Data Collection Procedures For Determination And Updating Of Highway Needs In Michigan

Prepared by:
The Joint Needs Study Coordinating Committee

Composed of Members of:
The Michigan Department of Highways and Transportation
The County Road Association of Michigan
The Michigan Municipal League

DATA COLLECTION PROCEDURES

FOR

DETERMINATION OF AND UPDATING HIGHWAY NEEDS

IN MICHIGAN

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ILLUSTRATIONS

PROCEDURES FOR UPDATING THE 1970 HIGHWAY NEEDS STUDY

This manual explains the procedures to be used to update the 1970 Highway Needs Study. It also repeats a major portion of the 1970 Needs Study Procedural Manual with minor revisions.

In 1970, all sections of the State Trunk Line System, the County Road System, and City Street Systems in cities over 5000 population were appraised by the responsible jurisdictions to determine construction costs to bring the facilities to standards adequate for estimated traffic 20 years from the time of proposed improvements.

The Department of State Highways also performed an appraisal of needs on a sample of cities and villages under 5000 population. All other cities and villages were invited to participate and many of them did.

This manual is written to instruct county and city personnel who will be responsible for updating their 1970 study and also to provide instructions to those cities and villages who are doing the study for the first time.

The responsibility for the update within each jurisdiction is as follows:

State - Chief of Advanced Planning Section
Department of State Highways and Transportation

County - County Road Commission or designated representative

City - City Street Administrator or designated representative

Personnel of the Advanced Planning Section of the Department of State Highways will be assigned liaison responsibilities for the three jurisdictional agencies.

The Needs Study Coordinators listed at the back of this manual will be responsible for the processing of the Needs Study Data.

RETENTION OF 1970 STUDY DATA

Every county and city which participated in the 1970 Needs Study was asked to submit inventory data on all of its roads and streets, and to retain on file copies of this data together with copies of the Project Identification Maps showing the location of each Needs Study Project.

You will need this data to update the study

If your Project Identification Maps have been lost or misfiled, contact the Needs Study Coordinator for replacement copies as soon as possible.

NEEDS STUDY UPDATE MATERIAL

Accompanying this procedural manual are the following items to be used for the update:

1. Computer Printout of Inventory Data

   This printout is to be used for recording changes to existing inventory data that have occurred since the last study.

2. Existing Inventory Data Worksheets (Forms 1716 & 1717)

   These sheets are to be used for recording inventory data of projects constructed since the 1970 study which were not included in that study (unless as "proposed" roads). They are also to be used for coding additional projects resulting from splits of existing projects.

3. New Construction Project Worksheets (Forms 1718)

   These sheets are to be used for proposed "new location" projects which you plan to construct by 1995 which were not included in the 1970 study.

4. Act 51 Maps

   These maps are to be used for:

   - showing Project Identification changes
   - new projects constructed since the 1970 study
   - projects proposed by 1995 (excluding sub-division streets)

DATA CHANGES AND REVISIONS TO COMPUTER PRINT-OUTS

Listed below are types of changes that may have occurred on your road or street system since the 1970 Study.

1. Condition Changes - due to deterioration or upgrading of the road or structure. These could include changes to --

   Surface Deterioration Factor
   Shoulder/Curb Condition
   Base Factor
   Drainage Factor
   Structural Condition (structures)
   Load Carrying Capacity (structures)
   Waterway Adequacy (structures)

2. System Changes - These could include changes to --

   Seasonal Road Classification
   Functional Classification
   Legal System
   Federal-aid System
   Mileage Control (proposed transfer of jurisdictional responsibility by 1995)

3. Operational Changes - These could include changes to --

No. of Traffic Lanes	Traffic Expansion Factors
Type of Parking	% Commercial Vehicles
Traffic Operation	Land Use
Direction of Travel	No. of Tracks (RR Grade Xings)
ADT	No. of Trains/Day (RR Grade Xings)
30th High Hour	Special Costing

4. Identification Changes - These could include changes to --

   Place Code
   Route No.
   Project I.D.

5. Construction Changes - These could include changes to --

   Section Length
   Surface Type
   Surface Width
   Year of Surface Improvement
   Shoulder Widths and Types
   Curb and/or Gutter
   Median Width
   R.O.W. Width

Construction changes could also include changes listed in Types 1 through 4 above.

Changes to any of the items listed above should be made directly on the computer print-out that has been sent to you. The changes should reflect conditions as of January 1, 1974.

Review the print-out, project by project, and using a red pencil, cross out the data that has changed and write the new data directly above. Refer to the coding instructions elsewhere in this manual. A paper guide strip which identifies the print-out columns, is provided for your convenience. The print-out columns can also be identified by the numbers across the top of the print-out. These numbers refer to the items numbered on the worksheets. A sample print-out sheet showing placement of the guide strip is on page 6A.

If changes occur in the Project Identification, show the changes on the print-out. If these changes affect the project numbering on your Project Identification Maps, show these changes on the maps sent to you for this purpose and also correct your own file copy.

If a road project, structure, or railroad crossing no longer exists, or has been transferred to another jurisdiction or Legal System, indicate this on the print-out.

Completing Worksheets for Additional Existing Projects

Inventory data of any new roads or streets not included in the 1970 Study (except as "proposed" projects), which have been built or will be open to traffic by January 1, 1974, should be submitted on the yellow worksheets (Form 1716 - Existing Roadway Projects). These sheets are also to be used for coding additional projects resulting from splits of existing projects. Refer to coding instructions on pages 7-23.

Data for new structures and railroad grade crossings as above, should be submitted on the pink worksheets (Form 1717 - Existing Structure & R.R. Crossing Protection). Refer to coding instructions on pages 24-36.

Worksheets are to be completed in duplicate - one copy to be submitted to the Department of State Highways and the other copy to be retained by each submitting agency for its files.

Completing Worksheets for Proposed Projects

Data for roads and streets (except subdivision streets) proposed to be built on new location by 1995, and not included in the 1970 Study, should be coded on the blue worksheets (Form 1718 - New Construction Projects). Refer to coding on pages 37-45.

Worksheets are to be completed in duplicate - one copy to be submitted to the Department of State Highways and the other copy to be retained by each submitting agency for its files.

Use of Project Identification Maps

The Act 51 Maps sent to you as part of the update material, are to be used to show --

- Changes in Project Identification.
- Additional Projects constructed since the 1970 study but not included in the 1970 study.
- Proposed roads and streets not included in the 1970 study.

Each of the above three types of changes may be shown on the same map, but use a separate map for each Legal System i.e. show all Primary or Major System changes on one map and all Local System changes on another map. Use a separate color for making each type of change.

You may submit your own base maps to show changes, if it is more convenient for you to do so.

Show only the changes and additions. Do not show projects whose termini remain the same as they were on the 1970 Needs Study Maps.

The maps showing changes and additions are to be returned to the Department of State Highways along with the other study data.

These changes and additions should also be made to the original Needs Study Project Maps that each agency has in its files.

Assignment of Project Numbers

When assigning new project numbers, be sure that there is no duplication of numbers used previously.

New Projects and additional projects resulting from a split of an existing project may be assigned a segment number as part of the project identification. Instructions on page 9 show where segment numbers are coded for the different legal systems. Use of segment numbers may help to provide continuity of numbering that might otherwise be broken as new projects are added. To maintain continuity it might be possible to renumber some projects but renumbering should be kept to a minimum.

Instructions for project identification and numbering can be found on page 9 and in Appendix B of this manual.

Functional Classifications

The Functional Classifications of most projects should remain the same as they were in the 1970 Study. However, there may be some instances where changes are warranted. Any changes to the Functional Classifications of existing projects and all classifications assigned to new projects will be subject to approval by the Joint Needs Study Coordinating Committee.

Urban Area Boundaries

Urban Area Boundaries for this update will remain the same as in the 1970 Study.

Submission of Data

All update material including revised print-outs, worksheets, and project identification maps should be submitted to the Needs Study coordinators for processing by March 31, 1974. Their names and address are at the back of the manual.

The submitted material will be returned to each agency for their files as soon as processing is completed.

PLAC 5 6 PROJ.ID. 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 D 33 34 35 36 37 38 39 40 41 42

	4		-02902	1		3		1	06	16	01.00	5	24	2	67	2	0	05		3	0	2		066	2	1	9		1	E00200		3.0		0	1	2	1
	4		-02903	1		3		1	06	06	03.11	5	18	3	61	2	0	06		3	0	2		066	3	1	9		1	E00070		3.0		3	1	1	1
	4		-03001	1		3		1	15	15	01.77	4	22	1	62	2	0	05		3	0	2		066	2	1	9		0	A00504		3.0		00	2	2	1
	4		-03002	1		3		1	05	05	06.15	4	20	1	65	2	0	08		3	0	2		066	2	1	9		1	E00100		3.0		25	1	1	1

MICHIGAN HIGHWAY NEEDS - EXISTING ROADWAY PROJECTS

Place Code	Route	Project Identification	All Season Truck Route	BR, BL, BS Identification	Federal Aid	Seasonal Road	Existing Functional Class	Future Functional Class	Section Length	Surface Type	Surface Width	Surf. Deterioration Factor	Yr. of Surf. Improvement	No. of Traffic Lanes	Type Parking	Outside Shoulder Width	Inside Shoulder Width	Shoulder Type	Curb and/or Gutter	Shldr.-Curb Condition	Median Width	Right Of Way	Base Factor	Drainage Factor	Traffic Operation	Direction on Divided	Terrain	Average Daily Traffic	30th High Hour	Traffic Expansion Factor	% Commercial Vehicles	% Sight Restriction	Existing Land Use	Future Land Use	Miles
4		-03302	1		3	1	05	05	00.50	4	20	2	61	2	0	04		3	0	2		066	2	1	9		1	A00091		3.0		0	1	1	1
4		-03401	1		3	1	05	05	00.51	4	20	3	61	2	0	06		3	0	2		066	3	3	9		1	E00090		3.0		0	1	1	1
4		-03402	1		3	1	05	05	02.56	4	20	2	68	2	0	06		3	0	2		066	2	1	9		1	A00090		3.0		0	1	1	1
4		-03403	1		3	1	05	05	03.01	3	20	3	55	2	0	06		3	0	2		066	2	3	9		1	E00120		3.0		0	1	1	1
4		-03404	1		3	1	05	05	01.00	4	24	2	55	2	0	08		3	0	1		066	2	1	9		1	A00151		3.0		0	1	1	1
4		-03405	1		3	1	05	15	01.56	4	24	2	69	2	0	08		3	0	1		066	2	1	9		2	A00284		3.0		10	1	2	1
4		-03501	1		3	1	15	15	00.94	4	20	3	47	2	0	03		3	0	3		066	3	3	9		0	A00186		3.0		00	2	2	1
4		-03601	1		4	1	15	14	02.01	4	24	2	67	2	0	04		3	0	2		066	2	1	9		0	E00400		3.0		00	2	2	1
4		-03602	1		4	1	14	14	01.01	4	48	1	69	4	0				2	1		066	1	1	9		0	A00900		3.0		0	2	2	1
4		-03603	1		3	1	14	14	00.18	4	48	1	69	4	0				2	1		066	1	1	9		0	A01248		3.0		0	2	2	1
4		-03604	1		3	1	14	14	00.26	4	48	1	61	4	0	04		3	0	2		066	2	1	9		0	A01643		3.0		00	2	2	1
4		-03701	1		3	1	15	15	01.44	4	24	3	63	2	0	06		3	0	2		066	2	3	9		0	A00578		3.0		0	2	2	1
4		-03702	1		4	1	15	15	01.44	4	24	3	66	2	0	06		3	0	1		066	2	1	9		0	A00140		3.0		00	2	2	1
4		-03801	1		3	1	06	05	01.50	4	20	2	64	2	0	02		3	0	3		066	2	1	9		1	A00165		3.0		0	1	1	1
4		-03802	1		3	1	06	15	01.05	4	20	2	64	2	0	04		3	0	2		066	2	1	9		1	A00226		3.0		20	1	2	1
4		-03803	1		3	1	16	15	02.07	4	20	1	64	2	0	04		3	0	2		066	2	1	9		0	A00286		3.0		00	2	2	1
4		-03901	1		4	1	05	05	03.20	4	24	2	67	2	0	06		3	0	1		066	2	3	9		2	E00030		3.0		22	1	1	1
4		-03902	1		4	1	15	15	00.55	4	24	2	66	2	0	06		3	0	1		066	2	1	9		0	E00040		3.0		0	2	2	1

INSTRUCTIONS FOR COMPLETING WORK SHEET TYPE 1
EXISTING ROADWAY

A roadway work sheet will be prepared for each section of highway of relative uniform cross-section, geometrics, surface type, physical conditions, and system classification. In addition, section breaks are to be made at county lines, corporate limits, urban area boundaries, (1970 - 1990), major highway intersections, and where significant changes occur in traffic volumes and terrain. On divided highways,[1] a work sheet will be prepared for each separate roadway.

Following are specific instructions for coding all items of the work sheet. Explanation of some items is further amplified in the appendix of this manual, and should be referred to as noted below.

Space is provided in the title block of this work sheet for identifying the person responsible for completing major sections of the work sheet and the date this work was completed.

---

(1) Any physical separation of opposing lanes constitutes a divided highway. A center lane for left turn does not constitute a divided highway.

IDENTIFICATION DATA

1. Type of Work Sheet - Preprinted in the coding block is 1 which indicates an existing roadway.

2. Highway District - For State use only.

Code	District Name	District No.
1	Crystal Falls	1
2	Newberry	2
3	Cadillac	3
4	Alpena	4
5	Grand Rapids	5
6	Saginaw	6
7	Kalamazoo	7
8	Jackson	8
9	Southfield	Metro

3. County Code - See Appendix A for county codes.

4. Place Code - See Appendix A for city codes.

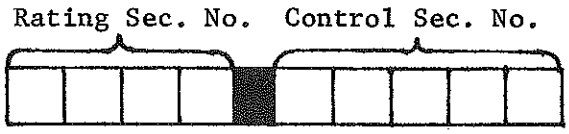
5. Route Designation -

Code	Route Designation
1	U. S.
2	Michigan
3	County
4	Unmarked

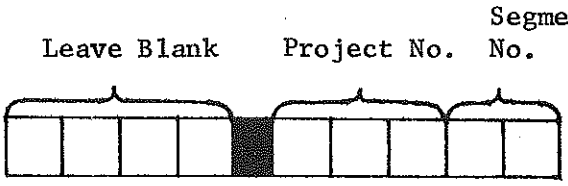
6. Route Number - This is the posted route number. (Optional for county and municipal systems).

7. Project Identification Number - See Appendix B for specific instructions on assigning project numbers. Code as follows:

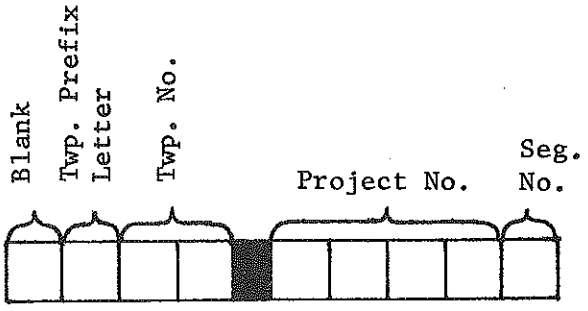
State Trunklines



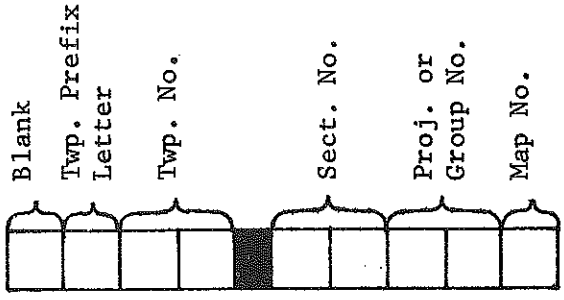
County Primary Rds.



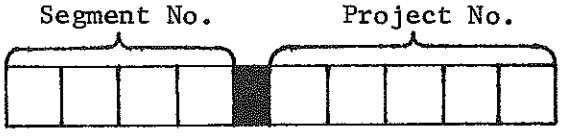
County Local Rds.



County Subdivision Sts.



Cities & Villages Maj. & Local Sts.



SYSTEM CLASSIFICATION

8. Legal System - Reference Act 51, Public Acts 1951 - Must conform to the system as presently certified.

Code	
1	State Trunkline Highways
2	County Primary Roads
3	County Local Roads
4	City Major Streets
5	City Local Streets

9. All Season Truck Route - Routes designated as All Season Truck Routes should be capable of carrying the maximum legal load permissible in Michigan, namely an 18,000 pound single axle load and a 32,000 pound tandem axle load. This loading should apply principally to county primary and city major streets, and to local roads and streets where justifiable designated by county and city agencies.

   Code 1 - All Season Truck Route.

   Code 2 - Not All Season Truck Route.

10. BR, BL, BS Ident.- Code only if rated section is a Business Route, Business Loop or Business Spur. Not applicable to County and Municipal Systems.

Michigan Highway Needs

FORM NO 1716

EXISTING ROADWAY PROJECT WORK SHEET

Field Data _____ Date _____

Office Data _____ Date _____

Review _____ Date _____

Road Name _____

From: _____

To: _____

IDENTIFICATION

(1) Type Work Sheet

(2) Highway District (For State Use Only)

(3) County Code

(4) Place Code

(5) Route Designation 1-U.S. 2-Mich. 3-County 4-Unmarked

(6) Route Number (Optional For County and Municipal)

(7) Project Identification

SYSTEM CLASSIFICATION

CLASS	Ru	Ur		Ru	Ur
Statewide Arterial	02	12	Primary Collector	06	16
Regional Arterial	03	13	Secondary Collector	07	17
Metro. Arterial		14	Residential	08	18
Local Arterial	05	15	Local Access	09	19
			Industrial-Comm.	10	20

(8) Legal System 1-State Trunkline 2-County Primary 3-County Local 4-City Major 5-City Local

(9) All Season Truck Route 1-Yes 2-No

(10) BR, BL, BS Identification 1-BR 2-BL 3-BS

(11) Federal Aid 1-Interstate 2-FAP 3-FAS 4-Non Federal Aid

(12) Seasonal Road 1-No 2-Yes

(13) Existing Functional Class.

(14) Future Functional Class.

Number Of Structure and Grade Crossing Work Sheets Attached _____

COMMENTS

EXISTING CONDITIONS

(15) Section Length (Hundredths of Mile)

(16) Surface Type

(17) Surface Width (Feet)

(18) Surface Deterioration Factor 1-Excellent 2-Good 3-Fair 4-Poor 5-Very Poor

(19) Year of Surface Improvement

(20) Number of Traffic Lanes

(21) Type Parking 0-None 1-Parallel One Side 2-Parallel Opp. Parallel 3-Angle One Side 4-Angle Opp. Parallel 5-Angle Opp. Angle

(22) Outside Shoulder Width (Feet)

(23) Inside Shoulder Width (Feet)

(24) Shoulder Type 1-Paved 2-Stabilized 3-Earth

(25) Curb and/or Gutter 0-None 1-One Side 2-Both Sides

(26) Shoulder-Curb Condition 1-Good 2-Fair 3-Poor

(27) Median Width (Feet)

(28) Right-Of-Way (Feet)

(29) Base Factor 1-Excellent 2-Good 3-Fair 4-Poor 5-Very Poor

(30) Drainage Factor 1-Adequate 3-Tolerable 5-Inadequate

(31) Traffic Operation 1-Freeway (Full Access Control) 2-Divided 3-One-way 4-Frwy. (Detroit Metro) 8-One-way Trunk (State Use) 9-Two Way Undivided

(32) Direction of Travel On Divided 1-NB 2-SB 3-EB 4-WB

(33) Terrain 0-All Urban 1-Level Rural 2-Rolling Rural

(34) Average Daily Traffic (Tens) E=Est. A=Act.

(35) 30th High Hour

(36) Traffic Expansion Factor

(37) Per Cent Commercial Vehicles

(38) Per Cent Sight Restriction

(39) Existing Land Use 1-Rural 2-Int. 3-CBD

(40) Future Land Use 1-Rural 2-Int. 3-CBD

(41) Mileage Control 1-No Change 2,3,4,5,6-See Manual

(42) Special Costing Code 1-Intersection 2-Reconstruction 3-Other

Code

1 Business Route

2 Business Loop

3 Business Spur

11. Federal Aid -

Code	Federal Aid
1	Interstate
2	Federal Aid Primary
3	Federal Aid Secondary
4	Non-Federal Aid

12. Seasonal Roads

Code

1 Open at least 6 months

2 Not open at least 6 months

13. Exist. Funct. Class. - The existing functional classification assigned during the functional classification phase of the study should be recorded.

FUNCTIONAL CLASS.	CODE Rural	CODE Urban
Statewide Arterials	02	12
Regional Arterials	03	13
Metro-Area Arterials	-	14
Local Arterials	05	15
Principal Collectors	06	16
Secondary Collectors	07	17
Residential	08	18
Local Access	09	19
Industrial-Commercial	10	20

14. Future Funct. Class. - The future functional classification assigned during the functional classification phase of the study should be recorded. See Item 13 for codes.

EXISTING CONDITIONS

15. Section Length - Record in hundredths of mile. Breaks in section length will be made when major changes occur in the following items:

(a) cross-section

(b) geometrics

(c) surface type

(d) physical condition

(e) existing or future functional classification

(f) county lines or corporate limits

(g) legal systems

(h) Federal aid system

(i) traffic volumes

(j) terrain

(k) land use (1970 or 1990 urban boundaries)

Also, breaks may be made at major highway intersections and interchanges.

16. Surface Type - Choose nearest applicable code and code as follows:

Code	Surface Type
0	Unimproved Earth
1	Graded and Drained Earth
2	Gravel and Similar
3	Bituminous Surface Treated Gravel
4	Mixed Bituminous Surface on Gravel (1" or more)
5	Mixed Bituminous Surface on concrete or brick or black base (1" or more)
6	Concrete
7	Brick
8	Freeway designed Bituminous Concrete on Aggregate Base
9	Other (Explain in Remarks)

17. Surface Width - Enter in whole feet the predominant width from edge of metal to edge of metal or face to face of curb. This is the width which would be used if parking were removed.

18. Surface Deterioration Factor - **(See Appendix C for guides for determing surface deterioration factors.**

Code		
1	Excellent --	No visible or apparent deterioration of surface.
2	Good --	Some surface deterioration evident, but on no more than 5% of the road length being rated. Average maintenance required.

Code		
3	Fair --	Surface deterioration on up to 25% of the road length being rated. May require above average maintenance, but not necessarily uneconomical when weighed against cost of resurfacing.
4	Poor --	Deterioration on more than 25% of the road length rated. Excessive maintenance warrants resurfacing soon.
5	Very Poor --	Extreme deterioration. Beyond maintenance capabilities. Warrants urgent resurfacing.

19. Year of Surface Improvement - Code the year of construction or the last year of major surface improvement, whichever is the latest. Estimate if year is unknown. See Appendix G for definitions of maintenance and construction.

20. No. of Traffic Lanes - Enter number of traffic lanes under rush hour conditions. If lanes are not marked, then the number of lanes should be determined on the basis of effective width using a minimum of 9 feet for each traffic lane.

21. Type of Parking - Code as follows: (use rush hour conditions)

Code	Type Parking
0	No parking allowed
1	Parallel on one side

Code	Type Parking
2	Parallel opposite parallel
3	Angle on one side
4	Angle opposite parallel
5	Angle opposite angle

22. Outside Shoulder Width - Enter to nearest foot the average width of shoulders on undivided roadways. On divided roadways enter width to nearest foot of the outside shoulder.

23. Inside Shoulder Width - Enter to nearest foot the width of the inside shoulder on divided roadways.

24. Shoulder Type

Code	Shoulder Type
1	Paved--concrete or bituminous mat.
2	Stabilized--a mixture of soil, gravel, broken stone or seal coat.
3	Earth--soil, soil with turf or oiled soil.

25. Curb and/or Gutter -

Code	
0	None
1	One side only
2	Both sides

26. Shoulder-Curb Condition - Code the overall structural condition of the shoulders or curb as follows:

Code

1 Good--Curb is structurally in good condition and curb height adequate for more than one resurfacing. Shoulders showing no visible or apparent deterioration of surface.

2 Fair--(maximum on roll curb) Curb is adequate for one resurfacing. Shoulder shows deterioration on up to 25% of length being rated. May require above average maintenance.

3 Poor--Structural condition of curb is poor or curb height is inadequate for resurfacing. Shoulder shows extreme deterioration and is beyond maintenance capabilities.

27. Median Width - Enter in feet the width of the median (includes inside shoulders).

28. Right-of-Way Width - Enter in feet the average existing ROW width.

29. Base Factor - This is an evaluation of soil, base, subbase material as to drainage qualities, and ability to carry loads without excessive pavement deterioration.

Code

1 Excellent No visible or apparent deterioration of the base. Code 1 is usually reserved for bases recently constructed by latest controlled density methods.

Code		
2	Good	Some base deterioration evident, but on no more than 5% of the road length being rated. Average maintenance required.
3	Fair	Base deterioration on up to 25% of the road length being rated. May require above average maintenance, but not necessarily uneconomical when weighed against cost of new base.
4	Poor	Base deterioration on more than 25% of the road length being rated. Excessive maintenance warrants reconstruction soon.
5	Very Poor	Extreme deterioration of base. Beyond maintenance capabilities. Warrants urgent reconstruction.

30. Drainage Factor - This is an evaluation of the drainage qualities.

Code	Drainage Factor
1	Adequate--Cross-section and culvert capacity adequate for normal run off to include snow storage and melting. Normal maintenance required.
3	Tolerable--Cross-section and culvert capacity below design standard. Above normal maintenance effort required in order to provide adequate traffic service due to drainage problems and snow storage.

Code	Drainage Factor
5	Inadequate--Very difficult or at times impossible to provide adequate traffic services because of drainage and snow storage problems. Road may be impassable at times. Excessive maintenance required.

31. Traffic Operation -

Code	
1	Freeway (Full Access Control)
2	Divided (Partial or no Access Control)
3	One way system
4	Freeway (Detroit Metro Area)
8	One way trunkline on 2-way street (State use only)
9	Two way undivided

32. Direction of Travel on Divided - (Divided includes one way systems and freeways)

Code	
1	Northbound
2	Southbound
3	Eastbound
4	Westbound

33. Terrain

Code	
0	All urban sections
1	Level rural sections
2	Rolling Rural sections (gradient and/or curvature sufficient to influence construction cost or design speed).

34. Average Daily Traffic - Enter the ADT in tens. In first code block enter A (actual) or E (estimated) to indicate whether the ADT count is actual or estimated.

10269 Actual = | A | | 1 | 0 | 2 | 7 |

10269 Estimated = | E | | 1 | 0 | 2 | 7 |

For dual highways where each separate roadway is inventoried on a separate work sheet, enter the ADT for the total roadway section, and not for the separate roadways.

35. 30th High Hour - When 30th high hour is known it will be entered in tens.

(Not needed for cities & villages)

9684 = | | 9 | 6 | 8 |

If the 30th high hour is not known, this item will be left blank. The 30th high hour is the optimum design hour traffic volume that was exceeded by 29 hourly volumes for the preceding year. (For dual highways - based on total ADT as defined in Item 34 above).

36. Traffic Expansion Factor - Enter the average annual traffic expansion factor (percent) which is estimated for the next 20 years. Do not exceed the maximum factors shown in the Expansion Factor Table on page D-1. The factors in this table are based on the existing and future functional classification of the roadway. The factors are to be coded in tenths of a percent as follows:

3.2% = | 3 | 2 |

37. Percent Commercial Vehicles - Enter the per cent of commercial vehicles to nearest whole percent.

(Not needed for cities & villages)

13.7% = | 1 | 4 |

If per cent of commercial vehicles is not known, leave this item blank.

38. Percent Sight Restriction - Using the guidelines listed in Appendix E, determine the per cent of the rated roadway section with a sight restriction, and enter in nearest whole per cent. This item applies to two lane roads in rural areas only.

(Not needed for cities & villages)

12.6% = | 1 | 3 |

39. Existing Land Use 1970 - Code as required.

Code	Land Use
1	Rural (including cities & villages with a population of less than 5000 unless in a designated urban area)
2	Intermediate
3	CBD

Rural - That section outside the present boundary of an urban area.

Intermediate - That section inside the present boundary of an urban area (5,000 population or more) but not in the CBD.

For purposes of this needs study, this area includes the fringe, outlying business district and residential areas.

CBD - Those portions of a municipality in which the dominant land use is for intense business activity. These districts are characterized by large numbers of pedestrians, commercial vehicle loadings of goods and people, a heavy demand for parking space, and a high parking turnover.

40. Future Land Use (1990) - Code as required.

Code	Land Use
1	Rural (including cities & villages with a population of less than 5000 unless in a designated urban area.)
2	Intermediate
3	CBD

Rural - That section outside the future boundary of an urban area.

Intermediate - That section inside the future boundary of an urban area (5,000 population or more) but not in the CBD. For purposes of this needs study, this area includes the fringe, outlying business district and residential areas.

CBD - Those portions of a municipality in which the dominant land use is for intense business activity. These districts are characterized by large numbers of pedestrians, commercial vehicle loadings of goods and people, a heavy demand for parking space, and a high parking turnover.

Note: Urban area boundaries must be in conformance with maps agreed upon with the Michigan Department of State Highways.

41. Mileage Control - The purpose of this code is to indicate changes which affect mileage accountability and/or changes in Administrative system.

Code 1 - No change

Code 2 - Roadway to be abandoned and/or vacated.

Code 3 - Roadway on traveled way of interstate, and to be absorbed by interstate system.

Code 4 - Roadway to be transferred to State Administrative System other than interstate.

Code 5 - Roadway to be transferred to County Administrative System.

Code 6 - Roadway to be transferred to Municipal Administrative System.

42. Special Costing Code - (Note: Codes 1, 2, and 3, used in the previous study, no longer apply.)

Urban standards may be desirable in places not within Urban Area Boundaries and, likewise, Rural Standards may be desirable in places within Urban Area Boundaries. If this situation applies, code as follows:

Code 4 - Change Rural Standards to Urban

Code 5 - Change Urban Standards to Rural

INSTRUCTIONS FOR COMPLETING WORK SHEET TYPE 2

EXISTING STRUCTURE AND RAILROAD GRADE CROSSING

A work sheet will be prepared for each existing structure and each existing railroad grade crossing on roadways for which a Work Sheet Type 1 has been completed. The agency responsible for the maintenance of the structure will prepare the work sheet, and in most instances the same agency is responsible for maintenance of the roadway, and prepares the roadway work sheet upon which the structure is located. The exceptions are those grade separation structures located on a county or municipal roadway which cross a state trunkline. On these structures the State will prepare the work sheet, and provide a carbon copy of the completed work sheet to the appropriate county or municipal agency for their information. Railroad over highway grade separations will be inventoried by the appropriate agency although maintenance thereof may be the responsibility of the railroad.

If there are more than one structure and one grade crossing on a roadway section, it will be necessary to prepare additional Work Sheets Type 2 for these additional structures or crossings.

Space is provided in the title block of this work sheet for identifying the person responsible for completing major sections of the work sheet and the date this work was completed.

Michigan Highway Needs

FORM NO. 1717

EXISTING STRUCTURE AND RR CROSSING

Field Data _____ Date _____

Office Data _____ Date _____

Review _____ Date _____

IDENTIFICATION

(1) Type Work Sheet — 2

(2) County Code

(3) Place Code

Road Name _____

@ _____

COMMENTS

ALL STRUCTURES

(4) Bridge Number

(5) Bridge Length (Feet)

*(6) Type of Structure 1-Timber 2-Concrete 3-Steel

*(7) Load-Carrying Capacity (Tons) H

*(8) Structural Condition 1-Good 2-Fair 3-Poor

*(9) Year Built

*(10) Bridge Width (Feet) @

*(11) Vertical Clearance-Over (Hundredths of Feet)

* Not Required For Railway Over Highway

BRIDGE OVER DRAINAGE — 1

(12) Project Identification

(13) Legal System 1-State Trunk 2-County Primary 3-County Local 4-City Major 5-City Local

(14) Waterway Adequacy 1-Adequate 2-Inadequate

HIGHWAY OVER RAILWAY — 2

(15) Project Identification

(16) Legal System 1-State Trunk 2-County Primary 3-County Local 4-City Major 5-City Local

RAILWAY OVER HIGHWAY — 3

(17) Project Identification

(18) Legal System

(19) Horizontal Clearance-Under (Feet) @

(20) Vertical Clearance-Under (Hundredths of Feet)

HIGHWAY OVER HIGHWAY — 4

(21) Project Identification-Over

(22) Project Identification-Under

(23) Legal System-Over

(24) Legal System-Under

1-State Trunk 2-County Primary 3-County Local 4-City Major 5-City Local

(25) Horizontal Clearance-Under (Feet) @

(26) Vertical Clearance-Under (Hundredths of Feet)

GRADE CROSSING — 5

(27) Crossing Number

(28) Project Identification

(29) Legal System 1-State Trunk 2-County Primary 3-County Local 4-City Major 5-City Local

(30) Existing Protection 1-Crossbucks 2-Flashing Lights 3-Gates 4-None

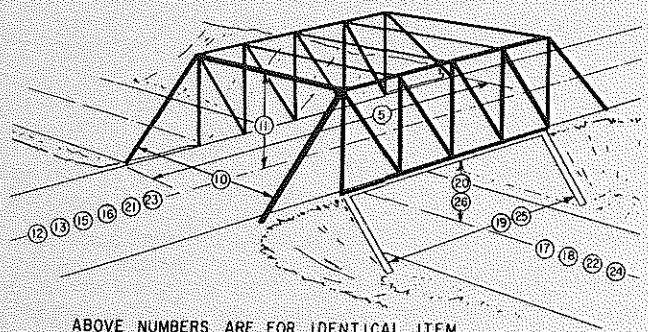
(31) Number of Tracks

(32) Number of Trains Per Day

SPECIAL COSTING

(33) Special Costing Code Blank-No Special Improvements 1-Special Improvements Required

REPRESENTATIVE STRUCTURE DATA



ABOVE NUMBERS ARE FOR IDENTICAL ITEM NUMBERS ON WORKSHEET

IDENTIFICATION DATA

1. Type of Work Sheet - Preprinted in the coding block is the code 2 indicating existing structure or railroad grade crossing.
2. County Code - See Appendix A for county codes.
3. Place Code - See Appendix A for city codes.

ALL STRUCTURES

4. Bridge Number - The bridge number is used to identify a particular structure, indicating the type of service and its location. The bridge number is assigned in sequence within project limits. The first code block indicates the type of facility and is coded as follows:

Code	Type
B	Bridge over Drainage
S	Highway over Highway
R	Highway over Railway
X	Railway over Highway
P	Pedestrian Overpass
Z	Miscellaneous

The second and Third code blocks indicate the sequential number of the structure

within a specific project. For example:

	Number
The first drainage structure	B 01
The second drainage structure	B 02
The twelfth drainage structure	B 12

5. Existing Bridge Length - Enter the existing length of structure in feet. Do not include approaches to structure.

6. Type of Structure - Indicate the predominant material of the longitudinal supporting beams or girders. Not required for railroad over highway structures.

Code	Material
1	Timber
2	Concrete
3	Steel

7. Load-Carrying Capacity - Enter the load carrying capacity of the structure. Do not code design loading for railroad over highway structures. If HS loading enter "S" in second code block. If restricted loading, enter "R" in right code block. The decimal indicates tenths of tons.

H-15

H		1	5	0	

HS-15

H	S	1	5	0	

H-8.3R

H			8	3	R

8. Structural Condition - Optional for railroad over highways. An on-site inspection of the substructure, superstructure and deck should be made. Items to be evaluated in determining the condition of the structure are defective members, disintegrated concrete, decayed piles, pier or abutment movement and crushed or decayed caps.

Code

1 Good - Rate the condition good when all of the material of the structure appears to be sound and properly maintained.

2 Fair - Rate the condition fair when the material appears sound but aged, or has minor deficiencies which could be corrected by maintenance.

3 Poor - Rate the condition poor when material is obviously deteriorated or damaged beyond repair capabilities.

9. Year Built - Enter year built. Not required for railroad structures.

1	9	3	8

10. Bridge Width - Enter the width of the structure from curb to curb or the width of the traveled way. This item is used for vehicular bridges for travel on the bridge deck. Bridge width must also be reported for pedestrian bridges. The first code block indicates whether a single structure or dual structures. The third and fourth code blocks indicate the bridge width of a single structure, or the width of one of the structures if dual. If the dual structures are unequal in bridge width, enter the letter D in the first code block and the total width of the dual structures in the third and fourth code blocks. This item is not required for railroad over highway structures. Figure 1.

Single Structure	1	@	4	8
Dual Structures (equal widths)	2	@	2	4
Dual Structures (unequal widths)	D	@	5	2

11. Vertical Clearance Over - This is the minimum vertical clearance of an overhead obstruction above the traveled way using the bridge deck. It will be coded in hundredths of a foot. The following conversion table may be used. If there is no obstruction leave blank. See Figure 1.

1 in. = .08
2 in. = .17
3 in. = .25
4 in. = .33
5 in. = .42
6 in. = .50
7 in. = .58
8 in. = .67
9 in. = .75
10 in. = .83
11 in. = .92
12 in. = 1.00

BRIDGE OVER DRAINAGE

12. Project Identification Number - In accordance with the instructions in Appendix B for assignment of project identification numbers, indicate the project identification number of the roadway section on which the bridge is located.

13. Legal System Number - Indicate the legal system of the roadway section on which the bridge is located.

Code	Legal System
1	State Trunkline Highway
2	County Primary Road
3	County Local Road
4	City Major Street
5	City Local Street

14. Waterway Adequacy - Indicate the adequacy of drainage under the bridge.

Code	
1	Adequate - Capable of handling high-water conditions without upstream flooding or overflow onto structure or roadway approaches.
2	Inadequate - Water flooding land upstream and/or over the structure and roadway approaches.

HIGHWAY OVER RAILWAY

15. Project Identification Number - In accordance with instructures in Appendix B for assignment of project identification numbers, indicate the project identification number of the roadway section on which the bridge is located.

16. Legal System - Indicate the legal system of the roadway section on which the bridge is located.

Code

1	State Trunkline Highway
2	County Primary Road
3	County Local Road
4	City Major Street
5	City Local Street

RAILWAY OVER HIGHWAY

17. Project Identification Number - In accordance with instructions in Appendix B for assignment of project identification numbers, indicate the project identification number of the roadway section under the railroad bridge.

18. Legal System - Indicate the legal system of the roadway section under the railroad bridge.

Code

1	State Trunkline Highway
2	County Primary Road
3	County Local Road
4	City Major Street
5	City Local Street

19. Horizontal Clearance - This is the total horizontal width of the traveled way underneath the railroad bridge measured between piers or abutments and will be coded as follows:

Example: No center pier. 40' Horizontal Clearance

1	@	4	0

If there is a center pier and the widths between the center pier and the outside piers or abutments are equal, enter 2 in the first code block and the width between the center pier and an outside pier or abutment in the other code blocks.

Example: Center pier, 42' Horizontal Clearance each side of center pier.

2	@	4	2

For unequal widths, enter 2 in the first code block and the minimum of the two widths. See Figure 1.

20. Vertical Clearance (Under) - This is the vertical clearance of a structure over the traveled way underneath, and will be indicated in hundredths of a foot. The following conversion table may be used: See Figure 1.

1 in. =	.08	**9 in. =**	**.75**
2 in. =	.17	**10 in. =**	**.83**
3 in. =	.25	**11 in. =**	**.92**
4 in. =	.33	**12 in. =**	**1.00**
5 in. =	.42		
6 in. =	.50		
7 in. =	.58		
8 in. =	.67		

HIGHWAY OVER HIGHWAY

21. Project Identification Number (over) - In accordance with instructions in Appendix B for assignment of project identification numbers, indicate the project identification number of the roadway section that passes over the bridge deck.

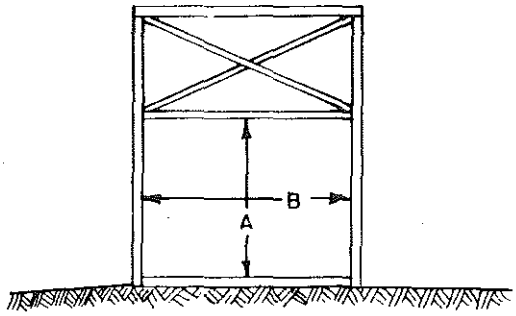
22. Project Identification Number (under) - Indicate the project identification number of the roadway section that passes under the bridge.

23. Legal System (over) - Indicate the legal system of the roadway section that passes over the bridge deck.

Code	Legal System
1	State Trunk Line
2	County Primary Road
3	County Local Road
4	City Major Street
5	City Local Street

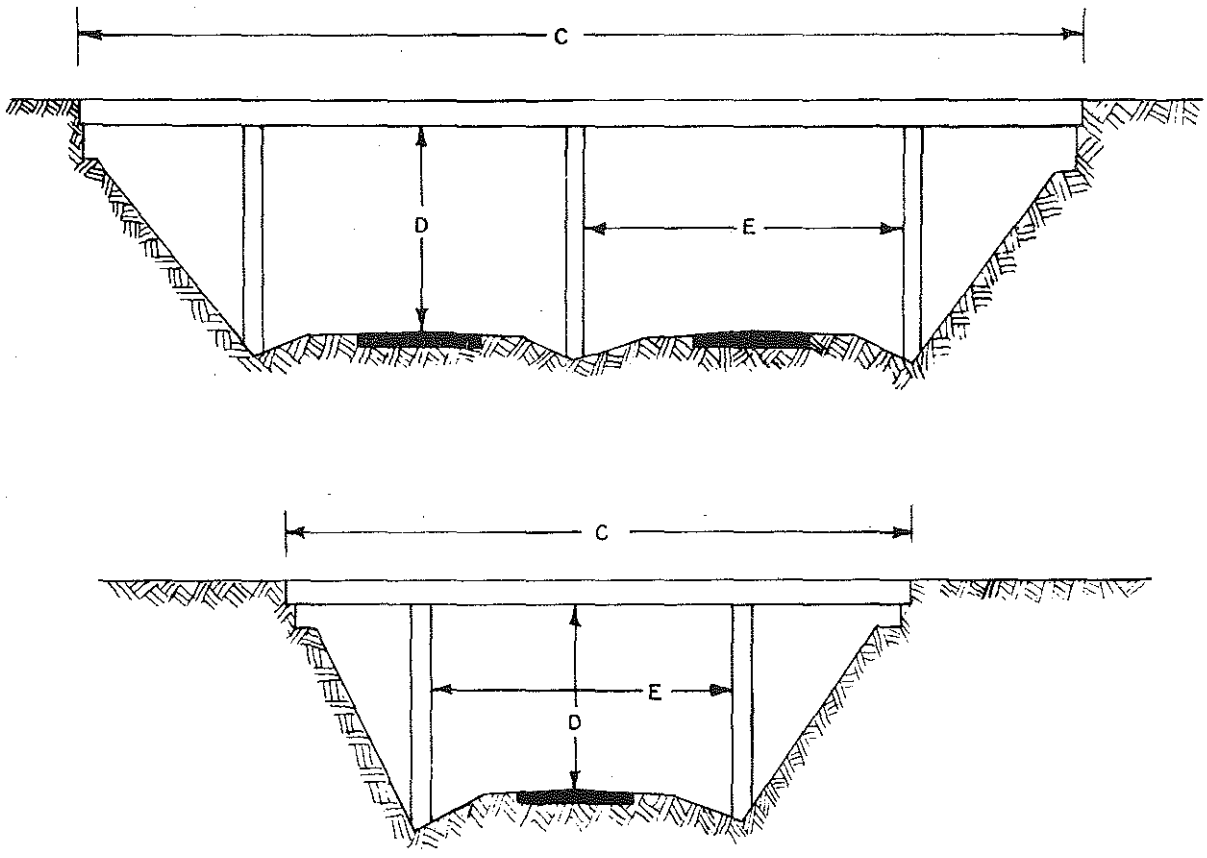
24. Legal System (under) - Indicate the legal system of the roadway section that passes under the bridge.

25. Horizontal Clearance - This is the total horizontal width of the traveled way underneath the bridge measured between piers or abutments, and will be coded in accordance with coding instructions in Item 19. See Figure 1.



END VIEW OF TRUSS BRIDGE

A = VERTICAL CLEARANCE FOR ITEM 11
B = BRIDGE WIDTH FOR ITEM 10



C = BRIDGE LENGTH FOR ITEM 5
D = VERTICAL CLEARANCE FOR ITEM 20 & 26
E = HORIZONTAL CLEARANCE FOR ITEM 19 & 25

FIGURE 1

26. Vertical Clearance - This is the minimum vertical clearance of the bridge over the traveled way under-neath, and will be indicated in hundredths of a foot. The following conversion table may be used: See Figure 1.

1 in. =	.08
2 in. =	.17
3 in. =	.25
4 in. =	.33
5 in. =	.42
6 in. =	.50
7 in. =	.58
8 in. =	.67
9 in. =	.75
10 in. =	.83
11 in. =	.92
12 in. =	1.00

GRADE CROSSING

27. Crossing Number - All railroad grade crossings on a specific project will be given a sequential number, beginning with 01 and preceded by G as follows:

	Number
The first grade crossing	G 01
The second grade crossing	G 02

28. Project Identification Number - In accordance with instructions in Appendix B for assignment of project identification numbers, indicate the project identification number of the roadway section on which the crossing is located.

29. Legal System - Indicate the legal system of the roadway section on which the crossing is located.

Code	Legal System
1	State Trunkline
2	County Primary Road
3	County Local Road
4	City Major Street
5	City Local Street

30. Existing Protection -

Code	Protection
1	Crossbucks
2	Flashing Lights
3	Flashing Lights and Gates
4	No Protection
5	Cantilever Arms

31. Number of Tracks - Enter number of tracks.

32. Number of Trains Per Day - Enter number of trains per day.

SPECIAL COSTING

33. Special Cost Code - Does not apply.

INSTRUCTIONS FOR COMPLETING WORK SHEET TYPE 3
NEW CONSTRUCTION ON NEW ALIGNMENT
(NON EXISTING SUBDIVISION STREETS NOT TO BE INCLUDED)

In the determination of the future functional classification of roads and streets, it will be found that some existing roads and streets cannot adequately meet future traffic demands. There are numerous and various criteria which must be considered in functionally classifying roads and streets for future conditions. Changes which have already occurred in trip lengths, travel patterns, traffic composition, character and level of service, and projection of these considerations into the future may determine that a new road or street on new alignment would be necessary to meet future demands. Future urban expansion may result in travel corridors where non now exist. Likewise, it may not be feasible to improve certain existing roads or streets to meet future design standards due to such factors as roadside development, terrain, right-of-way restrictions, etc.

In those cases where the existing road or street cannot be improved to adequately meet future demands, or where new corridors will develop, new construction on new alignment should be considered. Once it has been determined that new construction is required, the type and route location of the new facility must be based on accepted highway planning procedures. The new facility must be functionally compatible with the existing roadway network. It would be probable that the functional classification and traffic volumes of nearby roads and streets would change when the new facility is completed.

In addition to determining the requirement for roadways, the requirement for new structures and for railroad crossing protection must be determined. These two determinations are made based on the topography, the railroad network and the existing roadway network. Grade separations for railroad crossings and for highways are determined from the design standards for the crossing facilities.

Work Sheet Type 3 is to be completed when there is to be new construction on new alignment. The new roadway data, new structure data and new railroad crossing data will be entered on this sheet. If there are more than one structure or railroad crossing on the particular roadway section, additional work sheets are required. On these additional sheets, it will not be necessary to complete Items 5 and 6 and Items 9 through 19. Determination of whether the new facility will be at-grade or grade-separated for railroad crossings will be based on the data recorded on the Work Sheet Type 3 and upon appropriate design standards. This determination will be made during the data analysis phase, and is not a consideration in the data collection phase.

Space is provided in the title block of this work sheet for identifying the person responsible for completing major sections of the work sheet and the date this work was completed.

IDENTIFICATION DATA

1. Type of Work Sheet - Code 3 preprinted to designate new facility on new alignment.

2. Highway District - For state use only.

Code	District Name	District No.
1	Crystal Falls	1
2	Newberry	2
3	Cadillac	3
4	Alpena	4
5	Grand Rapids	5
6	Saginaw	6
7	Kalamazoo	7
8	Jackson	8
9	Pontiac	9
0	Southfield	10

3. County - See Appendix A for county codes.

4. Place Codes - See Appendix A for city codes.

5. Route Designation - Enter if known

Code	Route Designation
1	U.S.
2	Michigan
3	County
4	Unmarked

6. Route Number - Enter if known. This is the posted route number. (Optional for County and Municipal Systems).

Michigan Highway Needs

FORM NO 1718

NEW CONSTRUCTION PROJECT WORK SHEET

Field Data _____ Date _____

Office Data _____ Date _____

Review _____ Date _____

Road Name _____

From: _____

To: _____

IDENTIFICATION

(1) Type Work Sheet — 3

(2) Highway District (For State Use Only)

(3) County Code

(4) Place Code

*(5) Route Designation 1-U.S. 2-Mich. 3-County 4-Unmarked

*(6) Route Number (Optional For County and Municipal)

(7) Project Identification

SYSTEM CLASSIFICATION

CLASS	Ru	Ur		Ru	Ur
Statewide Arterial	02	12	Primary Collector	06	16
Regional Arterial	03	13	Secondary Collector	07	17
Metro. Arterial		14	Residential	08	18
Local Arterial	05	15	Local Access	09	19
			Industrial – Comm.	10	20

(8) Legal System 1-State Trunkline 2-County Primary 3-County Local 4-City Major 5-City Local

*(9) All Season Truck Route 1-Yes 2-No

*(10) BR, BL, BS Identification 1-BR 2-BL 3-BS

*(11) Federal Aid 1-Interstate 2-FAP 3-FAS 4-Non Federal Aid

*(12) Future Functional Class.

Number of New Construction Work Sheets Attached _____

(for additional structure and grade crossings)

COMMENTS

ROADWAY DATA

*(13) Section Length (Hundredths of Miles)

*(14) Right of Way (Existing Width-Feet)

*(15) Terrain 0-All Urban 1-Level Rural 2-Rolling Rural

*(16) Average Daily Traffic (Tens)

*(17) Traffic Expansion Factor (Tenths)

*(18) Future Land Use 1-Rural 2-INT 3-CBD

*(19) Time Period 1-1970-1974 2-1975-1979 3-1980-1984 4-1985-1989

STRUCTURE DATA

(20) Type Service 1-Bridge Over Drainage 2-Highway over Highway

(21) Proposed Length (Feet)

(22) Number of Loops

(23) Number of "T" Ramps

RAILROAD CROSSING DATA

(24) Number of Tracks

(25) Number of Trains per Day

SPECIAL COSTING

(26) Special Costing Code Blank-No Special Improvement 1-Intersection 2-Other

* Not required if worksheet is used for additional structure or grade crossing

7. Project Identification Number - This identification number will be assigned in accordance with instructions for project identification in Appendix B. If it is impossible to assign a permanent identification number to new construction, a temporary number will be assigned. A sequential numbering system will be used beginning with the Number 1 followed by the Letter A, the Letter A indicating a temporary number.

SYSTEM CLASSIFICATION DATA

8. Legal System - Reference Act 51, Public Acts 1951. Enter the legal system to which it is anticipated the new roadway will be assigned.

Code

1 State Trunkline Highway

2 County Primary Road

3 County Local Road

4 City Major Street

5 City Local Street

9. All Season Truck Route - Enter if known. Routes designated as all season truck routes should be capable of carrying the maximum legal load permissible in Michigan, namely an 18,000 pound single axle load and a 32,000 pound tandem axle load. This loading should apply principally to county primary and major city streets, and to local roads and streets where designated by county and city agencies.

Code

1 All season truck route

2 Not all season truck route

10. BR, BL, BS - Enter if known. Code only if rated section is a business route, business loop or business spur. Not applicable to County and Municipal Systems.

Code

1 Business Route

2 Business Loop

3 Business Spur

11. Federal Aid - Enter if known.

Code	Federal Aid System
1	Interstate
2	Federal-Aid Primary
3	Federal-Aid Secondary
4	Non Federal-Aid

12. Future Functional Classification - Enter the future functional classification of the facility at the time of construction.

Functional Class.	Code	
	Rural	Urban
Statewide Arterial	02	12
Regional Arterial	03	13
Metro Area Arterial		14
Local Arterial	05	15
Principal Collector	06	16
Secondary Collector	07	17
Residential	08	18
Local Access	09	19
Industrial-Commercial	10	20

ROADWAY DATA

13. Section Length - Record in hundredths of mile. Breaks in section length will be made when major changes occur in the following items:

(a) county lines or corporate limits

(b) legal systems

(c) federal aid

(d) traffic volumes

(e) terrain

(f) land use (1990 urban boundaries)

(g) traffic expansion factor

Also, breaks may be made at major highway intersections and interchanges.

14. ROW Width - Existing - Code in feet the existing ROW width. If none enter zeros.

15. Terrain - Code

Code	
0	All urban sections
1	Level rural sections
2	Rolling rural section

(Rolling is used to denote gradient and/or curvature sufficient to influence construction cost or design speed).

16. Average Daily Traffic - Enter estimated ADT in tens for time of new construction.

16980 =

1	6	9	8

17. Traffic Expansion Factor - Enter the average annual traffic expansion factor (percent) for the next 20 years after the time of new construction. See Appendix D for maximum factors.

18. Future Land Use - (1990)

Code	Land Use
1	Rural
2	Intermediate
3	CBD

Rural - That section outside the future boundary of an urban area.

Intermediate - That section inside the future boundary of an urban area (5,000 population or more) but not in the CBD. For purposes of this needs study, this area includes the fringe, outlying business district and residential areas.

CBD - Those portions of a municipality in which the dominant land use is for intense business activity. These districts are characterized by large numbers of pedestrians, commercial vehicle loadings of goods and people, a heavy demand for parking space, and a high parking turnover.

Note: Urban area boundaries must be in conformance with maps agreed upon with the Michigan Department of State Highways.

19. Time Period - Indicate time period roadway is to be constructed. Structure and railroad crossing improvements will also be made in this time period.

Code	Time Period
1	1975-1979
2	1980-1984
3	1985-1989
4	1990-1995

STRUCTURE DATA (If more than one proposed structure is located on this roadway section, additional work sheets type 3 are required. Only items 2, 3, 4, 7 and 8 need be completed along with structure and/or railroad crossing data).

20. Type Service -

Code	
1	Bridge over drainage
2	Highway over highway

21. Proposed Length - Enter in feet the proposed length of the new structure.

22. Number of Loops - Enter the number of loops required.

23. Number of T Ramps - Enter the number of T ramps.

RAILROAD CROSSING DATA (If more than one grade crossing exists on the proposed roadway section, additional work sheets type 3 are required. Only items 2, 3, 4, 7 and 8 need be completed if this work sheet is for additional structures or grade crossings).

24. Number of Mainline Tracks - Enter the number of tracks at the proposed crossing.

25. Number of Trains per Day - Enter number of trains per day at the proposed crossing.

26. Special Costing Code - Does not apply

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

01 - Alcona County
- 3016 - Harrisville
- 3958 - Lincoln

02 - Alger County
- 1282 - Chatham
- 4604 - Munising

03 - Allegan County
- 0118 - Allegan
- 1904 - Douglas
- 2308 - Fennville
- 3244 - Hopkins
- 4230 - Martin
- 5080 - Otsego
- 5392 - Plainwell
- 6024 - Saugatuck
- 7132 - Wayland

04 - Alpena County
- 0152 - Alpena

05 - Antrim County
- 0598 - Bellaire
- 1230 - Central Lake
- 2114 - Elk Rapids
- 2124 - Ellsworth
- 4140 Mancelona

06 - Arenac County
- 0332 - Au Gres
- 5000 - Omer
- 6444 - Standish
- 6474 - Sterling
- 6804 - Turner
- 6832 - Twining

07 - Baraga County
- 0434 - Baraga
- 3698 - L'Anse

08 - Barry County
- 2518 - Freeport
- 3044 - Hastings
- 4404 - Middleville
- 4656 - Nashville
- 7418 - Woodland
- 0342 - Auburn

09 - Bay County
- 0342 - Auburn
- 0516 - Bay City
- 2208 - Essexville
- 5328 - Pinconning

10 - Benzie County
- 0634 - Benzonia
- 0676 - Beulah
- 2094 - Elberta
- 2498 - Frankfort
- 3238 - Honor
- 3730 - Lake Ann
- 6692 - Thompsonville

11 - Berrien County
- 0452 - Baroda
- 0630 - Benton Harbor
- 0652 - Berrien Springs
- 0898 - Bridgman
- 0970 - Buchanan
- 1462 - Coloma
- 2042 - Eau Claire
- 2574 - Galien
- 2766 - Grand Beach
- 4394 - Michiana
- 4704 - New Buffalo
- 4766 - Niles
- 6176 - Shoreham
- 6426 - St. Joseph
- 6480 - Stevensville
- 6710 - Three Oaks
- 7108 - Watervliet

12 - Branch County
- 0926 - Bronson
- 1444 - Coldwater
- 5600 - Quincy
- 6158 - Sherwood
- 6856 - Union City

13 - Calhoun County
- 0074 - Albion
- 0310 - Athens
- 0506 - Battle Creek
- 0996 - Burlington
- 3230 - Homer
- 4228 - Marshall
- 6381 - Springfield
- 6656 - Tekonsha

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

14 - Cass County
- 1168 - Cassopolis
- 1912 - Dowagiac
- 2082 - Edwardsburg
- 4200 - Marcellus
- 6904 - Vandalia

15 - Charlevoix County
- 0846 - Boyne City
- 0848 - Boyne Falls
- 1272 - Charlevoix
- 2012 - East Jordan

16 - Cheboygan County
- 1286 - Cheboygan
- 4116 - Mackinaw City
- 7404 - Wolverine

17 - Chippewa County
- 1806 - Detour Village
- 6028 - Sault Ste. Marie

18 - Clare County
- 1344 - Clare
- 2288 - Farwell
- 3012 - Harrison

19 - Clinton County
- 1728 - DeWitt
- 1978 - Eagle
- 2152 - Elsie
- 2478 - Fowler
- 4182 - Maple Rapids
- 5102 - Ovid
- 6424 - St. Johns
- 7226 - Westphalia

20 - Crawford County
- 2820 - Grayling

21 - Delta County
- 2202 - Escanaba
- 2582 - Garden
- 2664 - Gladstone

22 - Dickinson County
- 3410 - Iron Mountain
- 3640 - Kingsford
- 4876 - Norway

23 - Eaton County
- 0608 - Bellevue
- 1274 - Charlotte
- 1856 - Dimondale
- 2040 - Eaton Rapids
- 2776 - Grand Ledge
- 4598 - Mulliken
- 4988 - Olivet
- 5536 - Potterville
- 6576 - Sunfield
- 6928 - Vermontville

24 - Emmet County
- 0060 - Alanson
- 2982 - Harbor Springs
- 5236 - Pellston
- 5286 - Petoskey

25 - Genesee County
- 1013 - Burton
- 1416 - Clio
- 1720 - Davison
- 2310 - Fenton
- 2388 - Flint
- 2404 - Flushing
- 2564 - Gaines
- 2730 - Goodrich
- 2768 - Grand Blanc
- 3966 - Linden
- 4524 - Montrose
- 4582 - Mt. Morris
- 5078 - Otisville
- 6596 - Swartz Creek

26 - Gladwin County
- 0566 - Beaverton
- 2666 - Gladwin

27 - Gogebic County
- 0666 - Bessemer
- 3420 - Ironwood
- 7014 - Wakefield

28 - Grand Traverse
- 2334 - Fife Lake
- 3644 - Kingsley
- 6764 - Traverse City

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

29 - Gratiot County
- 0140 - Alma
- 0298 - Ashley
- 0872 - Breckenridge
- 3438 - Ithaca
- 5274 - Perrinton
- 6428 - St. Louis

30 - Hillsdale County
- 0120 - Allen
- 1072 - Camden
- 3192 - Hillsdale
- 3516 - Jonesville
- 3978 - Litchfield
- 4518 - Montgomery
- 4788 - North Adams
- 5670 - Reading
- 7022 - Waldron

31 - Houghton County
- 1064 - Calumet
- 1546 - Copper City
- 2962 - Hancock
- 3258 - Houghton
- 3760 - Lake Linden
- 3870 - Laurium
- 6336 - South Range

32 - Huron County
- 0386 - Bad Axe
- 1154 - Caseville
- 2116 - Elkton
- 2976 - Harbor Beach
- 3632 - Kinde
- 5106 - Owendale
- 5314 - Pigeon
- 5496 - Port Austin
- 5498 - Port Hope
- 6080 - Sebewaing
- 6844 - Ubly

33 - Ingham County
- 1706 - Dansville
- 2018 - East Lansing
- 3850 - Lansing
- 3926 - Leslie
- 4240 - Mason
- 6490 - Stockbridge
- 7144 - Webberville
- 7342 - Williamston

34 - Ionia County
- 0588 - Belding
- 1368 - Clarksville
- 3292 - Hubbardston
- 3400 - Ionia
- 3774 - Lake Odessa
- 4104 - Lyons
- 4592 - Muir
- 5292 - Pewamo
- 5520 - Portland
- 6016 - Saranac

35 - Iosco County
- 2026 - East Tawas
- 6640 - Tawas City
- 7308 - Whittemore

36 - Iron County
- 0154 - Alpha
- 1160 - Caspian
- 1646 - Crystal Falls
- 2560 - Gaastra
- 3412 - Iron River
- 4468 - Mineral Hills
- 6442 - Stambaugh

37 - Isabella County
- 4584 - Mt Pleasant
- 5864 - Rosebush
- 6146 - Shepherd

38 - Jackson County
- 0932 - Brooklyn
- 1504 - Concord
- 2808 - Grass Lake
- 2970 - Hanover
- 3450 - Jackson
- 5182 - Parma
- 6386 - Springport

39 - Kalamazoo County
- 0348 - Augusta
- 1410 - Climax
- 2570 - Galesburg
- 3538 - Kalamazoo
- 5158 - Parchment
- 5510 - Portage
- 5728 - Richland
- 6048 - Schoolcraft
- 6948 - Vicksburg

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

40 - Kalkaska County
- 3544 - Kalkaska

41 - Kent County
- 1058 - Caledonia
- 1210 - Cedar Springs
- 2008 - East Grand Rapids
- 2784 - Grand Rapids
- 2794 - Grandville
- 3594 - Kent City
- 3597 - Kentwood
- 4064 - Lowell
- 5804 - Rockford
- 5990 - Sand Lake
- 6360 - Sparta
- 7028 - Walker
- 7455 - Wyoming

42 - Keweenaw County
- 0046 - Ahmeek

43 - Lake County
- 0404 - Baldwin
- 4090 - Luther

44 - Lapeer County
- 0148 - Almont
- 1406 - Clifford
- 1482 - Columbiaville
- 1944 - Dryden
- 3354 - Imlay City
- 3852 - Lapeer
- 4380 - Metamora
- 4800 - North Branch
- 5094 - Otter Lake

45 - Leelanau County
- 2176 - Empire
- 4868 - Northport
- 6586 - Suttons Bay

46 - Lenawee County
- 0026 - Addison
- 0030 - Adrian
- 0782 - Blissfield
- 0916 - Britton
- 1218 - Cement City
- 1378 - Clayton
- 1412 - Clinton
- 1750 - Deerfield
- 3298 - Hudson
- 4540 - Morenci
- 5022 - Onsted
- 6654 - Tecumseh

47 - Livingston County
- 0906 - Brighton
- 2480 - Fowlerville
- 3272 - Howell
- 5326 - Pinckney

Luce County
- 4742 - Newberry

49 - Mackinac County
- 4114 - Mackinac Island
- 6416 - St. Ignace

50 - Macomb County
- 0268 - Armada
- 1224 - Center Line
- 2002 - East Detroit
- 2506 - Fraser
- 4348 - Memphis
- 4576 - Mt. Clemens
- 4698 - New Baltimore
- 4714 - New Haven
- 5732 - Richmond
- 5836 - Romeo
- 5872 - Roseville
- 6406 - St. Clair Shores
- 6475 - Sterling Heights
- 6880 - Utica
- 7078 - Warren

51 - Manistee County
- 0554 - Bear Lake
- 1544 - Copemish
- 2016 - East Lake
- 3542 - Kaleva
- 4150 - Manistee
- 5012 - Onekama

52 - Marquette County
- 3432 - Ishpeming
- 4226 - Marquette
- 4680 - Negaunee

53 - Mason County
- 1680 - Custer
- 2468 - Fountain
- 2520 - Freesoil
- 4076 - Ludington
- 6072 - Scottville

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

54 - Mecosta County
- 0458 - Barryton
- 0702 - Big Rapids
- 4334 - Mecosta
- 4546 - Morley
- 6450 - Stanwood

55 - Menominee County
- 1692 - Daggett
- 4352 - Menominee
- 5542 - Powers
- 6472 - Stephenson

56 - Midland County
- 1452 - Coleman
- 4406 - Midland
- 6010 - Sanford

57 - Missaukee County
- 3738 - Lake City
- 4274 - McBain

58 - Monroe County
- 1114 - Carleton
- 1962 - Dundee
- 2214 - Estral Beach
- 4086 - Luna Pier
- 4266 - Maybee
- 4506 - Monroe
- 5284 - Petersburg
- 6342 - South Rockwood

59 - Montcalm County
- 1144 - Carson City
- 2076 - Edmore
- 2850 - Greenville
- 3268 - Howard City
- 3816 - Lakeview
- 4276 - McBride
- 5317 - Pierson
- 6150 - Sheridan
- 9448 - Stanton

60 - Montmorency County
- 3188 - Hillman

61 - Muskegon County
- 1158 - Casnovia
- 2548 - Fruitport
- 3829 - Lakewood Club
- 4512 - Montague

61 - Muskegon County contd.
- 4618 - Muskegon
- 4620 - Muskegon Heights
- 4838 - North Muskegon
- 4871 - Norton Shores
- 5658 - Ravenna
- 5848 - Roosevelt Park
- 7288 - Whitehall

62 - Newaygo County
- 2524 - Fremont
- 2802 - Grant
- 4740 - Newaygo
- 7256 - White Cloud

63 - Oakland County
- 0638 - Berkley
- 0679 - Beverly Hills
- 0725 - Bingham Farms
- 0746 - Birmingham
- 0790 - Bloomfield Hills
- 1362 - Clarkston
- 1372 - Clawson
- 2282 - Farmington
- 2283 - Farmington Hills
- 2320 - Ferndale
- 2502 - Franklin
- 3078 - Hazel Park
- 3218 - Holly
- 3322 - Huntington Woods
- 3558 - Keego Harbor
- 3728 - Lake Angelus
- 3778 - Lake Orion
- 3865 - Lathrop Village
- 3916 - Leonard
- 4125 - Madison Heights
- 4412 - Milford
- 4890 - Novi
- 4912 - Oak Park
- 5040 - Orchard Lake
- 5050 - Ortonville
- 5122 - Oxford
- 5410 - Pleasant Ridge
- 5484 - Pontiac
- 5784 - Rochester
- 5902 - Royal Oak
- 6328 - South Lyon
- 6348 - Southfield
- 6606 - Sylvan Lake
- 6792 - Troy
- 7044 - Walled Lake
- 7390 - Wixom
- 7407 - Wolverine Lake

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

64 - Oceana County
- 3020 - Hart
- 3148 - Hesperia
- 4708 - New Era
- 5254 - Pentwater
- 5878 - Rothbury
- 6134 - Shelby
- 7034 - Walkerville

65 - Ogemaw County
- 5554 - Prescott
- 5860 - Rose City
- 7188 - West Branch

66 - Ontonagon County
- 5024 - Ontonagon

67 - Osceola County
- 2228 - Evart
- 3146 - Hersey
- 3884 - Le Roy
- 4212 - Marion
- 5688 - Reed City
- 6618 - Tuston

69 - Otsego County
- 2610 - Gaylord
- 6906 - Vanderbilt

70 - Ottawa County
- 1540 - Coopersville
- 2326 - Ferrysburg
- 2770 - Grand Haven
- 3212 - Holland
- 3302 - Hudsonville
- 6378 - Spring Lake
- 7486 - Zeeland

71 - Presque Isle County
- 4434 - Millersburg
- 5004 - Onaway
- 5524 - Posen
- 5820 - Rogers City

72 - Roscommon County
- 5854 - Roscommon

73 - Saginaw County
- 0740 - Birch Run
- 1298 - Chesaning
- 2494 - Frankenmuth
- 4364 - Merrill
- 4922 - Oakley
- 5957 - Saginaw
- 6400 - St. Charles
- 7490 - Zilwaukee

74 - Sanilac County
- 0230 - Applegate
- 0944 - Brown City
- 1146 - Carsonville
- 1634 - Croswell
- 1742 - Deckerville
- 2432 - Forestville
- 3942 - Lexington
- 4222 - Marlette
- 4344 - Melvin
- 4464 - Minden
- 5232 - Peck
- 5504 - Port Sanilac
- 6008 - Sandusky

75 - Schoolcraft County
- 4154 - Manistique

76 - Shiawassee County
- 0420 - Bancroft
- 1034 - Byron
- 1568 - Corunna
- 1972 - Durand
- 3726 - Laingsburg
- 4550 - Morrice
- 4724 - New Lothrop
- 5108 - Owosso
- 5278 - Perry
- 6934 - Vernon
- 3912 - Lennon

77 - St. Clair County
- 0112 - Algonac
- 1106 - Capac
- 2174 - Emmett
- 4208 - Marine City
- 4234 - Marysville
- 5500 - Port Huron
- 6402 - St. Clair
- 7458 - Yale

APPENDIX A

COUNTY CODES AND CITY PLACE CODES

78 St. Joseph County
- 1008 - Burr Oak
- 1234 - Centreville
- 1466 - Colin
- 1516 - Constantine
- 4350 - Mendon
- 6540 - Sturgis
- 6712 - Three Rivers
- 7266 - White Pigeon

79 Tuscola County
- 0052 - Akron
- 1128 - Caro
- 1164 - Cass City
- 2256 - Fairgrove
- 2562 - Gagetown
- 3650 - Kingston
- 4270 - Mayville
- 4442 - Millington
- 5696 - Reese
- 6864 - Unionville
- 6914 - Vassar

80 - Van Buren County
- 0424 - Bangor
- 0792 - Bloomingdale
- 0874 - Breedsville
- 1738 - Decatur
- 2698 - Gobles
- 3022 - Hartford
- 3874 - Lawrence
- 3878 - Lawton
- 4258 - Mattawan
- 5202 - Paw Paw
- 6322 - South Haven

81 - Washtenaw County
- 0212 - Ann Arbor
- 1288 - Chelsea
- 1828 - Dexter
- 4142 - Manchester
- 4410 - Milan
- 5964 - Saline
- 7478 - Ypsilanti

82 - Wayne County
- 0126 - Allen Park
- 0606 - Belleville
- 1734 - Dearborn
- 1735 - Dearborn Heights
- 1808 - Detroit

82 Wayne County contd.
- 2054 - Ecorse
- 2382 - Flat Rock
- 2584 - Garden City
- 2636 - Gibraltar
- 2886 - Grosse Pointe
- 2888 - Grosse Pointe Farms
- 2890 - Grosse Pointe Park
- 2892 - Grosse Pointe Shores
- 2894 - Grosse Pointe Woods
- 2960 - Hamtramck
- 3004 - Harper Woods
- 3176 - Highland Park
- 3388 - Inkster
- 3964 - Lincoln Park
- 3994 - Livonia
- 4346 - Melvindale
- 4870 - Northville
- 5420 - Plymouth
- 5756 - River Rouge
- 5766 - Riverview
- 5812 - Rockwood
- 6349 - Southgate
- 6643 - Taylor
- 6770 - Trenton
- 7134 - Wayne
- 7223 - Westland
- 7415 - Woodhaven
- 7450 - Wyandotte

83 - Wexford County
- 0974 - Buckley
- 1040 - Cadillac
- 3006 - Harrietta
- 4166 - Manton
- 4378 - Mesick

APPENDIX B

NOTE

Appendix B is, for the most part, a reprint of instructions from the 1970 Needs Study Manual explaining procedures for assigning project identification numbers for that study.

It is reprinted in this manual for benefit of those agencies and personnel who are doing a study for the first time and does not apply to those agencies who participated in the 1970 Study except to refamiliarize them with study procedures.

APPENDIX B

ASSIGNMENT OF PROJECT IDENTIFICATION NUMBERS ON COUNTY AND CITY SYSTEM

County Roads

To insure complete coverage of the entire county road system and to assist in reviewing the needs data, each county will indicate on the proper map the location and identification of:

- each road project.
- each structure of 20 feet span and greater.
- each railroad grade crossing.
- each new construction roadway structure and railroad crossing.

Each project in this study is to be identified by means of a project identification number. The project identification number is comparable to the control section number used by the Michigan Department of State Highways.

Project identification numbers for the County System are assigned by two methods - one for County Primary Roads and the other for County Local Roads.

County Primary Roads

Each county is requested to show the location and identification of all Primary Road projects on an Act 51 Road Systems Map marked "Primary Road Needs." A sample map is shown on B-9. Project limits should be indicated by arrows to the ends of the projects. Limits are to be determined on the basis of uniformity of function, route number, federal aid and land use and should constitute logical construction projects. A project number will be assigned to these projects. To establish some uniformity in assigning these numbers it is suggested that they begin with the Number 1 and commence in the lower left of the county and running west to east and then south to north. There should be no duplicate numbers.

Within each project a further breakdown will be made by assigning segment numbers. The determination of segment legnths should be based on changes which occur in cross section, geometrics, surface type, physical condition, county lines, corporate limits, legal systems, federal aid, traffic volumes, terrain, land use and optionally at major highway intersections and interchanges. A work sheet will be completed for each segment, thus providing needs analysis and improvement for specific portions of a project. Segment numbers will not be shown on the maps.

The project identification number for the county Primary Roads will be coded on the work sheets in the manner shown on page 9.

County Local Road System

"County local roads to be included in the needs study must be certified to the Local Government Division of the Michigan Department of State Highways."

Each county is requested to show the location and identification of all local road projects on Act 51 Township or Section (subdivision) Maps. A sample township map is shown on page B-10 and a sample section (subdivision) map is shown on B-11. Give each political (not land) township a number.

Note: Normally the political township will be the same as the land township requiring one or two digits; however in some cases a political township will contain more than one land township, requiring a letter prefix. Examples: B16 or C08.

Routes recorded on the Primary Road Systems will be excluded from consideration on the Local Road Maps.

Project or group limits should be indicated by arrows to the ends of the projects or groups.

Limits are to be determined on the basis of uniformity of function, surface types, cross section, geometrics, route number, federal aid and land use (1970-1990 urban boundaries) and should constitute logical construction projects. Project numbers only will be used on the township maps and will begin with Number 1 in the lower left and run west to east and then south to north.

Either project or group numbers may be used on Section (subdivision) maps. If you desire to group subdivision streets, assign a group number to all similar streets on the Section Map and consider as a single project for identification.

Most section maps contain all the subdivisions located within the section. However, if there is more than one map for the same section, assign all maps within the section a map number beginning with Number 1.

The project identification numbers for county local roads are to be coded in the manner shown on page 9.

The work sheet will be completed for each group in accordance with coding instructions for completion of work sheets Type 1, 2 and 3.

Structures and Railroad Grade Crossings

Structures and railroad grade crossings are to be given the project identification number for

the roadway on which they are located. Structures and railroad grade crossings will also be assigned a number. Within each roadway project (not within each segment) number in consecutive order as follows:

Stream Crossings	B-1, B-2, B-3, etc.
Highway Over Highway	S-1, S-2, S-3, etc.
Railroad Over Highway	X-1, X-2, X-3, etc.
Highway Over Railroad	R-1, R-2, R-3, etc.
Railroad Grade Crossing	G-1, G-2, G-3, etc.
Pedestrian Overpass	P-1, P-2, P-3, etc.
Miscellaneous	Z-1, Z-2, Z-3, etc.

Project Identification Numbers for City and Village Street System

Every city and village participating in the Needs Study will be furnished four (4) copies of its current Act 51 Map. Two (2) of the maps - one identifying the major street project numbers, and the other identifying the local street project numbers - is to be returned to the Michigan Department of State Highways. A copy of each map is to be retained by the city or village for its use.

To assure complete coverage of the entire street system, each municipality shall indicate on the proper map (see sample on page B-12) the location and identification of:

- every street project.
- every structure (over 20 feet).
- every railroad grade crossing.
- proposed locations for new streets, structures and crossings, if known.

Determination of Projects and Project Numbers

"Project" as used here merely means a continuous section of a street of substantially uniform characteristics for needs identification pruposes. As evident on the sample maps a project identification section may cover the entire length of some streets, whereas other streets will be divided into several project identification sections. The project identification number is comparable to the "control section number" used by the Michigan Department of State Highways.

The assignment of project numbers should be in a systematic manner. One set of numbers (starting with Number 1) is to be assigned for the major streets and a separate set (also starting with Number 1) for the local streets. The numbering in each case should begin in the southwest section of the city, numbering all the east-west streets consecutively from left to right. Then number all the north-south streets consecutively from bottom to top. Each map should be labeled clearly as "Major Street Project Identification Map" or "Local Street Project Identification Map."

Project limits should be determined on the basis of uniformity of function and characteristics, based on significant changes in cross section, geometrics,

surface type, physical condition, traffic volumes and land use. In addition, project limits should break at each point where there is a change in existing or future functional classification or Federal-Aid classification and at each county or corporate line. The project limits also may be terminated at major intersections or interchanges.

Project identifications should be indicated on the maps by arrows to the ends of the project limits. There should be no duplicate numbers on a single map.

A separate roadway work sheet will be prepared for each project. The project identification numbers will be coded on the worksheets in the manner shown on page 9.

Note that the first 4 code blocks may be used for segment numbers to allow a further breakdown of the project identification numbers for updating.

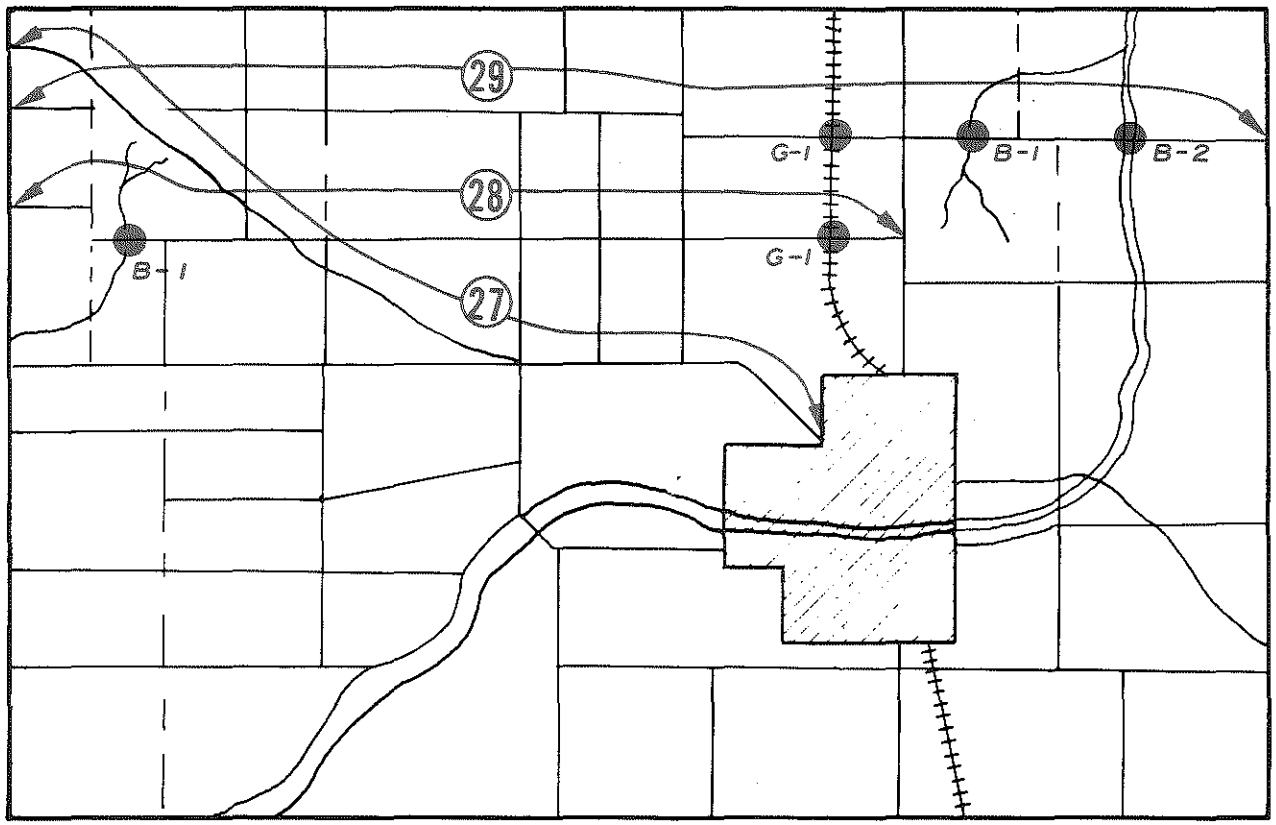
Structures and Railroad Grade Crossings

Structures and railroad grade crossings are to be assigned the same Project Identification Number for the street on which they are located. Each structure and railroad grade crossing within each project section will also be assigned a number, starting with Number 1 and using an alphabetical prefix (see below) to identify the kind of facility.

If there is more than one such structure or grade crossing within that street project section, number each in consecutive order as follows:

Highway over Stream or Water	B-1, B-2, B-3, etc.
Highway over Highway	S-1, S-2, S-3, etc.
Railroad over Highway	X-1, X-2, X-3, etc.
Highway over Railroad	R-1, R-2, R-3, etc.
Railroad Grade Crossings	G-1, G-2, G-3, etc.
Pedestrian Overpass	P-1, P-2, P-3, etc.
Miscellaneous	Z-1, Z-2, Z-3, etc.

PRIMARY ROAD NEEDS - PROJECT MAP



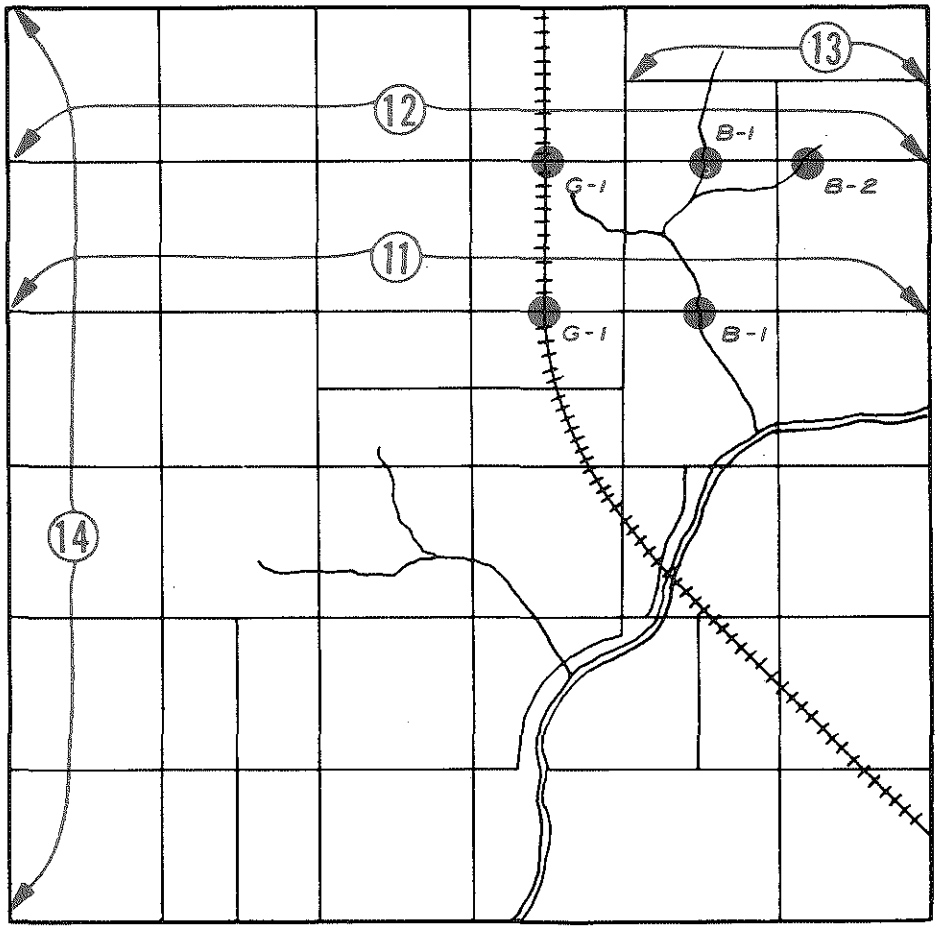
ACT 51 MAP

Number road projects consecutively, starting with (1) in each county.

SHOW ON THIS MAP -

- ✓ Each Primary road project
- ✓ Each Primary road structure of 20' span and over
- ✓ Each Primary railroad grade crossing

LOCAL ROAD NEEDS - PROJECT MAP



Township Map

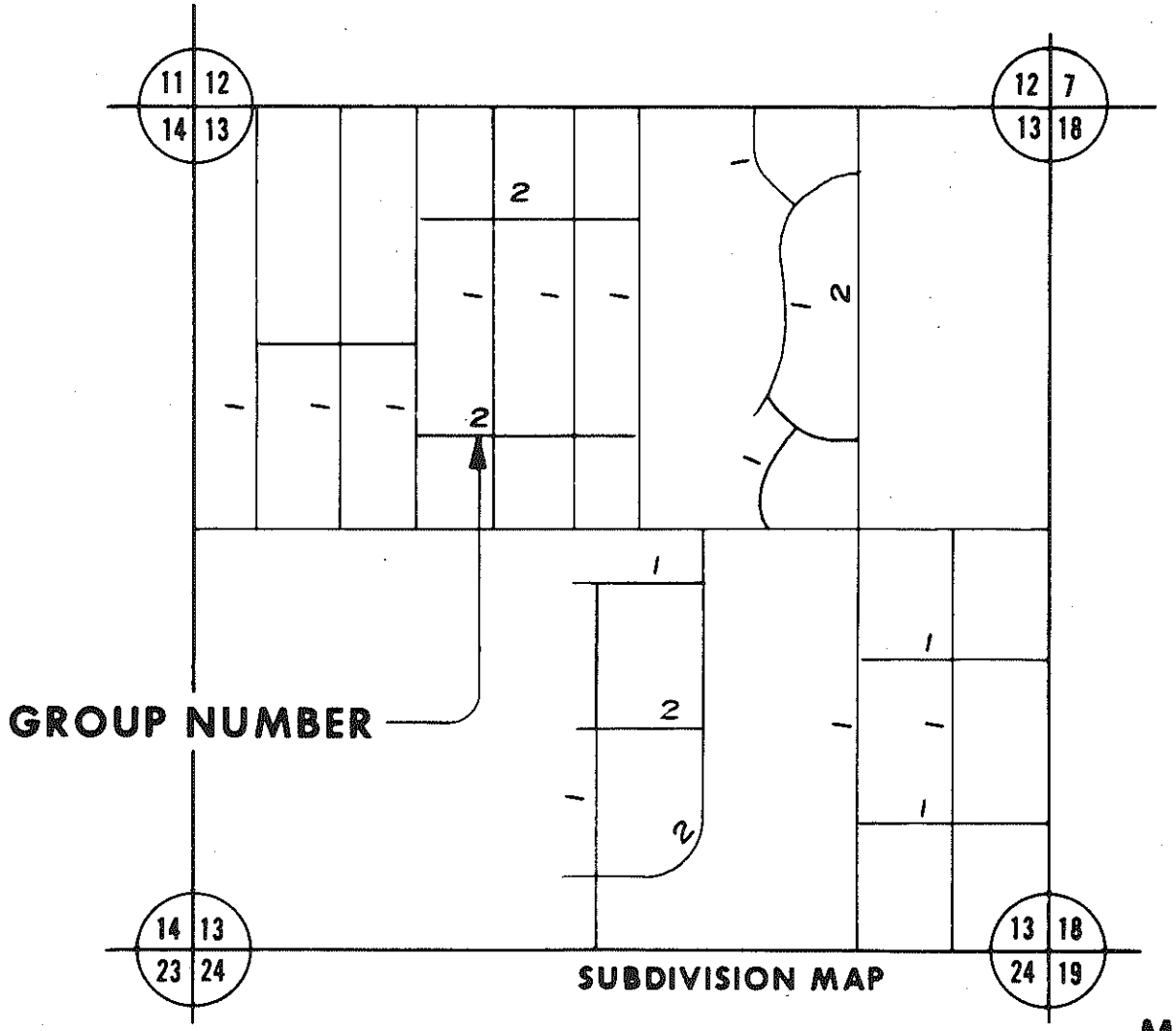
IMPORTANT –
Numbering series for all Local roads should be based on political townships rather than geographical townships.

Number projects consecutively starting with (1) in each political township.

SHOW ON THIS MAP -

- ✔ Each Local road project
- ✔ Each Local road structure of 20' span and over
- ✔ Each Local railroad grade crossing

PLATTED STREET NEEDS - PROJECT MAP



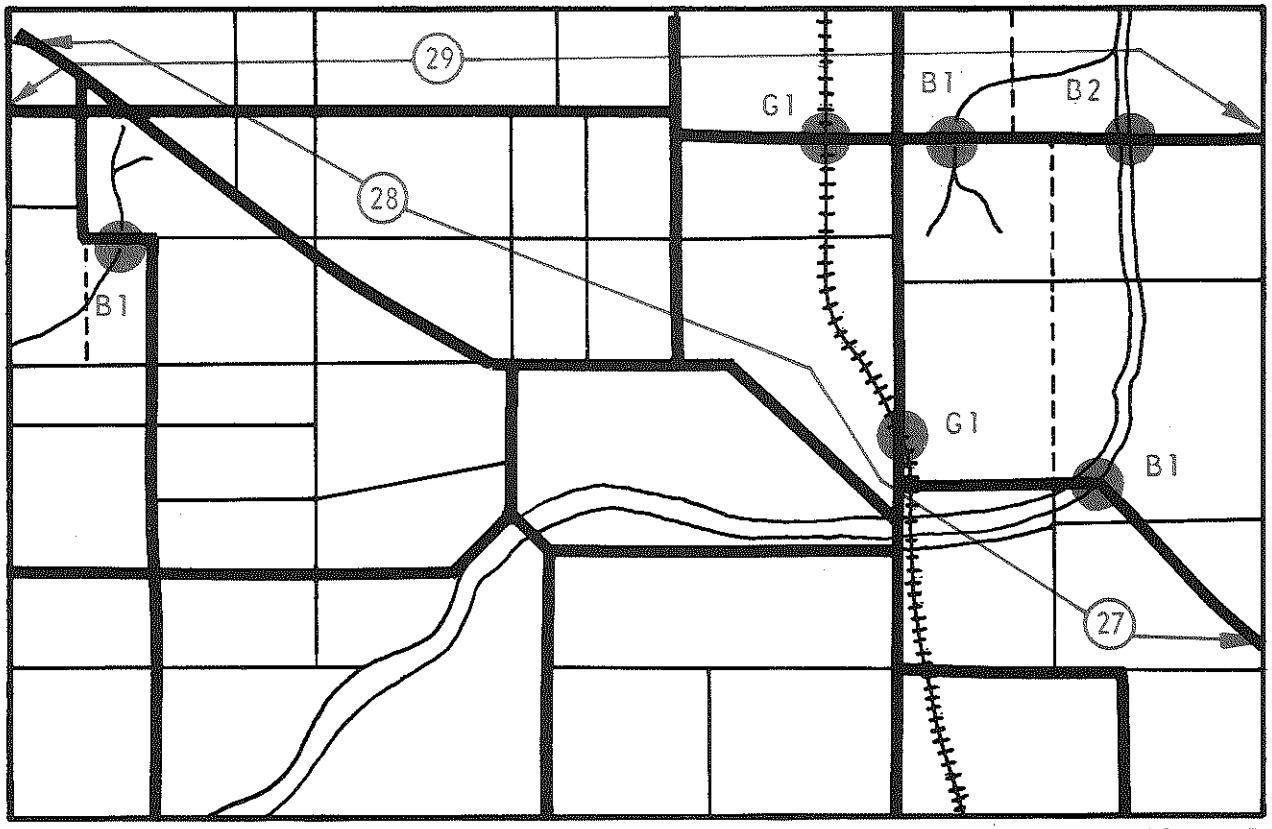
MAP No. 4 - 13 - 1

Political Twp. No.

Section No.

Map No.

MAJOR STREET NEEDS - PROJECT MAP



Number street projects consecutively, starting with (1)

ACT 51 MAP

SHOW ON THIS MAP -

- ✓ Each Major Street project
- ✓ Each Major Street structure of 20' span and over
- ✓ Each Major Street railroad grade crossing

APPENDIX C

Guides for Determining Surface Deterioration Factor

Code	Rating	Rigid Pavement	Bituminous Concrete on Rigid Base	Bituminous Concrete on Flexible Base
1	Excellent	(a) No evidence of patching or cracks (b) Excellent surface appearance (c) No settlement or slab deflection (d) Usually constructed recently	(a) No evidence of patching or cracking (b) Excellent surface appearance (c) No dips or settlement (d) No rutting or shoving (e) Usually constructed recently	(a) to (e) Same as for bituminous concrete on rigid base
2	Good	(a) Isolated patching or cracking (b) Isolated locations where surface deterioration occurs (c) Isolated minor slab deflections (d) Usually constructed recently	(a) Isolated patching or locations where rigid base joints are reflected (b) Good surface appearance (c) Isolated minor settlements (d) No noticeable rutting (e) Usually constructed recently	(a) Isolated patches or hair line cracks (b) to (e) Same as bituminous concrete on rigid base
3	Fair	(a) Some patching or cracking (b) Soma pavement spalling, etc. (c) Surface is not rough enough to cause a reduction in speed (d) Minor and infrequent deflections and settlement	(a) Some patching and reflected cracking (b) Some deterioration of surface and breakage along pavement edge (c) Surface not rough enough to cause reduction in speed (d) Some minor settlements (e) Some rutting or shoving	(a) Some cracks and patches (b) to (e) Same as bituminous concrete on rigid base
4	Poor	(a) Patching, transverse cracks, and diagonal cracking at joints (b) Pitting and spalling along joints (c) Pavement surface may be rough enough to cause some reduction in operating speed (d) Some pavement deflection and settlement	(a) Patching and frequent reflected cracking (b) Some deterioration of surface (c) Surface condition may be rough enough to cause some reduction in operating speed (d) Some dips and settlements (e) Noticeable rutting or shoving	(a) Patching and in some locations map cracking (b) to (e) Same as bituminous concrete on rigid base
5	Very Poor	(a) Considerable patching and cracking (b) Extensive deterioration of surface (c) Surface is too rough to allow a high operational speed (d) Noticeable pavement deflection and settlement (e) Pavement requires considerable maintenance to keep in operation	(a) Considerable patching and cracking (b) Extensive deterioration of surface (c) Surface too rough to allow high speed (d) Noticeable pavement deflection and settlement (e) Requires considerable maintenance to keep in operation	(a) to (e) Same as for bituminous concrete on rigid base

APPENDIX D

MAXIMUM ANNUAL TRAFFIC EXPANSION FACTORS (%)

In the table below are maximum annual traffic expansion factors expressed as percentages. The factors are based on the existing and future functional classification of the roadway. Note that these are maximums and lesser factors should be used if they apply.

1990 Functional Classification

Existing Functional Classification	2	3	5	6	7	8	9	10	12	13	14	15	16	17	18	19	20
2	X	1.0	1.0	1.0	1.0	0	0	0	X	1.5	1.5	1.5	1.0	1.0	0	0	0
3	X	3.0	1.0	1.0	1.0	0	0	0	X	4.0	1.5	1.5	1.0	1.0	0	0	0
5	X	3.5	2.5	1.0	1.0	0	0	0	X	4.5	4.0	3.5	1.0	1.0	0	0	0
6	X	4.0	3.0	2.0	1.0	0	0	0	X	5.0	4.5	4.0	2.0	1.0	0	0	0
7	X	4.5	3.5	2.5	1.5	0	0	0	X	5.5	5.0	4.0	2.5	2.0	0	0	0
8	X	5.0	4.0	2.5	2.0	.3	.3	.3	X	6.0	5.0	4.5	3.0	2.5	1.0	1.0	1.0
9	X	5.0	4.0	2.5	2.0	.3	.3	.3	X	6.0	5.0	4.5	3.0	2.5	1.0	1.0	1.0
10	X	5.0	4.0	2.5	2.0	.3	.3	.3	X	6.0	5.0	4.5	3.0	2.5	1.0	1.0	1.0
12	X	0	0	0	0	0	0	0	3.5	1.5	1.5	1.0	0	0	0	0	0
13	X	0	0	0	0	0	0	0	4.0	3.0	2.0	1.5	0	0	0	0	0
14	X	0	0	0	0	0	0	0	4.0	3.5	3.0	2.0	0	0	0	0	0
15	X	0	0	0	0	0	0	0	4.5	4.0	3.5	2.5	0	0	0	0	0
16	X	0	0	0	0	0	0	0	4.5	4.5	4.0	3.0	2.0	0	0	0	0
17	X	0	0	0	0	0	0	0	5.0	4.5	4.5	3.5	2.5	1.5	0	0	0
18	X	0	0	0	0	0	0	0	5.0	4.5	4.5	4.0	2.5	2.0	.5	.5	.5
19	X	0	0	0	0	0	0	0	5.0	4.5	4.5	4.0	2.5	2.0	.5	.5	.5
20	X	0	0	0	0	0	0	0	5.0	4.5	4.5	4.0	2.5	2.0	.5	.5	.5

APPENDIX E

PROCEDURES

FOR DETERMINING 1500 FOOT PASSING SIGHT DISTANCE

This procedure describes the single car method of surveying for 1500 foot passing sight distance to be used in the analysis of highway capacity. This determination is not necessary in urban areas wherever operating speeds and conditions become significantly different from those prevailing in rural areas. It is necessary to perform this survey only on two-lane rural highways. Separate determinations should be made for each roadway project, i.e. for all work sheets with the same project identification number.

Method of Measuring Sight Distance Restrictions

The 1500 foot passing sight distance for capacity determinations is measured from the height of the driver's eye (3.75 feet) to the pavement surface. For measurement of the 1500 feet, it is assumed that 1500 feet is equal to 28 hundredths of a mile when using an odometer reading to hundredths or three tenths of a mile when using an odometer reading to tenths. The driver of the vehicle estimates when it is 1500 feet ahead of his vehicle to a point where he cannot see the pavement surface and notes his

odometer reading at this time. He also notes some physical feature which pinpoints the location ahead where he loses sight distance. When he reaches this physical feature, he again notes his odometer reading. If the distance travelled is equal to or greater than 1500 feet (.28 mile) there is no restriction. If the distance is less than 1500 feet the distance travelled will be recorded. From this point the driver repeats the above procedure, recording the distances with less than 1500 feet sight distance. For the particular section length being inventoried, the total length of sight restrictions as determined above will be divided by the rated section length to determine the percentage.

If highway striping for no passing zones has been determined on basis of 1500 feet passing sight restrictions, the striping may be used in measuring sight distance restrictions.

APPENDIX G

DEFINITIONS OF CONSTRUCTION AND MAINTENANCE

The Department of State Highways, in the interest of uniformity, has adopted the following definitions and rules as a basis for classifying expenditures for construction and maintenance:

CONSTRUCTION is the building of a new road or street and the improving of an existing road or street by correcting grades, drainage structures, width, alignment or surface. It is the building of bridges or grade separations and the repair of such structures by strengthening, widening and the replacement of piers and abutments. It is the initial signing of newly constructed roads or streets, major resigning of projects and the installation, replacement or improvement of traffic signals.

MAINTENANCE is the routine work and materials required to keep the road or street, roadbed, surface, and drainage in good repair; prevent damage by water or wind; repair and paint bridges and guardrails; provide for safe and convenient travel by keeping signs, signals and pavement marking in good condition, and by snow and ice removal, and cleaning the road or street surface.

A BRIDGE is a structure of 20 feet or more clear span length crossing a drain, stream or dry gulley.

A GRADE SEPARATION is a structure of 20 feet or more clear span length crossing over or under another highway or railroad.

A CULVERT is a structure of less than 20 feet clear span.

The following is a partial classification of those items of work that need clarification with regard to whether they are construction or maintenance:

CONSTRUCTION

1. All items normally included in a construction contract for a new road or street including removal of old roadbed, structures, detour expense, and replacement of any sidewalks damaged by construction operation, or made necessary by change of grade.

2. Rebuilding short sections of roadway to super-elevate curves, to improve grades, to lengthen horizontal curves, and to improve sight distances.

3. Any resurfacing or reconstruction operation which changes the roadway surface type.

4. Resurfacing a bituminous, concrete, or brick surface with bituminous material which adds a thickness of 3/4 inch or more compacted to the original surface.

5. Placing 3 inches or more of new aggregate on prepared gravel or stone surfaces to substantially increase the thickness of the surfacing material beyond that originally built.

6. Curb or curb and gutter construction in block lengths.

7. Surfacing of shoulders with materials of higher quality than the adjacent roadsides.

8. Installation of new culverts, wash checks, baffles, drains, sewers, and catch basins on old or new roads or streets.

9. Installation of traffic signs, delineators, traffic signals and pavement markings on newly constructed roads or streets, or the original installation on old roads and streets.

10. Extending old culverts and rebuilding headwalls.

11. Building flood control, flood prevention, and earthwork protective structures.

12. Bridges, grade separations or culverts that are rebuilt, and the resultant product increases the vehicular or pedestrian traffic capacity over that of the original design.

13. Bridges, grade separations or culverts that require major modifications, consisting of strengthening, widening or replacement of piers and abutments or complete deck replacement.

MAINTENANCE

1. Placing new aggregate on an existing gravel or stone surface to replace original material worn off.

2. Reconditioning of bituminous surfaces of any length section by scarifying and remixing, or resurfacing without scarifying when new material added increases the existing bituminous surface less than 3/4 inch.

3. Patching and repairing roadway surface of bituminous, concrete or brick.

4. Cleaning of ditches and drainage structures.

5. Dust layers, sprinkling and flushing.

6. Brushing and tree trimming.

7. Retracing pavement markings.

8. Replacement in kind or repair of traffic signs, delineators and traffic signals.

9. Guardrail or right-of-way fence repair or replacement and new installations of less than 500 feet on old roadways.