Ketchikan Gateway Borough
Public Works Department

Road Construction Standards

Contents:

Overview

The criteria set forth in this standard for the construction of local public roads within the Ketchikan Gateway Borough outside the jurisdictions of the City of Ketchikan and the City of Saxman, represents the minimum acceptable standard for construction practices. Roads shall be built to the highest standard practicable within economic constraints. A permit pursuant to KGB Code 70.10.020 is required prior to beginning construction within dedicated rights-of-way.

Standards:

Before a road is certified by the Borough, it must meet or exceed the requirements set forth in this standard. The Borough Public Works Department has adopted the standards for construction of roads contained herein. Should there be a conflict between the road construction standards set by the Public Works Department and those contained in the subdivision ordinance or other chapters of the Borough Code (Code), Code standards shall control. This standard only establishes the design and construction standards for roads within Ketchikan Gateway Borough's jurisdiction; it is the applicant's responsibility to comply with all federal, state, and other local laws, if applicable.

Certification:

The Public Works Director may designate a road as "certified"; this designation means the road meets or exceeds the design standards set forth in this set of standards. Any Borough road that does not meet the minimum requirements of this standard shall not receive certification. Lots that are served by Borough rights-of-way roads that are not certified will not receive approval from the Public Works Director for driveway access.

Special Assessment Districts:

The Assembly may require the formation of a Special Assessment District (SAD) in accordance with Title 51 of the Ketchikan Gateway Borough Code of Ordinances when rights-of-way are unimproved or does not meet the established road standards.

Road Categories

Categories I, II, III and IV Design Standard

The Public Works Director or designee will determine the category of road required based on the standards set forth in this section. The standard to which a road is constructed shall be based on the number of lots served as set forth below and the other factors set out in this subparagraph. The category shall also be determined by lots indirectly served where the road is a collector or subcollector and provides necessary access to lots not otherwise served by a Borough or state collector or subcollector.

- Category I: A cul-de-sac road or other minor road, both of which serve less than three (3) lots.
- Category II: A road that serves between three (3) and fifteen (15) lots.
- Category III: A road that serves between sixteen (16) and fifty (50) lots.
- Category IV: A road that serves greater than fifty (50) lots.
- Collector roads: Collector roads shall be constructed to Category IV road standards.

Road Widths:

Roads certified by the Borough must comply with the minimum and maximum widths in the following table:

Category of Road	Minimum Width (Feet)*	Maximum Width (Feet)*	Minimum Embankment (inches)
I	16’	24’	18”
II	24’	32’	30”
III	24’	32’	48”
IV	26’	32’	48”

(*Shoulder to shoulder)

Construction Standards

Typical Section:

Gravel roads shall be constructed in accordance with the Gravel Road Typical Section drawing and associated tables in **Appendix A**. Additional requirements are:

Roads must be contiguous with an existing road system. All roads must be on a dedicated rights-of-way or a dedicated easement and must be built along the rights-of-way centerline. Minimum rights-of-way width shall be 40 feet. If geotextile is utilized over organics, the minimum depth of embankment material required for the applicable category road constructed must cover the fabric. Extraction of material between the ditch lines for any purpose other than excavation to subgrade is prohibited. The roadway embankment shall be placed in lifts of 12 inches or less and compacted to not less than 92 percent of maximum density. No organic debris may be buried within the right-of-way for Category II, III and IV roads, unless otherwise approved by the Public Works Director. A 2:1 slope is the standard ditch line slope; a rock lined ditch may exceed the 2:1 slope requirements with prior approval. Fill areas over six feet in depth must be an engineered design and be preapproved by the Public Works Director. Roads constructed in level terrain susceptible to ponding require the applicant to submit to

the Public Works Director for approval drainage designs which may include approved drainage galleries or elevated road sections. The Public Works Director or designee will designate the defective areas in a written report. Roads constructed across wetlands, including muskeg, must be designed and certified by a State of Alaska licensed civil engineer and preapproved by the Public Works Director. In order to limit damage to the rights-of-way, adjacent properties, watercourses, and waterbodies, construction of roads within the Ketchikan Gateway Borough Mapped Flood Data Area and Flood Insurance Rate Map (FIRM) areas require an engineering analysis and design certified by a State of Alaska licensed civil engineer whose credentials are approved by the Public Works Director prior to start of construction.

Requirements for Embankment Material:

Embankment material shall consist of 1' minus pit run shot rock, preapproved by the Borough Public Works Director prior to placement

Categories I, II and III Alternate Design Standard

Alternate construction methods may be utilized for Category I and II roads if approved by the Public Works Director prior to construction based on conditions and documentation that shows soil, cost, terrain, or other conditions that are such that a standard typical section are not practical. The application for an alternate design shall be filed and approved by the Public Works Director prior to the start of construction of a new road or upgrade to a different category of road standard. Failure to get approval of the Public Works Director prior to construction shall result in non-certification of the road. Applicants shall provide the Public Works Director documentation that shows soil, economic, terrain, or other conditions are such that the standard typical section is not practical. A minimum of three Public Works inspections will take place, consisting of initial, midway, and final inspections. An engineered design may be submitted for Category I, II, and III roads if prepared and sealed by a licensed civil engineer. The design shall include typical section(s), centerline plan, and profile. The design shall provide for adequate drainage. The design shall be based on a soils investigation with test holes at least every 500 linear feet or less at the Public Works Director's discretion pursuant to written findings regarding topography, material used, design, and opportunity for inspections during the construction stages along with other relevant considerations. A report shall be submitted with test hole logs and soil analyses. Engineered designs must be pre-approved by the Public Works Director prior to construction. Once the project is complete, as-built drawings or a detailed report certifying that the road has been constructed to Public Works standards, prepared and sealed by a licensed civil engineer, shall be submitted to the Public Works Director for approval. A report in lieu of as-built drawings must include photos, sieve analysis of materials used, field inspection reports, compaction test results, and other inclusions the Public Works Director may request. The as-built drawings or report are required prior to acceptance by the Public Works Director of the road.

Category IV Engineering Required

Category IV roads are required to be designed and engineered by a State of Alaska licensed civil engineer. Drawings of the detailed plans must be submitted and approved by the Public Works Director prior to construction. The design shall meet the minimum standards as designated in the Category IV Asphalt Road Typical Section drawing as indicated in the Category IV Road Table. The project engineer must provide a certified as-built drawing or a detailed report certifying that the road has been constructed to Public Works standards before certification of the road will be granted. The report must include photos, sieve analysis of materials used, field inspection reports, compaction test results, and other inclusions the Public Works Director may request.

Requirements for Embankment Material:

Percent Passing by Weight Category IV Road Table

Sieve Designation	Type I	Type II	Type III
4 inch	95—100	—	—
2 inch	85—100	100	100
1 inch	—	—	95—100
No. 4	30—60	30—65	40—75
No. 16	—	—	20—43
No. 200	0—6	6—10	4—10

Typical Section Materials

Embankment Material

Embankment material shall contain no muck, frozen materials, roots, sod, or other deleterious matter. It shall have a liquid limit not greater than 25 and plasticity index not greater than six as determined by AASHTO T89 and T90. Type III shall be crushed aggregate material with at least 50 percent of the coarse aggregate having at least one fresh mechanically fractured face and graded within the limits of the Category IV Road Table.

Geotextile Fabric

Geotextile fabric shall meet or exceed the following physical and mechanical requirements:

Geotextile Property		
Test Method	Required Minimum	
Grab Tensile Strength	190 lbs.	
Grab Elongation	ASTM D 1682	30%
Burst Strength	ASTM D 751	290 psi
Trapezoidal Tear Strength	ASTM D 117	50 lbs.
Permeability	AASHTO M 288 K (soil)	

Geotextile shall be installed in accordance with manufacturer's recommendations. If multiple sections of fabric are required, the fabric shall be joined by overlapping adjacent sections a minimum of three feet.

Alignment

Vertical Alignment - Roads shall be constructed in a manner such that grades shall not exceed, at any point, six percent on arterial roads and ten percent on all other roads, and no more than four percent within 100 feet of any intersection.

Horizontal Alignment - Horizontal alignment shall meet the requirements of KGB 55.43.30. Roads shall be constructed along the centerline of the right-of-way and shall have curves meeting the minimum radius requirements of not less than 300 feet for rights-of-way with 100 feet in width or more, and not less than 200 feet on all other roads.

Clear Zone - There shall be a roadside clear of hazardous objects or conditions for a distance consistent with the speed, traffic volume, and geometric conditions of the site. Roads shall be constructed with a

minimum clear zone of 8 feet. Where hazardous physical features exist which cannot be located outside the clear zone, alternative treatments such as guardrails may be required as approved.

Turnarounds – Turnarounds shall meet the requirements of KGB 55.43.30. Roads designed to have one end closed, either permanently or temporarily, shall be constructed with a suitable approved turnaround with either a minimum radius of 30 feet; hammer head or T-shape turnaround area. Dedicated cul-de-sacs shall be constructed with a minimum radius of 35 feet. The turnaround shall be constructed to a four percent (4%) grade or less.

Intersections - Road intersections shall be constructed as nearly at right angles as possible. A minimum unobstructed sight distance of 150 feet shall be provided unless it is determined by the Public works Director, prior to construction, that a lesser distance is appropriate due to topography, traffic flow, or other physical characteristics. Appropriate warning signs may be required by the Public Works Director, if an exception to sight distance is granted. Road intersections shall be constructed with a minimum turn radius of 20 feet. Where acute intersections are provided, return radii shall be increased appropriately.

Driveways - Driveways shall be spaced as far apart from other driveways and intersections as practical to avoid interference with ditch drainage.

Drainage and Culvert Material

Roads shall be constructed to prevent ponding of runoff waters in roadside ditches. Drainage ditches shall be constructed such that runoff waters will be conveyed to natural drainage courses, ditches or waterways, or other man-made drainage courses. Outfalls shall be constructed to prevent excessive siltation of riparian habitats, channel erosion, or other damage to public or private property. The Public Works Director may require an engineering analysis and design for locations susceptible to flooding, siltation, or other natural conditions potentially damaging to the right-of-way, adjacent property, or water courses and water bodies. A roadway cross culvert shall be a minimum diameter of 12 inches, and with at least a one percent drainage grade through the culvert, and driveway culverts shall be a minimum of 12 inches and 30 feet in length. Plastic culverts are acceptable if they meet AASHTO Standard Section 706-2.07 corrugated polyethylene pipe, AASHTO M 294, Type S. AASHTO cross culvert markers must be installed.

Structures and Bridges

Bridge plans must be prepared and stamped by a State of Alaska licensed civil engineer and shall be submitted to the Public Works Director prior to construction or certification of the road for maintenance if the road contains a bridge, bottomless culvert, guardrail, retaining wall, or other similar structure. An engineered report must also be submitted once the construction is complete. The engineered report must document and certify compliance with all relevant state and federal requirements.

Signs

General Information - Sign location, type of installation, and sign removal will be as designated by the Public Works Director consistent with these standards, Public Works policy and Title 57 of the Ketchikan Gateway Borough Code of Ordinances.

Street Name Signs - Street name signage shall be installed by developers of new roads, following the specifications set forth in the "Alaska Sign Design Specifications."

Speed Signs - Speed signage and parking signage shall comply with the requirements of AKDOTPF, and Public Works policy.

Unauthorized signage - Unauthorized signs located in the Ketchikan Gateway Borough right-of-way may be removed by the Public Works Department.

Paving Specifications

The Public Works Director will only certify roads containing asphalt concrete pavement on a prepared base if designed and stamped by a licensed civil engineer. The work under this section consists of the performance of all work required for the construction of asphalt concrete pavement on a prepared base (as shown in the Paved Road Typical Section drawing and associated Paved Road Table). Current editions of "Standard Specifications for Highway Construction," as adopted by the Alaska Department of Transportation and Public Facilities and the "Standard Specifications for Streets, Drainage, and Utilities," as adopted by the Municipality of Anchorage will be the references used for asphalt concrete paving.

Material and Testing

The Public Works Department requires the asphalt pavement mix design be submitted and stamped by a state of Alaska licensed civil engineer or prepared and approved by the Alaska Department of Transportation and Public Facilities. Process quality control records for aggregate shall be submitted with the asphalt pavement mix design. The project engineer must provide a certified as-built drawing or a detailed report certifying that the road has been constructed to Public Works standards. This report must include photos, sieve analysis of materials used, field inspection reports, compaction test results, and other inclusions the Public Works may request. The asphalt required by these specifications shall conform to the requirements of The Asphalt Institute for the type and grade and shall comply with ADOT/PF specifications used in the area. Crushed aggregate base coarse, D-1, shall comply with ADOT/PF specifications. Minimum two-foot compacted shoulders are required. The prepared base shall, at a minimum, meet the standards for a Category III road. Inspection of the subgrade by the design engineer is required prior to paving. The contractor shall submit a certified analysis of the asphalt to the Public Works for review and approval by the Public Works Director. The Public Works Director reserves the right to make check tests of the asphalt at the project site, and, if the asphalt is not in accordance with the certified analysis, the road will be rejected for certification. The contractor or developer, at their own expense, will be required to perform field tests measuring aggregate gradation and fracture, asphalt content, and compaction. Test results shall be in conformance with pavement mix design requirements and shall be stamped by a state of Alaska licensed civil engineer.

Other Specifications

The Public Works Department will use the current editions of "Standard Specifications for Highway Construction," as adopted by the Alaska Department of Transportation and Public Facilities to address seal coat, prime coat, paving geotextile, recycled asphalt paving, and other specifications required to assure the Public Works Department that the road meets all quality control measures.

Definitions

For purposes of this standard, the following definitions apply:

"AASHTO" means "American Association of State Highway and Transportation Officials."

"Arterial Road" means a road intended to carry traffic from local and subdivision roads to major highways. Such roads primarily accommodate relatively large volumes of traffic for relatively long distances at relatively high speeds.

“Certification” means the road meets or exceeds the design standards of the Ketchikan Gateway Borough.

"Collector Road" means roads which provide both land access and carry traffic from local or subdivision roads to arterial or major highway systems.

"Construction" means physical activity by the applicant using labor, materials or equipment within the right-of-way beginning with clearing and grubbing and ending with certification for maintenance by Public Works.

"Level Terrain" means when the topography adjacent to the rights-of-way slopes less than 3 percent.

"Licensed Civil Engineer" means a Registered Professional Engineer, licensed to practice Civil Engineering by the State of Alaska, in accordance with AS 08.48 and 12 AAC 36.

"Local Roads" means internal subdivision roads or a road designed and intended to serve local areas. Such roads primarily accommodate land access to abutting property. Local roads feed traffic into collector and arterial street systems.

"Motor Vehicle" means a vehicle which is self-propelled except a vehicle manned by human or animal power.

"Muskeg" means wetlands containing at least one foot of substantial peat/organic accumulation.

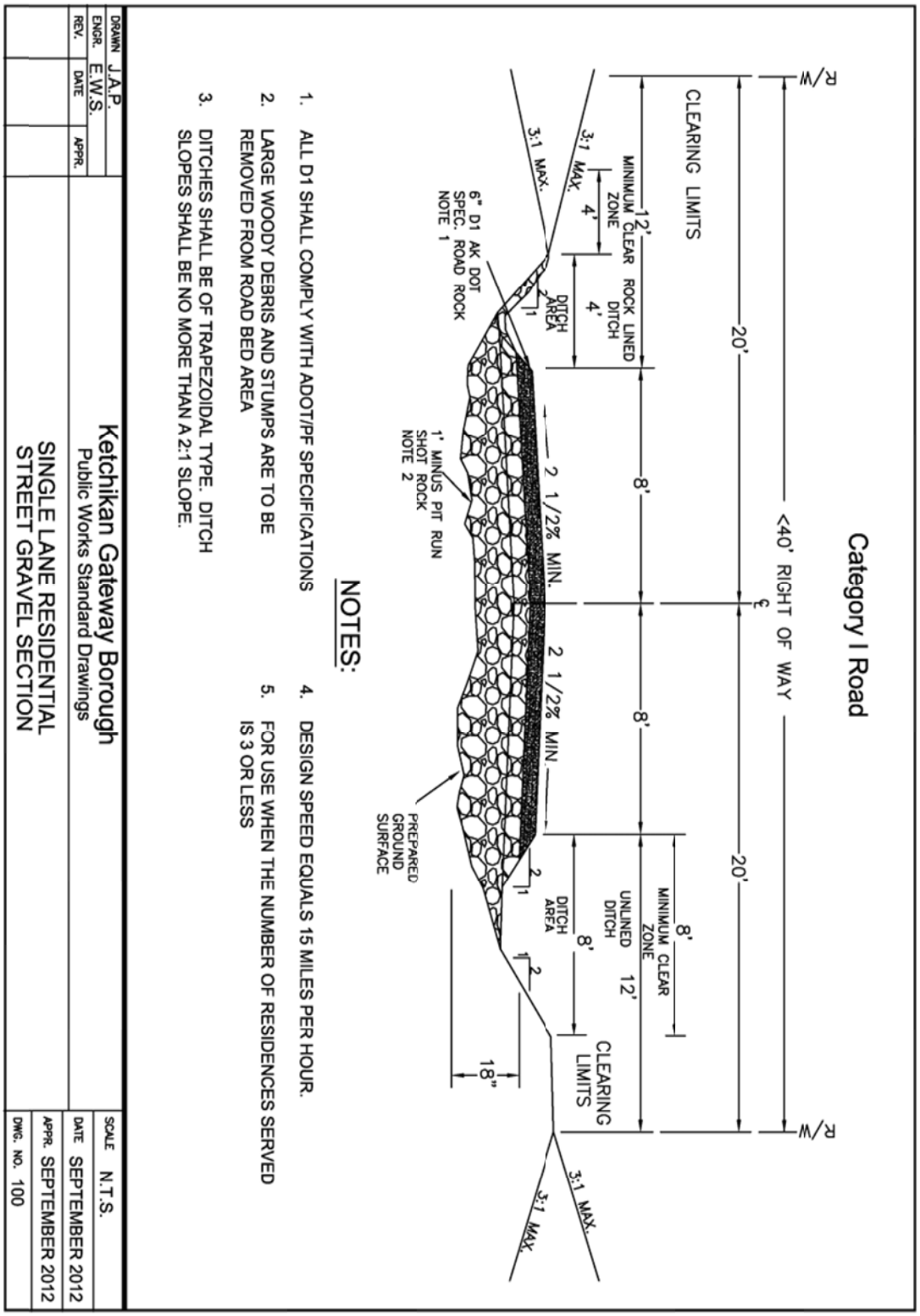
"Road Construction Standards" or "Road Standards" means the minimal standards set forth in this standard for the purposes of certification by Public Works.

"Subcollector Road" means a local road which also provides through traffic service between local roads and collector, arterial, or major highway roads.

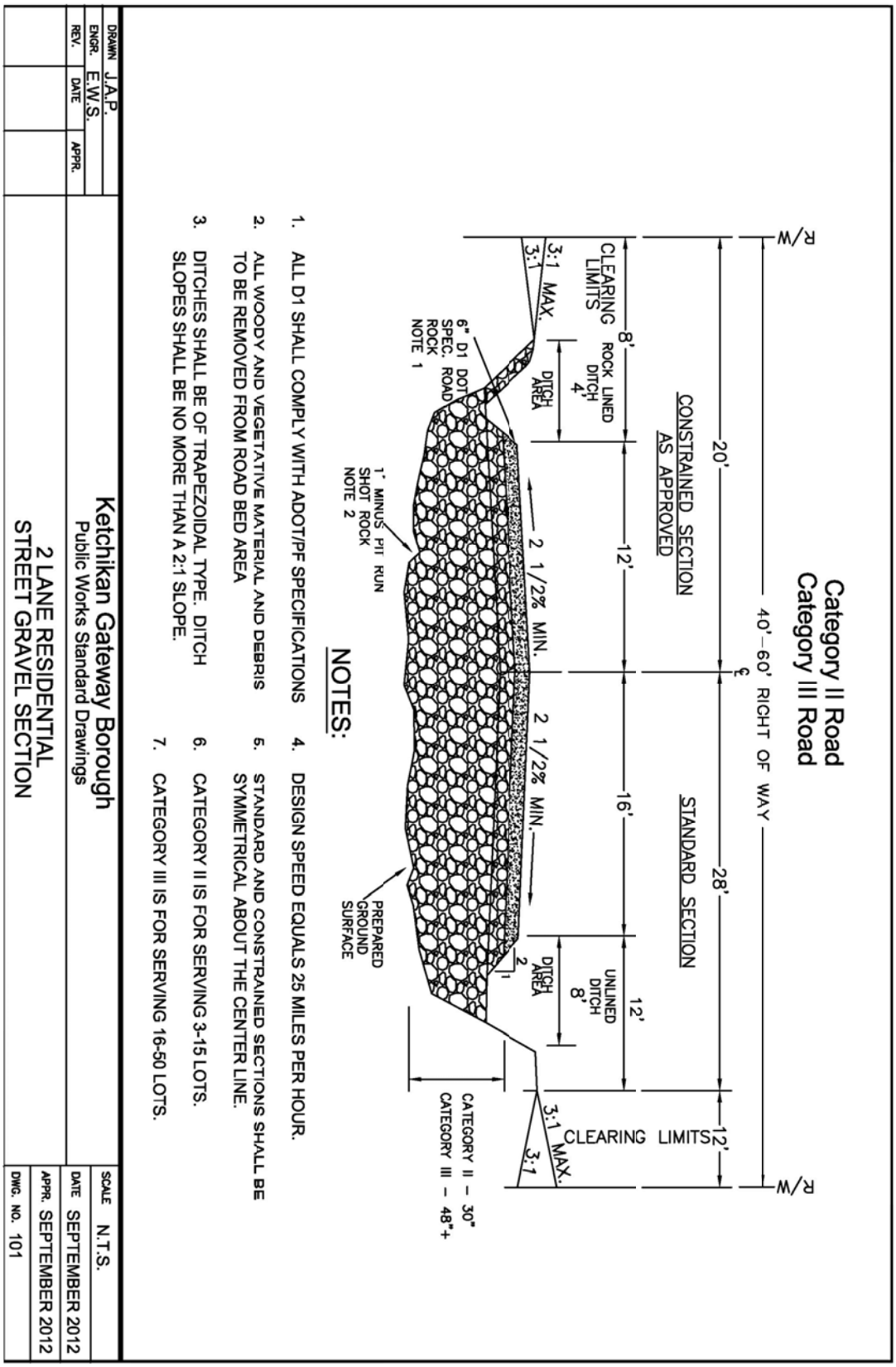
"Type IV Material" is materials consisting of earth, sand, rock, or combinations thereof containing no muck, peat, frozen material, roots, sod, or other deleterious matter and is compactable.

Appendix A – Typical Standard Drawings

Category 1 Typical Section Diagram



Categories II & III Typical Section Diagram



NOTES:

1. ALL D1 SHALL COMPLY WITH ADOT/PF SPECIFICATIONS
2. ALL WOODY AND VEGETATIVE MATERIAL AND DEBRIS TO BE REMOVED FROM ROAD BED AREA
3. DITCHES SHALL BE OF TRAPEZOIDAL TYPE. DITCH SLOPES SHALL BE NO MORE THAN A 2:1 SLOPE.
4. DESIGN SPEED EQUALS 25 MILES PER HOUR.
5. STANDARD AND CONSTRAINED SECTIONS SHALL BE SYMMETRICAL ABOUT THE CENTER LINE.
6. CATEGORY II IS FOR SERVING 3-15 LOTS.
7. CATEGORY III IS FOR SERVING 16-50 LOTS.

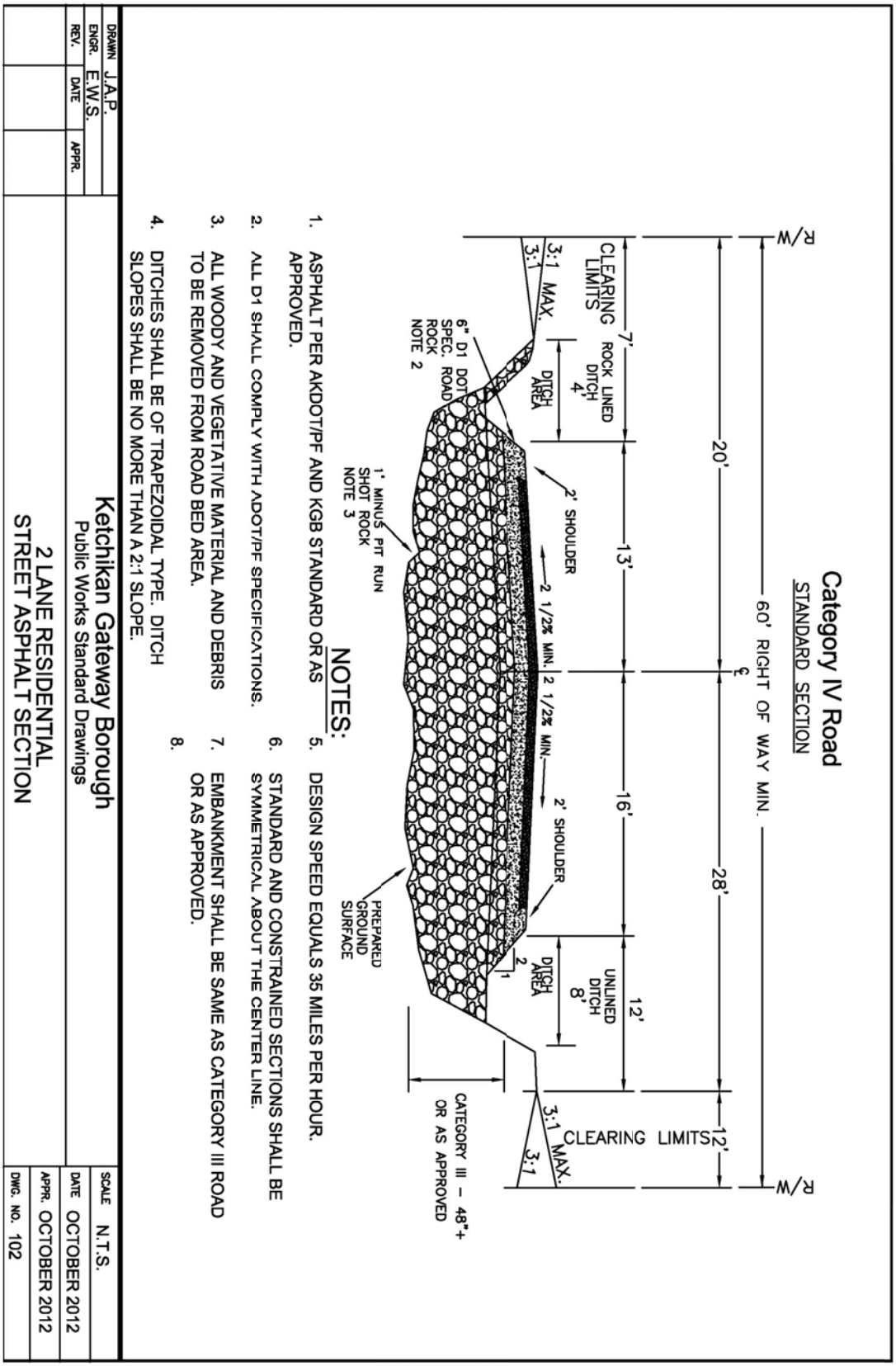
DRAWN	J.A.P.		
ENGR.	E.W.S.		
REV.	DATE	APPR.	

Ketchikan Gateway Borough
Public Works Standard Drawings

2 LANE RESIDENTIAL
STREET GRAVEL SECTION

SCALE	N.T.S.
DATE	SEPTEMBER 2012
APPR.	SEPTEMBER 2012
DWG. NO.	101

Category IV Typical Section Diagram



NOTES:

1. ASPHALT PER AKDOT/PF AND KGB STANDARD OR AS APPROVED.
2. ALL D1 SHALL COMPLY WITH ADOT/PF SPECIFICATIONS.
3. ALL WOODY AND VEGETATIVE MATERIAL AND DEBRIS TO BE REMOVED FROM ROAD BED AREA.
4. DITCHES SHALL BE OF TRAPEZOIDAL TYPE. DITCH SLOPES SHALL BE NO MORE THAN A 2:1 SLOPE.
5. DESIGN SPEED EQUALS 35 MILES PER HOUR.
6. STANDARD AND CONSTRAINED SECTIONS SHALL BE SYMMETRICAL ABOUT THE CENTER LINE.
7. EMBANKMENT SHALL BE SAME AS CATEGORY III ROAD OR AS APPROVED.
8.

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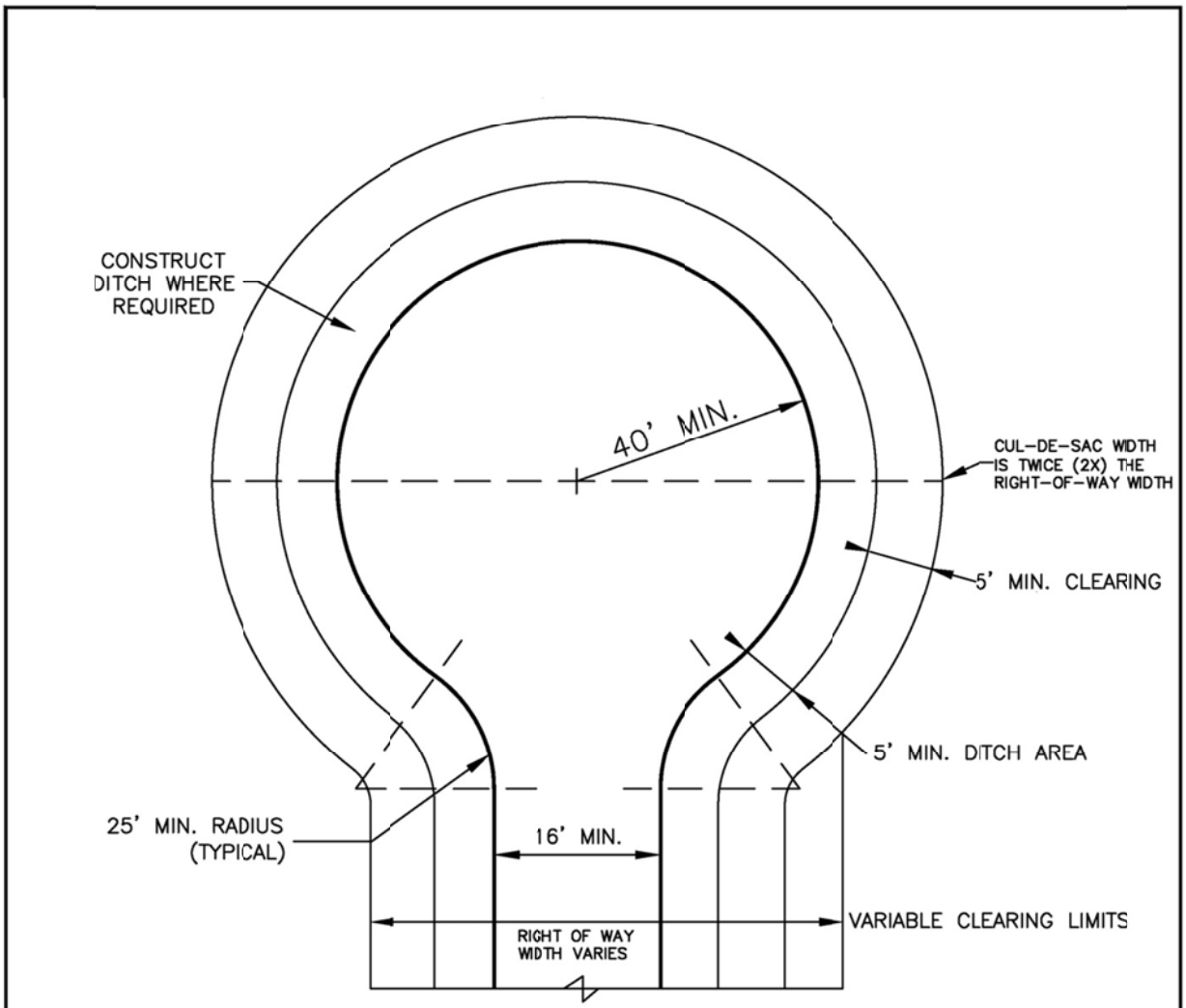
ENGR.	E.W.S.		
REV.	DATE	APPR.	

Ketchikan Gateway Borough
Public Works Standard Drawings

2 LANE RESIDENTIAL
STREET ASPHALT SECTION

SCALE	N.T.S.
DATE	OCTOBER 2012
APPR.	OCTOBER 2012
DWG. NO.	102

Typical Cul-de-sac Diagram

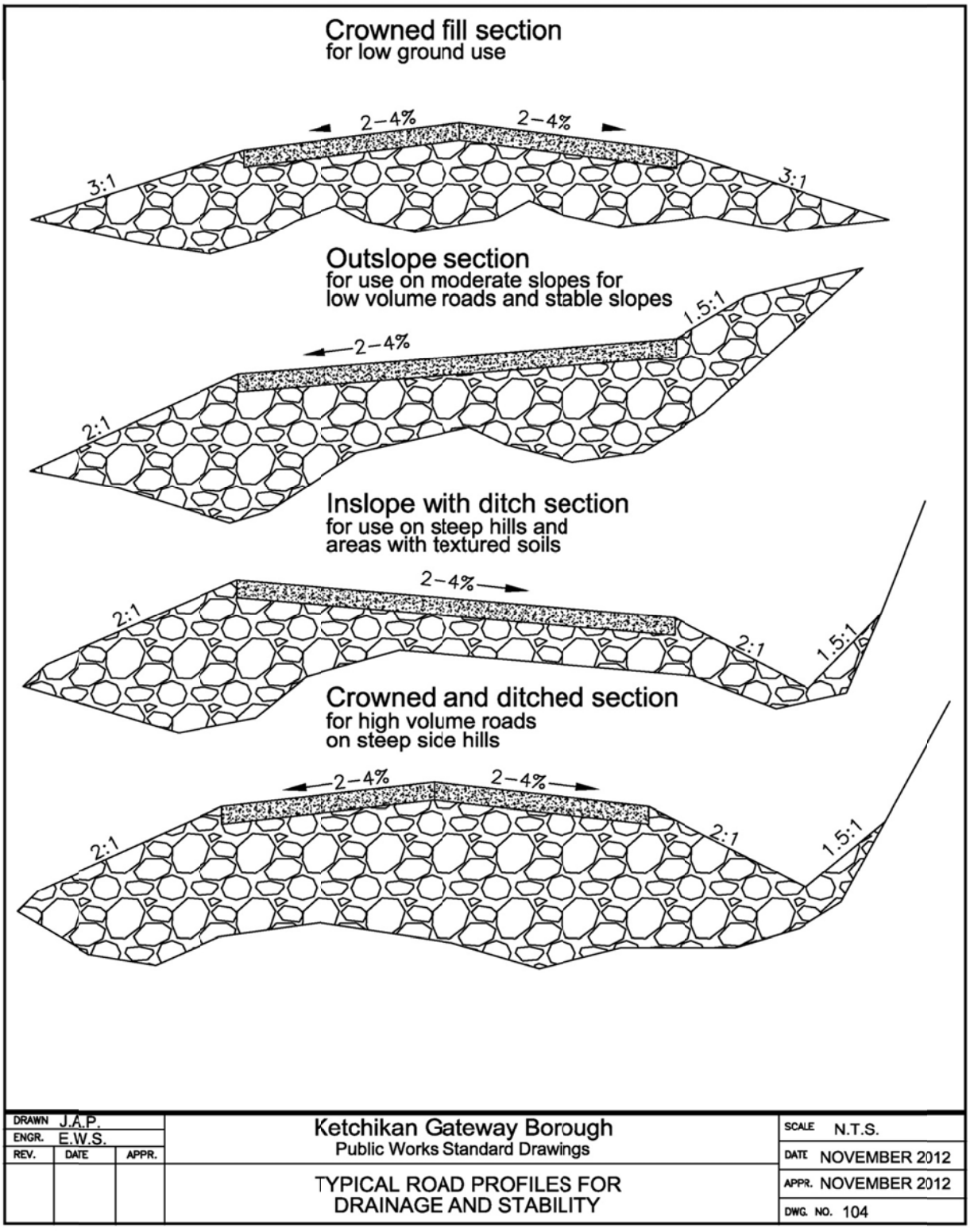


NOTES:

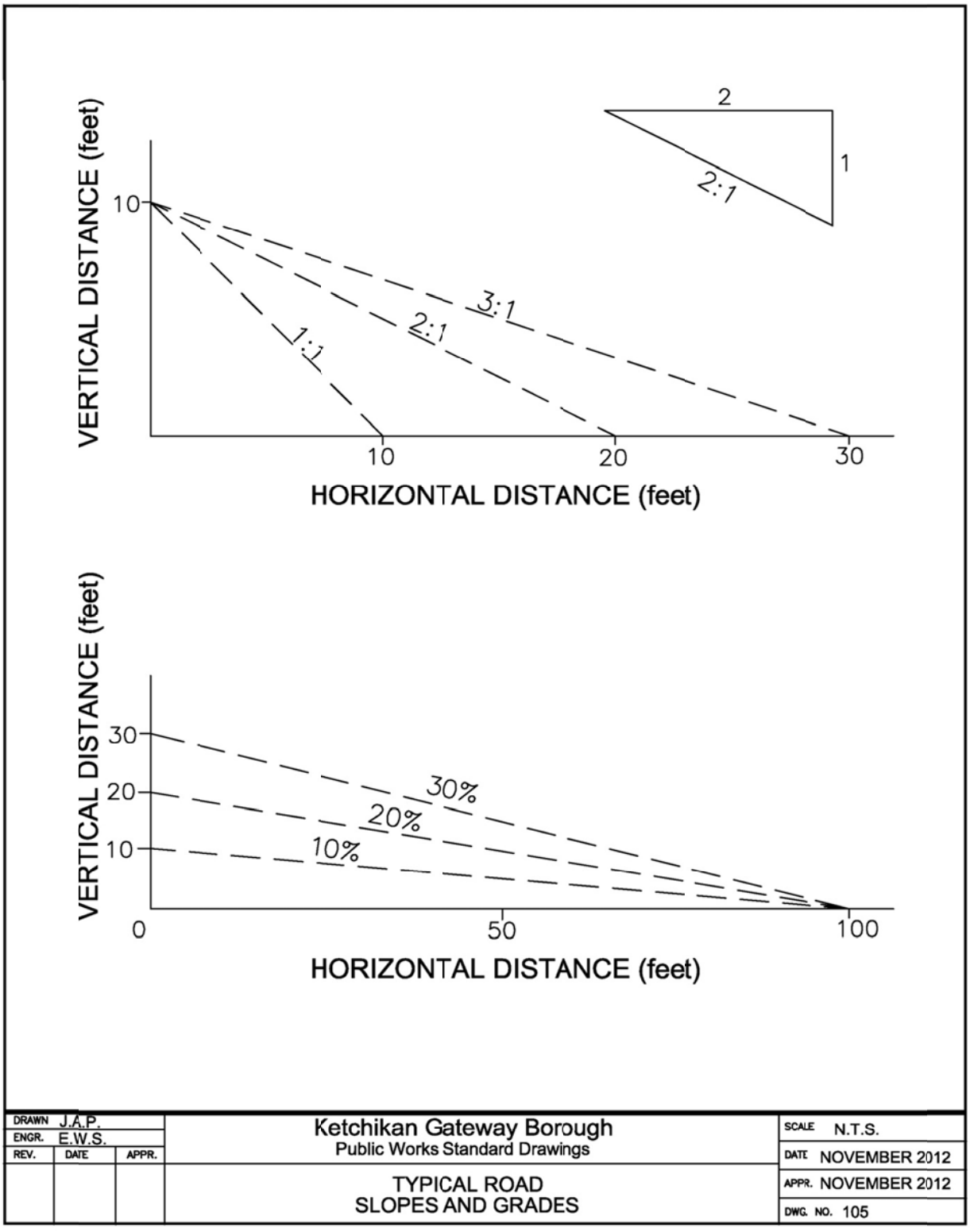
1. ALL D1 SHALL COMPLY WITH ADOT/PF SPECIFICATIONS
2. LARGE WOODY DEBRIS AND STUMPS ARE TO BE REMOVED FROM ROAD BED AREA
3. DITCHES SHALL BE OF TRAPEZOIDAL TYPE. DITCH SLOPES SHALL BE NO MORE THAN A 2:1 SLOPE.
4. DESIGN SHALL COMPLY WITH KGB 55.43.030.
5. CUL-DE-SAC GRADE SHALL BE LESS THAN 4%.
6. CUL-DE-SAC LENGTH SHALL BE NO MORE THAN TEN (10) TIMES THE MINIMUM LOT WIDTH FOR RESIDENTIAL ZONES.
7. CUL-DE-SAC LENGTH SHALL NOT EXCEED 600 FEET FOR ALL OTHER ZONES.
8. HAMMERHEAD OR OTHER TURN AROUND DESIGNS SUBJECT TO DIRECTOR APPROVAL.

DRAWN J.A.P.			Ketchikan Gateway Borough Public Works Standard Drawings	SCALE N.T.S.
ENGR. E.W.S.				DATE NOVEMBER 2012
REV.	DATE	APPR.	CUL-DE-SAC PLANVIEW RESIDENTIAL OR COMMERCIAL STREET	APPR. NOVEMBER 2012
				DWG. NO. 103

Typical Profiles Diagram



Typical Grades and Slopes Diagram



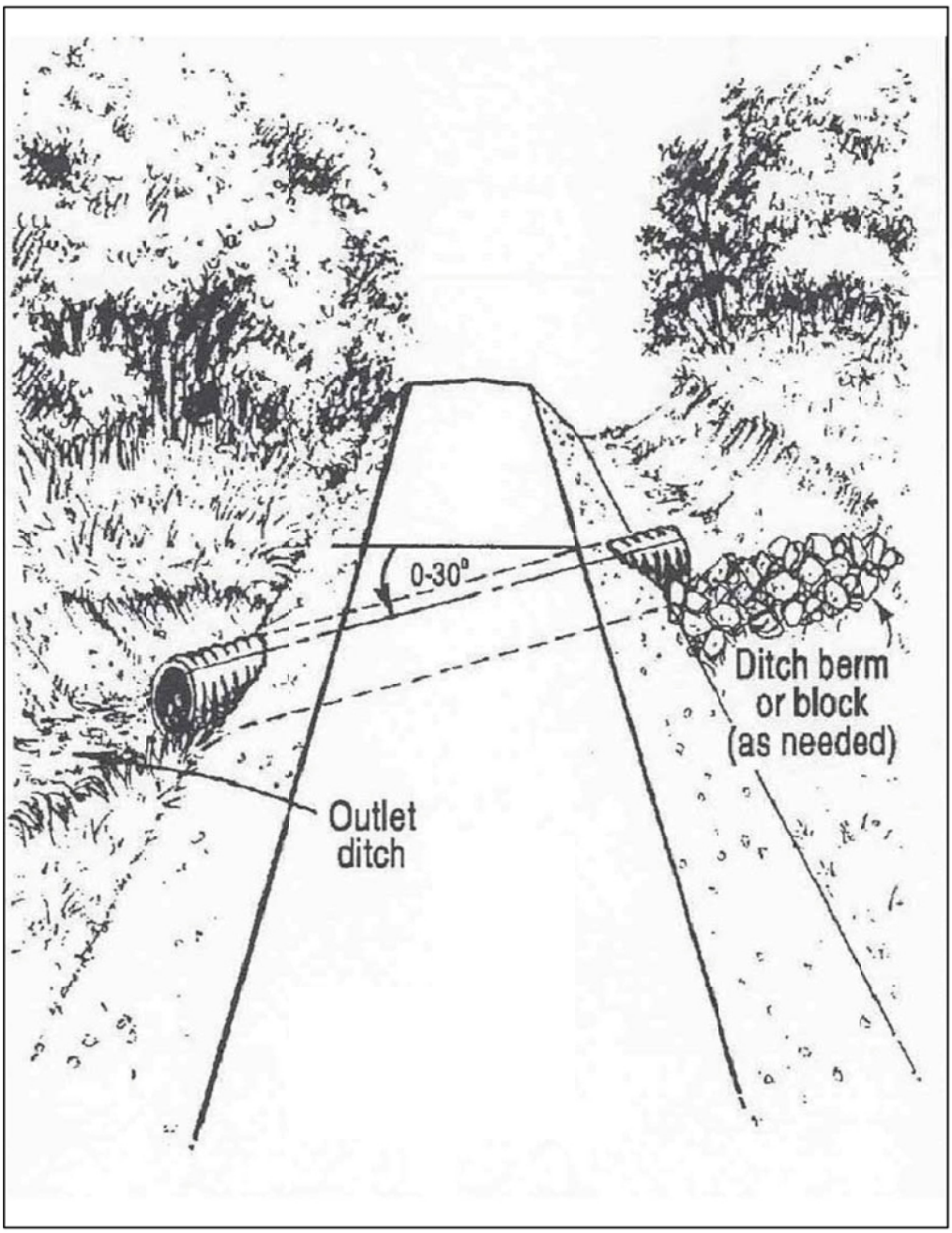
NOTES:

1. DRAINAGE IMPROVEMENTS OR MODIFICATIONS MAY REQUIRE AN PERMIT FROM THE U.S. ARMY CORPS OF ENGINEERS. VERIFY APPLICABILITY BEFORE STARTING ANY WORK.
2. MINIMUM PIPE SIZE SHALL BE 12". EXTEND PIPE AT LEAST 12" BEYOND TOE.
3. PIPE SHALL BE INSTALLED PER MANUFACTURES SPECIFICATIONS.
4. DITCHES SHALL BE OF TRAPEZOIDAL TYPE.
5. DITCH SLOPES SHALL BE NO MORE THAN A 2:1 SLOPE UNLESS OTHERWISE APPROVED.
6. CORRUGATED POLYETHYLENE PIPE IS ACCEPTABLE IF IT MEETS AASHTO M 294.
7. PLASTIC CULVERTS ARE ACCEPTABLE IF THE MEET AASHTO 706-2.07.
8. TYPE S AASHTO CROSS CULVERT MARKERS SHALL BE INSTALLED.

DRAWN J.A.P.			Ketchikan Gateway Borough Public Works Standard Drawings	SCALE N.T.S.
ENGR. E.W.S.				DATE SEPTEMBER 2012
REV.	DATE	APPR.	ROAD CULVERT PLACEMENT & INSTALLATION	APPR. SEPTEMBER 2012
				DWG. NO. 106

Typical Culvert Placement & Installation Diagram

Typical Road Culvert Diagram



DRAWN J.A.P.			Ketchikan Gateway Borough Public Works Standard Drawings	SCALE N.T.S.
ENGR. E.W.S.				DATE NOVEMBER 2012
REV.	DATE	APPR.	ROAD CULVERT	APPR. NOVEMBER 2012
				DWG. NO. 106a