BALDWIN COUNTY COMMISSION

DESIGN STANDARDS FOR NEW ROAD CONSTRUCTION 2020

Design Standards for New Road Construction

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Chapter 1 General Elements for Design

The following information will be included in the design for the paving of dirt roads and new construction.

1.1 Design

The design of new and reconstructed roadways with design traffic counts of 2,500 ADT or greater will be based on the American Association of State Highway and Transportation Officials (AASHTO) publication, *A Policy Design of Highways and Streets, current edition*.

New and reconstructed projects having less than 2,500 design year ADT will be based on this document. All design criteria will be based on the future (i.e. , 10 year) ADT.

Any Project using State or Federal money must use ALDOT approved design criteria and documentation.

Any feature not meeting the above standards must be approved by the County Engineer or designated representative as a design exception.

1.2 Clear Zone

The following is given as guidance for clear zones and treatment for slope and drainage structure protection for different type projects:

The area adjacent to the traveled way that is clear of obstructions and having a slope no steeper than three horizontal to one vertical (3:1) foreslopes.

NEW AND RECONSTRUCTED ROADWAYS WITH DESIGN TRAFFIC COUNTS OF 2,500 ADT OR MORE.

The suggested clear zone width is as shown in the American Association of State Highways and Transportation Officials publication, *A policy on Geometric Design of Highways and Streets, current edition, and Roadside Design Guide, current edition*.

NEW AND RECONSTUCTED ROADWAYS WITH DESIGN TRAFFIC COUNTS BELOW 2,500 ADT.

The suggested clear zone width is as shown in this document design criteria for New and Reconstructed Roadways and Bridges with less than 2,500 ADT.

1.3 Guardrail

Any project shall require guardrail and end anchor protection at existing and proposed bridge and culvert structures in accordance with the following guidelines:

For projects with functional classification less than collector and design speeds of 45 mph or less and design year traffic of 2,500 ADT or less, the *length of need requirement is waived and the approach guardrail length is dictated by the type anchors used, applicable drawings, and warranty criteria.

For projects with functional classification of collector or greater and design speeds greater than 45 mph or design year traffic greater than 2,500 ADT, a minimum 75 foot *length of need is applicable.

*Note: the "Length of Need" is defined as the total length of a longitudinal barrier of needed to shield an area of concern.

1.4 Roadway (Street)

Composition of the traveled way and shoulders.

1.5 Traveled Way

The portion of the roadway that is used for the movement of vehicles, exclusive of the shoulders.

1.6 Typical Roadway Cross Section

Roadways for this policy may include the following cross section types:

Open – Ditch
Curb and Gutter
No – Crown

1.7 Drainage

Drainage for this policy includes the following:
Open Channels
Sidedrain or Lateral Systems
Crossing (Closed) Storm Sewer
Culvert (Open) Cross Drainage
Bridge or Bridge Culvert
Detention requirements (if required) shall conform to the *Baldwin County Subdivision Regulations, current edition* and all applicable, Alabama Department of Transportation, Special and Standard Drawings, Current Edition.

1.8 Traffic Control

All contracted projects shall include traffic control and will conform to the current edition approved by ALDOT of the MUTCD, *Manual on Uniform Traffic Control Devices, Part VI.*

1.9 Erosion Control

Projects shall include the current requirements of NPDES. Reference the Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas, current edition and all applicable, Alabama Department of Transportation, Special and Standard Drawings, Current Edition.

1.10 Specifications and Construction Standards

All new road construction shall follow Alabama Department of Transportation Specifications, current edition.

Chapter 2 Functional Classification

The classification of local roadways into different functional classes is necessary for communication among engineers, local agencies, and the general public. Different classifications apply for different purposes in both the rural and urban environment. Functional classification, the grouping of streets /roads by the character of service they provide, is the main purpose in planning, design, meeting social needs, and to establish funding. The functional classification of roads and streets is an important management tool in the establishment for realistic improvements both for individual roadways and for the county road system as a whole. The idea is to combine adequacy with economy and to attain a rural road or urban street system giving the highest overall level of service per dollar of investment. A complete functional roadway system provides the motoring public with a series of distinct travel movements. From main movement at the national level, to the termination movement at an isolated location at the rural level, the function of each type of roadway should be designed and planned in a distinctly different manner.

According to the guidelines as established in *AASHTO, A Policy on Geometric Design of Highways and Streets, Current Edition,* the current concept of a complete highway system consists of six stages or movements. In most cases these stages are *main, transition, distribution, collection, access,* and *termination.* In some cases, the termination of a trip may exclude some of these movements.

Main movement involves the transportation of the highest volumes of vehicular traffic on *expressway* or *freeway* and primary arterial systems at national and state levels. Examples of this include roads like the Interstate System (I-10 and I-65), U.S. Highway system (U.S. Hwy 287, U. S. Hwy 98, and U. S. Hwy 90). This level requires the highest design standards for mobility and safety, while limiting access points throughout its entire system.

Transition movement is the first step in directing traffic from a national, state, or inter-county level roadway system to the local environment level. The transition movement includes *arterial* and *collector systems.* Examples of this include roads like State Hwy 59, and Foley Beach Express. Transition movement design requires the designer or planner to start allocating for the need of public access to property; however mobility at this level is still the primary focus.

Distribution movement consists of a broad spectrum of vehicular traffic trying to access a wide variety of *collector roads* and various *local roads* in a county-wide system. Examples of this include roads like CR 32, CR 48, CR 55, and CR 65. The demand for public access to property becomes varied and is the main focus in design. Mobility is restricted at different levels and for different purposes. The Collection movement, Access movement and Termination movement constitute the rest of the various local road systems. Transportation at this level involves the movement of a wide variety of vehicular types to and from a wide variety of destinations. Access is the main focus for design, yet still having to blend with the movement of vehicular traffic. Such movement can range from high density work or school traffic, to a single vehicle destined for a boat ramp on an isolated rural road (trail). The design of these roads may and will vary considerably.

The first step in developing road classifications is by determining its urban verses rural roadway area. *AASHTO, A Policy on Geometric Design of Highways and Streets, Current Edition,* defines urban areas as all areas which have a population greater than 5,000 or more, Urban areas are further subdivided into urbanized areas (population of 50,000 and over) and small urban areas (population between 5,000 and 50,000). All other areas which have a lesser population are rural. The Alabama Department of Transportation has established by code (Section 101 of Title 23, U. S. Code) the boundary of Baldwin County that has an urbanized area. In both the rural or urban areas all the vehicular movement levels occur, but the vehicular densities and the access to properties vary considerably. The quantity of vehicular traffic does not determine an urban area just as the use of land does not determine a rural area.

The next step in developing road classifications is by determining the general characteristics that the road has. Some of the general characteristics would include; linkage with other roads, the service it provides to the area, design speeds, access to property, truck usage, and level of service. The current roadway system, as recognized by NACE and defined by AASHTO, designates four basic classifications; *Primary Arterial, Minor Arterial, Collector (major and minor) and Local.*

	Urban Mileage (Percent)		Rural Mileage (Percent)
Principal Arterial Street	5-10	Principal Arterial Roads	2-4
Principal Arterial plus	15-25	Principal Arterial plus	7-10
Minor Arterial Streets		Minor Arterial Roads	
Collector Streets	5-10	Collector Roads	20-25
Local Streets	65-85	Local Roads	65-75

(Fig. 2)

2.1 Arterial and Collector Street /Road General Characteristics

2.1.1 Principal Arterial

A. Major link from State to State
B. Provide high mobility for longer trips
C. Design speeds are high, 50-70 mph
D. Access is limited to other roads only and rarely to property
E. Truck usage is high and will accommodate the largest vehicle type
F. Level of Service B Desirable

2.1.2 Minor Arterial

A. Major link within state or county level
B. Serve as high traffic corridor to primary arterials
C. Provide high to moderate mobility for moderate trips
D. Design speeds are moderate to high, 35-70 mph
E. Access to abutting property should be limited and sometimes restricted
F. Truck usage is high with possible restrictions in vehicle type

G. Level of Service C Desirable

2.1.3 Collector

A. Major link within county
B. Serve as major traffic generator not directly served by arterials
C. Spaced at intervals that accumulate traffic for local road systems
D. Provide moderate mobility within county
E. Design speeds are moderate to low 20-60 mph
    a. Note: low speeds 20-30 mph should only be used in mountainous terrain.
F. Access to abutting property is minimal to limited
G. Truck usage is moderate with some restrictions in vehicle type
H. Level of Service C to D Desirable

The Local Street /Road functional classification is the next level and constitutes approximately 65-80%of the total roadway mileage. Based on AASHTO this classification has the same general design criteria characteristic. However, not all local streets or Roads have or should have the same characteristics in design, function, and environment. Because of the diversity in characteristics, the following local road classifications have been established by Baldwin County. (See Fig 2.1)

2.2 Local Street /Road General Characteristics

Local Street /Road Functional Classification

	Urban Mileage (Percent)		Rural Mileage (Percent)
Major Local Streets	8-15	Major Local Roads	20-25
Minor Local Streets	10-20	Minor Local Roads	20-30
Residential Streets	35-50	Residential Roads	10-20
Single Purpose Streets	2-5	Single Purpose Roads	5-10
Access Lanes	1-2	Access Lanes	1-2

(Fig. 2.1)

2.2.1 Major Local Street /Road

The classification of roadway is the **highest local level** that links to equal or higher functional classification roadways at each end.

A. Links between equal or higher functional classification roadways
B. Serves as a link to communities or significant areas within a jurisdiction
C. Design speeds are moderate, 25-45 mph Urban 30-45 mph Rural
D. Access to abutting property is moderate
E. Right-of-way width should be a minimum of 60 ft., unless the environment which it serves restricts the acquisition to a lesser width.
F. Truck usage is moderate to high

G. This level of service provides moderate traffic flow except during times of heavy congestion and with no passing restrictions

2.2.2 Minor Local Street /Road

This classification of roadway links **isolated (developed or planned) areas** like subdivisions, industrial or recreational sites in urban areas or commercial farms, timberlands, small communities, residential areas, industrial or recreational sites in rural areas to higher functional classification roadways.

A. Links isolated areas to equal or higher functional classification roadways
B. Serves as typically the only access road from a higher classification roadway
C. May loop into an isolated area and reconnect to the same type of roadway
D. Design speeds are low to moderate, 15-40 mph
E. Access to abutting property is moderate to high
F. Right-of-way width should be a minimum of 50 ft., unless the environment which is serves restricts the acquisition to a lesser width
G. Truck usage is low to moderate
H. This level of service provides minimal traffic flow with limited passing

2.2.3 Residential Local Street /Road

This classification of roadway links **developed or planned subdivisions** to higher functional classification roadways.

A. Links residential areas to higher functional classification roadways
B. May be a part of an internal grid of residential roadways or serve as the only access point
C. Urban geographical environment is city /urban community with small parcels of land and with a high density of population
   Rural geographical environment is county /rural community, with possible large parcels of land and low density of population
D. Design speeds are low 10-30 mph
E. Access to abutting property is high (main function)
F. Right-of-way should be a minimum of 30 ft
G. Truck usage is low
H. This level of service provides slow traffic flow and may require stopping to allow opposing traffic to pass

2.2.4 Single Purpose Local Street /Road

This classification of roadway links **isolated areas** like a minimal number of houses, a recreational area or a scenic place to a higher functional classification roadway.

Single purpose street. A two-directional one-lane local street.
Access to a subdivision by means of a single purpose street is not permitted. Single Purpose Roads are not permitted to be used in a new subdivision.

Characteristics:

Links isolated areas serving a minimal number of parcels, and has little potential for further development

A. Serves as only access
B. Design speeds are low, 15 mph
C. Access to served property is main function
D. Right-of-way width should be a minimum of 30 ft
E. Truck or recreational usage would be determined based on the single use of the road
F. This level of service provides restricted traffic flow and may require stopping and backing to allow opposing traffic to pass

2.2.5 Access Lane

This classification of roadway links **isolated areas** with a minimal number of houses to a higher functional classification roadway.

A. Links isolated areas serving a minimal number of parcels, and has no potential for further development
B. Design speeds are very low, 10 mph
C. Access to served property is main function
D. Right-of-way width is typically the same as the roadway width, and may only include the prescriptive area of the roadway
E. Truck or recreational vehicle usage would not typically use this type of roadway
F. This level of service provides restricted traffic flow and will require stopping and backing to allow opposing traffic to pass

The roadway functional classification system should be developed at a local level by those individuals who have the knowledge about the distribution and location of the various environmental, industrial, residential, recreational, and commercial areas within their jurisdictional boundaries. In most cases this would be those having jurisdiction and control for design, construction and maintenance of the local roadway system. These local agencies should have good information as to the frequency and usage by the traveling public. The functional classification system as a management tool should be updated on an approximate five year cycle.

Chapter 3 Elements of Design for Major or Minor Local Streets /Roads

The following roadway design criteria will be used for roads functionally classified as Local Streets/Roads (both Major and Minor), Residential, and Cul-de-sacs.

3.1 Minimum Rodway Design Criteria

1 – 750 ADT

Design Speed mph	Min. Traveled Way Width (a) Feet	Min. Shoulder Width (b/c) Feet	Min. Clear Zone (d) Feet
15	18	2	2
20	18	2	2
25	18	2	2
30	18	2	2
35	18	2	2
40	18	2	2
45	18	2	2

(a) Traveled way is defined as the portion of the roadway for the movement of vehicles, excluding Valley Gutters, Curb & Gutters, Shoulders, and Bicycle Lanes. The width of the traveled is determined above.
(b) 4 feet or wider shoulders should be used on open-ditch type roadway cross section, unless special constraints restrict their use.
(c) On some open-ditch type roadways 1-2 feet paved shoulder may be approved by Baldwin County. If approved, this paved area would be sloped at the same rate as the traveled way, but would be considered as part of the shoulder width.
(d) The area adjacent to the traveled way with a curb and gutter cross section design or open ditch will have a minimum clear zone of 2 feet.

751 – 2500 ADT

Design Speed mph	Min. Traveled Way Width (a) Feet	Min. Shoulder Width (b/c) Feet	Min. Clear Zone (d) Feet
15	20	4	4
20	20	4	4
25	20	4	4
30	22	4	4
35	22	4	4
40	22	6	6
45	22	6	8

(a) Traveled way is defined as the portion of the roadway for the movement of vehicles, excluding Valley Gutters, Curb & Gutters, Shoulders, and Bicycle Lanes. The width of the traveled is determined above.
(b) 4 feet or wider shoulders should be used on open-ditch type roadway cross section, unless special constraints restrict their use.
(c) On some open-ditch type roadways 1-2 feet paved shoulder may be approved by Baldwin County. If approved, this paved area would be sloped at the same rate as the traveled way, but would be considered as part of the shoulder width.
(d) The area adjacent to the traveled way with a curb and gutter cross section design or open ditch will have a minimum clear zone of 2 feet.

3.2 Minimum Stopping and Intersection Sight Distance Criteria

3.2.1 Stopping Sight Distance and Adjustment for Grades (f)

Design Speed mph	Stopping Sight Distance (ft) For Level Roadway (e)	Stopping Sight Distance (ft) for Downgrades			Stopping Sight Distance (ft) for Upgrades		
MPH	0%	3%	6%	9%	3%	6%	9%
15	80	80	82	85	75	74	73
20	115	116	120	126	109	107	104
25	155	158	165	173	147	143	140
30	200	205	215	227	200	184	179
35	250	257	271	287	237	229	222
40	305	315	333	354	289	278	269
45	360	378	400	427	344	331	320
55	495	520	553	593	469	450	433

(e) Distance given is for level roadways and adjustment should be made based on grade.
(f) Stopping sight distance will be calculated on 3.5ft (Driver eye height) and 2 ft. (Object height).

3.2.2 Intersection Sight Distance (g)

Mph	Feet (h/i)
15	170
20	225
25	280
30	335
35	390
40	445
45	500
50	555
55	610

(g) Distances are for a passenger vehicle under stopped condition measured from a point on the minor road 15 (feet) from the edge of pavement of the major road making a left turn maneuver onto a main road with no stopping requirement and may require additional distance for a larger design vehicle. Speed shown (mph) is the speed the vehicle is traveling along the main road and the distance shown (feet) is from the side road to the vehicle on the main road. Intersections that do not meet minimum distance may require an advisory intersection and speed sign. Object 3.5 ft, Driver Eye Height 3.5 ft.
(h) Distances should be adjusted for grades more than 3%. New intersections shall meet at least minimum Intersection Sight Distance.
(i) Additional guidance may be found in *The Green Book*.

3.3 Horizontal and Vertical Criteria

3.3.1 Horizontal Alignment: $R_{min} = \frac{V^2}{15\,(0.01 e_{max} + f_{max})}$

Normal Crown Cross Slope (%) — Minimum Centerline Radius (feet)

Design Speed (mph)	20	25	30	35	40	45
f max	.26	.22	.20	.18	.16	.15
-2.0	115	210	340	515	765	1,040
-2.2	115	215	345	520	775	1,060

3.3.2 Superelevation: emax = .06 (Urban Area)

emax = .08 (Rural Area)

Superelevation (%) — Minimum Centerline Radius (feet)

Design Speed (mph)	20	25	30	35	40	45
f max	.26	.22	.20	.18	.16	.15
8.0	80	140	220	320	450	590
7.0	85	145	225	330	465	615
6.0	85	150	235	345	490	645
5.0	90	160	245	360	510	680
4.0	90	165	255	375	535	715
3.0	95	170	265	390	565	755
2.5	95	175	270	400	580	775
2.2	100	175	275	410	590	790
2.0	100	180	280	415	595	800

Refer to the Alabama Department of Transportation "Standard and Special Drawings," current edition, index number 807 for more information.

3.3.3 Vertical Alignment:

Design Speed mph	K Value for Crest Vertical Curves (I)	K Value for Sag Vertical Curves (I)
15	3	10
20	7	17
25	12	26
30	19	37
35	29	49
40	44	64
45	61	79

(I) Rate of vertical curvature, K, is the length of curve divided by the percent of algebraic difference in intersection grades
(A) K = L/A

3.3.4 Maximum Grade: 15%

3.3.5 Vertical Clearance Over Roadway: 18 ft.

3.3.6 Pavement Cross Slope: 2.0% - 2.5% Open- Ditch
2.0% - 2.5% Curb and Gutter

3.3.7 Grass Shoulder Cross Slope: 4% - 6%

3.3.8 Pavement Build-up:

ADT 1-750

- 424-A Superpave Bituminous Concrete Wearing Surface layer**,** ¾ inch Maximum aggregate size mix, ESAL Range B (220 lb/sy)
- 401-A Bituminous Treatment Type "A" (0.25 gal/sy)
- 301-A Compacted Granular Soil Base Course (sand/clay) Type "A" minimum of two 4" lifts of compacted thickness;
- OR
- 301-B Crushed Aggregate Base Course (limestone) Type "B" minimum 6 inch compacted thickness, (if used delete 401-A treatment)

ADT >750

- 424-A Superpave Bituminous Concrete Wearing Surface layer**,** ½ inch Maximum aggregate size mix, ESAL Range B (125 lb/sy)
- 405-A Tack Coat, Spread Rate of (0.10 gal/sy)
- 424-B Superpave Bituminous Concrete Binder Layer, 1 inch Maximum aggregate size mix, ESAL Range B (220 lb/sy)
- 401-A Bituminous Treatment Type "A" (0.25 gal/sy)
- 301-A Compacted Granular Soil Base Course (sand/clay) Type "A" minimum of two 4" lifts of compacted thickness;
- OR

- 301-B Crushed Aggregate Base Course (limestone) Type "B" minimum 6 inch compacted thickness, (if used delete 401-A treatment)

3.4 Drainage Criteria

3.4.1 Side Drain or Lateral Storm Sewer: Minimum 10 yr. storm

3.4.2 Crossing (Closed) Storm Sewer: Minimum 25 yr. storm

3.4.3 Culvert (Open) Cross Drainage: Minimum 25 yr. storm*

3.4.4 Bridge or Bridge Culvert: Minimum 50 yr. storm*

*(FEMA Flood Zone Requirements may require 100yr Design and FEMA coordination)

(Structure greater than 20 feet of longitudinal length along roadway centerline, Requiring HS – 20 Structural Design)

3.4.5 Typical Bridge Width and Loading: Minimum 28 ft. Loading
HS-20
(2-12 ft. lanes and 2-2 ft. shoulders)

(Bridge widths may need additional width based on functional classification. Where volume > 2500 ADT refer to *"The Green Book"*)

3.5 Slope Criteria

3.5.1 Front Slope: Maximum 3 : 1

3.5.2 Back Slope: Desirable 3 : 1
Maximum 1 : 1

Chapter 4 Elements of Design for Single Purpose Local Street/Road using Existing Topography

The following roadway design criteria will be used for roads functionally classified as single Purpose using Existing Topography.

4.1 Minimum Roadway Design Criteria

Design Speed mph	Traveled Way Width feet	Shoulder Width (j) feet	Clear Zone feet
15	12	2	2

(j) The engineer will determine if shoulder width is possible, 2 feet preferred minimum, and shall be approved by Baldwin County Engineer.

4.2 Minimum Stopping and Intersection Sight Distance Criteria

4.2.1 Stopping Sight Distance and Adjustment for Grades (h)

Design Speed	Stopping Sight Distance (ft) for Level Roadway (e)	Stopping Sight Distance (ft) for Grades		
mph	0%	3%	6%	9%
15	160	160	164	170

(h) Stopping sight distance will be calculated on 3.5 ft. (Driver eye height) and 2 ft. (Object height).

4.2.2 Intersection Sight Distance (c)

Mph	feet (n)
15	170

(c) Distances are for a P design vehicle making a left turn maneuver onto a main road and may require additional distance for a larger design vehicle. Speed shown (mph) is the speed the vehicle is traveling along the main road and the distance shown (feet) is from the side road to the vehicle on the main road. Intersections that do not meet minimum distance may require an advisory intersection and speed sign.
(n) Distances should be adjusted for grades more than 3%...

4.3 Horizontal and Vertical Criteria

4.31 Horizontal Alignment (k):

Design Speed (mph)	Minimum Centerline Radius (ft)
15	50

(k) Curves may vary to match existing topography.

4.32 Vertical Alignment:

Design Speed	K Value for Crest Vertical Curves (d)	K Value for Sag Vertical Curves (d)
mph	Feet	feet
15	12	27

(d) Rate of vertical curvature, K, is length of curve divided by the percent of algebraic difference in intersecting Grades (A). K = L/A
(i) Curves may vary to match existing topography.

4.33 Vertical Clearance Over Roadway: 16 ft.

4.34 Pavement Cross Slope: 0.0% - 4.0% No Crown

4.35 Grass Shoulder Cross Slope: Shoulder area to be determined by engineer and site conditions.

4.36 Pavement Build-up:

ADT 1-750

- 429-A Improved Bituminous Concrete Wearing Surface layer**,** ¾ inch Maximum aggregate size mix, ESAL Range B (220 lb/sy)
- 401-A Bituminous Treatment Type "A" (0.25 gal/sy)
- 301-A Compacted Granular Soil Base Course (sand/clay) Type "A" minimum of two 4" lifts of compacted thickness;
- OR
- 301-B Crushed Aggregate Base Course (limestone) Type "B" minimum 6 inch compacted thickness, (if used delete 401-A treatment)

4.4 Drainage Criteria

4.4.1 Drainage Criteria

Drainage should match existing topography. Additional drainage improvements to be determined by site by site basis.

4.5 Slope Criteria

4.5.1 Front slopes and back slopes should match existing topography.

Chapter 5 Design Waiver

Design waivers shall be permitted in accordance with the following procedure. The engineer shall submit a written proposal which will detail the design change and outline the specific reasons and consequences of the change to the County Engineer. The County Engineer will submit the waiver with his recommendation to the County Commission for their consideration.

For clear zones, the criteria in this design policy should be treated as guidance and not as a county standard requiring a design exception if not numerically met.

References

1. AASHTO, A Policy on Geometric Design of Highways and Streets, "The Green Book". Washington, D. C.: AASHTO, Current Edition.

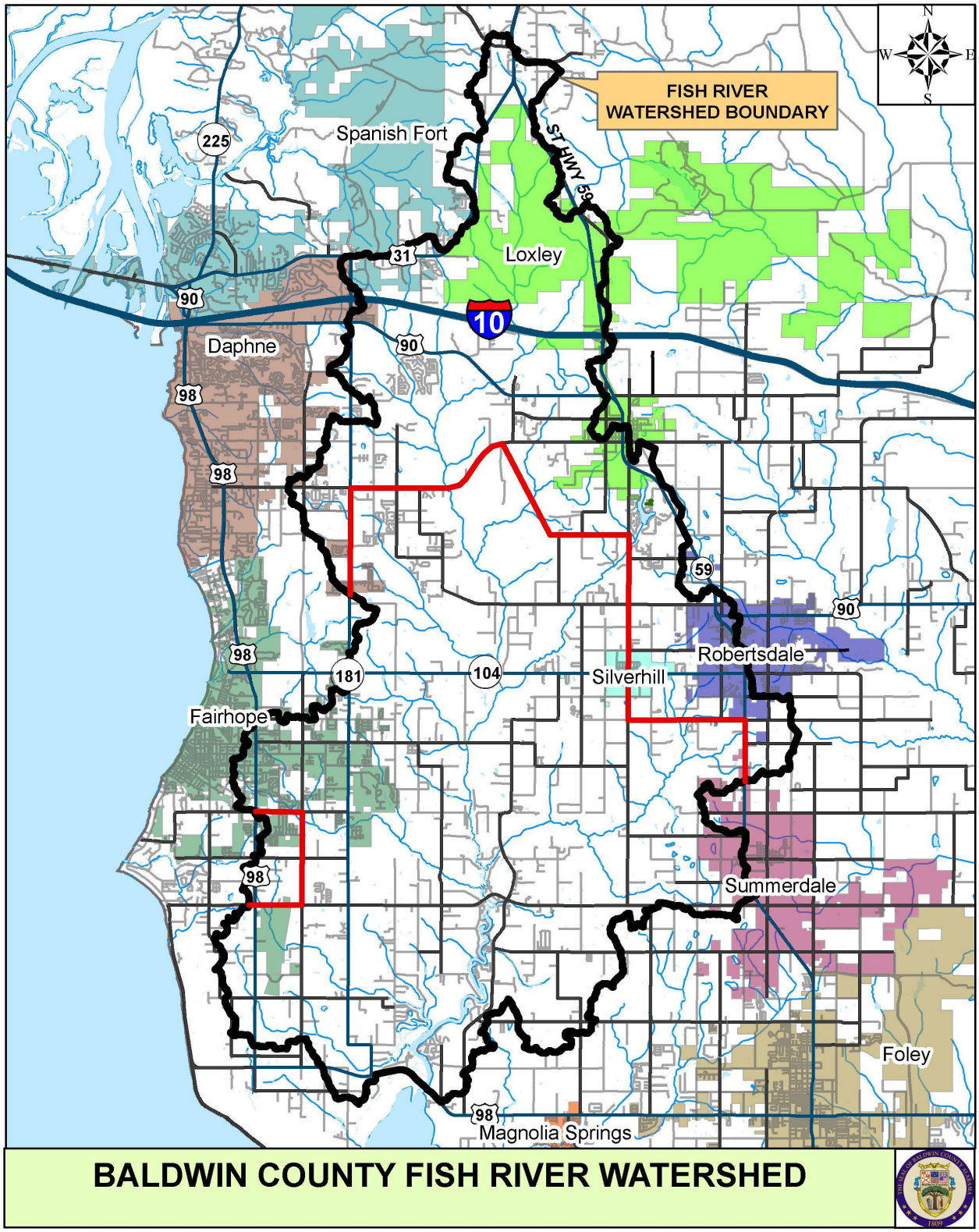
2. U. S. Department of Transportation, Federal Highway Administration. National Association of County Engineers Action *Guide Series, Volume II-2*, Rural Transportation Planning. Washington, D. C.: 1995.

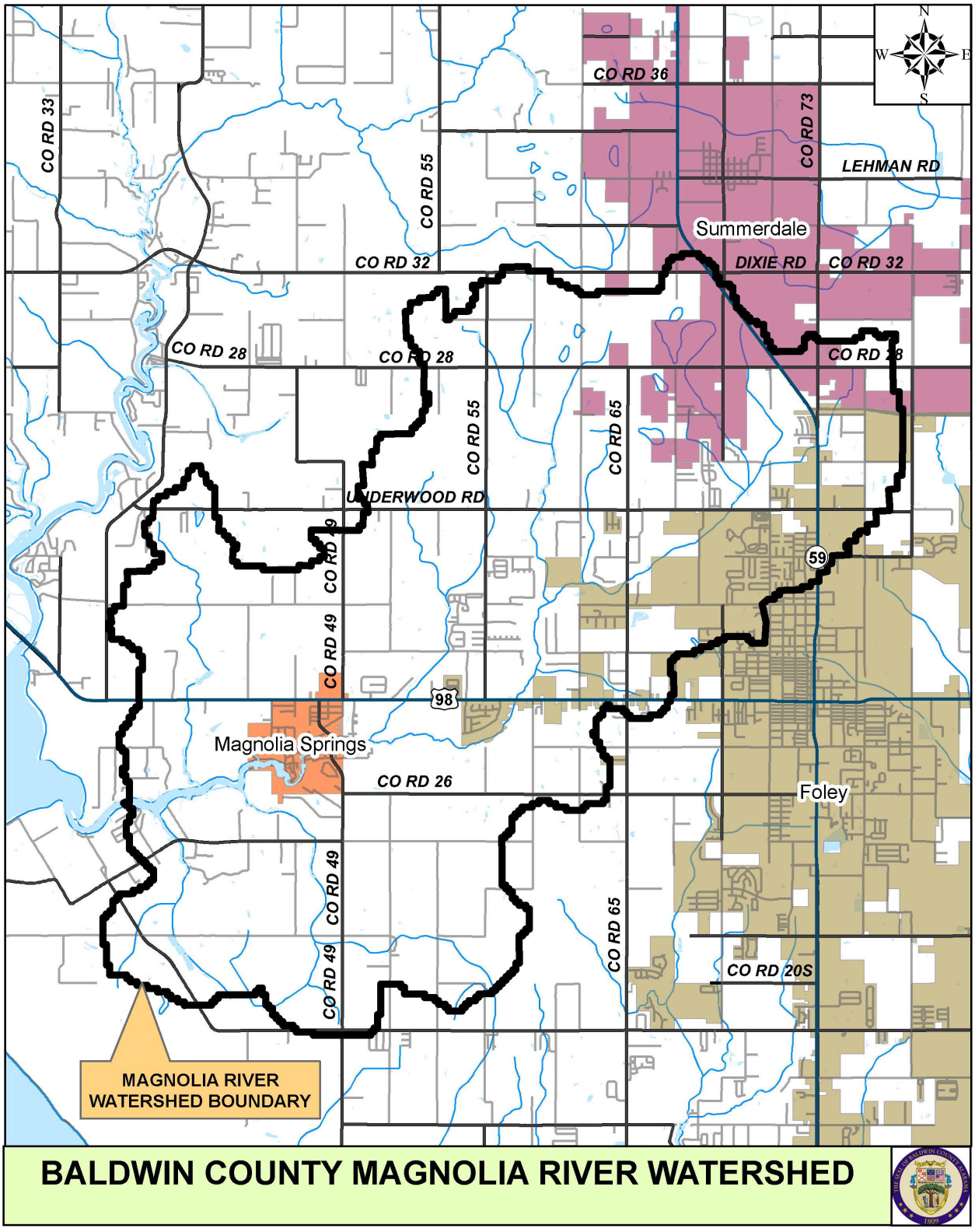
3. U. S. Department of Transportation, Federal Highway Administration. National Association of County Engineers Action *Guide Series, Volume II-4*, Rural Transportation Planning. Washington, D. C.: 1995.

4. Transportation Research Board, National Research Council. Determination of Stopping Sight Distances, NCHRP Report 400.Washington, D. C.: 1997.

5. Alabama Department of Transportation County Design Policy

Appendix 5 Watershed Study Maps

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CO RD 28
CO RD 28
CO RD 55
CO RD 65
UNDERWOOD RD
CO RD 49
59
CO RD 49
98
Magnolia Springs
CO RD 26
Foley
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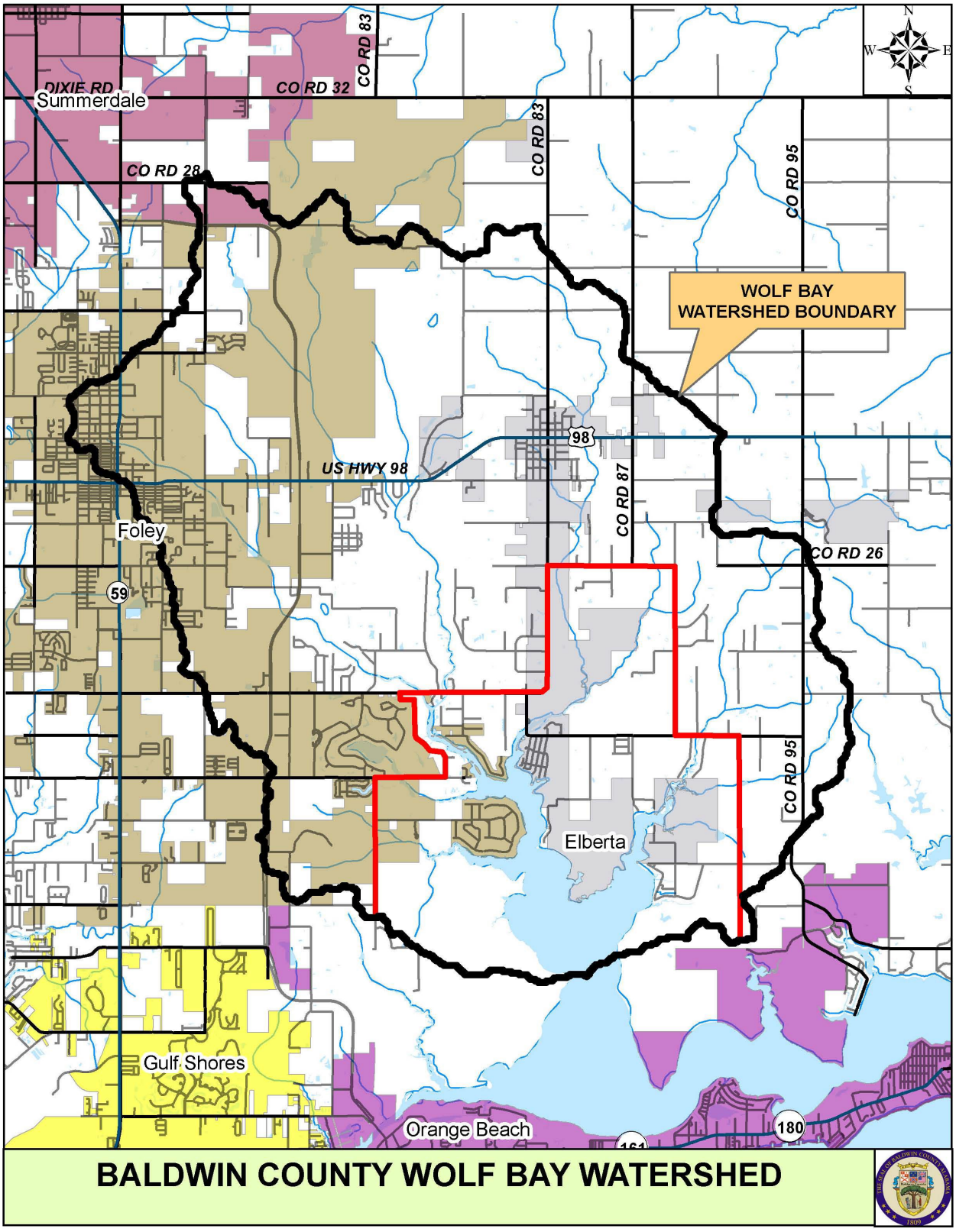
CO RD 49
CO RD 65
CO RD 20S
MAGNOLIA RIVER
WATERSHED BOUNDARY
BALDWIN COUNTY MAGNOLIA RIVER WATERSHED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CO RD 32
CO RD 83
CO RD 28
CO RD 83
CO RD 95
WOLF BAY
WATERSHED BOUNDARY
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CO RD 87
CO RD 26
Foley
59
CO RD 95
Elberta
Gulf Shores
Orange Beach
180
BALDWIN COUNTY WOLF BAY WATERSHED

Appendix 6 Baldwin County Traffic Impact Study Requirements

1 TRAFFIC IMPACT STUDY REQUIREMENT

1.1 General

The transportation impact report shall identify the traffic impacts and potential problems to be generated by a proposed use, and improvements required to insure safe ingress and egress from a proposed development, maintain street capacity, and eliminate hazardous conditions. The following policies and guidelines have been established for the preparation of Traffic Impact Studies (TIS) for development proposals of all land use types. The*se* policies exist to ensure consistent and proper traffic planning and engineering practices are followed when land use actions are being considered. The guidelines provide for a standard process, set of assumptions, set of analytic techniques, and a presentation format to be used in the preparation of the TIS.

1.2 Applicability

Developers and/or property owners shall be required to conduct traffic impact studies, as described herein, for all proposed development that meet any or all of the following:

a. When traffic generated by the proposed development would cause the daily or peak hour traffic volumes on adjacent streets that serve as access for the development to exceed acceptable levels as defined by Baldwin County;
b. Where a development proposes to take direct access to a collector or arterial roadway; or
c. In the opinion of the Baldwin County Engineer significant operational deficiencies and/or safety concerns currently exist or would be created as a result of the developments expected trip generation. Developers who are proposing developments are strongly encouraged to contact the Baldwin County Engineer to discuss traffic impact requirements prior to submitting a rezoning application or subdivision/site plans.

1.3 Applicant Responsibility

The responsibility for conducting a TIS and assessing the traffic impacts associated with an application for development approval rests with the Applicant. The assessment of these impacts shall be contained within a TIS report as specified herein. It shall be prepared under the supervision of, and sealed by, a Licensed Professional Engineer in Alabama with experience in traffic engineering and transportation planning/engineering.

For all State Highways within the study area, the Applicant is required to meet the requirements of the Alabama Department of Transportation (ALDOT) in addition to those of Baldwin County.

1.4 Capacity and Safety Issues

Development of property has a direct impact on transportation, including vehicular, transit, bicycle, and pedestrian traffic. In order to meet capacity and safety needs as they relate to the traffic generated from a particular land use, specific traffic circulation improvements should be made. The goal of the TIS is to address traffic related issues that result from new development

and to determine the improvements required to address and mitigate those issues such that street maximum capacities are not exceeded and traffic and pedestrian safety is maintained. The competing objectives of vehicular movement, pedestrians, bicyclists, and others must be balanced in the development review process. The TIS will provide information and guidance as plans are developed and decisions made for the proposed development plan.

1.4.1 Vehicular Traffic Improvements

Examples of traffic capacity and safety improvements to mitigate development impacts include: road widening, turn lanes, deceleration lanes, intersection through lanes, traffic signals, stop signs, design speed adjustments, modifications to access points, roundabouts and other traffic calming techniques as approved by the County.

1.4.2 Pedestrian Traffic Considerations and Improvements

Examples of street conditions that promote safe, comfortable and convenient pedestrian environments include: narrower roadways that promote shorter walking conditions; short blocks; lower prevailing travel speeds; sidewalks; well-defined crosswalks, median refuge areas and islands at street intersections. Walkway tunnels and overhead structures are examples of safety improvements that afford maximum protection for pedestrians.

1.4.3 Bicycle Traffic Improvements

The addition of on-street bicycle lanes or off-street bicycle paths may be needed to achieve connectivity between the proposed project and the existing bikeway system.

2 TRAFFIC IMPACT STUDY PROCEDURES AND CRITERIA

2.1 Scoping Meeting/Telephone Conference

2.1.1 Purpose

A scoping meeting/telephone conference prior to the submittal of a request for rezoning or site/development plan will be required and used to determine the study area, study parameters and documentation requirements for conducting a Traffic Impact Study (TIS) for specific development proposals. The parameters determined in the scoping meeting/telephone conference represent general agreement between the County and the Applicant's consulting engineer, but they may not be all-inclusive. The County retains the right to require additional information and/or analysis to complete an evaluation of the proposed development project.

2.1.2 Meeting/Telephone Conference Setup and Content

The applicant is required to contact the County to arrange for a Scoping Meeting/telephone conference to discuss the TIS requirements and determine the base assumptions. It is incumbent upon the Applicant to discuss the following:

1. Previous TIS prepared for the site, if any;
2. Location of the site;
3. Proposed access and its relationship to adjacent properties and their existing/proposed access;
4. Preliminary estimates of the site's trip generation and trip distribution at buildout;
5. Identification of proposed year of build-out;
6. Anticipated roadway improvements required to mitigate development impact;
7. Phasing plan proposed; and
8. Special analysis needs.

2.1.3 Results of Meeting/Telephone Conference

The Scoping Meeting/telephone conference shall conclude with the County and Applicant in mutual agreement with regard to determining the level of detail and extent to which the TIS will need to address each of the following:

1. Study area for the impact analysis;
2. Other developments within the study area;
3. Existing intersection counts;
4. Intersections and roadways to be studied in detail;
5. Existing traffic volume forecasts;
6. Location of the nearest bicycle and pedestrian facilities; and
7. Special analysis needs (non-traditional peak hour volumes for some uses, neighborhood impacts, access management plans, etc.)

2.2 Evaluation Elements

The key elements of the project traffic impact assessment shall be specified by the County from the following list:

1. Conformity with the transportation related policies of Baldwin County, including any other adopted access plans.

2. Peak hour intersection and roadway level of service.

3. Appropriateness of access locations;

4. Location and requirements for turn lanes or deceleration lanes at accesses or intersections, including recommendations for taper lengths, storage length, deceleration lengths, and other geometric design requirements as required by the County or ALDOT.

5. Sight distance evaluations and recommendations (intersection, stopping, passing);

6. Continuity and adequacy of pedestrian and bike facilities;

7. Recommended traffic control devices for intersections which may include two way stop control, four way stop control or yield signs, school flashers, school crossing guards, crosswalks, traffic signals or roundabouts.

8. Traffic signal and stop sign warrants.

9. Other items as requested by the County Engineer and agreed to in the Scoping Meeting/telephone conference.

10. Neighborhood and public input issues.

2.3 Roadway Traffic Volumes/Traffic Counts

Current morning and afternoon commuter peak hour (7-9 A.M. and 4-6 P.M.) traffic counts as specified by the County Engineer shall be obtained for the roadways and intersections within the study area for one, non-holiday Tuesday, Wednesday, or Thursday. Each peak hour count shall be conducted over the designated hours (or as specified by the County Engineer) and shall include fifteen (15) minute count data to clearly identify the peak hours.

Weekend counts and/or average daily counts may also be required where appropriate and when required by the County Engineer. ALDOT average weekday traffic (AWT) counts may be used when available. Pedestrian counts and bike usage should be obtained. Vehicle classification counts may be required.

In any case, these volumes shall be no more than one year old (from the date of application submittal). The source(s) of each of the existing traffic volumes shall be explicitly stated (ALDOT counts, new counts by Applicant, etc.). Summaries of current traffic counts shall be provided. Based on the impacts to daily and peak hour traffic volumes from Baldwin County Schools or immediately adjacent City Schools, the County will require the use of adjustment factors for data collected when either of these facilities is not in operation. Adjustment factors proposed for use in any TIS shall be submitted along with all supportive data to the County Engineer for review and approval. If in the opinion of the County Engineer, the proposed adjustment factors will not accurately reflect traffic conditions that would be in place during school operations, traffic count data will be accepted and require collection during those periods when the educational facilities are in operation.

In most cases, the actual completion of developments will occur at some time in the future. As part of the TIS, an annual growth rate of adjacent roadways and intersections will be developed. Growth rates utilized in the preparation of a TIS must be based on historical traffic growth, use of a regional travel demand model or other methods as approved by the County Engineer. Application of traffic growth shall be applied for buildout conditions and other interim development levels as required by and approved by the County Engineer.

2.4 Intersection Level of Service

As a minimum, A.M. and P.M. peak hour intersection levels of service shall be determined for the existing signalized and unsignalized intersections at all study intersections and roadways.

Additional intersections should be included in the analysis where post development conditions are considered by the County to be significant. The analysis shall use procedures as described in the latest edition of the Highway Capacity Manual. Capacity analyses for intersections shall be based on individual approach levels of service whereas impacts on roadways shall be based on daily traffic volumes and the specific roadway classification.

2.5 Trip Generation Rate

Trip generation rates utilized for conducting traffic impact studies in Baldwin County should be taken from actual rates developed and generated from land uses in the area. When data is not available for a proposed land use or for a land uses unique to the Baldwin County area is proposed, the Applicant must conduct a local trip generation study following procedures prescribed in the ITE Trip Generation Manual and provide sufficient justification for the proposed generation rate. This rate must be approved by the County Engineer prior to its use in the TIS written study.

If, in the opinion of the Baldwin County Engineer, trip generation rates found in the latest edition of the Institute of Transportation Engineers' Trip Generation Manual or other industry publications accurately reflect the trip generation characteristics of a particular land use proposed, that trip generation rate may be used in forecasting traffic to be generated by a development.

2.6 Preliminary Land Use Assumptions

The trip generation values contained in studies submitted prior to the establishment of a site-specific development plan shall be based on the maximum number of dwelling units permitted by the Baldwin County Zoning Ordinance for the approved land uses, and/or the maximum trip generation rates for the nonresidential development proposed land use action. When a TIS is being developed for a project with an established site-specific development plan, trip generation shall be based on actual dwelling unit counts and square footage(s) proposed on the final plan.

2.7 Trip Generation Table

The Applicant shall prepare a Trip Generation Table, listing at a minimum, each type of land use within the site at build-out, the size and unit of measure for each land use, trip generation rates (total daily traffic, A.M. and P.M. peaks), and the resultant total trips generated.

2.8 Trip Distribution

The distribution of site generated traffic must be documented in the TIS. The procedures and rationale used in determining the trip distributions for proposed developments must be fully explained and documented. It is recommended the Applicant coordinate with the Baldwin County Engineer to establish an acceptable distribution pattern. Distribution patterns assumed for development shall be illustrated in graphic format and provided to the County Engineer prior to proceeding with the remainder of a traffic impact study.

2.9 Requirement for Additional Lanes

Within the study area of a TIS, as established by agreement between the County and the Applicant, additional lanes are may be required on streets where minimum levels of service are exceeded for existing cross sections based on post development conditions. If such additional lanes are required, as established as part of the TIS, they can include general purpose through lanes, left turn lanes and right turn lanes. Additional lanes, when determined by a TIS and in the opinion of the County Engineer of the need for such lanes is established, shall be provided by the Applicant. Such improvements must be designed and constructed to county or state standards. The cost of such improvements will be borne entirely by the Applicant.

During the design phase of providing additional lanes on public streets and roadways, if it is determined that additional right-of-way is required to construct such additional lanes; the Applicant shall provide additional right-of-way along their property frontage as directed by the County Engineer. If the construction of such additional lanes requires right-of-way beyond the property frontage of the Applicant, the Applicant shall work with the County to devise a method to provide the additional right-of-way and related roadway improvements or modify their development plan to remove the requirement for such additional lanes.

2.10 Intersection Delay

An A.M. and P.M. commuter peak hour intersection level of service analysis shall be conducted for each intersection analyzed in the TIS for existing conditions and those that reflect post development conditions. This analysis shall be based on procedures specified in the most recent release of the Highway Capacity Manual. In those areas adjacent to or in close proximity to County schools or adjacent City Schools, additional peak hour analyses shall be conducted for those afternoon hours which reflect the peaks for those facilities. The intent of this analysis is to establish the existing and post development intersection delays and related levels of service for comparison and determination of impacts on operations.

2.11 Driveway Access

Driveway plan concepts for a development shall be submitted to the County for approval prior to development of construction plans. Because frequent curb cuts and driveways providing access to numerous adjoining properties are an impediment to the proper functioning of major streets, on-site circulation and cross-access agreements between lots are encouraged. Minimum spacing of driveways and other curb cuts shall conform to the minimum standards outlined in the Subdivision Regulation of Baldwin County.

Where an intersection contains a left-turn stacking lane, any driveway opposite such lane shall not permit left turns into or from the driveway. Raised islands or other approved methods of restricting these movements will be required as approved by the County Engineer. Limitations on movements from driveways near intersections shall also apply to deceleration lanes.

Required distances between curb cuts and street corner property lines shall be measured from the edge of the curb cuts.

Various roadways in Baldwin County have center medians that have been constructed for both traffic safety and aesthetic considerations. Any alteration of existing or planned roadway medians shall be allowed at the discretion of the Baldwin County Council. Alterations to existing medians shall only be considered where such alternation is deemed by the County to be in the public interest. In those cases where medians are proposed for alternation as part of a development, it will incumbent on the Applicant to demonstrate through traffic operational analysis in the TIS that such alternation can be implemented and not comprise public safety.

On those routes maintained by the Alabama Department of Transportation, an access permit is required from that agency. The County shall be copied on all ALDOT permit applications within Baldwin County and its planning jurisdiction.

2.12 Traffic Signals

2.12.1 Proposed and existing access points, proposed intersections, and existing intersections effected by the land use actions being analyzed in the report that have any potential for traffic signalization will be reviewed and discussed during the Scoping Meeting/telephone conference.

2.12.2 During the Scoping Meeting/telephone conference an outline of locations for signal warrant analysis will be agreed upon.

2.12.3 Signal Warrant Analysis for potential signal locations shall consist of a review of the applicable signal warrants contained in the Manual on Uniform Traffic Control Devices. On roadways controlled by the Alabama Department of Transportation, procedures for meeting traffic signal warrants as established by that Department shall be followed.

2.12.4 Alternatives to signalization at potential signal locations will be discussed in the Scoping Meeting/telephone conference and the TIS report. The alternatives to adding new intersections would include added access points, limited movements at access points, frontage roads, joint use access points, roundabouts and other such designs as required and /or approved by the County.

2.12.5 If any signal timing and/or phasing changes are proposed as a mitigation measure of a TIS, an appropriate analysis of the intersection where the signal exists shall be conducted to demonstrate the potential implications of the suggested modifications. Such modifications to existing traffic signals in Baldwin County shall require submittal of a request for such change with supportive documentation of analysis and findings and shall not be undertaken without approval from the County Engineer.

2.12.6 Sight distance concerns that are anticipated or observed which may impact driveway, intersection, or roadway operation and safety need to be discussed in the TIS. Recommendations regarding stopping sight distance, intersection sight distance, and passing sight distance needs should be provided by the Applicant's traffic engineer for detailing on the final development, site plan, or final

construction plans. Intersection sight distances requirements shall meet the guidelines as established in Section 436 of the Baldwin County's Zoning Ordinance and /or AASHTO.

2.13 Mitigation Measures

When a project's vehicular impacts are determined to not meet the minimum acceptable level of service standard, the TIS shall include feasible measures which would mitigate the project's impacts. An appropriate measure of traffic mitigation would be the ability of roadway, intersection and traffic control improvements to maintain acceptable levels of service for the impacted facility. In the case of interstate and arterial routes, a level of service of "D" for post development conditions would be required and a post level of service of "C" would be required on all other roadways and intersections. Mitigation measures could include the addition of added through lanes (roadway widening), left turn lanes, right turn lanes, improved traffic control, access management and other such measures as deemed appropriate by analysis and concurrence by the County.

2.14 Traffic Signal Operations Improvements

Traffic Signal Operational improvements shall include upgrading signal*s* to include additional signal phases and timing plans, signalization of an unsignalized intersection and/or implementation of traffic signal systems. Signal improvements and/or installations on County streets must be approved by the County Engineer. Traffic signals recommended to be installed on ALDOT roadways shall be jointly approved by the State and County.

2.15 Street Widening and Other Physical Improvements

Mitigation measures, which include street widening, and other physical improvements must be demonstrated to be physically feasible and must meet minimum County standards and codes for both on-site and off-site improvements. As part of the basic TIS analysis, a determination of the need for left and right turn lanes as a result of development generated traffic should be undertaken. The analysis techniques utilized shall include procedures and methods outlined in the National Cooperative Highway Research Program (NCHRP) report 213 or other methodologies as approved by the County Engineer.

2.16 Geometric Improvements

The needs for turn lanes and other auxiliary lanes shall be determined based on the criteria as established by Baldwin County each development access and study intersection included in the TIS. The basis of design for such devices shall generally be ITE, AASHTO, ALDOT, or other nationally accepted standards as approved by the County. All proposed project entrances onto arterial and collector streets shall be evaluated as to whether they require deceleration lanes.

3 TRAFFIC IMPACT STUDY REPORT CONCLUSIONS

3.1 Recommended Improvements

The findings of the Traffic Impact Study should be provided in summary format, including the identification of any areas of significant impacts and recommended improvements/mitigation measures to achieve the maximum volume standards for all modes.

3.1.1 Geometric Improvements

The TIS shall include recommendations for all geometric improvements such as pavement markings, signs, adding through or turn lanes, adding project access and assorted turn lanes and changes in medians. Sufficient dimensions/data shall be identified to facilitate review. Anticipated right-of-way needs shall also be identified. This information shall be made available to the project civil engineer for use in preparing scaled drawings.

3.1.2 Responsibility

The Traffic Impact Study shall describe the location, nature and extent of all transportation improvements required to achieve the required post development levels of service within the study area. The responsibility for implementation of the post development mitigation measures shall rest with the Applicant.

4 TRAFFIC IMPACT STUDY REPORT OUTLINE

4.1 Introduction (Purpose of report and study objectives)

4.2 Proposed Development

A. **Site Description** (include small version of site plan in appendices)
B. **Site Location** (include site location map)
C. **Zoning** (Current and proposed)
D. **Time Frame of Development** (include any phasing of development which is anticipated)

4.3 Background Information

A. **Background Traffic Growth Rate** (include projected traffic growth rate for the development time frames included in the proposed development and include method for traffic growth projections)
B. **Off-Site Developments** (description of other significant development in the vicinity which could impact traffic conditions in the study area)
C. **Planned and Programmed Roadway Improvements** (description of any Planned or Programmed Roadway Improvements within the study area which could impact traffic conditions within the study area during the time frame for development of the proposed project)

4.4 Existing Traffic Conditions

A. **Traffic Count Data** (introduce and illustrate current traffic counts for the study area roadways and intersections)

B. **Existing Conditions Capacity Analysis** (evaluate study area roadways and/or intersections based upon industry standard capacity analysis methods)
C. Summary of Existing Traffic Conditions in the study area

4.5 Future Traffic Conditions

A. **Background Traffic Growth** (apply the background growth rate for the time frame for a give phase of development)
B. **Inclusion of Planned or Programmed Improvements** (in the event any of the Planned or Programmed improvements are to be included in the analysis of future traffic conditions, a status of the projects and time frame of the projects should be demonstrated)
C. **Trip Generation Estimates** (estimate trip generation potential for each level of development)
D. **Trip Distribution** (describe the anticipated routes for traffic expected to be generated by the proposed development and illustrate the findings in graphic format)
E. **Traffic Assignment** (assign traffic expected by the proposed development to the study area roadways based upon the distribution patterns established)
F. **Future Conditions Capacity Analysis** (evaluates the study area roadways and intersections as well as site accesses with post-development traffic volumes)
G. **Identify Capacity Deficiencies** (identify roadways and/or intersections in which capacity deficiencies are expected for future traffic conditions)
H. **Recommended Roadway and Traffic Control Improvements** (develop and test potential improvements for the study area roadways and intersections aimed at mitigation of traffic impacts resulting from development traffic)
I. **Internal Circulation** (demonstrate the ability of the site's internal circulation pattern to handle site generated traffic)
J. **Capacity Analysis with Recommended Improvements** (demonstrate the effectiveness of Recommended Roadway and Traffic Control Improvements and resultant levels of service)

Note: These steps should be taken for each level of development within the corresponding time frame.

4.6 Summary and Conclusions (provide a summary of the findings of the study effort to include existing traffic conditions, future traffic conditions for each level of development, and the recommended improvements aimed at mitigating potential traffic impacts resulting from the proposed development for each level of development).