

SHOW LOCATION OF UNDERDRAINS WHEN REQUIRED.  
SEE SHT. IV-4

ALLEY SECTION

CLASSIFICATION	NO. OF LANES	A	B	C	CURB TYPE $\Delta$	MIN. C RADIUS	NOTES
ARTERIAL, MAJOR	5	80'	60'	N/A	COMB C&G "C"	500**	NO SIDEWALK
ARTERIAL, MINOR	4	80'	48'	10'	COMB C&G "C"	500**	SIDEWALKS BY APPROVAL
COLLECTOR	2	60'	38'	5'	COMB C&G or COMB C&G "A"	200**	SIDEWALKS REQUIRED
LOCAL	2	50'	28'	5'	COMB C&G "A"	200**	SIDEWALKS REQUIRED
SERVICE DRIVE *	2	40'	30'	N/A	N/A	40'	NO SIDEWALK
ALLEY	1	14'	10'	N/A	N/A	N/A	NO SIDEWALK

\* MINIMUM ACCESSIBLE PAVEMENT WIDTH FOR INDUSTRIAL SUBDIVISIONS.  
\*\* MINIMUM TANGENT OF 100' SHALL SEPARATE ALL REVERSE CURVES.

CLASSIFICATION	MIN. GRADE	MAX. GRADE	MIN. SIGHT DISTANCE
ARTERIAL	0.5%	5.0%	600'
SECONDARY	0.5%	5.0%	300'
COLLECTOR STREET	0.5%	7.0%	300'
LOCAL STREET	0.5%	10.0%	300'
SERVICE DRIVE			
ALLEY	0.5%	10.0%	

CLASSIFICATION	MINIMUM PAVEMENT THICKNESS			
	TYPE 1		TYPE 2	
	HMA SURFACE	HMA BINDER	HMA BASE	PORT. CEM CON. PAVT.
ARTERIAL, MAJOR	1 1/2"	2"	8"	9"
ARTERIAL, MINOR	1 1/2"	2"	7"	8"
COLLECTOR STREET	1 1/2"	2"	6"	8"
LOCAL STREET	1 1/2"	2"	4"	6"
SERVICE DRIVE *	1 1/2"	2"	7"	9"
ALLEY **	1"	2"	3"	6"

\* MINIMUM ACCESSIBLE PAVEMENT WIDTH FOR INDUSTRIAL SUBDIVISIONS.  
\*\* NEW OR RECONSTRUCTED.

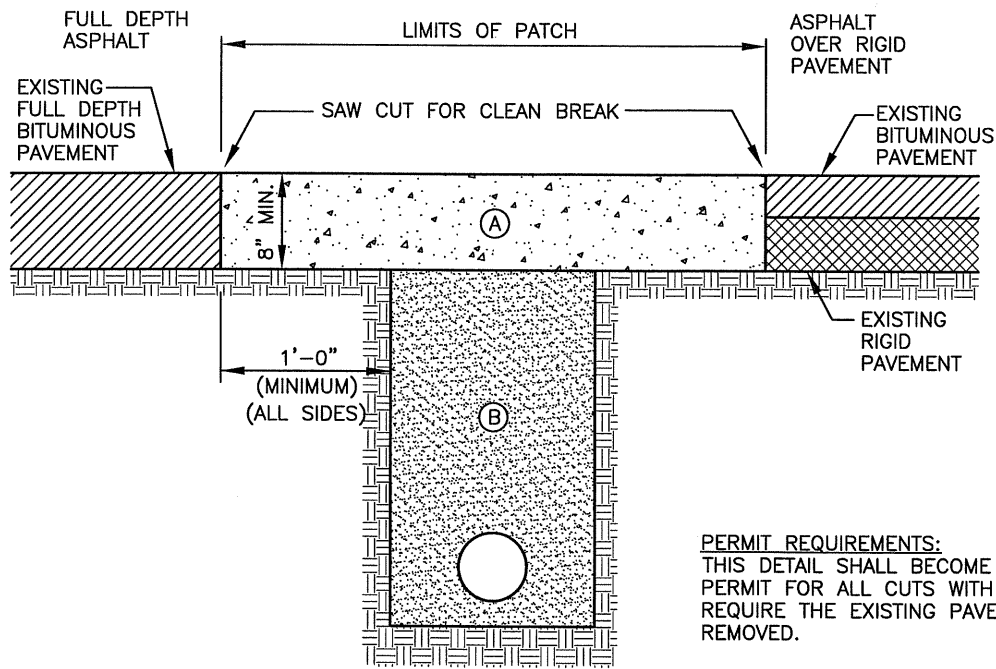
NOTES:

1. ALL HMA MIXES SHALL BE IN ACCORDANCE WITH INDOT SPECIFICATION 402.
2. OTHER PAVEMENT SECTIONS WILL BE CONSIDERED PROVIDING THEY ARE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF INDIANA, AND ARE BASED ON TRAFFIC NEEDS AND EXISTING SOIL CONDITIONS.
3. ALL RIGHT OF WAY IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE INDIANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST EDITION.
4. THE DEVELOPER SHALL INSTALL ALL SANITARY SEWER TAPS TO EACH PLATTED LOT AT THE TIME THAT THE MAIN SEWER IS INSTALLED. SEE DETAIL ON SHEET V-8.
5. FOR COMPACTION REQUIREMENTS PLEASE SEE STANDARD SPECIFICATIONS SECTION 1-9.

PREPARED BY: DLZ INDIANA, LLC

*Brian K. Arterbery*  
11/15/08

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY EFFECTIVE DATE: APRIL 2007			CITY OF MISHAWAKA, INDIANA	
ITEM	REVISION		APPROVED DATE	ENGINEERING STANDARDS
$\Delta$	UPDATED CURB TYPES TO MATCH III-1	1-15-08	TYPICAL SECTIONS	SHT. NO. IV-1



**PERMIT REQUIREMENTS:**  
 THIS DETAIL SHALL BECOME PART OF THE PERMIT FOR ALL CUTS WITH ROADS THAT REQUIRE THE EXISTING PAVEMENT TO BE REMOVED.

**LEGEND**

- (A) PLAIN CONCRETE IS TO BE FINISHED FLUSH TO THE EXISTING RIGID PAVEMENT. 8" MIN. CONCRETE OR MATCH EXISTING PAVEMENT DEPTH, WHICHEVER IS GREATER. 10" CONCRETE ON HIGH VOLUME OR MAJOR ARTERIAL ROAD. IF CONCRETE IS PLACED AS PATCH IN EXISTING ASPHALT PAVEMENT, IT SHALL BE INTEGRAL DYED WITH LAMP BLACK DYE.  
  
 2" MACHINE LAID ASPHALT OVERLAY MAY BE REQUIRED BY CITY ENGINEER IN ADDITION TO 8" MIN. CONCRETE, IN NEWLY CONSTRUCTED ASPHALT PAVEMENT.
- (B) PATCH AREAS ≤ 8 FT. X 8 FT. (64 SQ FT) – FLOWABLE BACKFILL IN ACCORDANCE SECTION IV-4-B OF THE MISHAWAKA STANDARD SPECIFICATIONS OR ALTERNATE METHOD AS DIRECTED BY THE CITY ENGINEER.  
  
 PATCH AREAS > 8 FT. X 8 FT. (64 SQ FT) – MAY UTILIZE CONVENTIONAL BACKFILLING METHODS SATISFYING THE COMPACTION REQUIREMENTS OF SECTION 1-9 OF THE MISHAWAKA STANDARD SPECIFICATIONS OR FLOWABLE BACKFILL AS DIRECTED BY THE CITY ENGINEER.

DETAIL FOR CUT ROAD PATCHING

**NOTES**

1. EXISTING PAVEMENT IS TO BE SAW CUT FOR A CLEAN BREAK PER DETAIL IV-3. 6. ALL JOINTS SHALL BE SAW CUT TO A DEPTH OF 4 INCHES (4") MINIMUM. BEFORE FINAL REMOVAL IS PERFORMED.
2. TRENCH SPOIL IS TO BE IMMEDIATELY REMOVED FROM THE WORK SITE.
3. FLOWABLE BACKFILL:
  - DO NOT PLACE ON FROZEN GROUND.
  - PROTECT FROM FREEZING UNTIL MATERIAL HAS SET.
  - DO NOT PLACE INTO OR THROUGH STANDING WATER, UNLESS APPROVED BY ENGINEER.
  - PROPERLY ATTACH OR ANCHOR ALL PARTS AND MATERIALS THAT ARE TO REMAIN IN THE EXCAVATION TO PREVENT OBJECTS FROM FLOATING.
4. HI-EARLY CLASS A (SLAG) CONCRETE WITH 6%-8% AIR ENTRAINMENT WILL BE ALLOWED FOR SPECIAL APPLICATIONS, UPON APPROVAL.
5. NEW SURFACE IS TO BE SLOPED AT THE SAME RATE AS THE EXISTING SURFACE.
6. ALL JOINTS BETWEEN EXISTING PAVEMENT AND NEW CONCRETE SHALL BE SMOOTH AND STRAIGHT.
7. PAVEMENT PATCH SHALL BE SMOOTH AND LEVEL. NO MORE THAN ¼" VARIATION FROM A STRAIGHT EDGE 5'-0" IN LENGTH SHALL BE ALLOWED. SMOOTH RIDEABILITY MUST BE MAINTAINED.

PREPARED BY: DLZ INDIANA, LLC

*B. K. Arterbery*  
 4/23/07

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY  
 EFFECTIVE DATE: APRIL 2007



CITY OF MISHAWAKA, INDIANA

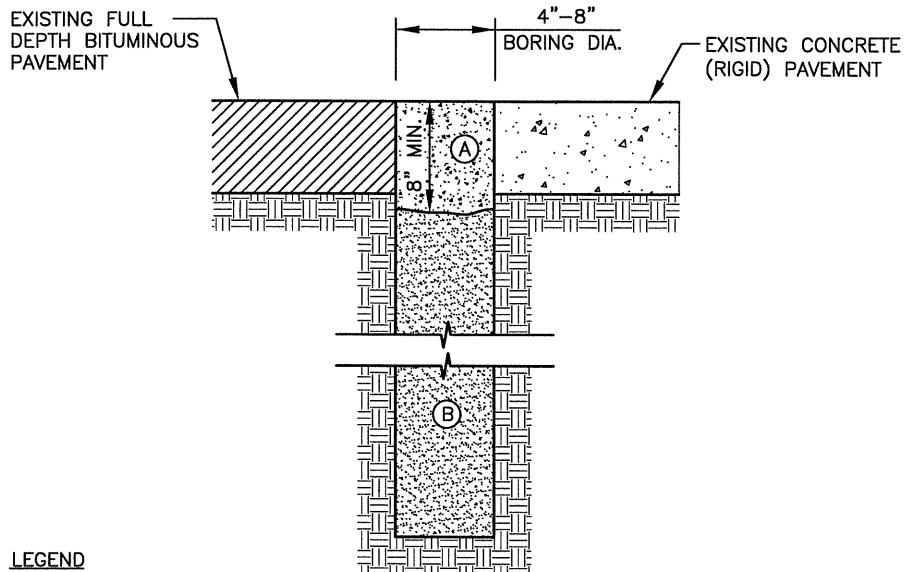
ENGINEERING STANDARDS

PAVEMENT PATCH DETAIL

SHT. NO.

IV-2

ITEM	REVISION	APPROVED DATE



**LEGEND**

- (A) RAPID SET CONCRETE PATCHING MATERIAL, *SET 45 CHEMICAL ACTION REPAIR MORTAR* (RECOMMENDED), OR APPROVED EQUAL. SEE SPECIFICATIONS BELOW.

FINISH FLUSH TO THE EXISTING PAVEMENT.  
 8" MIN. OR MATCH EXISTING PAVEMENT DEPTH, WHICHEVER IS GREATER.  
 10" MIN ON HIGH VOLUME OR MAJOR ARTERIAL ROADS.
- (B) BACKFILL BORE HOLES IN ACCORDANCE WITH STANDARD INDIANA DEPARTMENT OF TRANSPORTATION PROCEDURES.

**RAPID SET CONCRETE PATCHING MATERIAL**

**DESCRIPTION:** ONE-COMPONENT, RAPID-SETTING, CEMENTITIOUS CONCRETE REPAIR AND ANCHORING MATERIAL. THE MATERIAL SHALL BE CAPABLE OF FILLING A 1/2 INCH TO FULL DEPTH REPAIR AND REQUIRE NO BONDING AGENT.

**SPECIFICATIONS:** THE CONCRETE PATCHING MATERIAL SHALL COMPLY WITH ASTM C928 STANDARD SPECIFICATIONS FOR PACKAGED, DRY, RAPID-HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE REPAIRS.

IT SHALL BE RESISTANT TO FREEZE/THAW CYCLES AND DEICING CHEMICALS.

WHEN PREPARED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS, THE PATCHING MATERIAL SHALL MEET THE FOLLOWING REQUIREMENTS:

<b>SET TIMES</b>		ASTM C266
INITIAL	10 MINUTES (MIN.)	
FINAL	45 MINUTES (MAX.)	
<b>COMPRESSIVE STRENGTH</b>		ASTM C109 (MOD.)
1 HOUR	2000 PSI	
3 HOUR	3000 PSI	
7 DAY	4000 PSI	
<b>BOND STRENGTH</b>		ASTM C882
24 HOUR	1000 PSI	

PREPARED BY: DLZ INDIANA, LLC

*B. K. Arterbery*  
4/23/07

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY  
EFFECTIVE DATE: APRIL 2007



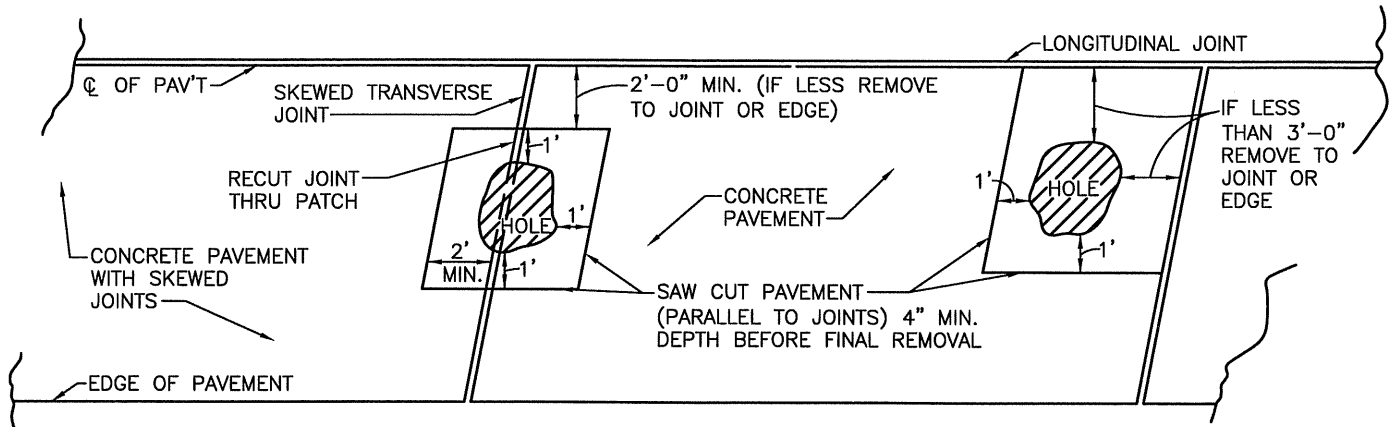
CITY OF MISHAWAKA, INDIANA

ENGINEERING STANDARDS

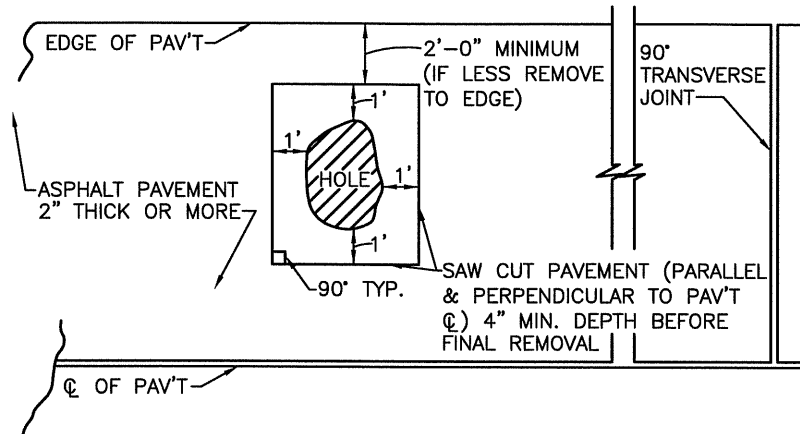
ITEM	REVISION	APPROVED DATE

BORE HOLE PAVEMENT  
PATCH DETAIL

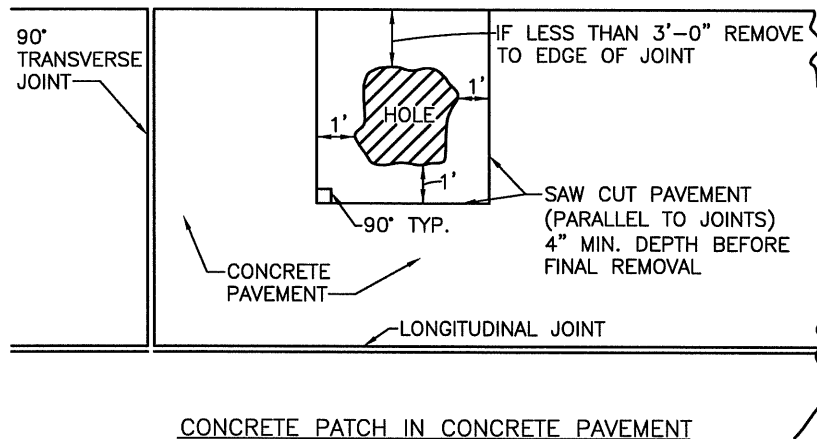
SHT. NO.  
IV-2A



CONCRETE PATCH IN CONCRETE PAVEMENT (WITH OR WITHOUT SKEWED JOINTS)



CONCRETE PATCH IN ASPHALT PAVEMENT



CONCRETE PATCH IN CONCRETE PAVEMENT

FINAL CONCRETE FINISH

1. ALL FINISH CONCRETE SHALL HAVE A ROUGH BROOM FINISH PERPENDICULAR TO TRAFFIC DIRECTION.
2. FINAL FINISH SHALL BE SPRAYED WITH CURING-SEALING COMPOUND TO PREVENT CONCRETE SPALDING.

PREPARED BY: DLZ INDIANA, LLC



*B. K. Arterbery*  
4/23/07

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY  
EFFECTIVE DATE: APRIL 2007



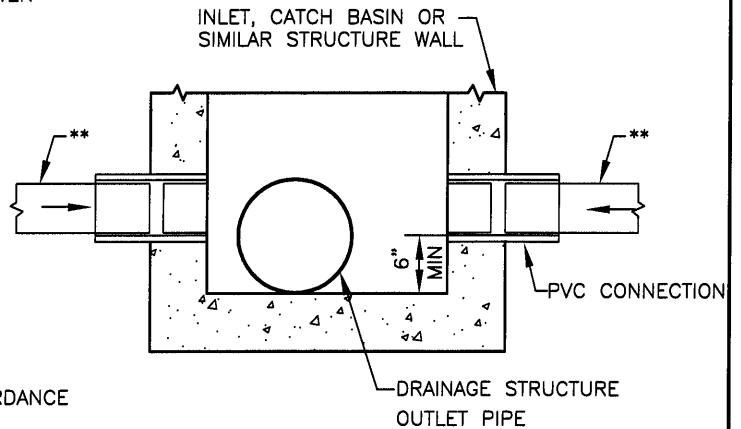
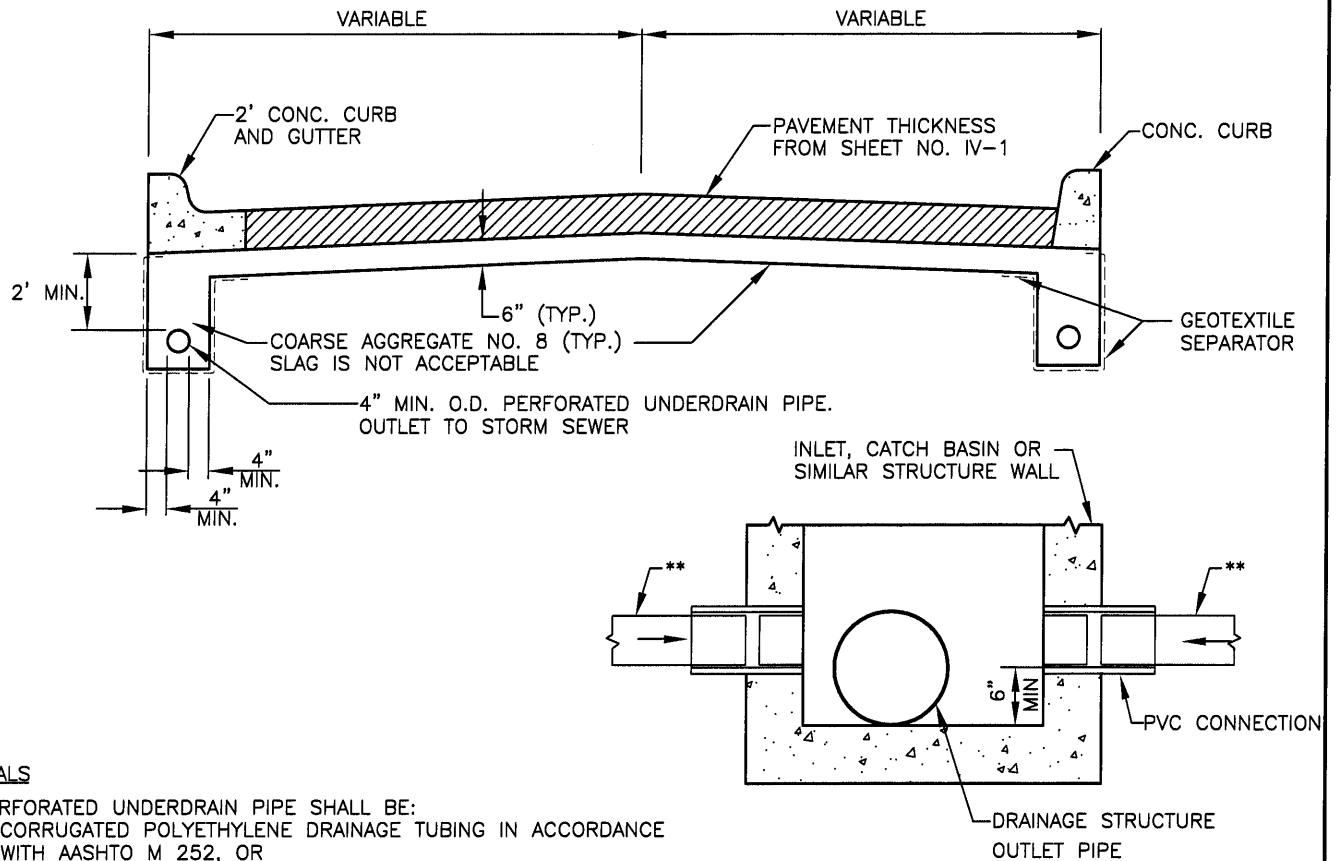
CITY OF MISHAWAKA, INDIANA

ENGINEERING STANDARDS

CONCRETE  
PAVEMENT PATCH

SHT. NO.  
IV-3

ITEM	REVISION	APPROVED DATE



**MATERIALS**

1. PERFORATED UNDERDRAIN PIPE SHALL BE:
  - CORRUGATED POLYETHYLENE DRAINAGE TUBING IN ACCORDANCE WITH AASHTO M 252, OR
  - POLYVINYL CHLORIDE PIPE IN ACCORDANCE WITH AASHTO M 304.
2. GEOTEXTILE SEPARATOR SHALL BE A NON-WOVEN GEOTEXTILE:
  - CONTECH C-31NW OR C-35NW
  - OR APPROVED EQUAL

\*\*\*4" MIN O.D. PERFORATED UNDERDRAIN PIPE  
**DRAINAGE STRUCTURE OUTLET DETAIL**  
 N.T.S.

PRIOR TO PLACING ANY CURBING, PAVEMENT OR UNDERDRAINS IN THE BELOW SOIL CLASSIFICATIONS, THE COMPACTED SUBGRADE SHALL BE PROOF-ROLLED BY A LOADED SINGLE AXLE OR TANDEM AXLE DUMP TRUCK IN THE PRESENCE OF A REPRESENTATIVE OF THE CITY ENGINEER. ANY SOFT OR YIELDING SUBGRADE SHALL BE UNDERCUT, BACKFILLED WITH GRANULAR BORROW MATERIAL, COMPACTED AND REPROOF-ROLLED IN THE PRESENCE OF A REPRESENTATIVE OF THE CITY ENGINEER. PIPE UNDERDRAINS ARE REQUIRED TO BE INSTALLED IN THE FOLLOWING U.S.D.A. SOIL CONSERVATION SERVICE SOIL CLASSIFICATIONS:

- |               |          |              |            |           |
|---------------|----------|--------------|------------|-----------|
| ADRIAN        | CROSIER  | MARTINSVILLE | PALMS      | TROXEL    |
| ALIDA         | DEL REY  | MAUMEE       | QUINN      | WALLKILL  |
| AUBBEENAUBBEE | EDWARDS  | METEA        | RENSSELAER | WASHTEWAW |
| BLOUNT        | GILFORD  | MIAMI        | RIDDLES    | WHITAKER  |
| BRADY         | HOUGHTON | MILFORD      | TEDROW     |           |
| BROOKSTON     | LANDES   | MORLEY       | TRACY      |           |

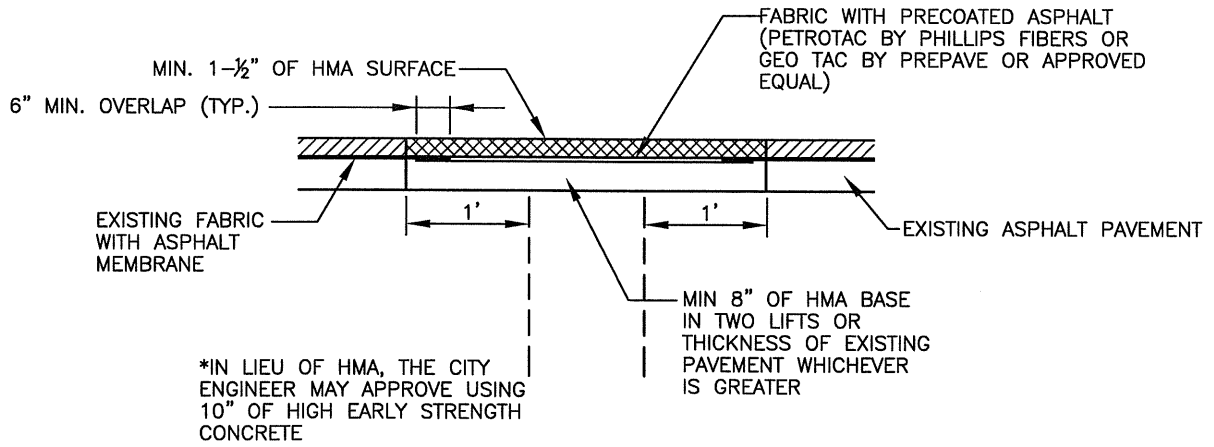
NOTE: IF ANY OF THE ABOVE U.S.D.A. SOIL CONSERVATION SERVICE SOIL CLASSIFICATIONS ARE ENCOUNTERED DURING THE COURSE OF INSTALLING UTILITIES, THE TRENCH REQUIRED FOR THE INSTALLATION OF SAID UTILITIES SHALL BE BACKFILLED WITH COARSE AGGREGATE NO. 53 TO A DEPTH OF 6" BELOW THE BOTTOM OF PAVEMENT ELEVATIONS. NONE OF THE ABOVE LISTED SOILS CLASSIFICATIONS SHALL BE USED FOR TRENCH BACKFILL.

UTILITY NOTE:  
 ANY UTILITY ENCOUNTERING AN AGGREGATE UNDERDRAIN SYSTEM WILL REPAIR THE SYSTEM.

PREPARED BY: DLZ INDIANA, LLC

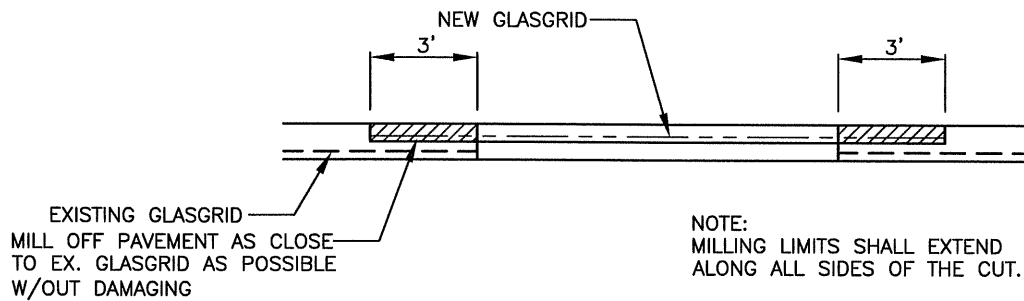
*B.M.S.*  
 3-26-13

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY			CITY OF MISHAWAKA, INDIANA
ITEM	REVISION	APPROVED DATE	
	EFFECTIVE	APRIL 2007	ENGINEERING STANDARDS
	REVISED: ADDED STR OUTLET DETAIL	MARCH 2013	
			UNDERDRAIN TYPICAL SECTION

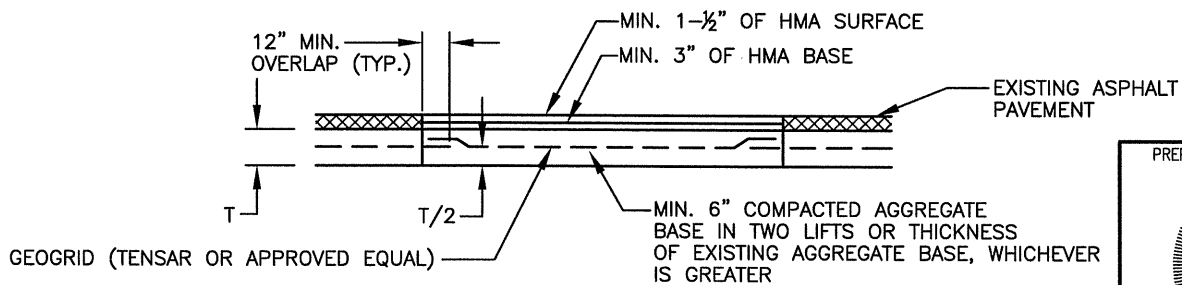


NOTE: WHEN CONTRACTOR ENCOUNTERS EXISTING FABRIC MEMBRANE OR GEOGRID FABRIC DURING EXCAVATION, PATCH SHALL CONFORM TO THE ABOVE STANDARD.

TYPICAL SECTION FOR REPAIR TO STREET WITH FABRIC MEMBRANE



TYPICAL SECTION FOR REPAIR TO STREET WITH GLASGRID



TYPICAL SECTION FOR REPAIR TO STREET WITH GEOGRID

PREPARED BY: DLZ INDIANA, LLC



*Brian K. Arterbery*  
4/23/07

APPROVED/REVISED BY THE BOARD OF PUBLIC WORKS & SAFETY  
EFFECTIVE DATE: APRIL 2007



CITY OF MISHAWAKA, INDIANA

ENGINEERING STANDARDS

ITEM	REVISION	APPROVED DATE

PAVM'T PATCH W/FABRIC MEMBRANE OR GEOGRID

SHT. NO.  
IV-5