Section 4 PLAN REQUIREMENTS

General

4.01 Compliance with Regulation: No subdivision of land shall be made, and no land in any subdivision shall be sold or offered for sale or lease, and no street or utility construction shall be started until a Final Plat, prepared in accordance with the requirements of these regulations, has been approved by the Board, and other required permits have been issued.

4.02 Character of Land for Subdivision: Land of such character that it cannot, in the judgment of the Board, be safely used for building development purposes because of exceptional danger to health or peril from fire, flood, poor drainage, excessive slope, or other hazardous conditions, shall not be platted for residential, commercial, or industrial subdivision, nor for such other uses as may increase danger to life or property, or aggravate

the flood hazard. Land with inadequate characteristics or capacity for sanitary sewage disposal shall not be subdivided for residential, commercial, or industrial subdivision purposes unless connected to municipal sewage system.

4.03 Premature Subdivision Development: Scattered or premature subdivision of land as would involve danger or injury to health, safety, or prosperity by reason of lack of water supply, drainage, transportation, school, fire department, or other public services, or that a lack of these facilities would be a hazard, or necessitate an excessive expenditure of public funds for the supply of such services shall not be approved by the Board.

4.04 Special Flood Hazard Area: In all subdivisions having land designated as "Special Flood Hazard Area" by the Federal Insurance Administration (HUD), the following additional submission requirements must be submitted in the preliminary layout:

a) Sufficient evidence (construction drawings, grading and land treatment plans) shall be submitted so as to allow a Board to determination that:

(i) all such proposals are consistent with the need to minimize flood damage

(ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located, elevated and constructed to minimize or eliminate flood damage, and

(iii) adequate drainage is provided so as to reduce exposure to flood hazards.

b) Adequate design information shall also be submitted to the Board assuring that new or replacement water supply systems and/or sanitary sewerage systems are designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, and that on-site waste disposal systems are located as to avoid impairment of them or contamination from during flooding.

4.05 Reserve Strips: No privately owned reserve strip, except an open space area, shall be permitted which controls access to any part of the subdivision or to any other parcel of land from any street, or from any land dedicated to public use, or which may be so dedicated.

4.06 Preservation of Existing Features: The subdivider shall give due regard to the preservation and protection of existing features, trees, scenic points, brooks, streams, rock out-croppings, water bodies, other natural resources, and historic landmarks.

4.07 Lot and Site Layout: The layout of lots and sites shall conform to the specifications of the Official Map and the requirements of the Zoning Regulations where in force and shall be appropriate for the intended construction. If allowed in the zoning regulations, a subdivision plat may be designed for cluster or planned unit development, provided all requirements of these and such zoning regulations are met. The layout of lots and sites shall be in conformance with Section 4.13 of these regulations.

4.08 Plats Straddling Municipal Boundaries: Whenever access to the subdivision is required across land in another local government, the Planning Board may request assurance from the Local Government Attorney that access is legally established, and from the Engineer that the access road is adequately improved, or that a performance bond has been duly executed and is sufficient in amount to assure the construction of the access road. In general, lot lines should be laid out so as not to cross municipal boundary lines.

Submission Requirements

4.09 Conceptual/Non-binding Consultation, Informational and Review Phase: Survey phase maps may be drawn in pencil; data may be tentative but shall be sufficiently clear to show all existing conditions on the property to be subdivided. Maps shall be at a scale of no more than 200 feet per inch. Survey phase submission shall contain or be accompanied by the following maps and information:

a) Property survey map for the entire area of the parcel being subdivided plus an additional 100 foot area completely around said parcel, showing perimeter boundary of said parcel, land use designation according to the Master Plan, zoning designation according to the Zoning Ordinance, topography, water areas (both Permanent and intermittent streams, rivers, ponds, lakes, marshes), foliage lines, existing roads, easements, structures, and other existing features;

b) Property location map (at scale of municipal base map, shown as inset on property survey map) showing proposed subdivision in relation to major roads, community facilities and utilities of the Town;

c) Soil mapping units and boundaries;

d) The Board may require further detailing of information and additional meetings before advising the subdivider to proceed with preliminary layout design. All material submitted in the survey phase will be included with subsequent preliminary layout and final plat submissions.

4.10 Preliminary Layout - Minor Subdivision: The preliminary layout shall be prepared to scale to enable the entire tract to be shown on one sheet and shall show or include the information listed below. The preliminary layout shall be 1 of 4 standard sizes, namely, 8 1/2 x 11, 11 x 17, 17 x 22, 22 x 34, as measured from cutting edges, and shall be drawn on tracing cloth, mylar, or equivalent materials at a scale of not less than 100 feet to the inch, except where otherwise directed by the Planning Board. The following items shall be included:

a) A key map at the Town Base Map scale of one inch equals 1500 feet (1"=1500') showing the relation of the proposed subdivision to existing streets or roads.

b) All existing structures and wooded areas within the portion to be subdivided and within 200 feet thereof.

c) The tax block parcel number and owners names of property abutting the tract to be divided. Proposed lots shall be numbered consecutively as instructed by the Engineer.

d) All streets or roads (showing edge of traveled way and right-of-way line) and streams within 500 feet of the area submitted for approval including 100-year flood limit line.

e) Certification of engineer or surveyor as to accuracy of plat details.

f) Sketch of the proposed layout of lots, and existing and proposed easements.

g) Any existing or proposed drainage.

h) Title block, graphic scale and reference meridian.

i) Certification of approval of subdivision by the State of New Hampshire Water Supply and Pollution Control Commission accompanied by a duplicate copy of all data submitted to them and any stipulations related to approval.

j) Perc test required.

4.11 Preliminary Layout - Major Subdivision: The preliminary layout for a major subdivision shall be prepared to a scale of no more than one inch equals 100 feet or at greater detail as detailed as directed by the Board to indicate clearly existing and proposed features of the site. Said plat shall be prepared on 22 x 34 inch standard sheets measured from cutting edges. If one sheet is not sufficient size to contain the entire area of the site and environs, the plat shall be divided into sections to be shown on separate sheets of equal size with references on each sheet to the

adjoining sheets. The preliminary layout for a major subdivision shall show or be accompanied by the following:

a) Date, name and location of subdivision, on a key map at the Town Base Map Scale of one inch equals 1500' (1"=1500') showing the relation of the proposed subdivision to existing streets or roads, name of record owner and subdivider, graphic scale and reference meridian. Name of engineer or surveyor.

b) Boundaries and area of the entire parcel, whether or not all land therein is to be subdivided; date and dates of any revisions.

c) Names and addresses of abutting property owners and tax block parcel number, subdivisions and buildings within 100 feet of the parcel to be subdivided, and intersecting roads and driveways within 200 feet of the parcel to be subdivided. Proposed lots shall be numbered consecutively as instructed by the Engineer.

d) Existing and proposed street right-of-way lines, widths of street, proposed names of new streets, existing and proposed lot lines.

e) Location of existing and proposed easements, deed restrictions, buildings, accessory buildings, building setback lines, parks and other open space to be reserved or dedicated to the public use, water courses, flood prone areas (100-year flood limit line), large trees, foliage lines and significant natural and man-made features, water mains, sanitary sewers, storm water drainage lines, drainage structures and drainage ways within the subdivision. All existing structures and wooded areas within 200 feet of the boundaries of proposed subdivision.

f) The purpose of any easements or land reserved, or dedicated to the public use shall be designated, and the proposed use of sites other then residential shall be noted.

g) Existing and proposed plans for telephone, electricity, and gas utilities.

h) Boundaries and designations of Zoning Districts lying within the subdivision, municipal boundary if any, land use designation from Master Plan.

i) A general site location map at the scale of the Official Map or municipal base map, locating exactly the subdivision boundary and proposed street in relation to at least two existing intersection streets or other features shown on the Official Map.

j) Soil mapping units and unit boundaries.

k) A statement of conditions of land as to soil suitability for development.

l) A statement of the work required on existing streets to meet the minimum standards set herein including cost estimates and the method of meeting such costs.

m) A statement as to the compliance of the proposed lots with zoning requirements. If any lots do not comply but are covered by zoning variances, the statement should include reference to such variance.

n) Existing and future subdivision, if any, in and adjacent to the subject subdivision.

o) A statement and contours in sufficient detail to indicate clearly the method of storm water drainage on and off the subdivision, methods of sanitary sewage disposal and water supply.

p) Water shed areas, preliminary drainage analysis and preliminary drainage computations.

q) Preliminary road profiles.

r) Certification of approval of the subdivision by the State Water Supply and Pollution Control Commission accompanied by a duplicate copy of all data submitted to them and any stipulation related to approval.

s) A statement that the proposed street centerlines and lot locations have been adequately flagged on the ground at the site to allow on-site evaluation of the proposed subdivision by the Board of Engineer.

t) Approval, as prescribed by law, from any other municipal, state, or federal agency which may have jurisdiction.

u) Perc test required.

4.12 Final Plat: The final plat shall be in permanent black ink, or permanent reproducible polyester film or mylar. It shall be submitted with four (4) blue (black) line paper pints. Sheet size shall be in accordance with requirements of the Register of Deeds but not smaller then 22' x 34'. Maps shall be at a scale of no more than 100 feet per inch. Space shall be reserved on the plat for endorsement by the Planning Board and all appropriate agencies. The final plat shall be consistent with the conditionally approved preliminary layout.

The plat shall contain the following statement: "The Subdivision Regulations of the Town of Carroll are a part of this plat, and approval of this plat is contingent on completion of all the

requirements of said Subdivision Regulations, excepting only any waivers or modifications made in writing by the Board and attached hereto." The final plat subdivision shall contain or be accompanied by the following maps and information:

A. Final Plat

1. Date, name of municipality and subdivision, name and address of the subdivider and designer;

2. Boundaries and area of the entire parcel, whether or not all land therein is to be subdivided (in whatever manner is practical, the subdivision boundary shall be referenced to some point, i.e., public street intersection or U.S.G.S. bench mark); north point, bar scale, date and dates of any revisions;

3. Names and addresses of abutting property owners, tax block parcel number, subdivisions and buildings within 100 feet of the parcel to be subdivided, and intersecting roads and driveways within 200 feet of the parcel to be subdivided;

4. Existing and proposed street right-of-way lines, dimensions of tangents, chords, and radii, accurate locations and description of all monuments to be set at street intersections, points of curvature and tangency of curved streets and at angles of lots, names of existing and proposed streets;

5. Existing and proposed lot lines, angles and dimensions, lot sizes in square feet and acres, consecutive numbering of lots, iron pins at lot corners; lots shall be numbered consecutively as instructed by the Engineer;

6. Location of existing and proposed easements, deed restrictions, building setback lines, parks and other open space to be dedicated to public use, water courses, and significant natural and man-made features;

7. The purpose of any easement or land reserved, or dedicated to public use shall be designated, and the proposed use of sites other than residential shall be noted;

8. A general site location map (at scale of municipal base map and/or tax map) locating exactly the proposed subdivision boundary in relation to major roads and community facilities of the Town.

9. Name and seal of engineer and/or land surveyor licensed by the State of New Hampshire.

10. Certification by the engineer or surveyor as to accuracy of plat details;

11. Certification that the applicant is the agent for the owner or is the owner of the land, or that the owner has given consent under an option agreement;

12. A written acknowledgment of the subdivider's responsibility for maintenance of easement areas, and the assumption by him of liability for injuries and damages that may occur on any land to be dedicated for public use, until such land has been legally accepted by the Town.

13. When approval of a plat is required by any officer or body of such a municipality, state or county, approval shall be certified on the plat in appropriate space provided therefore on the plat.

14. If a subdivision is to be served by public water supply or by public sewers, a statement from the municipal department or company involved, attesting to the availability of such service.

15. That at least one bench mark be established on each section or submission of a subdivision, tied into any previously established bench mark on any previously submitted plat. Said bench mark to be plainly marked in field and stationed on the final plat with its elevation. Ties to U.S.G.S. bench marks may be required.

16. Final State of New Hampshire approval when appropriate form the Department of Public Works and Highways R.S.A. 249, The Special Board on Dredging and Filling R.S.A. 149:8-a and R.S.A. 482:41 e-i and the Water Supply and Pollution Control Commission R.S.A. 149-E shall be received before a public hearing is scheduled. Perc test required on all lots regardless of size.

17. A Performance and Maintenance Bond, if required as stated in Section 4.18.

18. The subdivider is responsible for the condition and maintenance of all roadways until such time, if ever, that the roadways are taken over by the Town of Carroll. A statement to this effect must be placed on the final plat to be recorded.

19. Perc test required.

As part of the final plat submission, the subdivider or his agent may be required by the Board to submit any or all of the following:

B. Subdivision Grading and Drainage Plan

This plan shall be submitted on a separate sheet or sheets and shall provide the following information for the entire area of the proposed subdivision, unless there is a determination by the Board that a lesser area is sufficient:

1. Basic street and lot layout, with all lots numbered consecutively.

2. Location of all existing and proposed buildings.

3. Contours of existing grade at intervals of not more than five (5) feet. Intervals less than five (5) may be required depending on the character of the topography. Contour lines shall extend a minimum of 100 feet beyond the subdivision boundary.

4. Final identification, location, elevation, grades and/or contours at intervals of not more than two (2) feet (less interval may be required depending on topography) for the existing and proposed drainage ways, drainage easements, drainage structures, and water bodies.

5. Final identification and relative location of proposed soil erosion and sediment control measures and structures.

6. Final drawings and specifications for each proposed soil erosion and sediment control measure and structure in accordance with formal and informal guidelines acceptable to the Town of Carroll.

7. Final drawings, details, and specifications for proposed flood hazard prevention measures and structures and for proposed storm water retention basins.

8. Final slope stabilization details and specifications.

9. A timing schedule indicating the anticipated starting and completion dates of the subdivision development and the time of exposure of each area prior to the completion of effective soil erosion and sediment control measures.

NOTE: The subdivider shall bear the final responsibility for the installation and construction of all required drainage, slope and stabilization, soil erosion and sediment control measures and structures according to the provisions of these regulations.

C. Subdivision Street and Utility Plan

This plan shall be submitted on a separate sheet or sheets and provide the following information:

1. Complete plans and profiles of all proposed streets including but not limited to:

a. Horizontal and vertical curve data at the street centerline;

b. Street stationing every 50 feet;

c. Intersection, turnaround, and/or cul-de-sac radii;

d. Statements and/or typical sections of proposed streets.

2. Complete plans and profiles of all proposed sanitary and storm sewers, including the following:

a. Invert elevations, original and finished ground profiles above these sewers and top of manhole elevations.

b. Profiles and grades of storm sewer lines and inlets grade.

c. Type of material and class, used and proposed grades.

3. Location and details of all existing and proposed utilities, including water mains, gas mains, telephone, electric, on and adjacent to the land to be subdivided.

4. A statement as to:

a. The flow available on existing water mains.

b. The proposed number of units and anticipated sanitary sewer flow.

c. The available storm water facilities downstream of this subdivision.

5. Any other details pertinent to street and/or utility construction.

D. Subdivision "As Built" Plans:

Other data required by Town Code shall be included as part of the Subdivision "As Built" Plans. The initial plans shall be modified to reflect As Built conditions. Prior to acceptance of the utilities by the Town, the subdivider shall submit an "as-built" plan. This plan shall be drawn to scale and shall indicate by dimensions, angles and distances, as applicable, the location of sewer and drain Y-branches, laterals, manholes, catch basins, hydrants, valves, curb shut-offs, road profiles and centerline elevations and final grading plan showing scales and ditches. Plan shall show easements and dedicated roadways.

As-Built Plans shall be submitted by the subdivider to the Town on a reproducible print.

4.13 Lot and Site Layout: When laying out or planning a subdivision, the following regulations shall govern the layout of lots and sites:

a) The lot size, width, depth, shape, orientation, and the minimum building setback lines shall be appropriate for the location of the subdivision and for the type of development and use contemplated.

b) Lot dimensions and area shall not be less than the requirements of the Zoning Ordinance, or as required by soil topography conditions.

c) Corner lots shall have extra width sufficient to permit a setback on each street.

d) Where extra width has been dedicated for widening of existing streets, lots shall begin at such extra width line, and all setbacks be measured from such line.

e) Side lines of lots shall be at right angles to straight streets, and radial to curved streets.

f) Where there is a question as to suitability of a lot or lots for its or their intended use due to the presence of such factors as rock formations, steep slopes, unusual surface configurations, tendency to periodic flooding, poor drainage, unsuitable spoil or soils, and inadequate capacity for sanitary sewer disposal, the Planning Board may, after adequate investigation, withhold approval of such lot or lots or require modification of such lots.

g) Lots fronting on two parallel streets will not, in general, be approved.

h) Where lots abut existing Town, County, State, or Federal street, marginal access roads or reversed frontage approach should be used with a minimum number of driveways and/or streets entering onto these streets.

4.14 Street Design: Proposed streets shall be in harmony and conformance with existing and proposed streets, as shown on the Town Master Plan or Official Map. Street patterns shall give due consideration to contours and natural features. Where required by the Board, provisions shall be made for the extension of the street pattern to abutting undeveloped property. Every proposed street in a subdivision shall be laid out and constructed as required by the following regulations:

a) All streets shall be constructed, and all bridges, culverts, drainage structures, storm sewers, gutters, drainage ditches, and other improvements required by the subdivision plat and accompanying documents, shall be installed in conformance with the standards adopted by the Town.

b) The plan of any proposed subdivision shall show all work required to connect and complete the improvements and utilities between the proposed street pattern and any connecting street in an existing subdivision.

c) Roads shall be related appropriately to the topography. Local roads shall be curved wherever possible to avoid uniformity of lot appearance. All streets shall be arranged so as to obtain as many as possible of the building sites at, or above, the grades of the streets. Grades of streets shall conform as closely as possible to the original topography. A combination of steep grades and curves shall be avoided. Specific standards are contained in this section of these regulations.

d) Proposed streets shall be extended to the boundary lines of the tract to be subdivided, unless prevented by topography or other physical conditions, or unless in the opinion of the Planning Board such extension is not necessary or desirable for the coordination of the layout of the subdivision with the existing layout or the most advantageous future development or adjacent tracks.

e) Where a subdivision abuts an existing street with an inadequate alignment, or right-of-way width, the subdivision plat shall include in the street dedication all land needed to meet standards established by these regulations, and as approved by the Board.

f) Where a proposed subdivision abuts an existing subdivision, the subdivider shall make every attempt to design the street system of the proposed subdivisions to connect with dead-end of "stub" streets of the existing subdivision.

g) Subdivision streets shall be so laid out as to provide a curvilinear street pattern.

h) No street shall have a name which duplicates or which is substantially similar to the name of an existing street. The continuation of an existing street, however, shall have the same name.

i) Local and collector streets shall not intersect with arterial streets less than eight hundred (800) feet apart, measured from centerline to centerline.

j) Except where it is impractical, because of the character of the land, streets shall intersect so that within 75 feet of the intersection the street lines are at right angles and in no case less than seventy-five degrees. The grade within 100 feet of an intersection shall not exceed one percent. No structure of planting shall impair corner visibility.

k) Multiple intersections involving a junction of more than two streets shall be prohibited. If at all possible, four-way intersections shall be avoided on all local and minor collector streets.

l) The minimum distance between centerline offsets at street jogs shall be one hundred fifty (150) feet.

m) Permanent dead-end streets should where possible not exceed 600 feet in length, and shall terminate in a turnaround 100 feet in diameter with a paved area 80 feet in diameter.

n) Temporary dead-end streets, where future extension to another outlet is approved by the Board, or where indicated on the plan, may exceed 1,000 feet in length. In such cases, the full width of the right-of-way to the subdivision property line shall be reserved as a street right-of-way.

o) If a dead-end street is of a temporary nature, a turnaround shall be provided and provisions made for future extension of the street through to adjacent property and reversion of the excess right-of-way to the adjoining properties.

p) The turnaround at the end of the cul-de-sac street should be located so that it drains toward its entrance.

q) Unless there is the expectation of extending the street through to the adjoining property, a cul-de-sac street should never be brought to the property boundary line, but should be placed so that the lots can back on the property line of the subdivision.

4.15 Road Regulatory Signs: The applicant shall deposit with the local government at the time of final subdivision approval the sum of $10 for each road sign required by the Engineer at all road intersections.

4.16 Classification of Streets: The classification of existing streets shall be as defined in the Town Master Plan or Official Map or by the Board where such Master Plan or Official Map does not exist. The classification of new streets shall be determined by the Board in accordance with the following table. The following standards of design shall apply to streets related to subdivision.

The Board may modify the maximum and minimum gradient for short lengths of streets where, in its judgment, existing topographic conditions or the preservation of natural features indicate that such modification will result in the best subdivision of land.

The Board may require greater width of right-of-way where, in its judgment, the demands of present or future traffic make it desirable or where topographic conditions create a need for greater width for grading.

In rural areas, streets shall have a minimum travel surface width as prescribed above, with shoulders not less than 2 feet wide. The Board may require a greater travel surface width and shoulders for Arterial and Collector Streets. In urban or village areas, the Board may require a greater width of right-of-way and paving, together with curbs and sidewalks.

In the case of subdivisions requiring construction of new streets, any existing street which provides either frontage to new lots or access to new streets shall meet the minimum standards established in Section 4.14 for such streets. Where a subdivision requires undue expenditures by the Town to improve existing streets to conform to minimum requirements, the Board may disapprove such subdivision until the Selectmen/Council shall certify that funds for the improvements have been assured by the municipality.

4.17 Road Design and Construction Standards:

1. Purposes:

The purpose of the Town of Carroll's Road Standards is to create safe and convenient traffic circulation, promote economical road construction and to ensure that the Town's acceptance of private roadways will not burden the Town with extensive maintenance or upgrading costs. These standards were established to provide the Town with livable neighborhoods and to alleviate future burdens from unsafe and substandard roadways.

2. Design Guidelines:

When designing a circulation system for a residential development certain factors should be kept in mind: 1) vehicular and pedestrian safety; 2) efficient service for the appropriate users; 3) compatibility with proposed development; and 4) the economy of land construction and maintenance requirements. The following guidelines are for use in designing vehicular and pedestrian circulation system within new developments. These guidelines can be applied to different types of development depending on the circumstances and needs of the individual development:

a. Local street layouts should be designed to minimize drive-thru-traffic, pedestrian-vehicular conflicts, intersections, and excessive vehicular travel and speed.

b. Adequate vehicular and pedestrian access should be provided to all parcels.

c. Provisions for bus service or car pooling within the development should be considered when appropriate.

d. The circulation system should represent the most practical and efficient use of the site's topography and the proposed use, and

e. Traffic circulation should also be studied for its affect on the Town's present circulation pattern and how best to minimize any negative impact.

3. Road Layout and Specifications:

The following specifications are intended to provide a guideline for the design and construction of private and public roadways. The Town's acceptance of these guidelines for its road work ensures the residents of Carroll a standard of construction that will ease future financial burden caused by upgrading substandard roadways. All applications for these guidelines are subject to change or waiver by the Planning Board/Highway Superintendent due to specific site characteristic or construction methods. These instances will be carefully reviewed by the Planning Board as not to jeopardize the integrity of the Town's roadways.

It is also recommended that privately constructed roadways attempt to meet these standards. Private roads will be reviewed by the Planning Board on their ability to provide safe and adequate access to the proposed development./

The developer, land owners or Homeowner Association shall be responsible for the maintenance and repair or private roadways. Any private roadway that is proposed for the Town maintenance must meet current road standards before Town acceptance.

The Planning Board's or Highway Superintendent's approval of any private roadways design DOES NOT constitute any future acceptance of the roadway by the Town. State Statutes on Town Road acceptance must be followed by the Town and road owner/developer.

A. ROADWAY SPECIFICATIONS

1. General Design - New streets shall be constructed to accommodate the continuation of the principal streets adjoining a subdivision with a width at least as great as the connecting street.

2. Right-of-way - All street right-of-ways shall be a minimum of fifty (50) feet and may, if warranted by the development, be greater.

3. Alignment - Street intersections and curves shall be designed to permit adequate visibility for vehicular and pedestrian traffic. No street shall be constructed with a curvature of less than 125 feet radius for a local street, 250 feet for a collector

street or 500 feet for an arterial street. Streets entering on the opposite side of the same street shall be laid out directly opposite each other or shall have a minimum offset of 125 feet from their center lines. Property on corners shall reserve a twenty (20) foot curve radius. (See Appendix A for definitions of streets.)

4. Intersecting roadways - Roads shall be laid out to intersect at 90 degree angles for a minimum of 50 feet, unless specific circumstances warrant differently. In any case, no street shall be less than 60 degrees. Intersecting roadways shall have a transitional area at all corners to accommodate turning movements to a radius of thirty (30) feet.

5. Grade - Grades of all streets shall conform in general to the terrain and shall not be less than 1.0 percent or more than 10 percent unless specifically approved by the Planning Board. All changes in grade exceeding .5 percent shall be connected by vertical curves of sufficient length to afford adequate sight distances. A maximum of 2 percent grade will be allowed within fifty (50) feet of an intersection.

6. Dead-end Streets - All dead-end streets shall be constructed with a cul-de-sac or turn-around providing adequate room for movement of snow plows and fire equipment. Variations in design may be allowed to accommodate variances in terrain. Dead-end streets designed to be permanent shall generally be less than 1000 feet in length. (See Appendix B)

7. Construction Specifications (See NOTES Appendix C)

Average Daily Traffic (ADT)#	Local Service 0-50	51-250	Collector 251 - 400	Major 401 - up
Pavement Width (ft)	20	20	24	variable
Shoulder Width (ft)	4	4	4	8-10
Pavement Type	Penetration and Sealer			Hot Bit. Conc.
Pavement Thickness				Varies
Pavement Slope	1/2" per ft	1/4" ft	1/4"/ft	1/4"/ft
Minimum Base Course Depth Crushed Gravel (top)	6"	6"	6"	6"
Bank Run (bottom)	12"	16"	18"	18"

#ADT = 8 trips per day per dwelling unit

Clearing - Clearing shall consist of cutting and disposing of all trees unless intended for preservation, down lumber, stubs, bushes and bushes that interfere with excavation, embankment or "clear vision" of the roadway.

Excavation - Excavation shall consist of removing and satisfactorily disposing of all material encountered within the limits of the work. Suitable material taken from the excavation may be used in the fill areas. Suitable material shall be free from all stumps, roots, bushes, grass, turf or other objectionable material that should be removed and disposed of in waste areas prior to the excavation. Suitable waste material may be used in the toe of the slope as described later.

Subgrade - The subgrade shall be maintained in such condition that the excavation shall be well drained at all times, and shall be compacted, shaped and maintained to a tolerance of two (2) inches above or below the required grade before the application of the gravel base.

Fill Areas - In fill areas of five (5) feet or more in depth, measures from the subgrade to old ground, stumps will be allowed to remain but shall be cut as close to the ground as practicable; but in no case will the stumps exceed a height of six (6) inches above the surrounding grounds. In fill areas of five (5) or less, measures from the subgrade to old ground, all stumps, bushes and objectionable material shall be removed and disposed of in waste areas prior to placing of the fill.

Waste Material - Waste material with all large stumps removed may be used in the toe of slopes in fill areas. The toe of the slope area shall be defined as that area below the subgrade and outside of a 2 to 1 slope from the shoulder break. Suitable waste material shall not include trees and bushes cleared from the right-of-way.

Road Base - The road base shall consist of a foundation course of hard durable particles of granular material, the type and source to be approved by the Superintendent or engineer prior to being used on the project. All base material shall be placed in layers not exceeding a compacted depth of twelve (12) inches. No stone exceeding the compact depth of any layer shall be used, and any stone exceeding the maximum dimension shall be removed from each layer prior to addition of the next course. Each layer shall be placed uniformly over the full width of the subgrade. The base shall be thoroughly compacted, shaped, and maintained to a tolerance of two (2) inches above or below the required grade before application of any surface course.

Shoulders - Should sections shall not be constructed in a separate operation from that of the gravel base. The should slope shall be constructed and compacted with the gravel base installation.

Backfill - Backfill shall be accomplished with the use of suitable material to fill all spaces excavated and not occupied by drainage or other structures, and areas shall be filled up to elevation of the surrounding terrain.

Ditching - The base level of the ditching shall be a minimum of thirty (30) inches below final grade level.

Gravel Surface - Gravel surface course shall consist of a wearing course or leveling course of crushed aggregate. This material shall be uniformly graded with 100 percent passing the 1 1/2 inch screen. When required, this course shall be treated with bituminous material of the type specified. The gravel surface course is for the fine grading operation to obtain the desired grade and good rideability. The quality of this material must allow for possible penetration of bituminous material; the gravel surface course shall be graded and loosened to a depth of one (1) inch with a power grader in order to allow uniform penetration of the bituminous material.

B. DRAINAGE

1. Culverts - Structural excavation shall consist of excavating, removing and satisfactorily disposing of all material encountered within the limits of the work as required for the construction of all drainage structures. All suitable material removed may be used for backfilling or within fill areas. In case the foundation material is soft or otherwise unsatisfactory, it may be necessary to excavate to a greater depth and backfill with granular material to establish a firm and suitable foundation for the drainage structure. If the foundation is solid rock, the trench should be excavated to a depth of six (6) inches below the flow line and backfilled with a granular material to insure a cushion between the culvert and the rock foundation.

The foundation should be carefully shaped so that the culvert will have full support for the entire length. Shimming beneath the culvert with dirt, stones, wood, etc., to meet the designated grade, will not be permitted.

The trench should be excavated to a width of twelve (12) inches beyond each side of the culvert to allow for proper backfill and compaction. The backfill material should be placed in layers, and each layer thoroughly compacted by means of hand tamps or vibratory compactors if available. The first layer should not exceed one-half the diameter of the pipe, with the following layers not exceeding twelve (12) inches. The layers shall be placed on

all sides at the same time to prevent displacement of the structure. When the backfill reaches a sufficient depth, compaction may be obtained by running heavy equipment or trucks back and forth over the trench. A minimum depth of fifteen (15) inches of backfill shall be placed and compacted over the top of any culvert before using heavy equipment for compaction.

Backfill material shall be of the same nature as that removed from the trench; i.e., granular material should be only be used when the material adjacent to the trench is granular. Caution should be taken so that no large stones come in contact with the culvert during backfilling.

Culvert pipes shall extend from toe of slope to toe of slope, the pipes to be bedded in a foundation of uniform density that is compacted and carefully shaped at the required grade to fit the lower part of the pipe. Headers or stone rip-rap, or both, shall be used at both inlets and outlets of culverts as approved by Highway Superintendent or engineer.

Laying of pipe will begin at the outlet; it shall be laid carefully in the prepared bed with the outside laps of circumferential joints pointing upgrade. The longitudinal laps parallel to the center line of the pipe shall be placed on the side of the culvert with the outside laps pointing down. The ends of section shall be fully and closely joined and true to the grade given. Each section of joint and pipe shall be securely attached to the adjoining section of joint of pipe with connecting bands. The bands shall be tightly drawn so that a rigid joint will be formed.

In fills with five (5) feet or more in depth over the top of the pipe, all pipe culverts forty-eight (48) inches in diameter and larger shall be elongated along the vertical diameter approximately three (3) percent by means of timber struts. Struts shall be left in place until the fill is thoroughly compacted.

New corrugated metal pipe with a minimum diameter of fifteen (15) inches shall be used under the roadway. Driveway culverts shall have a minimum length of twenty-four (24) feet and minimum diameter of twelve (12) inches or larger, depending upon local conditions, with a minimum cover of eighteen (18) inches.

2. Catch Basins - Catch basins and manholes shall be constructed of portland cement concrete blocks, precast concrete sections, or parts of both, placed on a prepared eight (8) inch concrete base or prepared earth foundation for the precast bases. Blocks shall be machine-made solid segments not less than eight (8) inches in width.

Cement concrete blocks shall be laid on the prepared concrete base by a mason. The blocks shall be wet with water before laying.

All joints shall be completely filled with mortar. No joint shall be greater than one-half (1/2) inch in thickness. Joints shall be neatly tooled on the inside of the structure. Mortar shall be composed of one (1) part portland cement and two (2) parts of sand.

Precast portland cement concrete catch basins or manholes shall conform to dimensions and specifications described in the New Hampshire Standard Specifications for Road and Bridge Construction standards. Concrete blocks or their equivalent shall be used for the layers involved around the inlet and outlet pipes and may be used for the remaining upper section of the structure. Type "E" catch basins are pre-assembled from either 24 inch of 30 inch BCCMP and constructed on a six (6) inch concrete base. They shall conform to the dimensions as described in the current State standards.

Underdrain lines shall be installed wherever underground water is encountered in the subgrade or to avoid entrapment of water in the road bed. A bed of required granular material six (6) inches in depth shall be place din the bottom of the trench. On this prepared bed, a six (6) inch perforated metal pipe or equivalent shall be laid true to the line and grade with the perforations on the bottom side of the pipe. These pipes shall than be backfilled and firmly compacted to an adequate height.

Granular material for the underdrain shall consist of uniformly graded clean sharp sand or fine gravel with 100 percent passing a two (2) inch screen. All stones of two (2) inches or greater shall be removed during the back-filling process.

C. EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are an important aspect of any road construction proposal. In general,1 erosion and sediment control should encompass these principles: 1) The smallest practical area of land shall be exposed during the development; 2) land shall not be left exposed during the winter months; 3) when land is exposed it shall be for the shortest time period possible; and 4) the development should be fitted to the existing topography to reduce erosion.

There are two kinds of control measures: mechanical and vegetative. The following discussion covers the more widely used and accepted forms of erosion and sediment controls.

1. Vegetation

Temporary - Temporary cover crops can be used to stabilize the soil when cover is only needed for a few months. These cover crops can be used when the time of the year is unfavorable for establishing permanent cover.

Permanent - Permanent cover crops should be selected on their ability to control erosion with little or no maintenance required. Permanent cover crops should be installed as soon as possible in the development.

2. Seeding and Loaming - The loaming and seeding of disturbed land shall take place with approved methods and materials for the proper establishment and growth of grasses to be used as permanent cover.

Hydro-seeding - Hyro-seeding, in which seed, fertilizer and mulching are applied in a fast all-in-one operation, is an acceptable form of permanent cover establishment.

3. Mulching - Straw mulch can be used to control erosion until a cover crop is established and doesn't have to be removed. Hay is another mulch which can be used as a mulch that adds an additional source of seeds to the ground cover. Straw and hay are usually applied at 1 1/2 ton per acre.

There are also a number of fibrous materials such as jute or cottons netting that can be used to control erosion until permanent cover is established.

4. Sediment Basins - Sediment basins shall be installed and maintained to remove sediment from runoff waters. Usually sediment basins are temporary structures and are graded into the surrounding landscape after construction is completed and the area stabilized.

5. Diversions - Diversions intercept and divert runoff so that it will not cause damage; they consist of a channel and ridge construction across the slope. Diversions need a stable outlet to dispose of the runoff safely. Many times if the slope is long enough, diversions are used in series to protect the slope and often seeded and blended into the landscape as permanent erosion control.

In general, the State of New Hampshire specifications for road and bridge construction sections #643-Fertilizer for grasses; #644-Grass seed; #645-Erosion Control; #646-Turf Establishment and #650-Planting in general provides accepted practices on erosion control and the establishment of ground covers. When used in conjunction with local practices, they will serve as a guideline for the Planning Board when reviewing erosion control proposals.

D. EMBANKMENTS - Embankment construction will generally follow the procedures set forth in the State of New Hampshire Department of Public Works and Highway specifications on road and bridge construction, Section 203-excavation and Embankments, sub-section 3.7.

In general, embankment construction may include materials obtained from excavation or borrow sources and placed in accordance with line and grade. Trees and bushes are not considered suitable for this purpose.

Any alternative methods or materials for embankment construction will be explicitly stated in the initial design submission and must received approval by the Planning Board or designated engineer before construction proceeds.

E. SIDEWALKS - Sidewalks shall be installed at the expense of the subdivider, where the subdivision abuts or fronts on major streets or at such locations as the Planning Board or Town deems necessary.

F. BOND OR ESCROW - If required by the Planning Board, no street or road construction shall begin until a performance bond of the full amount of the construction cost based on the engineer's estimate is submitted to the Town. As a substitution for the performance bond, money for the full amount of the construction cost may be deposited in a savings account in escrow. As an alternative to both of the above, the owner(s) may build the road for its full length or in a phased construction in accordance with these standards and approved by the Planning Board before any construction of dwellings proceeds.

G. SUBMISSION DATA FOR ROAD DESIGN - Road design shall be submitted in plan and profile on sheets 22 x 34 in size and having a horizontal scale of 1"=50' and a vertical scale of 1"=10'. Three copies shall be submitted to the Planning Board for review and approval. In case of a subdivision, excluding private roadways, subdivision approval will not be granted until a satisfactory road design is approved.

The Plan will show:

1. TITLE, including the name of the subdivision, name of the owner, name of road, date, scale and name of designer/engineer.

2. Right-of-way lines

3. Slope and drainage easements

4. All center line data

5. Edge of pavement lines

6. Typical cross section

7. Existing grade at each half station (on profile)

8. Proposed grade at each half station (on profile)

9. Length of vertical curves and data (on profile)

10. Utility locations

11. Specific material or reference

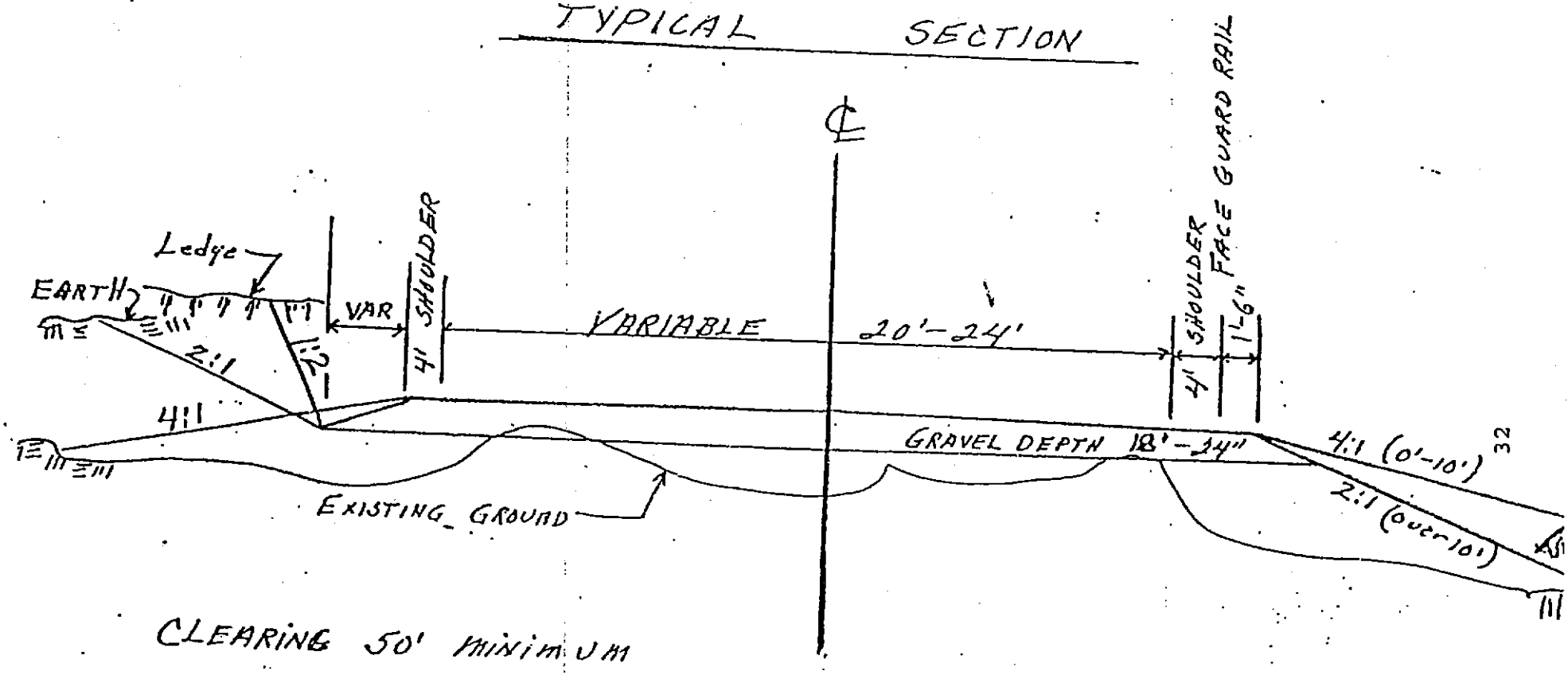
12. Drainage structure location, inverts, skew, station, length, slope and end treatments

13. Design year

14. Average Daily Traffic

A detailed engineer's estimate of construction costs will be filed with the street plan when submitted for approval.

TYPICAL SECTION



CLEARING 50' MINIMUM

Appendix A - Definitions

Average Daily Traffic (ADT) - An estimate of the daily volume of traffic determined using eight vehicle trips per day per household on an exclusively residential road.

Collector Street - Primary function is to intercept traffic from intersecting local streets and carry it to the nearest major street. Typical ADT is from 251 to 400 per day.

Dead End Street - A local street open at one end with special provision for turning around such as cul-de-sac.

Drainage - All drainage systems, catch basins, drains, ditches, culverts, pipes and mains.

Local Street - Primary function is to serve abutting land use with ADT of from 1 to 250 cars per day.

Major Street - Primary function is to carry through traffic with ADT in excess of 400 cars.

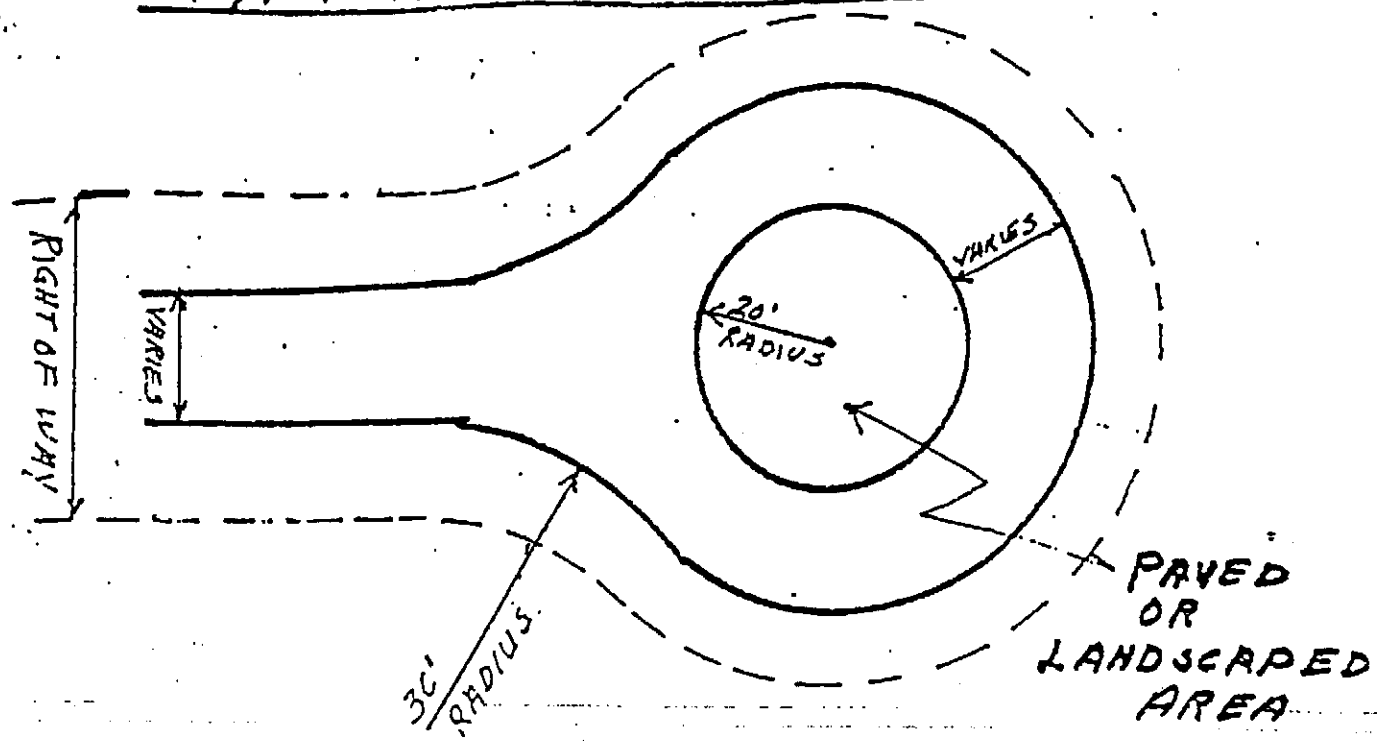
Private Road - Any road which has not be accept by the Town of Carroll.

Road - A public way designated for purposed of vehicular and/or pedestrian traffic including the entire area within the right-of-way, avenues, boulevards, highways, streets and all other ways.

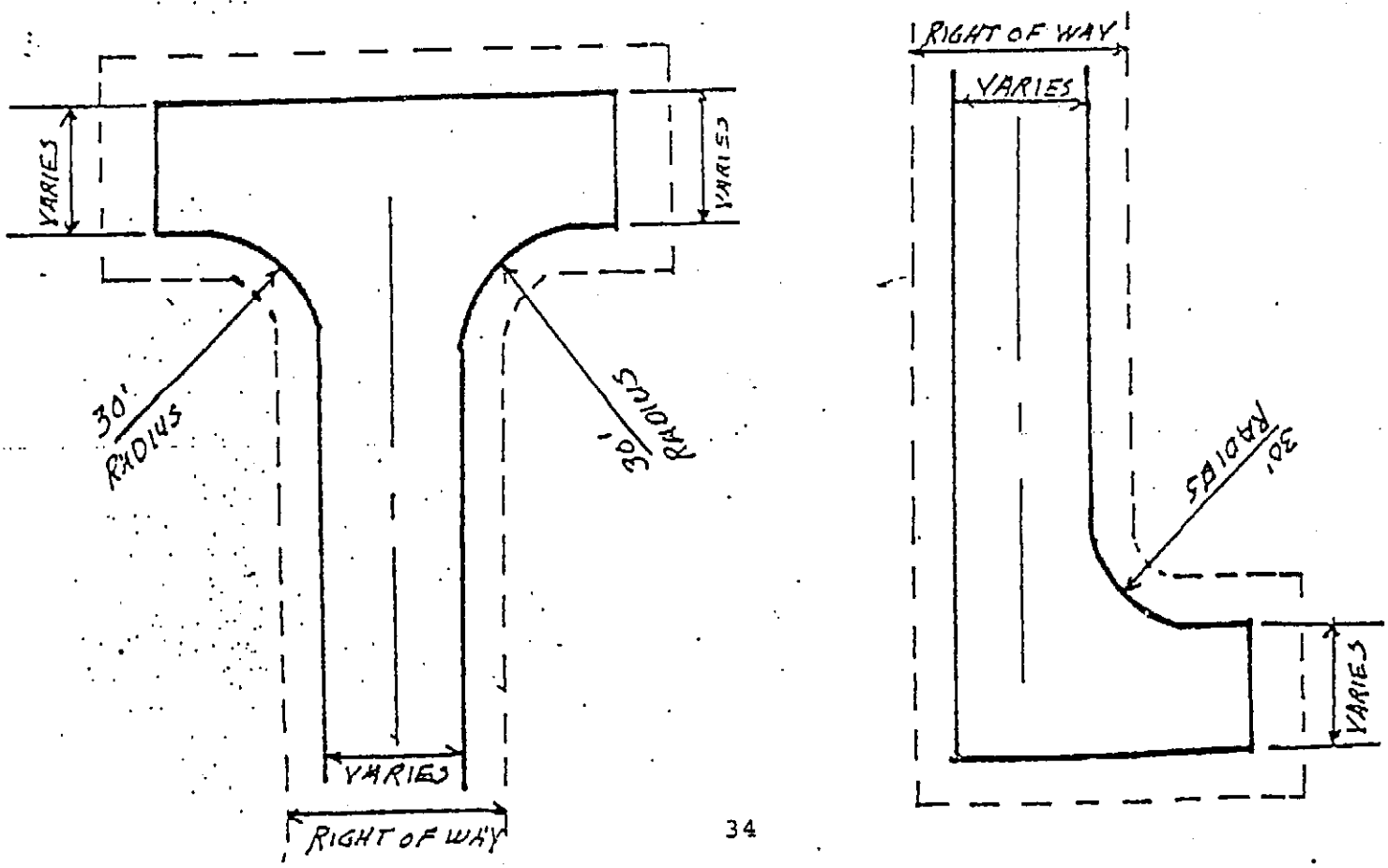
Road Right-of-Way - Road right-of-way shall include all construction, excavation, or fill and all cut and fill slopes with a maximum slope of 1 1/2 to 1.

Subgrade - The top surface of the road bed upon which the pavement and shoulders are constructed.

TYPICAL CUL-DE-SAC



TYPICAL TURNAROUNDS



Appendix C Notes

1. Typical cross section - Elements including pavement and shoulder width may be modified when based on sound engineering design and approved by the Town Highway Superintendent or its designated engineer.

2. Material specifications shall conform to standard specifications for road and bridge construction by New Hampshire Department of Public Works and Highways and adopted 1983.

3. Design standards shall conform to geometric design guides by the American Association of State Highways and Transportation Officials.

4. Hot Bit. Conc. indicated hot laid bituminous asphalt pavement in accordance with New Hampshire Standard Specifications Section 403.