

- EXISTING**
- SET IRON W/CAP43058
  - FOUND IRON/PIPE/MON/NAIL
  - SECTION CORNER
  - EASEMENTS
  - SURVEYORS NOTES
  - BENCHMARK
  - SANITARY DRAIN, MANHOLE
  - STORM DRAIN, MANHOLE
  - CATCH BASIN SQUARE, ROUND, END SECTION
  - WATERMAIN, HYDRANT, GATE VALVE
  - WATER SHUT-OFF, WATER METER
  - COMBINED SEWER & MANHOLE
  - UNKNOWN MANHOLE
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  - PUB. LIGHTING DEPT. MANHOLE
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  - TV U/G LINE, PEDESTAL
  - DECIDUOUS TREE
  - CONIFEROUS TREE
  - SHRUB
  - TREE LINE
  - FENCE
  - WALL
- PROPOSED**
- STORM DRAIN, CATCH BASIN
  - STORM DRAIN STRUCTURE NUMBER
  - 640.40 GRADES
  - DRAIN WATER FLOW
  - ASPHALT PAVEMENT

**BENCHMARKS**

- BM 1 Arrow on hydrant located at Southeast corner of Campbell & Lincoln Elev=643.71'
- BM 2 Arrow on hydrant located at Southeast corner of Campbell & Harwood Elev=643.42'

EASEMENT DOCUMENTS PROVIDED BY THE CLIENT  
NO TITLE SEARCH WAS PERFORMED

1. Telephone and electric line 10 feet wide easement; L2874, P296.

**SHEET INDEX**

- 1) TOPOGRAPHIC SURVEY & DEMO PLAN
- 2) GENERAL PLAN
- 3) GRADING & PAVING PLAN
- 4) UTILITY PLAN

**LEGAL DESCRIPTIONS**

**Parcel 63-72-25-23-301-019**  
Lots 61 & 62, also 1/2 of Vacated Alleys adjacent to same, "Lincoln-Campbell Sub'd.", of NW 1/4 of NW 1/4 of SW 1/4 of Section 23, T1N, R11E, Oakland County, Michigan, as recorded in Liber 32 of Plats, Page 31, Oakland County Records.

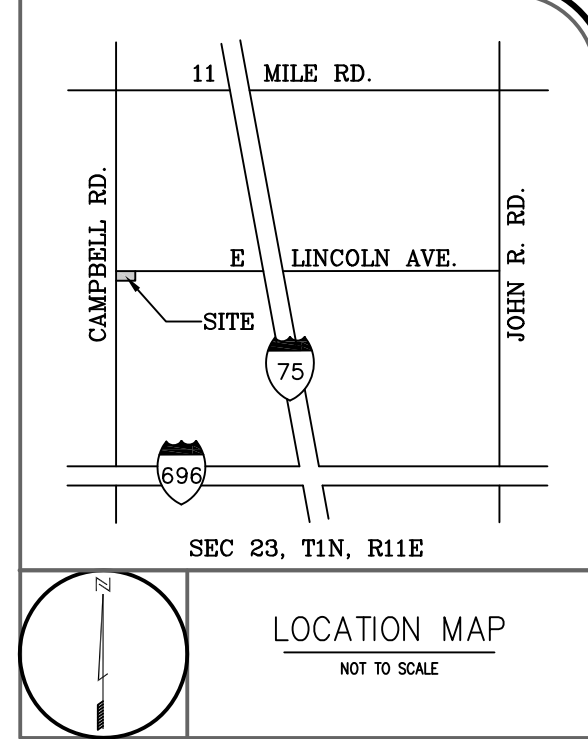
**Parcel 63-72-25-23-301-034**  
Lots 16-30, also all of Vacated Alley adjacent to Lots 20-25, also 1/2 of Vacated Alleys adjacent to Lots 16-20 and Lots 26-30, "Lincoln-Campbell Sub'd.", of NW 1/4 of NW 1/4 of SW 1/4 of Section 23, T1N, R11E, Oakland County, Michigan, as recorded in Liber 32 of Plats, Page 31, Oakland County Records.

**COMBINED PARCEL**

Lots 16-30, 61 & 62, also all of Vacated Alleys adjacent to said Lots, "Lincoln-Campbell Sub'd.", of NW 1/4 of NW 1/4 of SW 1/4 of Section 23, T1N, R11E, Oakland County, Michigan, as recorded in Liber 32 of Plats, Page 31, Oakland County Records.

**NOTE**

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**MICHIGAN SURVEYING, INC.**  
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37637 Five Mile Rd., Ste 364, Livonia, MI 48154  
ph 734-542-9088, fx 734-943-6831  
info@mi-survey.com www.mi-survey.com

**SITE ENGINEERING PLANS**  
**PARKING ADDITION**  
SW 1/4 SEC. 23, T1N, R11E,  
ROYAL OAK, OAKLAND CO., MI

REVISIONS	
DATE	REMARKS
10/20/08	PER CITY
02/12/09	PER CLIENT

DISTRIBUTION	
<input type="radio"/>	PRELIMINARY
<input type="radio"/>	APPROVAL
<input checked="" type="radio"/>	CONSTRUCTION
<input type="radio"/>	AS-BUILT

SEAL	
DATE:	09/15/08
DESIGNED BY:	JR
CHECKED BY:	DK

CLIENT	
PROJECT NAME	

PROJECT NUMBER	08-127
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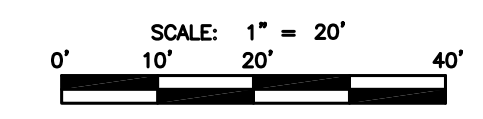
DRAWING SCALE	1"=20'
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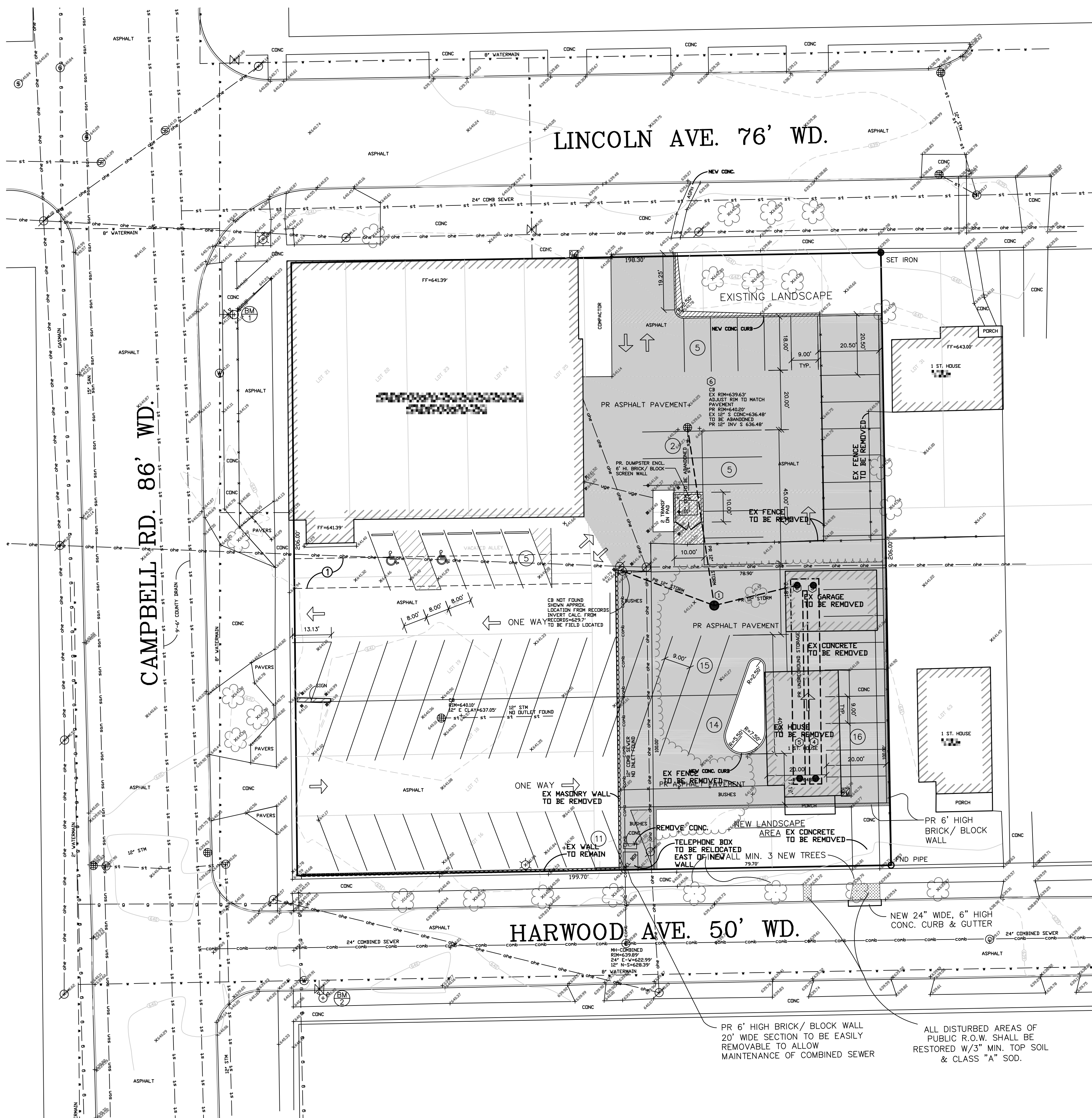
SHEET NAME	TOPO & DEMO PLAN
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SHEET NUMBER	1
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**PRIOR TO COMMENCING ANY WORK:**

- a. A CURB CUT PERMIT SHALL BE SECURED FROM THE CITY OF ROYAL OAK ENGINEERING DEPARTMENT.
- b. A PRIVATE PROPERTY PAVING PERMIT SHALL BE OBTAINED FROM THE CITY OF ROYAL OAK ENGINEERING DEPARTMENT.



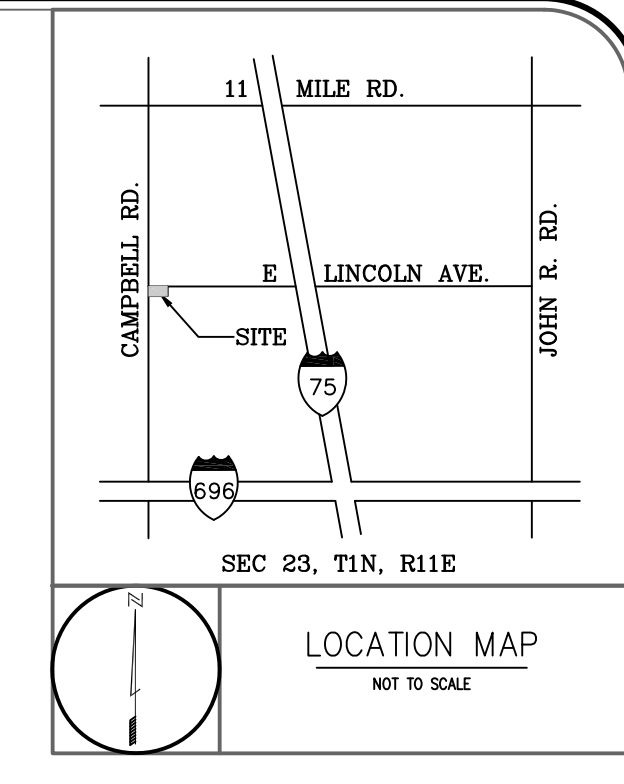


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- BENCHMARKS**
- Arrow on hydrant located at Southeast corner of Campbell & Lincoln Elev=643.71'
  - Arrow on hydrant located at Southeast corner of Campbell & Harwood Elev=643.42'

- PROPOSED**
- STORM DRAIN, CATCH BASIN
  - STORM DRAIN STRUCTURE NUMBER
  - GRADES
  - DRAIN WATER FLOW
  - ASPHALT PAVEMENT

**SITE DATA**  
ZONED: MIXED USE TWO



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**SITE ENGINEERING PLANS**  
**PARKING ADDITION**  
SW 1/4 SEC. 23, T1N, R11E,  
ROYAL OAK, OAKLAND CO., MI

REVISIONS	
DATE	REMARKS
10/20/08	PER CITY
02/12/09	PER CLIENT

- DISTRIBUTION**
- PRELIMINARY
  - APPROVAL
  - CONSTRUCTION
  - AS-BUILT

**SEAL**

DATE:	09/15/08
DESIGNED BY:	JR
CHECKED BY:	DK

**CLIENT**  
[Logo]

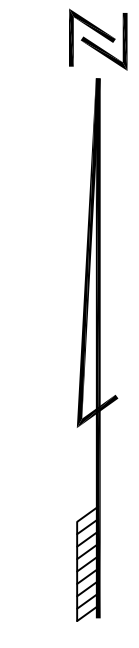
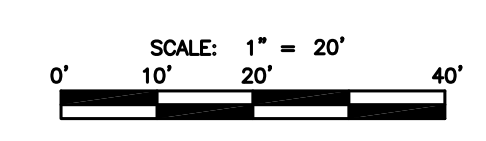
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[Logo]

**PROJECT NUMBER**  
08-127

**DRAWING SCALE**  
1"=20'

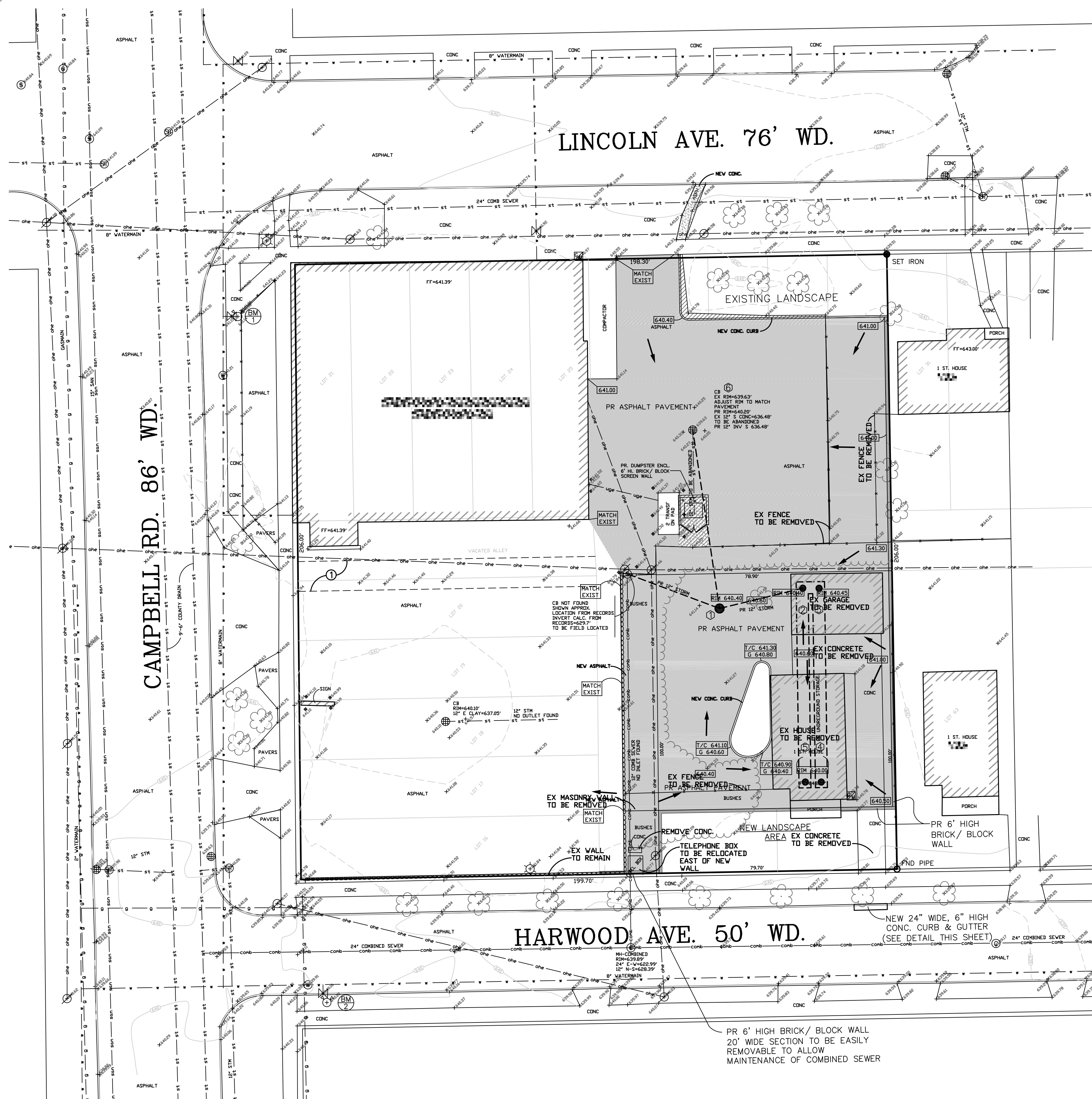
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GENERAL PLAN

**SHEET NUMBER**  
2

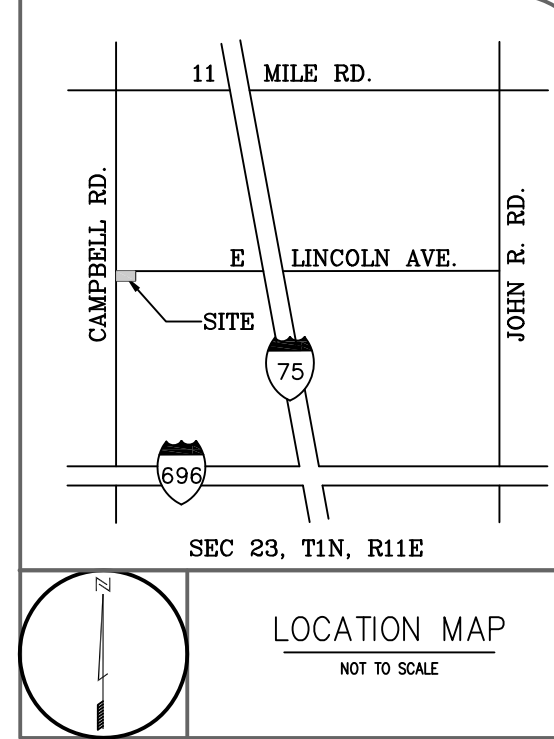


**NOTE**  
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  - WALL
- PROPOSED**
- STORM DRAIN, CATCH BASIN
  - STORM DRAIN STRUCTURE NUMBER (5 TOTAL)
  - 646.40 GRADES
  - DRAIN WATER FLOW
  - ASPHALT PAVEMENT



- BENCHMARKS**
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●	CONSTRUCTION
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SEAL

DATE:	DESIGNED BY:	CHECKED BY:
09/15/08	JR	DK

CLIENT

PROJECT NAME

PROJECT NUMBER  
08-127

DRAWING SCALE  
1"=20'

SHEET NAME  
GRADING & PAVING PLAN

SHEET NUMBER  
3

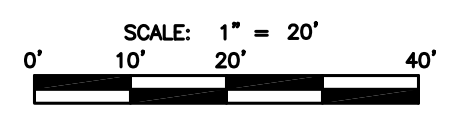
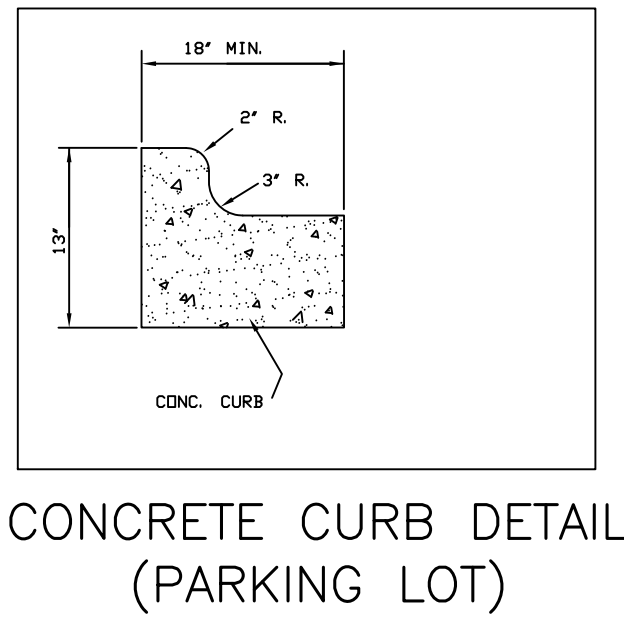
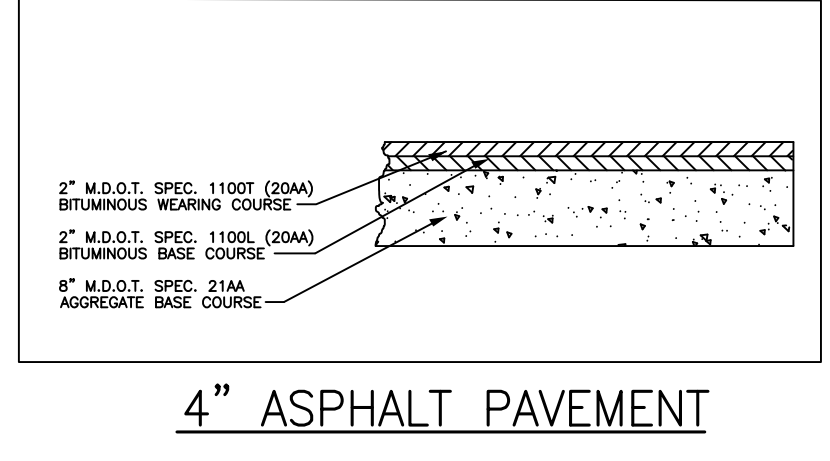
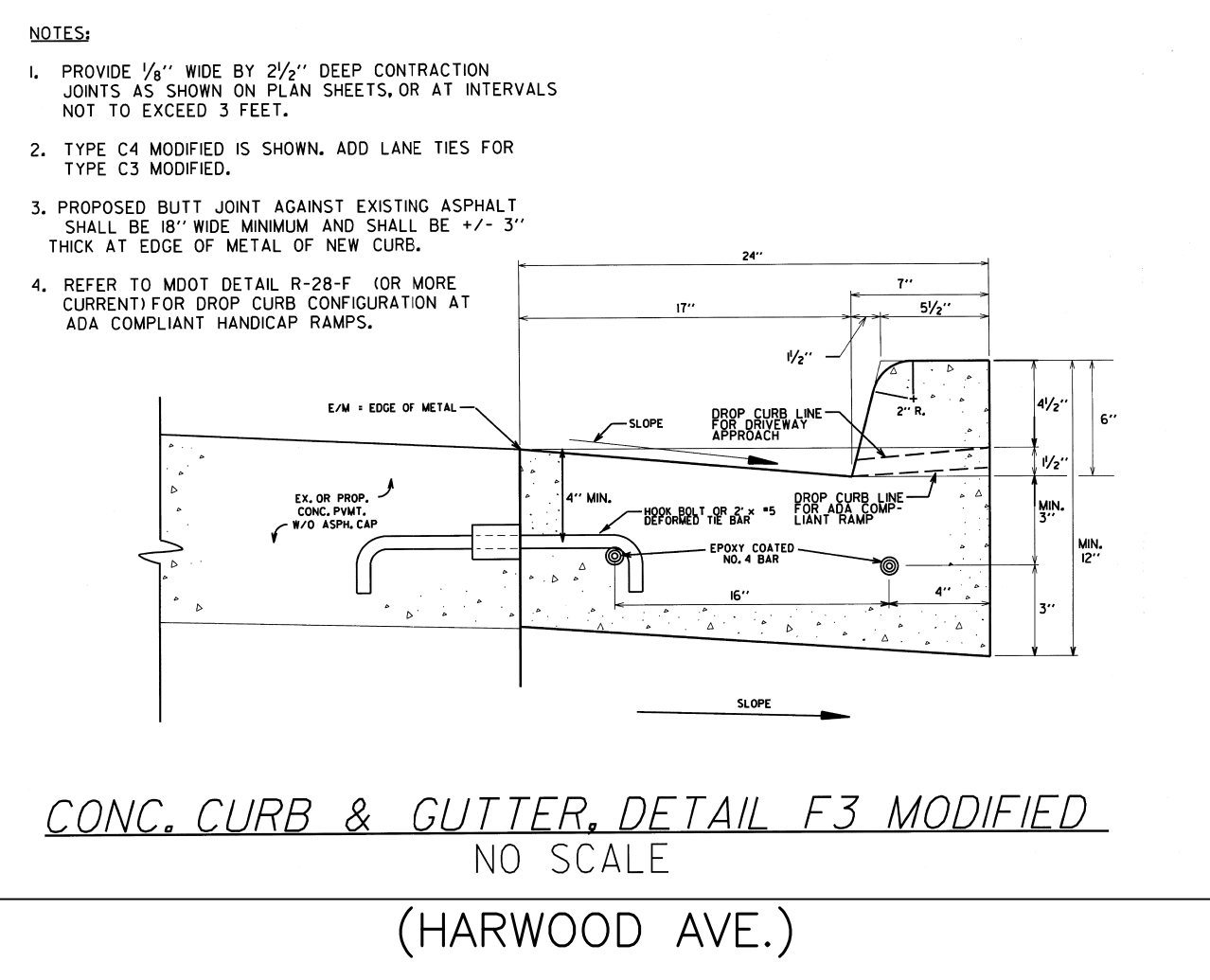
**QUANTITY ESTIMATE**

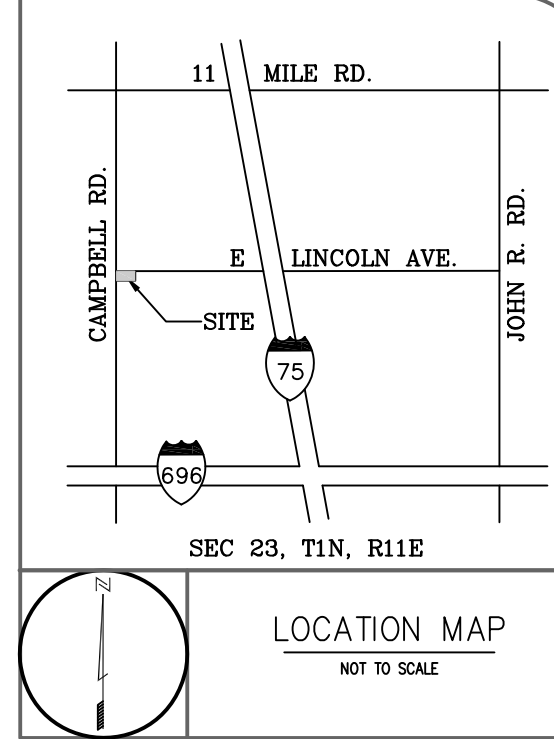
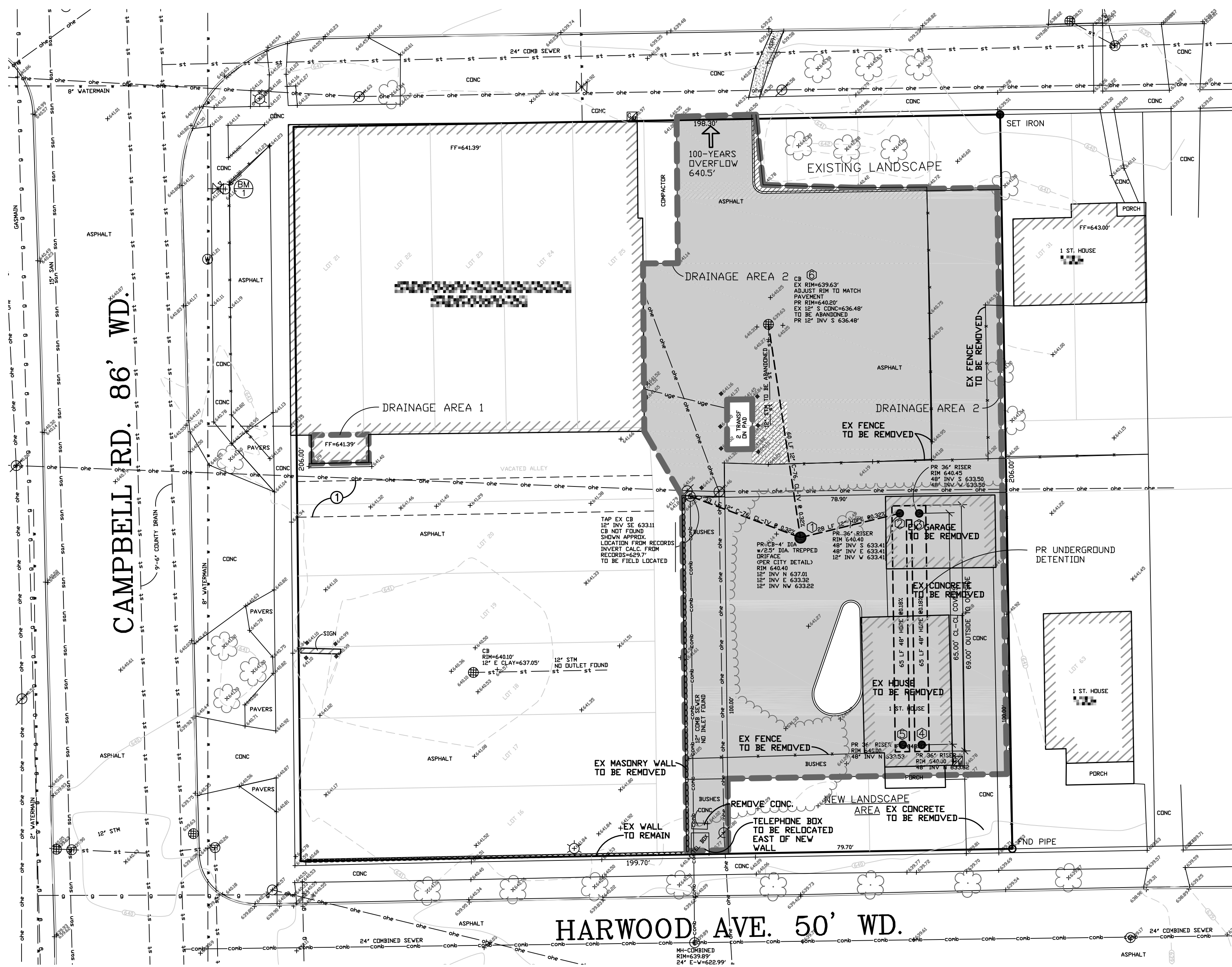
- 4" ASPHALT PAVEMENT ON 6" 21AA AGGREGATE BASE 1,702 S.Y.
- 6" CONCRETE CURB 170 L.F.
- 6" CONCRETE CURB & GUTTER 10 L.F.

**NOTE:**  
 CONTRACTOR SHALL CALCULATE HIS OWN QUANTITIES FOR ALL ITEMS OF WORK WHETHER OR NOT INDICATED ON THESE PLANS. THE OWNER OR ENGINEER IS NOT RESPONSIBLE FOR ANY DIFFERENCES IN QUANTITIES.

**NOTE:**  
 THE DEVELOPER IS RESPONSIBLE FOR RESOLVING ANY DRAINAGE PROBLEMS ON ADJACENT PROPERTIES WHICH ARE A RESULT OF THE DEVELOPER'S ACTIVITIES.

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- FENCE
- WALL

- PROPOSED**
- STORM DRAIN, CATCH BASIN
  - STORM DRAIN STRUCTURE NUMBER (S)
  - GRADES
  - DRAIN WATER FLOW
  - ASPHALT PAVEMENT

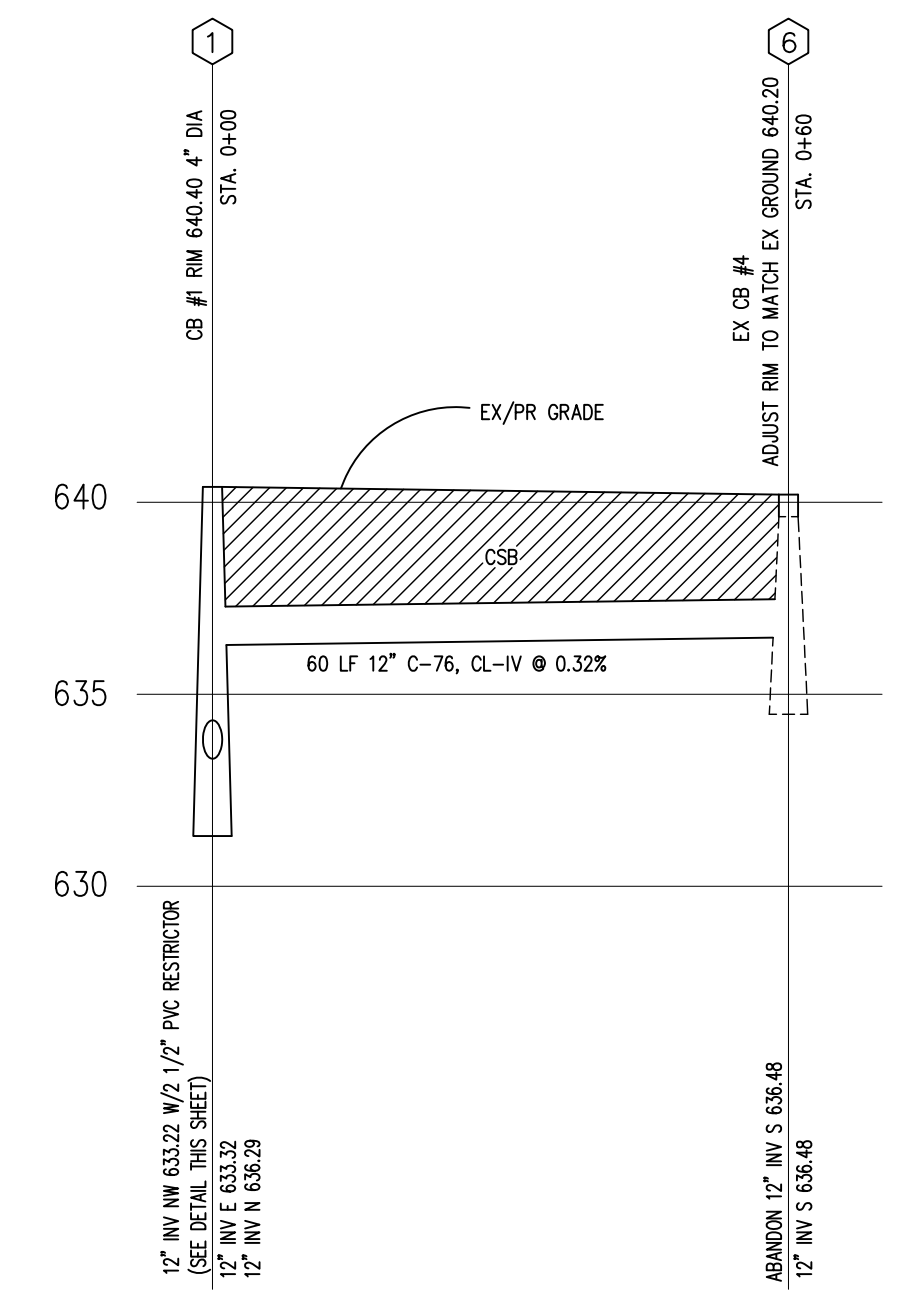
**QUANTITY ESTIMATE**

- 4' DIA. CATCH BASIN W/MODIFIED RESTRICTED TRAP 1 EA.
- 3' DIA. RISER W SOLID COVER 4 EA.
- 12" C-76, CL-IV 93 LF
- 12" HDPE 28 LF
- 48" HDPE 130 LF
- 48"x48" TEE W/36" RISER 2 EA.
- 48"x36" TEE 2 EA.

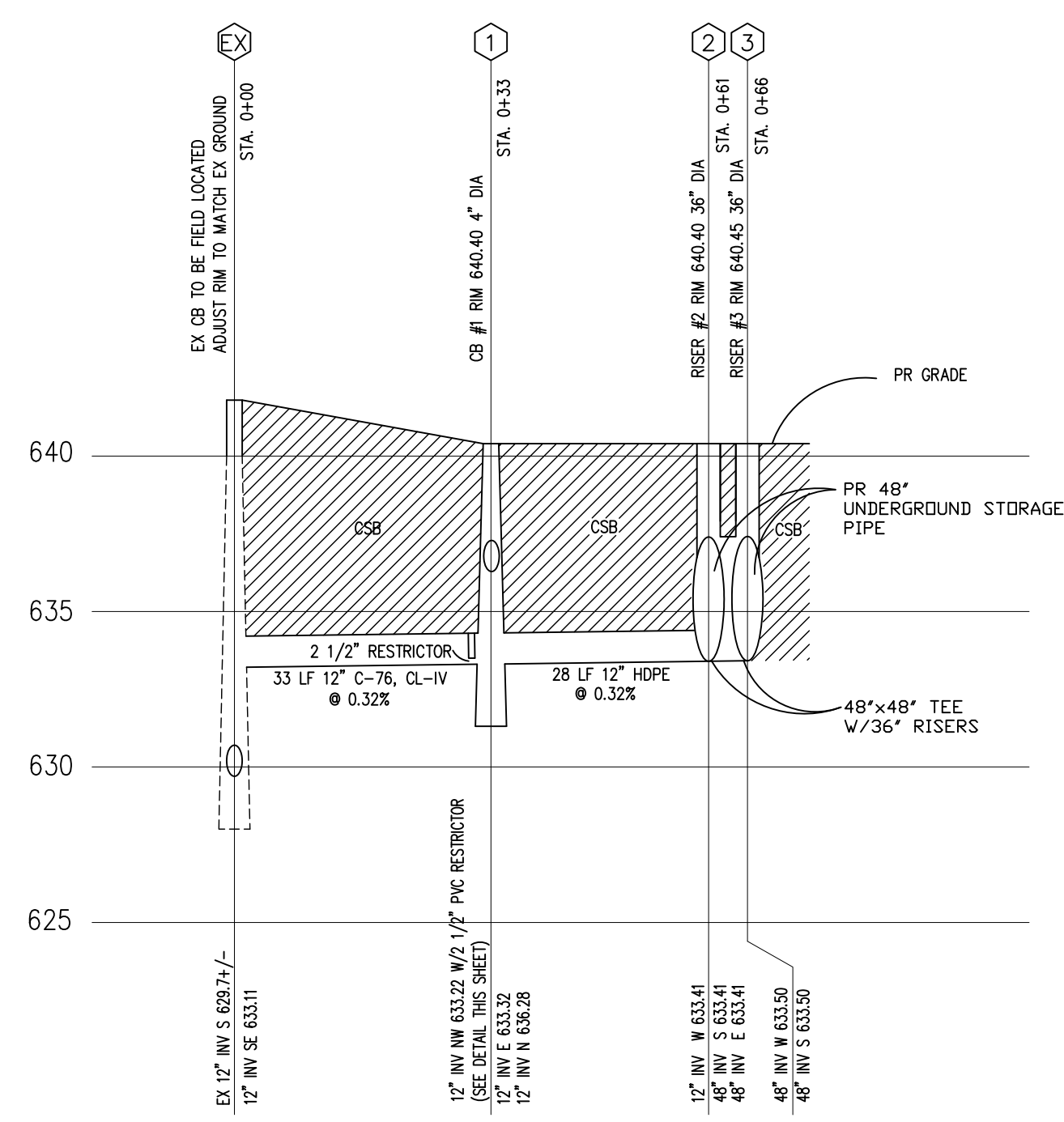
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**STORM SEWER PROFILE**  
SCALE: 1" = 20' HOR.  
1" = 5' VERT.



**STORM SEWER PROFILE**  
SCALE: 1" = 20' HOR.  
1" = 5' VERT.

**STORM SEWER NOTES**

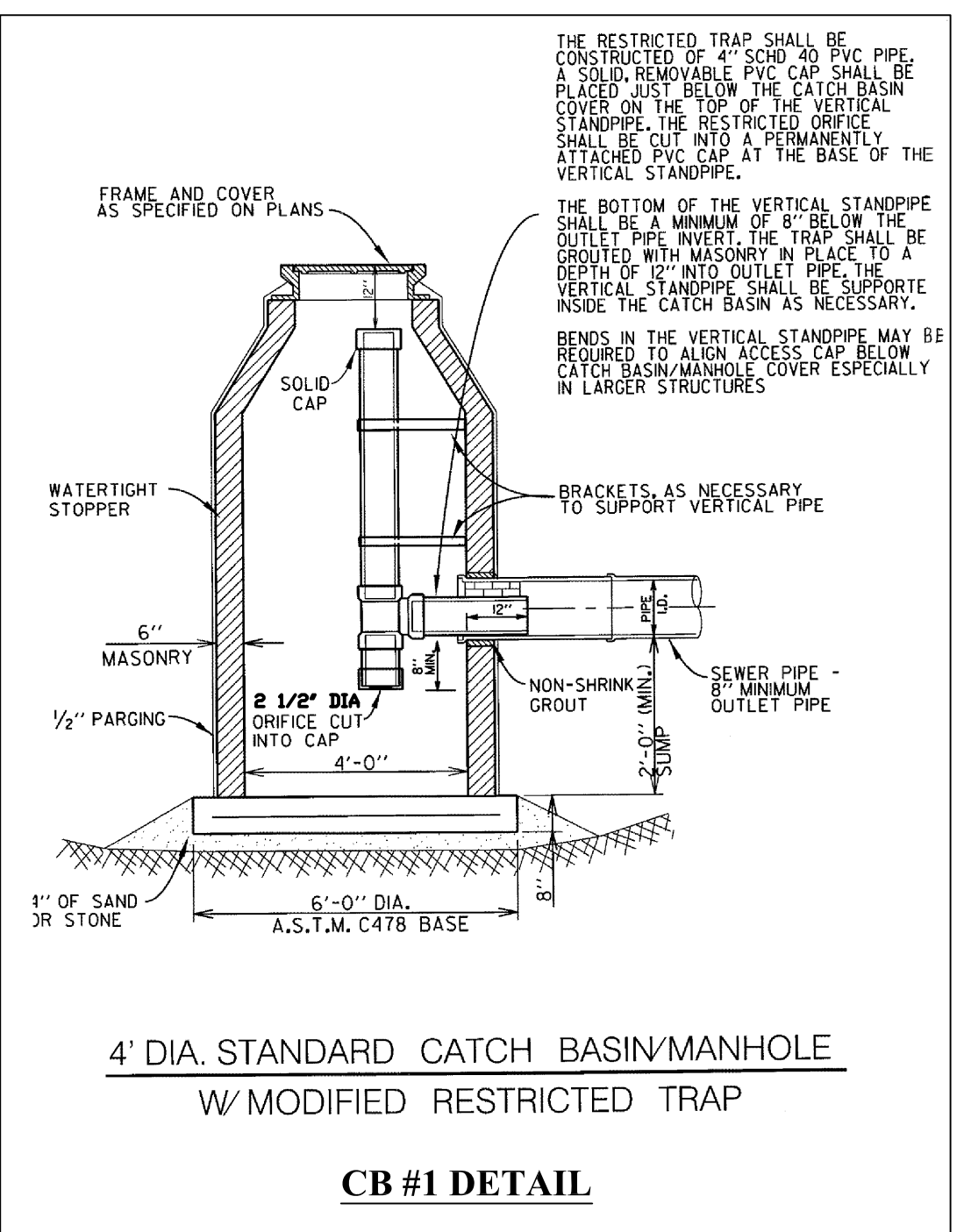
- THE REQUIRED PIPE BEDDING IS MAXIMUM 3/4-INCH DIAMETER CRUSHED STONE MEETING MDOT 6A ANGULAR MATERIAL SPECIFICATION.
- TRENCH BACKFILL MUST BE MDOT CLASS II GRANULAR MATERIAL COMPACTED TO 95% FOR STORM SEWER TRENCH LOCATED UNDER OR WITHIN THREE FEET OF PAVEMENT.
- ALL STRUCTURES WITHIN PARKING LOT SHALL HAVE 1010 OR 1040 E.J.L.W. FRAME OR PRE-APPROVED EQUAL.

**AREA CALCULATION**

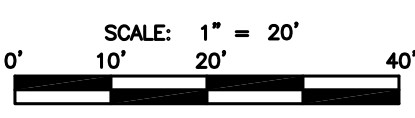
AREA 1 127 SF  
AREA 2 16,046 SF  
TOTAL 16,173 SF=0.371AC

DETENTION CALCULATIONS - 10 YEAR STORM PER OAKLAND COUNTY STANDARDS			
TIME INITIAL	t =	20.00	MINUTES
AREA	A =	0.371	ACRES
RUNOFF COEFF	C =	0.90	
TOTAL ALLOWABLE DISCHARGE	QA = C1 x A =	0.30	CFS
ALLOWABLE OUTFLOW	Q0 = QA / (A x C) =	0.90	CFS/ACRE
PEAK STORAGE TIME	T = 25h(SQR(6562.5 / Q0)) =	60.46	MINUTES
MAX. STORAGE VOLUME/ACRE	VS = (10500 x T / (T + 25)) - (40 x Q0 x T) =	5251.83	CU.FT./ACRE
TOTAL STORAGE REQUIRED	VT = VS x A x C =	1753.58	CU.FT.
TOTAL STORAGE PROVIDED	130' 48" @ 12.6 CF/LF	1638.00	CU.FT.
STORAGE PROVIDED	9.5' 48" @ 12.6 CF/LF	119.70	CU.FT.
TOTAL STORAGE PROVIDED		1757.70	CU.FT.
AREA OF ORIFICE	AR = C1 x A / (0.62 x SQR(2 x 32.2 x H)) =	0.02	SQ.FT.
DIAMETER OF OUTLET	D = 2 x SQR(144 x AR / PI) =	2.25	INCHES

USE A 2.5" RESTRICTOR PER CITY STANDARDS



**4' DIA. STANDARD CATCH BASIN/MANHOLE W/MODIFIED RESTRICTED TRAP**  
**CB #1 DETAIL**



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**SITE ENGINEERING PLANS**  
**PARKING ADDITION**  
SW 1/4 SEC. 23, T1N, R11E,  
ROYAL OAK, OAKLAND CO., MI

**REVISIONS**

DATE	REMARKS
10/20/08	PER CITY
02/12/09	PER CLIENT
03/31/09	PIPE SIZE

**DISTRIBUTION**

<input type="radio"/>	PRELIMINARY
<input type="radio"/>	APPROVAL
<input checked="" type="radio"/>	CONSTRUCTION
<input type="radio"/>	AS-BUILT

**SEAL**

DATE:	09/15/08
DESIGNED BY:	JR
CHECKED BY:	DK

**CLIENT**

PROJECT NAME	
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**PROJECT NUMBER**

PROJECT NUMBER	08-127
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**DRAWING SCALE**

DRAWING SCALE	1"=20'
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**SHEET NAME**

SHEET NAME	UTILITY PLAN
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**SHEET NUMBER**

SHEET NUMBER	4
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