

DESIGNED BY	DWB	DATE 04/2005
DRAWN BY	CADD	DATE 04/2005
SUPERVISED BY_	SFF	DATE 04/2005
CHECKED BY	SFF	DATE 04/2005

	ESTIMATED BRIDGE QUANTITIES		
ITEM NO.	DESCRIPTION	UNIT	TOTAL
603-02.01	REPAINTING EXISTING STEEL STRUCTURES (33-I24-12.08)	LS	1
603-05.20	CONTAINMENT AND DISPOSAL OF WASTE (33-I24-12.08)	LS	1
604-04.02	APPLIED TEXTURE FINISH (EXISTING STRUCTURES)	SY	1020
604-10.05	CONCRETE	SF	20
604-10.14	REMOVAL OF ASPHALT WEARING SURFACE	LS	1
0 604-10.30	BRIDGE DECK REPAIR (FULL DEPTH OF SLAB)	SY	10
604-10.50	BRIDGE DECK REPAIR (PARTIAL DEPTH OF SLAB)	SY	170
604-10.53	CONCRETE REPAIRS	SY	10
604-10.54	CONCRETE REPAIRS	SF	420
	603-02.01 603-05.20 604-04.02 604-10.05 604-10.14 (b) 604-10.30 (b) 604-10.50 604-10.53	ITEM NO. DESCRIPTION	ITEM NO. DESCRIPTION ONLY 603-02.01 REPAINTING EXISTING STEEL STRUCTURES (33-I24-I2.08) 603-05.20 CONTAINMENT AND DISPOSAL OF WASTE (33-I24-I2.08) 604-04.02 APPLIED TEXTURE FINISH (EXISTING STRUCTURES) SY 604-10.05 CONCRETE 604-10.14 REMOVAL OF ASPHALT WEARING SURFACE LS 10 604-10.30 BRIDGE DECK REPAIR (FULL DEPTH OF SLAB) SY 10 604-10.50 BRIDGE DECK REPAIR (PARTIAL DEPTH OF SLAB) SY

FOOTNOTES

617 - 01

INCLUDES HAND TOOL CLEANING, PAINTING, CONTAINMENT AND DISPOSAL AND ALL OTHER LABOR AND MATERIALS NECESSARY TO CLEAN AND PAINT BEARING DEVICES (28 TOTAL).

BRIDGE DECK SEALANT

- (2) INCLUDES THE COST TO BLAST CLEAN, CONTAIN AND DISPOSE OF WASTE FROM ALL STEEL BEARINGS OF BRIDGE.
- INCLUDES THE COST OF ALL LABOR AND MATERIALS NECESSARY TO APPLY A TEXTURED FINISH TO THE PARAPETS, SLAB EDGE. AND SOFFIT. SEE SKETCH ON THIS SHEET. IT ALSO INCLUDES ALL LABOR AND MATERIALS NECESSARY TO APPLY A TEXTURED FINISH TO ALL EXPOSED SURFACES OF THE WINGWALLS, ENDPOSTS, BENTS AND ABUTMENTS.
- (4) INCLUDES THE COST OF ALL LABOR AND MATERIALS NECESSARY TO REMOVE 6"(+/-)OF EXISTING ASPHALT ON BRIDGE. CONTRACTOR TO TAKE SPECIAL CARE NOT TO DAMAGE THE EXISTING BRIDGE DECK SURFACE DURING REMOVAL OF ASPHALT WEARING SURFACE. ANY ASPHALT REMAINING AFTER MECHANICAL REMOVAL WILL NEED TO BE REMOVED PRODUCING A SMOOTH SURFACE. ANY DAMAGE TO THE BRIDGE DECK SURFACE DURING THE REMOVAL SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
- (5) INCLUDES THE COST OF ALL LABOR AND MATERIALS NECESSARY TO REPAIR CONCRETE SURFACE, TO BE LOCATED BY THE ENGINEER, ON THE EXISTING BRIDGE. SEE NOTES AND DETAILS ON DWG. NO. BR-75-21.
- (6) INCLUDES THE COST OF ALL LABOR AND MATERIALS NECESSARY TO PERFORM FULL DEPTH DECK REPAIRS.SEE DETAIL AND NOTES ON DWG. NO. BR-75-21.
- (7) INCLUDES THE COST OF ALL LABOR AND MATERIALS NECESSARY TO PERFORM PARTIAL DEPTH DECK REPAIRS. SEE DETAIL AND NOTES ON DWG. NO. BR-75-21.
- (8) INCLUDES THE COST OF ALL LABOR AND MATERIALS NECESSARY TO REMOVE DELAMINATED CONCRETE AT LOCATIONS IDENTIFIED BY THE ENGINEER ON THE BOTTOM OF THE DECK AND TO CLEAN AND PAINT ANY EXPOSED REINFORCEMENT. SEE UNDERSIDE DECK DELAMINATION DETAIL AND NOTES ON DWG. NO. BR-75-21.
- (9) THIS ITEM SHALL BE BID WITH THE CONTINGENCY THAT THIS ITEM MAY BE INCREASED, DECREASED OR ELIMINATED AS DIRECTED BY THE ENGINEER.
- 300 FULL AND PARTIAL DEPTH DECK REPAIR WILL BE DONE USING QUICK SET PATCHING MATERIAL.

GENERAL NOTES

SPECIFICATIONS: STANDARD ROAD AND BRIDGE SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORATION, (MARCH 1, 1995 EDITION)

LOADING: HS20-44

DESIGN SPECIFICATIONS: AASHTO 2002 EDITION WITH ADDENDA

CONCRETE: TO BE CLASS "A", 3000 PSI CONCRETE UNLESS NOTED OTHERWISE.

REINFORCING STEEL: SHALL BE ASTM A615 GRADE 60. SEE SECTION 604 AND 907 OF THE STANDARDS SPECIFICATIONS.

SHOP DRAWINGS: SHALL BE SUBMITTED ACCORDING TO SPECIAL PROVISION NO. 105A. SHOP DRAWINGS SHALL

CONTRACTOR IS NOT ALLOWED TO USE A HYDRAULIC RAM MOUNTED ON A

BE SUBMITTED TO THE BRIDGE REPAIR OFFICE OF THE DIVISION OF STRUCTURES.

DEMOLITION: THE CONTRACTOR SHALL TAKE SPECIAL CARE TO PROTECT ANY PARTS OF THE STRUCTURE THAT ARE NOT TO BE REMOVED SPECIFICALLY. THE

> BACKHOE (COMMONLY CALLED A HOE RAM) OR OTHER SIMILARLY HEAVY EQUIPMENT FOR CONCRETE REMOVAL. PNEUMATIC HAMMERS MAY BE USED TO REMOVE UNSOUND CONCRETE. FOR FULL DEPTH OF CONCRETE SLAB REMOVAL AND ANY WORK OVER BEAMS, THE MAXIMUM HAMMER SIZE IS 90 POUND CLASS.

SAWING OR CUTTING OF THE CONCRETE IS ACCEPTABLE SO LONG AS ANY SPECIFIED PROJECTION OF THE EXISTING REINFORCING STEEL IS MAINTAINED. ALL DEVICES PROPOSED FOR CONCRETE DEMOLITION SHALL

MEET THE APPROVAL OF THE ENGINEER.

CONCRETE AND CONCRET PATCHING MATERIAL:

ALL CONCRETE AND CONCRETE PATCHING MATERIAL SHALL NOT BE PLACED BY PNEUMATIC METHODS.

CONCRETE CURING: ALL CONCRETE IN REPAIR AREAS SHALL BE CURED ACCORDING TO THE STANDARD SPECIFICATIONS.

QUICK-SET PATCHING MATERIAL: QUICK SET PATCHING MATERIAL SHALL BE A POLYMER MODIFIED CEMENTITIOUS PATCHING MATERIAL SUCH AS SIKA TOP 123. MASTERPATCH 230 VP OR APPROVED EQUAL.

FINISHING CONCRETE SURFACES: CONCRETE FINISHING SHALL BE IN ACCORDANCE WITH SECTION 604.22 OF THE TENNESSEE STANDARD SPECIFICATIONS. A CLASS I FINISH FOLLOWED BY AN APPLIED TEXTURE FINISH SHALL BE USED IN LIEU OF A CLASS II FINISH. NO TEXTURE FINISH SHALL BE APPLIED PRIOR TO THE COMPLETION OF PAVING AND HAULING OPERATIONS AT THE BRIDGE SITE. THE APPLIED TEXTURE FINISH SHALL BE MEASURED AND PAID FOR UNDER ITEM NO.

604-04.02.

BRIDGE DECK SURFACE FINISH: TO BE IN ACCORDANCE WITH NOTE (C) IN ARTICLE 604.23 OF THE STANDARD SPECIFICATIONS

GRADING: ANY AREA THAT IS DISTURBED OUTSIDE THE LIMITS OF CONSTRUCTION DURING THE LIFE OF THIS PROJECT SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

CONTRACTOR: THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SKEW ANGLES BEFORE FABRICATING REINFORCING STEEL, EXPANSION JOINTS, OR ORDERING MATERIALS.

CLEANING AND PAINTING OF BEARINGS: ALL STEEL SHALL BE CLEANED IN ACCORDANCE WITH TENNESSEE STANDARD SPECIFICATION 603.05(A). HAND OR POWER TOOL LEANING SHALL REMOVE ALL RUST, SCALE, LOOSE PAINT AND DIRT. AFTER CLEANING, THE BEARINGS SHALL BE PAINTED WITH AN APPROVED EPOXY MASTIC PAINT APPLIED AT A MINIMUM DRY FILM THICKNESS OF 4.0 MILS. THE COLOR OF THE EPOXY MASTIC PAINT SHALL BE GREEN.

> THE COATING APPLICATOR SHALL FOLLOW THE MANUFACTURER'S PRINTED INSTRUCTIONS ON SITE DURING THE COURSE OF THE WORK.

CONTAINMENT AND DISPOSAL: ACCORDING TO OUR RECORDS THE EXISTING PAINT SYSTEM CONTAINS AN INORGANIC ZINC PRIMER AND VINYL TOP COAT. THE CONTRACTOR SHALL CONTAIN AND DISPOSE OF ALL PAINT REMOVAL WASTE IN ACCORDANCE WITH SECTION 613.13.

REVISIONS BRIEF DESCRIPTION 12/20/05 DWB REVISED NOTE 3 01-24-06 VN GENERAL REVISION

YEAR

2005

SHEET NO.

🙆 🛕 HIGH EARLY STRENGTH (18 HOUR) CONCRETE

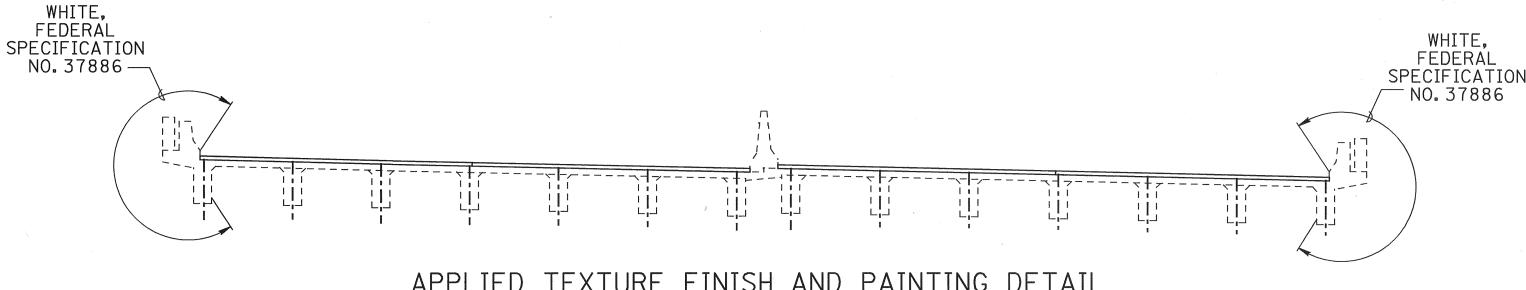
TO BE CLASS "A" HIGH EARLY STRENGTH CONCRETE, THE CONCRETE FOR THIS CONSTRUCTION SHALL OBTAIN A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI IN 18 HOURS. THE CONTRACTOR SHALL SUBMIT A CONCRETE DESIGN
CAPABLE OF OBTAINING 3500 PSI IN 18 HOURS TO THE
MATERIALS AND TEST DIVISION OF THE TENNESSEE
DEPARTMENT OF TRANSPORTATION FOR APPROVAL AND VERIFICATION THAT THE CONCRETE WILL MEET THE MINIMUM STRENGTH REQUIREMENTS IN THE ALLOTTED TIME. THE DESIGN SUBMITTAL AND TESTING SHALL BE COMPLETED BEFORE ANY WORK ON THE BRIDGE IS BEGUN. NO LOADING SHALL BE PERMITTED UNTIL THE CONCRETE HAS BEEN IN PLACE A MINIMUM OF 18 HOURS. HIGH EARLY STRENGTH CONCRETE SHALL BE USED IN ITEM NO. 604-10.30 AND IPÉM NO. 604-10.50.

PROJECT NO.

33003-4159-04

SPECIAL NOTES CONTRACTOR

SEVEN (7) DAYS PRIOR TO ANY LANE CLOSURES OR TRAFFIC SHIFTS BEING IMPLEMENTED ON THIS PROJECT THE CONTRACTOR SHALL NOTIFY THE PROJECT'S CONSTRUCTION SUPERVISOR, THE REGION 2 CONSTRUCTION OFFICE AT (423) 510-1217 AND THE REGION 2 COMMUNITY RELATIONS OFFICE AT (423) 510-1164 SO THAT ADEQUATE NOTIFICATION CAN BE GIVEN TO THE PUBLIC CONCERNING POSSIBLE TRAFFIC DELAYS.



APPLIED TEXTURE FINISH AND PAINTING DETAIL

IN ADDITION TO THE SURFACES SHOWN IN THIS DETAIL. ALL EXPOSED SURFACES OF THE WINGWALLS, ENDPOSTS, BENTS AND ABUTMENTS ARE TO RECEIVE AN APPLIED TEXTURE

NOTE: THE CONTRACTOR SHALL CLEAN ALL SURFACES TO RECIEVE APPLIED TEXTURE COATING. ALL CLEANING SHALL BE SATISFACTORY TO THE ENGINEER PRIOR TO APPLAYING THE TEXTURE FINISH.

NOTE: THE APPLIED TEXTURE FINISH COLOR FOR BRIDGE SHALL BE SIMILAR TO WHITE, FEDERAL SPECIFICATIONS NO.37886, FEDERAL COLOR STANDARD 595B A COLOR SAMPLE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. A LIST OF APPROVED TEXTURE COATINGS MAY BE OBTAINED FROM THE TENNESSEE DEPARTMENT OF TRANSPORTAION DIVISION OF MATERIALS AND TESTS.

NO TEXTURE FINISH SHALL BE APPLIED PRIOR TO COMPLETION OF PAVING AND HAULING OPERATIONS AT BRIDGE SITE.

COSTS ASSOCIATED WITH CLEANING, FURNISHING AND APPLYING TEXTURE COATING AND ALL LABOR AND NECESSARY MATERIALS SHALL BE INCLUDED IN ITEM NO. 604-04.02, APPLIED TEXTURE FINISH (EXISTING STRUCTURE), S.Y.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

GENERAL NOTES AND ESTIMATED BRIDGE QUANTITIES

> INTERSTATE 24 OVER GERMANTOWN ROAD

BRIDGE I.D. NO. 33-124-12.08 HAMILTON COUNTY 2005

TN D.O.T. ENGINEERING SUPERVISOR

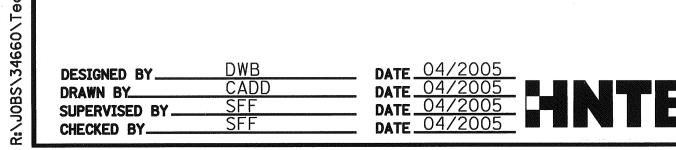
V. NEWBERRY

SY

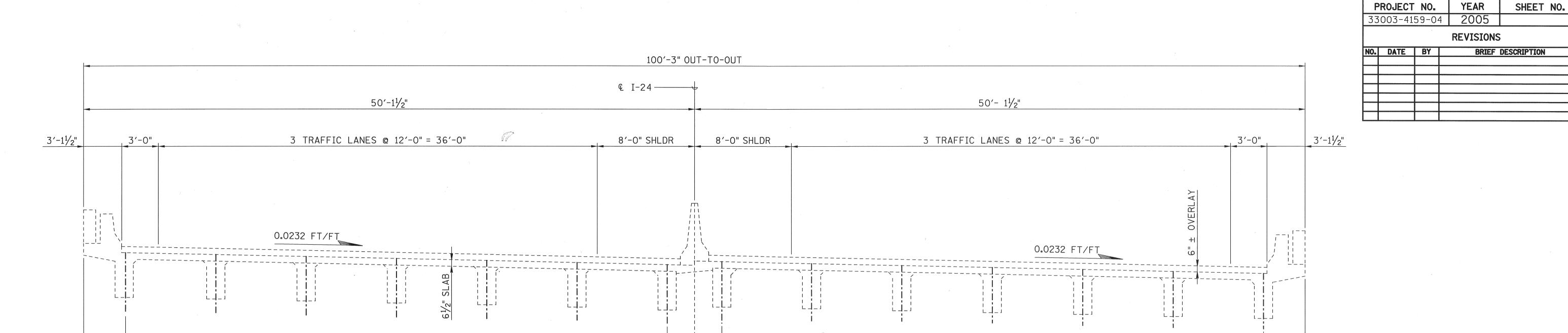
1780

BR-75-18

SCANNED

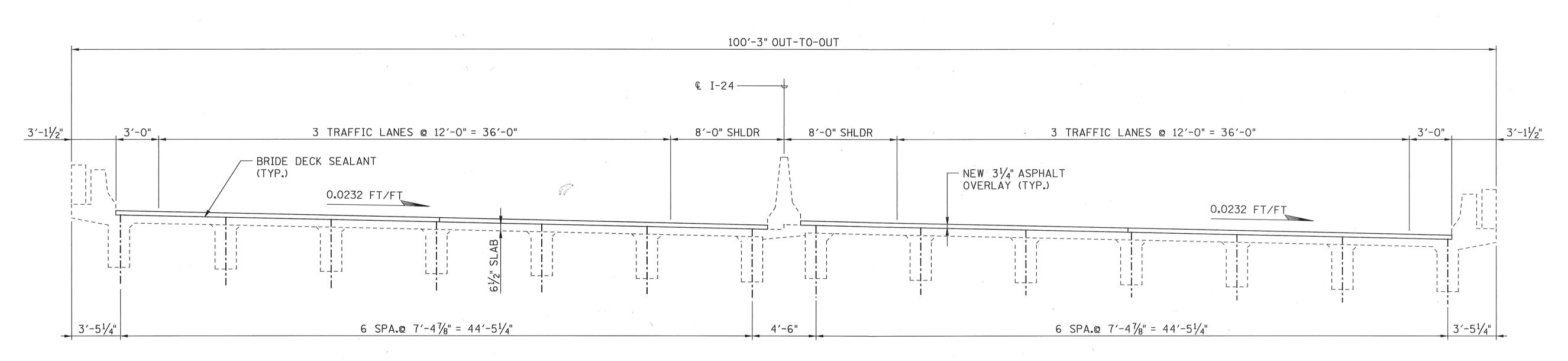


3'-51/4"



6 SPA.@ $7'-4\frac{7}{8}$ " = $44'-5\frac{1}{4}$ "

EXISTING TYPICAL SECTION



FINAL TYPICAL SECTION



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION

INTERSTATE 24 OVER GERMANTOWN ROAD

BRIDGE I.D. NO. 33-124-12.08 HAMILTON COUNTY 2005

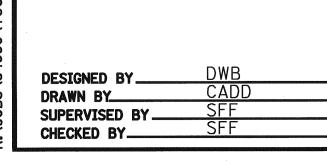
TN D.O.T. ENGINEERING SUPERVISOR V. NEWBERRY

6 SPA.@ $7'-4\frac{7}{8}$ " = $44'-5\frac{1}{4}$ "

BR-75-19



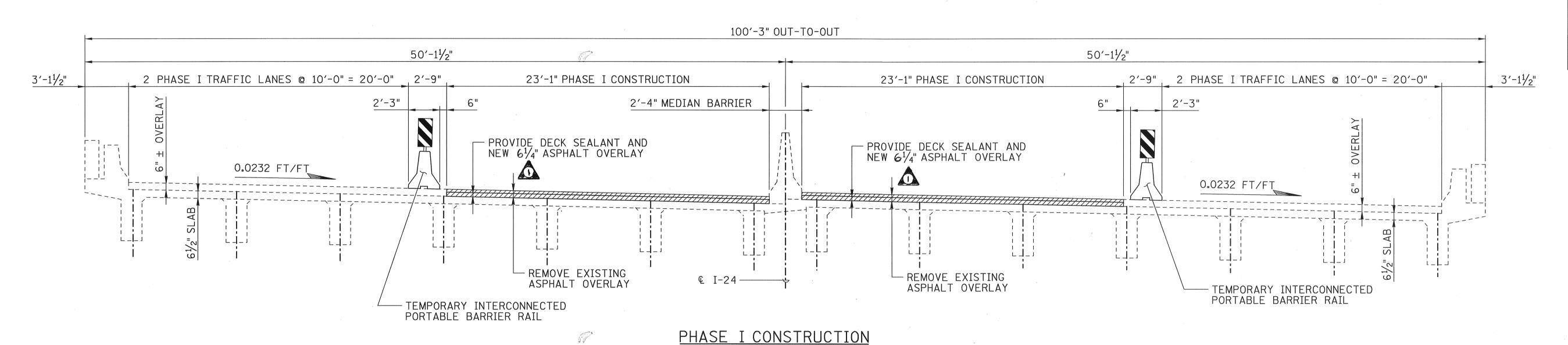
SCANNED



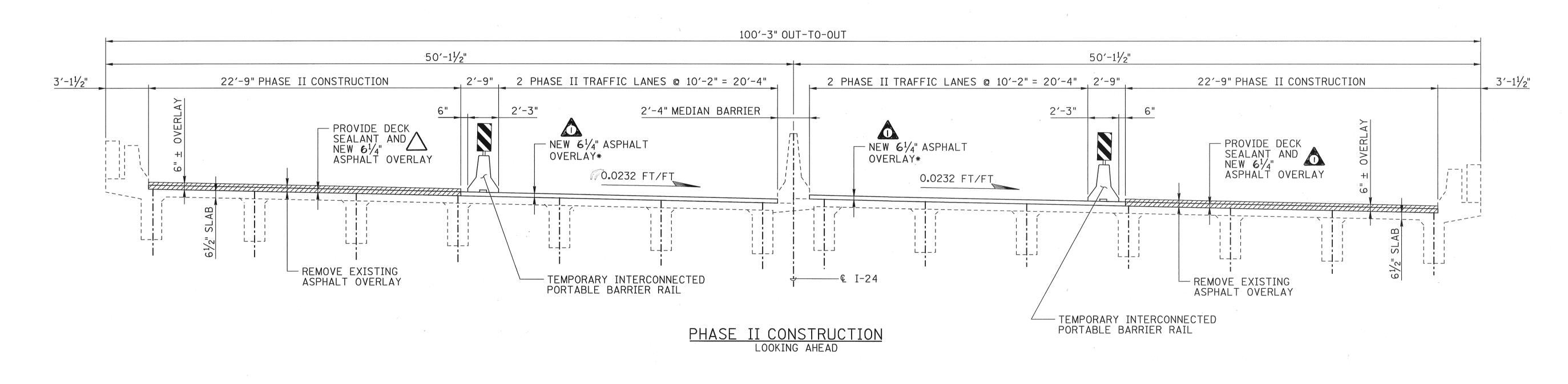
PROJECT NO. SHEET NO. 2005 33003-4159-04

REVISIONS

	1/2 / 1020110				
NO.	DATE	BY	BRIEF DESCRIPTION		
1	01-24-06	NN	CHANGED ASPHALT THICKNESS & REMOVED		
			NOTE		
3					



LOOKING AHEAD





STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PHASING

INTERSTATE 24 OVER GERMANTOWN ROAD

BRIDGE I.D. NO. 33-124-12.08 HAMILTON COUNTY 2005

BR-75-20

SPALLED SURFACE REPAIR DETAILS

NOTE: LIMITS AND LOCATION OF REPAIRS TO BE DESIGNATED BY THE ENGINEER, NOTE: SAW CUT EXISTING CONCRETE SURFACES SO AS TO OBTAIN SQUARED CORNERS.

NOTES FOR ITEM 604-10.54:

THE COST OF SAW CUTTING, REMOVING SPALLED OR CRACKED CONCRETE, BLAST CLEANING, PATCHING MATERIAL, LABOR AND ANY MISCELLANEOUS MATERIALS NECESSARY TO COMPLETE THE REPAIRS AS SHOWN SHALL BE INCLUDED IN ITEM NO. 604-10.54, CONCRETE REPAIRS, S.F.

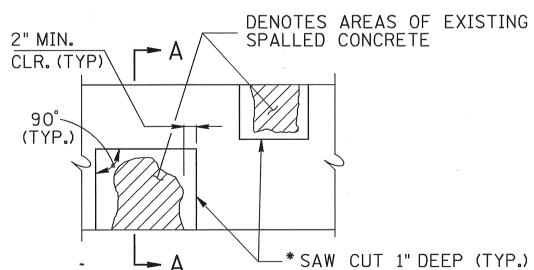
PATCHING MATERIAL SHALL BE A POLYMER-MODIFIED CEMENTITIOUS STRUCTURAL PATCHING VERTICAL AND OVERHEAD MATERIAL. SEE GENERAL NOTES AND T.D.O.T QUALIFIED PRODUCTS LIST 13, SPEC. CATEGORY J, SUBLIST F FOR ACCEPTABLE PATCHING MATERIALS.

AFTER CONCRETE REMOVAL OF THE 2" DEPTH HAS TAKEN PLACE THE ENGINEER SHALL HAVE THE OPTION TO REMOVE ADDITIONAL CONCRETE DEPTH AND SHALL DESIGNATE THIS AREA TO BE REPAIRED AND PAID FOR UNDER ITEM NO. 604-10.05 INSTEAD OF UNDER ITEM NO. 604-10.54.

NOTES FOR ITEM 604-10.05:

THE COST OF REMOVING PORTIONS OF THE EXISTING CONCRETE WITHIN THE LIMITS SHOWN, SAW CUTTING, CLEANING EXISTING REINFORCING STEEL, PATCHING MATERIAL, FORMING, LABOR AND ALL MISCELLANEOUS MATERIAL NECESSARY TO COMPLETE REPAIRS AS SHOWN SHALL BE INCLUDED IN PRICE BID FOR ITEM NO. 604-10.05, CONCRETE, S.F.

PATCHING MATERIAL SHALL BE A POLYMER-MODIFIED CEMENTITIOUS STRUCTURAL PATCHING VERTICAL AND OVERHEAD MATERIAL. SEE GENERAL NOTES AND T.D.O.T. QUALIFIED PRODUCTS LIST 13, SPEC. CATEGORY J, SUBLIST F FOR ACCEPTABLE PATCHING MATERIALS.

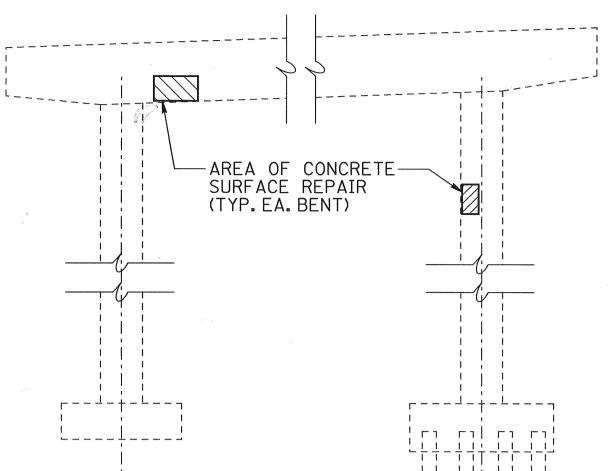


* SAW CUT EXISTING CONCRETE 1" DEEP SO AS TO OBTAIN A RECTANGULAR AREA. ALL EXISTING REINFORCEMENT SHALL BE CAREFULLY PRESERVED AND BLAST CLEANED. SEE SECTION A-A.

CONCRETE REMOVAL AREAS

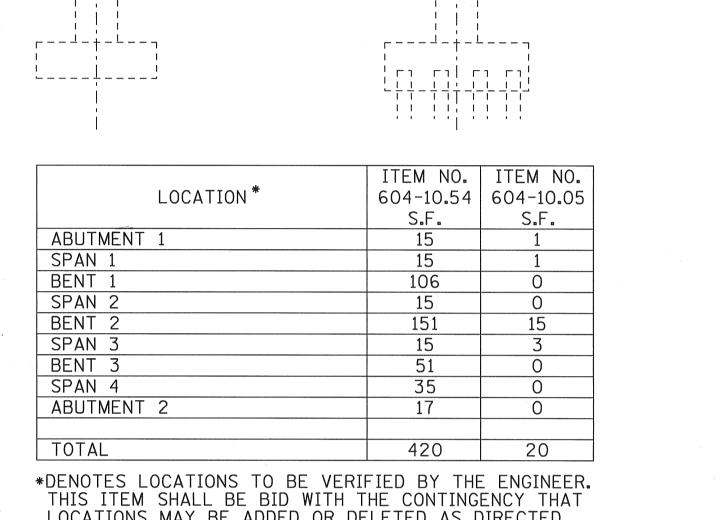
EXTREME CARE SHALL BE TAKEN WHEN REMOVING THE EXISTING SPALLS REMOVING THE EXISTING SPALLED CONCRETE SO AS NOT TO DAMAGE THE EXISTING REINFORCING STEEL. ALL EXPOSED EXISTING REINFORCING STEEL SHALL RECEIVE A COMPLETE CLEANING TO REMOVE ALL RUST. ALL EXISTING REINFORCING STEEL SHALL REMAIN IN PLACE. ALL WORK MUST BE APPROVED BY THE ENGINEER.

DESIGNED BY	DWB	DATE <u>04/2005</u>
DRAWN BY	<u> CADD</u>	DATE 04/2005
SUPERVISED BY	SFF	DATE 04/2005
CHECKED BA	SFF	DATE 04/2005



LOCATIONS MAY BE ADDED OR DELETED AS DIRECTED BY THE ENGINEER.

THESE QUANTITIES INCLUDE REPAIR TO CONCRETE BEAMS AS WELL AS CONCRETE SUBSTRUCTURES.



CHIP AND REMOVE - DELAMINATED CONCRETE UNDERSIDE OF DECK CLEAN AND PAINT EXPOSED REINFORCEMENT

UNDERSIDE DECK DELAMINATION DETAIL

NOTE: LIMITS AND LOCATION OF REPAIRS TO BE DESIGNATED BY THE ENGINEER.

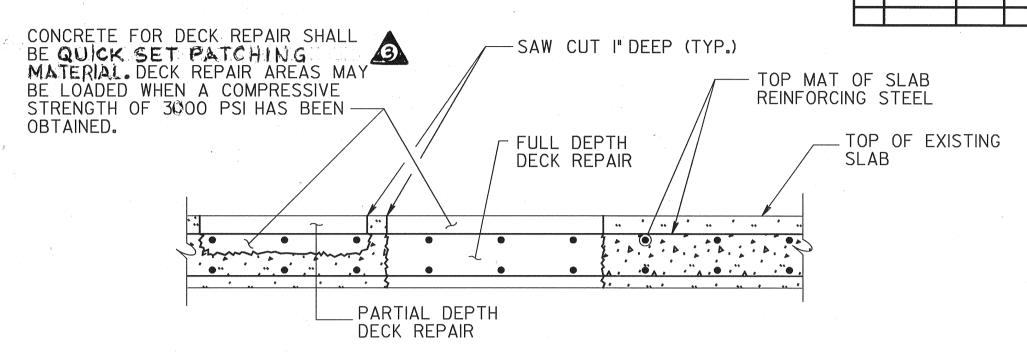
NOTES FOR ITEM 604-10.53:

THE COST OF REMOVING PORTIONS OF THE EXISTING CONCRETE WITHIN THE LIMITS SHOWN. CHIPPING. CLEANING EXISTING REINFORCING STEEL, PAINTING, LABOR AND ALL MISCELLANEOUS MATERIAL NECESSARY TO COMPLETE REPAIRS AS SHOWN SHALL BE INCLUDED IN PRICE BID FOR ITEM NO. 604-10.53.

> EXTREME CARE SHALL BE TAKEN WHEN REMOVING THE EVICTING REMOVING THE EXISTING SPALLED CONCRETE SO AS NOT TO DAMAGE THE EXISTING REINFORCING STEEL. ALL EXPOSED EXISTING REINFORCING STEEL SHALL RECEIVE A COMPLETE CLEANING TO REMOVE ALL RUST. ALL EXISTING REINFORCING STEEL SHALL REMAIN IN PLACE. ALL WORK MUST BE APPROVED BY THE ENGINEER.

PROJECT NO.	YEAR	SHEET	NO.			
33003-4159-04	2005					
PEVISIONS						

KFA1210N2 NO. DATE BY BRIEF DESCRIPTION 12/20/05 DWB REVISED NOTE 3 01-24-06 VN CHANGED NOTE & ASPHALT THICKNESS

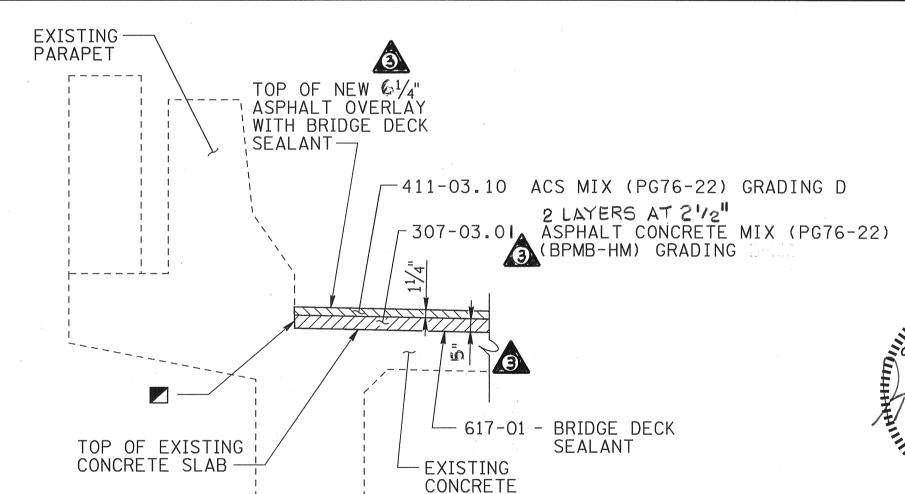


DETAIL SHOWING FULL AND PARTIAL DEPTH DECK REPAIR

NOTE: REMOVE CONCRETE IN ALL DELAMINATED AREAS TO A DEPTH OF 3/4" BELOW THE TOP BAR OF THE TOP MAT OF REINFORCING STEEL. ALL REINFORCING STEEL IN AREAS OF DECK REPAIR SHALL BE COMPLETELY CLEANED. AREAS OF CONCRETE REMOVAL SHALL BE DESIGNATED BY PERSONNEL FROM THE BRIDGE REPAIR OFFICE. INSPECTIONS TO DETERMINE AREAS OF DECK REPAIR SHALL BE SCHEDULED WITH THE BRIDGE REPAIR OFFICE AT LEAST THREE (3) DAYS IN ADVANCE. DECK REPAIR WILL BE PAID FOR UNDER ITEM NO. 604-10.50. BRIDGE DECK REPAIR (PARTIAL DEPTH OF SLAB), AND ITEM NO. 604-10.30, BRIDGE DECK REPAIR (FULL DEPTH OF SLAB). DURING PARTIAL DEPTH REPAIRS, SHOULD DETERIORATED CONCRETE BE ENCOUNTERED WHICH APPEARS TO RUN FULL DEPTH IN THE SLAB, THE ENGINEER MAY DESIGNATE THESE AREAS TO BE REPAIRED UNDER ITEM NO. 604-10.30.

NOTE: ITEM NO. 604-10.30 AND 604-10.50 SHALL BE BID WITH THE CONTINGENCY THAT THESE ITEMS MAY BE INCREASED. DECREASED OR ELIMINATED AS DIRECTED BY THE ENGINEER.

NOTE: CARE SHALL BE TAKEN WHEN REMOVING ANY AREAS OF SLAB NEAR THE I" SAW CUT LINE. A I" MINIMUM VERTICAL DEPTH SAW CUT LINE IS REQUIRED AROUND THE FULL PERIMETER OF THE PATCH PRIOR TO PLACEMENT OF CONCRETE.



ASPHALT PAVEMENT DETAIL

NOTE: SEE SECTIONS 617 AND 906.04 OF THE TENNESSEE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. DENOTES: MASTIC AS RECOMMENDED BY MANUFACTURER OF MEMBRANE. SEE STANDARD SPECIFICATIONS, ARTICLE 906.04.

SPECIAL NOTE: CONTRACTOR IS TO TAKE CARE NOT TO DAMAGE THE CONCRETE DECK WHILE REMOVING THE ASPHALT WEARING SURFACE FROM THE EXISTING BRIDGE. ANY ASPHALT REMAINING ON THE DECK AFTER MECHANICAL REMOVAL WILL NEED TO BE REMOVED TO PRODUCE A SMOOTH SURFACE.



STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS DETAILS

INTERSTATE 24 OVER GERMANTOWN ROAD

BRIDGE I.D. NO. 33-124-12.08 HAMILTON COUNTY 2005

TN D.O.T. ENGINEERING SUPERVISOR

BR-75-2I

V. NEWBERRY

SLAB