPOSED STORM SEWER

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 CHECKED BY KS DATE 10/27/17

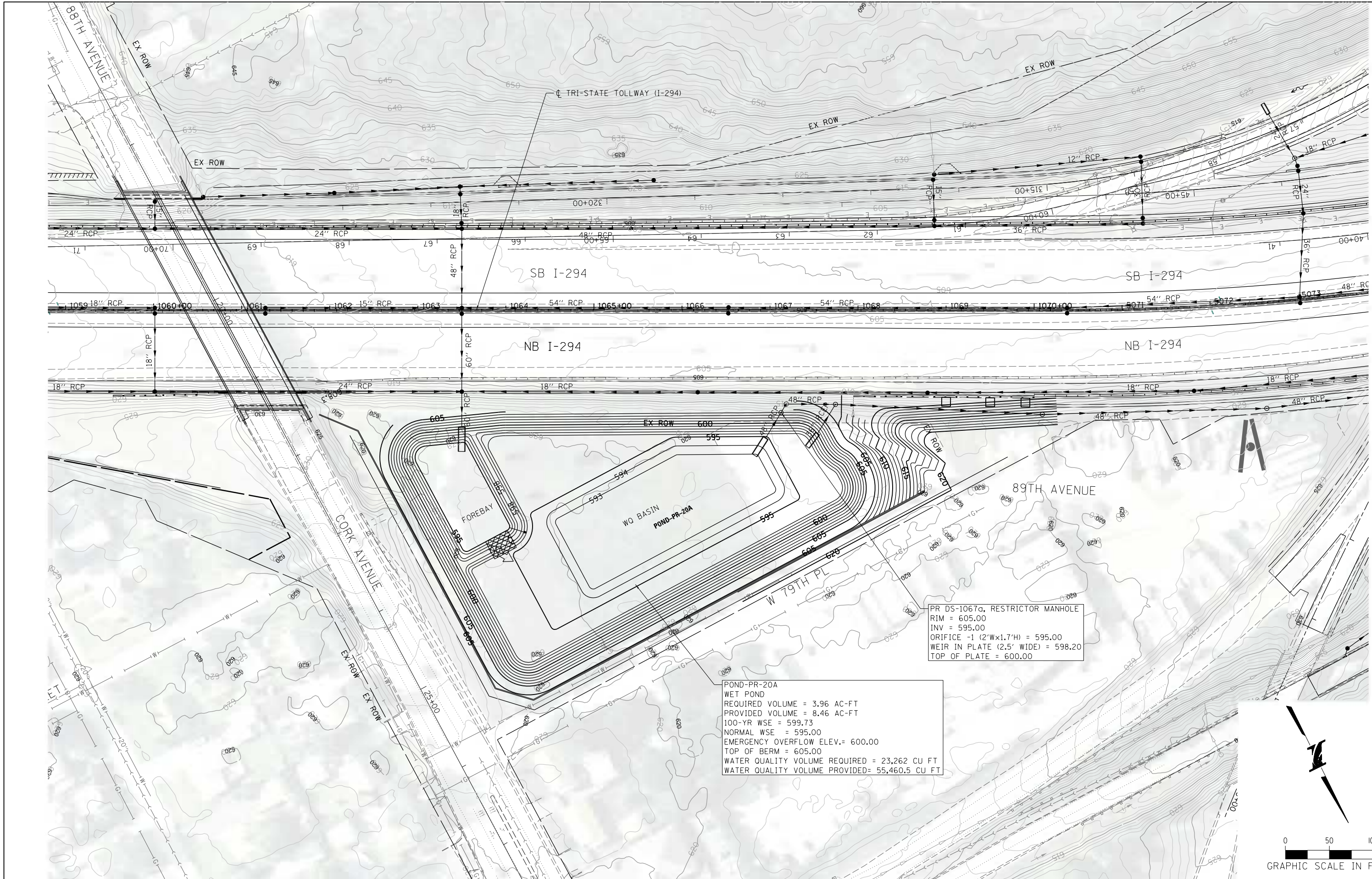
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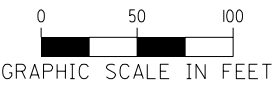
CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASINS 19F

SHEET NO.
 EXHIBIT 5.11.4
 DRAWING NO.
 4 OF 14



PR DS-1067a, RESTRICTOR MANHOLE
 RIM = 605.00
 INV = 595.00
 ORIFICE -1 (2'Wx1.7'H) = 595.00
 WEIR IN PLATE (2.5' WIDE) = 598.20
 TOP OF PLATE = 600.00

POND-PR-20A
 WET POND
 REQUIRED VOLUME = 3.96 AC-FT
 PROVIDED VOLUME = 8.46 AC-FT
 100-YR WSE = 599.73
 NORMAL WSE = 595.00
 EMERGENCY OVERFLOW ELEV.= 600.00
 TOP OF BERM = 605.00
 WATER QUALITY VOLUME REQUIRED = 23,262 CU FT
 WATER QUALITY VOLUME PROVIDED= 55,460.5 CU FT



12/22/2017
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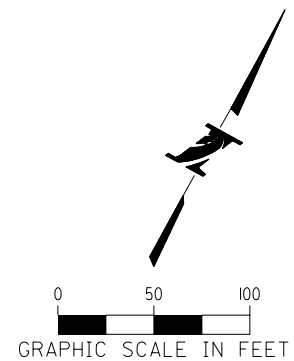
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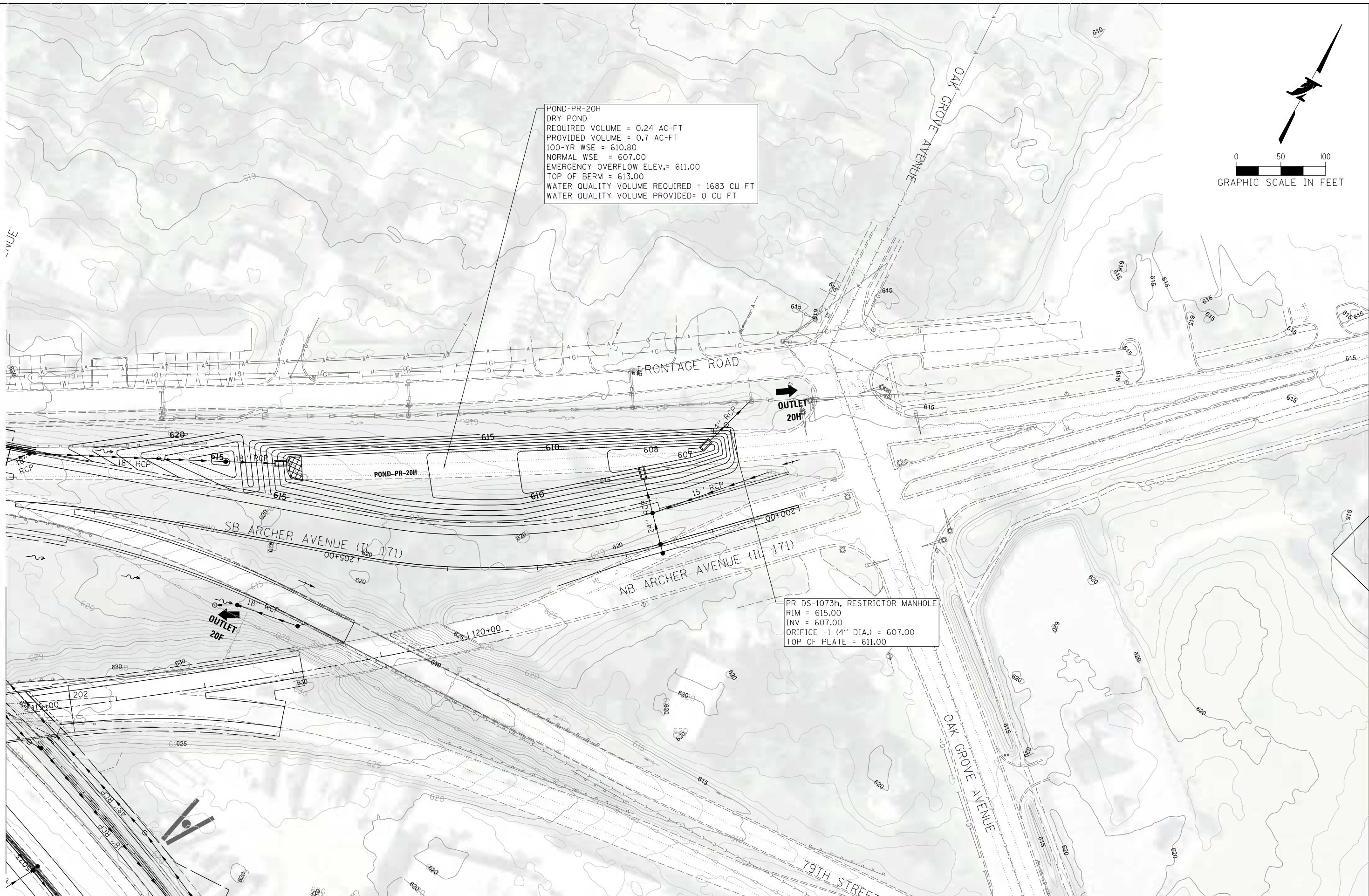
CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASIN 20A

SHEET NO.
EXHIBIT 5.11.5
 DRAWING NO.
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POND-PR-20H
 DRY POND
 REQUIRED VOLUME = 0.24 AC-FT
 PROVIDED VOLUME = 0.7 AC-FT
 100-YR WSE = 610.80
 NORMAL WSE = 607.00
 EMERGENCY OVERFLOW ELEV.= 611.00
 TOP OF BERM = 613.00
 WATER QUALITY VOLUME REQUIRED = 1683 CU FT
 WATER QUALITY VOLUME PROVIDED= 0 CU FT

PR DS-1073H, RESTRICTOR MANHOLE
 RIM = 615.00
 INV = 607.00
 ORIFICE -1 (4" DIA.) = 607.00
 TOP OF PLATE = 611.00



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CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASIN 20H

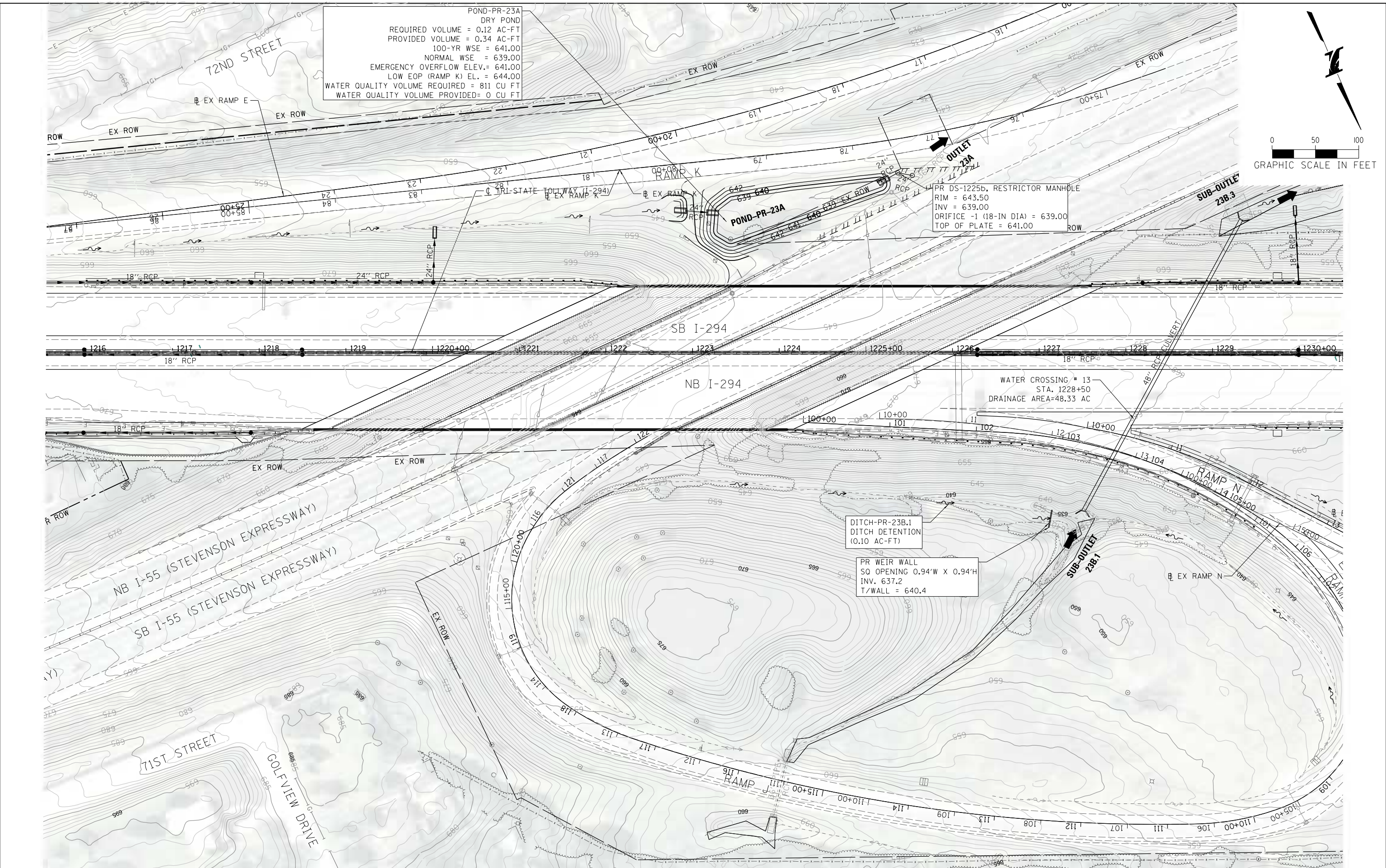
SHEET NO.
 EXHIBIT 5.11.6
 DRAWING NO.
 6 OF 14

POND-PR-23A
 DRY POND
 REQUIRED VOLUME = 0.12 AC-FT
 PROVIDED VOLUME = 0.34 AC-FT
 100-YR WSE = 641.00
 NORMAL WSE = 639.00
 EMERGENCY OVERFLOW ELEV. = 641.00
 LOW EOP (RAMP K) EL. = 644.00
 WATER QUALITY VOLUME REQUIRED = 811 CU FT
 WATER QUALITY VOLUME PROVIDED = 0 CU FT

PR DS-1225B, RESTRICTOR MANHOLE
 RIM = 643.50
 INV = 639.00
 ORIFICE -1 (18-IN DIA) = 639.00
 TOP OF PLATE = 641.00

DITCH-PR-23B.1
 DITCH DETENTION
 (0.10 AC-FT)

PR WEIR WALL
 SQ OPENING 0.94'W X 0.94'H
 INV. 637.2
 T/WALL = 640.4



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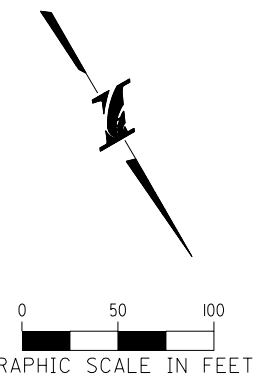
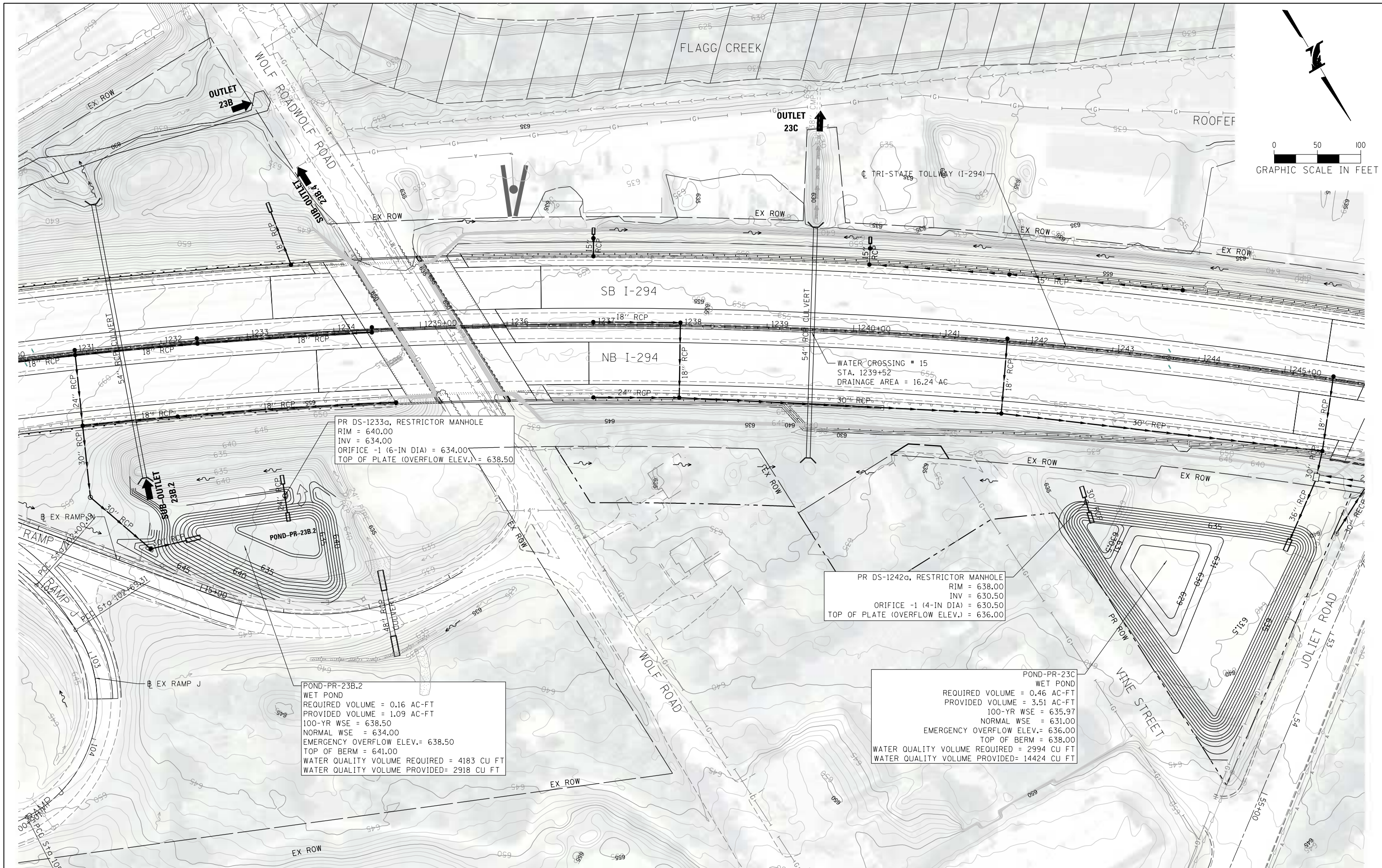
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REVISIONS		DESCRIPTION
NO.	DATE	

CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASIN 23A

SHEET NO. 5.11.7
 DRAWING NO. 7 OF 14



PR DS-1233a, RESTRICTOR MANHOLE
 RIM = 640.00
 INV = 634.00
 ORIFICE -1 (6-IN DIA) = 634.00
 TOP OF PLATE (OVERFLOW ELEV.) = 638.50

PR DS-1242a, RESTRICTOR MANHOLE
 RIM = 638.00
 INV = 630.50
 ORIFICE -1 (4-IN DIA) = 630.50
 TOP OF PLATE (OVERFLOW ELEV.) = 636.00

POND-PR-23B.2
 WET POND
 REQUIRED VOLUME = 0.16 AC-FT
 PROVIDED VOLUME = 1.09 AC-FT
 100-YR WSE = 638.50
 NORMAL WSE = 634.00
 EMERGENCY OVERFLOW ELEV. = 638.50
 TOP OF BERM = 641.00
 WATER QUALITY VOLUME REQUIRED = 4183 CU FT
 WATER QUALITY VOLUME PROVIDED = 2918 CU FT

POND-PR-23C
 WET POND
 REQUIRED VOLUME = 0.46 AC-FT
 PROVIDED VOLUME = 3.51 AC-FT
 100-YR WSE = 635.97
 NORMAL WSE = 631.00
 EMERGENCY OVERFLOW ELEV. = 636.00
 TOP OF BERM = 638.00
 WATER QUALITY VOLUME REQUIRED = 2994 CU FT
 WATER QUALITY VOLUME PROVIDED = 14424 CU FT

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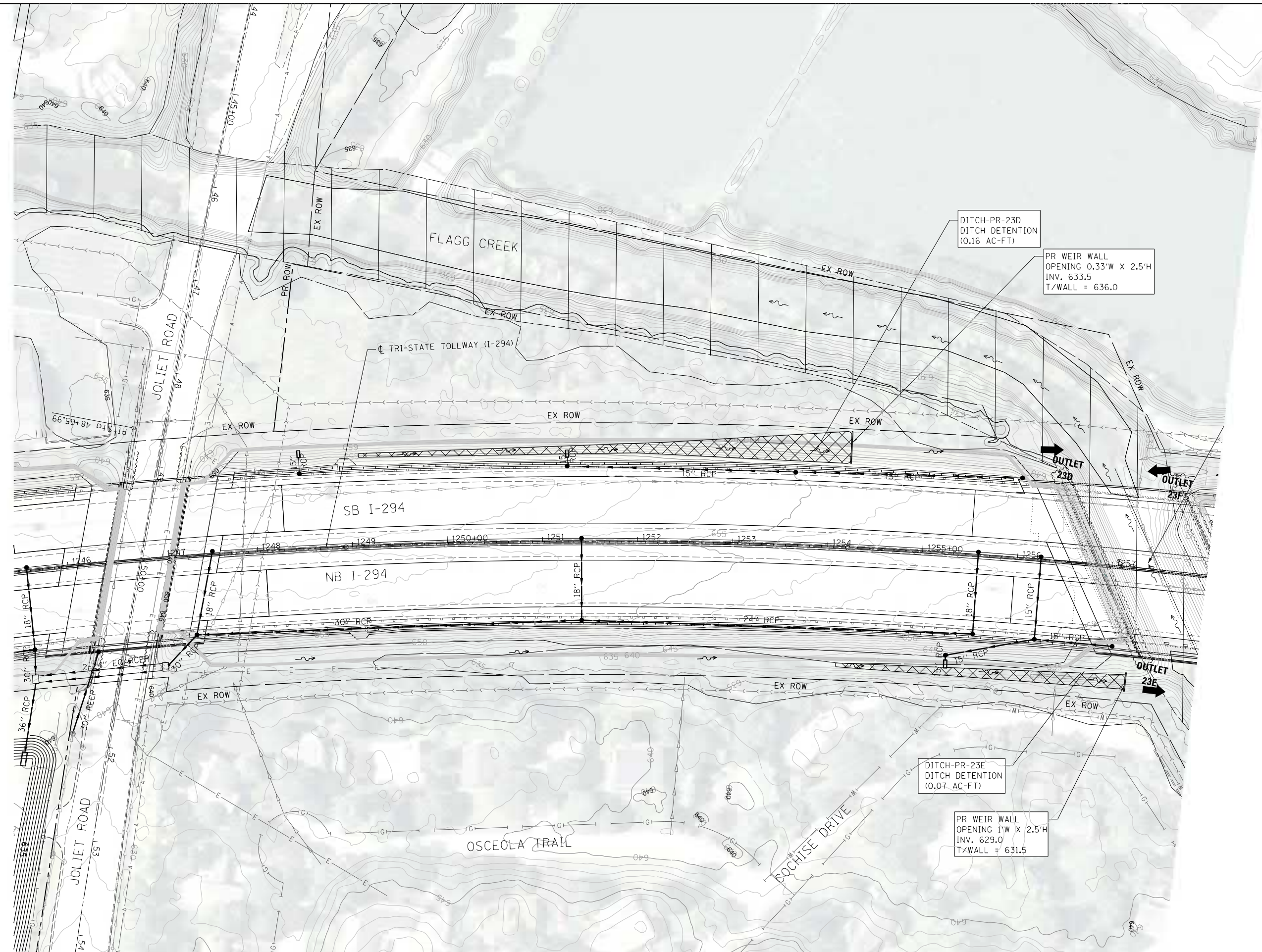
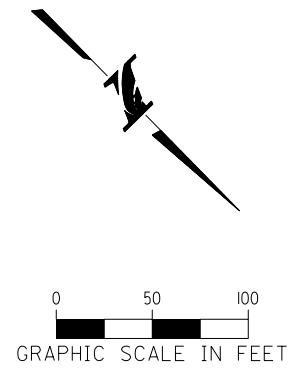
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REVISIONS		DESCRIPTION
NO.	DATE	

CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASINS 23B AND 23C

SHEET NO.
 EXHIBIT 5.11.8
 DRAWING NO.
 8 OF 14



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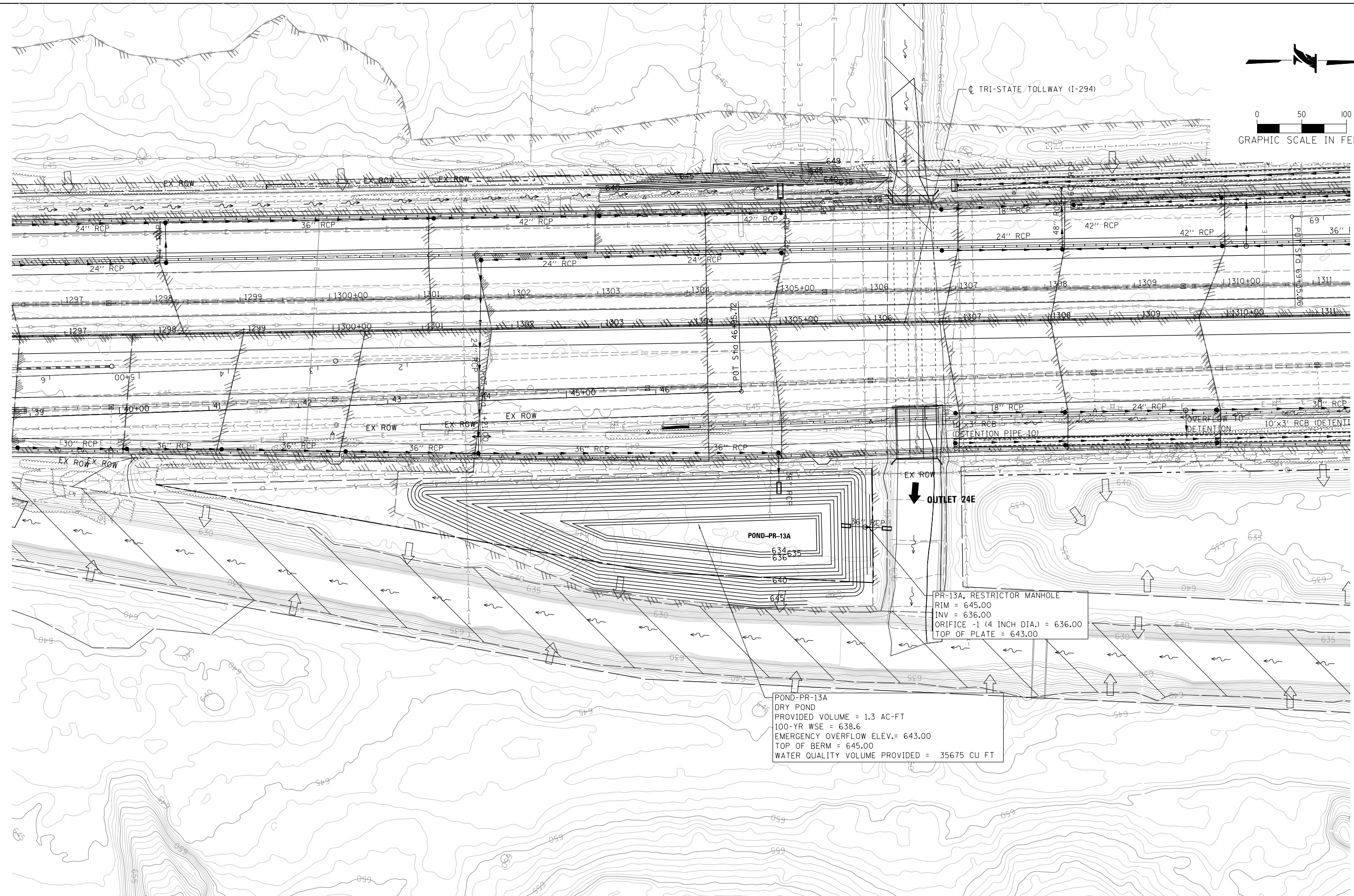
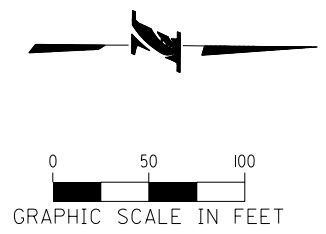
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REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASINS 23D AND 23E

SHEET NO.
 EXHIBIT 5.11.9
 DRAWING NO.
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 JWC

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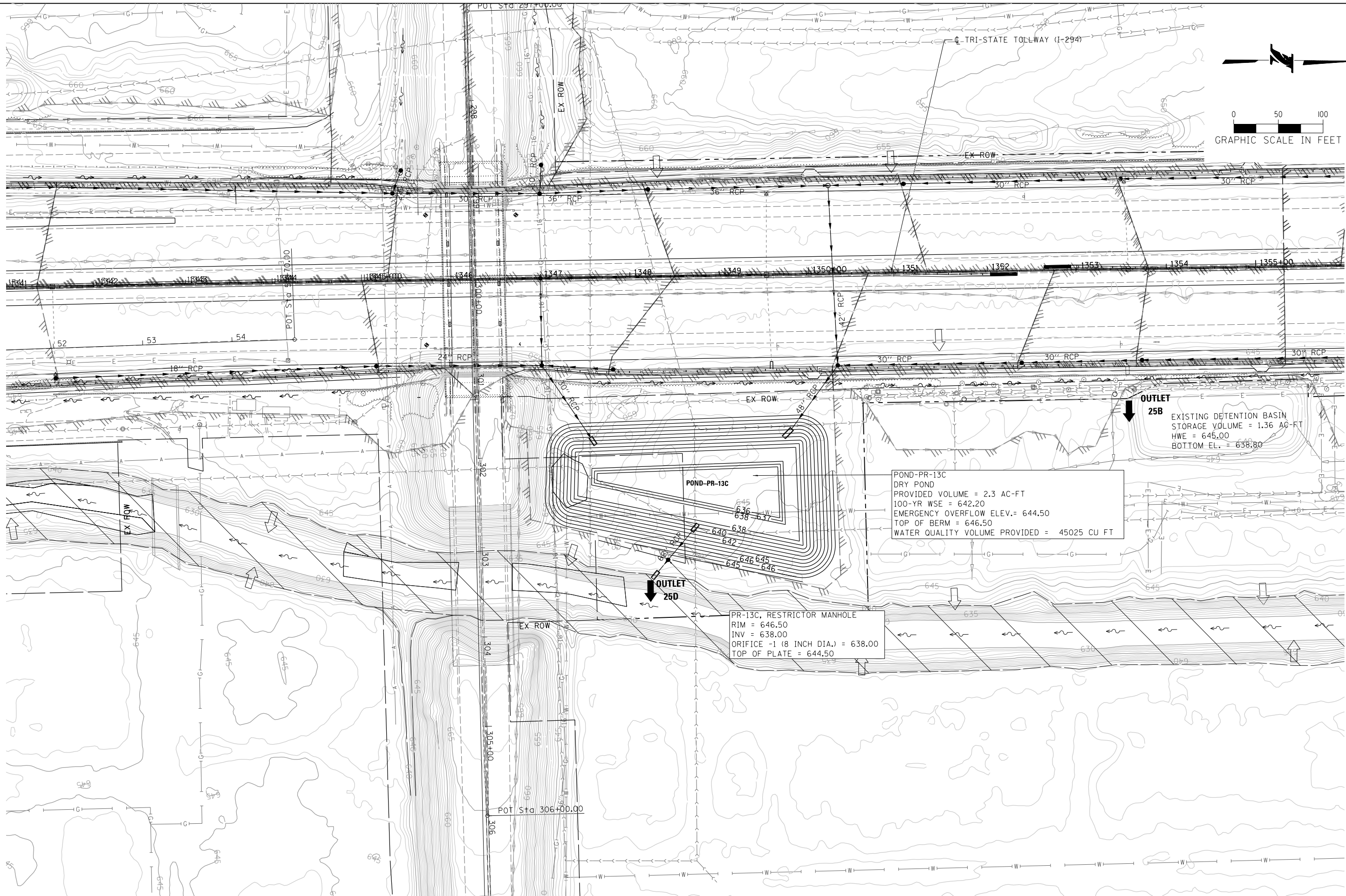
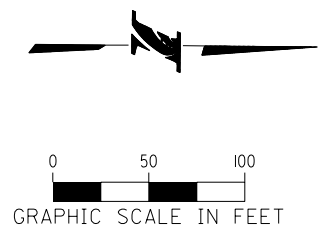


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NO.	DATE	REVISIONS	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASIN 13A

SHEET NO. 5.11.10
 DRAWING NO. 10 OF 14



POND-PR-13C
 DRY POND
 PROVIDED VOLUME = 2.3 AC-FT
 100-YR WSE = 642.20
 EMERGENCY OVERFLOW ELEV. = 644.50
 TOP OF BERM = 646.50
 WATER QUALITY VOLUME PROVIDED = 45025 CU FT

OUTLET 25B
 EXISTING DETENTION BASIN
 STORAGE VOLUME = 1.36 AC-FT
 HWE = 645.00
 BOTTOM EL. = 638.80

PR-13C, RESTRICTOR MANHOLE
 RIM = 646.50
 INV = 638.00
 ORIFICE -1 (8 INCH DIA.) = 638.00
 TOP OF PLATE = 644.50

OUTLET 25D

12/22/2017
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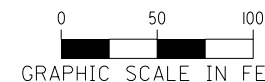


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NO.		REVISIONS	
NO.	DATE	DESCRIPTION	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASIN 13C

SHEET NO. EXHIBIT 5.11.11
 DRAWING NO. 11 OF 14



PR-13D, RESTRICTOR MANHOLE
 RIM = 647.00
 INV = 639.00
 ORIFICE -1 (4 INCH DIA.) = 639.00
 TOP OF PLATE = 645.00

POND-PR-13D
 DRY POND
 PROVIDED VOLUME = 1.1 AC-FT
 100-YR WSE = 644.30
 EMERGENCY OVERTFLOW ELEV.= 645.00
 TOP OF BERM = 647.00
 WATER QUALITY VOLUME PROVIDED = 14416 CU FT

POND-PR-13E
 DRY POND
 PROVIDED VOLUME = 0.2 AC-FT
 100-YR WSE = 642.2
 EMERGENCY OVERTFLOW ELEV.= 644.00
 TOP OF BERM = 645.00

PR-13E, RESTRICTOR MANHOLE
 RIM = 645.00
 INV = 641.00
 ORIFICE -1 (4 INCH DIA.) = 641.00
 TOP OF PLATE = 644.00

12/22/2017
 C:\Users\jwong\Documents\Projects\RR-14-4223\Drawings\PR-13D.dwg
 JWC

DRAWN BY MLR SCALE 1"=50'
 CHECKED BY JWC DATE 10/27/17

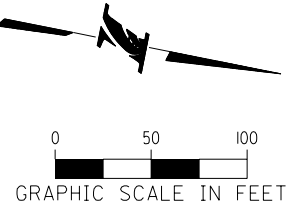


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

NO.	DATE	REVISIONS	DESCRIPTION

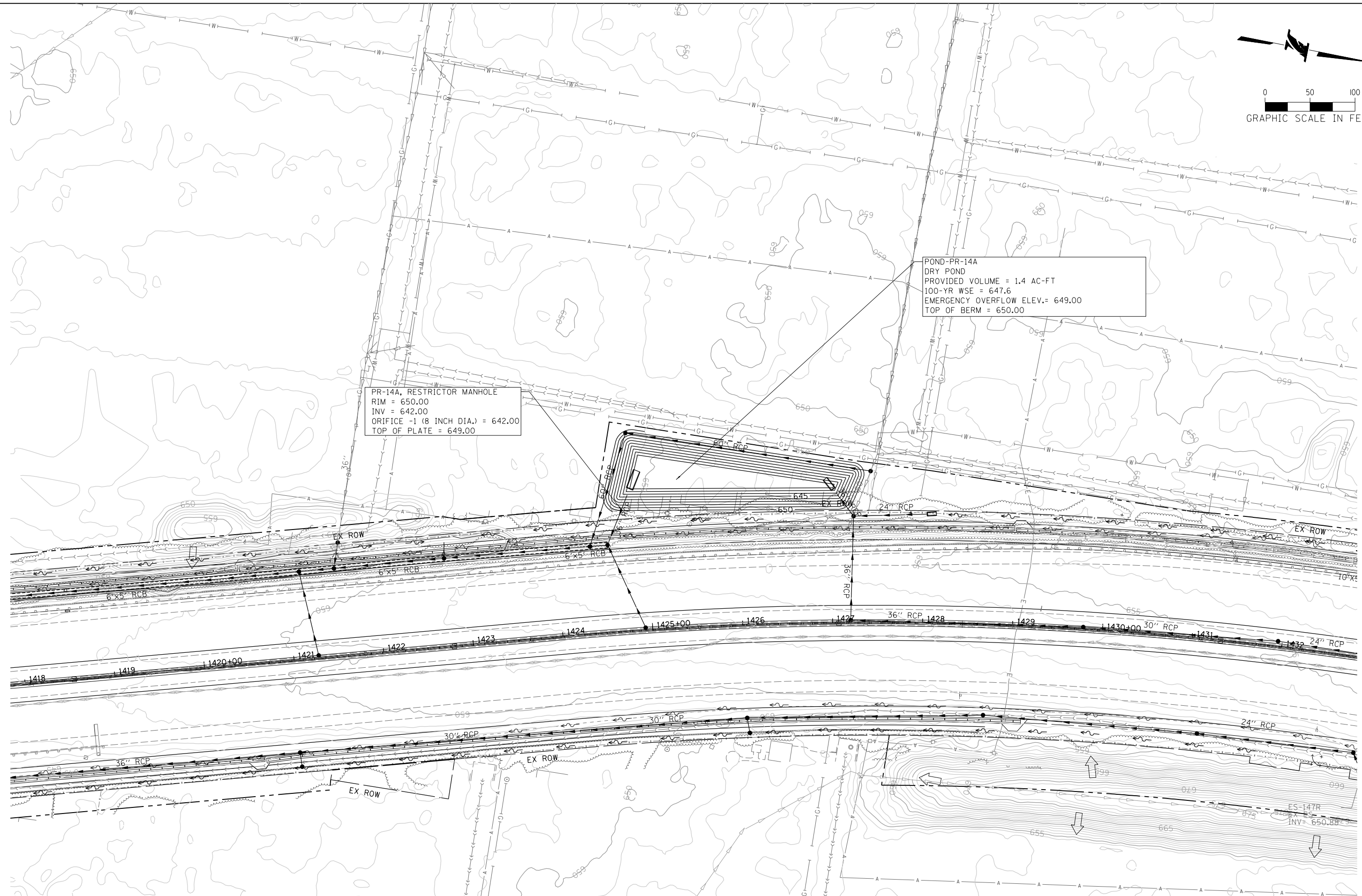
CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASINS 13D AND 13E

SHEET NO.
 EXHIBIT 5.11.12
 DRAWING NO.
 12 OF 14



POND-PR-14A
 DRY POND
 PROVIDED VOLUME = 1.4 AC-FT
 100-YR WSE = 647.6
 EMERGENCY OVERFLOW ELEV.= 649.00
 TOP OF BERM = 650.00

PR-14A, RESTRICTOR MANHOLE
 RIM = 650.00
 INV = 642.00
 ORIFICE -1 (8 INCH DIA.) = 642.00
 TOP OF PLATE = 649.00



12/22/2017
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 DeFault

DRAWN BY MLR SCALE 1"=50'
 CHECKED BY JWC DATE 10/27/17

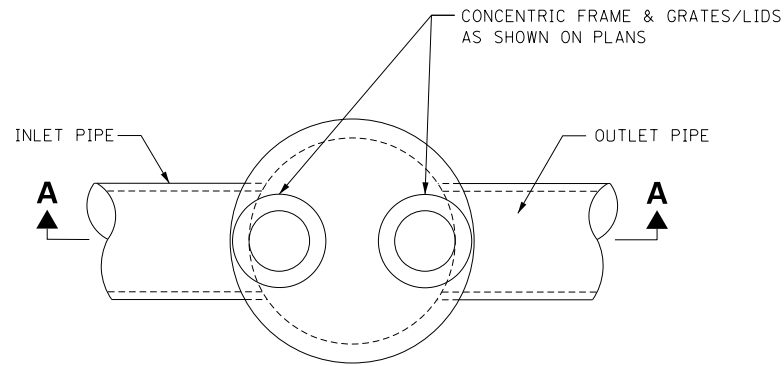


THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
 2700 OGDEN AVENUE
 DOWNERS GROVE, ILLINOIS 60515

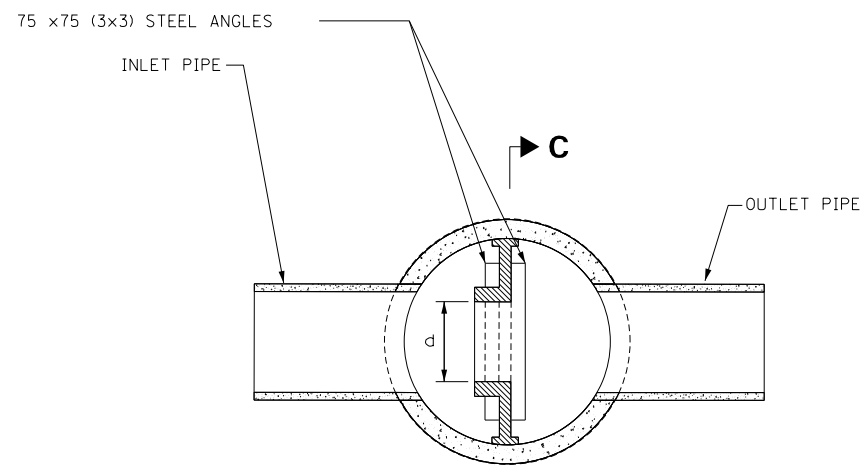
REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
 PROPOSED DETENTION BASIN 14A

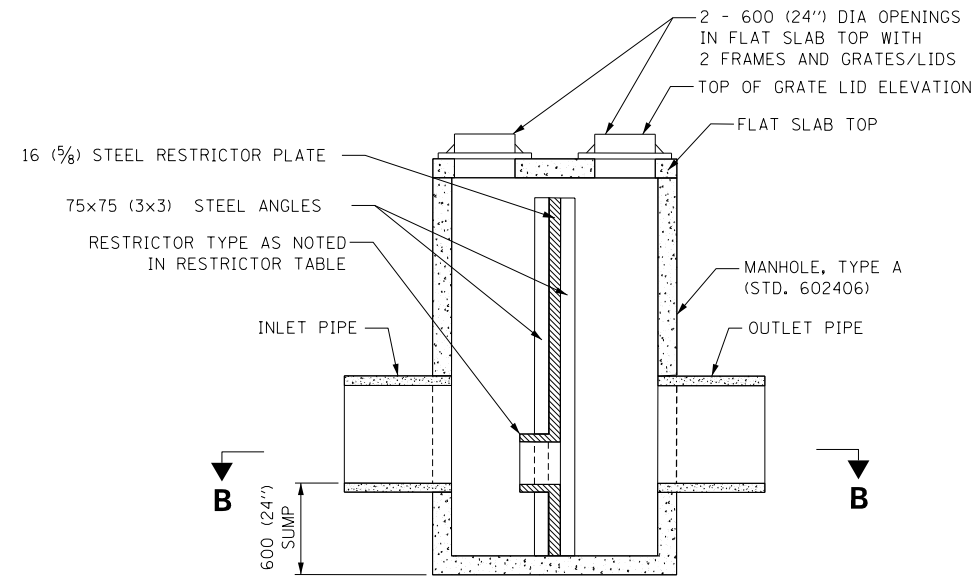
SHEET NO. 5.11.13
 DRAWING NO. 13 OF 14



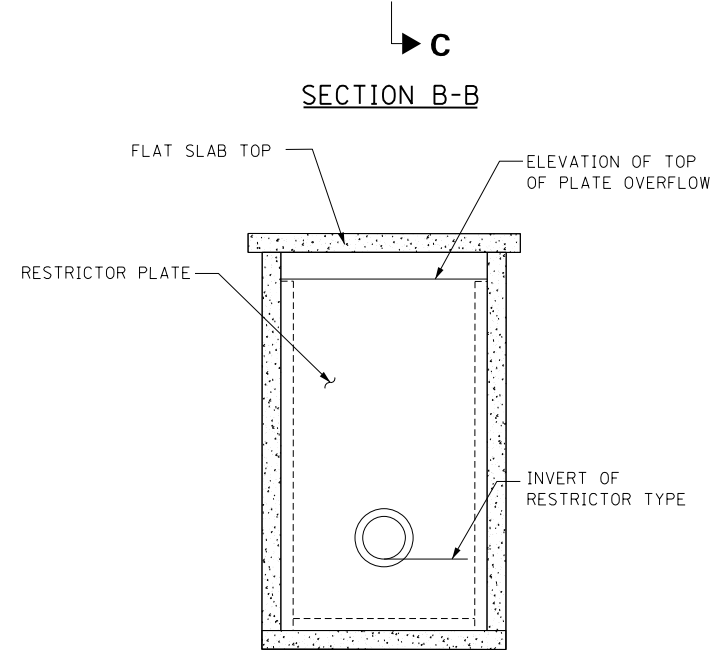
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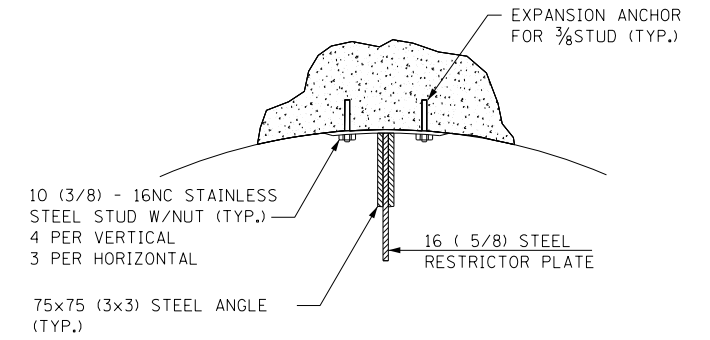
SECTION B-B



SECTION A-A



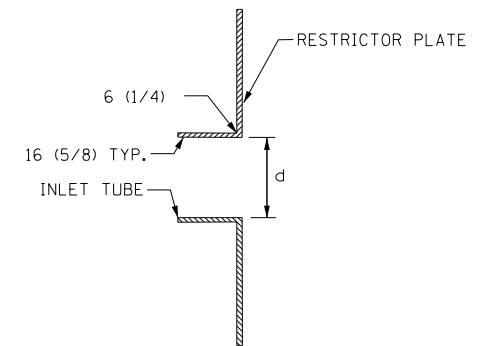
SECTION C-C



ANGLE FASTENER DETAIL

NOTES:

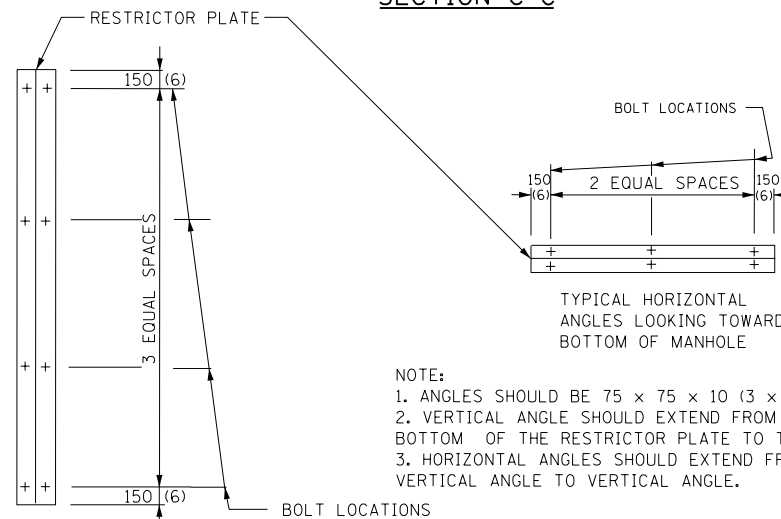
1. ALL STEEL ANGLES AND PLATES TO BE GALVANIZED AFTER FABRICATION.
2. ALL RESTRICTOR PLATES, ANGLES AND HARDWARE TO BE INCLUDED IN THE COST OF THE MANHOLE.
3. BASIS OF PAYMENT: "MANHOLES, TYPE A, 6'-DIAMETER, WITH 2 TYPE 1 FRAME, CLOSED LID, RESTRICTOR PLATE EACH.



INLET TUBE DETAIL

MANHOLE WITH RESTRICTOR PLATE
N.T.S.

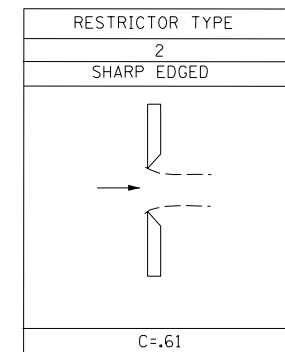
STR. ID	STATION OFFSET	MANHOLE DIAMETER (feet)	FRAME AND GRATE	RESTRICTOR TYPE	INSIDE RESTRICTOR TYPE DIA (inch)	INVERT OF RESTRICTOR TYPE	ELEVATION OF TOP OF PLATE OVERFLOW	100-YR WSE
DS-9511	951+00 RT	6	T1FCL	TYPE 2	4	613.00	616.00	616.00
DS-1006d	1006+46 RT	6	T1FCL	TYPE 2	12	621.50	627.00	627.00
DS-1029a	1029+45 LT	6	T1FCL	TYPE 2	16	624.72	630.50	631.50
DS-1038e	1038+58 RT	6	T1FCL	TYPE 2	12	621.18	625.60	626.26
DS-1067a	1067+13 RT	6	T1FCL	TYPE 2	24x20.4	595.00	600.00	599.73
DS-1073h	200+50 RT	6	T1FCL	TYPE 2	4	607.00	611.00	610.80
DS-1225b	1225+37 LT	6	T1FCL	TYPE 2	18	639.00	641.00	641.00
DS-1233a	1233+31 RT	6	T1FCL	TYPE 2	6	634.00	638.50	638.50
DS-1242a	1242+87 RT	6	T1FCL	TYPE 2	4	630.50	636.00	635.97
PR-13A	1303+62 RT	6	TYPE 1		4	641.00	643.00	642.74
PR-13C	1348+37 RT	6	TYPE 1		4	641.50	644.50	644.50
PR-13D	1378+79 RT	6	TYPE 1		4	642.00	645.00	645.00



TYP. VERTICAL ANGLES
LOOKING TOWARD MANHOLE WALL

STEEL ANGLE BOLTING DETAILS

- NOTE:
1. ANGLES SHOULD BE 75 x 75 x 10 (3 x 3 x 3/8).
 2. VERTICAL ANGLE SHOULD EXTEND FROM THE BOTTOM OF THE RESTRICTOR PLATE TO THE TOP.
 3. HORIZONTAL ANGLES SHOULD EXTEND FROM VERTICAL ANGLE TO VERTICAL ANGLE.



ALL DIMENSIONS ARE IN MILLIMETERS (INCHES)
UNLESS OTHERWISE SHOWN

12/22/2017 12:22:2017 C:\Users\jguy\Documents\Projects\14223-shr-DrainR-Control-Structure.dgn

DRAWN BY SB SCALE
CHECKED BY KS DATE 10/27/17

exp. U.S. Services Inc.
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BUILDINGS • EARTH & ENVIRONMENT • ENERGY
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THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
2700 OGDEN AVENUE
DOWNERS GROVE, ILLINOIS 60515

REVISIONS		
NO.	DATE	DESCRIPTION

CONTRACT NO. RR-14-4223
CONTROL STRUCTURE SCHEMATICS

SHEET NO.
EXHIBIT 5.11.14
DRAWING NO.
14 OF 14