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Appendix A. Maps of Forest Roads

State, County, and ML-3, 4, and 5 Forest Service Roads

(See separate electronic document for these seven maps).

(Angelina NF Index Map to be inserted)

(Angelina NF Map 1 of 6 to be inserted)

(Angelina NF Map 2 of 6 to be inserted)

(Angelina NF Map 3 of 6 to be inserted)

(Angelina NF Map 4 of 6 to be inserted)

(Angelina NF Map 5 of 6 to be inserted)

(Angelina NF Map 6 of 6 to be inserted)

Appendix C. County Road Coop Agreements

Angelina National Forest Road Coop Agreements

<u>Road ID</u>	<u>Road Name</u>	<u>Length</u>	<u>Jurisdiction</u>	<u>Maintainer</u>	<u>Remarks</u>
Angelina County					
302	Cyclone Hill Rd	3.2	FS	FS	Forest Highway and PFSR
303	Bouton Lake Rd	6.6	FS	FS	Forest Highway and PFSR
309	Vernon School Rd	2.5	County	County	
314	Blue Hole Rd	4.9	FS	FS	Forest Highway and PFSR
ANG-21	Faye Smith Road	0.5	County	County	
ANG-24	Hammer Road	1.0	County	County	
ANG-Bingham	Old Concord	1.4	County	County	
ANG-Boulware Hudspeth		7.5	County	County	
ANG-Chambers	Old Cyclone Hill Road	4.0	County	County	
ANG-Dead Man		5.4	County	County	
ANG-Durham Ranch	Hawkins Road	1.8	County	County	
ANG-Forest Hopson	Nancy	2.8	County	County	
ANG-Guidrey	Boykin Cemetery Road	2.4	County	County	
ANG-Hopsonville		1.7	County	County	
ANG-Kitchen Cemetery	West Kitchen Cemetery Road	1.0	County	County	
ANG-Martin Cochran	Stanley Creek Road	1.1	County	County	
ANG-Molly Wood	Shorewood Acres	1.5	County	County	
ANG-Moore Farm Road	Moore Farm Road	1.3	County	County	
ANG-Old Johnson School	East Craven Road	1.0	County	County	
ANG-Ozias		0.1	County	County	
ANG-Palmer Ivy	Walker Road	2.5	County	County	
ANG-Parker Point Road	Parker Point Road	1.4	County	County	
ANG-Plum Ridge Road	Old Road 306	0.9	County	County	Forest Highway and PFSR
ANG-Plum Ridge Road	Old Road 306	0.8	County	County	
ANG-Roland Marshall	Marshall Road	1.2	County	County	
ANG-Roxie Point Road	Faye Smith Road	0.8	County	County	
ANG-Sam Hawkins	Ozias Church Road	1.9	County	County	
ANG-Sandy Creek	Pittman Road	1.2	County	County	
ANG-Thornton	Thornton Road	2.0	County	FS	
ANG-Zavalla Cemetery	Hawkins Road	0.4	County	County	
ANG-ZS Roberts		2.6	County	County	

Jasper County					
303	Bouton Lake	2.8	FS	FS	Forest Highway and PFSR
309	Vernon School Road	2.5	County	County	
314	Blue Hole	2.5	FS	FS	Forest Highway and PFSR
326	Aldridge	4.0	FS	FS	
327	Joseph Conn	1.6	FS	FS	
330	Maddux	0.6	County	County	
335	Lee	1.7	FS	FS	Forest Highway and PFSR
335	Lee	0.6	FS	FS	
JAS-007	Gaging Station Road	0.2	County	County	
JAS-010	Boykin Road	0.5	County	County	
JAS-019	Boundary Road	0.9	County	County	
JAS-061	Ebenezer Road	0.4	County	County	
JAS-062	Ellis Road	1.7	County	County	
JAS-7	McGee Bend Road	1.1	County	County	
JAS-8	Boykin Road	0.4	Private	Private	
JAS-9		0.3	Unknown	Unknown	
Nacogdoches County					
361	Southern Pacific	3.0	FS	County	PFSR
San Augustine County					
300 East		6.4	FS	FS	Forest Highway and PFSR
300 East		2.3	County	County	Forest Highway and PFSR
300 West		3.9	FS	FS	Forest Highway and PFSR
316	Long Bell	2.6	FS	FS	
318	Murphys Hill	2.0	FS	FS	
SAA-3000	Pergan Road	0.6	County	County	
SAA-319	Macedonia Cemetery Road	4.5	County	County	
SAA-3400	Price Road	0.7	County	County	
SAA-491 N	Snell Wood Church Road	0.9	County	County	
SAA-491 S	Lucas Cemetery Road	1.8	County	County	
SAA-R 304E		5.1	County	County	
SAA-R 304E	Brookland	1.5	County	County	Forest Highway and PFSR
SAA-R 304W	Brookland	1.7	County	County	
SAA-R 317	Oak Grove	4.0	County	County	PFSR

Appendix D. Forest Service ML-3, 4, and 5 Roads

Angelina National Forest
Forest Service ML-3, 4, and 5 Roads

<u>Road ID</u>	<u>Road Name</u>	<u>Length</u>	<u>Functional Class</u>	<u>Operational Maintenance Level</u>	<u>Primary Maintainer</u>	<u>Surface Type</u>	<u>Traffic Service Level</u>	<u>Remarks</u>
300 East	Bannister	6.4	Collector	3	FS	Aggregate	C	Forest Highway / PFSR
300 West	Bannister	3.9	Collector	3	FS	Aggregate	C	Forest Highway / PFSR
300A	Kirkair	1.9	Local	3	FS	Aggregate	D	
300C	Roberson	1.3	Local	3	FS	Aggregate	D	
300C	Roberson	0.2	Local	3	FS	Dirt	D	
301	Frost	1.8	Local	3	FS	Aggregate	C	
302	Cyclone Hill	3.2	Collector	4	FS	Aggregate	C	Forest Highway / PFSR
302A	Oil	2.7	Local	3	FS	Aggregate	C	
303	Bouton Lake	6.6	Collector	4	FS	Aggregate	B	Forest Highway / PFSR
304A	Lucas Creek	1.2	Local	3	FS	Aggregate	C	
Townsend Recreation Area:								
305	Townsend	1.6	Local	5	FS	Paved	A	
	Townsend Loop A	0.5	Local	3	County	Paved	D	
	Townsend Loop B	0.6	Local	3	County	Paved	D	
	Townsend Loop C	0.3	Local	3	County	Paved	D	
3053	Barnes	0.8	Local	3	FS	Dirt	D	
3056	Roberson Spur	0.3	Local	3	FS	Aggregate	D	
3056	Roberson Spur	0.4	Local	3	FS	Dirt	D	
306E	Big Pond	1.2	Local	3	FS	Dirt	D	
307	Major Smith	3.4	Collector	3	FS	Aggregate	D	
3070	Rock Crusher	1.7	Local	3	FS	Dirt	D	
307A	Yellow Jacket BR	1.3	Local	3	FS	Aggregate	D	
307A	Yellow Jacket BR	0.3	Local	3	FS	Dirt	D	
308		1.1	Local	3	FS	Aggregate		
308B	Concord	0.8	Local	3	FS	Aggregate	D	
308C	Church	0.8	Local	3	FS	Aggregate	D	
308G	Fox Camp	0.4	Local	3	FS	Dirt	D	
308H	Mudd Creek	1.2	Local	3	FS	Dirt	D	
3094	Luce	1.6	Local	3	FS	Dirt	D	
311	Beech	1.6	Local	3	FS	Aggregate	D	
311B		0.9	Local	3	FS	Aggregate	D	
312		1.1	Local	3	FS	Aggregate	D	
313	Boykin Springs	1.6	Collector	5	FS	Paved	A	Forest Highway / PFSR
313	Boykin Springs	2.0	Local	5	FS	Paved	B	Forest Highway / PFSR
313A	Sand Hill	0.7	Local	3	FS	Aggregate	D	
313A	Sand Hill	0.9	Local	3	FS	Dirt	D	

314	Blue Hole	4.9	Collector	4	FS	Aggregate	B	Forest Highway / PFSR
316	Long Bell	2.6	Local	3	FS	Improved Dirt	C	
316A	Hardikner Creek	0.9	Local	3	FS	Dirt	D	
317	Oak Grove	1.8	Local	3	FS	Improved Dirt	C	
317A	Parker Creek	0.8	Local	3	FS	Aggregate	D	
318	Murphy's Hill	2.0	Local	3	FS	Aggregate	D	
318A	Murphy's Spur	1.0	Local	3	FS	Aggregate	D	
322	Bayou Recreation Area	0.3	Local	3	FS	Aggregate	C	
323	District Office/W.C.	0.3	Local	5	FS	Paved	B	
324	Shearwood	0.6	Local	3	FS	Aggregate	D	
324A	Shearwood Spur	0.8	Local	3	FS	Aggregate	D	
325B	Blackland BR	0.7	Local	3	FS	Dirt	D	
326	Aldridge	4.0	Collector	3	FS	Aggregate	C	
326A	Aldridge Spur	0.4	Local	3	FS	Aggregate	D	
327	Joseph Conn	1.6	Local	3	FS	Improved Dirt	C	
329	Clear Creek	1.4	Local	3	FS	Aggregate	D	
332	McGee Bend	1.7	Local	3	FS	Improved Dirt	C	
333	Sandy Creek	2.1	Collector	5	FS	Paved	A	Forest Highway / PFSR
333	Sandy Creek	0.8	Collector	5	FS	Paved	A	
333A	Kreut	0.3	Local	3	FS	Aggregate	D	
333A	Kreut	1.9	Local	3	FS	Improved Dirt	D	
334	Harvey Creek	1.7	Local	5	FS	Paved	A	
335	Lee	1.7	Collector	5	FS	Paved	A	Forest Highway / PFSR
335	Lee	0.4	Collector	5	FS	Paved	A	
335B	Shay Bark	0.8	Local	3	FS	Aggregate	D	
335C		0.6	Local	3	FS	Paved	C	
335C1		0.4	Local	3	FS	Aggregate	C	
Caney Creek Recreation Area:								
336	Knightsley	1.7	Local	5	FS	Paved	A	PFSR
336	Knightsley	2.6	Local	5	FS	Paved	A	
	Dogwood Loop	0.5	Local	3	FS	Paved	D	
	Pine Loop	0.2	Local	3	FS	Paved	D	
	Elm Loop	0.3	Local	3	FS	Paved	D	
	Hickory Loop	0.4	Local	3	FS	Paved	D	
	Maple Loop	0.4	Local	3	FS	Paved	D	
337	Hensarling	0.7	Local	3	FS	Aggregate	C	
338	Admin Site	0.1	Local	5	FS	Paved	C	
338A	Lump Road	0.1	Local	5	FS	Paved	C	
340	Kochley	0.9	Local	3	FS	Aggregate	D	
341	Bowers	1.0	Local	3	FS	Aggregate	D	
342	Agan	1.8	Local	3	FS	Aggregate	D	
343 North		1.1	Local	3	FS	Dirt	D	
343 South		1.1	Local	3	FS	Dirt	D	
344	Pophers	1.0	Local	3	FS	Aggregate	D	
345	Steptoe Branch	0.9	Local	3	FS	Aggregate	D	

346	Monterey	0.85	Local	3	FS	Aggregate	C	
346A	Hanks	0.5	Local	3	FS	Aggregate	C	
346B	Boynton	0.3	Local	3	FS	Aggregate	C	
347A	Grove	1.4	Local	3	FS	Aggregate	D	
348	Wash Branch	0.4	Local	3	FS	Aggregate	D	
349	Labe	1.1	Local	3	FS	Aggregate	D	
350	Northwest	5.1	Collector	3	FS	Aggregate	C	
350A	Northwest Spur	0.9	Local	3	FS	Aggregate	D	
350B		0.9	Local	3	FS	Aggregate	C	
350C		0.8	Local	3	FS	Aggregate	C	
351	Elrod	2.8	Local	3	FS	Aggregate	D	
351A	Lick Branch	0.2	Local	3	FS	Aggregate	D	
351B	Mill Creek	1.1	Local	3	FS	Aggregate	D	
354	Lois	2.6	Local	3	FS	Aggregate	D	
355	Mott	1.7	Local	3	FS	Aggregate	C	
355A	Jubilee	0.8	Local	3	FS	Aggregate	D	
356	Big Branch	1.2	Local	3	FS	Aggregate	D	
357	Rocky	0.9	Local	3	FS	Aggregate	D	
358	Bullet	0.6	Local	3	County	Aggregate	D	
359	JoAnn	0.8	Local	3	FS	Aggregate	C	
359A	Ferguson's Find	0.6	Local	3	FS	Aggregate	D	
361	Southern Pacific	3.0	Local	3	County	Aggregate	C	PFSR
362	Pisgah	0.8	Local	3	FS	Aggregate	D	
363A	Hog Branch	1.9	Local	3	FS	Aggregate	C	
364	Log Crossing	0.7	Local	3	FS	Aggregate	D	
373	Moss Hill	0.8	Local	3	FS	Aggregate	D	
374	Prairie Creek	1.0	Local	3	FS	Aggregate	C	
374A	Prairie Creek Spur	1.0	Local	3	FS	Improved Dirt	C	
375	Chicken Road	0.7	Local	3	FS	Aggregate	D	
376	Y'Barbo	0.5	Local	3	FS	Aggregate	D	
400	Blount	2.0	Local	3	FS	Improved Dirt	C	
400B	Garden Spot	0.2	Local	3	FS	Improved Dirt	C	
401	Arriola	2.0	Local	3	FS	Improved Dirt	C	
401A	Hardwood	0.4	Local	3	FS	Improved Dirt	D	
402	Pettijohn	1.1	Local	3	FS	Improved Dirt	D	
402B	Jack Creek	0.9	Local	3	FS	Aggregate	D	
404	Spring Branch	1.6	Local	3	FS	Improved Dirt	C	

Appendix E. Maintenance Levels

PARAMETERS	1	2	3	4	5
Service Life	Intermittent Service-Closed Status	Constant Service or Intermittent Service - Open Status (Some uses may be restricted under 36 CFR 261.50)			
Traffic Type	Open for non-motorized uses. Closed to Motorized traffic traffic.	Administrative, permitted, dispersed recreation, specialized, commercial haul.	All National Forest Traffic - General Use and Commercial		
Vehicle Type	Closed-N/A	High clearance, pick-up, 4x4, log trucks, etc.	All types - passenger cars to large commercial vehicles		
Traffic Volume	Closed-N/A	Traffic volume increases with maintenance level			
Typical Surface	All types	None, Native, or Aggregate (may be dust abated)		Aggregate (usually dust abated) or Paved	
Travel Speed	Closed-N/A	Travel speed increases with maintenance level			
User Comfort and Convenience	Closed-N/A	Not a consideration	Low Priority	Moderate Priority	High Priority
Functional Classification	All Types	Local Collector	Local Collector Arterial	Local Collector Arterial	Local Collector Arterial
Traffic Service Level	Closed-N/A	D	A, B, C Traffic Service Level increases with Maintenance Level		
Traffic Management Strategy	Prohibit or Eliminate	Discourage or Prohibit cars. Accept or Discourage high clearance vehicles.	Encourage, Accept	Encourage	Encourage

Appendix F. Traffic Service Levels

	A	B	C	D
Flow	Free flowing with adequate parking facilities.	Congested during heavy traffic such as during peak logging or recreation activities.	Interrupted by limited passing facilities, or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two-way traffic is difficult and may require backing to pass.
Volumes	Uncontrolled; will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods.	Erratic; frequently controlled as the capacity is reached.	Intermittent and usually controlled. Volume is limited to that associated with the single purpose.
Vehicle Types	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Controlled mix; accommodates all vehicle types including the critical vehicle. Some use may be controlled to vehicle types.	Single use; not designed for mixed traffic. Some vehicles may not be able to negotiate. Concurrent use traffic is restricted.
Critical Vehicle	Clearances are adequate to allow free travel. Overload permits are required.	Traffic controls needed where clearances are marginal. Overload permits are required	Special provisions may be needed. Some vehicles will have difficulty negotiating some segments.	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in.
Safety	Safety features are a part of the design.	High priority in design. Some protection is accomplished by traffic management.	Most protection is provided by management.	The need for protection is minimized by low speeds and strict traffic controls.
Traffic Management	Normally limited to regulatory, warning, and guide signs and permits	Employed to reduce traffic volume and conflicts.	Traffic controls are frequently needed during periods of high use by the dominant resource activity.	Used to discourage or prohibit traffic other than that associated with the single purpose.
User Costs	Minimize; transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays.	Not important; efficiency of travel may be traded for lower construction costs.	Not considered.
Alignment	Design speeds is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors. Design speeds are generally low.	Dictated by topography, environmental factors, and the design and critical vehicle limitations. Speed is not important.
Road Surface	Stable and smooth with little or no dust, considering the normal season of use.	Stable for the predominant traffic for the normal use season. Periodic dust control for heavy use or environmental reasons. Smoothness is commensurate with the design speed.	May not be stable under all traffic or weather conditions during the normal use season. Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protection.	Rough and irregular. Travel with low clearance vehicles is difficult. Stable during dry conditions. Rutting and dusting controlled only for soil and water protection.

Appendix G. Road Management Objectives



United States
Department of
Agriculture

Forest
Service

National Forests and
Grasslands in Texas
SO

701 N. First Street
Lufkin, TX 75901
Phone 936-639-8501
TDD# 936-639-8560

File Code: 7730

Date: July 7, 1999

Route To:

Subject: Road Maintenance Objectives (RMOs)

To: District Rangers

Enclosed are the RMOs for the Forest. They have been approved for use Forestwide. If you have a project that requires an exception to these generic RMOs, then you can develop and approve a new RMO that meets the specific project requirements. Specific project RMOs can be approved by the District Ranger.

s/ Glenn P. Donnahoe

GLENN DONNAHOE
Acting Team Leader
Heritage, Recreation, Lands,
Engineering and Information Systems

cc: R. Graves
S. Lewis
J. White
N. Snoberger
L. Felts
B. Rasbeary
B. Breland
G. Bible
D. Benner
D. Phillips
G. Weick
L. Bonner
D. Peterson
G. Ippolito

NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 4 and 5 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL: ML 4: Moderate degree of user comfort

ML 5: High degree of user comfort

Recreation roads are subject to seasonal closure

TRAFFIC SERVICE LEVEL: ML 4: TSL C & B

ML 5: TSL B & A

FUNCTIONAL CLASS:	ML 4: Local – 57.1 miles	ML 5: Local – 38.6 miles
	Collector – 25.7 miles	Collector – 0 miles
	Arterial – 0 miles	Arterial – 0 miles

A. Design Criteria

Primary Road Users:

Mixed traffic including public, recreational, commercial, suburban, mail, medical and law enforcement travel needs.

B. Traffic Requirements – Traffic consists of cars, pickups, school buses, mail carriers, local law enforcement and rescue squad emergency vehicles and touring buses. Some tractor trailer, commercial and industrial carriers.

1. Design Vehicle – Cars and tractor-trailers operating at the maximum legal weight of 85,000 pounds.
2. Design Speed – Speed limits should be determined based upon road alignment and geometry and meeting state requirements.
3. Safety – Provide for surfacing material to support design vehicles within the approved design speed limit for each road. Provide for minimum 8 foot safety zones on each side of the road. Signing shall conform to the latest edition of the TX MUTCD.
4. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
5. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

- A. Design Class – Double lane, including minimum 8-foot safety zones.
- B. Right-of-way – 50 feet
- C. Design width – 26 feet includes 22 foot riding surface with 2 foot shoulders.
- D. Design Profile & Grade – Road cross section includes cut and fill sections with ditches and drainage structures. Maximum centerline grade of 4% with short road sections of up to 8% for distance of 500 feet or less.
- E. Slopes – Front slopes 4:1, Back slopes 3:1
- F. Surfacing – ML 4: Minimum of 6 inches of crushed aggregate. ML 5: Minimum of 3 inches of hot mix asphalt or two coats of bituminous chip seal.
- G. Sub-grade – Improve structural strength with lime or cement treated sub-grade. Minimum depth to be determined by engineering design.
- H. Drainage Structures – Designed to meet 50 year flood events, structural and environmental needs.
- I. Sign – Provide regulatory, informational, directional, and warning signs according to the TX MUTCD.
- J. Erosion Control – Provide temporary and permanent erosion control to minimize the loss and damage of roadway and areas.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 4 and 5 roads will remain open and are subject to the Highway Safety Act. Emergency repairs of damaged roads and signs must be completed in a timely manner to respond to public traffic needs.
- B. Maintenance – Current and Preventative – Provide routine maintenance activities necessary to prevent damage to the roadway and surrounding s. Frequent monitoring and maintenance repairs are needed to ensure the safety of the traveling public and Forest Service employees. Monitor frequently and provide as a minimum road maintenance inspection on roads that have a high ADT and accident history. Take corrective action on any critical safety need.

C. The Maintenance Level 4 and 5 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this "RMO – Maintenance Level 4 & 5".

PREPARED BY:	<u>s/ <i>Richard Graves</i></u>	<u>6/29/99</u>
	Richard Graves	Date
REVIEWED BY:	<u>s/ <i>Glenn P. Donnahoe</i></u>	<u>7-6-99</u>
	Glenn Donnahoe	Date
APPROVED BY:	<u>s/ <i>Ronnie Raum</i></u>	<u>7/7/99</u>
	Ronnie Raum Forest Supervisor	Date

NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 3 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL 3: Suitable for passenger cars

TRAFFIC SERVICE LEVEL: TSL C

FUNCTIONAL CLASS: Local – 231 miles

Collector – 201 miles

Arterial – 37 miles

A. Design Criteria

Primary Road Users:

Mixed traffic including public, recreational, commercial and other National Forest resources, suburban, mail routes, medical and law enforcement travel needs.

B. Traffic Requirements – Traffic consists of cars, pickups, log trucks, oil and gas heavy duty trucks, school buses, mail carriers, local law enforcement and rescue squad vehicles and local farming equipment and trucks.

1. Design Vehicle – Cars and tractor-trailers operating at the maximum legal weight of 85,000 pounds.
2. Design Speed – Speed limits should be determined based upon road alignment and geometry and meeting state requirements.
3. Safety – Provide for surfacing material to support design vehicles within the approved design speed limit for each road. Signing shall conform to the latest edition of the TX MUTCD.
4. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
5. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

- A. Design Class – Single lane, with turnouts, includes some double lane roads.
- B. Right-of-way – 40 feet
- C. Design width – 14 foot riding surface with 1 foot shoulders

- D. Design Profile & Grade – Road cross section includes cut and fill sections with ditches and drainage structures. Maximum centerline grade of 6% with short road sections of up to 10% for distance of 500 feet or less.
- E. Slopes – 3:1
- F. Surfacing – Roads shall maintain a minimum of 4 inch depth of crushed aggregate surfacing with improved sub-grade.
- G. Drainage Structures – Designed to meet minimum 25 year flood events, structural and environmental needs. Provide for protection of culvert and bridge inlets and outlets, including rip rap or reinforced concrete protection.
- H. Sign – Provide warning, directional and regulatory signs complying with the TX MUTCD.
- I. Erosion Control – Provide temporary and permanent erosion control to minimize loss and damage of roadway and areas.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 3 roads can be closed. They are subject to the Highway Safety Act. Emergency repairs of damaged roads and signs must be completed in a timely manner to respond to public traffic needs. Use proper closure devices and signing, meeting Texas MUTCD and Forest Service requirements.
Maintenance – Current and Preventative
Provide routine maintenance activities necessary to prevent damage to the roadway and surrounding s. Frequent maintenance repairs are needed to ensure the safety of the traveling public and Forest Service employees. Monitor frequently and provide as a minimum road maintenance inspection on roads that have a high ADT and accident history. Take corrective action on any critical safety need.
- B. The Maintenance Level 3 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this “RMO – Maintenance Level 3”.

PREPARED BY:	<u>s/ <i>Richard Graves</i></u>	<u>6/29/99</u>
	Richard Graves	Date
REVIEWED BY:	<u>s/ <i>Glenn P. Donnahoe</i></u>	<u>7-6-99</u>
	Glenn Donnahoe	Date
APPROVED BY:	<u>s/ <i>Ronnie Raum</i></u>	<u>7/7/99</u>
	Ronnie Raum, Forest Supervisor	Date

NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 2 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL 2: High Clearance Vehicles

TRAFFIC SERVICE LEVEL: TSL C and TSL D

FUNCTIONAL CLASS: Local - 1483 miles

A. Design Criteria

Primary Road Users:

- Commercial Timber Haul
- Dispersed Recreation
- Hunting and Trails
- Forest Service Administration
- Contact Administration
- Environmental Monitoring
- Resource Protection

B. Traffic Requirements

Traffic primarily consists of commercial haul vehicles with related high clearance service and administrative type vehicles.

1. Design Vehicle – Tractor trailers operating at the maximum legal weight of 85,000 pounds.
2. Safety – Provide for structural materials (riprap, geotech fabric) to reinforce poor subgrades, minimize rutting and to increase traction on grades greater than 6%. Provide for proper signing.
3. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
4. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

- A. Design Class – Single lane with turnouts and curve widening as needed for safety.
- B. Right-of-way (ROW) – 20 to 28 feet
- C. Design width – 12 foot riding surface with 1 foot shoulders.

- D. Design Profile & Grade – Road cross section includes cut and fill sections with ditches and drainage structures. Maximum centerline grade of 8% with short road sections of up to 14% for distances to 500 feet or less.
- E. Slopes – 3:1
- F. Surfacing – Spot surfacing and surfacing of sections of roads or entire lengths of roads depending upon volume and type of traffic, soil type and strength and erosion control requirements. Some roads with existing native surfacing that prevents rutting do not need crushed aggregate.
- G. Drainage Structures – Design to meet minimum 10 year flood events, structural and environmental needs.
- H. Erosion Control – Provide temporary and permanent erosion control to minimize loss of surfacing, roadbed, and roadway components.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 2 roads can be closed. Use proper closure devices and signing meeting Texas MUTCD and Forest Service requirements.

Maintenance Level 2 roads are not subject to the Highway Safety Act.
- B. Maintenance – Provide maintenance activities necessary to protect the environment and resources that the transportation facility serves. Provide for spot surfacing and erosion control repair or replacement as needed. Utilize a road maintenance condition survey to identify maintenance needs.
- C. The Maintenance Level 2 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this
“RMO – Maintenance Level 2”.

PREPARED BY:	s/ <u>Richard Graves</u>	<u>6/29/99</u>
	Richard Graves	Date
REVIEWED BY:	s/ <u>Glenn P. Donnahoe</u>	<u>7-6-99</u>
	Glenn Donnahoe	Date
APPROVED BY:	s/ <u>Ronnie Raum</u>	<u>7/7/99</u>
	Ronnie Raum, Forest Supervisor	Date

NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 1 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL 1: Basic Custodial Care
Road Closed

TRAFFIC SERVICE LEVEL: TSL D

FUNCTIONAL CLASS: Local – 444 miles

A. Design Criteria

Primary Road Users:

Commercial Haul
Dispersed Recreation
Hunting and Trails
Forest Service Administration
Contact Administration
Environmental Monitoring
Resource Protection

B. Traffic Requirements – Traffic primarily consists of commercial haul vehicles with related high clearance service and administrative type vehicles.

1. Design Vehicle – Tractor-trailers operating at the maximum legal weight 85,000 pounds.
2. Safety – Provide for structural materials (riprap, geotech fabric) to reinforce poor subgrades, minimize rutting and to increase traction on grades greater than 8%. Provide for proper signing.
3. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
4. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

A. Design Class – Single lane, only add turnouts where needed for safety.

B. Right-of-way – 20 feet.

C. Design width – 12-foot travelway.

- D. Design Profile & Grade – Usually flat grades with dips and ditches as needed to reduce sediment runoff. Pitch grades can be between 8% and 15% for distances of 500 feet or less. Use culverts in perennial streams and intermittent streams.
- E. Slopes – 3:1
- F. Surfacing – Provide surfacing to protect resources including stream approaches, dips and other drainage structures.
- G. Drainage Structures – Design to meet structural and environmental needs. Provide for a minimum hydraulic design for a 10-year flood event.
- H. Erosion Control – Provide temporary and permanent erosion control to minimize loss of soil.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 1 roads will be closed permanently or seasonally. Use proper closure devices and signing meeting Texas MUTCD and Forest Service manual requirements.

Maintenance Level 1 roads are not subject to the Highway Safety Act.

- B. Maintenance – Provide maintenance activities necessary to protect the environment and resources that the transportation facility serves. Annual and routine maintenance is not required. Repair washed out road sections to prevent further loss of roadway and drainage structures. Road condition surveys should be performed to identify maintenance needs.
- C. The Maintenance Level 1 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this “RMO – Maintenance Level 1”.

PREPARED BY:	<u>s/ <i>Richard Graves</i></u>	<u>6/29/99</u>
	Richard Graves	Date
REVIEWED BY:	<u>s/ <i>Glenn P. Donnahoe</i></u>	<u>7-6-99</u>
	Glenn Donnahoe	Date
APPROVED BY:	<u>s/ <i>Ronnie Raum</i></u>	<u>7/7/99</u>
	Ronnie Raum	Date
	Forest Supervisor	

Appendix H. Summary of Current *Plan* Direction

The Revised Land and Resource Management Plan for the National Forests and Grasslands in Texas (the *Plan*) was approved in March 1996. This appendix summarizes the desired future conditions in the *Plan* related to roads and the *Plan's* standards and guidelines that apply to road management.

1.1 The Plan's Desired Future Condition for Roads

The discussion of the desired future conditions and management objectives in Chapter 4 of the *Plan* provide the general direction to consider in the management of roads and access to the forest. The goals, desired future conditions, and objectives relative to roads were developed to respond to the Roads and Trails issue that arose during the public involvement process during preparation of the *Plan*.

The *Plan* contains the following direction specific to roads:

Roads will exist to provide access to the NFGT, however, some of these roads will be for administration and management only, with limited vehicular use by the public (the *Plan*, p. 44).

Forest-wide objectives relative to roads include the following (the *Plan*, p. 47):

Acquire rights-of-way that facilitate efficient management.
Manage the transportation system for increased cost-effectiveness and efficiency.

1.2 Plan Standards and Guidelines Applicable to Roads

1.2.1 Forest-wide Standards and Guidelines

FW-051

Develop the Forest Road System, as needed, to respond to resource and travel management objectives while providing for the appropriate movement of people and products to and through National Forest System lands.

Road and trail construction, reconstruction, and maintenance related activities will occur to support timber management, minerals exploration and development, recreation access, special uses, Forest administration and other management activities.

FW-052

Establish and maintain vegetative cover on slopes and areas outside the driving surface or trail head that were disturbed during road and trail construction and reconstruction activities.

FW-053

Design and construct roads and trails to minimize siltation and maintain to provide surface drainage away from streams and into vegetated buffer strips or other filtering system.

FW-054

Follow Scenic Resource Standards according to FSH and FSM guidelines for road location planning.

FW-055

Provide road and trail design and construction that allows unrestricted fish passage.

FW-056

Provide appropriate maintenance, operational management and reconstruction of existing dams, roads and trails.

The use of EPA approved herbicides following appropriate site-specific environmental analysis is permitted.

FW-057

Maintain Forest Development Roads to appropriate maintenance level standards for the planned use and traffic.

The appropriate maintenance level for roads are:

Arterial Roads - Level 4 or 5

Collector Roads - Level 3,4, or 5

Local Roads - Level 1,2,3,4, or 5

Level 1 - Custodial care with road use restrictions.

Level 2 - Limited traffic with brush control for high clearance vehicle.

Level 3 - Limited traffic with rough surface, passenger vehicle use possible with user comfort and convenience a low priority.

Level 4 - Moderate traffic with surface maintenance, passenger vehicle use provided with a moderate degree of user comfort and convenience

Level 5 - High traffic possible with surface maintenance, passenger vehicle use provided with a high degree of user comfort and convenience.

FW-058

Obliterate existing roads not needed for current or future use and have vegetative cover reestablished on all disturbed areas.

FW-059

Apply road use restrictions to protect other resource values.

a. Transportation routes inventoried in the Forest Transportation Information System (Infrastructure) should remain open for public travel unless restrictions are implemented in response to resources or program including but not limited to wildlife, recreation, minerals, fire, soil and water, and road maintenance reduction

b. A site specific analysis will be prepared for each proposed travelway closure or restriction. This analysis shall consider the effects on developed and dispersed recreation including the needs of people with disabilities

c. Restrictions shall conform to the requirements of 36 CFR 261

FW-214

Design roads according to Best Management Practices (BMP's). Implementation of construction and maintenance conforms to BMP's to meet State Water Quality Standards.

1.2.2 Management Area 1 – Upland Forests Ecosystems Standards and Guidelines

MA-1-11

New trails and roads are developed as necessary to provide access for recreation and other compatible multiple uses.

New trails, trailheads, or parking facilities may be built where needed to improve recreation opportunities Provide facilities and access to key attractions such as recreational fisheries Provide access for handicapped users in the design and construction of the facilities.

MA-1-12

All system roads shall be planned, located, designed, constructed, and reconstructed to provide the road density necessary to meet commodity production needs.

Other criteria considered are

- * *Resource management objectives,*
- * *Environmental needs and requirements,*
- * *Safety,*
- * *Traffic requirements,*
- * *Vehicle characteristics;*
- * *Road users, including users with disabilities;*
- * *Use seasons, and*
- * *Economics.*

MA-1-13

Develop a total road density, including temporary roads, for timber sales using a maximum skid distance of approximately 1300 feet.

MA-1-14

Construct and reconstruct Forest Development Roads (FDR) to standards appropriate for Traffic Service Levels B through D.

MA-1-15

Provide appropriate maintenance and operational management for the FDR System to accommodate commodity production, other access needs, safety, and resource protection.

This includes the use of Environmental Protection Agency (EPA) approved pesticides where approved through site-specific environmental analysis.

MA-1-16

Require commercial users of system roads to contribute to road maintenance commensurate with their level of use.

Contributions will be in the form of reimbursement or actual work performed.

MA-1-17

Local roads constructed or reconstructed in conjunction with timber sale or special use activities may be closed or remain open for secondary purposes.

These special use roads may be managed as linear wildlife openings, open for limited use if needed for recreation or administrative uses, or available for non-motorized travel.

MA-1-18

Obliterate and revegetate temporary roads as part of the project work.

Methods used, timing, and mitigation measures shall be in accordance with the site-specific project plan. Such roads shall be designed to reestablish vegetative cover on the disturbed area as soon as practicable.

MA-1-81

Spot treat roads, skid trails, and log landings with mulch as needed to provide a protective cover according to specifications in appropriate R8-CT provisions as provided in timber sale contracts.

1.2.3 Management Area 2 – Red-cockaded Woodpecker Emphasis Standards and Guidelines

MA-2-11

New trails and roads are developed as necessary to provide access for recreation and other compatible multiple uses.

New trails, trailheads, or parking facilities may be built where needed to improve recreation opportunities, Provide facilities and access to key attractions such as recreational fisheries Access for people with disabilities shall be provided in the design and construction of facilities.

MA-2-12

All system roads shall be planned, located, designed, constructed, and reconstructed to provide the road density necessary to meet resource management and commodity production.

Other criteria considered are

- * Resource management objectives,*
- * Environmental needs and requirements,*
- * Safety,*
- * Traffic requirements,*
- * Vehicle characteristics;*
- * Road users, including users with disabilities;*
- * Use seasons, and*
- * Economics.*

MA-2-13

Develop a total road density, including temporary roads, for timber sales using a maximum skid distance of approximately 1300 feet.

MA-2-14

Construct and reconstruct Forest Development Roads (FDR) to standards appropriate for Traffic Service Levels B through D.

MA-2-15

Provide appropriate maintenance and operational management for the FDR System to accommodate commodity production, other access needs, safety, and resource protection.

This includes the use of Environmental Protection Agency (EPA) approved pesticides, where approved through site-specific environmental analysis.

MA-2-16

Require commercial users of system roads to contribute to road maintenance commensurate with the levels of use.

Contributions will be in the form of reimbursement or actual work performed.

MA-2-17

Local roads constructed or reconstructed in conjunction with timber sale or special use activities may be closed or remain open for secondary purposes.

These special use roads may be managed as linear wildlife openings, open for limited use if needed for recreation or administrative uses, or available for non-motorized travel.

MA-2-18

Obliterate and revegetate temporary roads as part of the project work.

Methods used, timing, and mitigation measures shall be in accordance with the site-specific project plan. Such roads shall be designed to reestablish vegetative cover on the disturbed area as soon as practicable. (not to exceed ten years after the termination of the contract, permit, or lease).

MA-2-80-3.3.5 Construction of Rights-of-way

Construction of linear right-of-way, such as roads, powerlines, or pipelines is prohibited within clusters, replacement or recruitment stands.

MA-2-80-3.3.6 Existing Rights-of-way

Reconstruction or maintenance of existing roads, powerlines, or pipelines through clusters, replacement or recruitment stands is allowed if the activities are scheduled outside the nesting season. Such activities shall be closely monitored to ensure protection of cavity trees and potential cavity trees.

Light maintenance of high standard open roads, such as road grading or mowing of rights-of-way, and emergency maintenance of powerlines and pipelines, may be allowed during the nesting season.

MA-2-80-4.6

Permanent clearings for nontimber purposes may not occur if the loss of habitat would reduce the capability of the HMA to support its identified RCW population objective.

1.2.4 Management Area 4 – Streamside Management Zones Standards and Guidelines

MA-4-22

Limit new road construction only to stream crossings or recreation facilities except where valid existing rights would allow.

Stream crossings should be constructed at right angles to the stream or riparian areas.

MA-4-23

Bridges are constructed so as to not constrict clearly defined stream channels.

- a. Design permanent bridges for 100-year flood levels to extent practicable*
- b. Bridge approaches should be constructed to prevent erosion, use of culverts or box culverts that adversely restrict flow and native fisheries should be avoided.*
- c. Limit the use of construction equipment in streams to the amount of time absolutely essential for completion of the project*

MA-4-24

Require appropriate structures at all designated trails, permanent and temporary road system stream crossings.

- a. Design these structures to permit fish passage.*
- b. Consider bridges on all perennial streams.*
- c. Use culverts, anchored corduroy, bridges, gravel and/or concrete fords at intermittent and certain ephemeral streams that are determined during site specific analysis to require protective measures.*
- d. Conforms with mandatory BMP for Section 404 for roads constructed for silvicultural purposes and Section 404 nationwide, general and individual permits for facility construction and maintenance when facilities are not for silvicultural purposes.*
- e. Minimize or avoid crossings for roads and trails with deeply-incased stream banks.*

MA-4-25

Protect road and trail approaches to and from perennial streams with anchored corduroy, gravel, or concrete for a minimum distance of 20 feet from the edge of stream channel.

Re-enforced approaches to bridges may be necessary and the need for these will be determined on a case-by-case basis. Extend the protection to the gradient break to include nearby transitions between the stream floodplain and other landforms.

MA-4-26

Construction of physical structures within stream channels will be designed and engineered.

Construction will consider physical stream systems, including fishery habitat improvement structures, through coordination with other resource specialists.

MA-4-27

Roads and trails will be constructed and maintained as per section 404 of the Clean Water Act.

1.2.5 Management Area 10b – Special Use Permit Sites Standards and Guidelines

MA-10b-31

Issue of new special use permits or reissue of existing special use permits will be consistent with management direction in the Revised Plan.

MA-10b-32

Upon application for new special use permits, conduct appropriate site specific analysis of the effects of the use before issuing permit.

MA-10b-33

Consolidate linear rights-of-way into a single corridor where physically and legally feasible.

MA-10b-34

New, permanent uses may be authorized only upon a clear demonstration that the proposal is in the best interests of the general public.

MA-10b-35

Deny an application for a permanent use where a reasonable alternative lies in using other than National Forest lands.

MA-10b-38

Authorize only one private access road per private tract, regardless of multiple ownership. Avoid committing National Forest land as substitute for lack of internal access due to poor sub-division planning or uncooperative neighbors in the same private tract.