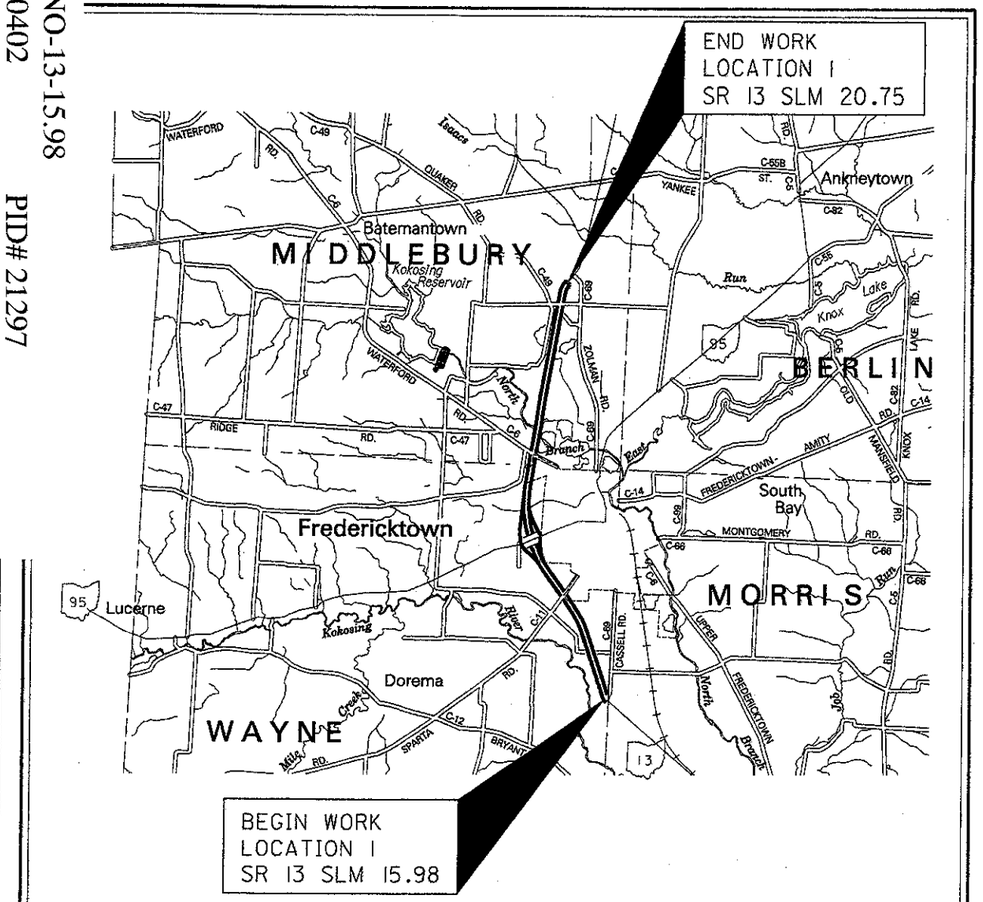
OHIO DEPARTMENT OF TRANSPORTATION

KNO-13-15.98
000402
DIST. 05

PID# 21297
08-02-00



PROJECT DESCRIPTION:
OVERLAYING EXISTING MAINLINE, PAVED SHOULDERS AND RAMPS WITH NOVACHIP, TYPE B. REPLACE GUARDRAIL

LOCATION	COUNTY	ROUTE	SECTIONS	PROJECT TERMINI		NET LENGTH MILES	VILLAGE
				BEGIN	END		
1	KNOX	SR 13	(16.00-18.72)	15.98	20.75	4.77	FREDERICKTOWN

INDEX OF SHEETS:

DESIGN DESIGNATION	
CURRENT ADT (2000)	10900
DESIGN YEAR ADT (2008)	13200
DESIGN HOURLY VOLUME (2008)	1320
DIRECTIONAL DISTRIBUTION	50%
TRUCKS	12%
DESIGN SPEED	65 MPH
LEGAL SPEED	60 MPH

1997 SPECIFICATIONS

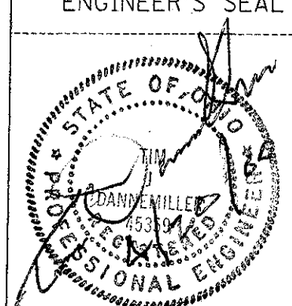
The standard specifications of the State of Ohio, Department of Transportation, including changes and supplemental specifications listed in the proposal shall govern this improvement.

I hereby approve these plans and declare that the making of this improvement will not require the closing to traffic of the highway and that provisions for the maintenance and safety will be as set forth on plans and estimates.

Approved _____
Date 4/24/00 District Deputy Director of Transportation

Approved _____
Date 5-2-00 Director, Department of Transportation

ENGINEER'S SEAL



UNDERGROUND UTILITIES
TWO WORKING DAYS
BEFORE YOU DIG
CALL 1-800-362-2764 (TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

PLAN PREPARED BY:

DISTRICT No. 5
OHIO DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS		STANDARD DRAWINGS		SUPPLEMENTAL SPECIFICATIONS	
BP-3.1 2-21-92	GR-4.3 2-21-92	MT-99.20 4-29-88	MT-98.16 6-24-93	806	9-9-97
GR-1.1 5-6-91	GR-4.2 5-6-91	MT-105.10 7-1-92			
GR-1.2 10-30-92	GR-5.1 10-30-92	MT-105.11 7-1-92	TC-71.10 9-10-91		
GR-1.3 2-21-92	GR-5.2 10-30-92	MT-95.30 10-10-88	TC-72.20 2-26-82		
GR-2.1 5-6-91	GR-5.3 10-30-92	MT-98.12 6-24-93	TC-35.10 8-29-84		
GR-3.1 5-6-91	GR-6 2-5-82	MT-98.13 6-24-93	TC-65.10 7-7-95		
GR-3.4 5-6-91	GR-7.1 10-30-92	MT-98.14 6-24-93	TC-65.11 7-7-95		
GR-4.1 5-6-91	GR-8.1 1-31-94	MT-98.15 6-24-93	TC-65.12 7-7-95		

DESIGNER - LARRY M. EBY JR.
K0130001.MTS 4-20-00

FEDERAL PROJECT NO. TE21-GOOO(437)
PID NO. 21297
CONSTRUCTION PROJECT NO.
RAILROAD INVOLVEMENT NONE
KNO-13-15.98
1-19

UTILITIES

THERE ARE NO UNDERGROUND UTILITIES SHOWN ON THIS PLAN. THE NATURE OF THE WORK REQUIRED BY THIS PROJECT WILL NOT AFFECT ANY KNOWN UNDERGROUND UTILITIES THAT EXIST UNDER OR ADJACENT TO THE WORK AREA.

TIME WARNER CABLE COMMUNICATIONS
111 S. MULBERRY
MT. VERNON, OH. 43050
ATTN: PETE FRYE, PROJ. COORD.
PHONE: (740)397-3250 EXT. 228

AEP
850 TECH CENTER DRIVE
GAHANNA, OH. 43230-6605
ATTN: RICK ECKLE
PHONE: (614)883-6829

KNOX COUNTY WATER & SANITARY
17604 COSHOCTON RD.
MT. VERNON, OH. 43050
ATTN: JOHN HUNT, SUPERINTENDENT
PHONE: (740)397-7041

ENERGY COOPERATIVE
P.O. BOX 455
UTICA, OH. 43080-455
ATTN: STEVE WILLIAMS, ENGR. SUPV.
PHONE: 1-800-542-1140 EXT. 1288

SPRINT TELEPHONE
175 ASHLAND RD.
MANSFIELD, OH. 44904
ATTN: MONICA MEGYESI
PHONE: (419)755-7138

COLUMBIA GAS TRANSMISSION CORP.
1608 HOMER RD., N.W.; CR 19
HOMER, OH. 43027-0079
ATTN: JACK ROHRBAUGH, LAND AGENT
PHONE: (740)892-5218

COLUMBIA GAS OF OHIO, INC.
1120 W. 4th STREET
MANSFIELD, OH. 44906
ATTN: BARTH SMITH
PHONE: (419)528-1114

CONTINGENCY QUANTITIES

THE CONTRACTOR SHALL NOT ORDER MATERIALS OR PERFORM WORK FOR ITEMS DESIGNATED BY PLAN NOTE TO BE USED "AS DIRECTED BY THE ENGINEER" UNLESS AUTHORIZED BY THE ENGINEER. THE ACTUAL WORK LOCATIONS AND QUANTITIES USED FOR SUCH ITEMS SHALL BE INCORPORATED INTO THE FINAL CHANGE ORDER GOVERNING COMPLETION OF THIS PROJECT.

RAISED PAVEMENT MARKER REMOVED FOR STORAGE, AS PER PLAN

REMOVAL OF RAISED PAVEMENT MARKERS SHALL CONFORM WITH SECTION NO. 202.0711 IN THE CONSTRUCTION AND MATERIAL SPECIFICATIONS MANUAL EXCEPT FOR THE FOLLOWING:
ONCE PAVEMENT MARKERS HAVE BEEN REMOVED THE OPENING THAT REMAINS IN THE ROADWAY SHALL BE CLEANED FREE OF ALL DEBRIS, TACKED AND FILLED WITH ASPHALT CONCRETE BY THE END OF THE SAME CONSTRUCTION DAY.
AFTER PAVEMENT MARKERS HAVE BEEN REMOVED BY THE CONTRACTOR, HE WILL THEN BE RESPONSIBLE TO TAKE THE REMOVED MARKERS TO A STATE GARAGE THAT WILL BE DESIGNATED BY THE ENGINEER. THE PROJECT ENGINEER SHALL GIVE THE DISTRICT MAINTENANCE ENGINEER 24 HOUR NOTICE PRIOR TO DELIVERY AND THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY TRANSFER DOCUMENTATION WITH ALL DELIVERIES. PAYMENT FOR ALL WORK DESCRIBED ABOVE SHALL BE PAID FOR UNDER ITEM 202 RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN.

ITEM 202 - RAISED PAVEMENT MARKER REMOVED FOR STORAGE, AS PER PLAN

LOCATION 1 - 750 ESTIMATED QUANTITIES CARRIED TO GENERAL SUMMARY

ITEM 614 - MAINTAINING TRAFFIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE SPECIFICATIONS, AS WELL AS THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR 614, MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

PROFILE AND ALIGNMENT

THE PROPOSED PAVEMENT RESURFACING SHALL FOLLOW THE ALIGNMENT AND PROFILE OF THE EXISTING PAVEMENT.

WEARING COURSE REMOVED, AS PER PLAN

THIS ITEM SHALL BE USED TO REMOVED GRADER PATCHING THROUOUT THE PROJECT. THE DEPTH OF REMOVAL SHALL BE VARIABLE AND AT THE DESCRETION OF THE ENGINEER AT THE TIME OF CONSTRUCTION. THE FOLLOWING QUANTITY IS CARRIED TO THE GENERAL SUMMARY AND SHALL BE USED AS DIRECTED BY THE ENGINEER.

ITEM 202 WEARING COURSE REMOVED, AS PER PLAN - 1400 SQ.YD.

PARTIAL DEPTH PAVEMENT REPAIR, AS PER PLAN

THIS ITEM SHALL BE USED AS DIRECTED BY THE ENGINEER TO REMOVE AND REPLACE ANY UNSOUND/DETERIORATED PAVEMENT IN THE ROADWAY AND UNDER GRADER PATCHES AFTER REMOVAL OF PATCH. THE UNSOUND/DETERIORATED AREA SHALL BE REMOVED TO A MINIMUM DEPTH OF 2.0 INCHES, TACKED WITH TACK COAT AND REPLACED WITH ITEM 448 ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG 64-22.

ITEM 251 PARTIAL DEPTH PAVEMENT REPAIR, AS PER PLAN - 200 SQ.YD.

ITEM 617, COMPACTED AGGREGATE, TYPE A, AS PER PLAN

ALL AGGREGATE SHALL BE 100% CRUSHED LIMESTONE. ALL QUALITY REQUIREMENTS EXCEPT SHALE SHALL BE WAIVED. OTHER GRADATION REQUIREMENTS SHALL BE AS SPECIFIED EXCEPT THE PLASTICITY INDEX SHALL BE WAIVED. IF SO DESIRED, THE CONTRACTOR MAY USE RECYCLED ASPHALT CONCRETE PAVEMENT (RACP MEETING REQUIREMENTS OF 617.03) IN LIEU OF CRUSHED LIMESTONE.

PAVEMENT MARKING

STOP LINES, CROSSWALK LINES, CHANNELIZING LINES, TURN ARROWS, ETC., SHOWN ON THE PLAN ARE TAKEN FROM EXISTING MARKINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DOCUMENT THE LOCATION OF EXISTING MARKINGS AND TO PLACE NEW PAVEMENT MARKINGS AS NEAR AS POSSIBLE TO THE EXISTING LOCATIONS UNLESS OTHERWISE DESIGNATED BY THE ENGINEER.

DETAILED LME
CHECKED TJD

GENERAL NOTES

KNO-13-15.98

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19

KOI30001.MGN 4-12-00

KOKOSING STATE SCENIC RIVER

SCENIC RIVER CONDITIONS IN ACCORDANCE WITH OHIO REVISED CODE SECTION (O.R.C.) 1597.16.

1. NO EARTHWORK OF ANY TYPE, GRUBBING, EXCAVATING OR FILLING WILL BE PERMITTED WITHIN ONE-THOUSAND (1,000) FEET OF THE KOKOSING STATE SCENIC RIVER.

   NO IN STREAM WORK, BANK SHAPING OR CHANNEL MODIFICATION OF ANY TYPE WILL BE PERMITTED WITHIN THE KOSOSING RIVER OR WITHIN 1,000 FEET UPSTREAM OF ANY TRIBUTARY WATERCOURSE

2. IF ANY EARTHWORK IS CONDUCTED WITHIN THE PROJECT AREA, A SEDIMENT AND EROSION CONTROL PLAN SHALL BE DEVELOPED AND IMPLEMENTED BEFORE EARTHWORK COMMENCES. ALL CONTROLS SHALL BE PROPERLY MAINTAINED UNTIL FINAL SITE STABILIZATION IS ACHIEVED. ALL DENUTED AREAS SHALL IIMMEDIATELY BE SEEDED AND MULCHED UPON COMPLETION OF EARTHWORK.

   PROPERLY INSTALLED (FRAMED and ENTRENCHED) SEDIMENT FENCE SHALL BE UTILIZED AROUND ANY STORM SEWER INLETS. APPROPRIATELY DESIGN ROCK CHECK DAMS AND OTHER EROSION CONTROLS SHALL BE UTILIZED IN DITCHES AND CULVERTS. ANY DENUDED DITCHES AND CULVERTS SHALL IMMEDIATELY BE SEEDED AND PROTECTED WITH EROSION CONTROL MATTING OR SOD UPON COMPLETION OF EARTHWORK.

3. NO CUTTING OR CLEARING OF ANY RIPARIAN VEGETATION WITHIN 1000 FEET OF THE KOKOSING RIVER SHALL BE PERMITTED.

4. NO TOXIC OR HAZARDOUS MATERIALS (ASPHALT, SEALANTS, PAINT, ETC.) EARTHEN MATERIAL, WASTE WATER OR DEBRIS OF ANY SORT SHALL BE DISCHARGED TO THE KOKOSING RIVER OR ANY TRIBUTARY WATER COURSES.

   ALL ASPHALT GRINDINGS, EXCESS ASPHALTIC MATERIAL OR ANY OTHER DEBRIS GENERATED DURING RESURFACING SHALL BE REMOVED FROM WITHIN 1,000 FEET OFTHE KOKOSING RIVER AND DISPOSED OF AT AN APPROPRIATE FACILITY ABOVE THE 100 YEAR FLOOD ELEVATION OF THE KOKOSING RIVER.

5. BOB GABLE, CENTRAL OHIO SCENIC RIVER COORDINATOR SHALL BE INVITED TO A PRECONSTRUCTION MEETING WITH THE CONTRACTOR PRESENT. PLEASE PROVIDE SUFFICIENT ADVANCE NOTICE TO ALLOW FOR CONFLICTS IN MY SCHEDULE.
   THESE CONDITIONS MUST BE ATTACHED TO THE CONSTRUCTION ON DRAWINGS ON SITE AND AVAILABLE TO ALL CONSTRUCTION PERSONNEL THROUGHOUT THE DURATION OF THE PROJECT.

BOB GABLE
OHIO DEPARTMENT OF NATURAL RESOURCES
1889 FOUNTAIN SQ. CT., BLDG. F-1
COLUMBUS, OH 43224
PHONE: (937) 854-0350

K0130006.MGN 4-21-00

CALCULATED LME CHECKED TJD

GENERAL NOTES

KNO-13-15.98

2A 19

GUIDELINES FOR *NOVACHIP*® SPECIFICATIONS

Item No.	Item	Quantity		Pay Unit
	NOVACHIP			square yd

ITEM:
NOVACHIP

DESCRIPTION:
This specification covers the requirements for the placement of NOVACHIP which shall consist of application of a warm Novabond polymer modified asphalt emulsion followed immediately with an ultrathin overlay of hot asphalt concrete. The Novabond emulsion shall be spray applied immediately prior to the application of the hot asphalt concrete overlay so as to produce a homogeneous wearing surface that can be opened to traffic immediately upon sufficient cooling. The finished wearing course shall have a minimum thickness of 1/2" for Type A and 5/8" for Type B and Type C.

MATERIALS:
The contractor shall formulate and submit a job mix formula that satisfies the design general limits listed in Table 1 - Mixture Requirements. The production tolerances in Table 1 will be permitted to exceed the design general limits.

Table 1 - Mixture Requirements

Composition by weight percentages							
SIEVES		**1/4 in. - Type A**		**3/8 in. - Type B**		**1/2 In. - Type C**	
ASTM	**mm**	Design General Limits % Passing	Production Tolerance, %	Design General Limits, % Passing	Production Tolerance, %	Design General Limits, % Passing	Production Tolerance, %
3/4 inch*	19					100	
1/2 inch	12.7			100		85 - 100	
3/8 inch	9.5	100		85 - 100	±5	60 - 80	±5
#4	4.75	40 - 55	±4	28 - 38	±4	28 -38	±4
#8	2.36	22 - 32	±4	25 - 32	±4	25- 32	±4
#16	1.18	15 - 25	±3	15 - 23	±3	15 - 23	±3
#30	0.60	10 - 18	±3	10 - 18	±3	10 - 18	±3
#50	0.30	8 - 13	±3	8 - 13	±3	8 - 13	±3
#100	0.15	6 - 10	±2	6 - 10	±2	6 - 10	±2
#200	0.075	4 - 7	±2	4 - 7	±2	4 - 7	±2
Asphalt Content, %		5.0-5.8		4.8-5.6		4.6-5.6	±0.5
Draindown Test		**0.10% max**					
Moisture Sensitivity, AASHTO T283**		**80% min**					
Asphalt Grade: Novabinder							

* A target of 100% passing the 5/8" is recommended. Mixtures containing 5/8" aggregate size will require greater paving thickness.
**Specimens for T-283 testing are to be compacted using the Superpave gyratory compactor. The mixtures are to be compacted using 100 gyrations. Mixture and compaction temperatures are to be as recommended by the binder supplier.

COARSE AGGREGATE:
The coarse aggregates selected should be those typically used for high performance surfaces. Coarse aggregate should meet the skid resistance criteria as set forth by the specifying agency or have a history of successful use in surface mixes. Coarse aggregates, material retained above the #4 sieve, shall be from approved sources and shall meet the requirements listed in Table 2.

Coarse aggregates, such as crushed gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, or blends of two or more of the above may be acceptable. When coarse aggregates for these mixes are from more than one source or of more than one type of material, they shall be proportioned and blended to provide a uniform mixture if approved by the Engineer.

Table 2- Coarse Aggregate - Properties

Tests		Method	Limit
Los Angeles abrasion value[1], % loss		AASHTO T 96-94	35 max
Soundness[1], % loss	Magnesium Sulfate orSodium Sulfate	AASHTO T 104-94	18 max12 max
Flat & Elongated Ratio		ASTM D 4791	25% max (3:1)
% Crushed, single face		ASTM D 5821	100 min
% Crushed, Two or more Mechanically crushed faces		ASTM D 5821	85 min
Micro-Deval, % loss		AASHTO TP58-99	18 max

[1]Note: Values shown for these tests are targets for aggregate selection purposes. The results of these tests should not be the sole basis for rejection.

FINE AGGREGATE:
The fine aggregates will be part of the asphalt mastic. The fine aggregate, passing the #4 sieve, shall meet the requirements of Table 3.

Table 3 - Fine Aggregate - Properties

Tests	Method	Limit
Sand Equivalent[2]	AASHTO T 176-86	45 min
Methylene Blue[2] (on materials passing 200)	AASHTO TP 57-99	10 max
Uncompacted Void Content	AASHTO T 304-96	40 min

[2]Note: Values shown for these tests are targets for aggregate selection purposes. The results of these tests should not be the sole basis for rejection. If the finished bituminous mixture passes the AASHTO T-283 requirement in Table 1, the sand equivalent and methylene blue requirements may be waived.

MINERAL FILLER:
Mineral filler may be used as an option to aid in meeting the gradation requirements. Hydrated Lime, certain classes of fly ash, baghouse fines and Type 1 Portland cement are acceptable as mineral filler.

Table 4 - Mineral Filler Requirement

Typical acceptable gradation:
100% passing #600 µm
75-100% passing #75 µm

NOVABOND EMULSION:
The emulsion shall be Novabond.

CONSTRUCTION DETAILS:

A. EQUIPMENT
The contractor shall use a self-priming paver, designed and built for the purpose of applying Novachip and appearing on the current Agency Approved List. Requests for approval of equipment not currently on the Approved List shall be made to the Director of the appropriate Bureau, prior to the start of any work. All other equipment and tools shall be approved by the Engineer. All equipment and tools shall be maintained in satisfactory working condition at all times.

CALCULATED CHECKED

B. APPLICATION

The Novachip shall not be placed on a wet pavement. The pavement surface temperature shall be not less than 10˚C (50˚F) at the time of placement. A damp pavement surface is acceptable for placement if it is free of standing water and favorable weather conditions are expected to follow.

The Novabond shall be sprayed by a metered mechanical pressure spray bar at a temperature 140 - 180˚F. The sprayer shall accurately and continuously monitor the rate of spray and provide a uniform application across the entire width to be overlaid. The rate of spray shall be in the range of 0.2 gal/yd^2 ± 0.07 gal/yd^2 as determined by the mix design. Adjustments to the spray rate shall be made based upon the existing pavement surface conditions and recommendations of the Novabond supplier.

No wheel or other part of the paving machine shall come in contact with the Novabond before the hot mix asphalt concrete wearing course is applied.

The hot mix asphalt concrete shall be applied at a temperature of 302 - 330˚F and shall be spread over the Novabond immediately after the application of the Novabond. The hot asphalt concrete wearing course shall be placed over the full width of the Novabond emulsion with a heated, combination vibratory-tamping bar screed.

Because of the minimal depth of the hot mix asphalt concrete being placed, it may be damaged if opened to traffic too quickly. Therefore, the new pavement shall not be opened to traffic until the rolling operation is complete and the material has cooled sufficiently to resist damage. The cooling time will be brief due to the minimal depth of the mat.

C. SURFACE PREPARATION

The following items will be performed prior to the commencement of paving operations and paid for under the appropriate item numbers.

1. Manhole covers, drains, grates catch basins and other such utility structures shall be protected and covered with plastic or building felt prior to paving and also shall be clearly referenced for location and adjustment after paving.
2. Thermoplastic traffic markings shall be removed if greater than ¼" thickness (ride quality).
3. Pavement cracks and joints greater than ½" wide shall be cleaned and filled using an approved material and method (separate pay item). The maximum film thickness allowed will be ¼" (ride quality).
4. Surface irregularities greater than 1" deep shall be filled with a material approved by the Engineer.
5. The entire pavement surface to be overlaid shall be thoroughly cleaned, giving specific attention to accumulated mud and debris. Pressurized water and/or vacuum systems may be required to insure a clean surface.

D. PAVING EQUIPMENT

The self-priming machine shall be capable of spraying the Novabond emulsion, applying the hot asphalt concrete overlay and leveling the surface of the mat in one pass at the rate of 30.5 to 92 ft/minute. The self-priming paving machine shall incorporate a receiving hopper, feed conveyor, insulated storage tank for Novabond emulsion, Novabond emulsion spray bar and a variable width, heated, tamper bar screed. The screed shall have the ability to be crowned at the center both positively and negatively and have vertically adjustable extensions to accommodate the desired pavement profile.

E. COMPACTION

Compaction of the wearing course shall consist of a minimum of two passes with a steel double drum asphalt roller of minimum weight of 10 metric tons, before the material temperature has fallen below 185˚F. At no time shall the roller or rollers be allowed to remain stationary on the freshly placed asphalt concrete. Compaction shall immediately follow the placement of the Hot Mix Asphalt Concrete with an approved asphalt roller(s). Roller(s) shall be well maintained, in reliable operating condition and be equipped with functioning water system and scrapers to prevent adhesion of the fresh mix onto the roller drums. Adequate roller units shall be supplied so the compaction will be accomplished promptly following the placement of the material. A release agent (added to the water system) may be required to prevent adhesion of the fresh mix to the roller drum and wheels. Compaction shall normally be done in the static mode.

F. QUALITY CONTROL

The following measures shall be used by the Contractor to maintain quality control and uniformity. The Contractor will be responsible for obtaining all the quality control (QC) samples. Prior to production, the Engineer will approve the sampling method used by the Contractor.

1. Novabond - The Novabond application rate as determined by three yield checks daily shall not exceed a tolerance of ± 0.02 gal/yd^2 from the established JMF application rate as determined by the mix design and/or the recommendations by the material supplier.
2. Hot Mix Asphalt Concrete Wearing Course - The bituminous surface course application rate as determined by a minimum of three yield checks daily , shall not exceed a tolerance of ±3.5
   lb/yd^2 of the target application rate.

Sampling of the bituminous surface course will take place at the area just before the screed of the paver unit.

One daily sample of the bituminous surface course placed, shall be tested before the next day's production. If this test result varies from the JMF by more than the quality control tolerances of Table 6, production will stop. The Contractor shall identify the cause and document, in detail what corrective action was taken. The JMF may only be adjusted if the revised JMF meets the mixture requirements of Table 5.

Table 6: Quality Control Tolerances

Percent Passing Indicated Sieves	Type A Mix	Type B Mix	Type C Mix
SIZE	Tolerance, %	Tolerance, %	Tolerance, %
¾			
½			±5
3/8	±5	±5	±5
#4	±4	±4	±4
#8	±4	±4	±4
#200	±2	±2	±2
PG Asphalt Binder Content, %	±0.5		

CALCULATED | CHECKED

G. Quality Assurance Sampling and Testing

The Engineer is responsible for all quality assurance (QA) sampling and testing, except where stated below. Quality assurance testing on bituminous surface course will be done at the field laboratory. All other testing will be done at a laboratory selected by ODOT. Quality assurance testing shall be completed in a reasonable time. Sampling and testing methods will be the same as used by the Contractor.

1. Novabinder - The Contractor shall take a daily sample of the Novabinder and submit to the Engineer for information only.
2. Novabond - The Contractor shall take a daily sample of the polymer modified asphalt emulsion and submit to the Engineer for information only.
3. Bituminous Surface Course - The total quantity of the bituminous surface course shall be divided into three equal sublots for acceptance purposes. A random sample shall be taken per sublot for Department testing. If all three sublot test results are in agreement with Table 6 tolerances, as compared to the JMF, the lot will be accepted.
4. Pay Adjustments - If any sublot test result on aggregate gradation on any one sieve, or asphalt binder content is outside Range 1 but within Range 2 tolerance limits of Table 7, a negative pay adjustment of 10% will be applied to that sublot quantity of Novachip.

If any sublot test result on aggregate gradation on any one sieve or asphalt binder content is outside range 2 tolerance limits on Table 7, a negative pay adjustment of 25 percent will be applied to that sublot quantity of Novachip.

If in the Engineer's judgement, defective areas warrant removal, the Contractor shall remove and replace those areas at the Contractor's expense with materials meeting specification requirements.

Table 7: Quality Assurance Tolerances

Bituminous Surface Course	Range	Designated Sieves					Asphalt Binder Content
		½"	3/8"	#4	#8	#200	
	Range 1	±5.0	±5.0	±5.0	±4.0	±1.0	±0.4
	Range 2	±8.0	±8.0	±8.0	±6.0	±2.0	±0.5

Method of Measurement:

The Novachip shall be measured by the number of square yards of pavement surfaced in accordance with this specification.

Basis of Payment:

The unit price bid per square yard shall include all labor, materials and equipment necessary to complete the work.

CALCULATED | CHECKED

WARRANTY GENERAL NOTES

Warranty Items and Remedial Action: Warranty items and Remedial Actions are specified in Table A. The warranty applies only to the mainline pavement lanes and ramps and shall be in effect for a period of two (2) years from construction completion. The warranty does not apply to structural problems below the pavement placed as part of this project, provided the structural problem is not the fault of the Contractor. The Threshold Levels are based on the 0.1 mile (160 m) Segments described below.

Meeting the minimum requirements and guidelines of this note are not to be construed as a warranty, expressed or implied, as to the materials properties and workmanship efforts required to meet the performance criteria set forth in Table A.

The Design Designation in the plan is an indication of the level of traffic expected on this project and is based on data the Department has taken in the past using best practice projections into the future and can be used to approximate the expected yearly trucks.

The intent of this contract is for the Contractor to provide a maintenance free pavement. The Contractor may perform routine maintenance during the warranty period, but this routine maintenance is limited to routing and sealing the pavement with Type I crack seal in accordance with Supplemental Specification 825 or other repairs authorized by the Department.

The Contractor's construction traffic control for performing any work required or allowed by this note during the warranty period shall be in accordance with current Department policy, the Ohio Manual of Uniform Traffic Control Devices for Streets and Highways, and subject to Department approval of the time the work will be performed. Any major change in Department construction traffic control policy will be considered a changed condition.

Asphalt concrete used for Remedial Action work or replacement of sampled areas (See Table A Note 3) shall be approved by the Engineer. The Engineer will take into account the Department's design criteria for the pavement type. The depth of a repair area may be increased by the Engineer to allow for the size of aggregate in the asphalt concrete. For Remedial Action work, the Engineer may approve alternatives to the extent or type of specified Remedial Action.

Any pavement markings or raised pavement markers (RPM) removed or obliterated while performing a Remedial Action shall be replaced with pavement markings or RPMs equal to or better than the original products at the Contractor's cost.

All Remedial Actions shall be performed on or before September 30. Prior to performing a Remedial Action, the Contractor shall submit a Remedial Action plan to the Engineer for approval. This plan shall state when and how the Remedial Action will be done, what material will be used, and how traffic will be controlled while the Contractor is performing the Remedial Action.

Emergency work, repairing pavement distresses which are hazardous to the traveling public, will be performed by the Department. If the emergency work is extensive, the Department may authorize the Contractor to do the repairs. The District Construction Engineer (DCE) will determine if the distress is or is not the fault of the Contractor. If the DCE determines the distress is the fault of the Contractor, the cost of this emergency work, no matter who does the emergency work, including construction traffic control, will be paid by the Contractor. The Contractor is not responsible for pavement damage beyond the Contractor's control (i.e., car fire, oil spill, etc.).

Annual Review: The project shall be divided into 1 mile (1600 m) Sections. The width of each Section will be the width of a single lane. Each Section shall be divided into 0.1 mile (160 m) Segments.

Each year, between March 1 and April 30, the project will be reviewed by a District Review Team (DRT). The DRT (the Area Engineer, the County Manager, a representative from the Planning Department and a representative from the Production Department) shall notify the Contractor of the scheduled review. The Contractor or any other interested party may attend the annual review, for observation only. Any comments by the Contractor or other interested party will be recorded by the DRT. The DRT will pick at least two Segments in each Section to review, but may review the entire Section. Within 15 days after the completion of the review, the results will be issued in writing to the Contractor.

Based on the results of a preliminary review by a member of the DRT, the District Deputy Director may authorize an additional review within 1 year after the Form C-85 is issued or waive the yearly review for all or part of the project. An additional review would be contacted in the same way as a yearly review. Any waiver will be in writing to the Contractor.

Appeal Process: The Contractor may appeal a finding of the DRT. Any appeal shall be submitted to the DCE, in writing, within 15 days after the written results of the DRT are given to the Contractor. If the results include Rutting beyond the Threshold Level, the submission time limit is changed to 15 days after removing the slabs (See Table A Note 3) for a dispute over Rutting only.

The DCE will evaluate the Contractor's appeal. This evaluation will include reviewing the disputed area in the field and consulting with the Construction Section of the Office of Highway Management. The evaluation may also include reviewing test data, obtaining samples, or interviewing Department (District or Central Office) or Contractor employees. The DCE's determination will be issued in writing to the Contractor within 45 days after the DCE receives the appeal.

If the Contractor disagrees with the DCE's determination, the Contractor may appeal the determination using an arbitration method acceptable to the Department. The Department will agree, in all cases, to arbitration in the manner in which those methods are practiced by the Department. If the Contractor selects arbitration, written notice of this approach must be made to the DCE within 15 days of receipt of the DCE's determination. After written notice has been provided, the parties shall agree in writing to the Arbitrator and agree to share equally the fees of the Arbitrator.

After the Arbitrator is given notice to proceed, the Arbitrator shall conduct an investigation and issue a determination within 45 days. The Arbitrator's determination will be limited to determining whether or not the pavement distress is or is not the fault of the Contractor.

WARRANTY GENERAL NOTES

TABLE A - WARRANTY ITEMS AND REMEDIAL ACTIONS		
Distress Type	Threshold Level (per Segment)	Remedial Action
Disintegrated Area (1)	None	(4)
Previous Patching (2)	300 square feet (28 m2)	(5)
Rutting (3)	0.250 inch (6.0 mm)	(4)

(1) This includes all types of disintegration, including, but not limited to, mix delamination, potholes, and raveling. This includes any type of disintegration that occurs at a joint or crack.

(2) An area of multiple patches is calculated as the width of the lane times the length of the patched area. These patches consist of Remedial Actions made by the Contractor or patches made by the Department in distressed areas that have been determined to be the Contractor's fault.

(3) This Threshold Limit only applies for 1 year after construction completion or after any Remedial Action work.

This Threshold Limit does not apply to the last 250 feet of pavement before a forced stop control (i.e., stop sign, traffic signal, etc.).

Measure the wheel path with a 4 foot (1.2 m) straight edge at 6 locations in a Segment. If one measurement exceeds the Threshold Level, the entire Segment will be measured at 50 foot (15 m) intervals for each wheel path. Remedial Action is required if six or more measurements exceed the Threshold Level.

To determine the depth of the distressed area, the Contractor shall cut a 1 foot (0.3 m) by 4 foot (1.2 m) slab to a depth necessary to determine the depth of the distress at a maximum of three locations determined by the DRT. The slabs shall be retained for possible use in any appeal process. Cost of this slab removal and replacement, including construction traffic control, is paid by the Contractor, unless it is determined the rutting is not the Contractor's fault. Slabs shall be removed within 30 days after receiving the results of the review.

(4) Remove and replace the distressed area to the depth needed to repair the distressed area.

(5) Remove and replace the surface in this Segment's lane to a minimum depth of 1.5 inches (38 mm), from the end of the first down station Segment with no patches to the beginning of the first up station Segment with no patches.

CALCULATED
CHECKED

WARRANTY GENERAL NOTES

KNO-13-15.98

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RPM General Notes

Materials Supplied by The Department

All materials are to be Contractor furnished, except that the Department shall supply RPM materials in the quantities shown herein to the Contractor. Pay items for the Department supplied materials shall be indicated as "Installation Only". The quantity and type of Department supplied materials are shown on sheet 17 of this plan.

The Contractor shall pick up the department supplied RPM materials at the direction of the Project Engineer.
For some projects having quantities of less than 20 RPMs, the contractor may pick up RPM materials at the District Offices. Quantities over 20 RPMs will be picked up at the Recycler's Warehouse or as arranged with the District. The Contractor shall pick up Department supplied RPM materials at the specified location(s) for transport to the work site or to the Contractor's storage facility. The Recycled Raised Pavement Marker (RPM) Authorization Form is to be signed by the District Construction Engineer prior to pick up of the RPMs. The Contractor shall notify the District and / or the parties listed on the authorization form in writing at least five (5) calendar days prior to pick up of the department supplied materials. The contractor shall store the RPMs without damage or contamination with foreign matter. A deduction in the amount of the actual cost to the Department shall be made for materials damaged by the Contractor or for castings received by the Contractor which were not installed and were not returned to the Department.

Return of Non-performed Raised Pavement Marker Materials Supplied by the Department

Raised Pavement Marker Materials Supplied by the Department, that are non-performed shall be carefully repacked or packed in the boxes in the same style and quantity as originally received from the Department. Casting styles shall not be mixed within any one container. The Contractor shall clearly mark on the outside of each container, the color of the prismatic retro-reflector, the style of casting. Boxes shall be placed on skids or pallets in the same style (Low Profile or Conventional, reflectorised or non reflectorised) and no more than 420 RPMs (or 21 Boxes) on one skid.

Only use the boxes supplied by the Raised Pavement Marker Recycler. Boxes must be marked with the recycler's part or catalog number and the project number. The recycler's catalog or part numbers may be obtained from the Office of Traffic Engineering in Columbus, Ohio or from the recycler. Boxes not marked with the proper recycler's catalog or part numbers, and the department's project number will not be accepted at the recycler's warehouse Non Performed Materials will be returned to the location as specified by the District Construction Engineer within 30 Days of the completion of the project.

The above work including all labor, equipment and material needed to perform the work, shall be considered incidental to the respective pay item.

If the department has to repackage the RPMs correctly, the Contractor will be assessed the actual cost for repackaging the Materials by the Department's Forces.

Loading of Materials Supplied by the Department at the Recycler's Warehouse

Trucks shall have a loading height of 48 inches and be able to back up flush to the loading dock.

Trucks shall not have any obstructions or protrusions that prevent the loading by a standard forklift or lift truck.

Semi trucks or 20 foot commercial trucks are the most appropriate trucks for loads in excess of 4 pallets (one pallet = 21 boxes = 2000 LBS).

Stake body trucks are appropriate to load less than 4 pallets, provided the truck is rated for the load and the load can be safely secured for transport by chaining or strapping down as needed.

Pickup trucks are appropriate for loads of approximately one pallet, provided the pickup truck is rated for the load and the load can be safely secured for transport.

Dump trucks, tilt bed trucks, and non commercial moving vans will not be loaded by the recyclers warehouse.

The warehouse supervisor will refuse to load any truck that is unsafe to load or unsuitable for the load being placed on the truck.

CALCULATED LME CHECKED TJD

GENERAL NOTES

KNO-13-15.98

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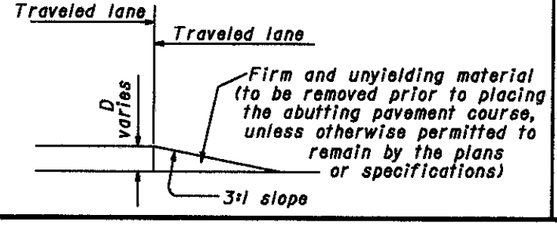
GENERAL NOTES

1. It is intended that this drawing be used for treatment of drop-offs that develop during construction operations, and that are not otherwise provided for in the construction plans. Where the plans do not provide specific items for labor, equipment, or materials to implement the drop-off treatments specified hereon, they shall be included for payment in the lump sum bid for Item 614 - Maintaining Traffic.
2. While the need for certain advisory signing is noted hereon, it is not intended that this be indicative of all signing that may be required to advise or warn motorists, and all requirements of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) must be fulfilled.
3. In urban or otherwise heavily developed areas where pedestrians and/or bicyclists may be present in significant numbers, additional signing and protective measures other than those shown hereon may be required.
4. The drop-off treatment selected for use at any given location shall be as appropriate for the prevailing conditions at the site.
5. Where concrete barrier is specified, it shall be in accordance with Standard Construction Drawing MC-9.2 and Item 622.
6. When drums are specified for a dropoff condition, a minimum number of four drums shall be used. Spacing shall be as indicated in the plans or as specified in the OMUTCD.
7. When OW-15l (Low Shoulder) signs or OW-17l (Uneven Lanes) and OWP-17l signs are required, they shall be placed 750' in advance of the condition, on all intersecting entrance ramps within the limits of the condition and immediately beyond all intersecting roadways within the limits of the condition. When the dropoff condition extends more than one-half mile, additional signs should be erected at intervals of one mile or less.
8. For locations, such as at ramps, lane shifts, lane closures, etc., where traffic is required to negotiate any difference in elevation between pavements, a 3:1 slope treatment similar to the Optional Wedge Treatment shall be provided.
9. Portable concrete barrier shall be placed on the same level as the traffic surface and shall not encroach on lane width(s) designated as the minimum required for traffic use. Where drums are used, and their presence would reduce traveled lane widths to less than 10', drums may be placed on the opposite level from that of traffic provided the dropoff depth does not exceed 5" and approval is granted by the Project Engineer.
10. Pavement Repairs (or similar work):
    a. Lengths greater than 60 feet - utilize appropriate treatment from Condition I.
    b. Lengths of 60 feet or less - repairs shall be effected in accordance with 255.08. Drums may be used as a separator adjacent to the traveled lane.

OPTIONAL WEDGE TREATMENT
(MILLING OR RESURFACING)

1. This treatment may be used when permitted for Condition I only.
2. OW-17l and OWP-17l signs required.

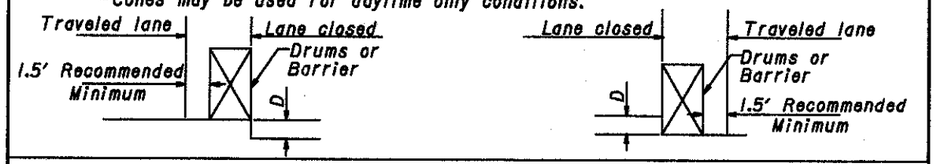


CONDITION I
DROPOFFS BETWEEN TRAVELED LANES

1. These treatments are to be used for resurfacing, pavement planing, excavation, etc. between or within traveled lanes.

D (In.)	Treatment
≤1½	Erect OW-17l and OWP-17l signs.
>1½-3	1) Lane closure utilizing drums* as shown below OR 2) Optional Wedge Treatment
>3-5	Lane closure utilizing drums as shown below.
>5	Lane closure utilizing portable concrete barrier as shown below.

*Cones may be used for daytime only conditions.

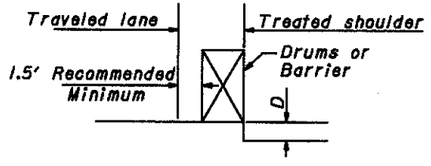


CONDITION II
DROPOFFS WITHIN GRADED SHOULDER AREA

1. The treatments indicated below are for use in conjunction with resurfacing, planing, or excavations within the graded shoulder area.
2. The graded shoulder area is that flat or gradually sloping area between the edge of a normally traveled lane and the more steeply sloping ditch foreslope or embankment slope. Its surface may be soil or turf, and/or it may be inclusive of a "treated" area (improved with aggregates, asphaltic materials, or concrete). For the purposes herein, its maximum width shall be considered to be twelve (12) feet.

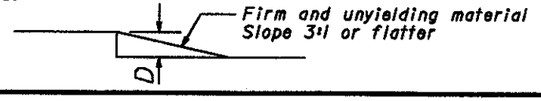
D (In.)	Treatment
≤1½	1) If edgelines are present, no treatment necessary OR 2) Erect OW-17l and OWP-17l signs.
>1½-5	1) If min.* lane width requirements can be met, maintain lanes utilizing drums as shown below OR 2) If min.* lane width requirements cannot be met, close adjacent lane utilizing drums OR 3) Optional Shoulder Treatment.
>5-12 Daylight only	If min.* lane width requirements can be met, maintain lanes utilizing drums as shown below.
>5-24	1) If min.* lane width requirements can be met, maintain lanes utilizing portable concrete barrier as shown below. OR 2) If min.* lane width requirements cannot be met, close adjacent lane utilizing drums.
>24	Lane closure utilizing portable concrete barrier as shown below.

*Minimum lane widths shall be 10' unless otherwise specified in the plans.



OPTIONAL SHOULDER TREATMENT

1. This treatment may not be used within a bituminous shoulder where a hot longitudinal joint per 40l.15 is required.
2. OW-15l signs required.

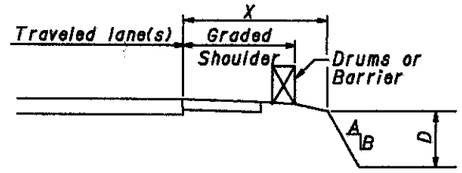


CONDITION III
DROPOFFS BEYOND GRADED SHOULDER OR BACK OF CURB

1. See Note 2 under Condition II.
2. Use Chart A or B below, as applicable.

CHART A

USE FOR: 1. Uncurbed Facilities.
2. Curbed Facilities, where:
   a. Curbs are less than 6" in height.
   b. Curbs are 6" or greater in height and the legal speed is greater than 40 mph.

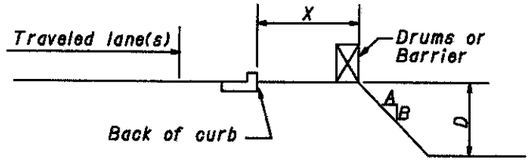


X (Ft.)	D (In.)	A/B	Treatment Required	
			Day	Night
0-4	Any	Any	(a)	(a)
4-30	Any	3:1 or Flatter	None	None
4-12	≤3	Steeper than 3:1	None	None
4-12	>3-<12	Steeper than 3:1	Drums	Drums
4-12	≥12	Steeper than 3:1	Drums	Barrier
>12-20	<12	Steeper than 3:1	None	None
>12-20	≥12-<24	Steeper than 3:1	Drums	Drums
>12-20	≥24	Steeper than 3:1	Drums	Barrier
>20-30	<24	Steeper than 3:1	None	Drums
>20-30	≥24	Steeper than 3:1	Drums	Barrier
>30	Any	Any	None	None

(a) Use treatment specified under Condition II.

CHART B

USE FOR: Curbed facilities, where the curb is 6" or greater in height and the legal speed is 40 mph or less.



X (Ft.)	D (In.)	A/B	Treatment Required	
			Day	Night
0-10	<12	Any	None	Drums
0-10	≥12	Any	Drums	Drums
>10	Any	Any	None	None

CALCULATED J.H.C. CHECKED A.L.S.

DROPOFFS IN WORK ZONES

KNO-13-15.98

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
BUREAU OF LOCATION AND DESIGN

DROPOFFS IN WORK ZONES

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED

9 19

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GENERAL NOTES

UNDERGROUND UTILITIES

THERE ARE LOCATIONS WHERE UNDERGROUND UTILITIES MAY CONFLICT WITH GUARDRAIL CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES BEFORE WORK BEGINS SO THAT THE COMPANIES CAN LOCATE AND MARK THE LOCATIONS OF THEIR FACILITIES BEFORE ANY EXCAVATION OR POST DRIVING BEGINS.

PUBLIC SAFETY

BEFORE WORK BEGINS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER THE NAMES AND TELEPHONE NUMBERS OF PERSONS WHO CAN BE CONTACTED 24 HOURS A DAY BY THE OHIO DEPARTMENT OF TRANSPORTATION AND ALL INTERESTED POLICE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING CONTROL DEVICES NECESSARY TO MAINTAIN SAFETY TO THE TRAVELING MOTORIST.

NO HAZARD SHALL BE LEFT WITHOUT GUARDRAIL EXCEPT FOR THE MINIMUM TIME NECESSARY FOR REMOVAL, GRADING AND REINSTALLATION. THE PERMANENT GUARDRAIL SHALL BE ERECTED AND THE TYPE A ANCHOR ASSEMBLIES SHALL BE HELD RIGIDLY IN PLACE AT THE GROUND SURFACE PRIOR TO PERMANENT ATTACHMENT AT THE CONCRETE ANCHOR, IN A MANNER ACCEPTABLE TO THE ENGINEER.

BERM RESHAPING AND GUARDRAIL REMOVAL AND CONSTRUCTION SHALL NOT PROCEED SIMULTANEOUSLY ON BOTH THE LEFT AND RIGHT SHOULDERS OF THE ROADWAY.
THE OPEN AREA DUE TO GUARDRAIL REMOVAL SHALL BE ADEQUATELY MAINTAINED AND PROTECTED AT ALL TIMES WITH TEMPORARY DRUMS OR BARRICADES AND OTHER WARNING DEVICES SATISFACTORY TO THE ENGINEER. NO OPEN AREAS DUE TO GUARDRAIL REMOVAL SHALL BE PERMITTED AFTER EACH WORK DAY IS COMPLETED.

PROTECTION OF INCOMPLETED WORK

ANY HAZARD DURING NON-WORKING HOURS SHALL BE ADEQUATELY PROTECTED WITH DRUMS OR BARRICADES, OR AS DIRECTED BY THE ENGINEER.
PAYMENT FOR ANY SUCH WORK REQUIRED WILL BE CONSIDERED AS INCIDENTAL AND INCLUDED IN THE GUARDRAIL REPAIR ITEM.

GUARDRAIL POST AND POST HOLES

ALL HOLES REMAINING AFTER REMOVAL OF GUARDRAIL POSTS OR GUARD POSTS SHALL BE FILLED WITH EITHER GRANUAL MATERIAL, EXCESS MATERIAL RESULTING FROM GUARDRAIL CONSTRUCTION OR EXCESS MATERIAL FROM BERM RESHAPING. FILL MATERIAL CONTAINING SOD SHALL NOT BE USED. ALL FILL MATERIAL SHALL BE APPROVED BY THE ENGINEER. MATERIAL PLACED IN HOLES SHALL BE THOROUGHLY COMPACTED AND LEVELED OFF AS DIRECTED BY THE ENGINEER. PAYMENT FOR THE ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE APPLICABLE GUARDRAIL ITEM.

ITEM 606 GUARDRAIL

ALL MATERIAL EXCAVATED FOR POST HOLES OR CONCRETE ANCHORS SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH 203.05 OF THE SPECIFICATIONS AND AREA NEATLY RESTORED. THE COST OF THIS IS TO BE INCLUDED IN THE APPROPRIATE GUARDRAIL BID ITEM. THE LOCATIONS OF GUARDRAIL RUNS AS SHOWN IN THESE PLANS ARE SUBJECT TO ADJUSTMENT TO ASSURE THAT THE PLANNED INSTALLATION WILL AFFORD MAXIMUM PROTECTION FOR TRAFFIC.

ITEM 606 SPECIAL - RESHAPING BERM

AT SOME LOCATIONS OF GUARDRAIL REPLACEMENT, BERMS SHALL BE RESHAPED AT THE DIRECTION OF THE ENGINEER. ANY NECESSARY EXCAVATION AS A RESULT OF RESHAPING BERM SHALL BE INCLUDED IN THE CONTRACT PRICE BID PER FOOT FOR ITEM 606 SPECIAL - RESHAPING BERM

A CONTINGENCY QUANITY 1000 FEET HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR BERM RESHAPING AS DIRECTED BY THE ENGINEER.

CALCULATED LME
CHECKED TJD

GUARDRAIL NOTES

KNO-13-15.98

K0130003.MGR 4-20-00

GENERAL NOTES

ITEM 606 ANCHOR ASSEMBLY, TYPE E-98

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING EITHER OF THE FOLLOWING GUARDRAIL END TERMINALS:

1) THE ET-2000 (1997) MANUFACTURED BY SYRO,INC., 1170 N. STATE STREET, GIRARD, OHIO 44420 (TELEPHONE: 330-545-4373).

THE LENGTH OF THE ET-2000 (1997) SYSTEM IS CONSIDERED TO BE 50' INCLUSIVE OF TWO 25' LONG RAIL ELEMENTS. INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS DETAILED ON THE PREAPPROVED SHOP DRAWING # SS265M, DATED 6-20-98. ODOT APPROVAL DATE 3-6-98. DRAWING NAME, ET-2000(1997) PLAN, ELEVATION & SECTIONS.

2) THE SKT-350 MANUFACTURED BY ROAD SYSTEMS, INC., 7631 NEW CASTLE DRIVE, FRANKFORT, IL 60423 (TELEPHONE: 815-464-5917)

THE LENGTH OF THE SKT-350 SYSTEM IS CONSIDERED TO BE 50' INCLUSIVE OF FOUR 12.5' LONG RAIL ELEMENTS. INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS DETAILED ON THE PREAPPROVED SHOP DRAWING # SKT-4M, DATED 12-11-97. ODOT APPROVAL DATE 3-6-98. DRAWING NAME, SEQUENTIAL KINKING TERMINAL (SKT-350) ASSEMBLY WITH 4 FOUNDATION TUBES.

A TYPE C DELINEATOR SHALL BE INSTALLED AT THE HEAD OF ALL TYPE E-98 UNITS LOCATED ON THE RIGHT SIDE OF THE THROUGH ROADWAY. A TYPE D DELINEATOR SHALL BE INSTALLED AT THE HEAD OF ALL TYPE E-98 UNITS LOCATED ON THE LEFT SIDE OF THE THROUGH ROADWAY.
DELINEATORS SHALL COMPLY WITH STANDARD TRAFFIC DRAWING TC-61.10M.

PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT BID PRICE FOR ITEM 606 ANCHOR ASSEMBLY, TYPE E-98 EACH, AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS NECESSARY TO CONSTRUCT A COMPLETE AND FUNCTIONAL ANCHOR ASSEMBLY SYSTEM, INCLUDING ALL RELATED TRANSITIONS, DELINEATORS, HARDWARE AND GRADING, NOT SEPERATELY SPECIFIED, AS REQUIRED BY THE MANUFACTURER.

ITEM 606 ANCHOR ASSEMBLY, TYPE B-98

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING EITHER OF THE FOLLOWING GUARDRAIL END TERMINALS:

1) SRT-350, GUARDRAIL END TERMINAL AS MANUFACTURED BY ; "SYRO INC., 1170 N. STATE STREET, GIRARD, OH 44420". TELEPHONE 330-545-4373

THE LENGTH OF THE SRT-350 SYSTEM IS CONSIDERED TO BE 37.5', INCLUSIVE OF THREE 12.5' LONG RAIL ELEMENTS. INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AS DETAILED ON PRE-APPROVED SHOP DRAWING NUMBER SS425M, DATED 6-21-97. ODOT APPROVAL DATE 3-6-98

2) THE FLEAT-350 MANUFACTURED BY ROAD SYSTEMS, INC. 7631 NEW CASTLE DRIVE, FRANKFORT, IL 60423 (TELEPHONE: 815-464-5917)

THE LENGTH OF THE FLEAT-350 SYSTEM IS CONSIDERED TO BE 37.5', INCLUSIVE OF THREE 12.5' LONG RAIL ELEMENTS. INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AS DETAILED ON PRE-APPROVED SHOP DRAWING NUMBER FLT-M, DATED 4-16-98. ODOT APPROVAL DATE 7-31-98.

GRADING SHALL BE IN ACCORDANCE WITH STANDARD CONSTRUCTION DRAWING GR-4.3.

THE FACE OF THE TYPE B-98 IMPACT HEAD SHALL BE COVERED WITH TYPE G REFLECTIVE SHEETING, PER CMS 730.19: APPROX. 36"W X 12"H FOR SRT-350 AND 14"W X 20"H FOR THE FLEAT.

PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT PRICE BID FOR ITEM 606, ANCHOR ASSEMBLY, TYPE B-98, EACH, AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS NECESSARY TO CONSTRUCT A COMPLETE AND FUNCTIONAL ANCHOR ASSEMBLY SYSTEM, INCLUDING ALL RELATED HARDWARE AND GRADING, NOT SEPARATELY SPECIFIED, AS REQUIRED BY THE MANUFACTURER.

ITEM 202 GUARDRAIL REMOVED FOR STORAGE, AS PER PLAN

THIS ITEM SHALL CONSIST OF REMOVING GUARDRAIL, DISASSEMBLING GUARDRAIL PANELS AND DELIVERING PANELS, POSTS AND END TERMINAL ASSEMBLIES (AS SPECIFIED BELOW) TO THE LOCATIONS LISTED BELOW. THE PROJECT ENGINEER SHALL INSPECT ALL GUARDRAIL ELEMENTS BEFORE BEING DELIVERED (THE INTENT IS TO SEND ONLY THE BEST PANELS AND POST TO THE COUNTIES). A 24 HOUR NOTICE SHALL BE GIVEN PRIOR TO DELIVERING ANY GUARDRAIL, O.D.O.T. WILL PROVIDE LOADER AND PERSONNEL TO UNLOAD GUARDRAIL UPON ARRIVAL AT SPECIFIED LOCATIONS. ONLY THOSE QUANTITIES ACTUALLY DELIVERED TO THE LOCATIONS BELOW SHALL BE PAID FOR UNDER ITEM 202 GUARDRAIL REMOVED FOR STORAGE, AS PER PLAN. THE FOLLOWING QUANTITIES SHALL BE DEDUCTED FROM THE GUARDRAIL REMOVED TOTAL ON SHEET 12.

QUANTITIES AND DELIVERY SIGHTS:

KNO. CO. (MAIN GARAGE) - 500' (40 PANELS)

PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT BID PRICE FOR ITEM 202 GUARDRAIL REMOVED FOR STORAGE, AS PER PLAN 500 LIN.FT.

CALCULATED LME CHECKED MLN

NOTES

GUARDRAIL N

KNO-13-15.98

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LOCATION	COUNTY	ROUTE	APPROX. LOCATION S.L.M.	SIDE	202-ITEMS REMOVED			606								622	626				COMMENTS
					GUARDRAIL	ANCHOR ASSEM.		GUARDRAIL, TYPE 5	GUARDRAIL, TYPE 5 BARRIER DESIGN	ANCHOR ASSEMBLY, TYPE ( )					BRIDGE TERMINAL ASSEMBLY TYPE, ( )		CONCRETE BARRIER, TYPE D	BARRIER REFLECTORS, TYPE ( )				
						TYPE A	TYPE A, B.D.			A	A, B.D.	B	E	T	1	4		A	B	A2	B2	
					FEET	EACH	EACH	FEET	EACH								FEET					
1	KNO	SR 13 N.B.	17.95	RT	150	1		90				1			1		45	2	2			SEE SCD GR 8.1
1	KNO		18.24	MED	200		1	125.0	75.0		1					1		4				SEE SCD GR 6
1	KNO		18.24	RT	225	1		212.5				1				1		4				REPLACE TYPE A W/TYPE B, ADD BRIDGE TERM TYPE 4
1	KNO		18.29	RT	37.5			37.5						1				1				TRAILING END OF BRIDGE RAIL
1	KNO		18.29	LT	37.5			37.5						1				1				TRAILING END OF BRIDGE RAIL
1	KNO		18.71	RT	725	1		725					1					8				MEASURED TO END RADIUS RETURN ON INTERSECTING ROAD
1	KNO		18.85	RT	1325			1325										14				MEASURED FROM RETURN ON INTERSECTING ROAD TO BRIDGE TERM.
1	KNO		19.06	MED	200		1	125.0	75.0		1							4				SEE SCD GR 6
1	KNO																					
1	KNO	SR 13 S.B.	19.17	MED	200		1	125.0	75.0		1							4				SEE SCD GR 6
1	KNO		19.16	RT	100	1		87.5				1						2				TIE INTO EXIST. BRIDGE TERM.
1	KNO		19.10	RT	1235			1235										13				MEASURED TO END RADIUS RETURN ON INTERSECTING ROAD
1	KNO		18.39	RT	562.5	1		550				1				1		6				REPLACE TYPE A W/TYPE B, END AT BRIDGE
1	KNO		18.33	MED	200		1	125.0	75.0		1					1		4				SEE SCD GR 6
1	KNO		18.28	LT	25			25						1				1				TRAILING END OF BRIDGE RAIL
1	KNO		18.28	RT	375			375						1				5				
1	KNO		17.95	MED	500			100	375		2			2				6				AROUND CENTER PIERS, SEE SCD GR 7.1 DESIGN B
1	KNO		17.95	RT	150	1		90				1			1		45	2	2			SEE SCD GR 8.1
1	KNO		17.28	RT	150	1		150				1						2				MEASURED TO TYPE A ANCHOR ON INTERSECTING ROAD (SPARTA RD)
		DEDUCTION FROM SHEET 11			-500																	
TOTALS CARRIED TO GENERAL SUMMARY					5897.5	7	4	5540.0	675.0		6	6	1	6	2	4	90	83	4			

NOTE:
ALL COUNTY S.L.M. SHALL BE VERIFIED BY THE PROJECT ENGINEER BEFORE WORK IS DONE AT ANY LOCATION.
ALL PROPOSED GUARDRAIL SHALL BEGIN AND END AT THE SAME (APPROX.) LOCATIONS AS THE EXISTING GUARDRAIL.

CALCULATED LME
CHECKED TJD

GUARDRAIL SUB-SUMMARY

KNO-13-15.98

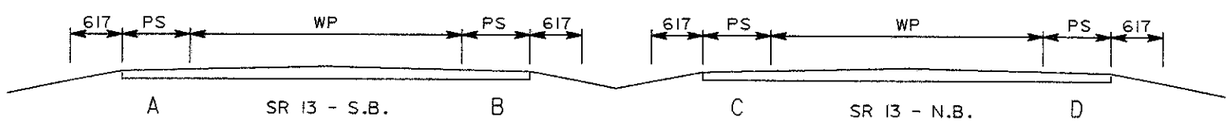
12
19

4-17-00

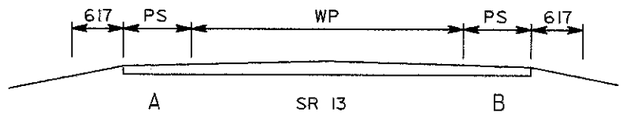
K0130001.MGR

ASPHALT CONCRETE

TYPICAL 1



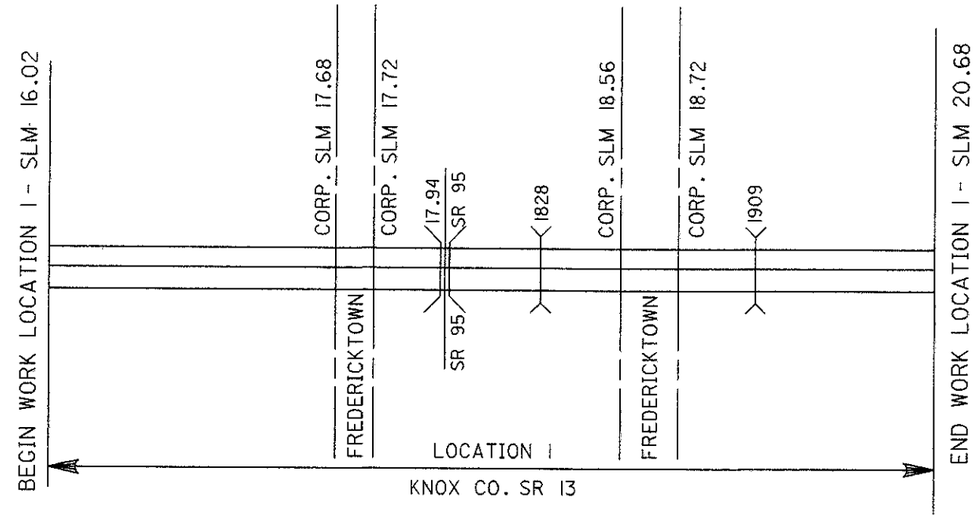
TYPICAL 2



SKIP EXPOSED BRIDGE DECKS & APPROACH SLABS

DEDUCTIONS

KNO-13-1828L&R: 2(67' X 24')/9 = 357 SQ.YD.
KNO-13-1910L&R: 2(185' X 24')/9 = 987 SQ.YD.



DEDUCTIONS (1) BRIDGE LENGTH X PAVEMENT WIDTH

PAVEMENT DATA

LOCATION	COUNTY	ROUTE	LOG POINT TO LOG POINT	LENGTH MILE	LENGTH FEET	WP FEET	TYPICAL	EXISTING PAVEMENT TYPE	PAVEMENT AREA SQ.YD.	SPECIAL NOVACHIP, TYPE B SQ.YD.			
1	KNO	SR 13	15.98-16.05	0.07	370	32AVG.	2	404	1314	1314			
			NORTHBOUND										
			16.05-20.68	4.63	24446	24	1	404	65190	65190			
			SOUTHBOUND										
			16.05-20.68	4.63	24446	24	1	404	65190	65190			
			20.68-20.75	0.07	370	35AVG.	2	404	1437	1437			
			BRIDGE DEDUCTIONS							(1344)			
1			TOTALS							131787			

CALCULATED LME CHECKED TJD

ASPHALT CONCRETE

KNO-13-15.98

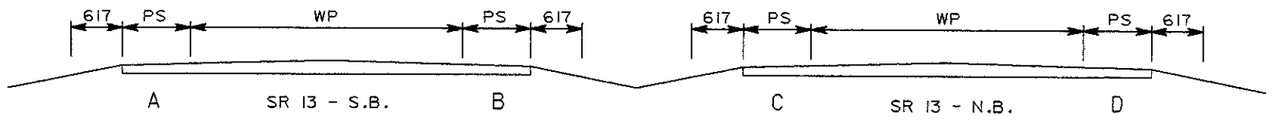
13/19

K013000I.MAC 4-17-00

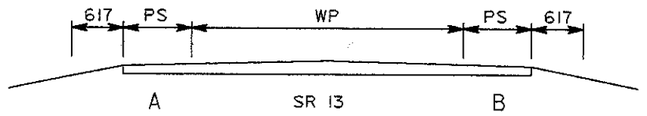
CALCULATED LME
CHECKED TJD

PAVED SHOULDERS

TYPICAL 1



TYPICAL 2



DEDUCTIONS ()

KNO-13-1828L&R: 2(67' X 12.5')/9 = 186 SQ.YD.
KNO-13-1910L&R: 2(185' X 12.5')/9 = 514 SQ.YD.

BRIDGE DEDUCTIONS: BRIDGE LENGTH X SHOULDER WIDTH ()

PAVED SHOULDER DATA

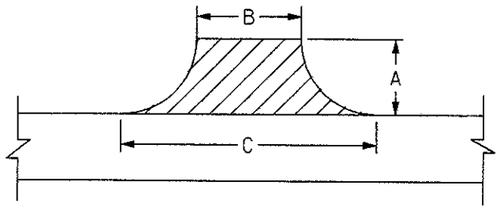
LOCATION	COUNTY	ROUTE	LOG POINT TO LOG POINT	LENGTH MILE	LENGTH FEET	TYPICAL	PROPOSED WIDTH (feet) A	B	C	D	SHOULDER AREA SQ.YD.	SPECIAL NOVACHIP, TYPE B SQ.YD.	617 COMPACTED AGGREGATE TYPE A, AS PER PLAN (2' X 2" THICK) CU.YD.	617 SHOULDER PREPARATION SQ.YD.
1	KNO	SR 13	15.98-16.05	0.07	370	2	7.5	7.5			617	617	9	164
			NORTHBOUND											
			16.02-20.68	4.66	24605	1			5	7.5	34174	34174	608	10936
			SOUTHBOUND											
			16.02-20.68	4.66	24605	1	7.5	5			34174	34174	608	10936
			BRIDGE DEDUCTIONS									(700)	(12)	(224)
			20.68-20.75	0.07	370	2	7.5	7.5			617	617	9	164
1	KNO	SR 13	TOTALS									68882	1222	21976

K013000I.MPS 4-17-00

KNO-13-15.98

14/19

EXTRA AREAS



\# ALL AREAS TAKEN FROM PREVIOUS CONSTRUCTION PLANS ( ) = AVERAGE

LOCATION	COUNTY	ROUTE	LOG POINT TO LOG POINT (SLM)	DESCRIPTION	A (FEET)	B (FEET)	C (FEET)	TOTAL AREA (SQ.YD.)	PROPOSED ITEMS: SPECIAL NOVACHIP, TYPE B (SQ.YD.)						
1	KNOX	SR 13													
				CROSSOVER				218	218						
			16.07	CO. RD. 69	30	30	155	308	308						
				CROSSOVER				1051	1051						
			17.29	CO. RD. 11	30	23	130	255	255						
			17.29	CO. RD. 11	30	23	130	255	255						
				S.E. RAMP SR 95				2874	2874						
				S.W. RAMP SR 95				3671	3671						
				N.E. RAMP SR 95				3479	3479						
				N.W. RAMP SR 95				3199	3199						
				CROSSOVER				1017	1017						
			18.85	CO. RD. 6	30	21	110	218	218						
			18.85	CO. RD. 6	30	22	110	220	220						
				CROSSOVER				992	992						
			20.45	CO. RD. 49	30	28	120	247	247						
			20.45	CO. RD. 49	30	28	120	247	247						
1		SR 13	TOTALS						18251						

CALCULATED LME CHECKED TJD

EXTRA AREAS

KNO-13-15.98

15 / 19

K013000I.MEA 4-11-00

CALCULATED LME
CHECKED TJD

EDGE LINE SUB-SUMMARY

LOCATION	COUNTY	ROUTE	S.L.M. FROM	S.L.M. TO	WHITE EDGE LINE QU. MILE	WHITE EDGE LINE QU. HIGHWAY	WHITE EDGE LINE QU. RAMP	YELLOW EDGE LINE QU. MILE	YELLOW EDGE LINE QU. HIGHWAY	YELLOW EDGE LINE QU. RAMP	PARTICIPATION TYPE IRG	PARTICIPATION TYPE FG	PARTICIPATION TYPE RSG	PARTICIPATION TYPE NON FED STATE	EDGE LINE MILE	REMARKS
1	KNO	SR 13	15.98	20.75	12.66	9.54	3.12	10.08	9.32	0.76					22.74	
						INCLUDES RAMPS @ SR 95										

CENTER LINE SUB-SUMMARY

QUANTITIES INCLUDE CL AROUND OUTSIDE OF PAINTED ISLAND

LOCATION	COUNTY	ROUTE	S.L.M. FROM	S.L.M. TO	CENTER LINES QUANTITIES TOTAL MILES	CENTER LINES QUANTITIES EQUIVALENT SOLID LINE	PARTICIPATION TYPE IRG	PARTICIPATION TYPE FG	PARTICIPATION TYPE RSG	PARTICIPATION TYPE NON FED			TOTAL CENTER LINE MILES	REMARKS
1	KNO	SR 13	15.98	16.22	0.31	0.62							0.31	SOUTH END TRANSITION
			20.51	20.75	0.31	0.62							0.31	NORTH END TRANSITION
1	KNO	SR 13	TOTALS										0.62	

LANE LINE/AUXILLIARY MARKING SUB-SUMMARY

LOCATION	COUNTY	ROUTE	S.L.M. FROM	S.L.M. TO	LANE LINE QUANTITIES TOTAL MILE	4 INCH LANE LINE DASHED	4 INCH LANE LINE SOLID	AUXILLIARY MARKINGS 24" TRANSVERSE LINES YELLOW	24" TRANSVERSE LINES WHITE	STOP LINE 24"	WORD ON PAVEMENT, 96" "ONLY"	LANE ARROWS TURN LEFT	LANE ARROWS TURN THRU	8" CHANNEL LINE	REMARKS
1	KNO	SR 13	16.02	20.68	9.51	9.51	INCLUDES DASHES AT ACCELERATION/DECELERATION LANES								
		ON SR 13	SOUTH OF	CO.RD. 69				463							
		CO.RD. 69	RIGHT SIDE							55					
		ON SR 13	NORTH OF	CO.RD. 69				620			2	1		201	
		CO. RD. 11	RIGHT AND	LEFT						80	2	2		150	
		S.E. RAMP							139	65			1	392	
		S.W. RAMP												159	
		N.W. RAMP							129	49			1	373	
		N.E. RAMP												197	
		CO. RD. 6	LEFT AND	RIGHT						72	2	2		141	
		CO. RD. 49	LEFT AND	RIGHT						79	2	2		146	
		ON SR 13	NORTH END	TRANSITION				533							
1	KNO	SR 13	TOTALS					1616	268	400	8	7	2	1759	

TOTALS CARRIED TO GENERAL SUMMARY

K013000I.TAS 4-20-00

EDGE LINE SUB-SUMMARY

KNO-13-15.98

16
19

CALC. BY SAB
DATE 03-23-99

CHKD. BY
DATE

LOCATION SUB-SUMMARY

DETAIL	
1	TAPERED ACCELERATION LANE
2	DECELERATION LANE
3	MULTILANE DIVIDED/ CONTROLLED ACCESS

DETAIL	
4	4 LANE DIVIDED TO 2 LANE TRANSITION
5	4 LANE UNDIVIDED TO 2 LANE TRANSITION
6	ONE LANE BRIDGE
7	STOP APPROACH
8	THRU APPROACH
9	TWO WAY LEFT TURN LANE

DETAIL	
10	APPROACH W/LT. TURN LANE
11	HORIZONTAL CURVE 40' (NOTE 2)
12	HORIZONTAL CURVE ALT. (NOTE 3)
GAP	CENTERLINE AT 80' TYP.

LOCATION NUMBER	LOCATION				DETAIL	RPM	ITEM QUANTITIES INSTALLATION ONLY			PRISMATIC RETRO-REFLECTOR	PRISMATIC RETRO-REFLECTOR COLORS					REMARKS
	COUNTY	ROUTE	S.L.M. MILES FROM	S.L.M. MILES TO			RPM	RPM CASTING	PRISMATIC RETRO-REFLECTOR		ONE-WAY WHITE	ONE-WAY YELLOW	TWO-WAY YELLOW/ YELLOW	TWO-WAY WHITE/ RED	TWO-WAY YELLOW/ RED	
	KNO	SR 13	15.98		4		44					28		16		SOUTH END TRANSITION
	KNO	SR 13	16.22		3		578							578		4-LANE AT 80'
	KNO	SR 13	CHANNEL LINE AT CR 69				6							6		CHANNEL LINE AT 40'
	KNO	SR 13	CHANNEL LINE AT CR 11				8							8		CHANNEL LINE AT 40'
	KNO	SR 13	CHANNEL LINE AT CR 6				8							8		CHANNEL LINE AT 40'
	KNO	SR 13	CHANNEL LINE AT CR 49				8							8		CHANNEL LINE AT 40'
	KNO	SR 13	20.75		4		37					21		16		NORTH END TRANSITION
	TOTAL CARRIED TO GENERAL SUMMARY						689					49		640		

CALCULATED SAB
CHECKED LME

RPM LOCATION SUB-SUMMARY

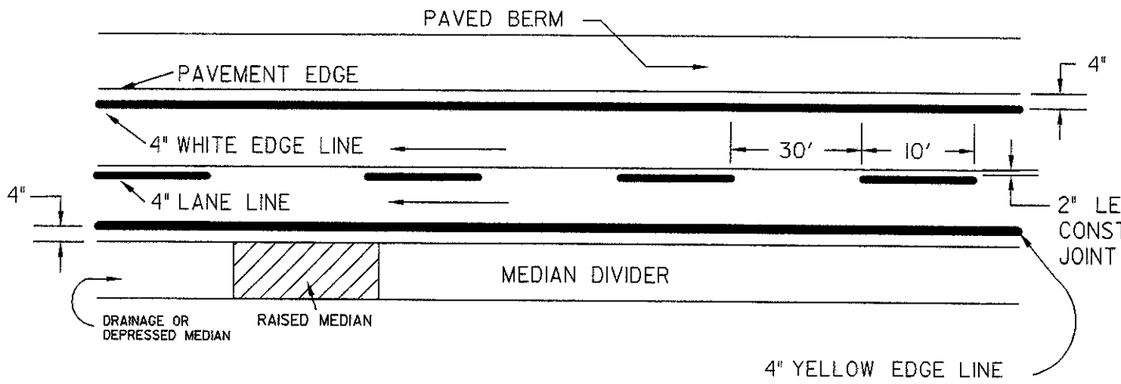
KNO-13-15.98

17
19

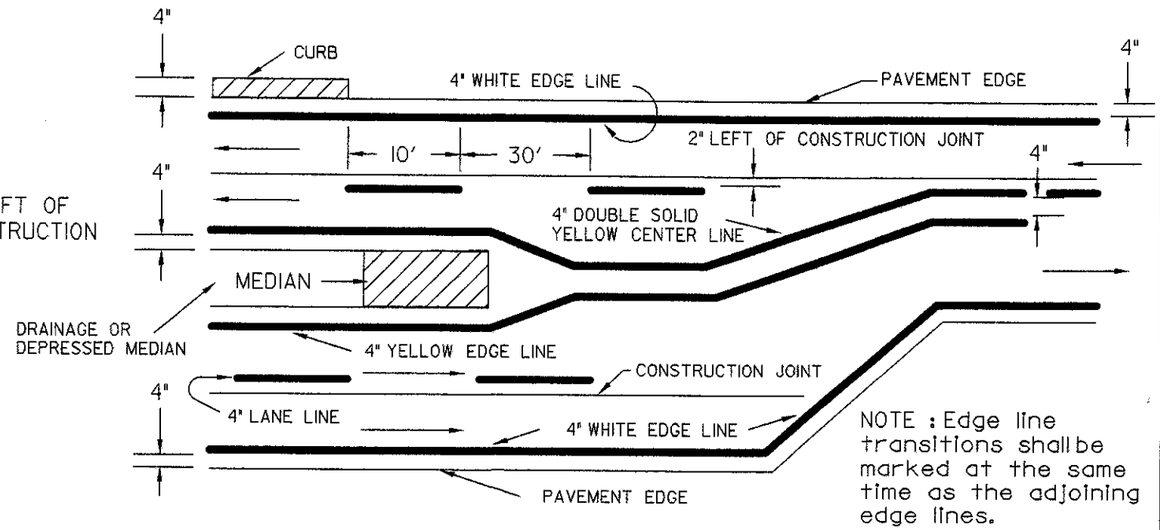
04-20-00

K0130001.TRM

FREEWAY & EXPRESSWAY MAINLINE MARKINGS

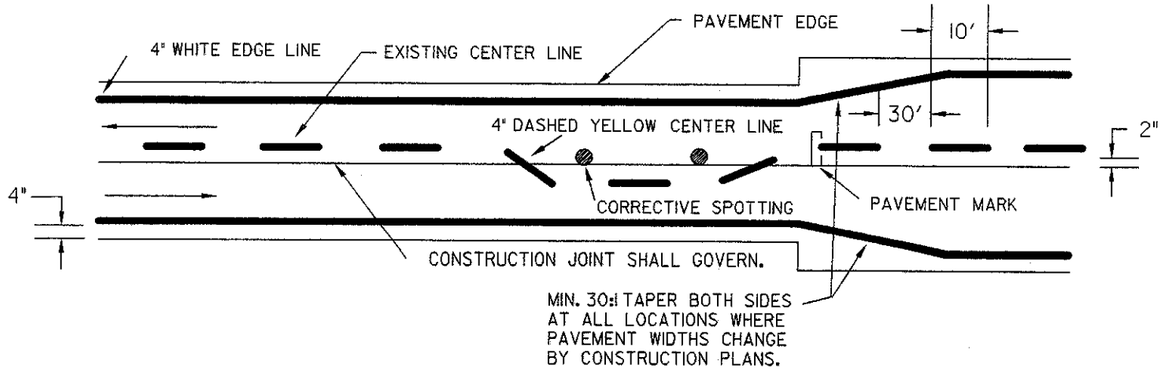


MULTILANE DIVIDED & UNDIVIDED HIGHWAY MARKINGS



NOTE : Edge line transitions shall be marked at the same time as the adjoining edge lines.

TWO LANE MARKINGS



NOTES:

1. The distance from the pavement edge to the nearside edge of the edgeline may be increased with the approval of the engineer in order to maintain uniform lane width.

2. See TC-72.20 for entrance and exit ramp markings.

3. The cycle length for dashed lines shall be 40 feet plus or minus 6 inches. The minimum length of dash shall be sufficiently long to maintain a 3:1 ratio between length of gap and length of dash.

Ohio Department of Transportation

Pavement Marking Typical Details

DATE
11-80
9-86
9-91

CALCULATED
CHECKED

PAVEMENT MARKING TYPICALS

KNO-13-15.98

18
19

K0130001.PMT 4-17-00

LOCATION 1 - SHEET TOTALS									ITEM	ITEM EXT. NO.	100% FED FUNDS	100% STATE FUNDS	GRAND TOTAL	UNIT	DESCRIPTION
2	10	11	12	13	14	15	16	17							
1400									202	23501		1400	1400	SQ.YD.	WEARING COURSE REMOVED, AS PER PLAN
			5897.5						202	38000	5897.5		5897.5	LIN.FT.	GUARDRAIL REMOVED
		500							202	38101	500		500	LIN.FT.	GUARDRAIL REMOVED FOR STORAGE, AS PER PLAN
			7						202	42000	7		7	EACH	ANCHOR ASSEMBLY REMOVED, TYPE A
			4						202	42210	4		4	EACH	ANCHOR ASSEMBLY REMOVED, BARRIER DESIGN
750									202	54101		750	750	EACH	RAISED PAVEMENT MARKER REMOVED FOR STORAGE, AS PER PLAN
200									251	01001		200	200	SQ.YD.	PARTIAL DEPTH PAVEMENT REPAIR, AS PER PLAN
				131787	68882	18251			SPECIAL	409E70000		218920	218920	SQ.YD.	NOVACHIP, TYPE B
			5540.0						606	13000	5540.0		5540.0	LIN.FT.	GUARDRAIL, TYPE 5
			675.0						606	15500	675.0		675.0	LIN.FT.	GUARDRAIL, BARRIER DESIGN, TYPE 5
			6						606	22000	6		6	EACH	ANCHOR ASSEMBLY, TYPE B-98
			1						606	22010	1		1	EACH	ANCHOR ASSEMBLY, TYPE E-98
			6						606	25500	6		6	EACH	ANCHOR ASSEMBLY, BARRIER DESIGN, TYPE A
			6						606	26500	6		6	EACH	ANCHOR ASSEMBLY, TYPE T
			2						606	35000	2		2	EACH	BRIDGE TERMINAL ASSEMBLY, TYPE 1
			4						606	35140	4		4	EACH	BRIDGE TERMINAL ASSEMBLY, TYPE 4
									SPECIAL	606E50000	1000		1000	LIN.FT.	RESHAPING BERM
	1000														
					1222				617	10101		1222	1222	CU.YD	COMPACTED AGGREGATE, TYPE A, AS PER PLAN
					21976				617	20000		21976	21976	SQ.YD.	SHOULDER PREPARATION
								689	621	00200		689	689	EACH	RAISED PAVEMENT MARKER, INSTALLATION ONLY
			90						622	24000	90		90	LIN.FT.	CONCRETE BARRIER, TYPE D
			83						626	00100	83		83	EACH	BARRIER REFLECTOR, TYPE A
			4						626	00200	4		4	EACH	BARRIER REFLECTOR, TYPE B
							22.74		642	00100		22.74	22.74	MILE	EDGE LINE, TYPE 1
							9.51		642	00200		9.51	9.51	MILE	LANE LINE, TYPE 1
							0.62		642	00300		0.62	0.62	MILE	CENTER LINE, TYPE 1
							1759		642	00402		1759	1759	LIN. FT.	CHANNELIZING LINE, TYPE 2
							400		642	00502		400	400	LIN. FT.	STOP LINE, TYPE 2
							1884		642	00702		1884	1884	LIN. FT.	TRANSVERSE LINE, TYPE 2
							9		642	01302		9	9	EACH	LANE ARROWS, TYPE 2
							8		642	01412		8	8	EACH	WORD ON PAVEMENT, 96", TYPE 2
									614	11000				LUMP	MAINTAINING TRAFFIC
									623	10000				LUMP	CONSTRUCTION LAYOUT STAKES
									624	10000				LUMP	MOBILIZATION

CALCULATED LME
CHECKED TJD

GENERAL SUMMARY

KNO-13-15.98

19
19

K013000I.MGS 4-26-00