Matanuska-Susitna Borough
Public Works Department

Subdivision Construction Manual

(Roads, Drainage and Utilities)

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MATANUSKA-SUSITNA BOROUGH
SUBDIVISION DESIGN AND CONSTRUCTION MANUAL

for

STREETS, DRAINAGE AND UTILITIES

INTRODUCTION

This manual is intended to accomplish several goals; one of which is to provide the subdivider and his engineer with information and guidelines which will help him to understand the requirements necessary for design of roads and utilities within subdivisions of the Matanuska-Susitna Borough. This manual is intended to provide information to both the subdivider, his engineers, and to the borough staff so that there is less uncertainty about requirements. Ultimately, it is intended to provide borough-maintained road systems which are safe throughout the year in all weather conditions. This road system must also have an inherent low maintenance cost, and meet design and construction standards. This manual should eliminate some of the commonly reoccurring problems such as poor drainage, bad intersection sight distances, hills that are too steep to traverse during winter ice conditions, and intersections that are too steep to safely stop. Other problems have been high expenses due to redesign for previous construction outside of rights-of-way, high expenses necessary for reconstruction due to roadbeds prepared with silty-type materials, and roads and rights-of-way that are improperly aligned and continue to provide traffic problems due to the poor locations.

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SECTION A

Residential Street Design

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SECTION A. RESIDENTIAL STREET DESIGN

A01 PURPOSE

A01.1 OBJECTIVE. The purpose of these provisions is to establish appropriate standards for the design of streets in residential subdivisions that will: a) promote the safety and convenience of vehicular traffic, b) protect the safety of neighborhood residents, c) minimize the long term costs for maintenance and repair of streets, d) protect the residential qualities of neighborhoods by limiting traffic volume, speed, noise and fumes, e) encourage the efficient use of land, and f) minimize the cost of street construction and thereby restrain the rise in housing costs.

A02 APPLICABILITY. These Standards shall be applicable to the design and construction of all new residential streets, within the Matanuska-Susitna Borough with the exception of those streets within cities which exercise local road powers by ordinance.

A03 STREET CLASSIFICATIONS

A03.1 CLASSIFICATIONS. The following street classifications tailor the design of each street to its function:

Street Classification	Minimum R-O-W feet	Paved/ Unpaved Traffic feet	Shoulder Unpaved/Paved*(7) feet	feet	Minimum Slopes Fore*(3) Unpaved	Paved	Back *(1)
Residential*(4) Street	50	20	0	2	3:1	2:1	2:1
Residential Subcollector	60	20	1	2	3:1	2:1	2:1
Residential Collector	60	22	1	2	3:1	2:1	2:1
Residential Frontage Access	50	20	0	2	3:1	2:1	2:1
Mountain*(8) Access	60	*(6) 20	0	0	2:1	2:1	*(2) 2:1
Pioneer*(8) Access	50	18					
Single Lanes*(5)		10	1	1	3:1	2:1	2:1
Alleys	20	10	1	1			

*(1) 2:1 Backslopes may be reduced to 1 1/2:1 if cuts exceed 5 feet and Soils Engineer certifies that steeper slopes would be stable, appropriate slope

stabilization is used.

*(2) or actual backslope recommended by Soils Engineer or demonstrated by actual conditions.

*(3) Normal ditch depth shall be 30 inches. Fore slopes 4:1 if ditches are 18 inches or less.

*(4) 50 feet ROW may need one 15 foot utility easement adjacent to be negotiated with the utilities.

*(5) ROW for single lanes shall match the street classification and include additional provisions for median width.

*(6) See A.08.2(e) for wider width requirements.

*(7) Guardrail to be installed if required by application of State of Alaska Highway Preconstruction Manual.

*(8) See E01.5 for maintenance of Pioneer access and Mountain Standard Roads.

A03.2 GENERAL DESIGN STANDARDS. Each proposed residential street shall be classified and designed, for its entire length, to meet or exceed the minimum standards for one of the following street types:

a) Residential Street: Residential streets are intended to carry the least amount of traffic at the lowest speed. The residential street will provide the safest and most desirable environment for a residential neighborhood. Developments should be designed so that all, or the maximum number possible, of the homes will front on this class of street.

b) Residential Subcollector Street: Residential subcollector street will carry more traffic than the residential street. The subcollector should provide an acceptable if not an optimum environment for a residential neighborhood.

c) Residential Collector Street: This is the highest class of street that could be considered as residential. Residential collector street will carry the largest volume of traffic at higher speeds. In large residential developments, this class of street

may be necessary to carry traffic from one neighborhood to another or from the neighborhood to other areas in the community. Residential Collectors are unsuitable for providing direct access to residences.

d) Special Purpose Streets: The Platting Board may require the development to include a Frontage Street or divided street if the circumstances set forth in item 1 and 2 below exist.

(1) Frontage Street: A Frontage Street is a street parallel and adjacent to a residential collector or higher level street which provides access to abutting properties and separation from through traffic. It may be designed using residential street or a residential subcollector standards as anticipated traffic volumes dictate.

(2) Divided Streets: For the purpose of protecting environmental features or avoiding excessive grading, the borough may allow a street to be divided. In such a case, the design standards shall be applied to the appropriate street classification and the single lane width.

A03.3 EXISTING STREETS. Each street abutting or affecting the design of a subdivision or land development, which is not already classified shall be classified according to its function, design and use by the borough at the request of the applicant or during plan review. The classification of existing streets shall include those categories of Section A03.1 and A03.2 above, or higher category as determined by either the adopted borough's street classification system, or current use.

A04 RESIDENTIAL STREETS

A04.1 SERVICE RESTRICTIONS. A residential street is a street which provides access to abutting properties. It shall be designed to carry no more traffic than that which is generated on the street itself but in no case an average daily traffic (ADT) volume greater than 200. Each half of a loop street may be regarded as a single Residential Street. The total calculated traffic volume generated on a loop Residential street shall not exceed 400 ADT, see figure in A05.2.

A04.2 STREET ACCESS. Residential streets may intersect or take access from any equal or higher street type. Both ends of a loop residential street are

any equal or higher street type. Both ends of a loop residential street are encouraged to intersect the same collecting street and be designed to discourage through traffic.

A04.3 SHOULDERS. A two foot wide shoulder on each side will be provided on paved streets.

A04.4 ENGINEERING CRITERIA. The design criteria for residential streets are set forth below. Any unspecified design shall meet or exceed the design criteria for a roadway design speed of 25 miles per hour.

a) Minimum ditch grade: 0.5%

b) Maximum centerline grade: 10%

c) Horizontal curvature: Minimum centerline radius 225 feet
(190 ft. min. with Public Works Department's approval)

d) Minimum tangent length between curves: 100 feet

e) Stopping sight distances: 150 feet minimum

f) Maximum grade within 50 feet of "T" intersection: 5% and through intersection 7%

g) Vertical curves where the algebraic difference in grades exceeds 2.0%

A04.5 CUL-DE-SAC TURNAROUNDS.

a) A drivable surface diameter of 80 feet centered in a R-O-W diameter of 100 feet shall be provided at the terminus of all cul-de-sacs.

b) Cul-de-sac are to access 20 lots or less, and not exceed 1000 feet in length.

c) The grade throughout the turnaround surface of a cul-de-sac shall not exceed 4%.

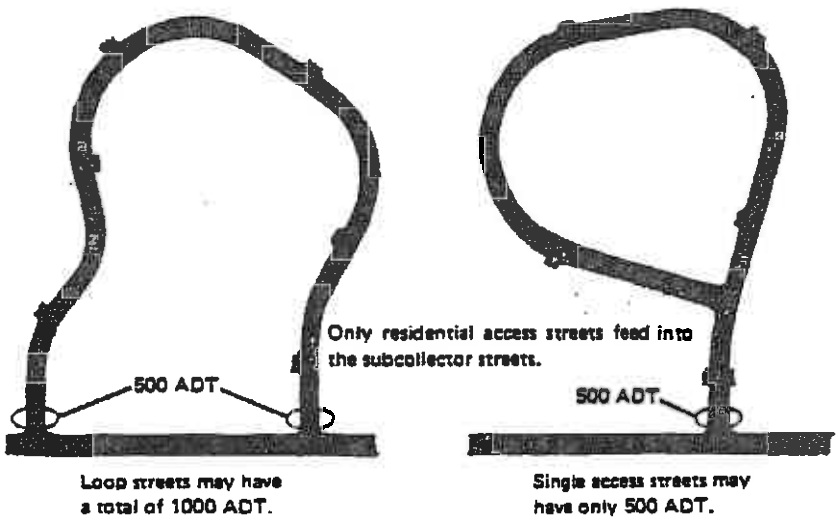
A05 RESIDENTIAL SUBCOLLECTOR STREETS

A05.1 SERVICE RESTRICTIONS.

a) A residential subcollector is a street which provides access to abutting properties and which may also move traffic from residential streets that intersect it.

b) Each Residential subcollector street shall be designed so that no section of it will move a traffic volume greater than 500 ADT. (Each half of a loop residential subcollector street may be regarded as a single residential subcollector street and the total traffic volume moved on a loop street shall not exceed 1000 ADT).

c) Residential Subcollector streets shall be designed to exclude all external through traffic which has neither origin nor destination on the residential subcollector or its tributary residential access streets. Adjacent parcels may acquire access if proven to be land locked by legal or terrain features or if such residential subcollector access can be demonstrated to be beneficial to the public.



Service restrictions for residential subcollector streets.

A05.2 STREET ACCESS. Every residential subcollector must be provided with no fewer than two access intersections to streets of higher classification if the total traffic volume exceeds 500 ADT on the street. For residential subcollector streets designed for 500 ADT or less, one access intersection to a street of higher classification is allowed.

Residential Subcollectors must take access from a street of higher order in the system - either from residential collectors or arterial roads. This restriction is to avoid the maze-like network of undifferentiated street types commonly found in many subdivisions. This restriction also ensures (when greater than 500 ADT) a multiplicity of access routes to the external street system. The advantages of multiple access points for residential subcollectors include: 1) reducing congestion and internal travel volumes by providing alternate access routes; 2) dispersing the impact of the development on the external road system; 3) providing alternate routes for emergency vehicles; 4) providing continuity in the internal street system for service, delivery, and maintenance vehicles, (such as snow plows); and 5) providing residents with an alternate open exit or access in the event that road or utility construction closes part of the residential subcollector. An additional consideration is that alternate exits and entrances provide greater traffic efficiency and opportunity for residents to get where they want to go by the shortest route.

A05.3 SHOULDERS. A two foot shoulder on each side will be provided on paved streets.

A05.4 MOVING LANES. All residential subcollector streets shall be provided with two continuous moving lanes within which no parking is permitted.

A05.5 ENGINEERING CRITERIA. Design criteria for residential subcollector streets are set forth below. Any unspecified design criteria shall meet or exceed the design criteria for a roadway speed of 30 miles per hour.

a) Minimum ditch grade: 0.5%

b) Maximum centerline grade: 10%

c) Horizontal curvature: min. centerline radius 350 ft. (275 feet with Public Works Department approval).

d) Minimum tangent length between curves: 100 ft.

e) Stopping sight distance: 200 feet

f) Maximum grade within 50 feet of "T" intersection: 5% and through intersection: 7%

g) Vertical curves where the algebraic difference in grades exceeds 2.0%

A05.6 CUL-DE-SAC. Cul-de-sac residential subcollectors are to provide access to areas that exceed the 1000 foot limit of section A04.5.

a) A drivable surface diameter of 85 feet centered in R-O-W diameter of 120 feet will be provided at the terminus of all residential subcollector cul-de-sac turnarounds.

b) Length of cul-de-sac to be governed by the anticipated traffic volume not exceeding 500 ADT. No distance limits are set herein.

c) The grade throughout the turnaround surface to be 4% or less.

A06 RESIDENTIAL COLLECTOR STREETS

A06.1 SERVICE RESTRICTIONS.

a) A residential collector street is a street which carries residential neighborhood traffic, but which restricts or limits residential frontage.

Residential collector streets should be designed to have no residential lots directly fronting on them. When this is not possible, the amount of residential frontage shall not exceed the following limits below. Only lots having frontages of 100 feet or greater may front on collector streets and space shall be provided on these lots for turnaround so that vehicles will not have to back out onto residential collector streets.

PERCENT OF THE TOTAL LENGTH OF COLLECTOR STREETS WHICH MAY HAVE RESIDENTIAL LOTS FRONTING ON AND TAKING ACCESS FROM THE RESIDENTIAL COLLECTOR STREET

ADT Level	1000-1199	1200-1599	1600-1999	2000+
Percent of Allowable Frontage	20%	10%	5%	0%

(The Percent of Allowable Frontage is calculated by taking the total lot frontage and dividing by 2 times the centerline length.)

b) Residential collector streets are required when the average daily traffic anticipated on the street will exceed the limits for residential subcollectors.

c) Residential collectors shall be laid out to discourage through traffic unless linkage between streets outside of the subdivision is determined by the Public Works Department to be desirable.

d) If the anticipated ADT will exceed 3000, the street shall be classified at a higher level than residential collector by the Public Works Department.

e) On-street parking shall be prohibited on residential collector streets.

A06.2 STREET ACCESS. Every residential collector must be provided with no fewer than two access intersections to streets of equal or higher classification or its termination approved by the Public Works Department.

A06.3 SHOULDERS. A two foot shoulder on each side will be provided on paved streets.

A06.4 MOVING LANES. All collector streets shall be provided with two continuous moving lanes within which no parking shall be permitted.

A06.5 ENGINEERING CRITERIA. The design criteria for residential collector streets are set forth below. Any unspecified design criteria for residential collectors shall meet or exceed the design criteria for a roadway design speed of 35 miles per hour.

a) Minimum ditch grade: 0.5%

b) Maximum centerline grade: 10%

c) Horizontal curves: minimum centerline radius of 550 ft. (400 ft minimum with Public Works Department approval.)

d) Minimum tangent length between curves: 100 feet

e) Maximum superelevation: 4%

f) Stopping sight distance: 250 feet

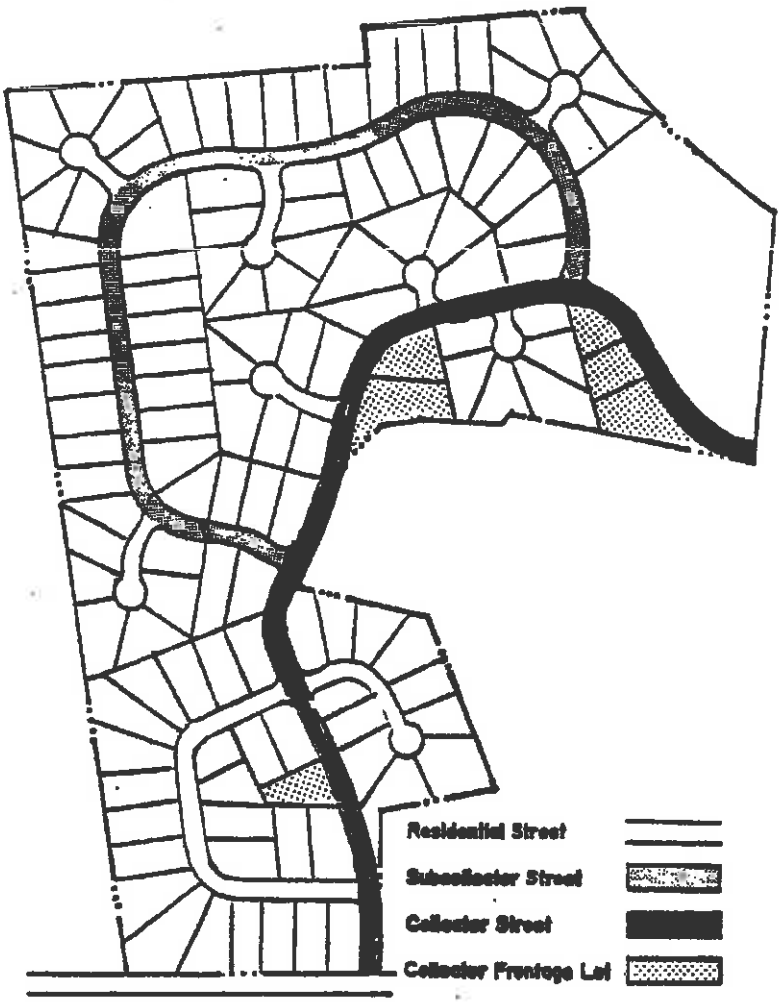
g) Maximum grade within 50 feet of intersection: 4%

h) Vertical curves where the algebraic difference in grades exceeds 1.5%.

i) When streets under this classification are located along section lines at grades exceeding 7%, the trafficway, which includes shoulders, will be 28 feet wide.

SAMPLE LAYOUT

It is important to maximize the proportion of the dwellings which front upon residential and subcollector streets. Few, if any, dwellings should front upon a collector street.



A07 ALLEYS

A07.1 GENERAL. Alleys are permitted provided ordinance conforming lot frontage is provided on an approved street.

A08 MOUNTAIN ACCESS

A08.1 DESCRIPTION. In areas where terrain dictates grades in excess of 10%, grades up to 15% may be approved by the Platting Board provided it finds:

a) Public Safety is not impaired.

b) Increased maintenance costs are not unduly excessive.

c) Drainage and erosion control measures are adequately provided.

d) School bus access is considered as school bus routes require all grades less than 10%.

e) Average terrain of access is over 25%.

A08.2 ENGINEERING CRITERIA.

a) Minimum ditch grade: 1%

b) Maximum centerline grade: Up to 15% with no more than 200' of over 10% with 100' of 10% or less for runout between steeper sections. Maximum grade in a horizontal curve is 10%.

c) Maximum grade within 50 feet of "T" intersection: 6% and through intersection: 9%

d) Switch backs will be allowed provided residential subcollector cul-de-sac criteria is met or turning radius is 40 ft at centerline with a 2% grade

e) Where grades exceed 7% the total roadway width (including shoulders) shall be 24 feet wide for safety purposes.

A09 ACCESS ROADS

A09.1 PIONEER ACCESS FOR WAIVER PARCELS AND RESIDENTIAL SUBDIVISIONS. The purpose of this classification is to establish a minimum requirement for any road providing access to proposed waiver subdivisions. This road, whether it is proposed or existing, shall have a minimum surface width of 18 feet, and a 12" gravel subgrade. Additional gravel thickness may be required to provide a stable road surface. Cross drainage culverts, minimum 24" diameter, will be installed where determined necessary and adequate ditches will be provided for drainage. The Public Works Department may require the upgrading of Access Roads where grades exceed 7% in the interest of public safety.

A10 FRONTAGE STREETS

A10.1 CLASSIFICATION AND DESIGN. Frontage streets are required as an alternative to allowing access to or from lots along existing or proposed collectors or higher classification streets. Frontage streets shall be classified and designed to conform with the design standards and service restrictions of either residential streets or residential subcollector streets as anticipated average daily traffic may dictate.

A10.2 INTERSECTION SPACING. The minimum distance between intersections of the frontage street with residential collectors shall be 300 feet and with higher classification streets shall be determined by the Public Works Department and approved by the Platting Board based upon the traffic characteristics of the higher classification street.

A10.3 DISTANCE BETWEEN TRAFFICWAY. A minimum distance of 30 feet shall be provided between the frontage street shoulder the higher classification street shoulder. This area may be used to provide a visual screen between the roadways by landscaping and/or use of a berm.

A11 STUB STREETS

A11.1 RESIDENTIAL AND RESIDENTIAL SUBCOLLECTOR STUB STREETS. Residential and residential subcollector stub streets may be permitted within subsections of phased development for which the proposed street extension

in its entirety has been included as part of an approved preliminary plat or master plan.

A11.2 RESIDENTIAL COLLECTOR STUB STREETS. Residential Collector stub streets may be required by the Public Works Department provided that the future extension of the street is deemed desirable by the Public Works Department or would conform to the adopted Official Streets and Highway Plan Map in the Transportation element of the Comprehensive Plan.

A11.3 TEMPORARY TURNAROUNDS. All stub streets requiring construction will be provided with a constructed turnaround with an outside diameter of 80 feet. No turnaround construction is required if the stub street is less than 200 feet long and provides access to two or fewer lots, a turnaround easement may be required. See A16.1(2)(4) for signage requirements. A 100 foot diameter temporary easement will be provided at the turnaround which will automatically terminate upon extension of the street.

A11.4 STUB STREET CONSTRUCTION. No construction is required if physical access is provided to all lots by adjoining streets.

A12 HALF STREETS

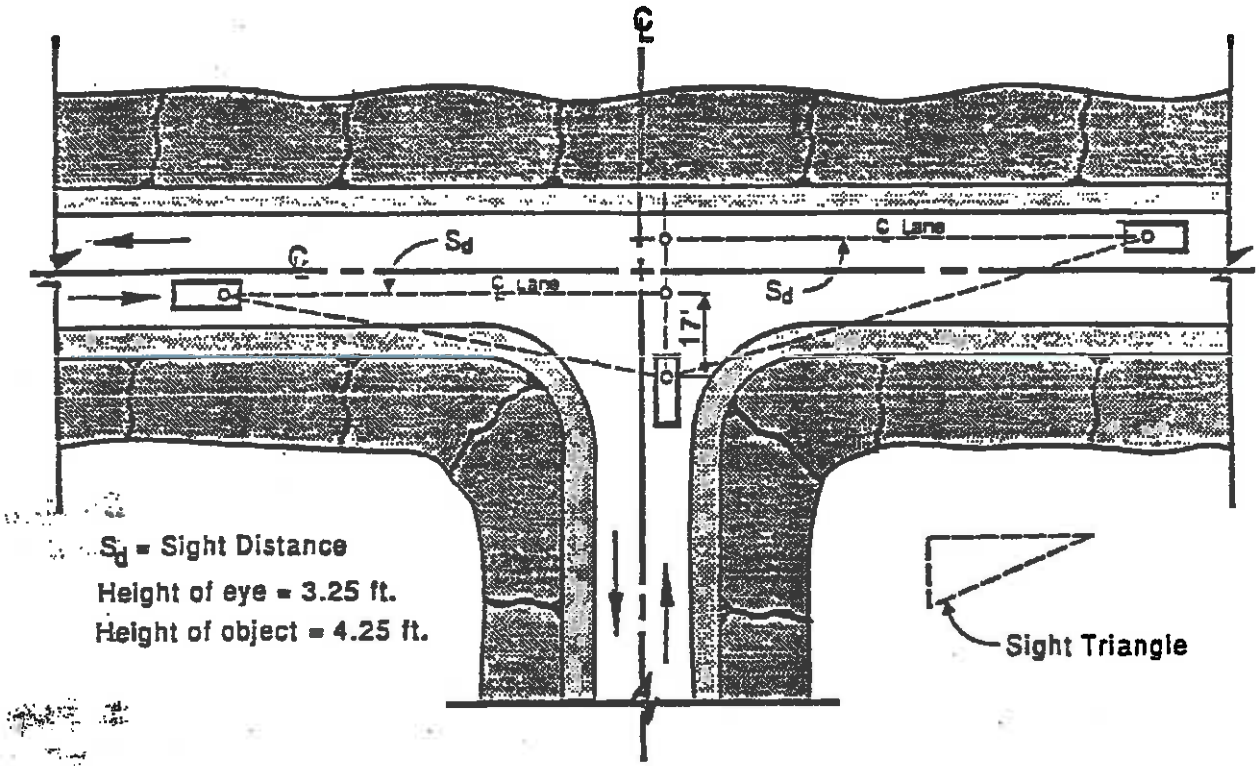
Half width trafficways are prohibited. The full trafficway width for all street classifications will always be provided.

A13 INTERSECTIONS

A13.1 CORNER SIGHT DISTANCE.

a) Whenever a proposed street intersects an existing or proposed street of higher order the street of lower order shall be made a stop street. Both intersecting streets shall be designed to provide a minimum corner sight distance as specified in the accompanying chart:

MINIMUM INTERSECTION SIGHT DISTANCE



Design Speed or Posted Speed Limit	Sd Desireable	Sd Minimum
25 mph	370 feet	150 feet
30	450	200
35	580	250
40	750	325
45	950	400
50	1180	475
55	1450	550
60	1750	650
65	2100	725

b) The entire area of the sight triangle, shall be designed to provide an unobstructed view from point B to all points 4.25 feet above the roadway along the lane centerlines from point A to point D.

A13.2 TRAFFICWAY CORNER. A corner radius shall be determined according to the classifications specified below:

Residential and access streets:	20 feet
Residential subcollector:	25 feet
Residential collector:	30 feet
Higher order streets:	40 feet

A13.3 INTERSECTION SPACING.

a) Four way intersections shall be minimized.

b) Minimum spacing between intersections shall be:

(1) 150 feet centerline to centerline/on residential subcollectors or lower, or

(2) 330' on residential collector or higher class of road.

A13.4 MINIMUM INTERSECTION ANGLE. Streets should intersect at an angle as close to 90° as possible for a minimum of 100 feet from the intersection centerline, but in no event at an angle less than 70°.

A14 RIGHTS-OF-WAY

A14.1 RIGHTS-OF-WAY. Minimum rights-of-way shall be provided as follows:

Residential Street	50 feet
Residential Subcollector	60
Residential Collector	60
Special Purpose streets:	
Frontage Street[1]	50 or 60
Mountain Access	60
Pioneer Access	50
Alleys	20

[1]Depending upon design requirements of Sections A04 and A05.

A14.2 INCREASE IN RIGHT-OF-WAY WIDTH.

a) If proposed lots are large enough for further subdivision or the road provides access to unsubdivided parcels, which, if subdivided, may change the street classification in the future to a higher class of street, the Public Works Department may recommend to the Platting Board that the right-of-way width for a higher classification street be provided.

b) If terrain dictates, right-of-way widths in excess of the minimum established in Section A14.1 may be required to contain all cut and fill slopes plus at least 5 feet outside the cut or fill catches.

A15 DRIVEWAYS

A15.1 DRIVEWAYS TO SINGLE-FAMILY LOTS.

a) Driveways shall be located not less than 40 feet from the tangent point of the radius return of any intersection. Driveways to corner lots shall gain access from the street of lower classification when a corner lot is bounded by streets of two different classification.

b) The standards which shall apply to the driveway apron at the edge of the trafficway are: Minimum curb cut or driveway width at the trafficway edge shall be 10 feet with 6 foot radius which equals 22 feet total.

c) Driveways are not usually required to be constructed within the rights of way at time of road construction. However, if a developer chooses to construct driveways, driveway permits are required, a sample copy is attached in Appendix A.

A15.2 SHARED RESIDENTIAL DRIVEWAYS FOR MULTI-FAMILY DEVELOPMENT.

a) All entrance drives serving 4 or fewer dwelling units may be designed to single family driveway standards above.

b) All entrance drives serving more than 4 dwelling units, but which may be expected to convey less than 200 ADT, shall be laid out to conform to the design, service, and access standards for residential streets.

c) All entrance drives which may be expected to convey greater than 200 ADT, but less than 1000 ADT, shall be laid out to conform to the minimum design, service, and access standards for residential subcollector streets.

d) All entrance drives which may be expected to convey greater than 1000 ADT shall be laid out to conform to the minimum design, service, and access standards for residential collector streets.

e) Driveways shall not drain onto the roadway and should not exceed 4% grade within 50 foot of the road shoulder.

A16 SIGNAGE

A16.1 SIGNS. Signs will be designed and placed in conformance with the Manual of Uniform Traffic Control Devices (MUTCD) with the Alaska Supplement (latest edition) also referred to as the Alaska Traffic Manual.

a) Subdivision roads will be identified and street signs will be installed by the subdivider.

(1) Each road within a subdivision will be identified and signed at its point of egress and ingress. Cul-de-sac roads will be signed and identified at their point of ingress according to Alaska Manual on Uniform Traffic Control Devices.

(2) Stop signs will be provided at designated intersections within the confines of the subdivision and at the intersection to the access road, if applicable.

(3) If a constructed stub street provides access to two or fewer lots and has no turnarounds a sign indicating a dead-end street shall be posted.

(4) If a dedicated stub street is not constructed, no signs are required.

b) All sign support columns will be of perforated metal construction 2 1/2 inches square. The size, construction and location will conform to the State of Alaska

MUTCD. Contact Matanuska-Susitna Borough, Public Works Department for details.

A17 TRIP GENERATION RATES. Streets will be designed for specific traffic volumes. The following formula can be used for residential land use traffic determination to determing average daily trips (ADT):

ADT = Number of dwelling units (potential) x 6 for single-family residential use.

A18 "T" TURNAROUNDS. The trafficway is to be at least 22 feet wide with 30 foot radius. "T" turnarounds are only allowed on Residential Streets. The length of the "T" portion will be at least 100 feet.

A19 DEFINITIONS

A19.1 AVERAGE DAILY TRAFFIC (ADT). Average Daily Traffic is the total volume during a given time period (in whole days greater than one day and less than one year) divided by the number of days in that time period. For new residential streets and driveways, the expected ADT is determined by using the Trip Generation Rates found in Section A17.

A19.2 DRIVEWAY. A private minor vehicular access way between a street and a parking area within a lot or property.

A19.3 STREET. A public thoroughfare used, or intended to be used, for passage or travel by motor vehicles. Streets are further classified according to their intended or actual function or use.

SECTION B

NONRESIDENTIAL ROAD DESIGN

B01.1 PURPOSE. This section provides a guideline for the design and construction of non-residential roads, arterials and highways within the Matanuska-Susitna Borough. Design and construction standards that apply to these classes of roadways are found in the following publications:

a) "A policy on Geometric Design of Highways and Streets", by AASHTO (current edition).

b) "Alaska Department of Transportation and Public Facilities, Standard Specifications for Highway Construction, 1988"; with Matanuska-Susitna Borough modifications.

c) "Matanuska-Susitna Borough Construction Manual" dated 3/3/86

d) "State of Alaska Highway Preconstruction Manual, Part IV" (latest revision)

B02 RIGHT OF WAY AND SURFACE WIDTHS

Classification	Min. R-O-W	Pavement Width	Shoulders Width
Arterial	100 ft.	24 ft.	4 ft.

B03 FUTURE CORRIDORS. Streets that are located along routes proposed for future upgrade as designated in the Comprehensive Development Plan: Transportation shall have rights of ways established up to a maximum of 100 feet in width plus slope easements. Additional widths as designated in the Comprehensive Development Plan: Transportation shall be reserved by building setbacks which will prohibit the location of any permanent structure within the setback area. The area within the setback shall be excluded from any minimum useable area calculations. These areas shall be labeled on the Final Plat as "Proposed Road Corridor."

SECTION C

CONSTRUCTION REQUIREMENTS

C01 GENERAL. This section establishes minimum construction requirements to be followed by the developer.

C01.1 CLEARING AND GRUBBING. The area within the Rights of Way, slope easements and utility easements is to be cleared and grubbed at the time of road construction. Debris is to be disposed of in an area designated by the developer, or his engineer, outside of all rights of way and utility easements. Slit trenches may be utilized for disposal within the utility easement if 4 feet of top soil or other non deleterious material is provided for cover and approval obtained from the Public Works Department. Slit trenches must not be within the road prism or within a 2:1 extension of the road prism. Organic material within the slit trench must be walked down with heavy equipment. Finished surface of a slit trench must be no lower than 2-1/2 feet below original grade and have positive drainage. Slit trench design and locations must be approved by Public Works Department prior to construction.

C01.2 ROAD CONSTRUCTION. Top soil is to be removed and disposed of as appropriate where overlay embankment is not proposed. Slit trenches may be utilized for top soil disposal provided the location is outside of the ditch line for residential streets and residential subcollectors. Slit trenches along residential collectors are to be located greater than five feet from the ditch line. The top 24 inches of the road surface is to meet NFS criteria (ADOT) with the upper 6 inches being a gravel having no material larger than 3 inches in its largest diameter. Binder between 5% and 15% passing 200 is required in upper 6 inches. The entire road prism is to be compacted to at least 90%. The finish surface to a depth of 12" is to be compacted to 95%. The use of a grid or sheeps foot compactor is highly recommended but not required. All loose material exceeding 6 inches in size is to be removed from the right of way especially along the ditches and foreslopes.

C01.3 LOW AREA. In areas that show peat or other types of wet material, a minimum of 24 inches of material meeting NFS criteria is to be utilized. The final grade is to be a minimum of 12 inches above the surrounding ground and embanked to a depth that will produce a stable surface.

C01.4 WINTER CONSTRUCTION. Winter construction may be allowed. The Public Works Department will not accept any roads until all ground has thawed and any settlement areas corrected. Generally no road inspections will be performed by the Public Works Department from October 15 to May 1.

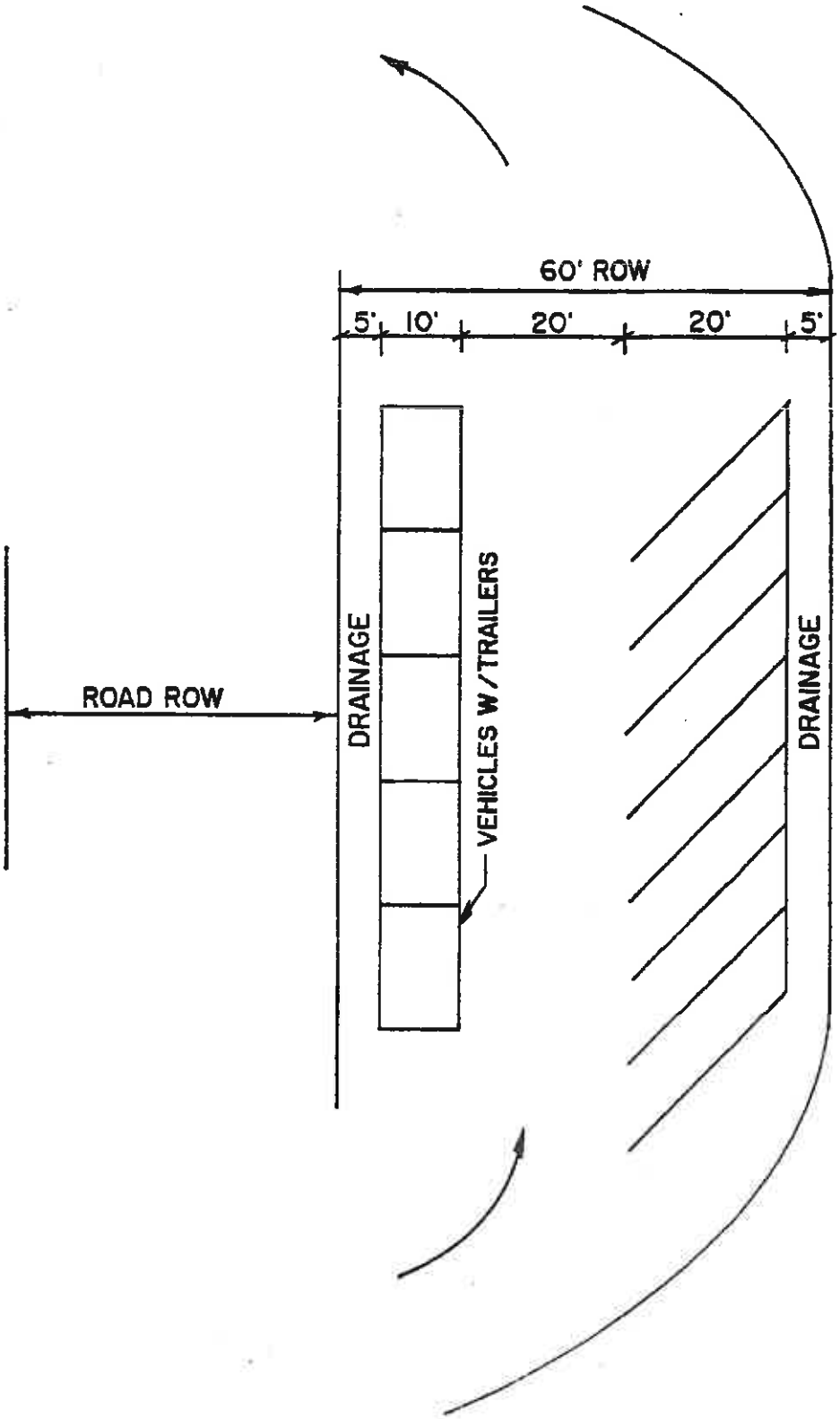
C01.5 ADDITIONAL APPROVAL. Alternate road construction criteria, except for road widths, may be submitted by the developer, or his surveyor or engineer that will more appropriately fit the conditions of the specific road locations, following general engineering practices. Final acceptance of such plans must be approved by the Public Works Department and Platting Board.

C02 TRAIL HEAD. For access to subdivision without a constructed road. (see drawing)

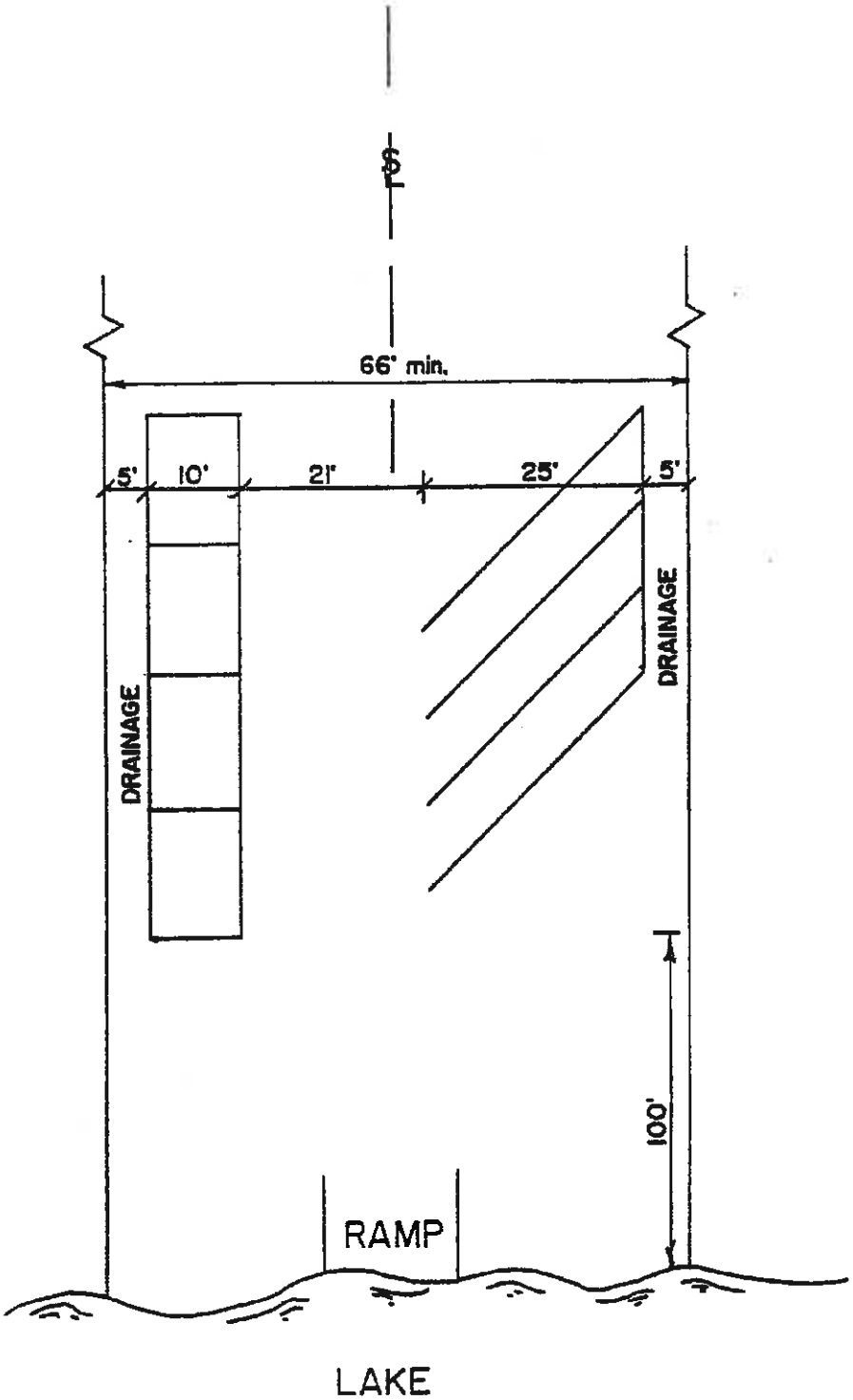
C03 LAKE ACCESS. Easement or other public access to lakes. (see drawing)

C02.0 TRAIL HEAD PARKING

EXAMPLE



C03.0 LAKE ACCESS PARKING
EXAMPLE



SECTION D

DRAINAGE REQUIREMENTS

D01 GENERAL. A topographic map of the proposed subdivision is to be submitted with the preliminary plat showing the following:

a) 5 foot contour interval

b) Drainage swales

c) Proposed drainage routing with necessary drainage easements to show positive drainage. Any drainage changes that may affect adjacent property.

d) Culvert sizing calculations for any actively flowing streams that exceed the culvert size 24" for a 10 year storm may be identified only at this submittal. Calculations are to be submitted with construction plans.

D02 DRAINAGE DITCHES. The depth of ditches along the two lowest classifications of streets (residential street and residential subcollector) may be reduced to one foot provided the following conditions exist:

a) Drainage is demonstrated to be contained within ditches.

b) Adequate drainage routes are provided and constructed within designated drainage easements.

c) The ditch line to be established 5 feet from the edge of trafficway shoulder.

d) Driveways to be swaled below trafficway shoulder to provide longitudinal drainage.

e) Ditches to be deepened to provide drainage through culverts 24" min. crossing streets.

f) The minimum culvert for a driveway is to be 18" in diameter, if used.

g) Snow storage at least equal to regular ditches is provided.

DO3 FISH PASSAGE CULVERTS

a. If a stream reach is determined to harbor fish, as determined by the Alaska Department of Fish and Game, then stream crossing structures shall be designed, constructed, and maintained so as to maintain the full hydrologic functioning of the water body they are crossing.

b. All stream crossing structures shall be designed using stream simulation methodologies. Stream simulation means that the crossing structure is designed using reference data from a representative section (reference reach) of the specific water body being crossed. Stream simulation is a crossing design technique that attempts to replicate the natural stream channel conditions found upstream and downstream of the crossing. Sediment transport, flood and debris conveyance, and fish passage are designed to function as they do in the natural channel.

c. Reference data shall include, at a minimum; channel width at the Ordinary High Water Mark (OHWM), cross-sectional area, gradient, substrate, and ability to pass floating debris.

d. Under normal flow conditions, the channel within and/under the crossing structure shall not differ from the reference reach condition in regards to the channel width at OHWM, cross-sectional area, gradient, substrate, and ability to pass floating debris.

e. Substrate material within/under the crossing structure shall remain dynamically stable at all flood discharges up to and including a fifty-year flood. For culverted crossings, this may require the placement of oversized material that can resist the predicted critical shear forces or the use of substrate retention baffles that allow bed load to continuously recruit within the culvert barrel.

f. The width of crossing structures shall not be less than one hundred and twenty percent (120%) of the channel width at the OHWM or use 1.0 times the bankfull width, whichever is greater.

g. Crossing structures shall be placed within/over the pre-existing channel alignment. Road alignment shall be as close to perpendicular to the channel as possible.

h. Crossing structures shall maintain the connectivity of wetlands adjacent to stream channels and shall accommodate sheet flow within such wetlands.

i. Crossing structures shall not interfere with the functioning of floodplains and shall be designed to accommodate at least the 100-year flood flow. If the crossing structure is not designed to accommodate the one hundred-year flow, a route must be established to safely convey flows exceeding the design flow without causing damage to property, endangering human life or public health, or causing significant environmental damage.

j. Design Standards

1. Culverted stream crossings shall be composed of a single oversize pipe or arch a minimum of one hundred and twenty percent (120%) of the channel width measured at the OHWM or use 1.0 times the bankfull width, whichever is greater.

2. Matanuska-Susitna Borough (MSB) *Bridge Criteria Manual* shall be used for design and construction of all new bridges, including buried structures such as culverts, in MSB public property and subdivision streets.

3. Culverts shall have a minimum diameter of three feet (3').

4. The use of multiple-pipe culvert batteries is discouraged. The use of trash racks or debris interceptors is prohibited.

5. Culvert pipes and arches shall be constructed of metal. The use of smooth wall culverts is prohibited except where the pre-development stream channel gradient is less than one-half percent (<0.5%).

6. Round culvert pipes shall have a minimum invert burial depth of forty percent (40%) of the culvert diameter into the substrate. Arch culvert pipes (i.e. "squash" pipes), shall have a minimum invert burial depth of twenty percent (20%) of the culvert's rise into the substrate, unless scour analysis shows less fill is acceptable. The minimum depth is 1 foot.

7. Substrate material within the culvert barrel shall incorporate a low flow channel.

8. If substrate retention baffles are used, they shall have a maximum weir height of one half (0.5) of the culvert invert burial depth (i.e. 20% of diameter for round pipes and 10% of rise for arch pipes). Substrate retention baffles shall be spaced so that the maximum drop between weirs is four inches (4"). The use of baffles without substrate is not allowed.

9. Culverts shall be aligned in a direction as nearly parallel to the pre-existing direction of water flow as possible.

10. Culvert outlet aprons and inlet protection shall be used as necessary to reduce the risk of scour and perching. If needed, culvert outlet aprons should extend approximately three (3) channel widths downstream from the culvert outlet, and shall be modeled to ensure fish passage if fish are present.

11. Hydraulically designed culverts are acceptable, in creeks without fish present, or in cases approved by the Borough engineer.

DO4 HYDRAULIC METHODS

a. The hydraulic method uses the swimming capability and migration timing of target design species and sizes of fish to create favorable hydraulic conditions throughout the culvert crossing. Information on this methodology is available at Alaska Fish and Game Sport Fish division (http://www.sf.adfg.state.ak.us/SARR/fishpassage /fishpass.cfm), the Federal Highway Administration (http://www.fhwa.dot.gov) and the USDA Forest Service Stream Systems Technology Center (http://www.stream.fs.fed.us/fishxing/).

b. The design fish shall be a 55 mm (2.16 in.) juvenile coho salmon for anadromous streams and a 55 mm (2.16 in) Dolly Varden char for nonanadromous streams. These criteria may change based on ongoing research by federal and state agencies.

c. Fish passage high flow design discharge will not exceed the 5% annual exceedance flow or 0.4 times the 2-year peak flow, whichever is lower and has the most supporting hydrologic data.

d. Fish passage low flow design discharge shall ensure a minimum 6-inch water depth or natural low flow and depth within the reach the crossing occurs. In cases where local conditions preclude natural low flow characteristics, backwatering or in-culvert structures shall be considered.

e. In cases where flared end sections with aprons are necessary and fish passage is required, water depths and velocities that satisfy fish passage criteria must be demonstrated across the apron in addition to within the culvert.

f. Fish passage criteria for all culvert design options must be satisfied 90 percent of the time during the migration season for the design species and age class pursuant to Alaska Statute 41.14.840. Tidally-influenced streams may sometimes be impassable due to insufficient depth at low flow and low tide. If the tidal area immediately downstream of a culvert is impassable for fish at low tide, the 5-percent exceedance criterion shall apply only to the time during which fish can swim to the culvert. Tidally-influenced fish passage structures shall satisfy Alaska Statute 41.14.840 for an average of at least 90% of the tidal cycles, excluding periods when the stream channel is not accessible to fish because of natural conditions at low tide.

SECTION E

DEVELOPMENT IMPLEMENTATION

E01 GENERAL. This section describes the procedure that the developer or his surveyor or engineer is to follow to construct any improvements required for filing a subdivision plat.

E01.1 PRELIMINARY PLAT SUBMITTAL. The preliminary plat submittal is to be accompanied by a topographic map (per Section D Drainage). Centerline profiles to be provided if grades exceed 6% and/or cut/fills exceed 5 feet at the ditch line.

E01.2 CONSTRUCTION PLANS. Plans that clearly depict all improvements shall be at a scale of 100 feet per inch or larger if more detail is needed. Cost estimate is to be included. The Public Works Department will not approve the construction plans but will issue a letter of acceptance for construction when all review comments are satisfied.

E01.3 PRECONSTRUCTION CONFERENCE. When the developer, or his surveyor or engineer, has a letter of acceptance for construction or is notified that the Chief of Platting is ready to issue a Notice to Proceed and the developer has selected his contractor, he is to request scheduling of a preconstruction conference with the Platting Division. Public Works Department Engineering staff will be present to discuss scheduling, and method of construction. The developer will designate which inspection fee he chooses to utilize. The Notice to Proceed will be issued at this conference or within two working days.

E01.4 INTERIM INSPECTIONS. Periodic interim inspections may be conducted on all projects whether or not construction plans have been required by the Public Works Department.

Interim inspections may also be made at the request of the developer or his engineer.

E01.5 FINAL INSPECTION. When the developer, or his surveyor or engineer, submits in writing, to Platting Division, that the improvements have been constructed according to the borough standards or according to the accepted

construction plans, the Public Works Department staff will conduct a Final Inspection. If a "punch list" is issued by the Public Works Department, a final acceptance of the improvements will be issued upon completion of the "punch list." All work is to be guaranteed for one year after final acceptance. Accepted roads within road service areas may be certified for maintenance the following calendar year. During the one year warranty period the developer is responsible for any road maintenance. Pioneer Access and Mountain Standard Roads may not be accepted for maintenance by the road service areas, even though they may meet the design standards.

SECTION F

SUBDIVISION AGREEMENT

F01 GENERAL. Subdivision agreements are available for use by the developer as referenced in the Platting Regulations.

F01.1 CONFERENCE. A conference will be conducted upon the developer's request to determine procedure for utilizing the Subdivision Agreement.

F01.2 LIMITATIONS. The Notice to Proceed (NTP) will be issued after the Subdivision Agreement has been approved.

SECTION G

COMMERCIAL AND INDUSTRIAL SUBDIVISIONS

G01. GENERAL. The use of the land will be identified by the developer, or his surveyor or engineer along with the appropriate industrial and commercial traffic rates per the American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets" (current edition) or an approved equal. Trafficway widths will be established as the potential traffic rates relate to the roadway classifications and criteria in Sections A & B. Parking will also require consideration in establishing widths unless off street parking is to be provided. Residential collector streets will be the lowest classification permitted.

SECTION H

INSPECTION FEES

H01. FEES. Inspection fees are to be as follows:

H01.1 1% FEE. Developer's Professional Registered Engineer provides the interim inspection and issues a written statement that the improvements have been constructed according to the accepted construction plans or according to borough standards if no plans have been prepared.

H01.2 2% FEE. This fee is required for improvements not covered in H01.1 above and when a Subdivision Agreement is utilized. The Public Works Department will provide all inspections.

SECTION I

UTILITIES

I01 UTILITIES. The location of utilities in Subdivisions are to be encouraged within established rights of way wherever possible. The developer or his representative will be responsible for satisfying any conflicts that may occur in the request for easements from any utility company during the platting process. Easements are to be clear of wells, septic systems, house, decks, buildings or other structures; unless the Developer has obtained a "Non-Objection to Easement Encroachment" from the utilities. Utility easements are to be fully useable for utility installation where installation equipment can safely work. Utility easements are not to be placed in swamps, steep slopes, or other unusable areas.

I01.1 UTILITY LOCATION GUIDELINES.

a) Rural Areas:

(1) When utility facilities are placed within the road right of way:

(a) Utility facilities should generally be located as shown in the attached drawing entitled LOCATIONS FOR UTILITIES.

(b) Back slopes or foreslope which extend into a utility easement should not exceed 4:1. These limits are necessary for construction equipment for utility installation.

(c) Utility facilities paralleling the ditch line may not be placed closer than five feet from the ditch bottom.

(d) No shallow utility installation paralleling the road surface will be allowed within the road surface or shoulder areas due to road compaction and/or designated fill requirements. This restriction is not applicable to underground road crossings.

(e) Underground road crossings require compaction according to the requirements of the permit issued to the utility by the borough.

(2) When utility facilities are placed outside the road right of way:

(a) Utility easements as deemed necessary by utility companies will be required.

(b) A fifteen foot utility easement is needed outside the road right of way to allow for utility installation and maintenance.

b) Urban Area - Paved streets with curbs and/or sidewalks:

Utilities installed in urban areas shall meet the requirements of the City, or if not in a City, shall be by an approved engineered design.

c) Separation of Utilities:

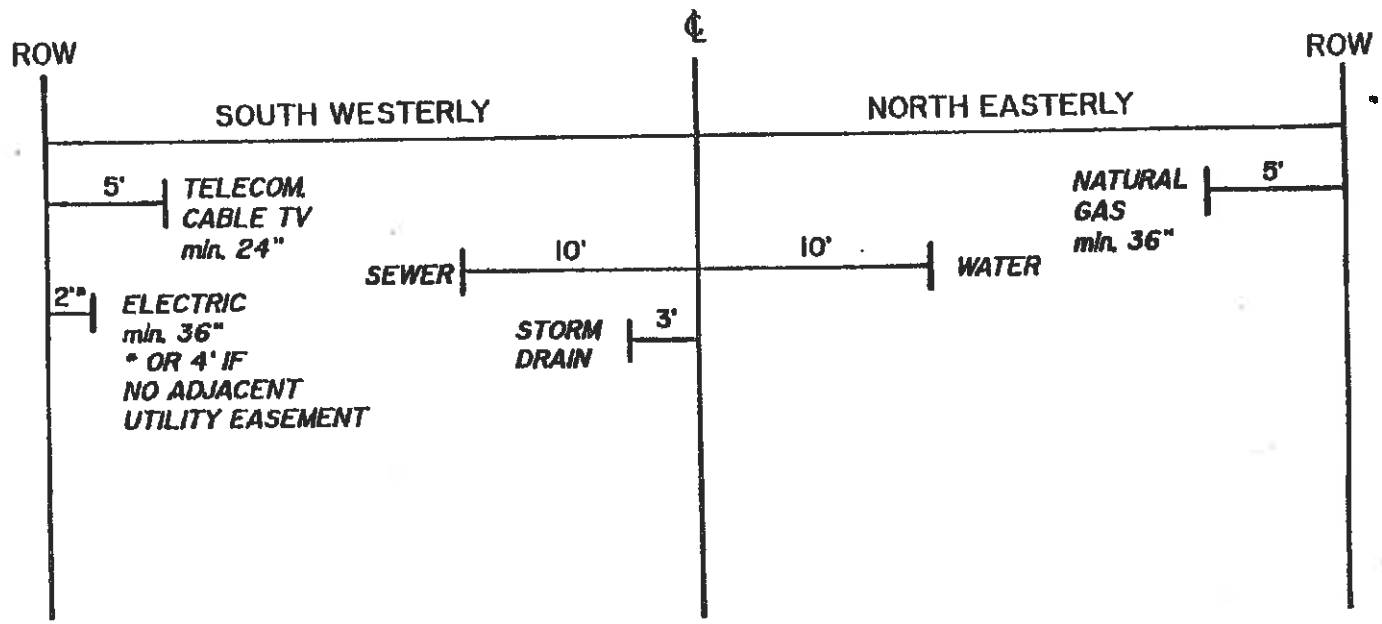
(1) Overhead - Recommend five (5) feet distance horizontally (power pole from underground cable).

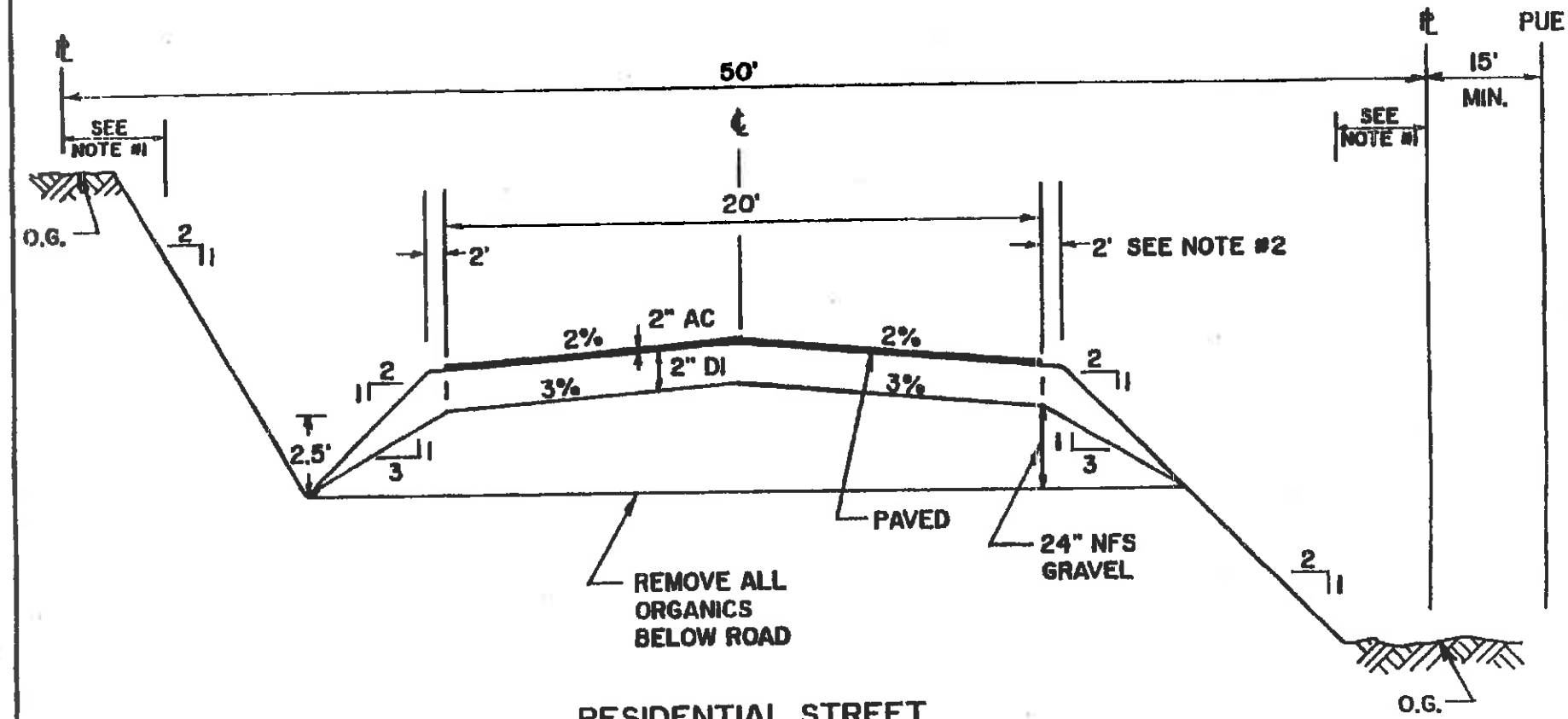
(2) Underground - Recommend minimum one (1) foot separation horizontally between telephone, TV and electric utilities when all are underground.

(3) Depth of burial - Electric depth of burial is (36) inches except deeper where driveways are planned, etc. TV and telephone burial is (24) inches except 48 inches on crossings.

Appendix "A"

LOCATIONS FOR UTILITIES

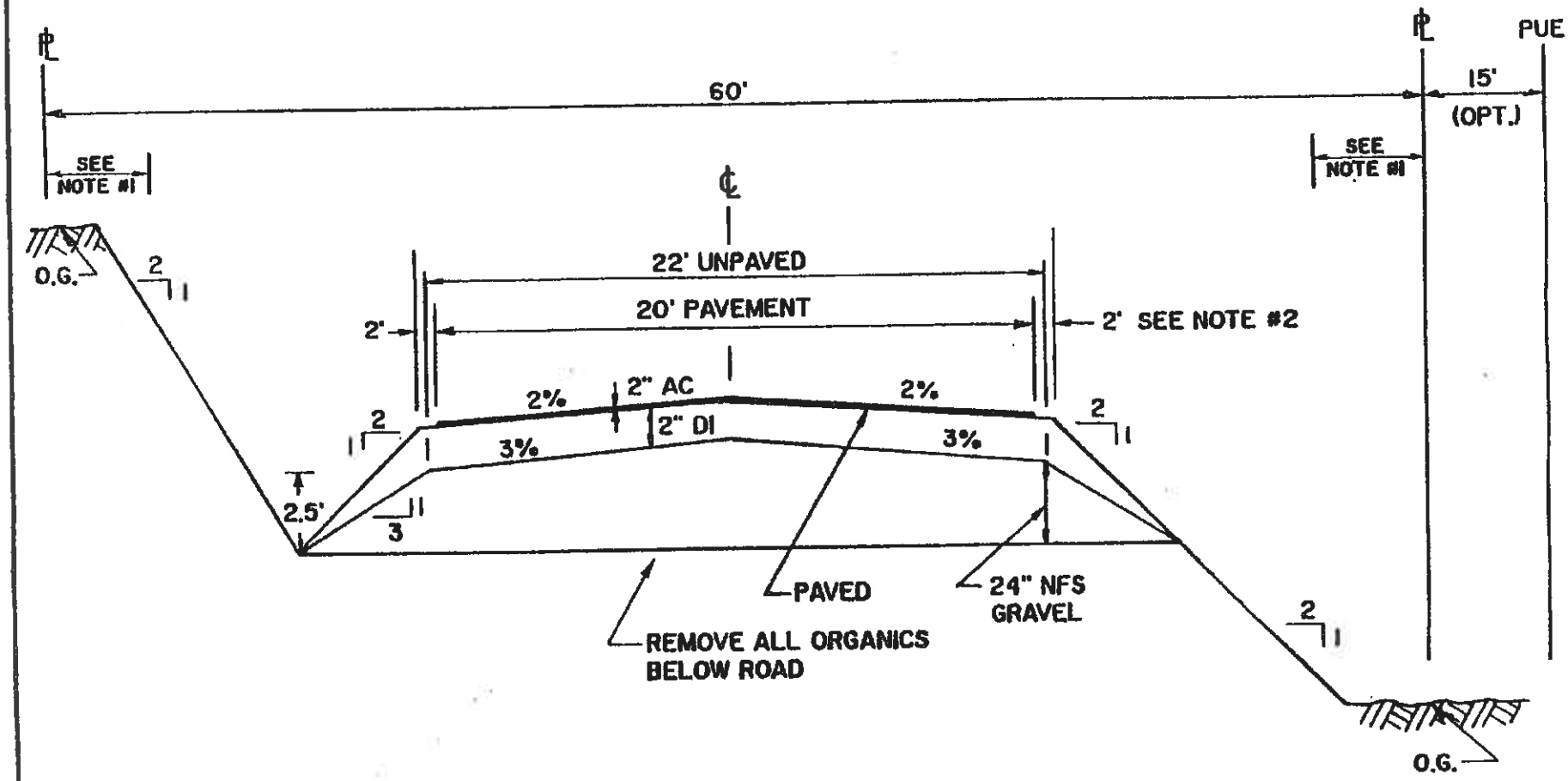




RESIDENTIAL STREET
NTS

NOTES: #1. ROW OR SLOPE EASEMENT TO CONTAIN ALL CONSTRUCTION +5'.
#2. 2' SHOULDERS ONLY FOR PAVED ROADS.
#3. SLOPES SHOWN ARE THE STEEPEST ALLOWED.

MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT
APRIL 15, 1991

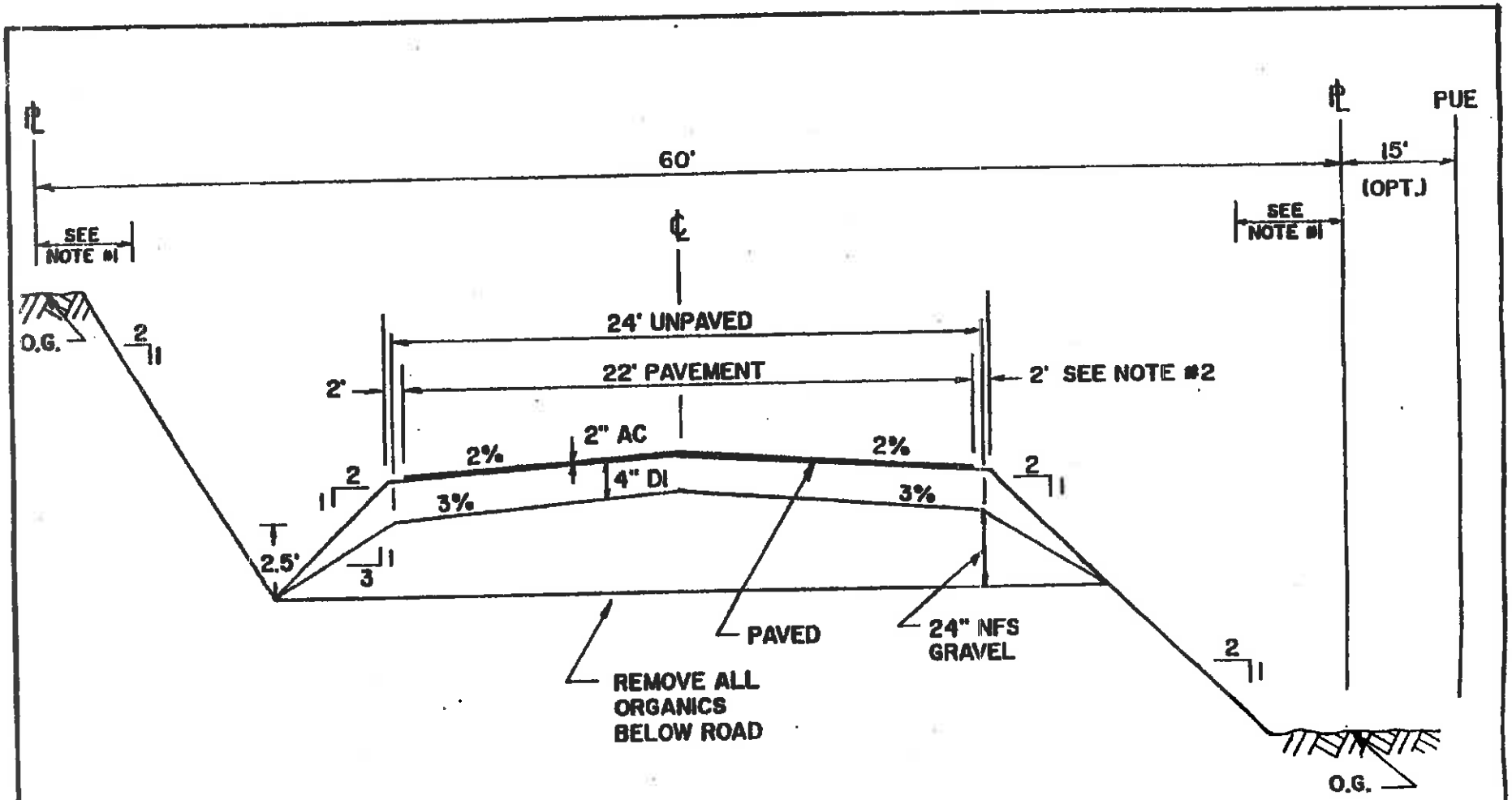


RESIDENTIAL SUBCOLLECTOR

NTS

NOTES: #1. ROW OR SLOPE EASEMENT TO CONTAIN ALL CONSTRUCTION +5'.
#2. 2' SHOULDERS ONLY FOR PAVED ROADS.

MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT
APRIL 15, 1991

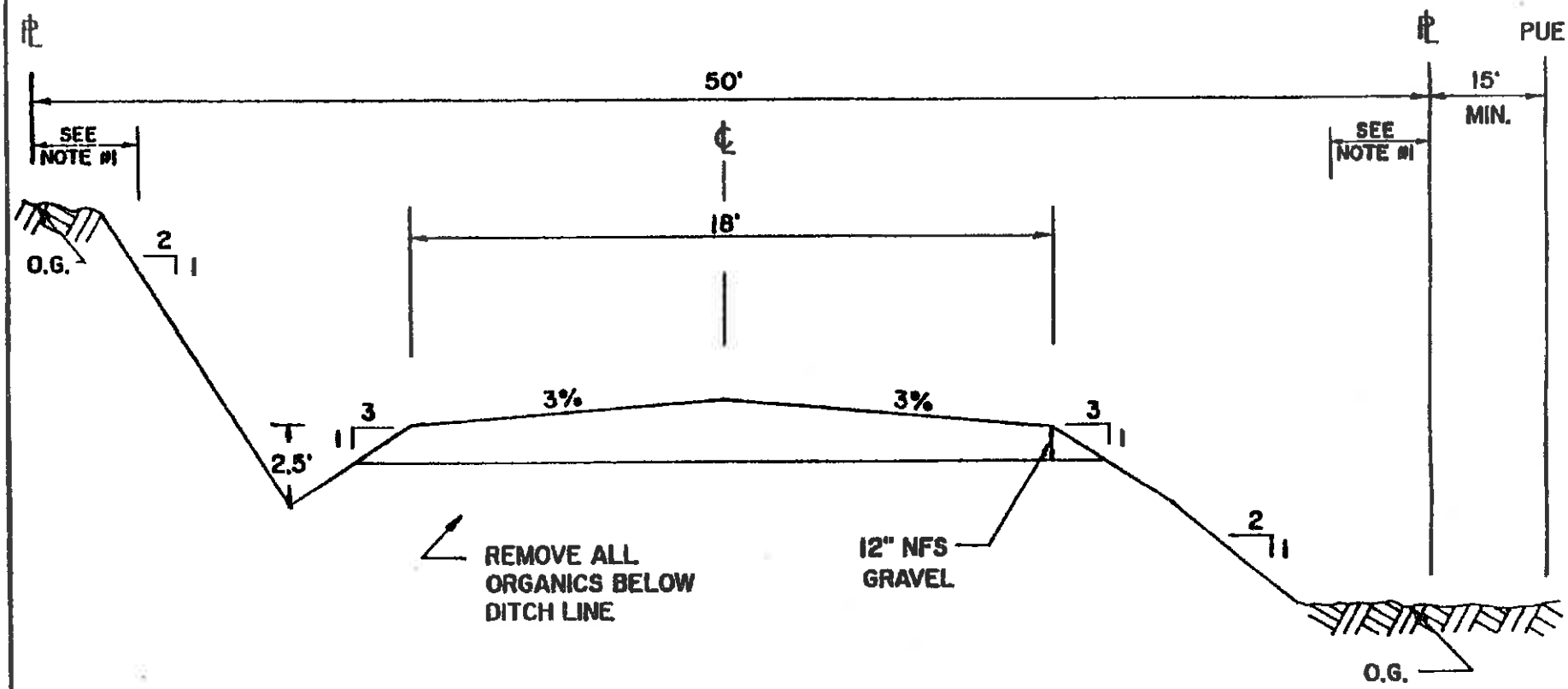


RESIDENTIAL COLLECTOR

NTS

NOTES: #1. ROW OR SLOPE EASEMENT TO CONTAIN ALL CONSTRUCTION +5'.
#2. 2' SHOULDERS ONLY FOR PAVED ROADS.

MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT
APRIL 15, 1991

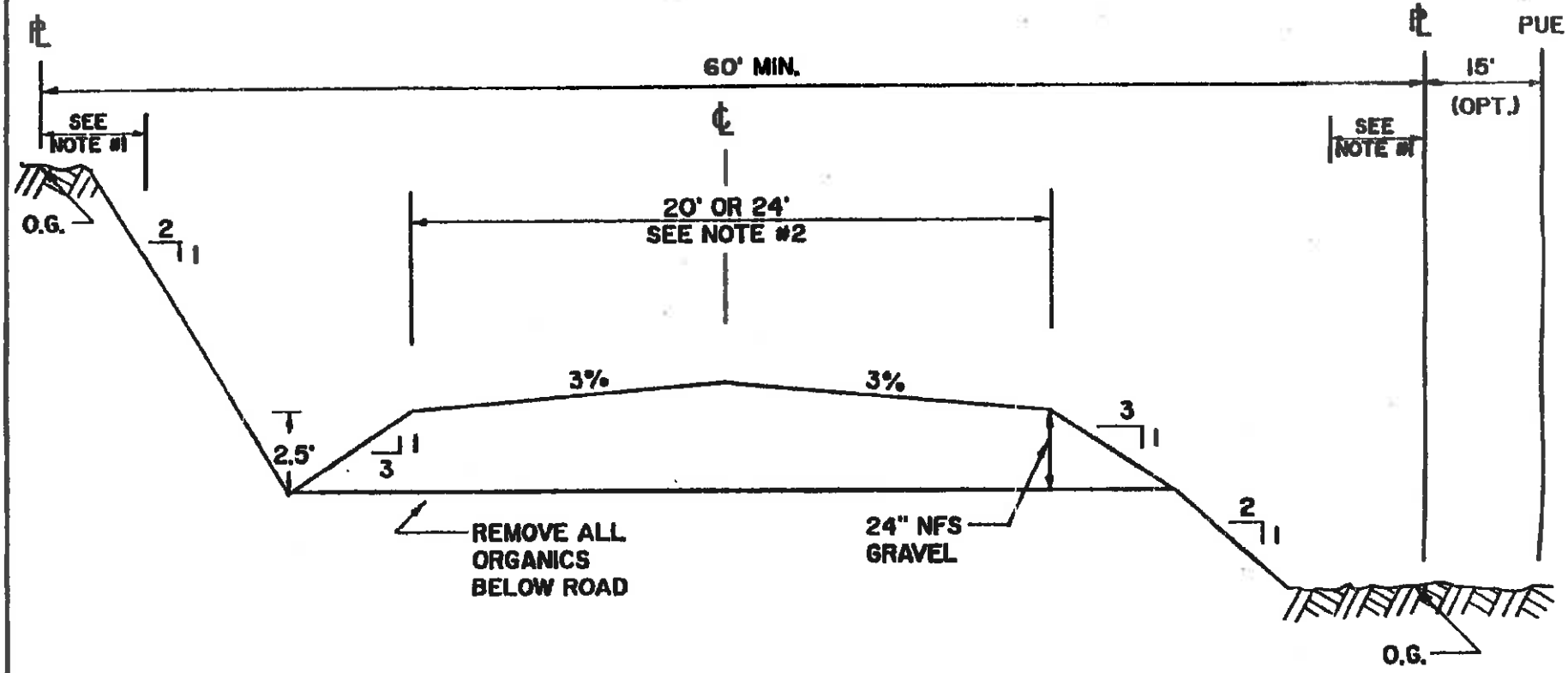


PIONEER ACCESS

NTS

NOTES: #1. ROW OR SLOPE EASEMENT TO CONTAIN ALL CONSTRUCTION +5'.
#2. MORE THAN 12" NFS GRAVEL MAY BE NEEDED FOR STABLE ROAD, DEPENDING ON SUBBASE.

MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT
APRIL 15, 1991



MOUNTAIN ACCESS

NTS

NOTES: #1. ROW OR SLOPE EASEMENT TO CONTAIN ALL CONSTRUCTION +5'.

#2. 20' WIDE < 7% ℄ GRADE
24' WIDE > 7% ℄ GRADE

MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT
APRIL 15, 1991

MATANUSKA–SUSITNA BOROUGH
ENGINEERING DEPARTMENT

APPLICATION & PERMIT TO CONSTRUCT & MAINTAIN DRIVEWAY ON PUBLIC RIGHT OF WAY

Permittee's Name: _____

Address: _____

_____ Phone: _____

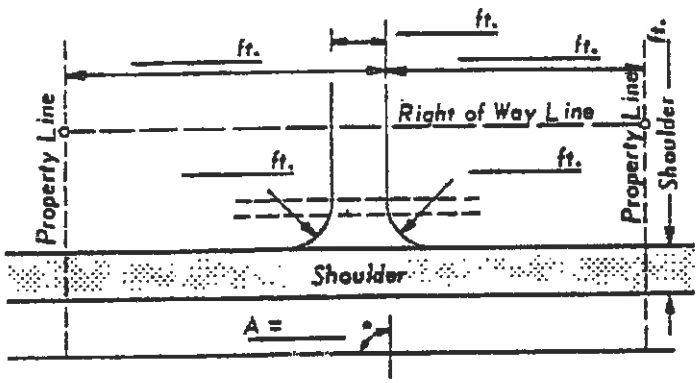
LOCATION: RSA # _____ PERMIT NO. : _____

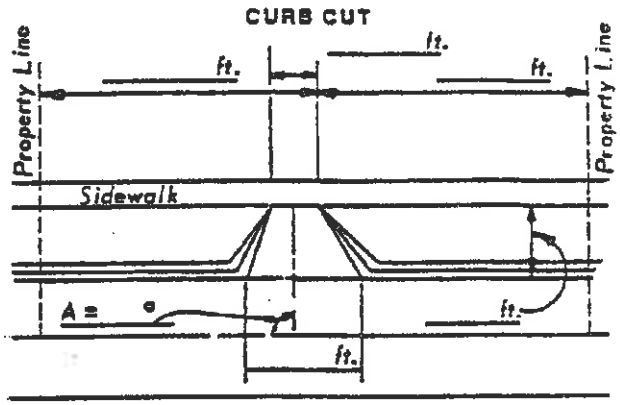
_____

_____

_____

Work to be completed by _____ in accordance with the below sketch and/or attached plans. The permit will be void if no work is accomplished by this date. Any installation without a valid permit will be treated as an encroachment.





Show North Arrow

Pavement Type _____
Shoulder Type _____

Show North Arrow

Pavement Type _____
Width _____ ft.

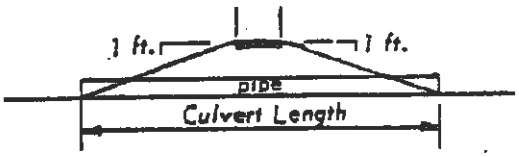
DRAINAGE

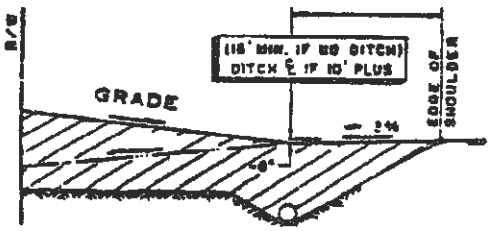
Culvert Length _____ ft.

Size (inside diameter) _____ in.

Culvert Type _____

Ditch Depth _____ ft.





The Permittee certifies that he is the (circle one) owner lessee, or authorized agent of the property, that the conditions, restrictions and regulations of the Department will be complied with and that he will maintain the driveway in accordance with the provisions on the reverse side of this permit.

SPECIAL CONDITIONS:

Date: _____

Permittee: _____

BY: _____

PERMIT GRANTED: _____
DATE

TITLE: _____

BOROUGH ASSEMBLY DOCUMENT
CONTROL & AM/IM FORM

Matanuska-Susitna Borough
350 E. Dahlia Avenue
Palmer, Alaska 99645-6488

For Agenda of: June 18, 1991 No. AM 91-173

SUBJECT: SUBDIVISION CONSTRUCTION MANUAL

ATTACHMENTS: Resolution No. 91- 048
Platting Board Resolution No. 91-002
Subdivision Construction Manual

Route to:	Dept/Committee/Individual (Please review & return to originator)	Initials	Remarks
5	Dep. Dir. of Engineering		Originator
	Planning Director		
	Assessor		
1	Public Works Director		
2	Finance Director		
3	Attorney		
4	Assistant to the Manager		
	Mayor		

SUMMARY STATEMENT:

The Subdivision Construction Manual was last revised in April, 1988. The Platting Board has been reviewing revisions to the Manual since March, 1990, and have held many public work sessions and public hearings on the scope and details of the Manual. At the June 6, 1991 Platting Board Meeting, the Manual was accepted with a unanimous vote, and no objection from the audience.

The Manual is being submitted to the Planning Commission for adoption at their June 17, 1991 meeting.

The Manual is being revised to bring the roads closer to State safety standards, and to help solve problems that have come before the Board and Staff.

RECOMMENDED ACTION: Accept the MSB-DPW Subdivision Construction Manual with the revisions shown in the June 6, 1991 draft.

APPROVED:

Donald L. Moore, Borough Manager

Page 1 of 1

Number: AM 91-173
RESO 91-048

pw/vr/am/91-173

MATANUSKA-SUSITNA BOROUGH
PLATTING BOARD

RESOLUTION SERIAL NO. 91-002

A RESOLUTION OF THE PLATTING BOARD RECOMMENDING ADOPTION OF THE REVISED SUBDIVISION CONSTRUCTION MANUAL.

WHEREAS, the subdivision construction manual was last rewritten and approved on April 21, 1988;

WHEREAS, the platting board has held several work sessions and public hearings to consider revisions and modifications to the subdivision construction manual;

WHEREAS, the subdivision construction manual needs revision to upgrade the development crieteria;

BE IT RESOLVED that the Matanuska-Susitna Borough Platting Board approves the revisions to the subdivision construction manual;

BE IT FURTHER RESOLVED that the platting board recommends that the planning commission and the assembly approve the updated subdivision construction manual.

PASSED AND APPROVED this 6th day of June 1991.

MATANUSKA-SUSITNA BOROUGH SEAL STATE OF ALASKA PLATTING BOARD

Robert L. Tucker

Robert Tucker, Chairman

ATTEST:

Marilyn McGuire

Marilyn McGuire, Platting Clerk

pw/vr/am-91-173

Am 91-173

MATANUSKA-SUSITNA BOROUGH
PLANNING COMMISSION

RESOLUTION 91-32

A RESOLUTION OF THE PLANNING COMMISSION OF THE MATANUSKA-SUSITNA BOROUGH RECOMMENDING ADOPTION OF THE REVISED SUBDIVISION CONSTRUCTION MANUAL

WHEREAS, the subdivision construction manual was last rewritten and approved on April 21, 1988; and

WHEREAS, the subdivision construction manual needs revision to upgrade the development criteria; and

WHEREAS, the platting board has held several work sessions and public hearings to consider revisions and modifications to the subdivision construction manual; and

WHEREAS, the platting board passed Resolution No. 91-002 recommending adoption of the revised subdivision construction manual on June 6, 1991.

NOW, THEREFORE, BE IT RESOLVED that the Matanuska-Susitna Borough Planning Commission approves the revisions to the subdivision construction manual; and

BE IT FURTHER RESOLVED that the planning commission recommends that the assembly approve the updated subdivision construction manual.

ADOPTED AND APPROVED by the Matanuska-Susitna Borough Planning Commission, this 17th day of June, 1991.

Carl DePriest, Chairman

ATTEST:

Linda Ketchum, Planning Clerk

PLN/ldk/RES091-32

MATANUSKA-SUSITNA BOROUGH

RESOLUTION SERIAL NO. 91-048

A RESOLUTION OF THE ASSEMBLY OF THE MATANUSKA-SUSITNA BOROUGH TO APPROVE THE REVISIONS TO THE SUBDIVISION CONSTRUCTION MANUAL.

WHEREAS, the subdivision construction manual was last rewritten and approved on April 21, 1988; and

WHEREAS, the Matanuska-Susitna Borough Platting Board has held several public work sessions and public hearings to consider revisions and modifications to the technical provisions included in the subdivision construction manual; and

WHEREAS, the subdivision construction manual needed revision to update the development criteria; and

WHEREAS, MSB Ordinance 16.05.015(C) requires that modification to the construction manual be approved by the platting board, planning commission, and assembly; and

WHEREAS, the Matanuska-Susitna Borough Platting Board approved the revisions to the subdivision construction manual by unanimous vote at their June 6, 1991 meeting; and

WHEREAS, the Matanuska-Susitna Borough Planning Commission approved the modifications to the subdivision construction manual at their June 17, 1991 meeting.

BE IT RESOLVED that the Matanuska-Susitna Borough Assembly approve the revisions to the subdivision construction manual as shown in the June 6, 1991 draft.

PASSED AND APPROVED this 18th day of June 1991.

Dorothy A. Jones

Dorothy A. Jones, Borough Mayor

ATTEST:

Linda A. Dahl

Linda A. Dahl, Borough Clerk

NUMBER: RESO 91-048
AM 91-173

pw/vr/am/91-173

pw/vr/am-91-173