ROADWAY CONSTRUCTION STANDARDS

AND

SPECIFICATIONS

TOWN OF EAST GRANBY, CONNECTICUT

MAY
1972

REVISED - FEBRUARY 1973

PREPARED FOR:

EAST GRANBY PLANNING AND ZONING COMMISSION

PREPARED BY:

LORD-WOOD, LARSON ASSOCIATES, INC.
AMENDMENTS TO ROADWAY CONSTRUCTION
STANDARDS AND SPECIFICATIONS

MAY, 1972

3.08 PARAGRAPH 4 - LINE 3. DELETE "COMMISSION OR ITS AUTHORIZED" and INSERT "TOWN'S".

10.01 PARAGRAPH C - ADD TO PARAGRAPH.

MAXIMUM GRADE MAY BE INCREASED TO 10% WITH SPECIAL AUTHORIZATION BY PLANNING COMMISSION AND BOARD OF SELECTMEN.

PARAGRAPH E - DELETE 3rd LINE AND INSERT "6"
PROCESSED AGGREGATE BASE;

APPENDIX

PLATE V TYPICAL STREET CROSS SECTION

B BASE - DELETE 6" ROLLED GRAVEL BASE OR 6" BROKEN STONE BASE - INSERT 6" PROCESSED AGGREGATE BASE.
ROADWAY CONSTRUCTION STANDARDS AND SPECIFICATIONS

Town of East Granby, Connecticut

GENERAL SPECIFICATIONS

All roadways and supporting appurtenances shall be constructed in conformance to the standard roadway cross sections for the particular roadway under consideration. Standard specifications governing the kind, quality and handling of material for roadways in the Town of East Granby shall be the same as those for the "Connecticut State Transportation Department, Bureau of Highways, Standard Specifications for Roads, Bridges and Incidental Construction, Form 810" and all current addenda pertaining thereto. A copy of this Specification may be examined in the First Selectman's Office, and copies may be obtained at the Connecticut Highway Bureau. All construction operations, methods and materials herein specified shall be subject to the inspection and approval and under the direction of the Board of Selectmen or their duly authorized representative.

In these Specifications, the terms Subdivider and Contractor shall have the same meaning and may be interchanged.

Reference to the Town's representative shall mean the Board of Selectmen, the Highway Superintendent, or a person authorized by them to act in their capacity.
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SECTION I

REFERENCES

1.01 A.A.S.H.O.

Wherever reference is made to A.A.S.H.O., it refers by number, letter, or both to the latest standard or tentative standard of the American Association of State Highway Officials as to material specifications or methods of testing.

1.02 A.S.T.M.

Wherever reference is made to A.S.T.M., it refers by number, letter, or both to the latest standard or tentative standard of the American Society for Testing and Materials as to material specifications or method of testing.

1.03 C.H.D. SPECIFICATIONS

Wherever reference is made to C.H.D., SPECIFICATIONS, it refers to number, letter, or both to the State of Connecticut Department of Transportation, Bureau of Highways, Standard Specifications Form 810, or as amended, as to construction methods and materials.
SECTION II

CLEARING AND GRUBBING

2.01 AREA TO BE CLEARED

This work shall consist of clearing the ground of trees, stumps, brush, rubbish and all objectionable material within the roadway and for a distance of 10 feet beyond the slope limits of roadway excavation, embankments, and fill areas, except that these limits may be reduced as necessary to confine this work within the highway limits. This work shall also include the clearing of the ground necessary for the construction and installation of drainage, structures, ditches, channels, fences and other highway appurtenances. Included in this work shall be the preservation from injury or defacement of vegetation and objects designated to remain.

2.02 METHOD OF CLEARING

A. Within the excavation lines all trees shall be cut off and stumps removed to a depth of not less than 12 inches below the graded surface.

B. Within the fill lines where an embankment is to be made not more than 5 feet in depth, trees, stumps, roots, etc., shall be removed. Where the embankments to be made exceed 5 feet in depth, trees, stumps, roots, etc., shall be cut off to within 6 inches of the ground surface.

C. Outside of the roadway and for a distance of 10 feet beyond the edge of pavement and in areas where clearing is necessary for the construction and installation of various highway appurtenances, all trees and stumps shall be cut flush with the ground and all dead or uprooted trees, brush, roots or other wise objectionable material shall be removed as directed by the Town's representative.

2.03 DISPOSAL OF MATERIAL

All trees that are cut shall be removed from within the limits of the highway before the grading is started. The Contractor shall dispose of all such trees, stumps, brush, etc., in a manner suitable to the Town's representative or the Fire Warden if burning is to be done.
2.04 BACKFILLING

All excavations made below subgrade surface by the removal of trees, stumps, etc., shall be filled with suitable material, which shall be compacted thoroughly in accordance with the provisions governing formation of embankments.

2.05 PRESERVATION OF TREES

Desirable trees outside the edges of the roadway shall be preserved where possible. Trees specifically designated by the Town’s representative to remain shall be protected during construction with suitable temporary fencing. The fence shall be constructed along the outermost spread of the branches.

2.06 WATERWAY CLEANING

All ditches, waterways, drainage structures, and culverts shall be cleaned and cleared of obstructions in a satisfactory manner and shall be left in a neat and trimmed condition. When directed by the Town’s representative, all existing ditches, waterways, drainage structures, and culverts shall be cleaned of obstructions resulting from construction operations.
SECTION III
ROAD CONSTRUCTION

3.01 EXCAVATION

A. All excavation shall be made in conformity with the require-
ments of the plans, cross sections, or as directed by the
Town's representative.

B. When ledge rock is encountered, this material shall be ex-
cavated to a depth of not less than 2 feet below subgrade.

C. If blasting is required in rock excavation, all possible care
shall be taken to avoid injury to persons and property. Su-
fficient warning shall be given to all persons in the vicinity
of the work before blasting. No blasting shall be done on
Sunday, and on weekdays blasting shall not be done between
the hours of 6:30 P.M. and 6:30 A.M., except by special per-
mission of the Town's representative.

3.02 EMBANKMENTS

A. Embankments shall be constructed of earth, rock, or a mix-
ture of earth and rock. Stumps, trees, sod, or other organ-
ic matter shall not be incorporated in embankments.

B. The depth of each layer shall not exceed 12 inches before com-
paction.

C. Frozen material shall not be used. No embankment layer shall
be deposited on surfaces of snow or ice, nor shall it be placed
on frozen or unstable surfaces.

D. No stone over 5 inches in its greatest dimension shall be placed
within 12 inches of the elevation of the subgrade.

E. The entire area of each layer shall be compacted with rollers
or compactors, exerting a pressure of not less than 300 pounds
per lineal inch of compression wheel or roller width.

F. All fill material shall be compacted at a moisture content
suitable for obtaining the required density. In no case shall
the moisture content be less than 3 per cent drier than the
Optimum Moisture Content determined by the A.A.S.H.O.,
Designation T-99, Method C.

G. When embankments are to be constructed on slopes steeper
than 1 vertical to 3 horizontal, the slope on which the embank-
ment is to be placed shall be plowed deeply or cut into steps
before the filling is begun.
H. Embankments, to an elevation 3 feet above the free water surface at the time of filling, shall be constructed of rock, free draining material, or gravel material.

I. Loam, topsoil and unsuitable material shall be removed prior to placing embankments. That loam and topsoil suitable for seeding and planting may be stockpiled and used in roadside seeding.

3.03 GRAVEL FILL

A. This material shall be used as a foundation for structures, to replace unstable material, as a foundation for sidewalks and culverts, backfilling around drainage structures, and elsewhere as indicated on plans, drawings, or required by the Town's representative.

B. Gravel shall consist of sound, tough, durable particles of crushed or uncrushed gravel, free from soft, thin elongated or laminated pieces and vegetable or other deleterious substances. It shall meet requirements for "Grading A", plasticity, and soft particles as specified in section M.02.07 of the C.H.D. Specifications.

C. The material shall meet the soundness and loss of abrasion requirements specified in section M.02.02-2 of the C.H.D. Specifications.

D. When gravel fill is used for foundation or structures, to replace rock or unsuitable material in trenches, or backfilling around drainage structures, it shall be deposited in layers not over 6 inches in depth and each layer thoroughly compacted before the addition of other layers.

3.04 SUBGRADE AND SLOPES

A. All soft and yielding material and other portions of the subgrade which will not readily compact shall be removed, and all loose rock and boulders over 5 inches in size shall be removed or broken off to a depth of not less than 1 foot below subgrade. Any material removed shall be replaced with suitable material and compacted.

B. The subgrade shall be thoroughly compacted with a smooth steel wheel roller weighing not less than 10 tons. Any portion of the subgrade which is not accessible to a roller shall be compacted with hand tampers or mechanical vibrators.
c. Slopes shall have a uniform surface as shown on the plans, cross section or as directed by the Town's representative. In no case shall earth slopes steeper than 1 foot vertical to 2 feet horizontal be constructed.

d. All slopes, except those in rock or ledge formations, shall be seeded or turfed as soon after construction as practicable and after all loose stone or other unsuitable material is cleared.

e. Slopes of ditches and and waterways shall have a uniform surface and meet the requirements described in the Section on Environmental Protection.

3.05 SUBBASE

A. Gravel shall consist of sound, tough, durable particles of crushed or uncrushed gravel free from soft, thin, elongated or laminated pieces and vegetable or other deleterious substances. It shall be hard and durable enough to resist weathering, traffic abrasion and crushing.

B. The material shall meet the gradation requirements of Grading "B", plasticity, and soft particles as specified in Section M.02.07 of the C.H.D. Specifications.

C. The prepared foundation for the subbase shall be shaped carefully to the required cross section and compacted thoroughly.

D. Where underdrains and outlets are specified, they shall be in place and functioning before any subbase material is placed.

E. The material shall be spread uniformly in layers or not over 6 inches in depth after final compaction. An exception shall be made when subbase 8 inches in depth is specified; it shall then be laid in one course.

F. After each layer has been placed as specified above, it shall be rolled with a 10 ton roller or other approved equipment until thoroughly compacted.

G. Should the foundation material beneath the subbase become churned up and mixed with the subbase material, the Contractor shall remove and replace it with new subbase material to the required depth. Such replaced subbase material shall be thoroughly compacted as specified above.
H. PROCESSED AGGREGATE MAY BE USED FOR SUBBASE MATERIAL IF DESIRED, BUT ONLY ONE TYPE OF MATERIAL SHALL BE USED ON ANY ONE PROJECT UNLESS OTHERWISE PERMITTED BY THE SUPERINTENDENT OF HIGHWAYS OR HIS REPRESENTATIVE.

3.06 PROCESSED AGGREGATE BASE

A. THE MATERIALS FOR THIS WORK SHALL CONFORM TO THE REQUIREMENTS OF ARTICLE M.05.01 OF THE C. H. D. SPECIFICATIONS.

B. THE MATERIAL SHALL BE PUT IN PLACE IN ACCORDANCE WITH CONSTRUCTION METHODS AS OUTLINED IN ARTICLE 3.04.03 OF THE C. H. D. SPECIFICATIONS. DEVIATIONS FROM THESE METHODS OF CONSTRUCTION ARE PERMITTED ONLY UPON APPROVAL OF THE SUPERINTENDENT OF HIGHWAYS OR HIS AUTHORIZED REPRESENTATIVE.

C. ALL ROLLING SHALL BE DONE WITH A 3 WHEEL POWER ROLLER WEIGHING NOT LESS THAN 10 TONS. THE ROLLING SHALL BEGIN AT THE SIDES AND PROGRESS TOWARDS THE CENTER, PARALLEL WITH THE CENTER LINE OF THE ROADWAY, UNIFORMLY LAPPING EACH PRECEDING TRACK AND COVERING THOROUGHLY THE ENTIRE SURFACE WITH THE REAR WHEELS.

3.07

3.08 BITUMINOUS CONCRETE SURFACE COURSE AND BITUMINOUS CONCRETE BINDER COURSE

A. MATERIALS AND MIX:

1. THE MATERIALS FOR THE BITUMINOUS CONCRETE PAVING MIXTURES SHALL CONSIST OF COARSE AGGREGATE, FINE AGGREGATE, MINERAL FILLER, IF NECESSARY, COMBINED TO MEET THE FOLLOWING COMPOSITION LIMITS BY WEIGHT AND OTHER CHARACTERISTICS: SURFACE COURSE MATERIALS SHALL CONFORM TO CLASS 2 MIXTURE AS SPECIFIED IN TABLE 1, SECTION M.04.01 OF THE C. H. D. SPECIFICATIONS. BINDER COURSE MATERIALS SHALL CONFORM TO CLASS 1 MIXTURE AS SPECIFIED IN TABLE 1, SECTION M.04.01 OF THE C. H. D. SPECIFICATIONS.

2. ALL MATERIALS, SOURCES OF SUPPLY, AND THE MIX FORMULA SHALL CONFORM TO SECTIONS M.04.01-1 AND M.04.01-2 OF THE C. H. D. SPECIFICATIONS.

4. In addition to the above general limits, which give maximum and minimum limits for all cases, the subdivider shall submit, in writing, to the Town's representative, a job mix formula indicating the definite percentage for each sieve fraction of aggregate, and for asphalt chosen as the fixed mean in each instance, and also the temperature of completed mixture taken as it is dumped from the mixer. Submission and approval of the job mix formula shall be the responsibility of the subdivider and shall bind the subdivider to furnish the specific mixture called for, within the tolerances specified in Section M.04.01-3 of the C.H.D. Specifications.

B. Transportation of Mixture:

1. The mixture shall be transported from the paving plant in tight vehicles which have been cleaned of all foreign material.

2. Loaded trucks shall be securely covered with canvas or other suitable materials to protect the mixture from weather conditions.

C. Placing of Mixture:

1. The temperature of the mixture when delivered at the project site will be governed by the air temperature in the shade and away from artificial heat as follows, within a tolerance of plus or minus 20°F.

<table>
<thead>
<tr>
<th>Air Temperature</th>
<th>Project Delivery Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>40°F</td>
<td>315°F</td>
</tr>
<tr>
<td>65°F</td>
<td>290°F</td>
</tr>
<tr>
<td>90°F</td>
<td>275°F</td>
</tr>
</tbody>
</table>

When the air temperature falls below 50°F, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials, placing and compacting the mixtures.

No mixtures shall be placed when the air temperature in the shade and away from artificial heat is 40°F or less; nor when material on which the mixture is to be placed contains frost.

2. The mixtures shall be placed only upon approved clean and dry surfaces; and when weather conditions are suitable. The Town's representative may, however, at the entire responsibility of the Contractor, permit work to continue when overtaken by sudden rain, up to and only the amount of material which may be in transit from the plant at the time and then
ONLY WHEN THE TEMPERATURE OF THE MIXTURE IS WITHIN
THE TEMPERATURE LIMITS SPECIFIED AND THE EXISTING
SURFACE ON THE ROADWAY IS NOT EXCESSIVELY WET.

3. THE EQUIPMENT FOR SPREADING AND FINISHING SHALL
BE MECHANICAL, SELF-POWERED PAVERS, CAPABLE OF SPREAD-
ING AND FINISHING THE MIXTURE TRUE TO LINE, GRADE, WIDTH,
AND CROWN REQUIRED WITHOUT THE USE OF FORMS OR SIDE SUP-
PORTS; THESE PAVERS SHALL BE CAPABLE OF SPREADING THE
MIXTURE WITHOUT SEGREGATION, IN LAYERS TO THE DEPTHS RE-
QUIRED.

4. THE BITUMINOUS CONCRETE SHALL BE PLACED IN TWO
COURSES WITH A COMPACTED DEPTH OF 3 INCHES OR AS OTHER-
WISE SHOWN ON THE PLANS.

5. INSOFAR AS PRACTICABLE, NO TRAFFIC OF ANY KIND SHALL
BE PERMITTED ON BINDER OR BASE WHEN DIRT OR ANY OTHER FOR-
EIGN SUBSTANCE MAY BE TRACED THEREON.

6. THE CONTACT SURFACES OF MANHOLES, CATCH BASINS OR
OTHER APPURTEINANT STRUCTURES IN PAVEMENT SHALL BE PAINTED
THOROUGHLY WITH A THIN UNIFORM COATING OF BITUMEN, SPEC-
IFICATION RC-70 OR RS-I JUST BEFORE ANY MIXTURE IS PLACED
AGAINST THEM.

7. THE EDGES OF MIXTURES PLACED ADJACENT TO RIGID CURB
LINES, AROUND MANHOLES OR OTHER SOLID FIXTURES, IF NECESS-
ARY, SHALL BE HAND TAMPED BEFORE BEING COMPACTED BY ROL-
LING.

D. COMPACTING OF MIXTURE:

1. ROLLING SHALL BE PERFORMED WITH POWER DRIVEN STEEL
WHEEL TANDEM ROLLER WEIGHING NOT LESS THAN 10 TONS. THE
NUMBER OF ROLLERS ENGAGED IN ROLLING THE SURFACE SHALL BE
NOT LESS THAN 1 ROLLER FOR EACH 500 TONS OF MIXTURE SPREAD
IN 1 DAY OF 8 HOURS WORKING TIME.

2. EACH ROLLER SHALL BE OPERATED BY A COMPETENT, EXPERI-
ENCED ROLLER OPERATOR AND SHALL BE KEPT IN AS NEARLY CON-
tinuous OPERATION AS PRACTICABLE WHILE THE WORK IS UNDERWAY.
THE MIXTURE SHALL BE ROLLED LONGITUDINALLY, DIAGONALLY AND
TRANSVERSELY AS MAY BE NECESSARY TO PRODUCE THE REQUIRED
CONTOUR SURFACE. LONGITUDINAL ROLLING SHALL START AT THE
SIDE AND PROCEED TOWARD THE CENTER OF THE PAVEMENT. THE
ROLLING SHALL BE CONTINUED AND SO EXECUTED THAT ALL ROLLER
MARKS, RIDGES, POROUS SOOTS AND IMPRESSIONS ARE ELIMINATED
AND THE RESULTING SURFACE HAS THE REQUIRED GRADE AND CON-
TOUR. THE MOTION OF THE ROLLERS SHALL AT ALL TIMES BE SLOW
ENOUGH TO AVOID ANY DISPLACEMENT OF THE HOT MIXTURE; AND
ANY DISPLACEMENT OR MARRING OF THE SURFACE OCCURRING AS A
RESULT OF REVERSING THE DIRECTION OF THE ROLLERS, OR FROM

3 - 7
any other case, shall be corrected. To prevent adhesion with the mixture, the wheels of the rollers shall be kept lightly moistened with water but excess water will not be permitted. The use of oil for this purpose will not be allowed.

3. Along curbs, structures and all places not accessible with a roller, the mixture shall be thoroughly compacted with approved tampers. The surface of the mixture after compaction shall be smooth and true to the established line and grade.

4. Any mixture which becomes loose or broken, mixed with dirt, or in any way defective shall be removed and replaced with new mixture which shall be compacted to conform with the surrounding area. Areas of one square foot or more showing an excess of bitumen shall be removed and replaced.

5. Placing of the mixture shall be as nearly continuous as possible and the roller shall pass over the unprotected end of the newly placed mixture only when the placing of the course is to be discontinued for such length of time as would permit the mixture to attain initial stability. In all such cases, including the formation of joints as herein specified, provision shall be made for proper bond with the new surface for the full specified depths of the courses.

6. Longitudinal and transverse joints shall be made in a careful manner, well bonded and sealed, and true to line and grade. The maximum length of longitudinal joint shall be such that the temperature of the mixture at the joint shall not be less than 150°F, when abutting mixture is placed.

7. In making joints along any adjoining edge such as a curb, gutter or an adjoining pavement, and after the mixture is placed by the mechanical spreader, just enough of the hot material shall be placed by hand method to fill any space left open. These joints shall be properly "set-up" with the back of a rake at the proper height and level to receive the maximum compaction. The work of "setting-up" these joints shall be performed only by competent workmen.

8. If directed by the Town's representative, the first width of any course shall be placed not less than 1 foot wider than the first width of top course, and successive widths of top and any other course shall be so placed that there will be at least a 1 foot overlap between the joints in the top course and the other course.
9. The rolling of successive widths of course shall overlap and shall be performed so as to leave smooth uniform joints and cross sections.

E. Testing and Correcting of Pavement:

1. For the purpose of testing the finished surfaces of the base courses and the top course of compacted mixtures, a 16-foot straightedge shall be used. The straightedge shall be carefully applied immediately after first compaction by rolling, and, from then on, as may be necessary until and after the final compaction of the material in place. The straightedge shall be held in successive positions parallel to the road centerline and in contact with the road surface; and the entire area checked from one side to the other of the pavement. Any irregularities which vary 1/4 of an inch from a true surface in the finished surface, or 3/8 of an inch from a true surface in the base or binder course shall be corrected.

2. Any irregularities or defects which remain after final compaction shall be corrected by removing and replacing with new material, as specified, to form a true and even surface. All minor surface projections, joints and minor honeycombed surfaces shall be ironed out smoothly to grade, as may be directed.

F. Protection of Pavement:

No vehicular traffic or loads shall be permitted on the newly compacted pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Town's representative.

3.09 Inspection of Work Before Placing Surface Course

Before placing the 1 1/2 inch bituminous concrete surface course, an inspection of the binder course and other work within the road right-of-way shall be conducted by the Board of Selectmen or its duly authorized representative. Authorization to place the surface course shall be issued if the binder course is suitable and if all work requiring heavy equipment to use the road has been completed.
SECTION IV

BITUMINOUS CONCRETE LIP CURBING

4.01 MATERIALS

The material for this work shall conform to the requirements of Section M.04.01, Class 3 in the C.H.D. Specifications.

4.02 PLACING OF MATERIAL

A. The lip curbing shall be machine laid and constructed on the pavement. The surface of the pavement where curbing is to be constructed shall be clean and dry at the time the mix is placed and shall be coated with an RC-2 bitumen just prior to placing the mixture.

B. Where machine work is impractical, hand laid curbing may be constructed; shape and form shall be similar to the machine laid curbing.

4.03 CARE OF CURBING

Care shall be given to insure the curbing has set sufficiently to prevent injury to the work.

4.04 TREATMENT OF CURB AT DRIVEWAYS

At driveways, the gutter line shall be maintained in such a way that water flowing in the gutter shall not enter the private drive. At least a 3-inch rise shall exist at drives; this rise shall be attained in such a way that a detrimental bump does not exist at the drive entrance. The drive entrance shall be paved in the area of the highway right-of-way. Paving methods in drives shall conform to the specifications for drives crossing sidewalks. At the Board of Selectmen's or its duly authorized representative's discretion, the drive entrance within the highway right-of-way may be constructed with a gravel surface.

4 - 1
SECTION V

DRAINAGE

5.01 GENERAL REQUIREMENTS

A. The Subdivider shall furnish all materials, labor, equipment, and appurtenances necessary for a complete installation, whether or not all such materials and appurtenances are shown on the plans.

B. All existing pipes, drains, conduits, and drainage structures which are not to be changed in location shall be carefully supported and protected from injury; they shall be restored by the Subdivider to their original condition.

5.02 STORM PIPE

A. Materials:

1. Reinforced concrete pipe shall conform to the requirements of A.A.S.H.O., M-170, Class 4.

2. Mortar for reinforced concrete pipe and vitrified clay pipe joints shall be a 1:2 Portland cement-sand mixture, with a minimum of water. No mortar shall be used after it has partially set.

3. Vitrified clay pipe shall be extra-strength pipe and conform to the requirements of A.A.S.H.O., M-65.


B. Construction Methods:

1. Pipe shall be laid in open trench, 2 feet plus the outside diameter of the pipe in width. All rocks, cemented gravel, old masonry, or other hard materials shall be excavated to at least 6 inches below the pipe at all points; such as space and all other cuts below the pipe grade shall be filled with finely compacted gravel.

2. When soft or unsuitable material is encountered, the depth of excavation below the pipe invert shall be increased to 1 foot and such space shall be filled with firmly compacted gravel.

3. Trenches shall be maintained in a safe condition at all times, and adequate sheeting and shoring shall be installed when so required.
4. When blasting is required for rock excavation, adequate provisions for safety shall be provided and such work shall be performed in compliance with applicable local requirements.

5. The bottom of trenches shall be sufficiently graded to insure uniform bearing for the full length of all pipes.

6. All pipe installed under paved areas shall be bedded in firmly compacted gravel or broken stone from 6 inches below the pipe to the center line of the pipe. Backfill from the center line of the pipe to 12 inches above the top of pipe shall be firmly compacted gravel or other suitable material.

7. Pipe not under paved areas may be bedded with existing material, if suitable, lightly tamped around the pipe.

8. Commencing at the lowest point in the system, pipe shall be carefully laid true to line and grade with the bell or groove — end upgrade.

9. Joints in reinforced concrete pipe and vitrified clay pipe shall be filled with mortar. Joints in concrete pipe shall be thoroughly wetted before making the mortar joint.

10. The inside of the joint shall be wiped and finished smooth.

11. A stopper shall be kept in the pipe mouth when the pipe laying is not in progress.

12. Trenches shall be backfilled only after pipe has been inspected and approved, and locations of pipes and appurtenances have been recorded.

13. Backfill material shall be free from frozen lumps, wood, and other extraneous material.

14. Rock fill shall not be placed closer than 2 feet from the pipe at any point. No boulders shall be used as backfill.

15. The ends of pipe which enter masonry shall be neatly cut to fit the inner face of masonry.

16. Dry conditions shall be maintained at all times and under no circumstances shall pipe be laid or appurtenances installed in water.
5.03 UNDERDRAINS

A. Materials:

1. Perforated or plain asphalt-coated corrugated metal pipe for underdrains or outlets shall conform to C.H.D. Specifications M.08.01.03.

2. The aggregates for filling the trench shall consist of clean, tough, durable pieces of broken stone or screened gravel meeting the requirements of Section M.08.03-1 in the C.H.D. Specifications.

3. The Town's representative may direct that sand shall be substituted for the above aggregate, in which case the sand shall meet the requirements of Section M.03.01-2 of the C.H.D. Specifications.

4. The uniformity coefficient of the material (60 per cent grain diameter divided by the 10 per cent grain diameter) shall not be less than 6.

B. Construction Methods:

1. Excavation and backfill shall be in accordance with the previously stated specifications under Storm Pipe, Construction Methods, except that the trench width shall be the pipe diameter plus 1/2 feet and backfill material shall be as noted above.

2. Perforated pipe shall be placed holes down and firmly bedded on a minimum of 3 inches of 3/8" broken stone tamped true to grade. Provide sufficient 3/8" broken stone along the sides of the pipe so as to completely cover the holes. After the pipe has been installed as described above, backfill for underdrain shall be placed carefully around and over the pipe to the height of the subgrade. Carefully tamp backfill in layers as shown on the plans or as directed.

3. In all cases where subbase material is to be placed over underdrains, a layer of at least 6 inches of subbase material shall be placed over the underdrain immediately after its completion.

5.04 STRUCTURES

A. Materials:

1. Cement shall be Portland Cement Type II and conform to the requirements of A.A.S.H.O. M-35.

2. Water shall be reasonably clean and free from oil, acid, and injurious alkali or vegetable matter.
3. Coarse aggregate for concrete mixes shall be obtained by combining 65 per cent of 1-1/4 inch and 35 per cent of 1/2 inch size broken stone.

4. Fine aggregate for concrete mixes shall be uniformly graded from coarse to fine and shall conform to Section M.03.01-2 (c) of the C.H.D. Specifications.

5. Concrete building brick for catch basins, manholes or drop inlets shall conform to the requirements of A.S.T.M. C-55.

6. Masonry concrete units for catch basins, manholes or drop inlets shall conform to the requirements of A.S.T.M. C-139.

7. Bar reinforcement for concrete structures shall conform to the requirements of A.A.S.H.O. M-31. Unless otherwise specified, all bars shall be "Intermediate" grade and shall be of the deformed type conforming to A.A.S.H.O. M-137.

b. Construction Methods:

1. When brick or concrete units are used for structures, they shall be laid with joints completely filled with mortar. Horizontal joints shall not exceed 1/2 inch, vertical joints 1/4 inch, on their interior face. Strike interior joints smooth with the face of the wall.

2. When joint material has set, backfill shall be placed in layers of not more than 6 inches in depth and thoroughly compacted.

3. Concrete for drainage structures shall develop a minimum compressive strength of 3000 pounds per square inch in 28 days.

5.05 PAVED DITCH

A. The surface course of this item shall conform to the specifications for "Bituminous Concrete Lip Curbing".

b. The base course shall be gravel conforming to the materials for "Rolled Gravel Base" and thoroughly compacted.

c. Sections inaccessible to the roller or distributor shall be hand tampered until thoroughly compacted and bituminous material shall be applied by means of hand equipment.

5.06 RIPRAP

A. Riprap shall consist of sound, tough, durable and angular rock,
FREE FROM DECOMPOSED STONE OR OTHER DEFECTS IMPAIRING ITS DURABILITY. BROKEN CONCRETE OR ROUNDED STONES WILL NOT BE ACCEPTABLE.

B. EACH STONE SHALL WEIGH NOT LESS THAN 20 POUNDS NOR MORE THAN 300 POUNDS AND AT LEAST 75 PER CENT OF THE MASS SHALL BE STONES WEIGHING MORE THAN 50 POUNDS. NO DIMENSION SHALL BE LESS THAN 6 INCHES.

C. THE RIPRAP SHALL BE GRADED SO THAT THE SMALLER STONE IS UNIFORMLY DISTRIBUTED THROUGHOUT THE MASS, AND SHALL BE CAREFULLY PLACED OVER THE AREA DESIGNATED UNTIL THE SPECIFIED DIMENSIONS ARE ATTAINED.

5.07 DRIVEWAYS

A. THE GUTTER LINE SHALL BE MAINTAINED IN SUCH A WAY THAT ROADWAY WATER SHALL NOT ENTER THE PRIVATE DRIVE. THE CURBING AT DRIVEWAYS SHALL BE FORMED AS SPECIFIED IN SECTION 4.04.

B. THE DRIVEWAY WITHIN THE ROAD RIGHT-OF-WAY SHALL CONSIST OF A COMPACTED SUBGRADE WITH A 12-INCH PROCESSED GRAVEL BASE. THE SURFACE SHALL CONSIST OF 3 INCHES OF BITUMINOUS CONCRETE OR AT THE DISCRETION OF THE BOARD OF SELECTMEN, OR ITS DULY AUTHORIZED REPRESENTATIVE, MAY CONSIST OF A GRAVEL SURFACE.
SECTION VI
ENVIRONMENTAL PROTECTION

6.01 DUST CONTROL
When excavation takes place in dry weather, reasonable precautions should be taken by the Contractor to insure that the inhabitants in the vicinity of the excavation are not unnecessarily inconvenienced by or caused discomfort by dust raised from construction operations. Dust may be stabilized by water spray, chemical means (calcium chloride or equivalent), or patching.

6.02 EROSION CONTROL
A. Temporary Controls:
During construction, temporary water checks and settling basins shall be built to prevent silting of water ways.

B. Permanent Controls:
Drainage channels shall be paved or planted in accordance with the requirements of the District Soil Conservation Office. Water checks shall be built where the velocity of flow exceeds the maximum for ditch flow.
SECTION VII

LOAM AND SEED

7.01 TOPSOIL

A. TOPSOIL SHALL BE A FRIABLE LOAM, TYPICAL OF CULTIVATED TOPSOILS OF THE LOCALITY, CONTAINING AT LEAST 2 PER CENT OF DECAYED ORGANIC MATTER (HUMUS). IT SHALL BE TAKEN FROM A WELL DRAINED ARABLE SITE. IT SHALL BE REASONABLY FREE OF SUBSOIL, STONES, EARTH, CLODS, STICKS, ROOTS OR OTHER OBJECTIONABLE EXTRANEOUS MATTER OR DEBRIS. IT SHALL CONTAIN NO TOXIC MATERIALS.

B. PRIOR TO STRIPPING, CLASS A TOPSOIL SHALL BE CLEANED TO THE DEPTH OF SALVAGE AS REQUIRED, SO THAT STONES, CLODS, STUMPS, WOOD CLUMPS, STICKS, DEBRIS AND OTHER MATERIAL FOUR INCHES OR MORE IN ANY DIMENSION ARE REMOVED. RANK GROWTHS OF VEGETATION, STONES, OR DEBRIS ON THE SURFACE WHICH MIGHT INTERFERE WITH GRADING OR LATER TILLAGE OPERATIONS SHALL BE REMOVED. SOD OR OTHER COVER, THAT CANNOT BE DISKED OR OTHERWISE INCORPORATED INTO THE TOPSOIL BEFORE OR AFTER DELIVERY, IN SUCH MANNER THAT IT CAN BE SPREAD PROPERLY, SHALL BE REMOVED. TOPSOIL SHALL BE REMOVED TO THE REQUIRED DEPTH FROM THE DESIGNATED AREAS PRIOR TO THE BEGINNING OF GRADING OPERATIONS. THE TOPSOIL REMOVED FROM AREAS TO BE STRIPPED OR AREAS TO BE GRADED SHALL BE KEPT SEPARATE FROM OTHER EXCAVATED MATERIAL. WHEN TOPSOIL IS TO BE STRIPPED AND SALVAGED FROM WOODED AREAS, OR FROM AREAS WHERE BOULDERS, LARGE STONES OR SIMILAR MATERIALS ARE PRESENT, CLEARING AND GRUBBING SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS OF APPLICABLE SECTIONS OF THESE SPECIFICATIONS.

C. THE TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED ON THE DESIGNATED AREAS AND EVENLY SPREAD, AND IN SUFFICIENT DEPTH TO COMPENSATE FOR ANY SHRINKAGE, SO THAT THE THICKNESS OF COMPACTED TOPSOIL SHALL BE AS PROVIDED BY THE DRAWINGS AND SPECIFICATIONS. THE TOPSOIL DEPTH SHALL BE MEASURED PERPENDICULAR TO THE PLANE OF THE FINISHED GRADE. THE SPREADING SHALL BE PERFORMED IN SUCH A MANNER THAT FINE GRADING, FERTILIZING, LIMING AND SEEDING CAN PROCEED WITH LITTLE ADDITIONAL SOIL PREPARATION OR TILLAGE. IRREGULARITIES IN THE SURFACE RESULTING FROM OPERATIONS THEREON SHALL BE CORRECTED TO PREVENT THE FORMATION OF DEPRESSIONS WHERE WATER WILL STAND. TOPSOIL SHALL NOT BE PLACED OR WORKED WHEN IT OR THE SUBGRADE IS FROZEN, EXCESSIVELY DRY, OR IN A CONDITION OTHERWISE DETRIMENTAL TO THE PROPOSED SEEDING OR TO PROPER GRADING.

D. TO ACHIEVE PROPER FINISH GRADES THE TOPSOIL SHALL BE ROUGH SPREAD BY MEANS OF A DOZER, SCRAPER PAN OR OTHER APPROVED METHODS. ALL AREAS WHERE POSSIBLE SHALL BE FINISH GRADED BY MEANS OF A GRADER. ALL OTHER AREAS SHALL GRADE TO MEET FINISH GRADES SHOWN ON THE PLANS.
E. Areas to be fine graded and seeded — all areas not covered by buildings or structures, paving or planting areas or otherwise designated shall be fine graded and seeded within the project limit lines.

7.02 LIME

Ground limestone shall be used and shall be sized such that 95 per cent passes a 100 mesh screen.

7.03 FERTILIZER

A. Fertilizer shall be a complete fertilizer, at least 25 per cent of the nitrogen of which is derived from a natural organic source. It shall be of a 1:2:2 ratio using a minimum analysis of 5-10-10.

B. Fertilizers, unless otherwise specified, shall be delivered mixed as specified, in standard size, unopened containers, showing weight, analysis and name of manufacturer. They shall be stored in a weather-proof storage place and in such a manner that it will be kept dry and its effectiveness not impaired.

7.04 SEED

A. The seed mixture shall conform to Section M.13.04 of the C.H.D. Specifications.

B. Type II seed shall be used only in areas of anticipated minimum maintenance or as directed.

C. Alternate seed mixtures, mulch, and fertilizer shall be used as directed to provide slope stabilization and uniform landscaping.

D. The normal seasonal dates for seeding shall be as follows:

   Spring Seeding — March 15th through June 1st
   Fall Seeding — August 15th through October 15th

7.05 QUANTITIES OF MATERIALS

A. Topsoil shall be spread to a minimum depth of six inches.

B. Commercial fertilizer shall be applied, by raking into the top two inches of the topsoil, at the rate of 25 pounds to 1,000 square feet of area.

C. Lime shall be applied at the rate of 100 pounds to 1,000 square feet of area.

D. Seed shall be applied at the rate of 6 pounds to 1,000 square feet of area.
SECTION VIII

SIDEWALKS

8.01 CONCRETE SIDEWALKS

A. Material shall be excavated to a depth of 13 inches below the finish grade of the walk. Sand filled processed gravel, shall be placed to a depth of 8 inches and compacted so as to leave a firm and even surface.

B. The concrete shall be placed to a depth of 5 inches. The concrete mixture shall consist of 1 part Portland Cement, 2 parts sand, and 3 parts of 1-inch crushed stone. The surface of the concrete shall be finished with a wood float, and then broomed to provide better footing. The concrete shall contain not less than 5 per cent, no more than 7 per cent entrained air at the time the concrete is deposited in the forms. The maximum allowable slump shall be 4 inches.

C. All sidewalks shall have an inclination sloping toward the gutter of $\frac{1}{4}$ inch per foot. The walks shall be laid in sections not to exceed 20 feet in length, and there shall be placed a strip of $\frac{1}{2}$ inch by 5 inch premolded asphalt expansion joint between each section. Markings shall be made every 5 feet within each section so as to give the appearance of separate blocks.

D. The method of laying sidewalks in driveways and other areas subject to vehicular traffic shall be the same as for pedestrian areas except the excavation below finish grade shall be 16 inches. Then 8 inches of sand filled processed stone shall be used and 8 inches of concrete shall be placed.

E. A liquid membrane curing compound shall be applied to all exposed surfaces of the concrete immediately following the disappearance of the water screen following the final finishing and before any marked dehydration of the concrete or surface checking occurs.

8.02 BITUMINOUS CONCRETE SIDEWALK

A. Material shall be excavated to a depth of 9 inches below the finish grade of the walk. A 6 inch processed aggregate base shall be placed and compacted so as to leave a firm and even surface.

B. A $\frac{1}{2}$ inch thick bituminous concrete binder course shall be placed and then a $\frac{1}{2}$ inch thick bituminous concrete surface course grading II shall be placed.
C. All sidewalks shall have an inclination sloping towards the gutter of \( \frac{1}{4} \) inch per foot.

D. At driveways, 15 inches shall be excavated below the finish grade of the walk. A 12 inch processed aggregate base shall be placed and the bituminous material placed to the same depth as in pedestrian areas.
SECTION IX
FENCING AND GUIDE POSTS

9.01 WOOD POSTS

A. Wood posts shall conform to the C.H.D. Specifications M.10.01.03, in all applicable respects, and shall be placed in locations shown on the Plans or as directed.

B. Posts shall be set in holes dug in thoroughly compact soil, and the bottom of the holes shall be thoroughly rammed to insure a stable foundation. Should rock or boulders be encountered in making the excavation, they shall be removed so as to make a hole of sufficient size to set the post to the required depth.

C. Holes shall be backfilled with approved material, thoroughly rammed in layers in such a way as not to shift the posts from the correct alignment.

9.02 CHAIN LINK FENCE

Chain link fence, where required, or indicated on the Plans, shall be in conformance with C.H.D. Specifications 9.13, in all applicable respects.
SECTION X
SELECTED DESIGN STANDARDS

10.01 STREET STANDARDS
A. Right-of-Way and Pavement Widths:

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<th>DESIGNATION</th>
<th>RIGHT-OF-WAY</th>
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<tr>
<td>Principal Street</td>
<td>60'</td>
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<tr>
<td>Local Street</td>
<td>50'</td>
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B. Cul-De-Sac:
Center to outside edge of right-of-way: 50' radius
Center to outside edge of pavement: 40' radius

C. Grades:
Minimum: 1 per cent
Maximum: 8 per cent - minimum grade may be increased to 10% with special authorization by planning commission and board of selectmen.

D. Crown of Road:
3/8-inch per foot

E. Pavement Depths (Local Street):
1 1/2 inches of bituminous concrete binder course;
1 1/2 inches of bituminous concrete surface course;
6" processed aggregate base.

6" to 12" gravel subbase.

F. Bituminous Curbing:
Required on all roads.

10.02 DRAINAGE STANDARDS
A. Storm drainage facilities to meet the following storm return frequency criteria:
   1. Storm sewers and minor ditches - 10 year storm
   2. Major culverts and ditches - 25 - 50 year storm
   3. Commercial and industrial facilities - 25 year storm

B. Pipe Size and Grade:
   1. Pipe shall have a minimum inside diameter of 15 inches.
   2. Pipe shall have a minimum grade of 1 per cent, if possible.
c. **Cover:**
A minimum cover of 3 feet shall be used.

d. **Storm sewers shall be designed to provide a self cleansing velocity of at least 2.5 feet per second when flowing full.**

e. **Headwalls shall be provided at open ends of storm water drains.**

f. **Location of Catch Basins and Manholes:**
The first set of catch basins in a storm drain system shall be located a maximum of 350 feet from the roadway highpoint. Spacing between sets of catch basins and manholes shall be a maximum of 300 feet. A drainage structure shall also be placed at each vertical grade change along a storm drain, at each change in horizontal direction, and at each junction point of two or more storm drains.
MANHOLE FRAME AND COVER TO BE
NEENAH FOUNDRY CO R-1792-FL
HEAVY DUTY OR APPROVED EQUAL.

CLASS A CONCRETE, CONCRETE BLOCK
OR PRECAST UNITS.

ADJUST GRADE WITH THREE COURSES BRICK (MAX)

LADDER RUNGS (MANHOLES ONLY)
TO BE WATERBURY FOUNDRY TYPE A OR EQUAL.

CONCRETE BLOCK WALLS ARE TO BE MORTARED OUTSIDE WITH 1:2 CEMENT MORTAR 1/2 THICK.

USE 12" THICKNESS WHERE M.H. IS DEEPER THAN 10'.

CLASS A CONCRETE BASE

STANDARD STORM SEWER MANHOLE
PLATE 1
NOTE
A — Class A Concrete or precast concrete units.
B — Class A concrete, concrete blocks, or precast units.
C — Wall thickness 12" at depths greater than 10'.

STANDARD TYPE 'C' CATCH BASIN
PLATE II
\( H = \text{Total height of Endwall} \)
\( B = \text{Base} \)
\( D = \text{Inside diameter of pipe} \)
\( S = \text{Height of slope above flow line} \)
\( L = \text{Length of wall} = 3S + D \)

All edges of exposed surfaces to be chamfered approximately one inch.

**DIMENSIONS AND QUANTITIES FOR ONE ENDWALL BASED ON \( S = D + 2^\prime \)**

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*Volume based on \( D \) and wall thickness at centerline of pipe has been deducted.*

**Note:**
All construction dimensions are nominal.

---

**STANDARD ENDWALL**

**PLATE III**
### Dimensions and Quantities for One Wing Type Endwall

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<tr>
<th>D</th>
<th>B</th>
<th>C</th>
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<th>H</th>
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**Diagram:**

- **Endwall Symmetrical About Q of Pipe**
- **Plan**
- **Front Elevation**
- **Side Elevation**

**When one endwall is to be used for two pipes, the dimensions of the endwall shall conform to those required for the larger pipe, except the dimension "L" shall be increased by the outside dia. of the smaller pipe plus two feet."
PLATE A

TYPICAL STREET CROSS SECTION

A. Surface - 1/4" Bimetallic Concrete Binder Course.
B. Base - 1/4" Bimetallic Concrete Surface Course on Processed Aggregate Base.
C. Subbase - 6" Gravel Subbase in Fill Sections, 12" Gravel Subbase in Cut Sections.
D. Bituminous Concrete Lip CURBING.
E. All Top And Seed.

EXIST. GROUND
R.O.W. WITHIN 50' MINIMUM

LOCAL STREETS