

City of Fayetteville Staff Review Form

2020-0604

Legistar File ID

8/4/2020

City Council Meeting Date - Agenda Item Only  
N/A for Non-Agenda Item

Chris Brown

7/16/2020

ENGINEERING (621)

Submitted By

Submitted Date

Division / Department

Action Recommendation:

Approval of an Update to the City of Fayetteville Minimum Street Standards and Associated Ordinance Revisions

Budget Impact:

Account Number

Fund

Project Number

Project Title

Budgeted Item? No

Current Budget

\$ -

Funds Obligated

\$ -

Current Balance

\$ -

Does item have a cost? No

Item Cost

Budget Adjustment Attached? No

Budget Adjustment

Remaining Budget

\$ -

V20180321

Purchase Order Number:

Previous Ordinance or Resolution #

Change Order Number:

Approval Date:

Original Contract Number:

Comments:



**MEETING OF AUGUST 4, 2020**

**TO:** Mayor and City Council

**THRU:** Susan Norton, Chief of Staff  
Garner Stoll, Development Services Director

**FROM:** Chris Brown, City Engineer

**DATE:** July 16, 2020

**SUBJECT:** Approval Updated Minimum Street Standards and related Revisions to Chapters 151, 166, 171, and 172 to the Unified Development Code to reflect changes to the Master Street Plan and current Best Practices.

---

**RECOMMENDATION:**

Staff and the Transportation Committee recommend approval of the attached Minimum Street Standards, and approval of revisions to related chapters of the Unified Development Code.

**BACKGROUND:**

The Minimum Street Standards provide detailed technical guidance for design and construction of street infrastructure. The most recent update to these standards was in 2015; that version was a complete overhaul of standards from the 1990's.

**DISCUSSION:**

Most of the changes to the Minimum Street Standards Document are to align street classification nomenclature with the recent update to the Master Street Plan. However, there are several other proposed changes, as detailed below:

Overall Document:

- Addition of table of contents at beginning of standards, and removal of table of contents at beginning of each chapter.
- General phrasing consistency and document formatting changes.

Chapter 1 – General Provisions

- Including statement that the City's Standard Specifications for Street and Drainage Construction supplement this document.
- General updates to 1.7 Definitions of Terms and Abbreviations

Chapter 2 – Construction Plans Submittal Requirements

- Currently designated as Chapter 3, combining pertinent submittal information from Chapter 2 – Submittal Review Procedures.

### Chapter 3 – Transportation Impact Study

- Addition of a chapter outlining when a TIS is required for development, as well as requirements of the TIS.
- Not in current MSS.
- Updates made to list of conditions that warrant a TIS.

### Chapter 4 – Street Design and Technical Criteria

- Updates to Drainage Systems requirements.
- Removing figures to create standard details.

### Chapter 5 – Intersections

- Establishing minimum curb radii for intersections through reference to standard details.
- Removing figures to create standard details.

### Chapter 6 – Pavement Design and Criteria

- Modifying binder grade, maximum lift thicknesses, and other general asphalt requirements to be more in line with current practices.
- Setting guidelines to allow for use of Marshall mixes.

### Chapter 7 – Traffic Control Devices

- Updating to better coincide and reference applicable federal and state standards and requirements.
- Adding midblock crossing requirements and guidance information.
- Removing figures to create standard details.

### Chapter 8 – Pedestrian Facility Design and Technical Criteria

- Adding clear zone requirements for trails.
- Clarifying subgrade requirements for trails constructed along roadways.

### Chapter 9 – Bicycle Facilities Design and Technical Criteria

- Setting provisions for protected intersections.
- Including FHWA Bikeway Selection Guide information chart.

### Chapter 10 – Neighborhood Traffic Safety

- Stating Fire Marshal approval required for traffic calming in addition to City Engineer to not conflict with fire code requirements.
- Formatting adjustments for clarity and conciseness.
- Removing figures to create standard details.

### Chapter 11 – Street Inspection and Testing Procedures

- Changing asphalt coring requirements to be less strict and closer to other agencies.
- Setting minimum asphalt density to 92%, removing option for penalties for asphalt densities between 90%-92%.

- Establishing absolute minimum asphalt thickness of 3 inches to allow for future roadway maintenance.

Similarly, most of the changes to the Unified Development Code are related to the changes to nomenclature in the Master Street Plan. Other significant proposed changes include:

#### UDC Chapter 171: Streets and Sidewalks

- Adding provisions to utility companies providing comments for right-of-way and public easement vacation requests to allow a petitioner to proceed if a utility company fails to provide comments within two weeks of request. Removing requirement for easement vacation requests be taken to the Planning Commission prior to City Council.
- Updating 171.13 (Property Owner To Construct Sidewalk or Contribute Cost of Sidewalk) to remove standard fee in lieu of sidewalk construction for single-family homes and duplexes and increasing the fee in lieu amount to \$5.00 per square foot of sidewalk not constructed to coincide with current construction cost.

#### **Attachments:**

- Minimum Street Standards
- UDC Chapter 151: Definitions
- UDC 166.08 Street Design And Access Management Standards
- UDC 166.11 Conformance To Plans And Regulations
- UDC 171.06 Procedure For Closing Public Utility Easements and Rights-of-Way
- UDC 171.13 Property Owner To Construct Sidewalk or Contribute Cost of Sidewalk
- UDC 172.04(F)(4) Entrances and Internal Aisle Design for Parking Lots Containing Nine (9) or More Parking Spaces

# MINIMUM STREET STANDARDS



CITY OF  
**FAYETTEVILLE**  
**ARKANSAS**

2020 EDITION



## TABLE OF CONTENTS

### CHAPTER 1 – GENERAL PROVISIONS

1.1	AUTHORITY OF THIS DOCUMENT .....	1-1
1.2	INTENT AND PROVISIONS .....	1-1
1.2.1	Objectives of Street Standards .....	1-1
1.3	RESOURCE STANDARDS .....	1-2
1.4	AUTHORITY OF THE CITY ENGINEER .....	1-3
1.5	ENFORCEMENT RESPONSIBILITY .....	1-3
1.6	AMENDMENTS AND REVISIONS TO STANDARDS .....	1-3
1.7	DEFINITIONS OF TERMS AND ABBREVIATIONS .....	1-3
1.8	INTERPRETATION OF STANDARDS .....	1-7
1.8.1	Governing Standards .....	1-7
1.8.2	Prior Acceptance of Construction Plans .....	1-7
1.9	VARIANCES AND APPEALS .....	1-7
1.10	WORK SCHEDULE .....	1-8
1.11	UTILITY COORDINATION .....	1-8

### CHAPTER 2 – CONSTRUCTION PLAN SUBMITTAL REQUIREMENTS

2.1	GENERAL .....	2-1
2.1.1	Submittal Content .....	2-1
2.1.2	Horizontal and Vertical Datum .....	2-1
2.1.3	Expiration of Plan Set .....	2-2
2.1.4	Additional Requirements .....	2-2
2.1.5	Opinion of Costs and Record Drawings .....	2-2
2.1	GENERAL FORMATTING AND REQUIRED INFORMATION .....	2-2
2.2.1	Size of Plan Sheets .....	2-2
2.2.2	Title Block .....	2-2
2.2.3	Incomplete Plans .....	2-3
2.2.4	Stamped Plans & Engineer of Record Statement .....	2-3
2.2.5	Scale .....	2-3
2.2.6	Dates .....	2-3
2.2.7	North Arrow .....	2-4
2.2.8	Existing Facilities .....	2-4
2.2.9	Legend of Symbols .....	2-4
2.2.10	Key Map .....	2-4
2.3	SHEET TITLE NAMES AND SPECIFIC REQUIREMENTS .....	2-4

2.3.1	Cover Sheet.....	2-4
2.3.2	Grading and SWPPP.....	2-5
2.3.3	Street Improvements.....	2-5
2.3.4	Street Improvements Details.....	2-8
2.3.5	Traffic Signing and Pavement Markings.....	2-8

## CHAPTER 3 – TRANSPORTATION IMPACT ANALYSIS

3.1	INTRODUCTION.....	3-1
3.1.1	General.....	3-1
3.1.2	Applicant Responsibility.....	3-1
3.1.3	Capacity and Safety Issues.....	3-1
3.2	REQUIREMENTS AND CRITERIA.....	3-2
3.2.1	Scoping Meeting.....	3-2
3.2.2	Types of Study.....	3-3
3.2.3	When a TIS is Required.....	3-3
3.2.4	Revisions and Updates.....	3-3
3.3	STUDY PARAMETERS.....	3-3
3.3.1	Project Description.....	3-3
3.3.2	Analysis Horizons.....	3-4
3.3.3	Study Area.....	3-4
3.3.4	Evaluation Elements.....	3-5
3.4	TRAFFIC VOLUMES.....	3-6
3.4.1	Existing Traffic.....	3-6
3.4.2	Background Traffic.....	3-6
3.4.3	Project Traffic.....	3-7
3.4.4	Total Traffic.....	3-8
3.5	PROJECT IMPACTS.....	3-9
3.5.1	Significant Negative Impacts.....	3-9
3.5.2	Project Impact Assessment.....	3-9
3.6	MITIGATION MEASURES.....	3-12
3.6.1	Traffic Signal Operations Improvements.....	3-12
3.6.2	Street Widening and Other Physical Improvements.....	3-12
3.6.3	Geometric Improvements.....	3-12
3.7	REPORT CONCLUSIONS.....	3-12
3.7.1	Recommended Improvements.....	3-12

## CHAPTER 4 – STREET DESIGN AND TECHNICAL CRITERIA

4.1	GENERAL.....	4-1
4.2	STREET LAYOUT REQUIREMENTS.....	4-1
4.2.1	Logical Placement and Extension.....	4-1
4.2.2	Master Planned Regional and Neighborhood Links.....	4-1

4.2.3	Residential Links .....	4-1
4.3	STREET CLASSIFICATIONS .....	4-2
4.4	GENERAL DESIGN ELEMENTS .....	4-2
4.4.1	Alignment .....	4-2
4.4.2	Cross Slope .....	4-5
4.4.3	Superelevation on Horizontal Curves .....	4-6
4.4.4	Design Speed .....	4-6
4.5	MEDIANS .....	4-6
4.5.1	Turn Lane and Access .....	4-6
4.5.2	Drainage .....	4-6
4.5.3	Nose .....	4-6
4.5.4	Transitions .....	4-7
4.5.5	Objects .....	4-7
4.6	NON-CONNECTIVE STREET ALIGNMENTS .....	4-7
4.6.1	Cul-de-Sacs .....	4-7
4.6.2	Knuckles .....	4-7
4.6.3	Dead-End Streets .....	4-7
4.7	DRAINAGE SYSTEMS .....	4-8
4.7.1	Drainage .....	4-8
4.7.2	Underdrains .....	4-8
4.7.3	Sidewalk Underdrains .....	4-8
4.7.4	Crosspans .....	4-9
4.7.5	Inlets .....	4-9
4.7.6	Waterway Crossings .....	4-9
4.7.7	Roadside Ditches and Driveway Culverts .....	4-9

## CHAPTER 5 – INTERSECTIONS

5.1	GENERAL .....	5-1
5.1.1	General Principles and Considerations .....	5-1
5.2	INTERSECTION DESIGN CRITERIA .....	5-1
5.2.1	Location of Intersections .....	5-1
5.2.2	Lane Alignment .....	5-1
5.2.3	Angle of Intersection .....	5-2
5.2.4	Horizontal Alignment and Vertical Profile .....	5-2
5.2.5	Exclusive Left Turn Lanes .....	5-2
5.2.6	Exclusive Right Turn Lanes .....	5-2
5.2.7	Design Vehicles .....	5-3
5.2.8	Curb Returns .....	5-3
5.2.9	Traffic Islands .....	5-4
5.2.10	Traffic Signals, Striping, and Signing .....	5-5
5.2.11	Access Ramps .....	5-5
5.2.12	Right-of-Way .....	5-5



5.2.13	Intersection Sight Distance .....	5-5
5.2.14	Pedestrian Requirements .....	5-6
5.2.15	Drainage .....	5-6
5.3	ROUNDABOUTS .....	5-6
5.3.1	Design Vehicle .....	5-6
5.3.2	Design Speed .....	5-6
5.3.3	Horizontal Configuration .....	5-6
5.3.4	Roadway Width .....	5-6
5.3.5	Truck Apron .....	5-7
5.3.6	Pedestrian Access Ramps for Bikes .....	5-7
5.3.7	Pedestrian Crossings .....	5-7
5.3.8	Drainage .....	5-7
5.3.9	Where Allowed .....	5-8
5.3.10	Design Software .....	5-8
5.3.11	Right-of-Way .....	5-8
5.3.12	Splitter Islands .....	5-8
5.3.13	Signage .....	5-8
5.4	PROTECTED INTERSECTIONS .....	5-8

## CHAPTER 6 – PAVEMENT DESIGN AND REPORT

6.1	GENERAL .....	6-1
6.1.1	Existing Streets .....	6-1
6.1.2	AASHTO Design .....	6-1
6.1.3	Standard Pavement Section .....	6-1
6.1.4	Roundabouts .....	6-1
6.1.5	Approval .....	6-2
6.1.6	Pavement Report Revisions .....	6-2
6.2	SOIL INVESTIGATION REQUIREMENTS .....	6-2
6.2.1	Location and Frequency of Soil Borings .....	6-2
6.2.2	Imported Fill .....	6-2
6.2.3	Supervision by Engineer .....	6-3
6.3	SUBGRADE AND FILL REQUIREMENTS .....	6-3
6.3.1	General .....	6-3
6.3.2	Classification Testing .....	6-3
6.3.3	Compaction Testing .....	6-3
6.3.4	California Bearing Ratio (CBR) Testing .....	6-3
6.3.5	Subsurface Water Investigation .....	6-4
6.3.6	Subgrade Requirements .....	6-4
6.3.7	Embankment Outside the Roadway .....	6-4
6.4	PAVEMENT DESIGN CRITERIA .....	6-4
6.4.1	Flexible Pavement .....	6-4
6.4.2	Rigid Pavement .....	6-5

6.4.3	Design Factors .....	6-5
6.4.4	Pavement Materials .....	6-6
6.4.5	Special Considerations .....	6-7
6.5	PAVEMENT DESIGN REPORT .....	6-8
6.5.1	List of Required Information .....	6-8

## CHAPTER 7 – TRAFFIC CONTROL DEVICES

7.1	GENERAL .....	7-1
7.1.1	Installation Responsibility .....	7-1
7.2	DESIGN REQUIREMENTS .....	7-1
7.2.1	Traffic Signal Design Requirements .....	7-1
7.3	TRAFFIC SIGNING .....	7-2
7.3.1	General .....	7-2
7.3.2	Intersections .....	7-3
7.3.3	Traffic Control Signs .....	7-4
7.3.4	Roundabouts .....	7-4
7.3.5	Temporary Construction Signage .....	7-4
7.4	PAVEMENT MARKING AND STRIPING .....	7-4
7.4.1	General .....	7-4
7.4.2	Pavement Markings (Symbols and Arrows) .....	7-5
7.4.3	Striping .....	7-5
7.4.4	Temporary Striping .....	7-6
7.4	MIDBLOCK CROSSINGS AND UNCONTROLLED INTERSECTIONS .....	7-6

## CHAPTER 8 – PEDESTRIAN FACILITIES DESIGN AND TECHNICAL CRITERIA

8.1	GENERAL .....	8-1
8.1.1	Reference Documents .....	8-1
8.1.2	ADA Requirements .....	8-1
8.1.3	Obstructions .....	8-1
8.1.4	Sidewalk Underdrains (Chases) .....	8-1
8.1.5	Pedestrian Crossings .....	8-1
8.1.6	Pedestrian Refuge Areas .....	8-2
8.1.7	Safety Railing (Handrails) .....	8-2
8.2	SIDEWALKS .....	8-2
8.2.1	General Layout and Design Criteria .....	8-2
8.3	ACCESS RAMPS .....	8-4
8.3.1	Ramp Requirements .....	8-4
8.4	SHARED-USE PAVED TRAILS .....	8-5
8.4.1	General Layout and Design Criteria .....	8-5
8.4.2	Horizontal Curves .....	8-6
8.4.3	Trail Lighting .....	8-7

8.5	SIDEWALK UNDERDRAINS (CHASES).....	8-7
8.6	PEDESTRIAN CROSSINGS.....	8-7
8.7	PEDESTRIAN REFUGE AREAS.....	8-7

## **CHAPTER 9 – BICYCLE FACILITIES DESIGN AND TECHNICAL CRITERIA**

9.1	GENERAL.....	9-1
9.1.1	Reference Documents.....	9-1
9.1.2	Bicycle Master Plan.....	9-1
9.1.3	Obstructions.....	9-1
9.1.4	Protected Intersections.....	9-1
9.2	ON-STREET BIKE LANES DESIGN REQUIREMENTS.....	9-1
9.2.1	On-Street Bike Routes.....	9-1
9.2.2	Width and Cross Sections.....	9-2
9.2.3	Signage and Striping.....	9-2

## **CHAPTER 10 – NEIGHBORHOOD TRAFFIC SAFETY**

10.1	GENERAL.....	10-1
10.1.1	Intended Use.....	10-1
10.2	TRAFFIC SAFETY PROBLEMS.....	10-1
10.2.1	Speeding.....	10-1
10.2.2	Measuring Speed of Roadway.....	10-1
10.2.3	Intrusion (Cut-Through Traffic).....	10-2
10.2.4	Pedestrian Safety.....	10-2
10.3	TRAFFIC CALMING DESIGN CRITERIA.....	10-2
10.3.1	Intersection Bulb-Outs.....	10-2
10.3.2	Center Island Narrowing.....	10-3
10.3.3	Gateway Treatment.....	10-3
10.3.4	Oval Median.....	10-3
10.3.5	Chokers.....	10-4
10.3.6	Chicanes.....	10-4
10.3.7	Two-Lane Slow Point.....	10-4
10.3.8	Traffic Circles.....	10-5
10.3.9	Textured Crosswalks.....	10-5
10.3.10	Speed Tables.....	10-6
10.3.11	Raised Crosswalks.....	10-6
10.3.12	Raised Intersections.....	10-7
10.3.13	On-Street Parking.....	10-7

## **CHAPTER 11 – STREET INSPECTION AND TESTING PROCEDURES**

11.1	QUALITY ASSURANCE.....	11-1
------	------------------------	------

11.2	PAVEMENT	11-2
11.2.1	Subgrade	11-2
11.2.2	Base Course	11-3
11.2.3	Asphalt Concrete Hot Mix (ACHM)	11-4
11.2.4	Portland Cement Concrete Pavement	11-5
11.3	STRUCTURAL CONCRETE	11-7
11.3.1	Concrete Specifications	11-7
11.3.2	Concrete Testing and Inspections	11-7
11.4	NON-STRUCTURAL CONCRETE	11-9
11.4.1	Concrete Specifications	11-9
11.4.2	Concrete Testing and Inspections	11-10
11.5	MISCELLANEOUS	11-11
11.5.1	Traffic Signs, Striping, and Signals	11-11
11.5.2	Storm Drain Bury Depth	11-11

## **CHAPTER 12 – ACCEPTANCE/WARRANTY PROCEDURES AND RECORD DRAWINGS**

12.1	GENERAL	12-1
12.1.1	Developer's Process	12-1
12.2	INITIAL ACCEPTANCE	12-2
12.2.1	Recommendation for Initial Acceptance	12-2
12.2.2	Initial Acceptance Letter	12-2
12.2.3	Submittal of Record Drawings	12-2
12.2.4	Submittal of Warranty Guarantee	12-2
12.3	WARRANTY PERIOD	12-3
12.3.1	Definition of the Warranty Period	12-3
12.3.2	The Warranty Guarantee	12-3
12.3.3	Time Frame for Completing Repair(s)	12-3
12.3.4	Failure to Complete Repair	12-3
12.3.5	Responsibility for Maintenance	12-3
12.4	FINAL ACCEPTANCE	12-3
12.4.1	Request for Final Inspection	12-3
12.4.2	Preparation for Inspection	12-4
12.4.3	Inspection and Punch List	12-4
12.4.4	Damage Caused by City Crews	12-4
12.4.5	Re-Inspection	12-4
12.4.6	Release from Responsibility	12-4
12.4.7	Release of Warranty Guarantee	12-4
12.4.8	Failure to Complete Repair	12-4
12.5	RECORD DRAWINGS	12-5
12.5.1	Updating Plans with Design Changes	12-5
12.5.2	Minor Design Changes	12-6

12.5.3 Submittal of Plans .....	12-6
12.5.4 Form of Submittal .....	12-6



## CHAPTER 1 – GENERAL PROVISIONS

### 1.1 AUTHORITY OF THIS DOCUMENT

This document adopted as Exhibit A of Ordinance 5789 of the City of Fayetteville, provides technical procedures and design standards to support Chapter 171: Streets and Sidewalks and other applicable chapters of the Title XV Unified Development Code.

### 1.2 INTENT AND PROVISIONS

These Standards shall be required for all development projects within the jurisdiction of the City of Fayetteville. The City's review and approval of any plans, reports, or drawings or the City's inspection and approval of any improvements constructed by the developer in accordance with these Standards, does not constitute a representation, warranty, or guarantee by the City that such improvements are free from defects or will operate adequately for the purpose intended. These Standards shall also be used as a guidance document for projects to be constructed by the City, including construction by City crews.

The chapters and appendices that make up these Standards pertain to planning, design, approval, construction, inspection, testing, and documentation of street improvements. The intent of this manual is to establish the minimum acceptable standards.

These Standards are a supplement to the City of Fayetteville Code of Ordinances Title XV Unified Development Code and other Ordinances. Where conflict between these Standards and City Code exists, the Code shall govern. All work shall conform to applicable sections of the City of Fayetteville Standard Specifications for Street and Drainage Construction. In case of discrepancy between these Minimum Street Standards and the Standard Specifications, the most stringent requirements will apply.

#### 1.2.1 Objectives of Street Standards

A. *Minimum Standards.* These Standards shall be the minimum standards necessary for design and construction of all street improvements required for development projects within the jurisdiction of the City of Fayetteville. Special situations as determined by the City may require different facilities and/or standards. For items not covered by these Standards, the City may require the use of resource standards in **Section 1.3** below.

B. *Objectives.* It is the objective of these Minimum Street Standards to address the following:

1. Public Safety and Convenience. To protect the public health, safety, and welfare and to minimize public inconvenience resulting from construction and maintenance activities within the public rights-of-way.

2. Maintaining Public Use. To assure that bicycle, pedestrian and vehicular uses of rights-of-way are the primary uses thereof and that the rights-of-way are properly maintained during construction and repair work in these areas.
3. Standardizing Criteria. To protect the City's infrastructure investment by establishing standardized design, materials, construction, and repair criteria for all public improvements.
4. Optimizing Use. To optimize the use of the limited physical capacity of public rights-of-way held by the City.
5. Protecting Private Property. To protect private property from damages that could occur because of faulty design and construction of public improvements upon public rights-of-way and easements.
6. Inspection. To provide criteria for inspection of public and private improvements, by the City or the engineer of record's designated inspector, in order to assure conformance with approved plan's uniformity, proper construction techniques, and to ensure that acceptable materials are used for the construction process of such public and/or private improvements.

### **1.3 RESOURCE STANDARDS**

The following resource standards (the latest editions unless otherwise stated) may be used as reference material when certain design or construction methods and materials are not specifically addressed in these Standards and require approval of the City Engineer.

1. Arkansas Department of Transportation (ARDOT) Standard Specifications for Highway Construction
2. American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets (also called the "Green Book")
3. Institute of Traffic Engineers (ITE), Trip Generation Volumes 1 through 3
4. Institute of Traffic Engineers (ITE), Designing Walkable Urban Thoroughfares: A Context Sensitive Approach
5. Institute of Traffic Engineers (ITE), Highway Capacity Manual
6. ASTM International (formerly American Society for Testing and Materials)
7. Federal Americans with Disabilities Act (ADA) Regulations
8. U.S. Department of Transportation, Manual on Uniform Traffic Control Devices (MUTCD)
9. Federal Highway Administration (FHWA), Roundabouts: An Informational Guide
10. American Association of State Highway and Transportation Officials (AASHTO), Guide for the Development of Bicycle Facilities
11. ARDOT Standard Specifications for Transportations Materials and Methods of Sampling and Testing, and AASHTO Provisional Standards
12. City of Fayetteville standard drawings, details, and specifications when available
12. National Association of City Transportation Officials (NACTO), Urban Bikeway Design Guide

## **1.4 AUTHORITY OF THE CITY ENGINEER**

The City Engineer shall have the authority on behalf of the City to determine that all design and construction is completed to a level that is equal to or exceeds the requirements set forth in these Minimum Street Standards.

## **1.5 ENFORCEMENT RESPONSIBILITY**

It shall be the duty of the City Engineer acting on behalf of the City of Fayetteville to enforce the provisions of these Minimum Street Standards.

## **1.6 AMENDMENTS AND REVISIONS TO STANDARDS**

These Standards may be periodically amended as necessary to provide additional clarity or to reflect changes in policy or in construction or engineering practice.

Technical revisions shall consist of such additions, revisions, and corrections to these Standards as may, in the judgment of the City Engineer, be necessary to better conform to good engineering and/or construction standards and practice. The City Engineer shall approve only those proposed technical revisions that are consistent with all existing policies relevant to the revision and are consistent with existing law. Technical revisions shall become effective when approved, in writing, by the City Engineer.

## **1.7 DEFINITIONS OF TERMS AND ABBREVIATIONS**

When the following words, phrases, or abbreviations appear in these Standards, they shall have the following definition and meaning. Where conflict between these Standards and Chapter 151: Definitions in the Unified Development Code exists, the Code shall govern.

**AASHTO** – American Association of State Highway and Transportation Officials

**Access Management** – The concept of a public agency controlling the location of access points in order to achieve the dual purposes of providing access to individual land uses and limiting access on higher order streets in order to facilitate the smooth flow of traffic with a limited amount of impedance.

**ACHM** – Asphalt Concrete Hot Mix

**ACI** – American Concrete Institute

**ADEQ** – Arkansas Department of Environmental Quality

**Alley** – A minor public way dedicated to public use for utility easements and vehicle access to the back or the side of properties abutting a street.

**Applicant** – The person or designated agent providing pertinent information for preparation of permit, etc. This is often the developer.

**ARDOT** – Arkansas Department of Transportation

**City** – The City of Fayetteville, Arkansas

**Code** – The latest official adopted ordinances, policies, codes, and/or regulations of the City of Fayetteville.



**Construction Costs** – Generally, the cost of all right-of-way, earthwork, paving, drainage, structures, signing and striping, traffic control, curb and gutter, sidewalk, and utility work necessary to complete the required improvements.

**Contract Documents** – The executed contract agreement, approved plans, and technical specifications, prepared by an Arkansas licensed professional engineer, for constructing a facility.

**Contractor** – The person, firm, or organization to whom a construction contract is awarded by the developer or City. Agents, employees, workers, or engineers employed by the contractor are also bound by the terms of the contract or permit.

**Cross Slope** – Slope of the pavement surface, excluding gutter, measured perpendicular to the street centerline.

**DCM** – Drainage Criteria Manual

**Deceleration Lane** – A right-turn lane or left-turn lane lengthened to provide for safe reduction of travel speed.

**Design Speed** – The speed determined for design which takes into account the physical features of a street influencing vehicle operation; the maximum safe speed maintainable on a specified section of street when conditions permit design features to govern. Design speed is normally 5 to 10 mph higher than the posted speed limit to provide a factor of safety and allow for other conditions or uses of the street that may affect vehicle operation.

**Developer** – Any person(s), parties, partnerships, or corporations, private or public, engaging in activities described as development.

**Development** – Shall include, but shall not be limited to, the construction of a new improvement, the construction of an addition to an existing improvement, or a parceling which results in the need for access and utilities.

**Driveway** – A private access from a public or private roadway.

**Driveway Approach** – The portion of the driveway lying in the public right-of-way or public access easement between the street gutter lip or roadway of a public street and the right-of-way or public access easement line, for the full width of the access, including both apron and side slopes.

**Engineer of Record** - The person or company responsible for the creation and submission of contract documents or construction plans for the purpose of one-time construction of a facility, working on behalf of the developer. This person shall be an Arkansas licensed professional engineer.

**FHWA** – Federal Highway Administration, Department of Transportation

**Final Acceptance** – The written notification from the City, after the City Engineer finds the warranty period to be satisfactorily completed, that all public improvements are free of defects and the City releases the developer from future maintenance obligations.

**Frontage** – The property line or lines of a lot which coincide with a right-of-way or other public open space.

**Greenspace** – Area of right-of-way between the face of the curb and the sidewalk.

**HHOD** – Hillside Hilltop Overlay District

**Improvements** – All public or private improvements within City right-of-way or easements.

**Initial Acceptance** – This is the City's document and process, by which the City initially accepts for ownership, maintenance, and warranty the public improvements identified in the approved plans for a specific project.

**Inspector (EOR inspector)** – An authorized representative of the engineer of record, assigned to make inspections to assure work is completed in compliance with plans, standards and specifications.

**“Issued for Construction” Plans** – Design plans that conform to these Standards and are signed and stamped by the engineer of record, ready for distribution to the contractor for construction.

**ITE** – Institute of Transportation Engineers

**Lane Width** – The width of a travel lane measured from the centerline of the lane striping to the centerline of the parallel lane stripe, the face of curb, or to the lip of gutter, whichever is applicable.

**Lift** – The maximum specified thickness of material that may be placed at one time.

**Lip** – Defines the outermost edge of the gutter pan.

**LOS** – Level of Service

**MSP** - Master Street Plan

**MUTCD** – Manual on Uniform Traffic Control Devices

**Neighborhood Link** – A street which in addition to serving abutting properties, intercepts minor streets, connects with community facilities and carries neighborhood traffic to the major Regional Link street system. Formerly designated as Collector Streets.

**Opinion of Cost (Cost Estimate)** – Unit costs, based on those approved by the City and assigned to materials and related quantities.

**Ordinance** – A law established by the City Council.

**PC** – Point of curvature

**PCC** – Portland Cement Concrete

**PCR** – Point of curb return

**Permittee** – The holder of a valid permit issued in accordance with these Standards or other City related process.

**Phasing Plan** – A plan that defines improvements to be completed in specified parts over a defined sequence.

**PI** – Point of intersection

**Plans** – Construction plans signed by the City depicting public improvements to be constructed for the project.

**Pre-Construction Meeting** – A meeting between the engineer of record and assigned agents and the City to review proposed work necessary to construct the project, prior to proceeding with the work. A meeting may be required for each project, at the City's discretion.

**Professional Engineer (P.E.)** – An Arkansas licensed professional engineer.

**Professional Land Surveyor (P.L.S.)** – An Arkansas licensed land surveyor.

**Project** – The public or private improvement(s) designated in the approved plans, which are to be constructed in conformance with these Standards, including any and all public or private improvement projects whether development projects, private utility projects, or capital improvement projects.

**Project Supervisor** – The person appointed by the developer or contractor for management and control of the work on the project as performed by the contractor and subcontractors.

**PT** – Point of tangency

**Public Improvements** – Those public-type facilities to include: pavement, curb and gutter, sidewalk, pedestrian/bike paths, storm drain facilities with related appurtenances, culverts, channels, bridges, water distribution or transmission facilities with related appurtenances, sanitary sewer collection facilities with related appurtenances, water and waste water treatment facilities, pavement markings, signage and striping, traffic signals and related appurtenances, erosion control and right-of-way grading, or earth excavation processes integral to construction of other public improvements listed herein.

**Punch list, Initial or Final** – A written list of work items, compiled by the inspector, which do not conform to these Standards, the plans or other associated City Codes that govern the project.

**PWI** – Public Works Inspector

**Raised Crosswalk** – A roadway crossing that slightly elevates the pedestrian crossing surface above the general roadway surface. A raised crosswalk is a traffic calming device.

**Record Drawings** – Original design drawings updated by the engineer of record depicting all modifications from the design that occurred during construction.

**Regional Link** – A street or road of considerable continuity which serves or is intended to serve as the principal traffic way between separated areas or districts which is the main means of access to the primary street system or expressways. Formerly designated as Arterials.

**Report** – A bound document, the contents of which may contain certain necessary analyses, surveys, tests, exhibits, and other pertinent data supporting the subject matter.

**Residential Links** – All street facilities that are not in one of the higher systems. Their primary purpose is to provide direct access to abutting lands and connections to the higher classification streets. Formerly designated as Local Streets.

**Right-of-way (ROW)** – The land opened, reserved or dedicated for streets, sidewalks, drainage or other public purposes.

**Roadway** – The portion of the State Highway, Regional Link, Neighborhood Link, or Residential Link, including shoulders, intended for vehicle and/or bicycle use.

**Shall** – A mandatory condition.

**Should** – An advisory condition, recommended, but not required.

**Sidewalks** – Paved or otherwise improved area for pedestrian use.

**Sight Distance** – The distance necessary for the driver of a motor vehicle stopped at a stop sign on a minor street or driveway to see approaching vehicles, pedestrians, and bicyclists along the intersecting major street and have sufficient space to make any allowed move to cross the major street or merge with traffic on the major street without causing vehicles, pedestrians, or bicyclists traveling at or near the design speed on the major street to slow down. The controlling distance for design is the longest distance, generally the distance necessary to merge with traffic.

**Specifications** – Construction specifications and standards adopted by the City.

**Stop Work Order (SWO)** – A written instruction/notice from the City, revoking the developer's and/or contractor's rights to continue work on the project due to nonconformance with these Standards.

**Stopping Sight Distance** – The distance required by the driver of a vehicle traveling at the design speed to bring the vehicle to a stop after an object on the road becomes visible.

**Structure** – Anything constructed or erected with a fixed location below, upon, or above grade, including without limitation foundations, traffic signals, fences, retaining walls, buildings, inlets, vaults, poles, bridges, and major drainage facilities.

**Subcontractor** – A person, other than the contractor, supplying labor and materials, or labor only, for the project, and working for the contractor or the City.

**SWPPP** – Storm Water Pollution Prevention Plan

**Target Speed** – The desired operating speed of a roadway.

**TIS** – Transportation Impact Study

**Trail** – Any path used by pedestrians or bicyclists within a public right-of-way or easement. This would include concrete, gravel, or natural surfaces.

**UDC** – Unified Development Code

**USGS** – United States Geological Survey

**Variance** – A grant of relief to a person from the requirements of these Standards. A variance, therefore, permits construction in a manner otherwise prohibited by these Standards.

**Warranty Period** – The period of time that the developer or contractor is responsible for material and workmanship defects in the public improvements, until written notification by the City of final acceptance of the public improvements.

**Work** – All construction activity, including materials, labor, supervision, and use of tools and equipment necessary to complete the project in full compliance with these Standards, or approved plans.

## **1.8 INTERPRETATION OF STANDARDS**

In the interpretation and application of the provisions of these Minimum Street Standards, the following principles apply:

### **1.8.1 Governing Standards**

These Standards are a supplement to the City of Fayetteville Code of Ordinances Title XV Unified Development Code and other Ordinances. Where conflict between these Standards and City Code exists, the Code shall govern.

### **1.8.2 Prior Acceptance of Construction Plans**

These Minimum Street Standards shall not modify or alter any street construction plans that have been filed with and accepted by the City prior to the effective date of the ordinance or resolution adopting these Standards. This exception shall be subject to the conditions and limitations under which said plans were accepted by the City Engineer.

## **1.9 VARIANCES AND APPEALS**

Any design that does not conform to these Standards must be approved by the City Engineer. Variances from these Standards will be considered administratively on a case-by-case basis following a written request for a variance prepared by a professional engineer and submitted to the City Engineer. If the developer, contractor, or utility responsible to the City for public improvements desires to design and construct such improvements in variance to criteria in these Standards, such variance(s) shall be identified in a written attachment to the initial submittal of construction plans to the City Engineer. The design submitted for review shall show the variance.

To assist with their plan preparation, the engineer of record may submit variance requests, along with sufficient documentation to support the variance, prior to formal submittal of construction plans for informal advisory consideration. Such advisory consideration shall not be binding on the City Engineer but may help to guide the requestor in the preparation of plans.

The variance request(s) shall include the following:

1. Identifying Issue. Identification of the standard to be waived or varied and why the standard is unfeasible or is not in the public interest.

2. Proposed Alternate Design. Identification of the proposed alternative design or construction criteria.
3. Comparing to Standards. A thorough description of the variance request including impact on capital and maintenance requirements, costs, and how the new design compares to the standard.
4. Justification. The professional engineer must determine and state that the variance will not be detrimental to the public health, safety and welfare, will not reduce design life of the improvement nor cause the City additional maintenance costs. The proposed plan (as varied) must advance the public purpose of the standard sought to be varied equally well or better than would compliance with such standard.
5. Approval or Denial of Variance. Based upon review of the plans and additional information submitted, and an analysis of the criteria set forth in this subsection the City Engineer may approve or deny the variance request.
  - a. If the City Engineer approves the variance request, the plans will continue to be reviewed and approved within the typical review process.
  - b. If the City Engineer denies the variance request, the developer shall subsequently submit revised plans in compliance with these Standards.
  - c. The City Engineer shall provide a written response outlining the basis for all approvals or denials of variance requests.

If a variance request is denied by the City Engineer, the developer may appeal the decision as outlined in Chapter 155, Appeals, of the UDC.

## **1.10 WORK SCHEDULE**

Normal working day hours are 7:00 a.m. to 5:00 p.m., Monday through Friday excluding City Holidays. No work requiring Public Works Inspector observation may be conducted outside of these normal working hours without prior approval.

Contractors shall follow the guidelines of Chapter 96, Noise Control, of the City of Fayetteville Code of Ordinances. Noise from construction activities shall be limited to no later than 11:00 p.m. every day and no earlier than 7:00 a.m. on all days, except Sundays when the time is extended to 9:00 a.m.

## **1.11 UTILITY COORDINATION**

The developer shall coordinate construction with affected private utility companies and notify said utilities in accordance with their notification prior to interruption of service or operation. Prior to construction, the developer shall be responsible to make special arrangements with private utilities for any relocation necessary within the approved project and to coordinate such relocation activities with adjacent affected property owners. The developer shall be responsible to notify said utilities of any damage to utility systems caused during construction.

All private utility installation within the City of Fayetteville right-of-way shall follow all requirements of Section 171.07, Occupation of Streets and Highways by Public Utilities, of the UDC and the ARDOT Utility Accommodation Policy.



## CHAPTER 2 – CONSTRUCTION PLAN SUBMITTAL REQUIREMENTS

### 2.1 GENERAL

This chapter gives criteria for submitting engineering drawings as required by these Minimum Street Standards. The submittal, review, and approval process for construction plans is available by contacting the Engineering Division. All other requirements for planning and related submittals can be found in the Unified Development Code.

#### 2.1.1 Submittal Content

The submittal shall be complete with all necessary information included for review of the project, including but not limited to:

1. Public improvement construction plans;
2. TIS, where required – refer to **Chapter 3, Transportation Impact Study**;
3. Soils investigation report – refer to **Chapter 6, Pavement Design and Report**;
4. Pavement design report – refer to **Chapter 6, Pavement Design and Report**;
5. Utility plans;
6. Erosion control plans;
7. SWPPP – refer to ADEQ General Stormwater Permit Requirements;
8. Tree preservation and landscape plans, where required – contact Urban Forestry for requirements; and
9. Drainage report – refer to the City’s Drainage Criteria Manual.

#### 2.1.2 Horizontal and Vertical Datum

The horizontal datum shall be NAD 83 (2011), Arkansas State Plane, North Zone (SPC 301). The units shall be U.S. survey foot. The vertical datum shall be NAVD 88 (computed using GEOID12B). These datums will change in the year 2022. Information regarding the upcoming datum change is available from the National Geodetic Survey at the following link: <https://www.ngs.noaa.gov/datums/newdatums/index.shtml>.

At least two horizontal control monuments and at least one benchmark shall be shown on each sheet. A horizontal and vertical tie to at least one City of Fayetteville GPS monument shall be made and the results provided when submitting applicable documents. If the monument is not a City of Fayetteville OPUS session, it shall be translated using the tool available at this link <https://www.ngs.noaa.gov/cgi-bin/nadcon2.prl> from the National Geodetic Survey.

### **2.1.3 Expiration of Plan Set**

Public improvement construction plans shall be valid for a period of one year from the date of approval by the City Engineer unless construction has started and continual progress is made towards completion of the improvements. Refer to Section 166.20 of the Unified Development Code for time limits and the process for time extensions.

### **2.1.4 Additional Requirements**

The engineer of record should be aware that whenever unusual or serious problems are anticipated or encountered for a proposed construction project, additional information and analysis beyond the minimum requirements of these Standards and criteria will be required.

### **2.1.5 Opinion of Cost and Record Drawings**

An opinion of costs for all public improvements and record drawings shall be prepared by the engineer of record in accordance to **Chapter 12, Acceptance/Warranty Procedures and Record Drawings**. Record drawings must be signed and stamped with the engineer of record's statement that any variations during construction have not changed the intent of the approved plans.

## **2.2 GENERAL FORMATTING AND REQUIRED INFORMATION**

The following information is provided for the developer and engineer of record when determining plan format and design requirements required by the City. This information should be considered the minimum information to be provided.

### **2.2.1 Size of Plan Sheets**

All sheets in the construction plan set shall be full-size (22 inches x 34 inches).

### **2.2.2 Title Block**

A title block is required on every sheet submitted for review and acceptance. The title block shall be located in the extreme lower right-hand corner, the right-side margin, or along the bottom edge of the sheet.

The following information shall appear in title block on each sheet:

1. The subdivision or development name and project number (if applicable);
2. The type of improvement (grading, site plan, utility plan, etc.);
3. The engineer of record's name, address (including zip code), telephone number, e-mail address, professional seal, company name and date;
4. Sheet number (consecutive, beginning with the cover sheet); and
5. Revision block.

### **2.2.3 Incomplete Plans**

Incomplete plan submittals or plans that do not have a sufficient level of detail will not be reviewed. The applicant shall be notified if the submitted plans are incomplete. Partial plans may be submitted when appropriate. This may be allowed on a case by case basis and must be authorized by the City Review Engineer prior to submittal.

### **2.2.4 Stamped Plans & Engineer of Record Statement**

All sheets shall include the engineer of record's signature, stamp and date and shall be stamped and signed in accordance with the rules and regulations established by the Arkansas State Board of Licensure for Professional Engineers and Professional Surveyors. No plans are considered final and ready for construction until signed and stamped by the engineer of record and signed by the City Engineer or designee.

### **2.2.5 Scale**

A. *General.* All scales listed below shall be based on a standard 22-inch x 34-inch full scale drawing.

1. For plan and profile scales, horizontal scales shall be 1 inch = 10, 20, 30, 40, or 50 feet and Vertical scales shall be 1 inch = 5 or 10 feet;
2. Overall plan scales shall not exceed 1 inch = 100 feet; and
3. Cross sections shall have a maximum vertical exaggeration ratio of 5:1, while 1:1 is preferred.

The scales listed above may not be appropriate for all plans. Other scales may be approved on a case by case basis upon request.

B. *Bar Scale and Other Options.* Show bar scale, other scales may be used upon City approval.

C. *Signing and Striping.* All signing and striping plans shall have a minimum scale of 1 inch = 30 feet.

D. *Key Map.* 1 inch = 500 - 1,000 feet.

E. *Vicinity Map.* 1 inch = 1,000 - 1,500 feet.

### **2.2.6 Dates**

All sheets shall have dates shown in the title block for both plan preparations and subsequent revisions. An electronic date shall appear on all electronic files to be submitted. Final approved construction plans shall start the date sequence again.



### **2.2.7 North Arrow**

All design sheets shall have a north arrow oriented toward the top or right side of applicable sheets.

### **2.2.8 Existing Facilities**

Each sheet shall show all existing facilities in a ghosted or alternate line weight or type.

### **2.2.9 Legend of Symbols**

Each plan sheet shall include a legend that identifies the symbols pertaining to the sheet unless an overall legend is provided for the entire plan set.

### **2.2.10 Key Map**

For plan sets that include 3 or more plan and profile sheets, each plan and profile sheet shall provide a key map showing the location of the street being detailed.

## **2.3 SHEET TITLE NAMES AND SPECIFIC REQUIREMENTS**

This section outlines the minimum required information to be included on specific sheets of the plan set. The following sheets are listed in the order they should appear in the plan set. Some sections of the plan set may have more than one sheet but should be labeled alike.

### **2.3.1 Cover Sheet**

All sets of construction drawings shall include a cover sheet with the following information provided:

- A. *General Construction Notes.* General Notes may be shown on this sheet or as a separate sheet.
- B. *Vicinity Map.* The vicinity map shall show the location and name of all Regional Links within one mile of the proposed construction, and all other roadways within 1/2 mile of the proposed construction. The project area shall be indicated by shading. The minimum size of vicinity map shall be 10 inches x 10 inches set to a scale of 1 inch = 1,000 – 1,500 feet.
- C. *Engineer/Owner Contacts.* The name, address, e-mail, and phone number of the developer/owner and engineer of record shall be listed on the cover sheet.
- D. *Index.* Each cover sheet shall include an index of all sheets within the plan set.
- E. *Indemnification Statement.* The indemnification statement shall be shown only on the cover sheet, as follows:

*These plans have been reviewed by the City for concept only. The review does not imply responsibility by the reviewing department, the City Engineer, or the City for accuracy and*

*correctness of the calculations. Furthermore, the review does not imply that quantities of items on the plans are the final quantities required. The review shall not be construed for any reason as acceptance of financial responsibility by the City for additional quantities of items shown that may be required during the construction phase.*

F. *Project Title.* The project title shall be clearly shown.

G. *Legend of Symbols.* Provide City of Fayetteville standard symbols for all appurtenances related to each type of facility. The standard legend may be expanded as necessary to fit specific projects.

### **2.3.2 Grading and SWPPP**

These plan sheets shall be drawn at a legible scale (1 inch = 10 - 50 feet) to clearly convey design and construction intent. All erosion control devices (temporary and long-term) shall be included, as well as revegetation methods with specific notes. Plan must show grades of all drainage facilities. All grading plans shall meet the requirements as described in Chapter 169 of the UDC. The Stormwater Pollution Prevention Plan (SWPPP) shall meet all ADEQ requirements and be accepted and approved by the City and ADEQ, when required, prior to issuance of the grading permit.

### **2.3.3 Street Improvements**

The plans shall include plan and profile views for all public and private streets proposed in the development. Cross-section sheets are required for all streets. All plans shall be produced at a scale that is completely legible for review and for construction. In addition to the requirements set forth elsewhere in these Minimum Street Standards, the following information shall be shown on all street plans submitted for review and approval:

A. *Street Plan View.* The plan view shall include, but not be limited to, the following:

1. Existing and proposed property/right-of-way lines, easements, and adjacent property owner names and addresses. The type and dimension of easement or tract is to be clearly labeled, and dimensions of property and right-of-way lines are to be marked.
2. Survey lines and stationing lines shall normally be based on centerline of travel lanes; other profiles may be included but shall be referenced to centerline stationing. Stationing in cul-de-sacs shall be on the centerline to the center of the bulb with flowlines dimensioned within the bulb. Survey lines and stationing lines shall deviate from centerline of the street to parallel the roadway for situations where two sides of a divided street are not parallel.
3. Stationing shall read in ascending order in the direction of the north arrow or to the right.
4. Streets, including street names, if known. Streets that have not been named shall be labeled similarly (e.g. Street A, B, C, etc.).
5. Existing utilities and structures including, but not limited to:
  - a. Storm sewer\*
  - b. Ditches/swales
  - c. Bridges/culverts

- d. Fence lines and gates
- e. Water lines\*
- f. Sewer lines\*
- g. Curbs and gutters
- h. Edge of pavement
- i. Telephone lines\*
- j. Electric lines/poles\*
- k. CATV lines\*
- l. Gas lines\*
- m. Signs
- n. Guardrails
- o. Houses/structures
- p. Trees/landscaping
- q. Driveways

\*Denotes all appurtenances for existing infrastructure shall be shown

- 6. Critical elevation (flowline, invert of pipe, etc.) of all existing and proposed utility or drainage structures.
- 7. Storm drainage flow direction arrows, particularly at intersections and all high and low points.
- 8. Match lines, stations and consecutive sheet numbers, beginning with cover sheet.
- 9. Station and elevation of all horizontal curves including PI, PCs, PTs, etc.; high or low point and VPI/PVI of all vertical curves; existing and proposed, centerline bearings, distances, and complete curve data.
- 10. Curb return radii, existing and proposed. Stations and elevations of all curb returns at the gutter line; mid-point elevations and additional locations as necessary, flowline to flowline intersection elevations, corresponding centerline spot elevations and percent of grade from the PCR to flowline to flowline intersections of all crosspans.
- 11. Centerline stations of all intersecting streets.
- 12. Survey tie lines to section corners or quarter corners, consistent with that shown on the plat.
- 13. All street intersections shall include construction and lane details for proposed and existing facilities for a minimum of 150 feet beyond the limits of construction.
- 14. Basis of plan view and profile elevations shall be the same (e.g. flowline to flowline, top of curb and bottom of curb, etc.).
- 15. Cul-de-sac high point and grades shown with percent arrows at critical points (e.g. cross slope and flowline).
- 16. Location of all proposed and existing sidewalk and/or trails.
- 17. Soil boring locations and CBR test locations (when available).
- 18. Location of all existing or proposed retaining walls.

B. *Street Profile*. Profiles shall include, but not be limited to, the following:

- 1. All streets shall be designed to show profile of centerline.
- 2. Existing grade (dashed line) and proposed grade (solid line). Both grades are to be plainly labeled for all centerline profiles.
- 3. Existing and design elevations shall be provided for the centerline.

4. Elevation and location of all underground utilities (e.g. waterlines, sanitary sewer lines, storm drains, etc.) in the immediate vicinity of the construction shall be shown on the profile. Separate left and right profiles may be required for clarification when there are multiple underground utilities.
5. Station and elevation of all vertical grade breaks.
6. Distance and grade between VPIs.
7. Vertical curves, when necessary, with VPI, VPC, and VPT, high or low point (if applicable) stations and elevations. All vertical curves shall be labeled with length of curve (L) and K-values.
8. Profiles for curb returns, when requested.
9. Specify limits of typical sections and transitions.
10. Separate drainage profiles are required for off-site storm drain infrastructure.

C. *Typical Street Section(s)*. A typical street section shall be included in the plans and shall show the following:

1. Pavement section type, width, and thickness;
2. Street cross slope and crown;
3. Location of profile grade (crown, centerline, curb line);
4. Curbs and/or ditches/swales;
5. Existing and proposed grades;
6. Right-of-way width;
7. Sidewalks and/or trails, where required;
8. Landscaping, if required;
9. Stationing limits for the typical section;
10. Street name(s) and classification for all proposed street sections; and
11. Parking, where required.

D. *Cross-Sections*. Street cross-sections shall be provided at intervals deemed necessary by the City to effectively evaluate connection with the existing facilities (typically every 50 feet horizontally, at intersections, transition points, driveways, storm drain infrastructure, etc.). Typical and unique cross-sections shall be submitted for each street, including the proposed width, treatment of curbs and gutters, and sidewalks/trails where deviations are proposed from these Standards. The cross-sections shall include the following:

1. Profile centerline, including proposed and existing spot elevations;
2. Street width;
3. Right-of-way width;
4. Pavement cross slope;
5. Pavement thickness;
6. Curbs and/or ditches/swales;
7. Proposed and existing waterlines, sanitary sewer lines, and storm drains (including size, material, elevation, and location); and
8. Street name.

- E. *Key Map*. Clearly depict each sheet's relative position compared to the overall project. The street or area that the design pertains to shall be shaded. Minimum scale is 1 inch = 500 feet, showing the location and name of all streets within and adjacent to the proposed construction and all planned streets. The scale should be indicated. The key map should be oriented consistent with detail in the sheet (i.e. same north).

### **2.3.4 Street Improvements Details**

All pertinent details related to street improvements shall be shown on a detail sheet (or sheets) for the project. Standard City of Fayetteville detail sheets shall be included, along with standard ARDOT detail sheets where work is planned within ARDOT right-of-way.

### **2.3.5 Traffic Signing and Pavement Markings**

All permanent and temporary traffic signing and pavement markings shall be shown on the signing and striping plan, with the existing and proposed street system used as the base layout. Locations of signs and pavement markings shall be indicated by station/offset, or other specific dimensions indicating exact locations. This sheet shall also contain any construction or application notes (e.g., application temperatures, surface cleaning methods to be used prior to application, etc.).

- A. *Area Map*. Separate signage and striping plans are to consist of an overall area map noting all specific use areas (e.g. schools, parks, recreation centers, library, commercial, industrial, fire zones, no-parking and designated parking areas, etc.).
- B. *Street Segment Pages*. The pages following the area map are to be broken down into street segments, for notation of signage and striping details.
- C. *Signing Plan*. The permanent signing plan should:
1. Show the general longitudinal location of each sign (horizontal offset and station);
  2. Specify the sign legend and sign type, per MUTCD requirements;
  3. Specify the sign size;
  4. Detail post and base dimensions and installation plan (showing sleeves, depth below surface, and materials used, according to City standards);
  5. Specify the blank gauge of the sign; and
  6. Note the reflectorization provided.
- D. *Striping Plan*. The striping plan must show:
1. Color and type;
  2. Lane widths, taper lengths, storage lengths, etc.;
  3. Striping/skip interval;
  4. Typical treatments for acceleration/deceleration lanes, turning lanes, and crosswalks;
  5. Type of material (thermoplastic);
  6. Station and offset or dimensions to all angle points, symbol locations, and line terminations; and

7. Pedestrian crossings.

- E. *Traffic Control Plan*. Plans for temporary traffic control during project construction must be accepted by the City prior to issuance of any grading permits for Neighborhood Links and Regional Links, and on lower classification streets when deemed necessary by the City Engineer. These plans shall be designed in accordance with the MUTCD, Section VI.



## CHAPTER 3 – TRANSPORTATION IMPACT STUDY

### 3.1 INTRODUCTION

#### 3.1.1 General

This chapter contains the policies and guidelines necessary for the preparation of Transportation Impact Studies (TIS) for development proposals in the City of Fayetteville. The policies exist to ensure consistent and proper traffic planning and engineering practices when developments are being considered within the City. The guidelines provide for a standard process, set of assumptions, set of analytic techniques, and presentation format to be used in the preparation of the TIS.

#### 3.1.2 Applicant Responsibility

The responsibility for assessing the transportation impacts associated with an application for development approval rests with the applicant. The City only serves in a review capacity. 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 the State of Arkansas 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 Arkansas Department of Transportation.

#### 3.1.3 Capacity and Safety Issues

Development 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 development, specific improvements may be necessary. The goal of the TIS is to address the transportation related issues that result from the new development and to determine the improvements required such that appropriate levels of service are safely maintained. The competing objectives of vehicular movement, pedestrians, bicyclists, and others must be balanced in the development review process. A balanced combination of elements is needed to provide facilities that serve all transportation modes. The TIS will provide information and guidance as plans are developed and decisions made for the approved plan.

- A. *Vehicular Traffic Improvements.* Examples of capacity and safety improvements for vehicular traffic include road widening/narrowing, capacity of travel lanes, turn lanes, acceleration and deceleration lanes, intersection improvements, traffic signals, stop signs and modifications to access points.

- B. *Pedestrian and Bicycle Traffic Considerations and Improvements.* Examples of safe, comfortable, and convenient pedestrian services are shorter blocks, lower traffic speeds, tree-lined sidewalks, well-defined crosswalks, median refuges and channelized islands in large street crossings. Grade separated structures are examples of safety improvements where vehicular traffic causes unsafe conditions for pedestrians, and where space is available for the needed ramps or steps. The addition of on- or off-street bicycle facilities per the guidelines found in **Chapter 9, Bicycle Facilities Design and Technical Criteria**, and in the Master Street Plan may be needed to achieve connectivity between the proposed project and the existing bikeway system.
- C. *Transit Traffic Improvements.* Examples of transit traffic improvements include accommodation of public transit facilities such as bus stops, bus bays, and transit stop facilities. This may involve wider lanes to accommodate larger vehicles.

## 3.2 REQUIREMENTS AND CRITERIA

### 3.2.1 Scoping Meeting

- A. *Purpose.* The purpose of the scoping meeting is to determine the parameters for the study of traffic impacts for a specific development project, and to document those parameters. The parameters determined in the scoping meeting represent general agreement between the City and the consulting engineer, but they may not be all-inclusive. The City retains the right to require any additional information and/or analysis to complete an evaluation of the proposed development project.
- B. *Meeting Setup and Content.* The applicant is required to contact the City to arrange for a scoping meeting to discuss the TIS requirements and determine the base assumptions. It is incumbent upon the Applicant to be prepared 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 build-out;
  - 5. Identification of proposed year of build-out;
  - 6. Trip adjustment factors proposed, if any;
  - 7. Approved and proposed developments in the study area, and the associated committed roadway improvements;
  - 8. Anticipated roadway improvements to be provided by the applicant;
  - 9. Phasing plan proposed;
  - 10. Potential bicycle and pedestrian connections;
  - 11. Special analysis needs.



### **3.2.2 Types of Study**

- A. *Master TIS*. Where large complex projects are planned or a project is phased over a multi-year build-out, it may be appropriate to prepare a Master TIS for the initial development followed by periodic updates for specific phases. The Master TIS must include overall phasing of improvements to coincide with project phasing. Updates to the Master TIS shall be submitted with the development applications for the specific phases, and shall meet the requirements for the Individual Site TIS.
- B. *Individual Site Transportation Impact Study*. An Individual Site TIS is prepared for a project that stands alone or is a phase of a master development. It can be for a new use in an existing or remodeled building, the construction of a new building (either single occupant or multiuser), construction of multiple buildings, or the construction of new residential development.

### **3.2.3 When a TIS is Required**

An Individual Site TIS shall be required if one or more of the following conditions occur:

1. The development will generate greater than 100 peak hour trips on to a Residential Link;
2. The development will generate greater than 150 peak hour trips on to a Neighborhood Link;
3. The development will generate greater than 200 peak hour trips on to a Regional Link;
4. New high-volume access is requested for a Regional Link or State Highway;
5. The City Engineer deems that other development-specific conditions warrant a TIS.

### **3.2.4 Revisions and Updates**

A revision or update to an approved TIS may be required when a previously approved development proposes an expansion, a change to access, or a change in use where new trip generation estimates exceed the original trip-end generation estimates. If the currently approved study was prepared within the last three years, an amendment letter addressing the changes may be accepted and satisfy the requirements of this guideline.

The letter must address: a) an estimate of site trip generation, b) existing site trip generation, c) the differences between anticipated estimates and existing trip generation and d) changes to the bicycle or pedestrian facilities. If the original study is older than three years, an entirely new study will be required by the City Engineer.

## **3.3 STUDY PARAMETERS**

### **3.3.1 Project Description**

A description of the proposed project will be prepared and include the type of land use and size of the proposed project (number of dwelling units or building square footage). Any proposed phasing will be discussed and the anticipated completion date established. A figure depicting the proposed site plan will also be included and the proposed vehicular access locations will be described. This section will also include a description of how pedestrian and bicycle travel will be accommodated

within the proposed site plan. This will include a discussion of types of sidewalks, trails, and connections to local and perimeter destinations.

### **3.3.2 Analysis Horizons**

Three study horizons are required for a Master or Individual Site TIS analysis. It may be acceptable for the short range and long range horizons to be identical for some large projects.

- A. *Existing Horizon.* The intent of completing an analysis of the existing (current) study horizon is to establish a baseline of traffic conditions.
- B. *Short Range Horizon.* The intent of the short range planning horizon is to investigate the immediate impacts of the completed, proposed project on the existing and proposed roadway network. The short range planning horizon year is defined as one year after the full occupancy of the project. If the project is proposed to occur over multiple phases, each phase shall be evaluated for impacts one year after the occupancy of that phase for the short range analysis. To properly model the impacts, two analyses should be completed. One to project traffic conditions at full build out, and the other to project traffic conditions during the same time without build out.
- C. *Long Range Horizon.* The third planning horizon is the long range planning horizon. It shall be based on the current Regional Transportation Plan 20-year planning horizon and related modeling. The intent of the long range planning horizon is to evaluate the implications of the fully developed proposed project on the long-range traffic condition. Data from the Northwest Arkansas Regional Planning Commission is available.

### **3.3.3 Study Area**

The limits of the transportation network study area shall be defined for all levels of TIS analysis. The limits of the transportation network to be studied shall be based on the size and extent of the application for development approval, the existing and future land uses, and traffic conditions on and near the site.

The exact limits of the study area are to be based on good engineering judgment, and an understanding of existing and future land use and traffic conditions at and around the site. The limits of the study area shall be agreed upon at the scoping meeting. The Master TIS shall generally establish the study area for all subsequent Individual Site TIS(s).

At a minimum, the factors to be considered for the establishment of the limits of the study area, the Master or Individual Site TIS should include as designated below:

1. All adjacent and internal Neighborhood Links and Regional Links - Master
2. Offside Neighborhood Links and Regional Links within the study area impacted 10% or more by the project, or provide the primary connections between the project and the urban services, unless otherwise approved by the City Engineer - Master
3. Continuity and adequacy of pedestrian and bike facilities - Master

4. Access to most direct transit facility or transit route – Master, Individual Site
5. Access routes to schools - Master, Individual site
6. All adjacent streets, intersections, and high-volume driveways - Individual Site
7. Nearest offsite major intersection(s), Neighborhood Links, and Regional Links - Individual Site
8. Internal public roads, including establishing the road classification - Individual Site
9. Additional offsite intersections as identified in the scoping meeting - Individual Site
10. Pedestrian and bicyclist destinations - Individual Site

### **3.3.4 Evaluation Elements**

The purpose of the Master TIS is to provide a general sense of the overall impacts to the transportation system and to identify the larger scale improvement needs necessitated by the proposed development (i.e. widening of streets, connecting gaps in the street system, etc.). The Master TIS does not need to include intersection analyses, although it may, at the applicant's option, if the applicant intends to proceed with a specific phase of the project immediately following approval of the Master Development Plan.

For example, for a Master Development Plan with a multi-phase build-out, the Master TIS would not only address the overall project, but also identify key measurable criteria that would trigger the construction of some incremental portion of the overall infrastructure improvement plan. Typically at the Large Scale Development (LSD) or Preliminary Plat (PPL) stage, with each phase of the project a new individual site TIS specific to that phase would be prepared. This new study would verify the accuracy of the original traffic projections, both on-site and background, and check the criteria identified for infrastructure improvements, and other pertinent information.

The key elements of the project impact assessment for a Master or Individual Site TIS shall include the following minimum evaluations as designated below:

1. Conformity with the adopted Master Street Plan including any adopted access control plans – Master, Individual Site
2. Appropriateness of access locations – Master, Individual Site
3. Pedestrian/bike requirements and/or improvements – Master
4. Safety and accident analysis – Master, Individual Site
5. Neighborhood and public input issues – Master
6. Peak hour intersection LOS – Individual Site
7. Location and requirements for turn lanes or acceleration/deceleration lanes at accesses or intersections, including recommendations for taper lengths, storage length, acceleration/deceleration lengths, and other geometric design requirements per City or ARDOT requirements – Individual Site
8. Intersection and stopping sight distance evaluations and recommendations – Individual Site
9. Continuity and adequacy of pedestrian and bicycle facilities within the study area – Individual Site
10. Recommended traffic control devices for intersections which may include two-way stop control, four-way stop control or yield signs, school flashers, crosswalks, traffic signals, or roundabouts – Individual Site

11. Traffic signal and stop sign warrants – Individual Site
12. Appropriateness of the existing roadway signage and striping – Individual Site

### **3.4 TRAFFIC VOLUMES**

#### **3.4.1 Existing Traffic**

- A. *Roadway Traffic Volumes/Traffic Counts.* Current A.M. and P.M. peak hour traffic counts as specified by the City Engineer shall be obtained for the roadways within the study area for one, non-holiday Tuesday, Wednesday, or Thursday. Each peak hour count shall be conducted over a two hour period (or as specified by the City Engineer) and shall include 15 minute count data to clearly identify the peak hours.

Weekend counts and/or average daily counts on residential links may also be required where appropriate when requested by the City Engineer.

The volumes shall be no more than one year old (from the date of application submittal). The City may require the use of seasonal adjustment factors depending on when data was collected and if the project is considered to be in an affected area (i.e. University of Arkansas).

- B. *Intersection Level of Service.* A.M. and P.M. peak hour intersection levels of service shall be determined for the existing signalized and unsignalized intersections with collectors and arterials within the area to be studied. Locations to be analyzed will normally be set in the scoping meeting. The analysis shall use procedures described in the latest edition of the Highway Capacity Manual.

#### **3.4.2 Background Traffic**

- A. *Short Range Volume Projections.* The traffic forecast for the short range planning horizon shall be the sum of existing traffic volumes plus cumulative development traffic. The cumulative development traffic shall be based, in part, on the A.M. and P.M. peak hour and ADT data established and accepted from planned and approved developments within and near the study area.

100% of the committed trips from the build out of the planned and approved projects in the study area must be included in the short range volume projection. The assumed baseline surface transportation network should reflect existing facilities (without the proposed project improvements) plus any committed improvements by the City, other public agencies, and/or other approved developments within the study.

The short range planning horizon background traffic growth rate shall be based on a growth rate based on one of the following methodologies:

1. Historical traffic counts projected to the build-out year (at least three years of traffic data should be used for this), or

2. Area-wide traffic count analysis which considers traffic volume trends in the study area's circulation system and uses proportion/extrapolation methods.

**B. *Long Range Volume Projection.***

1. Historical traffic counts projected to the build-out year (at least three years of traffic data should be used for this), or
2. Area-wide traffic count analysis which considers traffic volume trends in the study area's circulation system and uses proportion/extrapolation methods, or
3. Growth rate agreed upon with the City Engineer.

### **3.4.3 Project Traffic**

- A. *Trip Generation Rate.* Trip generation should be calculated from the latest data contained within the Institute of Transportation Engineers' Trip Generation Manual. Other industry publications (such as the ITE Journal or other sources) may be approved by the City. Data limitations, data age, choice of peak hours (for the land use or adjacent street traffic), choice of independent variables, and choice of average rate versus statistically significant modification should be discussed in the study when appropriate. When data is not available for a proposed land use or a modification 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 City prior to its use in the written study.
- B. *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 for the approved land uses, and/or the maximum trip generation rates for the non-residential development. 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.
- C. *Trip Generation Table.* The Applicant shall prepare a Trip Generation Table, listing 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), directional splits for each in/out driveway, the resultant total trips generated. The data source shall be stated. Build-out land uses and trip generation shall be used for both the short range and long range planning horizons. Developments proposed that are of a type that build-out in the short-range is not feasible due to the size, may propose phases (such as 2-year increments) for the development.
- D. *Adjustments to Trip Generation.* Trip-making reduction factors may be used after first generating trips at full ITE rates or pre-approved rates from other professional sources. These factors fall into two categories: those that reassign some portion of generated trips to the background stream of traffic, and those that remove or move generated trips. In all cases, the underlying assumptions of the ITE trip generation rates must be recognized and considered before any reductions are used in the TIS. Two specific situations will be closely reviewed. The first is when the traffic study assumes rates where the collection of mixed uses, such as at

a shopping center, result in lower peak hour trips than when applying individual rates to each land use. The second is when reductions in the trip generation rates are assumed based on reductions due to travel demand management.

1. Pass-by Trips. This first category may be considered when trips to the proposed development currently exist as part of the background traffic stream, referred to as a pass-by trip. Pass-by percentages identified in the ITE Trip Generation report or other industry publications will be considered with appropriate explanation and documentation. Pass-by traffic must remain assigned to driveways and access points. They are not additive to the background traffic stream. A technical appendix, table or map that illustrates the re-division of pass-by trips is required which may be submitted as a legible, hand-written work sheet(s).
  2. Internal Site Trips/TDM. Analytic support documentation of internal site trips, and transit use shall be provided to show how trip adjustments are derived. Optimistic assumptions regarding transit use will not be accepted unless accompanied by specific implementation proposals that will become a condition of approval. Such implementation proposals must have a high expectation of realization within a 5-year period after project initiation.
- E. *Trip Distribution*. Trip distribution must be documented in the TIS. It may be based on the professional engineer's judgment applied to one or more of the following: regional traffic volume projections, gravity model, market analysis, existing traffic flows, or applied census data. Regardless of the basis of the estimates, the procedures and rationale used in determining the trip distributions must be fully explained and documented.
- F. *Trip Assignment*. The project traffic will be assigned to the roadway system according to the trip distribution established above. The resulting project site generated traffic and total site traffic will be depicted on figures for each analysis horizon. These figures will include peak hour traffic volume information, plus daily traffic volume. Separate maps or values are required when the trip distribution differs by more than 10% between the short and long range analysis horizons.

### **3.4.4 Total Traffic**

The total traffic projections will be determined for each of the analysis horizons identified earlier in the base assumptions. The total traffic projections will include the existing traffic, plus the future background traffic, plus the project generated traffic. The future total traffic projections will be depicted on figures for each study year.

Based upon the total traffic projections and the City's street standards and Master Street Plan, the Applicant shall provide roadway functional classification recommendations.

## 3.5 PROJECT IMPACTS

### 3.5.1 Significant Negative Impacts

This section applies primarily to vehicular related impacts associated with the proposed project. A project is defined as significantly impacting a study intersection when one of the following criteria are satisfied:

#### A. *For Signalized Intersections.*

1. When the added project traffic causes an intersection to fail the minimum acceptable level of service standard; or
2. When the background traffic conditions (without project traffic) causes an intersection to fail the minimum acceptable level of service standards; and when the project traffic causes more than a 2 percent increase in the intersection delay.

#### B. *For Unsignalized Intersections.*

1. When backstacking to adjacent intersections would create impeded traffic flows and/or excessive congestion; or
2. When added project traffic is determined to create potential safety problems.

### 3.5.2 Project Impact Assessment

The key elements of the project impact assessment include evaluations of issues outlined for a specific analysis. Refer to **Section 3.3.4** for a listing of the Evaluation Elements.

#### A. *Motor Vehicle Impact Evaluations.*

1. Existing Condition. Drawings shall be prepared and included in the report to document traffic counts, lane geometrics (including striping, signing and other pavement markings), traffic control, existing access locations, lane lengths, widths, tapers, and any other notable features. When Regional Links are impacted by the proposed project, the report shall include a tabulation or diagram which identifies the number of existing and proposed accesses contained within, and up to one-quarter mile of, the evaluated Regional Link and/or intersection .
2. Using the peak hour traffic volumes forecast and the maximum traffic volumes allowed for the specific classes of roadways, a general evaluation should be made of the street system for the specified analysis horizons. A summary report of the level of service evaluations for roadway links shall be presented in the TIS. Within one block (approximately 500 to 1000 feet) of an intersection with a street of higher functional classification, additional through and turning lanes may be required on a street to meet the level of service requirements in **Table 4-1** and/or for the intersection. The additional lanes shall not be considered a reclassification of the street.
3. Intersection Delay.

- a. An A.M. and P.M. peak hour intersection level of service analysis shall be conducted for each intersection analyzed in the TIS, based on procedures specified in the most recent release of the Highway Capacity Manual.
    - b. The principal objective of the intersection level of service traffic impact analysis is to identify whether the traffic from the proposed project when added to the short range planning horizon traffic will result in a significant impact and an unacceptable level of service.
  - 4. Driveway Access. The design, number, and location of access points to collector and arterial roadways must be submitted for approval with the development. State Highway accesses require the issuance of a permit from ARDOT. The number of access points must be kept to a minimum and be designed to be consistent with the Access Management Policy. Access points will be reviewed and approved by the City based on the following information:
    - a. Access location(s) as shown on the site plan.
    - b. Proposed traffic turning movements.
    - c. Analysis of on site (driveway) stacking/queuing and impacts to adjacent streets.
    - d. Signalization requirements and design in accordance with these guidelines.
  - 5. Traffic Signals.
    - a. Proposed and existing access points, proposed intersections, and existing intersections effected by the development being analyzed in the report that have any potential for signalization will be reviewed and discussed during the development review process. Discussion will include review of existing signals/potential modifications, proposed signals, school signals for school crossings, school flashers, pedestrian signals/crossings, and any other potential for signal devices and signal interconnect issues.
    - b. 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.
    - c. If any location proposed for signalization is not spaced according to the City's policy, then a traffic signal progression analysis shall be required.
    - d. Alternatives to signalization at potential signal locations will be discussed in the report. The alternatives to adding new intersections to be discussed should include no new intersection, limited movements, and roundabouts.
    - e. If any signal timing and/or phasing changes are proposed, an appropriate signal progression analysis may be required.
- B. *Pedestrian and Bicycle Evaluations*. Pedestrian and bike facility demand shall be identified and related items for discussion should include:
- 1. School routing plans per the MUTCD between the project and all schools within 1-1/2 miles of the project boundary;
  - 2. The demand for pedestrian and bike facilities to serve high pedestrian activity areas within the land use;
  - 3. The need for links of bicycle or pedestrian facilities to neighboring land uses or attractions (trails, etc) as guided by the Active Transportation Plan;



4. Geometric improvements and recommended traffic control devices to accommodate pedestrians and bicyclists;
5. Existing and proposed pedestrian and bike facilities shall be evaluated for compliance with the following elements:
  - a. Directness. Walking distance to destinations like transit stops, schools, parks, and commercial or activity areas should be direct.
  - b. Continuity. The sidewalk/ walkway system should be complete, without gaps. The pedestrian corridor should be integrated with the activities along the corridor and should provide continuous access to destinations.
  - c. Street Crossings. Safety and comfort is essential while crossing streets, intersections and mid-block crossings. Factors that affect the LOS include: number of lanes to cross, crossing delay for pedestrians, signal indication, cross-walks, lighting, raised medians, visibility, curb ramps, pedestrian buttons, convenience, comfort, and security.
  - d. Security. Pedestrians should be visible to motorists, separated from motor vehicles and bicycles, and under adequate street lighting.
  - e. Surface Condition. Pedestrian facilities should be free from obstructions, cracks, and interruptions.
  - f. Grade. Off street facilities shall be designed to minimize running slopes; maximum grade shall be 5% where possible. If steeper slopes are needed due to terrain, no more than 30% of the length of a facility should exceed 8.33%.

C. *Special Studies*. This section provides the City with opportunities to request specific focused traffic analyses that may be unique to the proposed land use action. The Applicant and the City will determine if special studies are required. These may include, but are not limited to the following:

1. Access spacing,
2. Accident/safety concerns (accident statistics),
3. Truck routing,
4. Neighborhood Transportation Impact Evaluation. The TIS may be required to include a focused analysis of the potential project related impacts on adjacent residential neighborhood quality of life issues such as potential cut-through traffic and speeding/volume concerns. If it is determined that a neighborhood transportation impact evaluation is required the following procedure should be followed:
  - a. Examine existing transportation conditions within the neighborhood. This should follow the same procedure as set forth earlier for the transportation impact analysis. Daily and peak hour traffic volumes should be collected for the local streets to be included in the analysis.
  - b. Determine project generated traffic for all modes within the neighborhood and show on a figure.
  - c. Determine total traffic projections for the local streets. This should follow the same procedures as described earlier, including other projects and area wide growth if applicable.
  - d. Determine if the proposed project would create significant impacts to the residential streets using the criteria stated earlier.

- e. If necessary, develop measures, including but not limited to traffic calming techniques, to mitigate any significant impacts.
- 5. Sight Distance. 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.

### **3.6 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. The mitigation measures are intended to be in addition to the minimum required improvements necessary to meet the City's standards and codes.

#### **3.6.1 Traffic Signal Operations Improvements**

Traffic Signal Operational improvements would include upgrading signal to include additional signal phases and/or, signalization of an unsignalized intersection. Signalization of project access drives would not be considered as a mitigation measure. The City Engineer must approve signal improvements and/or installations.

#### **3.6.2 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 City Standards and Ordinances for both on-site and off-site improvements.

#### **3.6.3 Geometric Improvements**

Turn lanes and other auxiliary lane needs shall be identified for each access. Design basis shall generally be ITE, AASHTO, CDOT, NCHRP or other nationally accepted standards. All proposed project entrances onto arterial streets shall be evaluated as to whether they require acceleration lanes or deceleration lanes.

### **3.7 REPORT CONCLUSIONS**

#### **3.7.1 Recommended Improvements**

The findings of the Transportation 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 LOS standards for all modes.

- A. *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 associated turn lanes, acceleration lanes, and changes in medians. Sufficient

dimensions/data shall be identified to facilitate review. Anticipated right-of-way needs shall also be identified.

- B. *Responsibility.* The applicant shall describe the location, nature, and extent of all transportation improvements that the applicant recommends to achieve the required level of service for each analysis horizon's year. In addition, the party(ies) responsible to complete the improvements shall be identified.



## **CHAPTER 4 – STREET DESIGN AND TECHNICAL CRITERIA**

### **4.1 GENERAL**

This chapter defines layout criteria and other design criteria that shall be followed for locating and designing all streets.

### **4.2 STREET LAYOUT REQUIREMENTS**

The locations of Regional and Neighborhood Links shall be in accordance with the current Master Street Plan. Other streets shall be located in accordance with all other applicable street layout requirements.

#### **4.2.1 Logical Placement and Extension**

All streets shall have a logical relationship to the existing topography and to the location of existing or platted streets within adjacent properties. Certain streets within the project may need to be extended to the project boundary to provide for the future extension of the street through adjacent properties.

#### **4.2.2 Master Planned Regional and Neighborhood Links**

The Master Street Plan shows the approximate locations of all Regional and Neighborhood Links for the City and its Planning Area. The Master Street Plan shall be used for establishing approximate locations of these streets. The City Engineer shall hold approval authority for specific alignments for all Regional Links and Neighborhood Links.

#### **4.2.3 Residential Links**

Layout of new Residential Links not covered by the Master Street Plan shall meet the needs of the specific development and satisfy all other specific requirements of this chapter and the access management requirements of Chapter 166 of the UDC. The City retains the authority for approval of the overall street layout.

- A. *Neighborhood Traffic Safety and Traffic Calming.* A major component in street layout is neighborhood traffic safety. This is an essential transportation issue in the City of Fayetteville. Traffic calming is the implementation of physical and perceptual techniques intended to slow or divert traffic on existing or planned roadways. It is often a reactive approach to minimize high speeds and volumes of vehicular traffic. Significant efforts in traffic calming have been put forward on existing roadways and in the development of new roadways to limit traffic speeds and traffic volumes in neighborhoods and to provide for safer travel for all modes of transportation including pedestrian, bicycle, and vehicular.

## 4.3 STREET CLASSIFICATIONS

Street cross sections shall meet the classifications as shown in the current Master Street Plan.

## 4.4 GENERAL DESIGN ELEMENTS

All streets shall be designed in accordance with design speeds specified for each street classification in **Table 4-1**. Where ranges are specified, the design speed shall be determined by the City Engineer.

**Table 4-1 Technical Design Criteria**

Design Element		Regional Link	Neighborhood Link	Residential Link*	Alley
Overall Design Parameters					
Design Speed (mph)		25-40	25-30	15-25	5-10
Desired Operating Speed (mph)		30-40	25-30	15-20	5-10
Stopping Sight Distance		See Table 4-3			
Horizontal Alignment					
Maximum Centerline Radius (ft)		Design	175	90	
Maximum Superelevation (%)		4	4	n/a	
Maximum Tangent Between Curves or at Intersections (ft)		100	100	30	n/a
Vertical Alignment					
Maximum Centerline Grade (%)	Ordinary	8	8	10	10
	Hilly	8	12**	15**	15
Minimum Centerline Grade (%)		0.5	0.5	0.5	0.5
Minimum K-Values	Crest	50	30	20***	10
	Sag	50	40	30***	20
Intersection Design					
Minimum Sight Distance at Intersections		See Standard Details for Sight Distance			
* Through streets shall be designed to minimize excessive speeds. Traffic calming measures may be required by the City Engineer when a street design creates conditions where operating speeds are expected to be exceeded due to horizontal and vertical alignment.					
** These grades are allowed for a maximum distance of 300 feet.					
*** In the HHOD, K-values may be less than the minimum upon approval by the City Engineer.					

### 4.4.1 Alignment

Horizontal and vertical street alignments should conform to existing land layout plus the following criteria:

- A. *Horizontal Alignment.* On Regional and Neighborhood Links, curve radii and tangents shall be as large as possible using the minimums only where necessary. All changes in direction shall be made using standard curves. Traffic calming measures may be required for relatively straight sections of Residential Links that encourage excessive speeds.

1. Horizontal Curve Radii. The minimum allowable centerline radii for horizontal curves shall be as designated in **Table 4-1**. For low speed, low volume subdivision streets with 90 degree turns, it may be appropriate to have a curve radius less than the minimum shown. These will be evaluated on a case by case basis and may be approved by the City Engineer. For these curves, a knuckle design may be used to provide additional lot frontage around the curve (see standard detail for knuckles). Reverse and compound curves should be used only when a single radius curve will not work. For driver safety, compound curves shall have a ratio no greater than 1.5, where the value of the larger radius is divided by the smaller radius.
2. Minimum Tangent Length.
  - a. Intersections. Whenever a minor street intersects a street of higher classification, a tangent length (measured from the nearest gutter flowline of the intersected street to the point of curvature in the intersecting street) shall be provided for a safe sight distance and safe traffic operation. The minimum required tangent lengths indicated in **Table 4-1** apply to the minor leg(s) only. The angle of departure shall not exceed 10 degrees for the length of tangent.
  - b. Reverse Curves. The tangent between reverse curves shall be no less than the length shown in **Table 4-1**. If the curve radii are at least 50% greater than the radii required by the design speed, the tangent sections may not be required depending on grades and topography. If the curves are superelevated, the superelevation transition lengths will determine the minimum length of tangent between reverse curves.
3. Consistent Radii. All curves along a Residential Link segment shall be designed with radii that are approximately equal to provide consistency and minimize unexpected difficult or quick maneuvers for the driver.
4. Curves with Small Deflection Angles (10° or less). To reduce the appearance of kinks in the street, minimum lengths of curve shall be designed with minimum arc lengths as shown in **Table 4-2**.

**Table 4- 2 Centerline Arc Lengths**

Street Classification	Minimum Centerline Arc Length (ft)
Regional Link	400
Neighborhood Link	300
Residential Link	200

5. Horizontal Curves on Vertical Curves. For driver safety, horizontal curves shall not begin near the top of a crest vertical curve nor near the bottom of a sag vertical curve.
6. Coefficient of Friction. The coefficient of friction shall conform to the recommendations in Chapter 3 of the AASHTO “Green Book.”
7. Joining Existing Improvements. Connection with existing streets shall be made to match the existing alignment of the existing improvements, in accordance with horizontal alignment criteria.
8. Lane Transitions. The lengths for the transition in the lane width or for the addition or reduction of the number of travel lanes shall be designed in accordance with AASHTO and MUTCD standards.

## B. *Vertical Alignment.*

1. Maximum and Minimum Grades for Streets. The maximum and minimum grades for specific street classifications are shown in **Table 4-1**. The centerline grade in the bulb of a cul-de-sac shall not exceed 3% (see standard detail for cul-de-sacs).
2. Minimum Flowline Grades. Minimum flowline grades for gutters shall be 0.50%, except the bulb of cul-de-sacs where the minimum shall be 1.0% (see standard detail).
3. Requirements for Using Vertical Curves. Vertical curves are required for grade changes that exceed 1.0%. Both centerlines and the curb and gutter flowlines shall be designed with vertical curves to meet AASHTO requirements. A series of grade breaks may be used in lieu of a specified vertical curve as long as the series of breaks meet the vertical curve criteria in these Standards for the design speed. K-values for design shall conform to **Table 4-1**. In sag curves on flowline, the minimum grade requirement of 0.50% shall override the slope within the vertical curve.
4. Joining Existing Improvements. Connection with existing streets shall be made to match the existing grade of the existing streets, in accordance with vertical alignment criteria. Grade breaks shall not exceed allowable.
5. Vertical Clearance. Vertical clearance above a roadway is a minimum of 16.5 feet. Clearance may be higher in ARDOT right-of-way, where ARDOT requirements will govern.
6. Intersection Approach Grades. Intersection approach grades are discussed in **Chapter 5, Intersections**.
7. Off-Site Continuance of Grade and Ground Lines. To assure that future street improvements will meet these Standards the future grade and ground lines of all streets, except cul-de-sacs, shall be continued for 100 feet beyond the proposed construction.
8. Master Residential Lot Grading Plan. Consideration should be given to the earthwork associated with the individual lot grading for finished floor elevations, driveway slopes, etc.

## C. *Sight Distance.* Sight distance is the distance necessary for a vehicle operator to perform expected functions and be able to do so without causing a hazard for the driver or other vehicle operators for the specific design speed of the street. In no case shall the distance be less than the stopping sight distance. This includes visibility at intersections and higher volume driveways as well as around curves and roadside encroachments.

1. Stopping Sight Distance for Vertical Crest Curves. Stopping sight distance is calculated assuming object height is 2 feet above road surface and viewer's height is 3.5 feet above road surface.
2. Stopping Sight Distance on Horizontal Curves. Where an object off the pavement restricts sight distance, the minimum radius of curvature is determined by the stopping sight distance. In no case shall stopping sight distance be less than as specified in **Table 4-3**. The sight distance design procedure shall assume a 6-foot high obstruction (as measured from actual finished grade) exists at all property lines except in the sight distance easements that may be required to preserve the needed sight distance. Stopping sight distance on horizontal curves is based upon lateral clearance from the inner edge of pavement to sight

obstruction, for various radii of inner edge of pavement and design speeds. The position of the driver's eye and the object sighted shall be assumed to be 6 feet from the inner edge of pavement, with the sight distance being measured along this arc. Minimum stopping sight distances are given in **Table 4-3**.

**Table 4-3 Stopping Sight Distance**

<b>Design Speed (mph)</b>	<b>Stopping Sight Distance (mph)</b>
20	125
25	150
30	200
35	250
40	275
45	325
50	400

From AASHTO "Green Book"  
(For Intersection Sight Distance, see standard details.)

3. Intersection (Corner) Sight Distance. The corner sight distance provides for vehicles to enter traffic and accelerate to the average running speed. Corner sight distance shall be measured in accordance with standard details for sight distance.
4. Intersection Sight Distance Triangles. All sight-distance triangles must be shown on the street plan/profile plans. All sight distances must be within the public right-of-way or a sight distance easement. The easement shall be dedicated to the City and be kept free of sight obstructions.
5. Sight Obstructions. Any object within the sight distance easement more than 30 inches above the flowline elevation of the adjacent street shall constitute a sight obstruction, and shall be removed or lowered. Such objects include but are not limited to berms, buildings, parked vehicles on private property, cut slopes, hedges, trees, bushes, utility cabinets or tall crops. Mailbox clusters must be installed a minimum of 2 feet from back of curb and not cause any sight obstruction. The City may limit parking to protect visibility. The sight distance shall be measured to the centerline of the closest through-lane in both directions. In no case shall any permanent object encroach into the line-of-sight of any part of the sight distance triangle.

#### **4.4.2 Cross Slope**

Cross slope on a pavement is provided to drain water from the street surface. The design of cross slope shall consider driver comfort and safety.

- A. *Minimum Cross Slope*. A minimum cross slope on all streets shall be 2.0%. Minimum cross slope on reconstruction or overlays of existing roadways is 1.5%.
- B. *Maximum Allowable Cross Slope*. The maximum allowable cross slope on all new construction shall be 3%. The maximum allowable cross slope on any reconstruction or overlays of existing roadways shall be 4%.



- C. *Cross Slope for Street Modifications.* When widening an existing street or adding turn lanes to an existing street, the resulting cross slope of the widened portion shall be within the limits stated above and the new cross slope shall be no less than the existing cross slope. However, if the cross slope of the existing street exceeds these Standards then new curb and gutter shall be designed such that the existing pavement, when overlaid, will result in a straight-line cross slope grade that meets these Standards. Alternatively, the existing pavement may be removed and re-profiled to comply with these Standards.
- D. *Cross Slope for Cul-de-Sacs.* Refer to the standard details for cul-de-sac bulb cross slopes.

#### **4.4.3 Superelevation on Horizontal Curves**

The purpose of superelevation on a roadway is to maintain the riding comfort on smaller than standard curves. Superelevation may only be used when other means of design will not work and is subject to review and approval by the City Engineer. The following criteria shall be followed:

- A. *Where Superelevation Is Permitted.* Superelevation may be allowed for curves on Regional Links and Neighborhood Links in order to reduce the minimum centerline radius. In no case shall superelevation exceed 4.0% cross slope. Superelevation shall not be used to reduce minimum radii on Residential Links.
- B. *Run-Out.* When superelevation is used, the minimum run-out used entering and exiting the superelevated portion shall be 100 feet.

#### **4.4.4 Design Speed**

Each roadway classification has a specific design speed. See **Table 4-1**.

### **4.5 MEDIANS**

#### **4.5.1 Turn Lane and Access**

The design of medians shall include the evaluation for needed turn lanes and accesses. For the minimum requirements of turn lanes, refer to **Chapter 5, Intersections**.

#### **4.5.2 Drainage**

Landscaped medians shall be provided with drainage facilities to handle sprinkler runoff and nuisance flows. Sprinklers shall be designed to prevent spray onto the pavement surface. A properly designed under drain system shall be required.

#### **4.5.3 Nose**

Vehicle tracking templates shall be used to determine the position of the median nose so that vehicles do not track onto the median. The minimum radius for nose curbs shall be 2 feet to back of curb. A Single Unit (SU) truck template should be used for the design vehicle.

#### **4.5.4 Transitions**

The ends of medians shall transition into turn lanes with a minimum radius of 100 feet. A change of directions must be accomplished with the use of radii. Angle points shall not be allowed. See standard details.

#### **4.5.5 Objects**

No permanent structures, including light poles, fire hydrants, etc., shall be placed within 5 feet of the travel lane or in any location that would obstruct sight distance except for structures as approved in these Standards. If a median streetlight is placed within 5 feet of the travel lane, the light must be a breakaway model.

### **4.6 NON-CONNECTIVE STREET ALIGNMENTS**

#### **4.6.1 Cul-de-Sacs**

- A. *Permitted Locations.* Cul-de-sacs shall be used only where necessary. Cul-de-sacs are permitted only on Residential Links in conformance with Chapter 166 of the UDC.
- B. *Minimum Radius.* The cul-de-sac shall have a minimum radius of 50 feet, or as required by the fire code.

#### **4.6.2 Knuckles**

- A. *Permitted Locations.* Knuckles may be permitted only on Residential Links that intersect Residential Links.
- B. *Permitted Lengths.* Knuckles shall have a maximum radius as indicated in the standard details.

#### **4.6.3 Dead-End Streets**

- A. *Temporary Dead-End Streets.* Temporary dead-end streets will be permitted only on streets that have no direct access from adjoining property. Additionally, a temporary dead-end street shall be planned to extend into neighboring property during a later development phase or project. The road must be fully constructed to the property line. Refer to the temporary dead-end street standard detail.
- B. *Temporary Turnarounds.* At locations where a temporary dead-end street exceeds 150 feet in length, a temporary turnaround shall be constructed. Refer to the temporary turnaround standard detail for two layout options.

- C. *Temporary Turnaround Easements*. All temporary turnarounds shall be constructed within an access easement or street right-of-way. The easement may be vacated by the City when the easement is no longer necessary.

## **4.7 DRAINAGE SYSTEMS**

### **4.7.1 Drainage**

Drainage system design shall be in accordance with current City of Fayetteville Drainage Criteria Manual.

- A. *Material Submittals*. The engineer of record shall submit approved material submittals for all drainage infrastructure within right-of-way. All materials shall conform to the Drainage Criteria Manual.
- B. *Bury Depth*. All storm drain underneath roadways shall be designed to have minimum 1 foot cover from the top of the pipe to the bottom of the pavement structure or meet manufacturer recommendations for cover less than 1 foot. When manufacturer recommendations exceed 1 foot, minimum cover shall be per the manufacturer recommendation.

### **4.7.2 Underdrains**

- A. *Controlling Groundwater*. Underdrains used for the purpose of controlling groundwater on private property may be constructed within public right-of-way. The system shall be private and must be maintained by viable private parties.
- B. *Protecting Right-of-Way Improvements*. Underdrains constructed for the purpose of protecting public right-of-way improvements may be installed only if other means are not possible. The City shall own and maintain these systems.
- C. *Design Criteria*. All underdrains covered by these Standards shall be designed to meet the following criteria:
1. Positive Outfall. Demonstrate that under drain has positive outfall for gravity drainage.
  2. Groundwater Barriers. The system shall be designed such that clay cutoff walls are provided at boundaries of the development to preclude hydraulic communication with offsite utility trenches either upstream or downstream.
  3. Filter Fabric. The underdrain trench shall be lined with a filter fabric specifically selected in consideration of on-site soil conditions in order to minimize the invasion of fine soil particles into the bedding gravel.

### **4.7.3 Sidewalk Underdrains**

Storm water from concentrated points of discharge shall not be allowed to flow over sidewalks but shall drain to the roadway by use of a sidewalk underdrain or other methods approved by the City Engineer.

A sidewalk underdrain shall not be located within a curb ramp, curb cut, or driveway. Sidewalk underdrains shall only be allowed in special situations, on a case-by-case basis, as determined by the City Engineer. Sidewalk underdrain sections shall be constructed in accordance with standard details.

#### **4.7.4 Crosspans**

- A. *Basic Requirements.* Crosspans for passing storm drainage flow across roadways shall be constructed at intersections along streets that have a slope of 1% or less. Crosspans shall be constructed as shown in the standard details.
- B. *Dimensions and Depth.* Crosspans shall be a minimum width of 2 feet and a 1-inch typical depth adjacent to all street classifications.
- C. *Minimum Grade.* Minimum grade on crosspans at the flowline of the pan shall be 0.5%.

#### **4.7.5 Inlets**

Refer to the Drainage Criteria Manual requirements for sizing of inlets. Inlets or inlet depressions should not be located in the curb return or in the ADA ramp location, but shall be located at or behind the tangent points of the curb returns. Inlets located in a sidewalk shall be integrated with sidewalks. The inlet access shall be flush with the sidewalk surface. No manholes, inlets, or other storm sewer facilities are allowed within handicap access ramps.

#### **4.7.6 Waterway Crossings**

All waterway crossings beneath and/or within the public right-of-way shall be designed to minimize maintenance requirements. The design shall maintain or increase the water velocity through the structure to minimize silting or provide other design elements to address this issue.

If the waterway crossing is designated as an area with a streamside protection zone, all requirements in Section 168.12 of the UDC shall be met.

#### **4.7.7 Roadside Ditches and Driveway Culverts**

- A. *Roadside Ditches.* Any roadway sections developed without curbs (and with roadside drainage ditches) must complete the ditch construction with the installation of staked sod or other approved erosion control blanket within the ditch area. The profile grade of the ditch shall be maintained at a minimum slope of 1% and a maximum slope of 5%. A ditch profile grade greater than 5% may be approved by the City Engineer if the ditch is permanently stabilized to prevent erosion. The side slopes of the ditches shall be a 3:1 slope or less with a 4-foot wide shoulder between the edge of pavement and the top of slope.
- B. *Driveway Culverts.* The slope and capacity of any roadside ditches shall be maintained in any areas that driveways cross the ditch. Each site is required to provide a pipe culvert a minimum

of 18 inches in diameter, calculated to meet capacity and strength. The pipe shall be designed to have no less than 12 inches of cover over the pipe. At each end of the culvert, there shall be a headwall or a flared end section installed. If a HDPE or CMP flared end section is used, a minimum 6-inch wide concrete band shall be constructed around the exposed edges of the flared end section.



## **CHAPTER 5 – INTERSECTIONS**

### **5.1 GENERAL**

Intersections shall be designed to provide for the safety of motorists, pedestrians, and bicyclists. This chapter is based on criteria from the ITE Traffic Engineering Handbook, ITE Designing Walkable Urban Thoroughfares and AASHTO's A Policy on Geometric Design of Highways and Streets.

#### **5.1.1 General Principals and Considerations**

By their nature, intersections are conflict locations. Vehicles, pedestrians, and bicycles all cross paths. Each crossing is a conflict point. The basic design of intersections includes the following objectives:

1. Minimize conflicts between modes of transportation.
2. Accommodate all modes with appropriate levels of service for motorists, pedestrians, bicyclists, and transit given the recommended speed, volume and expected mix of traffic.
3. Avoid elimination of any travel modes due to intersection design. Intersection widening for additional turn lanes to relieve traffic congestion should be balanced against impacts to pedestrians, bicyclists and transit.
4. Provide good driver and non-driver visibility through proper sight distance triangles and geometric features that increase visibility.
5. Minimize pedestrian exposure to moving traffic.
6. Avoid extreme intersection angles and break up complex intersections with pedestrian refuge islands. Keep intersections easily and fully comprehensible for all users. Strive for simplicity in intersection design.
7. Ensure intersections are fully accessible to the physically disabled.

### **5.2 INTERSECTION DESIGN CRITERIA**

#### **5.2.1 Location of Intersections**

For intersection location criteria, refer to Section 166.08, Street Design and Access Management Standards, of the UDC and the current Master Street Plan.

#### **5.2.2 Lane Alignment**

All lanes shall be in alignment through each intersection, with a maximum of a 2-foot shift in a hardship situation only, subject to approval by the City Engineer.

### 5.2.3 Angle of Intersection

Crossing roadways should intersect at 90 degrees whenever possible. In no case shall they intersect at less than 75 degrees or more than 105 degrees.

### 5.2.4 Horizontal Alignment and Vertical Profile

- A. *Horizontal.* The horizontal alignment of streets through an intersection shall be designed in conformance with **Table 4-1**. Intersections may be placed on horizontal curves, provided that the tangent lengths given in **Table 4-1** are provided on the minor street and the required sight distance is obtained.
- B. *Vertical.* The grade of the street with the higher classification shall prevail at intersections. The lesser street shall adapt to the grade of the major street. When roads are of equal classification, the City Engineer shall determine which street grade prevails.

The street profile grade of the lesser street shall not exceed 5% on the approach to the intersection, as measured along the centerline of the street for a minimum distance equal to the tangent length for the street classification, see the standard details. In areas where steep terrain is an issue, the City Engineer may allow a greater approach grade in order to reduce the grading impact on the site.

### 5.2.5 Exclusive Left Turn Lanes

Exclusive left turn lanes shall be provided on Regional Links and other streets wherever left turn lanes are warranted and approved by the City Engineer. The engineer of record shall use information in the Transportation Impact Study (TIS) to determine whether an exclusive left turn lane is warranted streets other than Regional Links. Refer to standard details for design requirements.

### 5.2.6 Exclusive Right Turn Lanes

Exclusive right turn lanes shall be provided at locations where they are required by the applicable TIS, and approved by the City Engineer.

- A. *Warrants for Right Turn Lanes.* The standard details provide guidelines and warrants for whether a right turn lane shall be provided at intersections or accesses.
- B. *Design Criteria.* Right turn lanes shall be designed to accomplish the following functions:
  - 1. Provide a means of safe deceleration outside the high speed through lane.
  - 2. Provide a separate storage area for right turns to assist in the optimization of traffic signal phasing.
  - 3. Provide a means of separating right turn movements at stop controlled intersections. The design elements, as shown in the standard details, are the approach taper, bay taper, lengths of lanes, width of lanes, and departure taper. For approach taper lengths, see the standard details.

- C. *Pedestrian Refuge*. Where Pedestrian refuge is required, it shall be designed in accordance with the standard details. Right turn lanes that turn into an exclusive lane that continues have a specific standard detail.

### **5.2.7 Design Vehicles**

As a minimum, intersections shall be designed to accommodate the following design vehicles for the specified turns. The minimum allowable intersection turning radii are as follows.

- A. *DL-23 (Delivery Truck)*. All DL-23 vehicles must be able to turn easily from one street to the next and remain in the correct lane for each roadway. This is required for all roadways.
- B. *SU-30 (Single Unit Truck)*. All SU-30 vehicles must be able to turn easily from one street to the next and remain in the correct lane for each roadway. For low traffic Residential/Residential Link intersections, the SU-30 may use more than one traffic lane to complete the turn without tracking onto the curb at corners. For all other roadways this vehicle must be able to complete turns without entering into opposing lanes.
- C. *CITY-BUS (City Transit Bus)*. All CITY-BUS vehicles may use more than one traffic lane to complete the turn when turning from the correct lane without tracking onto the curb at corners. This shall apply to all streets. When the intersection is on a regular or planned transit route where the turning movement could conflict with a stopped vehicle at the intersection, then the intersection must be designed to allow the bus to turn easily from one street to the next without entering opposing lanes of either roadway.
- D. *WB-40 (Intermediate Semitrailer)*. All WB-40 vehicles may use more than one traffic lane to complete the turn without tracking onto the curb at corners. In addition, the vehicle must make the turn in one forward maneuver not encroaching into opposing traffic lanes unless the intersection has been designed to allow for safe encroachment. This requirement shall apply to all Regional/Regional Link, Regional/Neighborhood Link, Regional/Residential Link and Neighborhood/Neighborhood Link intersections. For all other intersections (including mini-roundabouts), the vehicles may use the entire paved surface of the street to negotiate the turn. The vehicle may have to back up to complete the turn.
- E. *WB-67 (Interstate Semitrailer)*. All modern roundabouts and Regional Link intersections containing raised medians and channelizing islands shall be designed to accommodate a WB-67 vehicle.
- F. *Other Vehicles*. For special circumstances other design vehicles may be required by the City Engineer.

### **5.2.8 Curb Returns**

- A. *Curb Return Radii*. The corner radii at intersections shall be set so that the selected design vehicles can pass through the intersection in an appropriate manner. The design vehicle types



and use of lanes shall be per **Section 5.2.7**. Intersections shall be designed to minimize curb radii while still accommodating the largest applicable design vehicle. The following should be considered when possible in order to minimize the curb return radii:

1. Bike lanes, on-street parking, and other facilities should be included to create an effective corner radius which accommodates the design vehicle. When on-street parking is used to establish an effective turning radius, the effective radius shall be delineated within the parking lane by an approved striping pattern, raised curb, or other approved traffic control device.
2. Traffic control devices should be arranged as to allow safe encroachment of infrequent vehicles into approaching lanes of traffic.
3. Compound radii should be used to minimize the crossing distance for pedestrians.
4. The outside vehicular lane should be widened through the intersection to increase the effective turning radius.

A variance from the above requirements and **Section 5.2.7** may be approved by the City Engineer where:

1. High pedestrian volumes are present or reasonably anticipated.
2. Volumes of turning vehicles are low.
3. The design vehicle constitutes a very low proportion of the turning vehicles.
4. Occasional encroachment of the design vehicle beyond that provided in **Section 5.2.7** is acceptable.
5. Occasional encroachment of turning school bus, moving van, or oversized delivery truck into an opposing lane is not acceptable.
6. Larger vehicles than those listed in 5.2.7 are expected to be frequent users of the street.

For curb returns on a State Highway, every effort shall be made to minimize curb radii through negotiation with ARDOT while acknowledging ARDOT's curb radii requirements supersede these Standards.

B. *Curb Return Grades*. The minimum allowable grade for flow lines around curb returns shall be no less than 0.5%. 1% minimum slope is recommended.

### **5.2.9 Traffic Islands**

The following is a list of different types of traffic islands:

A. *Corner Islands Separating Right Turns*. Standard corner islands may be used in Regional/Regional Link intersections to channelize traffic where required to provide pedestrian refuge, or where required by the City Engineer. The corner islands shall be designed as raised islands in accordance with standard details for a right turn lane continuing to an exclusive lane or for a right turn lane stop condition, respectively. The striping shall be in accordance with the requirements of **Chapter 7, Traffic Control Devices**.

- B. *Median Islands Separating Opposing Traffic*. Median islands are required at all Regional Link/Regional Link intersections. The length of the island shall include the appropriate approach taper, bay taper and length of lane required by these Standards, or supported by another approved resource standard. The design shall be in accordance with standard details and as follows:
1. No Obstruction. Medians must not obstruct the minimum left turn radius for the design vehicle(s).
  2. Drainage. Landscaped medians shall include drainage facilities to handle sprinkler run-off and nuisance flows. When low maintenance landscaping is used in conjunction with trickle irrigation, drainage requirements may be waived and outfall curb and gutter should be used.
  3. Pedestrian Refuge. A pedestrian refuge area shall be provided at all pedestrian crossings.
- C. *Splitter Islands on Roundabouts*. In modern roundabout designs, raised splitter islands shall be designed in accordance with Federal Highway Administration Roundabouts to direct traffic and provide pedestrian refuge.

#### **5.2.10 Traffic Signals, Striping and Signing**

See **Chapter 7, Traffic Control Devices**.

#### **5.2.11 Access Ramps**

See **Chapter 8, Pedestrian Facilities Design and Technical Criteria**.

#### **5.2.12 Right-of-Way**

- A. *Requirements*. All intersection rights-of-way shall be dedicated as shown in the current Master Street Plan to provide adequate right-of-way to include greenspace, sidewalks, and access ramps around the radii. Additional right-of-way may be required at intersections to provide space for additional left or right turn lanes without reducing the widths of standard required facilities.

#### **5.2.13 Intersection Sight Distance**

Street intersections shall be designed so that adequate sight distance is provided along all streets. The required sight distance shall be determined by the design speed and grades of the street and the acceleration rate of an average vehicle as prescribed below.

- A. *Minimum Requirements*. All designs must provide minimum safe stopping sight distance in accordance with **Chapter 4, Street Design and Technical Criteria**, and AASHTO. In addition, for all streets that intersect with Regional and Neighborhood Links, the sight distance must be large enough to allow a vehicle to enter the street and accelerate to the average running speed without interfering with the traffic flow on the Regional or Neighborhood Link.

- B. *Landscaping and Hardscaping*. No landscaping or hardscaping higher than 30 inches above the flow line of the gutter shall be permitted within a corner cut that will block the line of sight for pedestrian visibility.

#### **5.2.14 Pedestrian Requirements**

See **Chapter 7, Traffic Control Devices**, concerning crosswalk requirements and **Chapter 8, Pedestrian Facilities Design and Technical Criteria**.

#### **5.2.15 Drainage**

See **Chapter 4, Street Design and Technical Criteria**, concerning drainage.

### **5.3 ROUNDABOUTS**

Roundabouts shall be specially designed to the specific need on high traffic volume streets and used to improve traffic flow. Refer to Federal Highway Administration, Roundabouts: An Informational Guide for typical layout. Also refer to standard details for typical roundabout layout features. The following are certain minimum requirements:

#### **5.3.1 Design Vehicle**

Regional and Neighborhood Link roundabouts shall be designed to accommodate WB-67 trucks. The design vehicle is to be accommodated by maintaining a 2-foot separation between the truck and the curb face. A truck apron shall be provided around the circulatory island. The WB-67 vehicle may use the truck apron for left turn movements and may use the truck apron for right-turn movements if necessary.

#### **5.3.2 Design Speed**

The design speeds for roundabouts shall be 15-20 mph for a mini-roundabout, 20-25 mph for a single-lane roundabout, and 25-30 mph for a multi-lane roundabout.

#### **5.3.3 Horizontal Configuration**

The roundabout layout shall be determined by the engineer of record and approved by the City Engineer.

#### **5.3.4 Roadway Width**

The circulatory roadway width shall be a minimum of 1.0 to 1.2 times the width of the widest entering roadway. This width may include the truck apron when approved by the City Engineer.

### **5.3.5 Truck Apron**

1. The width of the truck apron shall be a minimum of 8-feet to allow for emergency or maintenance vehicles. The truck apron shall be constructed of a material different in appearance from the adjacent pavement to provide visual contrast. Final truck apron design shall be based on truck turning analysis plus a two-foot buffer. The designer shall provide a jointing pattern plan to control shrinkage cracking.
2. The truck apron shall have a 4% to 6% Cross Slope to allow utility and maintenance vehicles access and discourage any pedestrian use.
3. Curb for the truck aprons shall be a 6-inch mountable curb with a 1:1 slope face. No expansion material shall be specified between the back of curb and the truck apron.
4. Truck apron pavement thickness shall be developed with the Final Pavement Design and may require subgrade stabilization if swelling soils exist.

### **5.3.6 Pedestrian Access Ramps for Bikes**

Bicycle traffic shall be assisted/encouraged to leave the roadway prior to the roundabout by construction of bicycle exit and re-entrance ramps.

### **5.3.7 Pedestrian Crossings**

1. The pedestrian crossing through the splitter island shall be set back 25-feet from the yield line at the nose of the splitter island pending sight triangle analysis. The pedestrian crossing and ramps shall meet the ADA requirements for accessible pathways.
2. A 7 to 8-foot wide pedestrian refuge opening shall be provided in the splitter island.
3. The pedestrian crossing shall cross both the entry and exit roads along a single tangent roughly perpendicular to the centerline of the splitter island as shown on the standard details.
4. Pedestrian ramps shall be lined up directly with the crosswalk. A two-foot wide truncated dome surface shall be located perpendicular to the pedestrian crossing at each location where pedestrians are designated to enter the traffic way including the splitter island refuge.
5. The pedestrian ramps and splitter island pedestrian refuge shall be contained by six-inch vertical curbs to give direction at the crossing as shown on the standard details.

### **5.3.8 Drainage**

1. All drainage within the roundabout shall drain away from the center island at a slope of 2% min. (1% min. for concrete). A crowned circulatory roadway shall be designed for all multi-lane roundabouts unless a variance is granted by the City Engineer.
2. No pavement swales or drainage crosspans shall be allowed to take storm drainage away from center island or across roundabout entry or exit alignments. Drainage directed to the roundabout from adjacent legs must be intercepted by storm drain inlets to minimize encroachment into the circulatory roadway.

### **5.3.9 Where Allowed**

Roundabouts may be allowed on any roadway as approved by the City Engineer. Design engineers are encouraged to evaluate the appropriateness of roundabouts for intersections within proposed developments.

### **5.3.10 Design Software**

The roundabout design shall be completed with the aid of computer software. Acceptable products include the latest versions of Auto Turn, ARCADY, RODEL or other software as approved by the City Engineer. VISSIM or other simulation software may be used for public presentation. The City Engineer is authorized to require the use of a specific software package when warranted by the needs of a specific intersection. The Design Engineer shall have specific knowledge of how to control the software and be able to demonstrate that understanding to the City Engineer.

### **5.3.11 Right-of-Way**

The City will require additional right-of-way to be dedicated by the developer to accommodate the roundabout.

### **5.3.12 Splitter Islands**

Raised splitter islands shall be required on all approaches. Where the approach leg has a central turning lane or median, the splitter island shall be extended to connect to the median or a sufficient distance from the pedestrian refuge to provide confinement of the entering and exit movements and control of the fastest paths (125-feet is suggested). The vertical face of the raised splitter island shall be set back approximately 3-feet from the approach edge of a median nose and 1 to 1.5-feet at the trailing edge (down traffic).

### **5.3.13 Signage**

The signage shall be in accordance with **Chapter 7, Traffic Control Devices**.

## **5.4 PROTECTED INTERSECTIONS**

When an intersection is planned along a bike facility that is designated on the Active Transportation Plan, a protected intersection may be required as determined by the City Engineer. Protected intersection design shall be based on NACTO's Don't Give Up at the Intersection.



## CHAPTER 6 – PAVEMENT DESIGN AND REPORT

### 6.1 GENERAL

The purpose of this chapter is to present the pavement design criteria required for use on streets in the City of Fayetteville. These criteria shall be used in conjunction with **Chapter 4, Street Design and Technical Criteria**. The final pavement design report shall include all testing in accordance with **Table 6-1**.

#### 6.1.1 Existing Streets

For existing streets, the City Engineer may require an evaluation of the existing pavement and base structure to determine if an overlay is feasible, or if reconstruction is necessary.

Any damage done to existing City streets during construction shall be repaired and/or replaced at the contractor's expense. All repair work shall meet the requirements of this document.

#### 6.1.2 AASHTO Design

The design criteria and procedures presented follow the AASHTO Guide for the Design of Pavement Structures.

#### 6.1.3 Standard Pavement Section

Streets are to be constructed of Asphalt Concrete Hot Mix (ACHM) pavement or Portland Cement Concrete (PCC) pavement, base course material, and subbase material (where required), and placed on compacted, unyielding subgrade.

The use of treated subgrade, treated base, and/or full depth asphalt pavement may be acceptable when designed and submitted by the engineer of record, and approved by the City Engineer in accordance with these Standards.

On streets with grades steeper than 10%, concrete pavement may be required. The final determination will be made by the City Engineer.

The pavement section requirements for alley construction, whether private or public, shall be the same as for a public roadway. Proposals for alternative pavement materials will require approval from the City Engineer.

#### 6.1.4 Roundabouts

The pavement thickness design for the circulatory roadway shall be based on the sum of the 20-year design volumes from all legs. A separate design analysis is required. Refer to **Section 5.3** for roundabout design requirements.

### **6.1.5 Approval**

The pavement design shall be submitted with final construction plans for approval.

### **6.1.6 Pavement Report Revisions**

A revised pavement design investigation and report shall be required if the following conditions occur:

- A. *Phases*. If a street is to be built in phases, (i.e., the center two lanes are built first, then at some later date more lanes are added), and it has been at least two years since the original design was completed.
- B. *Imported Fill Material*. If any new fill material that does not match the properties of the subgrade soil proposed in the design is imported, the City may require a new pavement design report or additional testing to verify the acceptability of this material for roadway fill.
- C. *Change in Existing Conditions*. If material that is not consistent with the approved design report is discovered during construction, the City may require a new pavement design report or additional testing to verify the acceptability of this material.

## **6.2 SOIL INVESTIGATION REQUIREMENTS**

### **6.2.1 Location and Frequency of Soil Borings**

Soil borings shall be taken in the existing or proposed street right-of-way. Subgrade samples shall be taken upon the material that will be subgrade for the proposed street improvements. Sample sizes shall be adequate for soil classification, compaction, and California Bearing Ratio (CBR) testing.

A minimum of one boring shall be obtained for any roadway segment. The distance between borings shall not exceed 500 feet. Multiple samples shall be taken alternately among lanes and shall be evenly spaced. The City Engineer may require more frequent testing.

Samples shall be taken to a minimum depth of 5 feet below the proposed subgrade elevation.

### **6.2.2 Imported Fill**

All fill material placed in the right-of-way shall be tested and approved by the City prior to its use on the project. The material shall meet minimum requirements. Sampling shall be at the beginning of the project, and after every 5,000 cubic yards of material is placed.

### **6.2.3 Supervision by Engineer**

All sampling and testing of soils shall be performed under the direct supervision of a professional engineer who must sign and stamp the report.

## **6.3 SUBGRADE AND FILL REQUIREMENTS**

### **6.3.1 General**

To simplify subgrade support testing, soil samples may be combined to form soil groups consistent with the AASHTO classification, group index, and location for the area investigated. Groupings shall not mix samples with different AASHTO classifications.

Appropriate tests, to include gradation, Atterberg limits, maximum compaction testing, and California Bearing Ratio tests, shall be accomplished in order to determine the suitability of soils for use as subgrade material within the roadway.

Subgrade shall be defined as material within 2 feet of the first paving layer (base or asphalt). Roadway limits shall extend to 1 foot behind the back of curb, or edge of pavement when no curb is present.

### **6.3.2 Classification Testing**

Soils shall be classified visually and tested to determine the properties. Soils shall be classified according to the AASHTO Soil Classification system.

### **6.3.3 Compaction Testing**

Maximum density of soils proposed for use as subgrade material shall be determined by AASHTO T-99 (Standard Proctor Test), using Note 7. A new moisture/density test shall be completed for every 5,000 cubic yards of material imported, or when field testing results indicate a change in material. This includes instances when field testing results yield percentages of compaction relative to maximum of 105% or greater.

### **6.3.4 California Bearing Ratio (CBR) Testing**

CBR testing in accordance with ASTM D1883-94 shall be completed on all soils proposed for use as subgrade material. CBR testing shall be performed at the dry density corresponding to 95% of the maximum dry density of the material being tested, and at 2% above optimum moisture content.

The 3-point method of CBR testing shall be performed on in-situ soils classified as A-1 or A-2, and on all soils proposed for use as borrow material for subgrade.



### **6.3.5 Subsurface Water Investigation**

If groundwater is encountered or predicted to be encountered within 5 feet of the original or proposed ground surface, a subsurface water investigation report shall be submitted for approval by the City Engineer. This report is required to ensure mitigation of high groundwater effects upon public improvements within the right-of-way. This information may be a separate report or may be included in the geotechnical report.

### **6.3.6 Subgrade Requirements**

The top 24 inches of subgrade must be of material meeting the following specifications unless a formal design is approved:

1. Material classified by the AASHTO Soil Classification System as A-1, A-2, or A-3, having a maximum of 35% of the material passing the #200 sieve, and having a CBR equal to or greater than 8.
2. Material not meeting the above requirements for AASHTO Soil Classification and gradation, but having a CBR equal to or greater than 8 and a liquid limit and plasticity index of less than or equal to 40 and 15, respectively.
3. Material not meeting the above requirements for liquid limit and plasticity index may be used if chemically modified by the use of lime, fly ash, or cement. The type and amount of treatment shall be determined by a material testing lab and approved by the City. The chemically modified soil must meet all requirements of Section 1 above.
4. Material not meeting the CBR requirements of Section 1 above, but meeting the requirements for liquid and plasticity limits may be used provided a formal pavement design based on the actual CBR value of the soil is provided. For this case, CBR values shall be a minimum of 4. Use of lower CBR values may be allowed where specialized pavement designs using geogrids or other technologies are proposed.

### **6.3.7 Embankment Outside the Roadway**

Material for curb backfill, under sidewalks, on backslopes, or in other areas within the right-of-way may be any material that is free from sod, stumps, roots, or other perishable or deleterious material that is capable of forming a stable embankment when compacted. Areas outside the roadway shall be compacted to minimum of 90% Standard Proctor Density unless otherwise specified.

## **6.4 PAVEMENT DESIGN CRITERIA**

### **6.4.1 Flexible Pavement**

Flexible pavements are those pavements that have sufficiently low bending resistance to maintain continuous contact with the underlying structure yet have sufficient stability to support a given traffic loading condition. Commonly known as asphaltic concrete pavement.

Refer to **Table 6-1** for structural number coefficients for the pavement design.

**Table 6-1 Pavement Strength Coefficients**

<b>Pavement Structure Component Conventional Materials</b>	<b>Design Strength Coefficients (per inch of material)</b>	<b>Limiting Test Criteria</b>
ACHM Surface Course	0.44	2" min. course*
ACHM Binder Course	0.44	3" min. course*
ACHM Base Course	0.36	R 90+ 4.5" min course*
Aggregate Base Course (Class 7)	0.14	R>72 6" min. course*
<b>Chemically Treated Subgrades (or Approved Substitute)</b>		<b>Compressive Strength of Field Specimen</b>
Cement Treated Subgrade	0.23	7 day, 650-1000 psi
Fly Ash Treated Subgrade	0.10	7 day, 150 psi at 70°±
Lime Treated Subgrade	0.14	7 day, 160 psi, PI <6
Kiln Dust Treated Subgrade	0.10	7 day, 150 psi, PI <6

\*Maximum lift is only limited by compaction requirements.

#### 6.4.2 Rigid Pavement

- A. *General.* Rigid pavements are those that possess a high bending resistance and distribute loads over a large area of foundation soil. Commonly known as Portland Cement Concrete Pavement.
- B. *Joint Design.* The construction plans for rigid pavement areas shall include a joint pattern layout for each street, alley and intersection. All joints and joint filling in rigid pavement shall be designed and detailed in accordance with the current AASHTO standards.

#### 6.4.3 Design Factors

- A. *Equivalent Single Axle Loads (ESAL).* Equivalent Single Axle Loads (ESAL) units are based on 18 kip (80 kN) axle loading on each design lane. All data and design procedures in this section use ESAL units for pavement loading repetitions. Maximum ESAL criteria for Residential Links and Neighborhood Links are given in Table 6-2. Where existing or projected traffic is such that maximum ESALs are exceeded, a formal design will be required, at the discretion of the City Engineer. ESAL calculations are required for Regional Links.

Directional distribution of ESALs may be 50% unless the Transportation Impact Study indicates otherwise. Lane distribution factors shall be 80% for two lanes of travel in each direction.

In the absence of truck traffic distribution data, 5% trucks shall be used, distributed across truck types in accordance with Federal Highway Administration guidance for urban arterial streets. The City Engineer may require a higher percentage of trucks to be included in the calculations when existing or projected truck traffic is expected to exceed 5%.

- B. *Design Serviceability.* The Serviceability Index to be used for all City roadways dedicated for public use is given in **Table 6-2**.

- C. *Minimum Pavement Section.* **Table 6-2** provides the minimum acceptable pavement sections and Structural Numbers for each roadway classification based on a minimum CBR of the subgrade material of 8, and on the maximum number of ESALs as specified. For lower CBR values and higher ESALs, pavement design calculations shall be provided. In specifying layer thickness, the designer shall consider how the pavement section will be physically constructed, including minimum asphalt layer thicknesses.
- D. *Portland Cement Concrete Working Stress (f').* The working stress (f') to be used in the design shall be 75% of that provided by third-point beam loading, which shall have a minimum laboratory 28-day strength of 600 psi based on actual tests of materials to be used.
- E. *Regional and Neighborhood Link Level Intersections.* The pavement thickness design for Regional and Neighborhood Link level intersections shall be the combined 20-year design for both directions for the shared use areas. A separate design analysis is required.

**Table 6-2 Pavement Design Criteria**

ROAD CLASSIFICATION		20-Year Design Traffic Info.	Serviceability Index (PSI)			Relia- bility	Min. Asphalt for Composite Section	Default Aggregate Base Course Section	Default Full Depth Asphalt Pavement Thickness (inches)	Minimum Concrete for Rigid Section	Minimum Structural Number					
			p <sub>o</sub>	p <sub>t</sub>	ΔPSI								Layer, inches	Layer, inches	Layer, inches	Layer, inches
			MAX. ESALS	Init.	Final							Diff.	(%)	HMA	ABC	Min.
RESIDENTIAL LINK		50,000	4.5	2.0	2.5	80	3.0	8.0	5.5	6.0	2.42					
NEIGHBORHOOD LINK		500,000	4.5	2.0	2.5	85	5.0	6	7	Design	3.04					
REGIONAL LINK	2 Lane	Design	4.5	2.5	2.0	95	Design	Design	Design	Design	Design					
	4 Lane	Design	4.5	2.5	2.0	95	Design	Design	Design	Design	Design					

\* A pavement design may be required as requested by the City Engineer.

#### 6.4.4 Pavement Materials

- A. *Aggregate Base Material.* Materials for aggregate base courses shall meet the requirements of Section 303.02 of the ARDOT Standard Specifications.
- B. *Asphalt Concrete Hot Mix.* Materials for Asphalt Concrete Hot Mix base, binder, and surface courses shall meet the requirements of the 2014 ARDOT Standard Specifications referenced below.

Asphalt mix designs shall meet the requirements of Section 404.01(b), and Tables 405-1, 406-1, 407-1, and 407-2 of Sections 405, 406, and 407, with additional requirements as follows:

Binder grade shall be PG64-22. PG70-22 binder may be required on some Neighborhood Links and Regional Links.

9.5 mm (3/8-inch) or 12.5 mm (1/2-inch) surface course may be used on streets classified as Residential Links or Neighborhood Links. 12.5 mm surface courses used on Residential Links should be finely graded. 12.5 mm surface course shall be used on all streets classified as Regional Links.

Lift thicknesses shall be a minimum of 3 times the maximum nominal aggregate size. Maximum lift thicknesses will be limited by capability of compaction equipment to achieve minimum compaction requirements and shall not exceed 6 times the maximum nominal aggregate size. 9.5 mm mixes on Residential Links shall be laid in two 1.5-inch thick lifts.

Marshall mixes may be used on Residential Links, in accordance with the requirements in **Table 6-3**.

**Table 6-3 Marshall Mix Requirements**

<b>Property</b>	<b>50-Blow Mix</b>
Air Voids	4% (3 – 5)
VMA	14 – 16%
Fines-to-Binder Ratio <i>use the Superpave definition: %Passing #200 / <b>effective</b> binder content</i>	0.6 – 1.6
Moisture Sensitivity	80% (min.) retained strength
Marshall Stability	1000 lb (min.)
Marshall Flow	7 – 16 (1/100 in)

Marshall mixes shall contain a maximum 10% recycled asphalt pavement (RAP). Mixes containing recycled asphalt shingles (RAS) require approval by the City Engineer. The use of Marshall mixes on Neighborhood and Regional Links may be allowed on a case-by-case basis when a pavement design report is submitted to the City Engineer for review and approval.

- C. *Concrete Requirements.* Materials for concrete pavement shall meet the requirements of the latest edition of the ARDOT Standard Specifications. Concrete for paving shall be Class 1 concrete with a minimum 28-day compressive strength of 4,000 psi and shall have air entrainment of 4 to 7 percent.

#### **6.4.5 Special Considerations**

- A. *Staged Construction.* This is an alternative for the developer to provide a minimum thickness pavement during construction, and after repairs, construct the final lift of asphalt, providing for a new finished pavement surface.

ACHM may be submitted for approval with a minimum wearing course thickness of 2.0 inches. If the full pavement section is not to be placed immediately, a pavement design for staged construction may be required by the City Engineer. The staged construction design must include asphalt thickness for each proposed stage. Calculations, traffic numbers, and construction truck traffic numbers supporting the staged design must also be submitted. For staged construction, accommodations must be provided for the paved surface to drain with no water left standing on the pavement.

- B. *Full Depth Sections.* Full depth asphalt pavement sections will be considered on a case by case basis where depth of bedrock, drainage, and soil conditions are compatible with full-depth asphalt. When permitted by the City Engineer, full depth asphalt pavements shall consist of one or more layers of black base or binder course topped with one or more layers of surface course.

- C. *Rehabilitating Existing Asphalt Streets.* Prior to overlaying existing asphalt, the City Engineer may accept nondestructive testing to determine the amount of overlay necessary to bring the street to current standards. All “pot-holes,” utility trench settlement, cracking, and any similar imperfections shall be repaired to the City Engineer’s satisfaction prior to overlaying.
- D. *Special Requirements.* The City Engineer may require full depth asphalt, concrete, or chemically treated base or subgrade in locations where traffic, utilities, type of construction, subsurface drainage, or time of construction would make asphalt on aggregate base impractical.

## **6.5 PAVEMENT DESIGN REPORT**

The pavement design report shall be prepared by (or under the supervision of), signed, and stamped by an Arkansas licensed professional engineer. The report shall make a recommendation for a typical pavement structural section based on known site soil conditions and a valid transportation impact study, when required. The report shall be submitted in PDF format.

### **6.5.1 Required Information for Pavement Design Report**

#### *A. List of Required Information.*

1. Project Name.
2. Owner Name and Contact Information.
3. Vicinity map to locate the investigated area.
4. Scaled drawings showing the location of final borings.
5. Plat with street names.
6. Scaled drawings showing the estimated extent of subgrade soil types and ESAL for each street classification.
7. Pavement design alternatives for each street classification.
8. Tabular listing of sample designation, sample depth, Group Number, liquid limit, plasticity index, percent passing the No. 200 sieve, AASHTO Classification, Group Index and soil description.
9. Swell/consolidation tests.
10. Borrow source identification.
11. Design calculations for all phases of soil report.
12. Design coefficient used for asphalt, base course, etc. Refer to **Table 6-1**.
13. Mix design test results as discussed in **Chapter 11, Street Inspection and Testing Procedures**, where chemical stabilization has been approved.
14. A discussion of potential subgrade soil problems including, but not limited to:
  - a. Heave or settlement prone soils;
  - b. Frost susceptible soils;
  - c. Ground water;
  - d. Drainage considerations (surface and subsurface);
  - e. Cold weather construction (if appropriate);
  - f. Soluble sulfates in subgrade;

- g. Other factors or properties that could affect the design or performance of the pavement system.
- 15. Recommendations to alleviate or mitigate the impact of problems discussed in Item 14 above.
- 16. Professional Engineer stamp.



## **CHAPTER 7 – TRAFFIC CONTROL DEVICES**

### **7.1 GENERAL**

This chapter describes general signal, signing, and striping design requirements for use in the City of Fayetteville. All design and construction of signals, signing, and striping shall be in conformance with this chapter and the latest revision of the MUTCD. If applicable, a traffic signal, signage, or pavement marking plan must be included in the construction plan submittal.

#### **7.1.1 Installation Responsibility**

The cost of the installation of traffic signals, street signage and pavement markings are the responsibility of the developer when required with a proposed development. The work and materials necessary for the installation shall be included as part of the street improvements.

### **7.2 DESIGN REQUIREMENTS**

#### **7.2.1 Traffic Signal Design Requirements**

The design of traffic signals shall be performed by a qualified Traffic Engineer registered in the State of Arkansas. The design will follow the latest edition of the ARDOT Standard Specifications for Highway Construction, ARDOT Standard Details, and MUTCD. The plan submittal shall include general notes, quantities, signal and controller layout, pavement markings, signage, phasing diagram, interval chart, conduit plan, and wiring diagram.

##### *A. Design Requirements.*

1. All steel poles shall be designed to meet the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
2. Electrical service shall be provided by the developer with external raintight breaker (main breaker), galvanized steel riser, and meter loop (if required) at a mutually acceptable point within the right-of-way. If the service point is over 10 feet from the controller, the contractor shall provide and install a separate two circuit external breaker (secondary breaker) on or near the traffic signal controller cabinet.
3. Conduit installed under roadway surfaces shall be installed by pushing or boring methods. If the Engineer determines this is not feasible, then a trenching method may be used with approval from the City Engineer. All conduit shall be 3" unless otherwise approved by the City Engineer.
4. Traffic Signal poles shall be galvanized unless otherwise approved by the City Engineer.
5. All pull boxes shall be a minimum Type 2 HD unless otherwise approved by the City Engineer.

6. The local radio with antenna shall be compatible with the existing closed loop coordination system.
7. The desirable minimum distance from the face of curb or shoulder edge to the face of the non-breakaway pole or obstruction is 6 feet.
8. Controller cabinet layout and orientation shall conform to IMSA Standards.
9. Controller shall be a NEMA TS-2/Type 2. Intersection software shall be included with the controller.
10. Video Detection shall include cameras with Astro-Brac universal mounting system, video input detection processors, connect module, and video communication.
11. Pedestrian buttons shall be piezo type actuated with LED light. A pedestrian sign shall be mounted directly above each button installed.
12. Traffic signal heads shall be LED. LED modules shall comply with ITE LED specification VTCSH Part 2 July 1998 and shall be certified EPA Energy Star Compliant. Traffic signal heads shall include 12-inch LED modules, 5-inch backing plates, tunnel visors and Astro-Brac universal mounting system.
13. All pedestrian heads shall be LED countdown pedestrian signal modules.
14. Luminaires assemblies shall be LED full cut off with a 25-foot arm.
15. Include all required pedestrian, regulatory, warning, and guide signs.

## 7.3 TRAFFIC SIGNING

### 7.3.1 General

- A. *Type and Location of Signs.* The City Engineer shall make the final determination regarding the type and location of signage controls within the city right-of-way. These controls shall include traffic control signs, street name signs, delineators, and permanent barricades.
- B. *Design, Installation, and Maintenance.* Because the City will maintain the permanent traffic control devices on public rights-of-way, all traffic control devices shall be fabricated and installed in accordance with this chapter and the latest edition of the MUTCD.
- C. *New Roadway.* Permanent signage, unless otherwise approved by the City Engineer, shall be completely in place before any new roadway is opened to the public.
- D. *Other Standards.* These Standards are to be used in conjunction with other applicable City regulations.
- E. *Sign Posts, Supports, and Mountings.*
  1. Sign Post (Greenspace Installation). The post shall be 2 #/ft green U-channel for signs with an area of 8 square feet or less. Signs with an area greater than 8 square feet shall be 3 #/ft. Stop and Yield signs shall be 3 #/ft. Post height will vary based on the size of the sign, minimum height required by the MUTCD, and a minimum vertical penetration of 30 inches.
  2. Sign Post (Concrete Installation). The installation shall include a sign post, sleeve, and anchor post. The sign post shall be a 2-inch punched square post (14 gauge, 1.99 lbs/ft),



the sleeve post shall be a 2.25-inch punched square post (12 gauge, 2.77 lbs/ft), and the anchor post shall be a 2.50-inch punched square post (12 gauge, 3.14 lbs/ft). The posts shall have a minimum vertical penetration depth into the concrete of 10 inches. Post height will vary based on the size of the sign, minimum height required by the MUTCD, and a minimum vertical penetration of 10 inches.

3. Pole Mounted Signs. Signs being attached to traffic signal poles, mast arms, or any other pole shall be installed using a stainless-steel strap and bracket system with an aluminum stiffener.
4. Sign Bolts. The bolt, washer, lock washer, and nut shall be zinc coated. A nylon washer shall be placed between the face of the sign and a zinc washer.

F. *Sign Reflectivity*. Reflective materials shall be a prismatic sheeting made with Micro-Prism in accordance with the latest version of ASTM D4956. Guide, pedestrian, and school area signs shall have a TYPE XI sheeting material and all other signs shall have a minimum TYPE III. Reflective material shall have a minimum 7-year warranty.

G. *Backing Plates*. Aluminum blanks of .080 gauge are standard, except for signs larger than 36 x 36 inches, which shall be .100 or .125 gauge aluminum.

### 7.3.2 Intersections

#### A. *Street Name Sign*.

1. Signalized Intersection. The sign face shall be a combination of upper and lowercase letters and include the street name, suffix, and block number & direction. 18-inch plates shall be used at all signalized intersections; lengths will vary to fit street names.
  - a. *Sign Assembly*: There shall be one plate for each mast arm. Typical installation shall include four street name signs, one for each direction. All 18-inch blank signs shall be .125-gauge.
  - b. *Sign Face*: The font shall be Hwy. Series C. The letter size shall be 10 inches for the street name and 4.5 inches for the block number & direction. The letters and numbers are to be white on a green background. There shall be a 0.75-inch white border. See **Section 7.3.1 (F)** for reflectivity requirements.
2. Non-Signalized Intersection. The sign face shall be a combination of upper and lowercase letters and include the street name and suffix. 9-inch plates shall be used at all non-signalized intersections; lengths will vary to fit street names.
  - a. *Sign Assembly*: There shall be one plate for each road, with a minimum of two plates per street sign assembly. Typical installation shall include two street name signs, one for each direction. All 9-inch blank signs shall be .125-gauge.
  - b. *Sign Face*: The font shall be Hwy. Series C. The letter size shall be 6 inches. The letters and numbers shall be white on a green background. There shall be a 0.625-inch white border. See **Section 7.3.1 (F)** for reflectivity requirements.

B. *Stop Signs.*

1. Location of all stop signs shall be determined and discussed in the Transportation Impact Study (TIS), when required.
2. Stop signs will be placed in accordance with the TIS, approved construction plans, and the MUTCD.

### **7.3.3 Traffic Control Signs**

- A. *Regulatory.* All regulatory signs shall be sized, designed, and installed in accordance with the latest editions of FHWA's Standard Highway Signs and MUTCD. All signage is subject to review and approval by the City Engineer.
- B. *Warning.* All warning signs shall be sized, designed, and installed in accordance with the latest editions of FHWA's Standard Highway Signs and MUTCD. All signage is subject to review and approval by the City Engineer.

Pedestrian crossings located along established school pedestrian routes and in school zones shall be signed at the crossing and in advance in accordance with the latest edition of the MUTCD. School area signs shall have a fluorescent yellow/green background.

### **7.3.4 Roundabouts**

Roundabouts shall be signed in accordance with the latest edition of the NCHRP Report 672, Roundabouts: An Information Guide and the MUTCD.

### **7.3.5 Temporary Construction Signage**

All temporary construction signage shall be placed according to MUTCD standards. All temporary signage is subject to review and approval by the City. Temporary street lane closures shall be coordinated with the City Engineer, emergency services and transportation providers. When required Detour Plans shall be submitted for review.

## **7.4 PAVEMENT MARKING AND STRIPING**

### **7.4.1 General**

- A. *Design of Striping and Markings.* The design of striping and markings shall be in accordance with these Standards and the latest edition of the MUTCD.

The City Engineer shall make the final determination in regards to the type and location of pavement striping and marking within the right-of-way during the review of the project.

- B. *Installation and Maintenance.* The City maintains the permanent pavement striping and marking on public rights-of-way after completion of the warranty period. All such devices

shall be specified and installed in accordance with these Standards and the latest edition of ARDOT's Standard Specifications for Highway Construction.

- C. *New Roadway*. Permanent striping and marking, unless otherwise approved by the City Engineer, shall be completely in place before any new roadway is opened to the public.

#### **7.4.2 Pavement Markings (Symbols and Arrows)**

- A. *General*. Preformed thermoplastic shall be used for all pavement markings such as arrows, “onlys,” crosswalks, railroad crossings, school crossings, stop lines, yield lines, bike symbols and any other symbol required by the City Engineer.
- B. *Preformed Thermoplastic Pavement Marking Specifications*. See Section 719 of ARDOT's Standard Specifications for Highway Construction, latest edition.
- C. *Crosswalks*.
  - 1. General. Crosswalk markings shall be used at all signalized intersections, approved crossings, school routes, adjacent to schools, and as otherwise directed. All crossing locations with 20 or more pedestrians per hour for any hour of an average day shall be marked. Children, senior citizens, and disabled users shall be counted 2x in this volume calculation.
  - 2. Standard Crosswalk. White 6-feet long x 24-inch wide bars with 24-inch spacing shall be used for all crosswalks.
  - 3. Crosswalk Enhancements. Crosswalk enhancements may be required at certain intersections, including uncontrolled intersections and midblock crossings. See **Section 7.5** for selection and design guidance.
- D. *Stop Lines*. All stop lines shall be white and a minimum of 12 inches wide. Stop bars are required at all signalized locations.
- E. *Roundabouts*. Pavement Markings in roundabouts shall be designed and installed in accordance with the latest edition of the NCHRP Report 672, Roundabouts: An Information Guide and the MUTCD.

#### **7.4.3 Striping**

- A. *General*.
  - 1. Typical striping widths for lane lines are 6 inches, unless otherwise noted. Double yellow centerline must have a 6-inch minimum gap between stripes.
  - 2. Thermoplastic markings shall be used on all striping unless otherwise approved by the City Engineer. Refer to Section 719, ARDOT Standard Specifications for Highway Construction latest edition for thermoplastic marking specifications.

3. All striping on sealcoats shall require a layout line. Prior to striping, tabs are required for sealcoats (prior to the sealcoat process). All other conditions require spot taping at an interval of 25 feet or closer.
- B. *Broken Line*. All broken lines shall be 6-inch wide using a 40-foot cycle (10 feet long with 30-foot gap).
- C. *Dotted Line*. All dotted lines shall be 6-inch wide using a 6-foot cycle (2 feet long with 4-foot gap).
- D. *Turn Bay Line*. All turn bay lines shall be created with a minimum 6-inch wide line. However, if a turn bay occurs on a horizontal curve, the bay taper from the start of the double wide 6-inch may be marked with short 6-inch wide dotted lines (2 feet long with 4-foot gap).
- E. *Centerline*. All centerline striping shall be double yellow, each a minimum of 6 inches wide, with an 6-inch minimum gap between the two.
- F. *Parking Stalls*. All striping for parking shall be white and 4 inches wide. All edge lines of parking areas shall also be white and a minimum of 4 inches wide.
- G. *Bikeway*. Striping to separate a travel lane and a bike lane shall be white and 6 inches wide.

#### **7.4.4 Temporary Striping**

All temporary striping shall conform to the ARDOT Standard Specifications for Highway Construction. When approved, temporary striping shall be required prior to the opening of a roadway for travel where pavement and/or permanent striping cannot be completed due to weather and/or time constraints or for staged construction.

- A. *Specifications*. Temporary striping shall be the same color and width as for permanent striping. Temporary striping shall consist of tabs, tape, or paint depending on the pavement surface, spaced at 25-foot intervals.
- B. *Time Duration Limit*. Temporary striping is permitted for no more than 7 days unless for staged construction or otherwise approved.
- C. *Extensions*. Extensions must be requested in writing if weather does not allow installation of permanent striping.

### **7.5 MIDBLOCK CROSSINGS AND UNCONTROLLED INTERSECTIONS**

To increase walkability and pedestrian safety, midblock crossings may be allowed or required on certain streets and implemented in accordance with NACTO's Guidance for Midblock Crossings and these Standards. The minimum expected crossing volume for installation of a midblock crosswalk is typically 20 or more pedestrians per hour for any hour of an average day. Children, senior citizens, and disabled users shall be counted 2x in this volume calculation. Crossing

locations near schools, parks, or other destinations, and more than 300 feet from the nearest crossing may be considered regardless of the pedestrian volume.

Midblock crossings and crossings at intersections without stop or signal control may require additional safety features under certain conditions. Countermeasures as outlined in the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations shall be installed as appropriate for the speed and volume of traffic and type of roadway conditions.

Crosswalks shall be marked at uncontrolled crossing locations where the following conditions occur:

1. Pedestrians exceed 20 pedestrians per hour for one hour, 18 pedestrians per hour for two hours, or 15 pedestrians per hour for 3 hours. Children, senior citizens, and disabled users count 2x for purposes of this volume calculation.
2. Vehicle ADT exceeds 3000 vpd.
3. Operating (85 percentile) speeds are greater than 35 mph.

All marked crosswalks at uncontrolled locations shall include:

1. High visibility crosswalk markings per standard details.
2. Adequate sight distance by restricting parking and other obstructions.
3. Adequate nighttime lighting levels. Lighting shall be installed on both sides of the crosswalk located such that the pedestrian is front lit while in the crosswalk.
4. Crossing warning signs.

Table 1 of the FHWA Guide for Improving Safety at Uncontrolled Crossing Locations shall be used to select crossing enhancements beyond the standards listed above. Notes and modifications to this table are as follows:

1. RRFB's are a minimum requirement when operating (85<sup>th</sup> percentile) speeds are above 35 mph, and may be required at lower speeds when ADT is higher than 9000 vpd.
2. Pedestrian hybrid beacons are always required when warranted per MUTCD criteria.
3. Other treatments identified in Table 1 shall be considered based on roadway configuration and traffic speed and volume. Treatment types circled or highlighted in black shall be minimum requirements.



## **CHAPTER 8 – PEDESTRIAN FACILITIES DESIGN AND TECHNICAL CRITERIA**

### **8.1 GENERAL**

This chapter sets forth the minimum criteria to be used in the design of all sidewalks, access ramps, and other pedestrian facilities within the right-of-way, or other public easements.

#### **8.1.1 Reference Documents**

Within this chapter, AASHTO's A Policy on Geometric Design of Highways and Streets, the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, the NACTO Urban Street Design Guide, and the ITE Designing Walkable Urban Thoroughfares were used as a reference.

#### **8.1.2 ADA Requirements**

All pedestrian facilities shall be designed in accordance with American Disabilities Act (ADA) regulations and the requirements of these Standards. Any variances from these requirements shall be in accordance with ADA requirements and shall be approved by the City Engineer prior to construction.

#### **8.1.3 Obstructions**

Manholes, utility poles or other appurtenances or obstructions, should not be located in sidewalks or trails unless specifically approved by the City Engineer. A minimum ADA accessible path of 3 feet in width should be provided that is free of such obstruction when feasible.

#### **8.1.4 Sidewalk Underdrains (Chases)**

Sidewalk underdrains shall not interfere with the pedestrian's use of the sidewalk. Underdrains shall not be located within an access ramp, curb cut, or driveway.

#### **8.1.5 Pedestrian Crossings**

All crosswalks shall be marked in accordance with **Chapter 7, Traffic Control Devices**. Crosswalks will be required at all signalized intersections, school areas, and high pedestrian areas as designated by the City Engineer.

### **8.1.6 Pedestrian Refuge Areas**

For Regional Links with raised medians and on splitter islands for roundabouts, a pedestrian refuge area shall be created in the median to increase pedestrian safety. See standard details.

### **8.1.7 Safety Railing (Handrails)**

Safety railings will be required on any drop adjacent to a sidewalk/trail greater than 30 inches that has a slope of 1:1 or greater. Handrails shall be a minimum of 42 inches in height according to AASHTO.

## **8.2 SIDEWALKS**

### **8.2.1 General Layout and Design Criteria**

- A. *Width.* Minimum sidewalk widths for the various street classifications shall be as specified in the City of Fayetteville Master Street Plan. The City Engineer may require additional width for activity areas and routes leading to and from these areas. The final sidewalk width shall be determined through additional study of higher pedestrian traffic areas.

When a sidewalk is less than 8 feet in width and located adjacent to the back of curb where on street parking is allowed, the sidewalk shall be widened by 1.5 feet to accommodate the car doors opening onto the sidewalk area.

- B. *Shy Distance.* A shy distance of 2 feet is required where vertical barriers (walls, fences, signs, etc.) greater than 40 inches in height are adjacent to the sidewalk and extend more than 4 feet in length parallel to the sidewalk. A shy distance of 1.5 feet is required from the back of curb. A shy distance of 1 foot is required for all other fixed obstacles. Shy distances shall be added to the minimum widths of sidewalks specified in the Master Street Plan or required by the City Engineer to determine the final sidewalk width.
- C. *Minimum Distance to Slope.* There shall be a minimum of 1 foot between the sidewalk and the beginning of a slope.
- D. *Concrete Thickness.* All sidewalks not within driveways shall be a minimum of 4 inches thick concrete. All sidewalks within a driveway shall be a minimum of 6 inches thick.
- E. *Sidewalk Crossings of Driveways and Alleys.* Sidewalks and side paths shall have continuous longitudinal grade through driveways and alleys. Sidewalks shall have an expansion joint at the edge of sidewalk opposite the street. The sidewalk edge adjacent to the street shall have at least 1 inch deep grooved joint mark (cannot be a saw cut) to clearly define the sidewalk through the driveway or alley.
- F. *Sidewalk Elevation.* The back of sidewalk elevation shall be such that the slope down from the back of sidewalk to the top of curb is 2% unless otherwise approved by the City Engineer.

#### G. *Slope.*

1. Cross Slope. Sidewalk cross slopes shall be a minimum of 1 percent and a maximum of 2%. The cross slope shall be towards the street unless otherwise approved.
2. Longitudinal Slope. Longitudinal slope of sidewalks shall be consistent with the adjacent street slopes.
3. ADA Requirements for Steeper Slopes. Sidewalks with greater than 5 percent longitudinal slope or those not adjacent to a street, shall be constructed to meet ADA requirements by use of ramps and landings, construction of switchbacks, or other acceptable means.

#### H. *Joints.*

1. Material. Expansion joint material shall be asphalt impregnated fiberboard meeting the requirements of AASHTO M213, or other joint material meeting the requirements of the latest edition of the ARDOT Standard Specifications.
2. Location. Full depth expansion joints shall be provided where sidewalks abut drainage structures, retaining walls, building faces, existing concrete flatwork, and all other fixed objects. Expansion joint material shall be provided at each cold joint.  
One-quarter depth (1 inch) weakened plane joints, or saw-cut joints shall be placed in sidewalks at regular intervals not greater than the width of the sidewalk.
3. Saw Joints. Saw joints shall be filled with self-leveling sealant such as Sonneborn SL1 or equivalent meeting the requirements of ASTM C 920, Type S.
4. Joint Sealant. All expansion joints and saw joints shall be sealed with joint sealant meeting the requirements of ASTM C 920, Type S. A self-leveling sealant shall be used for horizontal surfaces. A non-sag sealant shall be used for vertical or nearly vertical surfaces.

#### I. *Finish.* All sidewalks shall have a broom finish.

#### J. *Curing Compound.* All sidewalks require the application of a concrete curing compound or the concrete is to be kept moist for seven (7) days.

#### K. *Existing Sidewalks.* When redevelopment is proposed on properties with existing sidewalks, the plans shall show the location of all existing and proposed sidewalk improvements. In accordance with Chapter 166.04 of the UDC, each development will be subject to review of the overall impact to the sidewalks to evaluate the extent of the sidewalk replacement.

Widening of the existing sidewalks to meet current sidewalk width standards is not allowed.

Removal and replacement of the existing sidewalks is required for all:

1. Segments of the sidewalk, including ramps, that do not meet all applicable ADA standards, including cross slope and running slope.
2. Segments that have cracked and/or settled to the extent that they are out of ADA compliance. This is defined as more than ¼ inch of vertical displacement or cracks or joints more than ½ inch wide.



3. Segments that display surface spalling or other distress such that a trip hazard (more than ¼ inch vertical displacement) is created.
4. Segments of sidewalk damaged during construction to the extent that any of the items above apply.

L. *Storm Water Runoff at Curb Cuts*. Drainage shall meet the requirements specified in **Section 4.7** and **Subsection 4.7.3**.

## **8.3 ACCESS RAMPS**

### **8.3.1 Ramp Requirements**

Access ramps shall be installed at all sides of all intersections and at certain mid-block locations for all new construction or reconstruction of curb and sidewalk. Access ramps shall meet ADA requirements to the maximum extent feasible.

- A. *Locations*. Two access ramps shall be included at all intersection corners. On T-intersections, corresponding access ramp are required opposite the intersecting street. Access ramps shall not be placed in designated parking areas nor in or across from driveways. Ramps shall be located to avoid conflicts with the storm drain inlet depressions. Ramps shall be included even when no ramp exists on the opposite side of the street.
- B. *Width*. The minimum width of an access ramp shall be 48 inches (60 inches preferred) excluding the flared sides. The width of access ramps for shared-use paved trails shall match the width of the trail.
- C. *Slope*. The slope of the ramp shall not be greater than 8.33% (1:12) for all new developments. It is preferred that ramp slopes are less than the allowed maximum.
- D. *Flared Sides*. The slope of the flared sides shall not be greater than 10% (1:10).
- E. *Finish*. Access ramps shall have a broom finish.
- F. *Curing Compound*. All access ramps require the application of a concrete curing compound or the concrete is to be kept moist for seven (7) days.
- G. *Detectable Warnings*. Detectable warning devices (truncated domes) meeting ADA requirements shall be installed at curb ramps and blended transitions at street crossings, cut through pedestrian refuge islands (excluding those less than six feet wide), pedestrian at-grade rail crossings, and other locations as required by ADA.

## 8.4 SHARED-USE PAVED TRAILS

### 8.4.1 General Layout and Design Criteria

- A. *Width.* The minimum width of shared-use paved trails shall be 12 feet, or in accordance with applicable Master Street Plan cross sections. and shall follow the trail cross-section standard details. Shared-use paved trails adjacent to the roadway shall have a minimum of 6 feet of greenspace, but may vary as designated on the Master Street Plan.
- B. *Materials.* All shared-use paved trails shall be constructed of concrete in accordance with the City standard details and specifications for concrete trails.
- C. *Grades.* All trails shall be constructed with a 2% maximum cross slope in the same direction as the existing grade unless otherwise designated to allow drainage to sheet flow across the trail. Trails adjacent to streets shall have 2% maximum cross slope towards the street. Longitudinal grade shall not exceed 5%. Longitudinal grade may be varied for sites with difficult topography. In such cases, the AASHTO longitudinal grade requirement for bicycles shall apply.
- D. *Clear Zones for Shared-Use Paved Trails.* A clear zone space of 3 feet is required from the edge of the trail where no vertical barriers (walls, fences, signs, etc.) are allowed. For safety of the trail, clear zones shall be free of any obstructions according to AASHTO requirements.
- E. *Concrete Trail Requirements.* All concrete portions of trails shall be constructed of a Portland cement concrete mixture with a compressive strength of 3500 psi with 4 to 7 percent air entrainment. Concrete trail sections shall be constructed to the following standards:
  - 1. Surface. Concrete trail portions shall have a minimum 4-inch thick concrete surface reinforce with fibers or welded wire fabric with a medium broom finish.
  - 2. Base Course. Base course for concrete trails shall consist of a 4-inch minimum thick layer of Class 7 aggregate compacted to 95% M.P.D.
  - 3. Subgrade. The top 24 inches of subgrade shall meet the requirements of **Chapter 6, Section 6.3.6 Subgrade Requirements**. Existing material not meeting these requirements shall be removed and replaced with approved select fill and compacted to 95% Standard Proctor Density (S.P.D.). Specific site conditions may require the additional undercut, placement of stone backfill or other methods in order to create a solid base. If a trail is along the roadway, subgrade shall meet both the requirements of sidewalk subgrade and be compacted to 95% Standard Proctor Density.
  - 4. Expansion joints. Full depth expansion joints shall be provided where trails abut drainage structures, retaining walls, building faces, and all other fixed objects. Expansion joint material shall be provided at each cold joint. Expansion joint material shall be asphalt impregnated fiberboard meeting the requirements of AASHTO M213, or other joint material meeting the requirements of the latest edition of the ARDOT Standard Specifications.
  - 5. Contraction Joints. 1 inch deep weakened plane joints, or saw-cut joints, shall be placed in trail at regular intervals matching the trail width, but not greater than 12 feet apart.

6. **Joint Sealant.** All expansion joints and saw joints shall be sealed with joint sealant such as Sonneborn SL1 meeting the requirements of ASTM C 920, Type S. A self-leveling sealant shall be used for horizontal surfaces. A non-sag sealant shall be used for vertical or nearly vertical surfaces.
- F. **Trail Shoulders.** A 2-foot shoulder adjacent to the trail shall be graded smooth and should not exceed 2% cross-slope in the same direction as the trail.
- G. **Tie Back Slopes.** The ground beyond the shoulder shall meet the existing grade with a maximum slope of 3:1. A swale may be required on the uphill side of the trail to direct stormwater runoff to a storm sewer system or culvert crossing. These may be required where runoff is concentrated onto the trail.
- H. **Trail Signage.** Trail signage shall comply with the MUTCD, Part 9 – Traffic Controls for Bicycle Facilities. *Note: signs specified in the MUTCD for trails are smaller than signs used along streets, refer to the MUTCD chart for shared use paths.*
- I. **Street Crosswalks.** Trails that intersect and cross public streets shall have a red concrete crosswalk with 2-foot wide white thermoplastic stripes on each side. Where appropriate, this crosswalk may be raised 2.5 inches above pavement surface. The concrete shall be colored with integral color mix (Soloman Dry Pigment 417 Apple Red with 4% loading) or with thermoplastic (Decomark Herringbone Pattern, Brick Red), or approved similar materials. Shared-use paved trails shall have continuous longitudinal grade through driveways, streets, and alleys. City standard details for trail crossings are based on the trail and vehicle traffic volumes at the crossing. The appropriate standard detail to be used will be determined based on the context of the crossing.
- J. **Striping.** Striping shall be included on shared-use paved trails and installed according to the MUTCD, Part 9 – Traffic Controls for Bicycle Facilities. Additional striping may be required for increased safety.
- K. **Location Criteria.** Shared-use paved trail locations shall be based on safety, circulation, and access considerations.
- L. **Overhead Clearance.** All shared-use paved trails shall have a minimum of 10 feet clear vertical distance above the path.
- M. **Drainage Design.** All culvert crossings shall be designed to carry the 10-year storm event.

#### **8.4.2 Horizontal Curves**

Shared-use paved trails shall have a minimum centerline radius of 50 feet unless otherwise approved. All changes in horizontal alignment shall be curved and not have angle transitions.

### **8.4.3 Trail Lighting**

Trail lighting and electrical conduit shall be installed based on Ordinance requirements of the UDC. Trail lighting shall be spaced to meet AASHTO 0.5-foot candle minimum.

### **8.5 SIDEWALK UNDERDRAINS (CHASES)**

Sidewalk underdrains shall not interfere with the pedestrian's use of the sidewalk. Underdrains shall not be located within an access ramp, curb cut, or driveway.

### **8.6 PEDESTRIAN CROSSINGS**

All crosswalks shall be marked in accordance with **Chapter 7, Traffic Control Devices**. Crosswalk markings will be required at all signalized intersections, school areas, and high pedestrian areas as designated by the City Engineer. Crossings at uncontrolled intersections or midblock locations may be required to have additional enhancements including rapid flashing beacons or pedestrian hybrid beacons as provided in the MUTCD.

### **8.7 PEDESTRIAN REFUGE AREAS**

For Regional Links with raised medians and on splitter islands for roundabouts, a pedestrian refuge area shall be created to increase pedestrian safety. See standard details.



## **CHAPTER 9 – BICYCLE FACILITIES DESIGN AND TECHNICAL CRITERIA**

### **9.1 GENERAL**

This chapter sets forth the minimum criteria to be used in the design of all bike lanes, bike paths, or other bicycles facilities within the City’s rights-of-way.

#### **9.1.1 Reference Documents**

In this chapter, the Fayetteville Mobility Plan, the AASHTO Guide for the Development of Bicycle Facilities, the NACTO Urban Bikeway Design Guide, and the MUTCD were used as references.

#### **9.1.2 Bicycle Master Plan**

This subsection was developed based on the City’s Active Transportation Plan (ATP). All projects shall optimize bicycle travel within the City by providing bicycle facilities in all new developments in accordance with this plan and the FHWA Bicycle Selection Guide.

#### **9.1.3 Obstructions**

Manholes, storm drains, utility poles or other appurtenances or obstructions, should not be located in bike lanes or bike paths.

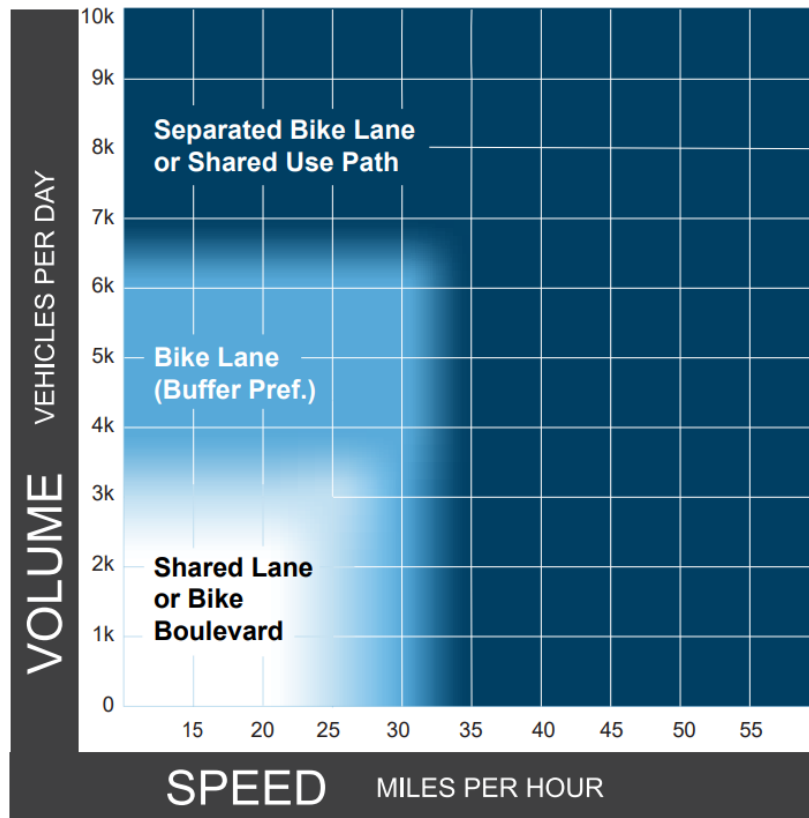
#### **9.1.4 Protected Intersections**

When an intersection is planned along a bike facility that is designated on the Active Transportation Plan, a protected intersection may be required as determined by the City Engineer. Protected intersection design shall be based on NACTO’s Don’t Give Up at the Intersection.

### **9.2 ON-STREET BIKE LANES DESIGN REQUIREMENTS**

#### **9.2.1 On-Street Bike Routes**

Specific streets are designated in the City’s Alternative Transportation and Trails Master Plan as on-street bicycle routes. Streets designated as on-street bicycle routes shall be designed in accordance with the Master Street Plan, Active Transportation Plan, and the FHWA Bikeway Selection Guide as shown in the included FHWA figure.



#### Notes

- 1 Chart assumes operating speeds are similar to posted speeds. If they differ, use operating speed rather than posted speed.
- 2 Advisory bike lanes may be an option where traffic volume is <3K ADT.
- 3 See page 32 for a discussion of alternatives if the preferred bikeway type is not feasible.

**Figure 9-1. FHWA Bikeway Selection Guide for use when designing on-street bike routes.**

## 9.2.2 Width and Cross Sections

In almost all cases, vehicle traffic volumes and speeds will dictate whether a shared street or separate shared-use paved trail is appropriate. Bike lane width shall not be less than 6 feet measured from the face of curb or edge of pavement if no curb exists.

## 9.2.3 Signage and Striping

All designated bike facilities shall be signed and striped, as required by MUTCD and as required in **Chapter 7, Traffic Control Devices**. 6-inch green thermoplastic or epoxy striping is required through intersections. For shared streets, a thermoplastic “sharrow” symbol with green backing shall be used.



## **CHAPTER 10 – NEIGHBORHOOD TRAFFIC SAFETY**

### **10.1 GENERAL**

This chapter presents acceptable methods of neighborhood traffic calming that are determined by the City to be necessary for existing Residential Links. This chapter also provides for specific design criteria for a number of traffic calming methods.

#### **10.1.1 Intended Use**

The necessity or desire for traffic safety and calming stems from the perception that Residential Links, particularly in residential areas, do not always function as intended. These roadways should be low traffic volume roadways used for direct access to residences on the street. They are also intended as a multi-modal system that is shared by vehicular, bicycle, and pedestrian traffic in a manner that minimally impacts residents in these areas.

### **10.2 TRAFFIC SAFETY PROBLEMS**

The presence of too many vehicles traveling at high speeds through a neighborhood diminishes that neighborhood's quality of life. Traffic calming measures are intended to minimize these issues and return the quality of life to the neighborhood. Care must be taken by the designer so that the installation of traffic calming devices does not create unintended hazards that delay emergency response or jeopardize the safety of bicyclists, pedestrians or motorists.

#### **10.2.1 Speeding**

Speeding may occur on roadways that allow the driver to feel safe while exceeding the posted speed limit. Factors that contribute to this perception include long, unbroken lines of sight, steep roadway grades, wide roadways, low density developments, low pedestrian activity, and large building setbacks. In addition, speeding may occur when the street functions as a higher classification street than originally intended.

#### **10.2.2 Measuring Speed of Roadway**

The standard method of measuring speed on any street is the determination of the 85th percentile speed. The 85th percentile speed is the speed at which or below which 85 percent of the vehicles travel. If the 85th percentile speed is at or below the posted speed limit, then speeding is not considered a problem. However, if the 85th percentile speed is over the posted speed limit by 5 miles per hour or greater, either the posted speed limit may be inappropriate or a speeding problem may exist.

### 10.2.3 Intrusion (Cut-Through Traffic)

Intrusion is increased volume or excessive non-local traffic along a neighborhood street. This cut-through traffic is caused by drivers who use a Residential Link to go through a neighborhood and save time on their trip. These streets, which are less impeded than others, will often invite cut-through traffic. Routes that are perceived to be timesaving will attract more traffic. This increased cut-through traffic can cause Residential Links to function more like a Neighborhood Link.

### 10.2.4 Pedestrian Safety

Pedestrian safety negatively impacted by speeding vehicles, cut-through traffic, or a combination of these problems. The high concern areas are in the vicinity of neighborhood schools and parks or mid-block pedestrian crossings, particularly on streets with on-street parking. These areas require special consideration for the mobility and safety of the pedestrian.

## 10.3 TRAFFIC CALMING DESIGN CRITERIA

All traffic calming alternatives have a City standard detail required to be followed when designing a traffic calming feature. Specific signage, striping, and markings shall be in accordance with the standard detail, other City standards, and the MUTCD.

The use of some traffic calming devices may not be appropriate in certain locations. In all instances where traffic calming will be implemented, the design and location shall be approved by the City Engineer and Fire Marshal.

### 10.3.1 Intersection Bulb-Outs

Intersection bulb-outs are areas of extended curb at intersections that narrow the overall width of the street and protect on-street parking. They can be an appropriate traffic calming device on Residential Links and Downtown/Urban Streets. Intersection bulb-outs are used to slow traffic at intersections and improve pedestrian safety by reducing the crossing distance and improving line of sight for pedestrians while making pedestrians more visible to oncoming traffic.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Improves pedestrian and bicycle safety</li><li>- Reduce vehicle speeds</li><li>- May slow right-turning vehicles</li><li>- Prevents parking close to intersections</li><li>- Can approve neighborhood appearance with landscaping</li></ul>	<ul style="list-style-type: none"><li>- Can result in loss of on-street parking space</li><li>- Drainage must be accommodated</li><li>- Landscaping maintenance</li></ul>

*Other Considerations.* Impacts of intersection bulb-outs on roadway drainage must be addressed. Drainage may be provided by devices such as inlets, concrete channels, valley gutters, etc.



### 10.3.2 Center Island Narrowing

Center island narrowing are areas of curbed or painted islands located before an intersection or mid-block along the centerline of a street. They can be an appropriate traffic calming device on Residential Links. Center island narrowing is used to slow traffic by narrowing the roadway with a median, and to increase pedestrian safety by providing a refuge halfway across the street so that only one direction of traffic needs be crossed at a time.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Improves pedestrian and bicycle safety</li><li>- Reduce vehicle speeds</li><li>- Can approve neighborhood appearance with landscaping</li></ul>	<ul style="list-style-type: none"><li>- Can result in loss of on-street parking space</li><li>- Landscaping maintenance</li><li>- May restrict access</li></ul>

### 10.3.3 Gateway Treatment

Gateway treatments are short medians at the entrance to a residential street. They can be an appropriate traffic calming device on Residential Links. Gateway treatments are used to slow vehicles as they turn into the street and to limit the exit to a single lane.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Improves pedestrian and bicycle safety</li><li>- Reduce vehicle speeds</li><li>- Prevents drivers from forming a second lane</li><li>- Can approve neighborhood appearance with landscaping</li><li>- Does not restrict resident access</li></ul>	<ul style="list-style-type: none"><li>- Can result in loss of on-street parking space</li><li>- Landscaping maintenance</li></ul>

### 10.3.4 Oval Median

Oval medians are curbed, oval-shaped medians located mid-block. They can be an appropriate traffic calming device on Residential Links and streets having volumes less than 3,500 vehicles per day. Oval medians are used to narrow the roadway width and slow vehicles as they pass around the median.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Reduce vehicle speeds</li><li>- Can approve neighborhood appearance with landscaping</li><li>- Does not restrict resident access</li><li>- Improves bicycle safety</li></ul>	<ul style="list-style-type: none"><li>- Can result in loss of on-street parking space</li><li>- Landscaping maintenance</li><li>- Reduces width of greenspace between the street and sidewalk</li></ul>

### 10.3.5 Chokers

Chokers are areas of extended curb that narrow the overall street width, typically located in mid-block locations. They can be an appropriate traffic calming device on Residential Links and streets having volumes less than 3,500 vehicles per day. Chokers are used to slow vehicle traffic by funneling it through a narrower street opening and are more effective when used in series.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Improves pedestrian and bicycle safety</li><li>- Reduce vehicle speeds</li><li>- Can approve neighborhood appearance with landscaping</li></ul>	<ul style="list-style-type: none"><li>- Can result in loss of on-street parking space</li><li>- Can impact drainage</li><li>- Landscaping maintenance</li></ul>

*Other Considerations.* Impacts of chokers on roadway drainage must be addressed. Drainage may be provided by devices such as inlets, concrete channels, valley gutters, etc.

### 10.3.6 Chicanes

Chicanes are a series of three curb bulb-outs that are staggered on alternating sides of the street, forming S-shaped curves that force vehicles to negotiate the narrowed roadway in a snake-like fashion. They can be an appropriate traffic calming device on Residential Links having volumes less than 3,500 vehicles per day, and on two-lane, two way or one-lane, one-way streets. Chicanes are used mid-block to slow vehicle speeds by forcing motorists to weave through the bulb-outs using horizontal deflection.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Reduce vehicle speeds</li><li>- Reduce traffic volumes</li><li>- May reduce collisions</li><li>- May reduce traffic noise</li><li>- Can approve neighborhood appearance with landscaping</li><li>- Improves bicycle safety</li></ul>	<ul style="list-style-type: none"><li>- Can result in loss of on-street parking space</li><li>- With two-lane chicanes, motorists may cross the centerline to maintain a straight line of travel</li><li>- Landscaping maintenance</li><li>- May slow emergency vehicles</li></ul>

*Other Considerations.* Traffic volumes should be balanced in each direction as chicanes lose effectiveness when volumes are significantly unbalanced. Chicanes may not be appropriate in areas with high truck traffic and should not be used in locations where grades exceed 8%. Placement will depend on site conditions and driveway locations.

### 10.3.7 Two-Lane Slow Point

Two-lane slow points are a pair of two triangular islands with an angled median in between that force vehicles to negotiate the narrowed roadway in a snake-like fashion. They can be an appropriate traffic calming device on Residential Links having volumes less than 3,500 vehicles

per day, and on two-lane, two-way and one-lane, one-way streets. Two-lane slow points are used to slow vehicles as they pass through the slow point.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>- Reduce vehicle speeds</li> <li>- Reduce traffic volumes</li> <li>- May reduce collisions</li> <li>- May reduce traffic noise</li> <li>- Can approve neighborhood appearance with landscaping</li> <li>- Improves bicycle safety</li> </ul>	<ul style="list-style-type: none"> <li>- Can result in loss of on-street parking space</li> <li>- Landscaping maintenance</li> <li>- May slow emergency vehicles</li> </ul>

*Other Considerations.* Traffic volumes should be balanced in each direction as two-lane slow points lose effectiveness when volumes are significantly unbalanced. Two-lane slow points may not be appropriate in areas with high truck traffic and should not be used in locations where grades exceed 8%. Placement will depend on site conditions and driveway locations.

### 10.3.8 Traffic Circles

Traffic circles are raised islands located in the center of an unsignalized intersection that force traffic to circulate in a counterclockwise direction. They can be an appropriate traffic calming device on Residential Links having volumes less than 3,500 vehicles per day and on streets without high pedestrian or left-turning volumes. Traffic circles are used to slow vehicles at intersections due to the horizontal deflection.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>- Reduce vehicle speeds</li> <li>- May reduce collisions</li> <li>- Reduces number of conflict points at an intersection</li> <li>- May reduce traffic noise</li> <li>- Can approve neighborhood appearance with landscaping</li> <li>- Creates a visual obstruction that deters through traffic</li> <li>- Improves bicycle safety</li> </ul>	<ul style="list-style-type: none"> <li>- Can result in loss of on-street parking space</li> <li>- May make it difficult for emergency vehicles, buses, and trucks to turn left</li> <li>- Landscaping maintenance</li> <li>- May require additional right-of-way</li> </ul>

*Other Considerations.* Traffic circles may not actually be round depending on the intersection configuration. A turning analysis must be completed to ensure that the design vehicle can negotiate the traffic circle. To accommodate emergency vehicles, buses, and trucks a mountable concrete apron may be used. Additional street lighting may be required.

### 10.3.9 Textured Crosswalks

Textured crosswalks include the use of pavers, imprinted concrete/asphalt, or other materials to distinguish crosswalks and alert motorists that they are entering a pedestrian-friendly area. They

can be an appropriate traffic calming device on all street classifications with posted speeds up to 45 mph where high pedestrian volumes exist. Textured crosswalks are often used in combination with raised crosswalks, raised intersections, or bulb-outs.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>- Improved street appearance</li> <li>- Alerts motorists to the potential presence of pedestrians, thus increasing pedestrian safety</li> <li>- Improves bicycle safety</li> </ul>	<ul style="list-style-type: none"> <li>- No effect on traffic speed or volume</li> <li>- May produce extra noise when vehicles pass over surface</li> </ul>

### 10.3.10 Speed Tables

Speed tables are raised surfaces on the roadway that are typically 3 inches in height and 12 to 22 feet in length. They can be an appropriate traffic calming device on Residential Links with posted speeds up to 30 mph having volumes less than 3,500 vehicles per day. Speed tables are used to encourage motorists to slow to a safe speed at or below the speed limit within typical residential travel speeds.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>- Reduce vehicle speeds</li> <li>- Relatively inexpensive to install</li> <li>- Improves bicycle safety</li> </ul>	<ul style="list-style-type: none"> <li>- Should be avoided on emergency routes</li> <li>- Drainage must be accommodated</li> <li>- May cause rutting and pavement damage in retrofit situations</li> </ul>

*Other Considerations.* Speed tables should be placed 250 to 600 feet apart, not within 150 feet of an intersection. They should not be used on curves, locations where grades are 8% or greater, or on streets without curbs.

### 10.3.11 Raised Crosswalks

Raised crosswalks are marked and elevated pedestrian areas that are an extension of the sidewalk at intersections or mid-block locations, typically 3 to 6 inches above street level. They can be an appropriate traffic calming device on Residential Links with posted speed limits up to 30 mph having volumes less than 3,500 vehicles per day. Raised crosswalks are used to reduce vehicle speeds and improve pedestrian safety.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>- Reduce vehicle speeds</li> <li>- Improves visibility of pedestrians and bicyclists</li> </ul>	<ul style="list-style-type: none"> <li>- Drainage must be accommodated</li> <li>- May slow emergency vehicles</li> </ul>

*Other Considerations.* Raised crosswalks are most appropriately used in areas with significant pedestrian traffic and are most effective when combined with textured crosswalks and bulb-outs.

Drainage inlets should be installed on the uphill side of the raised crosswalk to address roadway drainage. Raised crosswalks must meet all ADA requirements.

### 10.3.12 Raised Intersections

Raised intersections are flat raised areas covering the entire intersection (including crosswalks) raised 3 to 6 inches above street level. They can be an appropriate traffic calming device on Residential Links and Neighborhood Links, streets having volumes averaging 10,000 vehicles per day, and in commercial areas and business districts with high pedestrian activity. Raised intersections are used to reduce vehicle speeds on all approaches, and to decrease conflicts between vehicles and pedestrians by better demarcating crossing areas and elevating pedestrians above the street.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Improves pedestrian and bicycle safety</li><li>- Reduce vehicle speeds</li><li>- Visual enhancement</li></ul>	<ul style="list-style-type: none"><li>- Expensive to construct</li><li>- Drainage must be accommodated</li><li>- May slow emergency vehicles</li></ul>

*Other Considerations.* Raised intersections the same height as the surrounding curb should use a slight lip or other tactile measure as a warning to the visually impaired. They are often used in conjunction with textured pavement treatments and curb extensions.

### 10.3.12 On-Street Parking

On-street parking creates the appearance of a narrower roadway due to the proximity of parked vehicles and doors opening into traffic. It can be an appropriate traffic calming device on any street of adequate width, commonly found in commercial areas and business districts. On-street parking is used to reduce vehicle speeds on wide streets and provide additional parking spaces for businesses and residents.

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- Reduce vehicle speeds</li><li>- Creates buffer between moving vehicles and pedestrians/bicycles</li></ul>	<ul style="list-style-type: none"><li>- May require additional right-of-way</li><li>- Disrupts traffic flow when vehicles are parking</li><li>- Drainage must be accommodated</li></ul>



## CHAPTER 11 – STREET INSPECTION AND TESTING PROCEDURES

### 11.1 QUALITY ASSURANCE

- A. *City Observation.* A City Public Works Inspector will observe key steps of the construction process to ensure compliance with these standards and the approved plans and specifications. Inspections will include but not be limited to: grading, erosion control, storm sewer installation, structures, non-structural concrete, subgrade, base course, pavement and traffic control devices.
- B. *Inspection.* The engineer of record shall provide inspection services for all work on the approved construction plans. The inspector shall keep a daily log of all construction activities and testing for the project. The logs shall be submitted to the City in PDF format on a weekly basis, unless otherwise approved.

The inspector will be responsible for coordinating the required testing to make sure that the contractor, testing lab, and City representatives are present.

All inspection personnel shall be qualified to read and interpret the plans and specifications and to observe the construction and testing procedures to ensure compliance.

The costs of all inspections and oversight of the construction process shall be paid for by the developer.

- C. *Testing.* During the construction process testing from an independent laboratory is required on all infrastructure installation including soils, concrete, asphalt, and other applicable tests. All testing laboratories engaged in testing for projects shall be pre-qualified by the City Engineer.

These Standards state the minimum requirements for materials sampling, testing, and inspection. All tests shall be made and certified by an approved independent testing laboratory. All costs required and pertaining to testing, the work performed, and materials supplied to verify compliance with these Standards shall be the responsibility of the developer.

The use of the testing laboratory's services does not relieve the developer of the responsibility to furnish the required materials and to perform the required construction in full compliance with these Standards. Passing test results do not constitute acceptance of the work or materials represented by the test. The developer is responsible for quality control of their work.

In various sections of these Standards, specific testing or other data is required by the City to ensure that the intent of these Standards is fulfilled. The costs of such tests or other specific data where required by these Standards or on the approved plans shall be borne by the developer. When evidence indicates that the work performed may not comply with these

Standards or the approved plans, the City Engineer may require additional tests or data beyond that required in these Standards or on the approved plans. The costs of such tests shall be borne by the developer. Should such tests or additional data show a failure to meet these Standards or the approved plans, the developer shall be responsible for all costs associated with repair or replacement of said failure.

- D. *Pavement Design Report.* The pavement design report required in these Standards shall be submitted for review a minimum of 10 working days prior to any paving. Refer to **Chapter 6, Pavement Structure and Materials**.
- E. *Mix Designs.* Pavement mix designs meeting the requirements of these Standards shall be furnished to the City Engineer a minimum of 10 working days prior to intended use of the mix. The mix design shall be reviewed and accepted by the City Engineer prior to use. If a mix design not accepted by the City is used, the City may require removal of all improvements placed with the unaccepted material.
- F. *Test Reports.* Test reports submitted to the City shall include all tests performed on the project. All test reports shall show the location where the test was performed or at which work or batch is represented by the test. Test reports shall include all information specified in the AASHTO, ASTM, or local test procedure used. Prior to acceptance of each phase of a project, all final reports shall be submitted to the City indicating compliance with these Standards.

## 11.2 PAVEMENT

### 11.2.1 Subgrade

The subgrade will be evaluated by the City Public Works Inspector prior to the placement of the next course. Any necessary reworking, compaction, or replacement will be required prior to continuation. The approval is valid only to a time when weather conditions may have changed the condition of the subgrade. Changes in weather such as freezing or precipitation, which may cause changes in the subgrade, will require re-approval of the subgrade.

- A. *Existing Material.* Unsuitable material will be excavated to a depth as directed by the City Engineer or the geotechnical engineer, disposed of, and replaced with fill material meeting the requirements of **Chapter 6, Pavement Structure and Materials**.

If the existing material is acceptable for use as subgrade material, or modified to be suitable, the subgrade will be scarified to a depth of 8 inches and recompacted to conform to the requirements of this chapter.

- B. *Moisture and Density Requirements.* All lifts in embankment areas shall be compacted to not less than 95% of the maximum density. The moisture content of the material shall be within 3% of optimum moisture content before compaction.

Maximum density will be determined using AASHTO T-99 (Standard Proctor). In-place field density measurements shall be determined using AASHTO T-191, T-233 or T-310.

Density requirements do not apply to portions of embankments constructed of materials such as rock that cannot be tested by approved testing methods.

- C. *Final Proof-Rolling.* Final proof rolling of subgrade shall be required prior to taking density tests. Proof rolling shall be done with a fully loaded tandem-axle dump truck.
- D. *Testing Frequency.* Density tests shall be taken every 300 feet for each lane or portion thereof. For streets less than 300 feet in length, a minimum of one test shall be taken for each lane. The Public Works Inspector shall determine the location of the tests.
- E. *Finished Subgrade.* The subgrade shall be shaped for its full width to the required grade and cross section. The finished subgrade shall not vary at any point by more than 1/2 inch from the design elevation.

### **11.2.2 Base Course**

The base course material shall be placed on a completed and approved subgrade or existing base that conforms to the grade and cross section shown on the plans. Base course shall not be placed on frozen subgrade.

- A. *Materials.* Materials for aggregate base courses shall meet the requirements of Section 303 of the ARDOT Standard Specifications (latest edition) for Class 7.
- B. *Moisture and Density Requirements.* All lifts in embankment areas shall be compacted at substantially optimum moisture content, no less than 98% of the maximum density.

Maximum density will be determined using AASHTO T-180 (Modified Proctor). In-place field density measurements shall be determined using AASHTO T-310.

- C. *Thickness.* The compacted base course shall be tested for thickness in the same general location of the density testing. The finished base course shall not vary at any point by more than 1/4 inch from the design thickness.
- D. *Testing Frequency.* Density tests shall be taken every 300 feet for each lane or portion thereof. For streets less than 300 feet in length, a minimum of one test shall be taken for each lane. The Public Works Inspector shall determine the location of the tests.
- E. *Finished Grade.* The base course shall be shaped for its full width to the required grade and cross section. The finished base course shall not vary at any point by more than 1/2-inch from the design elevation.



### 11.2.3 Asphalt Concrete Hot Mix (ACHM)

- A. *Materials.* Materials for Asphalt Concrete Hot Mix base, binder, and surface courses shall meet the requirements of the ARDOT Standard Specifications (latest edition) as referenced in **Section 6.4.4** of these Standards.
- B. *ACHM Testing.* All testing shall be done in accordance with AASHTO or ASTM as designated throughout this chapter.

Testing results for asphalt binder content, VMA, and air voids shall be provided by the contractor upon request by the City Engineer. Prior to the pavement being cored, plant data shall be furnished to the City.

For every development, the pavement shall be cored at 500 foot intervals, alternating lanes for each core. The core locations shall be chosen so as to accurately represent the quality of the asphalt placed in a particular area. For all developments, a minimum of two cores shall be taken regardless of total pavement length for averaging purposes. The City Engineer reserves the right to require additional cores be taken if paving was done under different conditions. For example, if part of a development was paved one week and the other part the next week due to inclement weather or other reasons.

- C. *Density Requirements.* The absolute minimum asphalt density shall be 92% of the maximum theoretical density. No density of less than 92% shall be accepted. Where densities are less than 92%, the paving shall be removed and replaced.

When a deficient density is obtained, two additional cores shall be taken within 10' either side of the deficient core location. If the density of both of these cores is 92% or higher, then no additional cores are necessary. If insufficient density is reported with the new cores, then additional cores shall be taken every 50 feet until the limits of the deficient asphalt have been established.

- D. *Thickness.* Thickness measurements shall be taken for each core sample. The thickness measurement shall be averaged for each run of paving. A run shall be considered a portion of paving constructed in one day on one section of street. Multiple streets paved in one day will result in multiple runs.

Should any deviation be found, additional cores may be taken to define the horizontal limits of the deviation. When measurement of the core is not deficient by more than 1/4 inch from the design thickness, the pavement thickness will be considered to be within acceptable tolerance. When such measurement is deficient more than 1/4 inch from the design thickness, two additional cores at intervals not less than 50 feet will be taken and used to determine the average thickness for that area. When the average thickness of cores is deficient by more than 1/4 inch the City Engineer may require that the area be removed and replaced.

Maximum thickness used for averaging purposes shall be the specified thickness plus 1/2 inch.

The absolute minimum asphalt pavement thickness for any core shall be 3 inches. When pavement design thickness is 3 inches, the minimum thickness for each core that will be accepted shall be the design thickness.

- E. *Surface Tolerance.* The finished surface of the pavement, when tested with a 10-foot straight edge parallel to the centerline or perpendicular across joints, will show variations as measured from the testing face of the straight edge to the surface of the pavement, which shall not exceed 1/8 inch on surface course and 3/16 inch on binder course. Areas that do not meet the required surface accuracy shall be clearly marked and if the City Engineer requires repair, the contractor shall repair the pavement.

#### **11.2.4 Portland Cement Concrete Pavement**

- A. *Materials.* Materials for Portland Cement Concrete Pavement shall meet the requirements of the ARDOT Standard Specifications (latest edition).
- B. *Concrete Testing.* All testing shall be done in accordance with AASHTO or ASTM as designated throughout this chapter.
- C. *Concrete Roadway Inspection.*

- 1. Tolerances.

- a. Where the constructed surface varies from the design cross slope by more than 1/2 inch in 10 feet, the pavement shall be removed and replaced. This technique may not apply in areas with less than 2% cross slope.
- b. Areas showing high spots greater than 1/4 inch as measured with a 10-foot straight edge, but less than 1/2 inch, may be diamond ground to within the specification of 1/4 inch.
- c. The thickness of the pavement shall be determined by average caliper measurement of cores tested. A minimum of 1 core per 500 LF will be taken at random. Should any deviation be found, additional cores may be taken to define the horizontal limits of the deviation. When measurement of the core is not deficient by more than 1/4 inch from the design thickness, the pavement thickness will be considered to be within acceptable tolerance. When such measurement is deficient more than 1/4 inch and not more than 1 inch from the design thickness, two additional cores at intervals not less than 50 ft will be taken and used to determine the average thickness for that area. When the thickness of pavement is deficient by more than 1/4 inch the City Engineer may require that the area be removed and replaced.

- 2. Specifications.

- a. All panels with cracks wider than 1/8 inch shall be repaired by total removal of the panel and replacement as required by the criteria herein.
- b. All panel cracks 1/8 inch and narrower may be routed and sealed at the discretion of the City Engineer.
- c. There shall be no more than one structural crack per panel. Panels with more than one structural crack shall be repaired by total panel removal and replacement.

- d. All sections removed shall have edges parallel to adjacent panel joints.
- e. All saw cuts for removal of slabs shall be full depth cuts.
- f. No panel shall be allowed that has a crack meeting an adjacent panel at an angle more acute than 45 degrees to a finished edge or control joint.
- g. All corner cracks to a panel shall be removed and replaced.
- h. Any vertical differential movement across a crack greater than 3/16 inch shall be repaired by either partial or total panel removal and replacement.
- i. All panels with faulted joints resulting from settlement and/or pumping of the edges shall be repaired by removal and replacement.
- j. All manholes, water valves, range boxes, etc., shall be flush to 1/4 inch below the final surface roadway grade.
- k. When an entire panel is removed, the panel shall be secured to the surrounding panels with 18-inch long 1/2-inch diameter smooth dowel bars placed at 12-inch centers.

**Table 11-1 Materials Testing**

	AASHTO	ASTM	Frequency
<b>Subgrade</b>			
Sampling	T87	D420	Per soil type encountered
Soil Classification	M145	D3282/D2488/D2487	
Standard Proctor	T99/T310	D698	
Modified Proctor	T180/T310	D1557	
Density & Moisture Content	T191/T233/T310	D2922/D3017	1 per 300 LF lane (minimum 1 per lane)
<b>Aggregate Base Course</b>			
Gradation	T27	C136	1 per source
Standard Proctor	T99	D698	
Modified Proctor	T180	D1557	
Density & Moisture Content	T310	D2922/D3017	1 per 300 LF lane (minimum 1 per lane)
<b>Asphalt Concrete Hot Mix</b>			
Sampling	T168	D979	-
Density (Nuclear)	-	D2950	As directed by City
Density (Coring)	T166	D2726	1 per 500 LF paved (minimum 2 total)
<b>Portland Cement Concrete</b>			
Sampling	T141	C172	1 per 100 CY 1 per 1000 LF (curb) (minimum 1 per day)
Mold and Cure	T23	C31	
Cylinder Transport	T23	C31	
Slump	T119	C143	
Air Content	T152	C231	See <b>Table 11-2</b> for Mix Design
Compressive Strength	T22	C39	
Compressive Strength (Coring)	T24	C42	As directed by City

**Table 11-2 Concrete Mix Design**

<b>Concrete Properties</b>	<b>Class 1</b>
28-Day Compressive Strength (psi)	4000
Portland Cement (bags)	6.5
Max. Water/Cement Ratio	0.44
Slump Range (inches)	1-4
Air Entrainment (%)	4-7
Maximum Fly Ash Content (%)	20

## **11.3 STRUCTURAL CONCRETE**

This section delineates the testing, inspection, and related documentation requirements for all structures, including retaining walls, cast-in-place box culverts, and other concrete structures specified within.

### **11.3.1 Concrete Specifications**

Class 1 concrete shall be used in drop inlets, junction boxes, box culverts, bridges, retaining walls, and other structures as specified.

### **11.3.2 Concrete Testing and Inspections**

- A. *Structural and Inspection Requirements.* The structural design engineer or his representative, familiar with assumptions inherent in the structure design, shall inspect the construction in sufficient detail to confirm that the construction meets the requirements of the plans and specifications.
- B. *Foundation Testing and Inspection Requirements.* Unstable foundation material shall be removed to a depth approved by the City Engineer below the finish grade elevation and be replaced with a material and construction procedure as approved by the City.
- C. *Inspection of Forms and False Work.*
1. The forms shall be clean of all dirt, mortar, and all foreign material. Forms that will later be removed shall be thoroughly coated with an approved form oil.
  2. The forms shall be mortar tight and of a quality (in addition to the bracing) to withstand the pressures from deposited concrete.
  3. Unless otherwise specified, forms for exposed surfaces shall be constructed with triangular fillets 3/4 inch at all exterior corners.
- D. *Inspection of Reinforcing Steel.*
1. Material Grade and Size. The material grade and size shall be as specified by the engineer of record on the certified construction plans.
  2. Tying.
    - a. The intersections of all bars shall be tied in accordance with the following requirements: Slab bars shall be tied at every intersection around the periphery and

at spacing according to bar sizes. Unless bar spacing is less than 12" in which case every other intersection shall be tied. However, in no case shall less than 30% of the intersections be tied.

- b. Wall bars should be tied sufficiently to prevent shifting, at least 3 times in any bar length at every third or fourth intersection and at spaces according to bar sizes, staggered:

- 1) #5 and smaller - 3'0"
- 2) #6 to #9 - 4'0" to 5'0"
- 3) #10 to #11 - 6'0" to 8'0"

Upper and lower mats shall be tied or otherwise fastened at 4 foot maximum spacing in each direction. Minimum splice length shall be 24 bar diameters.

- 1) All reinforcing steel shall be supported with steel chair or precast mortar.
- 2) Reinforcing steel shall be clean and free of all foreign material before concrete is placed.
- 3) All clearances shall be in compliance with approved plans and specifications.

#### E. *Concrete Testing and Inspections.*

- 1. Materials Specifications. The class of concrete shall be in accordance with **Table 11-2**. Concrete that does not meet strength in 28 days is subject to removal.
- 2. Concrete Tests.
  - a. All testing shall be done in accordance with AASHTO or ASTM as designated in **Table 11-1**.
  - b. Maximum time allowed between sampling and casting cylinders shall not exceed 15 minutes. Cylinders shall be transported to the laboratory within 24 hours of casting but after the concrete has hardened, (see AASHTO T23 or ASTM C-31).
  - c. The slump test shall be performed in accordance with AASHTO T119. The air test shall be performed in accordance with AASHTO T196 or T121. Slump and air test measurements shall be taken with each cylinder series.
  - d. If compressive strength of cylinders does not meet the specified values, the engineer of record shall recommend and the City Engineer shall approve the necessary mitigation measures needed.

#### F. *Testing Frequency and Related Inspections.*

- 1. Testing frequency shall be in accordance with **Table 11-1**.
- 2. At least 4 compressive strength cylinders shall be taken from the same concrete delivery truck to provide design compliance testing at the laboratory. Two of the four specimens will be tested at 28 days for acceptance and 1 shall be tested at 7 days for information. The fourth cylinder shall only be necessary if the 28-day fails. Additional cylinders may be required, as directed by the City Engineer.

G. *Placement (Inspection).*

1. Concrete placement shall be done in a manner such that the concrete is not segregated or altered before placing. It shall not be allowed to free fall more than 5 feet. Concrete shall be placed in lifts not to exceed 18 inches.
2. A sufficient number of vibrators shall be used to properly consolidate the concrete as required.
3. Weepholes and drainage systems should be installed in the structure at the locations noted on the plans or specifications.
4. Construction joints and expansion joints shall be constructed in conformance with approved plans and specifications.

## 11.4 NON-STRUCTURAL CONCRETE

Non-structural concrete includes curb, gutter, sidewalks, driveways, crosspans and ADA ramps.

### 11.4.1 Concrete Specifications

A. *Materials.* Class 1 concrete shall be used in curb and gutter, sidewalks driveways, crosspans, ADA ramps and miscellaneous concrete items as specified. See **Table 11-2**.

B. *General Specifications.*

1. Humps and Depressions. Any localized humps and/or depressions greater than 1/4 inch (as measured with a 10-foot straight edge) will require removal and replacement of the work in question.
2. Water Ponding. No ponding of water shall greater than 1/4 inch be allowed.
3. Flow Line Depth. Curb and gutter flow line depth shall not vary from adopted standards by more than  $\pm 1/4$  inch, measured vertically from the top of curb to the gutter invert.
4. Cross Slope in Pedestrian Walks. Pedestrian walks shall have a maximum of 2.0% cross slope.
5. Joint Spacing. Contraction and construction joints shall be placed at a maximum spacing of 10 feet in curb and gutter, crosspans, trickle channels, etc. Refer to **Chapter 8, Pedestrian Facilities Design and Criteria**, for sidewalk and trail joint spacing.
6. Heave or Settlement of Sidewalk. Heave or settlement of sidewalk, relative to separate curb pour, greater than 1/4" shall be cause for corrective action.
7. Utility Placement. No utility facilities shall be placed in curb and gutter, sidewalk, crossspan, ADA ramp etc., unless specifically called out on the approved construction plans. This includes meter boxes, manholes, power poles, fire hydrants, water valves, etc.
8. Concrete Cracks.
  - a. At the time of final acceptance, the repair of all cracks will be completed.
  - b. Any section of concrete with longitudinal cracks or with cracks greater than 1/16-inch in width will require complete removal and replacement of that section between joints.

- c. Repair action for hairline cracks may be waived at the discretion of the City Engineer. For the purpose of this section, a hairline crack is one that is reasonably immeasurable and without separation as determined by the City Engineer.
- 9. Concrete Chips and Gouges. Chips and gouges in the concrete will be evaluated on an individual basis. If determined by the City to be unacceptable, then the section shall be removed and replaced.
- 10. Other Imperfections in Concrete Surface. Stress cracking, pop-outs, spalling, rain damage, graffiti, and other surface defects will remain discretionary and will usually require removal and replacement.
- 11. Final Grade.
  - a. A light broom finish shall be required.
  - b. All concrete work shall have the proper finished grade.
  - c. No abrupt changes in grade shall be allowed, i.e., curb returns from new to existing, driveway entrances, etc.

#### **11.4.2 Concrete Testing and Inspections**

##### *A. Concrete Tests.*

- 1. Concrete Tests.
  - a. All testing shall be done in accordance with AASHTO or ASTM as designated in **Table 11-1**.
  - b. Maximum time allowed between sampling and casting cylinders shall not exceed 15 minutes. Cylinders shall be transported to the laboratory within 24 hours of casting but after the concrete has hardened, (see AASHTO T23 or ASTM C-31).
  - c. The slump test shall be performed in accordance with AASHTO T119. The air test shall be performed in accordance with AASHTO T196 or T121. Slump and air test measurements shall be taken with each cylinder series.
  - d. If compressive strength of cylinders does not meet the specified values, the engineer of record shall recommend and the City Engineer shall approve the necessary mitigation measures needed.
- 2. Grade Verification of Gutter Flow Line. After completion of curb and gutter, including curb returns and crosspans, and prior to installation of asphalt, the new installation must be flow-tested with water in the presence of the Public Works Inspector to confirm that there are no areas that hold water. The City Engineer will confirm the results and accept or reject the work. The work will not be accepted if it holds water more than 1/4 inch deep or for a distance greater than 5 feet. Unacceptable work must be removed and replaced.

##### *B. Testing Frequency and Related Inspections.*

- 1. Testing frequency shall be in accordance with **Table 11-1**.
- 2. At least 4 compressive strength cylinders shall be taken from the same concrete delivery truck to provide design compliance testing at the laboratory. Two of the four specimens will be tested at 28 days for acceptance and 1 shall be tested at 7 days for information. The fourth cylinder shall only be necessary if the 28-day fails. Additional cylinders may be required, as directed by the City Engineer.

### *C. Placement (Inspection).*

1. Concrete placement shall be done in a manner such that the concrete is not segregated or altered before placing. It shall not be allowed to free fall more than 5 feet. Concrete shall be placed in lifts not to exceed 18 inches.
2. A sufficient number of vibrators shall be used to properly consolidate the concrete as required.
3. Construction joints and expansion joints shall be constructed in conformance with approved plans and specifications.

## **11.5 MISCELLANEOUS**

### **11.5.1 Traffic Signs, Striping, and Signals**

- A. *Installation/Application.* The City Engineer shall verify that traffic control devices are installed or applied at appropriate locations as shown on the approved signing and striping plans.

All striping layouts will be reviewed by the City Engineer prior to any installation of paint or markings. The City requires a 48-hour notice before any application for inspection or approval.

### **11.5.2 Storm Drain Bury Depth**

All storm drain underneath roadways shall have a minimum of 1 foot of cover from the top of the pipe to the bottom of the pavement structure or meet manufacturer recommendations for cover less than 1 foot. When manufacturer recommendations exceed 1 foot, the minimum cover shall be per the manufacturer recommendation. Storm drain not meeting minimum cover requirements is subject to removal and replacement at the discretion of the City Engineer.





## CHAPTER 12 – ACCEPTANCE/WARRANTY PROCEDURES AND RECORD DRAWINGS

### 12.1 GENERAL

This chapter defines the requirements for approval and acceptance of the improvements installed within the rights-of-way and easements. This chapter also covers warranty procedures and record drawings requirements.

#### 12.1.1 Developer's Process

The developer shall be required to meet the following process prior to the acceptance of the public improvements and maintenance:

- A. *Completion of Work.* Completion of all public improvements required in the approved construction plans and specifications in accordance with these Standards.
- B. *Notification.* Developer notifies the engineer of record of the project completion.
- C. *Inspection – By Engineer of Record.* The engineer of record shall perform a site inspection to determine if the project is substantially complete and ready for a joint inspection as described below. The engineer of record shall generate a punch list of deficiencies and all items on the list shall be corrected before scheduling a joint inspection. The City Engineer may deem some punch list items as incidental and allow the scheduling of the joint inspection.
- D. *Joint Inspection.* A joint inspection will be performed with City representatives, the engineer of record, and the contractor. The public improvements will be inspected for compliance to the plans, standards, and specifications. The engineer of record shall develop a final punch list.
- E. *Correction of Deficiencies.* The contractor or developer shall correct deficiencies. As-built survey may identify additional deficiencies, which shall be addressed as stated below.
- F. *Submittal of Record Drawings.* The engineer of record shall submit signed and sealed record drawings in accordance with the description in **Section 12.5**. One hard copy, one electronic copy in PDF format and one electronic copy in .dwg format shall be submitted to the Engineering Division. A review copy in PDF format will be required for review purposes prior to the final submittal.
- G. *Initial Acceptance.* After the contractor has corrected the deficiencies identified on the punch list and the engineer of record has inspected the site, the City may be contacted by the engineer of record to inspect the corrections. Upon satisfactory completion of the punch list items and

submittal of the public improvement construction costs, warranty guarantee, inspection reports, material testing reports, engineer certifications, final as-built drainage report, record drawings, and any other project requirements per the approval letter, initial acceptance shall be granted.

## **12.2 INITIAL ACCEPTANCE**

### **12.2.1 Recommendation for Initial Acceptance**

After the contractor has completed the punch list, the engineer of record shall inspect and notify the PWI that the work has been complete. The PWI shall recommend granting or denial of initial acceptance based on re-inspection for compliance with the joint inspection punch list.

If new deficiencies are found, either in quality or extent of construction, the developer/contractor shall be notified in writing of these deficiencies. These deficiencies shall be also be corrected, and additional inspections shall be performed until the work is acceptable.

### **12.2.2 Initial Acceptance Letter**

The City Engineer shall issue written notice either granting or withholding initial acceptance within ten working days of the acceptance re-inspection. The initial acceptance letter shall specify the date on which the developer is eligible to request final acceptance.

### **12.2.3 Submittal of Record Drawings**

Prior to issuance of the initial acceptance, record drawings shall be completed, stamped, and signed by the engineer of record and submitted to the City Engineer. The record drawings shall be submitted in paper and electronic form (as specified by the City Engineer). Refer to **Section 12.5** for record drawing requirements.

### **12.2.4 Submittal of Warranty Guarantee**

Prior to issuance of the initial acceptance, a warranty guarantee in the amount of 25% of all public improvements associated with the project shall be submitted to the City. The following items shall be included on the guarantee:

1. Identify guarantee as for MAINTENANCE.
2. Name of project.
3. Project description & location (address, subdivision, if applicable).
4. Description of items guaranteed & total construction cost of public infrastructure.
5. Name the City of Fayetteville as Obligee or Dual Obligee.
6. Contact information for the provider of guarantee – (who purchased the guarantee).

## **12.3 WARRANTY PERIOD**

### **12.3.1 Definition of the Warranty Period**

The warranty period for all public improvements shall be two years. During the warranty period, the developer/contractor shall guarantee the work to be free of any damage or defects in workmanship and material. The warranty period shall start the date that initial acceptance occurs. The warranty period shall end with the final acceptance of the public improvements. If deficiencies are noted during the City's warranty inspection, the developer/contractor shall repair the deficiencies.

### **12.3.2 The Warranty Guarantee**

A warranty guarantee shall be required for the entire warranty period. The warranty guarantee shall be in the form of a letter of credit, maintenance bond, or cash deposit in accordance with Chapter 158 of the UDC. The guarantee shall be in the amount of 25% of the total value of the public improvements for the project, including water, sewer, drainage, sidewalk, etc.

### **12.3.3 Time Frames for Completing Repair**

At any time before the completion of the warranty period, the City may notify the developer of needed repairs. If repair areas are considered to be an imminent danger to the public health, safety, and welfare, the contractor shall act within 24 hours to complete the repair. If the work is not considered a safety issue, the developer has 10 working days to schedule the work, and 30 calendar days to complete the work. Extensions of time may be considered when necessary due to weather constraints.

### **12.3.4 Failure to Complete Repair**

If the developer has not completed the warranty repairs in the time frame specified, the City may choose to affect the necessary repairs. The City will either invoice the developer for all costs for the related work plus a \$500.00 administrative fee or it will collect from the guarantee.

### **12.3.5 Responsibility for Maintenance**

The developer is responsible for maintaining all public improvements throughout the warranty period.

## **12.4 FINAL ACCEPTANCE**

### **12.4.1 Request for Final Inspection**

Within 45 days of the end of the warranty period, the developer shall request a final inspection and acceptance, in writing, to the City Engineer.

#### **12.4.2 Preparation for Inspection**

The developer is responsible for sweeping and cleaning public improvements for inspection. If the developer does not provide a clean site, including having curb flow lines clear of debris and dirt, then the inspection may be postponed until the site is sufficiently clean.

#### **12.4.3 Inspection and Punch List**

The City Engineer shall inspect all public improvements related to the project. If applicable, a written final punch list shall be compiled listing any necessary repair or replacement of materials or workmanship. The punch list shall be sent to the developer and contractor.

#### **12.4.4 Damage Caused by City Crews**

If the developer can demonstrate that the City maintenance crews caused damage to certain improvements, the developer will not be held responsible for the replacement.

#### **12.4.5 Re-Inspection**

If repair or replacement of public improvements is required, the developer/contractor shall complete repair or replacement within 30 calendar days of receipt of the final punch list, unless otherwise agreed upon. Upon completion, the developer/contractor shall contact the City Engineer for a re-inspection.

#### **12.4.6 Release from Responsibility**

Once all repairs or replacements are satisfactorily completed, the developer/contractor shall receive written notice from the City that all public improvements are complete and the City releases the developer/contractor from responsibility for all future maintenance and repairs for the public improvements on this project.

#### **12.4.7 Release of Warranty Guarantee**

Upon the satisfactory completion of the final punch list the City will release the warranty guarantee.

#### **12.4.8 Failure to Complete Repair**

If the developer has not completed the warranty repairs in the time frame specified, the City may choose to affect the necessary repairs. The City will either invoice the developer for all costs for the related work plus a \$500.00 administrative fee or it will collect from the guarantee.

## 12.5 RECORD DRAWINGS

### 12.5.1 Updating Plans with Design Changes

The construction plans shall be updated with all design changes that occurred after plan approval. The final installation of all public infrastructure shall be surveyed prior to submittal of record drawings. The professional surveyor shall provide stamped drawings specifically identifying the limits of as-built survey performed. Field changes not previously approved by City Engineer, discovered during the as-built process are at the contractor's risk and may not be accepted.

- A. *Street*. Street record drawings shall identify the actual pavement type and grade or mix type used; if the subgrade was treated or additional undercut; location of any under drains added; and document all changes to widths and lengths for streets, sidewalks, and curbs.
  - 1. At 100 ft interval or as necessary to reflect actual placement of roadway, the back of curb shall be located in reference to the existing/or proposed right-of- way.
    - a. Deviations more than 6 inches shall be identified on the plans and included in a transmittal letter to the City Engineer.
    - b. Additional right-of-way dedication or reconstruction may be required.
  - 2. At grade breaks, no more than 500 ft intervals, profile and cross slope verification will be performed and shown on plans.
    - a. Deviations more than 0.5% profile or cross slope shall be identified on the plans and included in a transmittal letter to the City Engineer.
    - b. Geometric K values no longer meeting city criteria shall be evaluated.
    - c. Additional calculations or reconstruction may be required.
  - 3. Record drawings shall identify all signage and striping locations as actually placed in the project.
- B. *Drainage*. Record storm drainage drawings shall document the location, size, rim elevation and invert elevation of all pipes (including pipe class), inlets, riprap, headwalls, detention pond volumes, swale cross-sections and all other storm drainage infrastructure shown on the construction plans, including those improvements located in areas outside of the public right-of-way, if appropriate. Record drawings shall also show all pipe and/or drainage way/swale grade percentages.
  - 1. More than 2-foot deviation of design alignment shall require new easement dedication or adjustment of the storm drain.
  - 2. More than 0.1-foot deviation of design elevation shall require revisions in the drainage report. Any field changes, that no longer meets drainage design criteria, shall be removed and replaced.
  - 3. Any field changes, that creates an adverse slope, shall be removed and replaced to original design.
  - 4. Change in specified material shall require revisions to the drainage report.

- C. *Utilities.* Water and sanitary sewer record drawings shall document the location, size, invert elevations and rim elevation of all pipes and manholes, location of all valves, changes in direction, encasements, meters, services, hydrants, etc.
1. Professional surveyor shall provide stamp drawings specifically identifying the limits of as-built survey performed.
  2. More than 2-foot deviation of design alignment shall require new easement dedication or adjustment of the utility drain.
  3. See Water & Sewer Specifications for additional criteria.
- D. *Other.* Record drawings shall verify other information as specifically requested by the City Engineer or outlined in the project's conditional approval letter.

### **12.5.2 Minor Design Changes**

Minor changes are not required to be included on the record drawings. Minor changes include incorrect references and grade changes less than 0.1 foot.

### **12.5.3 Submittal of Plans**

An Arkansas licensed professional engineer shall update and stamp the record drawing construction plans. The engineer of record shall submit the plans to the City and receive approval prior to the initial acceptance.

The engineer of record must also certify that the streets, sidewalk, storm sewer, water, fire line, and sewer lines, etc., were installed per approved plans and City of Fayetteville requirements.

### **12.5.4 Form of Submittal**

All record documents shall be submitted in the following formats as required by the City Engineer:

1. Record drawings shall be submitted in electronic format as specified by the City Engineer, in PDF format, in .dwg format and one full size paper copy.
2. Warranty guarantee shall be original documents.
3. All other documents shall be submitted in electronic PDF format.
  - a. Public improvement construction costs;
  - b. Inspection reports;
  - c. Submittals & material testing reports;
  - d. Engineer certifications;
  - e. Final as-built drainage report.

## 151.01 - Definitions

For the purpose of Title XV, Unified Development Code, the following definitions shall apply to the divider sections, chapters, sections or subsections, unless the context clearly indicates or requires a different meaning.

### **A**

*Abbreviated tree preservation plan* (Tree preservation and protection.) A shorter, less formal tree preservation plan required of applicants seeking building, grading, or parking lot permits, but who are not subject to the requirements for large scale developments or subdivisions.

*Accent lighting* (outdoor lighting) means any directional lighting which emphasizes a particular object or draws attention to a particular area.

*Accessory community structures* (manufactured homes and parks) (manufactured homes and parks opened or expanded after 4-20-72). A structure or a portion of a structure for commercial use that is located in a manufactured home park and which is intended solely for the convenience of the residents or occupants of the manufactured home park.

*Accessory dwelling unit.* A separate, complete housekeeping unit with a separate entrance, kitchen, sleeping area, and full bathroom facilities, which is an attached or detached extension to an existing single-family structure.

*Accessory ground mounted solar energy system:* A solar energy system that is accessory to the principal use of the property and is structurally mounted to the ground. For the purposes of zoning, accessory ground mounted solar energy systems shall be considered accessory structures.

*Accessory roof mounted solar energy system:* A solar energy system that is accessory to the principal use of the property and is structurally mounted to the roof of a building or structure. For the purposes of zoning, accessory roof mounted solar energy systems shall be considered accessory structures.

*Accessory structures* (manufactured homes and parks) (manufactured homes and parks opened or expanded, 4-20-72). Any structural addition to the manufactured home such as awnings, cabanas, carports, Florida rooms, porches, patio covers, and similar additions.

*Accessory use or structure.* A use or structure on the same lot with, of a nature and size of 50% or less, and customarily incidental and subordinate to, the principal use or structure.

*Act* (wireless telecommunications facilities). The Communications Act of 1934, as it has been amended from time to time, including the Telecommunications Act of 1996, shall include any future amendments.

*Active open space* (development). An area intended for rigorous activity such as tennis, baseball, badminton, and other games requiring physical exertion.

*Administrative determination* (tree preservation and protection). Final action by the landscape administrator to either approve, conditionally approve or disapprove a tree preservation plan. Administrative determinations apply only to those projects which do not require Planning Commission approval.

*Adult arcade (zoning).* Any place to which the public is permitted or invited wherein coin-operated or slug-operated or electronically, electrically, or mechanically controlled image producing devices are maintained to show images to five (5) or fewer viewers at one time, and where the images so displayed are distinguished or characterized by the depicting or describing of "specified sexual activities" or "specified anatomical area."

*Adult bookstore or adult video store* (zoning). A commercial establishment whose principal business purpose is to offer for sale or rental for any form of consideration any one (1) or more of the following:

books, magazines, periodicals or other printed matter, or photographs, films, motion pictures, video cassettes, or video reproductions, slides or other visual representations which depict or describe "specified sexual activities" or "specified anatomical areas."

*Adult cabaret* (zoning). A nightclub, bar, restaurant, or similar commercial establishment which regularly features:

- (A) Persons who appear in a state of nudity; or
- (B) Live performances which are characterized by the exposing of "specified sexual activities" or "specified anatomical areas;" or
- (C) Films, motion pictures, video cassettes, slides, or other photographic reproductions which are characterized by the depiction of "specified sexual activities" or "specified anatomical areas."

*Adult motion picture theater* (zoning). A commercial establishment where, for any form of consideration, films, motion pictures, video cassettes, slides, or similar photographic reproductions are regularly shown, excluding those which are characterized by the exposure of "specified sexual activities" or "specified anatomical areas."

*Adult theaters* (zoning). A theater, concert hall, auditorium, or similar commercial establishment, which regularly features persons who appear in a state of nudity or live performances which are characterized by the exposure of "specified sexual activities" or "specified anatomical areas."

*Airport* (Airport Zone). Fayetteville Airport (Drake Field).

*Airport elevation* (Airport Zone). 1,251 feet above mean sea level.

*Alley* (development). A minor public way dedicated to public use for utility easements and vehicle access to the back or the side of properties abutting a street.

*Alternative tower structure* (wireless tele-communications facilities). Man-made trees, clock towers, bell steeples, light poles, and similar alternative design mounting structures that camouflage or conceal the presence of antennas or towers and are built for the express purpose of serving as a tower or for locating antennas.

*Analysis report* (tree preservation and protection). A report, which among other things, sets forth any alternative designs the applicant considered in arriving at the proposed design.

*Animal daycare* (zoning). A facility that provides day or nighttime supervision for three (3) or more animals. Animals are kept inside the facility, except animals are permitted to be walked on a leash outside. Facilities that contain outdoor dog runs, play areas, or kennels are not considered an animal daycare.

*Antenna* (wireless telecommunications facilities). Any structure or device used to collect or radiate electromagnetic waves, including both directional antennas, such as panels, microwave dishes and satellite dishes and omni-directional antennas, such as whips but not including satellite earth stations.

*Applicant* (tree preservation and protection). Any person, party, partnership, corporation or other business entity seeking the city's approval of a proposed tree preservation plan.

*Approach surface* (Airport Zone). A surface longitudinally centered on the extended runway centerline, extending outward and upward from the end of the primary surface and at the same slope as the approach zone height limitation slope. In a plane the perimeter of the approach surface coincides with the perimeter of the approach.

*Approach, transitional, horizontal and conical zones* (Airport Zone). Those zones as set forth in §165.01.

*Approval* (physical alteration of land). A written authorization by the City Engineer.



*Appurtenances* (DDOD). Architectural features consisting of awnings, marquees, porches, stoops, balconies, turrets, cupolas, balconies, colonnades, and arcades.

*Arcade* (DDOD). A colonnade composed of counterthrusting arches.

*Area sign* (signs). A sign to identify a common area containing a group of structures, or a single structure on a minimum site of 5 acres, such as a residential subdivision, residential office, commercial or industrial subdivision, apartment complex, manufactured home park, or shopping center located at the entrance or entrances of the area, and consisting of fence or wall or archway with letters or symbols affixed thereto or other supporting structure as approved by the zoning and development administrator.

*Articulation* (development). The architectural composition or combined treatment of elements and parts of the edges, corners, and surface of a building.

*Artist studio* (zoning). Any building or place of business where Artists use the premises for the creation, sale and/or display of art or craft work.

*As graded* (physical alteration of land). The surface condition on completion of grading.

*Aspect* (landscape regulations). The angle of exposure from sunlight as it relates to the slope of the earth, primarily south and west in this region.

*Auto Salvage* (zoning). The dismantling or wrecking of motor vehicles or trailers, or the storage, keeping, selling, buying, or dumping of any wrecked, scrapped, ruined, dismantled, disabled, or inoperable motor vehicle or motor vehicle part.

*Awning* (DDOD). A flexible roof-like cover that extends out from an exterior wall and shields a window, doorway, sidewalk, or other space below from the elements.

## **B**

*Balcony* (DDOD). An open habitable portion of an upper floor extending beyond a building's exterior wall that is not supported from below by vertical columns or piers but is instead supported by either a cantilever or brackets.

*Baluster* (DDOD). A short vertical member used to support a railing or coping.

*Balustrade* (DDOD). A railing together with its supporting balusters or posts, often used at the front of a parapet.

*Banner* (signs). Any sign printed or displayed upon cloth or other flexible material, with or without frames.

*Barrel roof* (DDOD). Like a covered wagon, or inverted ship; barrel vault is an arch of uniform cross-section.

*Base density* (tree preservation and protection). The number of trees an applicant must plant based upon the quality and number of the trees proposed to be removed per acre.

*Base flood* (stormwater management, drainage and erosion control). The flood having a 1% chance of being equaled or exceeded in any given year, also referred to as the one hundred (100) year storm event.

*Beacon* (signs.) A stationary or revolving light which flashes or projects illumination, single color or multi-colored, in any manner which is intended to attract or divert attention; except, however, this term is not intended to include any kind of lighting device which is required or necessary under the safety regulations described by the Federal Aviation Agency or similar agencies.

*Bed and breakfast facility* (zoning). A permanently owner occupied private home with a maximum of five (5) guest rooms furnishing temporary lodging and meals to overnight and event guests.

*Block.* A combination of building lots, the perimeter of which abuts streets.

*Board of Adjustment (Airport Zone).* The Board of Adjustment established by Chapter 33.

*Bona fide agricultural purpose* (tree preservation and protection). The aim or goal of facilitating the ongoing commercial pursuit of farming, dairying, pasturage, horticulture, viticulture, or the keeping or raising of livestock or poultry, not otherwise prohibited by city ordinance.

*Build-to line.* A build-to line identifies the precise horizontal distance from a street right-of-way that the building shall be built to, in order to create a uniform line of buildings along the street.

*Build-to zone.* A build-to zone is a range of allowable distances from a street right-of-way in which a building or structure shall be constructed in order to create a moderately uniform line of buildings along the street.

*Buildable area* (zoning). The portion of a lot remaining after required yards have been reserved.

*Building frontage:* The vertical side of a building which faces the primary space or street and is built to the build-to line.

*Building official* (building regulations). A city building inspector.

*Building permit* (manufactured homes and parks) (manufactured homes and parks opened or expanded after 4-20-72). A written permit issued by the enforcement officer permitting construction, erection, alternation, remodeling, or repair of a manufactured home park.

## C

*Caliper* (parking and loading). A measurement of general tree size taken at a point located 6 inches above natural ground or root ball surface.

*Caliper* (landscape regulations). A measurement of general tree size taken at a point located 6 inches above natural ground or root ball surface.

*Canopied slopes* (tree preservation and protection). Any land with a slope of 15% or greater containing trees, woody shrubs and herbaceous plants that serve the function of sustaining the structural integrity of the soil, thus reducing the likelihood of erosion, slide or slump.

*Canopy* (tree preservation and protection). The combined crowns of all trees on a tract of land.

*Carport.* An automobile shelter having one (1) or more sides open.

*Center for collecting recyclable materials* (zoning). A facility that is not a salvage yard and in which recoverable resources, such as paper products, glass, aluminum, metal cans, and other products are processed for recycling. Processing may include the preparation of materials for efficient shipment by such means as baling, compacting, flattening, grinding, crushing and mechanical sorting.

*Chief Administrator* (building regulations). The Mayor of the City of Fayetteville.

*Chief Appointing Authority* (building regulations). The City Council.

*Chief building official* (building regulations). Building Safety Division Director.

*Cistern* (stormwater). Roof water management devices that provide retention storage volume in above or underground storage tanks. They are typically used for water supply. Cisterns are generally larger than rain barrels, with some underground cisterns having the capacity of 10,000 gallons. On-lot storage with later reuse of stormwater also provides an opportunity for water conservation and the possibility of reducing water utility costs.

*City* (stormwater management, drainage and erosion control). The City of Fayetteville, including staff and elected officials, or designee.

*City Engineer* (stormwater drainage and erosion control). The City Engineer or his appointed representatives, including assigned staff engineers, technicians and inspectors.

*City of Fayetteville Landscape Manual* (tree preservation and protection). A document having detailed instructions for preparing tree preservation plans and standards and specifications for tree protection, planting, maintenance and design.

*City official* (streets and sidewalks). The Mayor (or other official designated by the Mayor, and authorized to issue the permits granted thereunder) of the city.

*City Planning Commission* (manufactured homes and parks) (manufactured homes and parks opened or expanded after 4-20-72). That commission created for the city by Chapter 33.

*Civic building*. Structure used primarily for public education, cultural performances, gatherings and displays administered by non-profit cultural, educational, governmental, and religious organizations.

*Club or lodge* (zoning). A building or portion of a building used by an association for the promotion of some common objective excepting clubs the chief activity of which is a service customarily carried on as a business.

*Coffee roasting facility*. A facility in which unprocessed green coffee may be sorted, roasted and processed or packaged for use and consumption.

*Collector street* ~~(streets and sidewalks). A street which in addition to serving abutting properties, intercepts minor streets, connects with community facilities and carries neighborhood traffic to the major arterial street system. Equivalent to a Neighborhood Link in the 2040 Master Street Plan.~~

*Co-location* (wireless telecommunications facilities). Locating wireless communications equipment for more than one (1) provider at a single communications facility, on a building, or on an alternative tower structure.

*Colonnade* (DDOD). A roofed structure, extending over the sidewalk, open to the street except for supporting columns or piers.

*Column* (DDOD). A supporting pillar usually consisting of a round shaft, a capital, and a base.

*Commercial development* (tree preservation and protection). Any development in an R-O, Commercial or Industrial Zone and any conditional use in any other zone which permits activities usually conducted within an R-O, Commercial or Industrial Zone.

*Commercial driveway* (streets and sidewalks). An entrance on public property or exit from any commercial, business, or public establishment adjacent to a public street or highway.

*Commercial tree pruner/service* (tree preservation or protection). A person who performs work on trees for profit.

*Common open space* (development). Land within or related to a development, not individually owned or dedicated for public use, which is reserved for the exclusive use or enjoyment of the residents or occupants of the development and their guests.

*Community recycling drop-off facility* (zoning). A facility designed to be a collection point where only pre-sorted recyclable materials are dropped off and temporarily stored prior to delivery to a center for collecting recyclable materials for processing. A community recycling drop-off facility is intended for household or consumer use. This facility can be temporary and/or mobile or a permanent installation that is the principal use.

*Community sewage system* (development). Any non-publicly owned system serving two (2) or more individual houses, housing units, apartments or other occupied structures for the collection and disposal of domestic, non-residential or industrial wastewater of a liquid nature, including various devices for the collection, conveyance and treatment of the treated wastewater effluent and the monitoring of the affected groundwater quality and the management of the associated solid waste by-products (septage and sludge). (Also known as decentralized sewer systems)

*Community storage structure* (manufactured homes and parks). A structure located in a manufactured home park for the convenience of the residents to provide storage space for often used outdoor equipment, furniture, tools and other items which cannot be conveniently stored in the typical manufactured home.

*Compact automobile* (parking and loading). Any vehicle less than 6 feet wide and 15 feet long.

*Compaction* (physical alteration of land). *The densification of a fill by mechanical means.*

*Company flag* (Signs). A flag identifying a business or organization by use of the name of the business or organization where the flag is displayed. The flag must have the same proportional dimensions as the United States Flag, be installed upon standard flag pole allowing flags to be raised and lowered, and be flown only in conjunction with either the United States Flag or Arkansas State Flag or both. The company flag must be flown lower than the government flag, cannot exceed the size of the government flag and in no case can exceed 6 feet in length.

*Conditional use* (zoning). A use permitted in certain zoning districts subject to certain conditions imposed by the Planning Commission after review of development plat.

*Condominium* (zoning). Two (2) or more single-family dwelling units constructed in a series of attached units and submitted to a horizontal property regime under A.C.A. §8-13-102 et seq.

*Conical surface* (Airport Zone). A surface extending outward and upward from the periphery of the horizontal surface at a slope of twenty-to-one (20:1) for a horizontal distance of 4,000 feet.

*Connection* (water and wastewater impact fees). The physical tie-in of a private water or wastewater service system to the City of Fayetteville's public water or wastewater system. For the purposes of the impact fee ordinance, the physical tie-in shall occur upon the installation of a water meter.

*Conservation easement* (tree preservation and protection). A formal, legally binding agreement between parties, usually a landowner and a private or public entity, providing for the preservation of land in its natural state.

*Construction permit* (stormwater management, drainage and erosion control). Stormwater management, drainage and erosion control permit issued by the city to an entity with the legal ability to construct the stormwater management system in accordance with the approved system design and permit conditions.

*Construction* (stormwater management, drainage and erosion control). Any on-site activity that would result in the creation of a new stormwater management system, including the building, assembling, expansion modification, or alteration of the existing contours of the property; the erection of buildings or other structures, any part thereof; or land clearing.

*Contiguous woodlands* (tree preservation and protection). A portion of canopy existing on the site of proposed development, which is a part of a larger, unbroken forest, whether or not it extends onto adjacent lots.

*Contour intervals* (development). Topographic map lines connecting points of equal elevations.

*Controlled access highway* (signs). Any state or federal numbered highway designated by ordinance as a controlled access highway by the City Council.

*Cornice* (DDOD). A projecting horizontal decorative molding along the top of a wall or building.

*Cribbing* (physical alteration of land). A framework of bars for support or strengthening.

*Cupola* (DDOD). A domelike structure surmounting a roof or dome, often used as a lookout or to admit light and air.

*Curb radius* The curved edge of street paving at an intersection, measured at the inside travel edge of the travel lane.

*Cut* (physical alteration of land). See "excavation."

## **D**

*Dance hall* (zoning). Any building, premises, pavilion, or place of business wherein dancing is permitted, conducted or engaged in by the public in general, including but not limited to private clubs as defined by ordinance and/or the laws of the State of Arkansas, either for profit or not.

*Dead-end street* (development). A street having one end open to traffic and being permanently terminated by a vehicular turnaround.

*Deciduous trees* (physical alteration of land). Trees that shed their leaves annually. Small deciduous trees are no more than 40 feet tall at maturity while large deciduous trees exceed 40 feet in height at maturity.

*Dedication* (development). Land and improvements offered to the city, county, or state and accepted by them for public use, control, and maintenance.

*Department of Law* (building regulations). The City Attorney's offices.

*Dependent manufactured home* (manufactured homes and parks) (manufactured homes and parks opened or expanded, 4-20-72). A manufactured home which does not have a flush toilet and bath or shower.

*Detention* (stormwater management, drainage and erosion control). The collection and temporary storage of stormwater with subsequent gradual release of the stormwater.

*Develop* (physical alteration of land). Permanently altering land by subjecting it to grading, removal of vegetation, or construction such as but not limited to buildings, parking lots, streets, and sidewalks.

*Developer* (stormwater management, drainage and erosion control). Any person(s), parties, partnerships, or corporations, private or public, engaging in activities described as development.

*Developer* (development). A person, firm or corporation undertaking to develop a subdivision or large scale development as set forth in the development regulations.

*Development* (stormwater management, drainage and erosion control). To make a site or area available for use by physical alteration. Development includes, but is not limited to, providing access to a site, clearing vegetation; grading; earth moving; providing utilities and other services such as parking facilities; stormwater management and erosion control systems; and sewage disposal systems; altering landforms; or construction of a structure on the land. Development shall also mean any of the following:

- (A) Construction, installation, alteration, demolition, or removal of a structure, impervious surface, or stormwater management system, or
- (B) Clearing, scraping, grubbing, or otherwise removing or killing the vegetation of a site; or
- (C) Adding, removing, exposing, excavating, leveling, grading, digging, dumping, or otherwise disturbing the soil or rock of a site in a manner contrary to the requirements of the stormwater management, drainage and erosion control regulations.

*Development* (streets and sidewalks). Shall include, but shall not be limited to, the construction of a new improvement, the construction of an addition to an existing improvement, or a parceling which results in the need for access and utilities.

*Development plan* (development). A drawing showing all proposed improvements to a piece of property such as streets, parking lots, buildings, drives, signs, utilities, drainage, grading and planting by size and location.

*Development site* (physical alteration of land). That portion of any lot or parcel subjected to grading, removal of vegetation, or construction such as, but not limited to, buildings, parking lots, streets and sidewalks.

*Diameter breast height (DBH)* (tree preservation and protection). The diameter of a tree measured at a point 4½ feet above the ground. If a tree splits into multi-trunks, the trunk is measured at its narrowest point below the split.

*Directional sign* (signs). A sign of a noncommercial nature which directs the reader to the location of public or educational institutions, or to the location of historical structures or areas, or the location of public parks or buildings.

*Display surface area* (signs). The net geometric area enclosed by the display surface of the sign including the outer extremities of all letters, characters and delineations; provided, however, "display surface area" shall not include the structural supports for free standing signs; provided further, that only one (1) face of a double-faced sign shall be considered in determining the display surface area.

*District or zoning district* (signs). A section or sections of the incorporated area of the city for which the then effective zoning ordinance governing the use of buildings and land are uniform for each class of use permitted therein. References to individual zoning districts contained herein shall refer to the zoning district established by the City Council in Chapter 160.

*Disturb* (physical alteration of land). To alter the natural state.

*Domed roof* (DDOD). A vaulted roof having a circular, polygonal, or elliptical base and a generally hemispherical or semispherical shape.

*Dormitory* (zoning). A building or group of buildings designed or altered for the purpose of accommodating students or members of religious orders with sleeping quarters, with or without communal kitchen facilities, and administered by educational or religious institutions.

*Drainage area* (stormwater management, drainage and erosion control). The watershed area contributing surface and stormwater runoff to a stormwater management system.

*Dripline* (tree preservation and protection). An imaginary vertical line that extends downward from the outermost tips of the tree branches to the ground.

*Drive-in/drive-through restaurant* (zoning). Any place or premises used for sale, dispensing, or serving of food, refreshments, or beverages in automobiles, including those establishments where customers may serve themselves and may eat or drink the food, refreshments or beverages on the premises.

*Dwelling, live/work*. A dwelling unit within which an at-home business is encouraged. Businesses are limited to a maximum of two (2) employees that do not dwell in the principal or accessory dwelling unit.

*Dwelling, manufactured home* (zoning). A detached residential dwelling unit designated for transportation on streets or highways on its own wheels or on flatbed or other trailers, and arriving at the site where it is to be occupied as a dwelling complete and ready for occupancy except for minor and incidental unpacking and assembly operations, location on jacks or other temporary or permanent foundation, connection to utilities, and the like. A travel trailer is not to be considered as a manufactured home.

*Dwelling, multi-family (zoning).* A residential building designed for or occupied by three (3) or more families, with the number of families in residence not exceeding the number of dwelling units provided.

*Dwelling, single-family attached/townhouse (zoning).* Two (2) or more dwelling units located on individual lots but joined along a single lot line. All such dwellings must be totally separated from other dwellings by a fire-resistant common wall.

*Dwelling, single-family (zoning).* A detached residential dwelling unit other than a manufactured home, designed for and occupied by one (1) family only.

*Dwelling, two-family/duplex (zoning).* A detached residential building containing two (2) dwelling units, designed for occupancy by not more than two (2) families and located on one (1) lot of record.

*Dwelling unit (zoning).* One (1) room, or rooms connected together, constituting a separate, independent housekeeping establishment for owner occupancy, or rental or lease on a weekly, monthly, or longer basis, and physically separated from any other rooms or dwelling units which may be in the same structure, and containing independent cooking and sleeping facilities.

## **E**

*Easement (development).* A grant by the property owner to the public, a corporation or persons, for the use of a strip of land for specific purposes.

*EIFS (exterior insulating and finish systems) (DDOD).* A cement based synthetic material used as an alternative to natural stucco.

*Electronic graphic display screen (signs).* A sign or portion of a sign that displays electronic images, graphics or pictures, defined by matrix elements using different combinations of light emitting diodes (LED), fiber optics, light bulbs, or other illumination devices. Electronic graphic displays include television screens, plasma screens, digital screens, flat screens, LED screens, LCD screens, video boards, holographic displays, or other technologies of a similar nature.

*Electronic message board (signs).* A changeable copy sign that displays electronic, non-pictorial, text information in which alphanumeric characters and punctuation marks are defined by illumination devices, such as, but not limited to, light emitting diodes (LED), fiber optics, light bulbs, and liquid crystal display (LCD).

*Enforcement officer (manufactured homes and parks) (manufactured homes and parks opened or expanded, 4-20-72).* The Chief Building Inspector of the city, or his/her duly authorized representative.

*Engineer (stormwater management, drainage and erosion control).* A professional engineer registered in Arkansas, or other person exempted pursuant to the provisions of the Arkansas Code Annotated, who is competent in the fields of hydrology and stormwater management.

*Erect (signs).* To build, construct, attach, hang, place, suspend, or affix, and shall also include the painting of wall signs.

*Erosion (stormwater management, drainage and erosion control).* The removal of soil particles by the action of water, wind, ice or other geological agents.

*Evergreen (physical alteration of land).* A plant that retains leaves or needles year-round.

*Excavation (physical alteration of land).* The mechanical removal of earth material from water or land.

## **F**

*FAA (Airport Zone).* The Federal Aviation Administration.

*Facilities emitting odors* (zoning regulations). Any function that involves a process which emits or has the potential for emitting odor.

*Facilities handling explosives* (zoning). Any function that involves a process dealing with a product with explosive potential.

*Fall zone* (wireless communications facilities). The area within which a tower or antenna might cause damage to persons or property should the tower or antenna be knocked down, blown over or fall on its own.

*Family* (zoning). In R-A, Neighborhood Conservation and all single family districts including single family Planned Zoning Districts, a "family" is no more than three (3) persons unless all are related and occupy the dwelling as a single housekeeping unit. In all other zoning districts where residential uses are permitted, a "family" is no more than four (4) persons unless all are related and occupy the dwelling as a single housekeeping unit with the exception that the City Council may permit a definition of "family" as no more than five (5) persons unless all are related and occupy the dwelling as a single housekeeping unit in a specific Planned Zoning District with proper safeguards for the surrounding neighborhood such as applying the parking requirements of §172.11 (even though this is a multifamily PZD), requiring that each five (5) person unit must be placed within a freestanding structure of not more than two (2) stories and be buffered from other residential districts outside the Planned Zoning District. The City Council shall consider whether an applicant's PZD with one (1) or more five (5) unrelated person structures would cause unreasonable traffic into an adjoining residential neighborhood before approving any such PZD. Persons are "related" for purposes of this definition if they are related by blood, marriage, adoption, guardianship, or other duly-authorized custodial relationship. The definition of "family" does not include fraternities, sororities, clubs or institutional groups.

*FCC* (wireless telecommunications facilities). The Federal Communications Commission.

*FEMA* (physical alteration of land). Federal Emergency Management Agency.

*Fenestration* (development) An exterior opening in the surface of a structure, such as a window, door, clerestory window, curtain wall, etc.

*Fill* (physical alteration of land). A deposit of earth material placed by artificial means.

*First or ground floor* (DDOD). The finished floor facing a street right-of-way.

*Flashing sign* (signs). An illuminated sign on which artificial or reflected lights is not maintained stationary and constant in intensity and color at all times when in use.

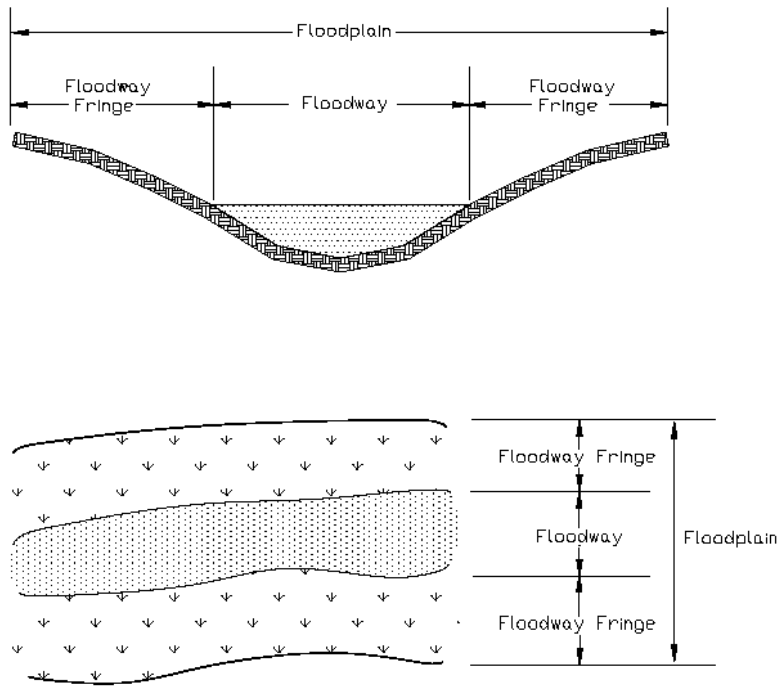
*Flood or flooding* (flood damage prevention). A general and temporary condition or partial or complete inundation of normally dry land areas from the overflow of flood waters, or the unusual and rapid accumulation or run-off of surface water from any source.

*Flood Boundary and Floodway Map*. (flood damage prevention). The official map on which the Federal Insurance Administration has delineated both the areas of flood hazards and the floodway.

*Flood Insurance Rate Map (FIRM)* (flood damage prevention). The official map on which the Federal Management Agency or Federal Insurance Administration has delineated both the areas of special flood hazards and the floodway.

*Flood Insurance Study (flood damage prevention)*. The official report provided by the Federal Insurance Administration that includes flood profiles, the FIRM, the Flood Boundary and Floodway Map, and the water surface elevation of the base flood.





**Floodplain** (stormwater management, drainage and erosion control). For a given flood event, that area of land that is temporarily covered by water and that adjoins a watercourse. In FEMA regulated, or established floodplains, the floodplains shall mean the area subject to inundation from any source during the regulatory event.

**Floodplain or flood-prone area** (flood damage prevention). Areas that are subject to, or are exposed to, flooding and flood damage.

**Floodplain management** (flood damage prevention). The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to, emergency preparedness plans, flood control works and floodplain management regulations.

**Floodplain management regulations** (flood damage prevention). Development code, building codes, health regulations, special purpose ordinances (i.e., grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

**Flood-proofing** (flood damage prevention). Any combination of structural and nonstructural additions, changes or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

**Floodway** (flood damage prevention). The channel of a river, or other watercourse, and the adjacent land area that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot. Also referred to as "regulatory floodway."

**Floodway** (stormwater management, drainage and erosion control). The channel of a stream, plus any adjacent floodplain areas that must be kept free to encroachment so that the one hundred (100) year flood discharge can be conveyed without increases of more than specified amount in base elevations, either zero (0) or one (1) foot depending on specific location. This is an area of significant depths and velocities and therefore due consideration should be given to the effects of fill and loss of cross-sectional flow area is increased water surface elevations.

**Floor** (DDOD). A story within a building.

*Foot candle.* A unit of measurement referring to illumination. One (1) foot candle is equal to one (1) lumen uniformly distributed over an area of one (1) square foot.

*Forestation* (tree preservation and protection). The act of planting trees.

*Fraternity or sorority house* (zoning). A building owned or leased by a general or local chapter of some regularly organized college fraternity or sorority, or by or on its behalf by a building corporation or association composed of members or alumni thereof, and occupied by the local chapter of such fraternity or sorority as a place of residence.

*Freestanding sign* (signs). A sign which is attached to or a part of a completely self-supporting structure. The supporting structure shall be set firmly in or below the ground surface and shall not be attached to any building or any other structure whether portable or stationary.

*Frontage line.* The property line or lines of a lot which coincide with a right-of-way or other public open space.

*Front yard area.* Front yard area shall mean the area between the plane of the front elevation of the principal façade(s) of the principal structure extending to the side property lines and the front property line abutting the street, including the driveway. A front shall be any plane of a building which abuts to a public street right-of-way.

*Functionally dependent use* (flood damage prevention). A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water.

## **G**

*Gable* (DDOD). The vertical triangular end of a building from cornice or eaves to ridge.

*Gabled roof* (DDOD). A double sloping roof that forms a gable at each end.

*Gambrel roof* (DDOD). A roof where each side has two (2) slopes; a steeper lower slope and a flatter upper one; a "barn roof".

*Garage sales* (zoning). An occasional sales activity, not to include activities described elsewhere as home occupations, but including activities generally referred to as garage sales, yard sales, rummage sales, white elephant sales, cleaning sales, or moving sales, where used goods are displayed or offered for sale to the general public in a residential area on the resident's premises.

*Gas outlet* (building regulations). For the purpose of establishing gas permit fees for additions, alterations, repair, and new installations, a gas outlet shall be defined as any service line and/or pipe replacement or extension and a connection to any device and equipment that receives, stores, consumes, transfers, and/or discharges gas.

*Gasoline service station* (Zoning).

(A) Buildings and premises where gasoline, oil, grease, batteries, tires, and automobile accessories may be supplied and dispensed at retail, and where in addition the following services may be rendered and sales made, no other:

- (1) Sale and servicing of spark plugs, batteries, and distributor parts;
- (2) Tire servicing and repair, but no recapping or regrooving;
- (3) Replacement of mufflers and tail pipes, water hose, fan belts, brake fluid, light bulbs, fuses, floor mats, seat covers, windshield wipers and wiper blades, grease retainers, wheel bearings, mirrors, and the like;
- (4) Radiator cleaning and flushing;

- (5) Washing and polishing, and sales of automotive washing and polishing materials;
  - (6) Greasing and lubrications;
  - (7) Providing and repairing fuel pumps, oil pumps, and lines;
  - (8) Minor servicing and repair of carburetors;
  - (9) Emergency wiring repairs;
  - (10) Adjusting and repairing brakes;
  - (11) Minor motor adjustments not involving removal of the head or crankcase or racing the motor;
  - (12) Sales of cold drinks, package foods, tobacco, and similar convenience goods for filling station customers, as accessory and incidental to principal operations;
  - (13) Provision of road maps and other information material to customer; provision of restroom facilities.
- (B) Uses permissible at a filling station do not include major mechanical and body work, straightening of body parts, painting, welding, storage of automobiles not in operating condition, or other work involving noise, glare, fumes, smoke, or other characteristics to an extent greater than normally found in filling stations. A filling station is not a repair garage or a body shop.

*Glare* (outdoor lighting) means the brightness of a light source that causes eye discomfort.

*Glazing* (development). A transparent or translucent material that is integrated into a building envelope, such as a window, display window, door, glass curtain wall, etc.

*Grade* (physical alteration of land). The percentage of rise or fall per 100 feet. Existing grade is the grade prior to grading. Rough grade is the stage at which the grade approximately conforms to the approved plan. Finish grade is the final grade of the site which conforms to the approved plan.

*Grading* (physical alteration of land). Any stripping, cutting, filling, or stockpiling of earth or land.

*Green roof* (Stormwater). Elevated roof surfaces that are entirely covered with a thin soil and vegetation layer.

*Ground cover* (physical alteration of land). Plants with low, spreading habit that form a dense mat in time, preventing erosion.

*Guyed towers* (wireless telecommunications facilities). A communications tower that is supported, in whole or in part, by guy wires and ground anchors.

## H

*Habitable space*. Building space whose use involves human presence. Habitable space excludes parking garages, self-service storage facilities, warehouses, and display windows separated from retail activity.

*Hazard to air navigation* (Airport Zone). An obstruction determined to have a substantial adverse effect on the safe and efficient utilization of the navigable airspace.

*Hazardous tree* (tree preservation and protection). A tree or tree parts with high probability of falling or causing injury or property loss; also, a tree harboring insects or a disease that could be detrimental to surrounding trees.

*Health officer* (Manufactured homes and parks) (manufactured homes and parks opened or expanded, 4-20-72). The legally designated health authority of the city or his authorized representative.

*Height*. (Airport Zone). Sea level elevation, unless otherwise specified.

*Height* (Hillside/Hilltop Overlay District). Building height shall be measured from the lowest point of the structure at the historic grade, prior to development, to the highest point of the structure. If the structure is located on a graded pad then the height of the building is measured from the historic grade.

*Height* (wireless telecommunications facilities). The vertical distance measured from the mean elevation of the finished grade to the highest point on the tower or other structure, even if said highest point is an antenna or antenna array.

*Highest adjacent grade* (flood damage prevention). The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

*Hillside/Hilltop Development Manual* (zoning). The best management practices document that supplements the Hillside/Hilltop Overlay District and illustrates desirable Hillside/Hilltop development practices.

*Hillside/Hilltop Overlay District* (zoning). Lands located within the city that generally have slopes in excess of 15%. The Hillside/Hilltop Overlay District is shown on the city's official zoning map. The development regulations in the Hillside/Hilltop Overlay District supercede the underlying zoning district.

*Hilltop* Hillside/Hilltop Overlay District). Land located above the Hilltop line which contains less than 15% slope and is completely surrounded by Hillside/Hilltop <15% slope.

*Hipped roof* (DDOD). A roof with slopes on all four (4) sides. The "hips" are the lines formed when the slopes meet at the corners.

*Historic discharge or volume* (Stormwater management, drainage and erosion control). The peak rate or volume at which stormwater runoff leaves a parcel of land in an undisturbed/natural site condition either by gravity or by the legally allowable discharge at the time of permit approval.

*Historic grade* (Zoning). The natural grade of the land prior to any development.

*Historic structure* (flood damage prevention). Any structure that is:

- (A) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (B) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district; or
- (C) Individually listed on a state inventory of historic places which has been approved by the Secretary of the Interior.

*Home occupation* (zoning). An occupation, profession or avocation conducted in a dwelling unit on a part-time or full-time basis for which financial compensation is received and which generates motor vehicle traffic to the dwelling unit by patrons or clients of the occupation, profession or avocation conducted therein. A nontraffic generating occupation, profession or avocation conducted in a dwelling unit by one (1) or more members of the family occupying the premises shall be considered a residential use and not a commercial use. The term home occupation shall include a child care facility handling not more than six (6) children at one (1) time.

*Horizontal surface* (Airport Zone). A horizontal plane 150 feet above the established airport elevation, the perimeter of which in plane coincides with the perimeter of the horizontal zone.

*Horsepower* (building regulations). The equivalent to 745 watts.

*Housing Board* (manufactured homes and parks) (manufactured homes and parks opened or expanded, 4-20-72). The Housing Board established by the city.

*House, lodging or rooming* (zoning). A dwelling or building where lodging is provided for two (2) or more persons for compensation, pursuant to previous arrangements, but which is not available to transients and with which no table board is furnished.

*Hydroseed* (physical alteration of land). A machine blown mixture of mulch, seed and sometimes fertilizer.

## I

*I-540 Overlay District*. The Overlay District encompasses all lands lying within 660 feet of each side of the right-of-way of I-540 from the intersection of I-540 and State Highway 471 (a/k/a 71B) north to the city limits of Fayetteville, (a/k/a the 71 Bypass and/or John Paul Hammerschmidt Expressway), and also that portion known as State Highway 471S described more fully as that portion of State Highway 471 which connects I-540 to State Highway 471 (a/k/a North College) and all future extensions of I-540 within the City of Fayetteville. Said boundaries are set out on the official plat pages along with a legal description of such boundaries located in the Planning Division.

*Illuminance*. The photometric quantity most closely associated with the perception of brightness and a measurement of the intensity of light falling on a surface at a given distance from the light source.

*Illuminated sign* (signs). Any sign which has characters, letters, figures, designs or outline illuminated by electric lights or luminous tubes as a part of the sign proper.

*Impact Fee Administrator* (water and wastewater impact fees). The Zoning and Development Administrator or his designee

*Impervious surface* (stormwater management, drainage and erosion control). A surface that has been compacted or covered so that it is highly resistant to infiltration by water.

*Improvements* (development). Physical changes made to property to prepare it for development such as street grading, drainage structures, street surface, sidewalks, curbs, gutters, utility lines, bridges and similar items.

*Independent manufactured home* (manufactured homes and parks) (manufactured homes and parks opened or expanded, 4-20-72). A manufactured home which has a flush toilet and a bath or shower.

*Intermittent stream* (stormwater management drainage and erosion control). A stream that carries water part of the year is dry another part but receives flow from the groundwater table when it is high enough.

*Invasive species* (tree preservation and protection). Any species not indigenous to a region, which becomes established and displaces native species.

## J

*Joint identification sign* (signs). A sign which serves as common or collective identification for a group of persons or businesses operating on the same subdivision or lot in a residential office, commercial or industrial district (e.g., shopping center, office complex, etc.) Such sign may name the person(s) or business included but carry no other advertising matter.

*Junkyard* (zoning). Any worn out or discarded materials including but not limited to scrap metal, inoperable motor vehicles and parts, construction material, discarded appliances, or other material in a condition such that it cannot be used for its original purposes.

## K

*Kennel* (zoning). A structure or facility used for the purpose of breeding two (2) or more litters of puppies or kittens within any twelve (12) month period. A facility that keeps animals commercially and has open dog runs, outside play areas, or any areas where animals are kept or left outside.

## L

*Lamp or bulb* (outdoor lighting) means the light producing source installed in the socket portion of a luminaire.

*Land disturbance* (tree preservation and protection). Clearing, scraping, grubbing, or otherwise removing or destroying the vegetation of a site, or adding, removing, exposing, excavating, leveling grading, digging, tunneling, trenching, burrowing, dumping, piling, dredging or application of toxic substance, storage of materials, and operation of equipment, or otherwise significantly disturbing the soil, mud, sand, or rock of a site.

*Landscape Administrator* (tree preservation and protection). The person who is responsible for the administration of Tree Preservation and Protection, Chapter 167 and Landscape Regulations, Chapter 177. Also known as Urban Forester.

*Landscape establishment guarantee* (tree preservation and protection). A bond, irrevocable letter of credit, or other surety held by the city until the satisfactory conclusion of the three (3) year landscape establishment period.

*Landscape fabric* (physical alteration of land). A barrier against soil erosion, allowing water to pass through while keeping soil in place.

*Landscaping* (zoning). The area within the boundaries of a given lot which consists of planting materials, including but not limited to trees, shrubs, ground covers, grass, flowers, decorative rock, bark, mulch, and other similar materials.

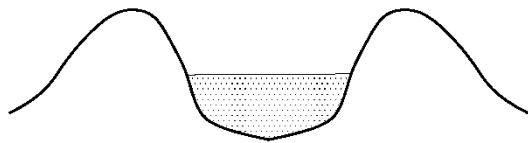
*Large scale development* (development). The development of a lot or parcel one (1) acre or greater in size or the construction of a multi-family building or buildings with twenty-four (24) or more units. The term development shall include, but shall not be limited to, the construction of a new improvement, the construction of an addition to an existing improvement, or a parceling which results in the need for access and utilities.

*Larger than utility runway* (airport zone). A runway that is constructed for and intended to be used by propeller-driven aircraft of greater than 12,500 pounds maximum gross weight and jet powered aircraft.

*Lattice tower* (wireless telecommunications facilities). A guyed or self-supporting three (3) or four (4) sided, open, steel frame structure used to support telecommunications equipment.

*Lease* (signs). An agreement by which a property owner conveys, usually for a specified rent, to other persons, permission to erect and maintain an advertising sign upon his property.

*Less desirable species* (tree preservation and protection). Low-priority trees or other woody shrubs listed in the City of Fayetteville Tree Preservation, Protection, and Landscape Manual.



Levee

*Levee* (flood damage prevention). A man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

*Levee system* (flood damage prevention). A flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

*Light pollution* (outdoor lighting) means general sky glow caused by the scattering of artificial light in the atmosphere and resulting in decreased ability to see the natural night sky.

*Liner building*. A building built in front of a parking garage, cinema, supermarket etc., to conceal large expanses of blank wall area and to face the street space with a façade that has doors and windows.

*Lintel* (DDOD). A horizontal beam that supports the weight of the wall above a window or door.

*Loading space, off-street (zoning)*. Space logically and conveniently located for bulk pickups and deliveries, scaled to delivery vehicles expected to be used, and accessible to such vehicles when required off-street parking spaces are filled.

*Lot* (development). A portion of a subdivision or other parcel of land intended as a unit for transfer of ownership or for development.

*Lot* (signs). A parcel of land under one (1) ownership whether described by metes and bounds or as a platted lot.

*Lot*. (zoning). A parcel of land of at least sufficient size to meet minimum zoning requirements for use, coverage and area, and to provide such yards and other open spaces as are herein required. The term includes the words "plot" or "parcel". Such lot shall have frontage on an improved public street, and may consist of:

- (A) A single lot of record;
- (B) A portion of a lot of record;
- (C) A combination of complete lots of record, of complete lots of record and portions of lots of record, or of portions of lots of record;
- (D) A parcel of land described by metes and bounds; provided that in no case of division or combinations shall any residential lot or parcel be created which does not meet the requirements of the zoning regulations, Chapter 167.

*Lot, corner* (zoning). A lot located at the intersection of two or more streets. A lot abutting on a curved street or streets shall be considered a corner lot if straight lines drawn from the foremost points of the side lot lines to the foremost point of the lot meet at an interior angle of less than 135 degrees.

*Lot, depth of* (zoning). The distance between the midpoints of straight lines connecting the foremost points of the side lot lines in front and the rearmost points of the side lot lines in the rear.

*Lot frontage* (zoning). The front of a lot shall be construed to be the portion nearest the street.

*Lot, interior* (zoning). A lot other than a corner lot with only one frontage on a street.

*Lot, through* (zoning). A lot, other than a corner lot, with frontage on more than one (1) street. Through lots abutting two (2) streets may be referred to as double frontage lots.

*Lot, width of* (zoning). The distance between straight lines connecting front and rear lot lines at each side of the lot, measured across the rear of the required front yard, provided, however, that width between side lot lines at their foremost points (where they intersect with the street line) shall not be less than 80% of the required lot width except in the case of lots on the turning circle of a cul-de-sac, where the 80% requirement shall not apply.

*Lot of record* (zoning.) A lot which is part of a subdivision recorded in the office of the county recorder or a lot or parcel described by metes bounds, the description of which has been so recorded.

*Lowest floor* (flood damage prevention). The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor;

provided, that such an enclosure is not built so as to render the structure in violation of the applicable nonelevation design requirements of this chapter.

*Luminaire or fixture* (outdoor lighting) means a complete lighting unit including the lamps or bulbs, together with the parts required to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply.

## **M**

*Major developments* (development). A suburban or urban major development shall be a large scale development or subdivision that satisfies either of the following conditions:

- (A) It contains 40 acres or more.
- (B) It contains one hundred (100) housing units or more.

Whether or not it is planned in one (1) or more phases, the total possible development shall be considered when its first stage, phase, or parcel is presented for review.

*Mall* (signs). Any concentration of retail stores and/or service establishments which share customer parking areas and are located within an enclosure having public walkways whereby a customer in one (1) store or establishment may walk to another store or establishment without leaving the enclosure.

*Mansard roof* (DDOD). A roof type with two (2) slopes on each of the four (4) sides, the lower slope being steeper than the other; capped off with a cupola, typically Victorian.

*Manual message board* (signs). A changeable copy sign that is arranged manually in the field through the utilization of alphanumeric characters and punctuation marks.

*Manufactured home* (flood damage prevention). A factory-built, single-family structure that meets the National Manufactured Home Construction and Safety Standards Act (42 U.S.C. §5401), commonly known as the HUD (U.S. Housing and Urban Development) code. For floodplain management purposes the term also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than one hundred eighty (180) consecutive days. For insurance purposes the term "manufactured home" does not include park trailers, travel trailers, and other similar vehicles.

*Manufactured home* (manufactured homes and parks). A home built entirely in the factory under a federal building code, administered by the U.S. Department of Housing and Urban Development (HUD), which went into effect June 15, 1976.

*Manufactured home* (manufactured homes and parks opened or expanded after 4-20-72). A detached structure designed as a complete residential dwelling unit with a permanent chassis and capable of being transported on its own wheels, or on a trailer, and constructed to be ready for use upon being placed on a temporary or permanent foundation.

*Manufactured home lot* (manufactured homes and parks opened or expanded after 4-20-72). A plot of ground or a lot in a manufactured home park designed for the location for only one (1) manufactured home.

*Manufactured home pad* (manufactured homes and parks opened or expanded after 4-20-72). That part of an individual manufactured home lot which has been reserved for the placement of a manufactured home.

*Manufactured home park* (manufactured homes and parks). Any plot of ground of at least one (1) acre in size upon which two (2) or more manufactured homes, occupied for dwelling or sleeping purposes, are located.

*Manufactured home park* (Manufactured homes and parks opened or expanded after 4-20-72). Any park, court, site, parcel or tract of land designed, maintained intended or used for the purpose of supplying a



location or accommodations for two (2) or more manufactured homes and shall include all buildings used or intended for use as part of the equipment thereof; whether or not a charge is made for the use of the court and its facilities.

*Manufactured home park or subdivision* (flood damage prevention). A parcel (or contiguous parcels) of land divided into two (2) or more manufactured home lots for sale or rent.

*Manufactured home space* (manufactured homes and parks). A plot of ground within a manufactured home park, designed for the accommodation of one manufactured home.

*Manufactured homes and trailer sales lot* (manufactured homes and parks opened or expanded after 4-20-72). A lot on which unoccupied trailers are parked for purposes of inspection and sale.

*Manufactured home court* (zoning). Any plot of ground on which there are located or intended to be located two (2) or more manufactured homes to be occupied for dwelling or sleeping purposes.

*Mansard roof* (signs). Any roof that has an angle greater than 45 degrees and which derives part of its support from the building wall and is attached to (but not necessarily a part of) a low slope roof and which extends along the full length of the front building wall or three-quarters of the length of a side building wall. For purposes of Signs, Chapter 174, a low slope roof shall mean any roof with a pitch less than 3 inches rise per 12 inches horizontal.

*Marquee*. A permanently roofed architectural projection the sides of which are vertical and are intended for the display of signs and which is supported entirely from an exterior wall of a building.

*May*. Is permissive.

*Mean sea level* (flood damage prevention). For purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

*Meter* (building regulations). For the purpose of establishing electrical permit fees for additions, alterations, repair, and new installments and to include farm buildings and owner/occupied dwellings a meter shall be defined as an apparatus to measure electrical power and an outlet shall be defined as a point on the wiring system at which current/voltage is switched, connected to a lighting fixture or receptacle, connected to utilization equipment, and connected to any equipment that receives, controls, stores, consumes, and/or transfers electricity.

*Microbrewery/microdistillery/microwinery*. An establishment for the manufacture, blending, fermentation, processing and packaging of no more than fifteen thousand (15,000) barrels of alcoholic beverages per year. It may serve alcoholic beverages for sampling on the premises and may also have wholesale and resale for sales of alcoholic beverages produced on the premises.

*Minimum buildable street frontage* (zoning). The minimum required percentage of a lot's street frontage, established by the underlying zoning district and measured in linear feet, that is met by constructing a portion or portions of the vertical side of a building or structure within the build-to zone, subject to supplementary district regulations. Buildings may be constructed outside of the build-to-zone after the minimum required percentage has been met.

*Ministorage units* (zoning). A structure or structures containing separate, individual, and private storage spaces of varying sizes leased or rented on individual leases for varying periods of time.

*Mitigation* (tree and preservation and protection). The planting of trees on-site in an effort to lessen the environmental damage caused by the injury or removal of trees during development.

*Mobile home* (zoning). A manufactured home built prior to June 15, 1976.

*Model home.* A dwelling unit utilized for display purposes which typifies the type of units to be constructed and available for sale in a subdivision. A model home is constructed in an approved preliminary plat which has not yet received final plat and may be used to sell homes in that subdivision. The model home shall not be used as a branch real estate office for conducting business unrelated to the marketing of homes and lots within the subdivision.

*Monopole tower* (wireless telecommunications facilities). A communications tower constructed without the use of guy wires and ground anchors and consisting of only a single pole.

*Monument sign* (signs). A freestanding signs whose entire base is in contact with and supported by the ground.

*Motor vehicle* (Zoning). A self-propelled vehicle that would have to be licensed to be operated on the public streets and highways. (See Chapter 14 of Title 27 of the Arkansas Code.)

*Motor vehicle accessory store* (Zoning). Stores that sell new automobile parts, tires, and/or accessories.

*Motor vehicle repair and body shop* (Zoning). Any property, building or portion thereof used for the service and repair of motor vehicles including major mechanical repair and body work, straightening of body parts, painting, welding, or other work involving noise, glare, fumes, smoke, or other characteristics to an extent greater than normally found in gasoline service stations.

*Mulch* (physical alteration of land). A layer of leaves, straw, bark, or other organic material spread around plants to retain moisture, and to control weeds or erosion.

*Mullions* (DDOD). Strips of wood or metal that separate and hold in place the panes of a window.

*Muntin* (DDOD). A short vertical or horizontal bar used to separate panes of glass in a window or panels in a door. The muntin extends from a stile, rail, or bar to another bar. This term is often confused with mullion.

## **N**

*Native woodlands* (tree preservation and protection). A biological community of trees and woody shrubs native to the Ozark Plateau, covering an area of 10,000 square feet or greater. A list of species to the Ozark Plateau may be found in the City of Fayetteville Tree Preservation, Protection, and Landscape Manual.

*Natural drainage ways* (physical alteration of land). Ephemeral, intermittent and perennial streams. Chapter 169 is not concerned with ephemeral streams.

*Neighborhood Link.* A street which in addition to serving abutting properties, provides a bridge between minor streets and community facilities, and the larger arterial/regional link street system. Equivalent to a Collector Street in previous Master Street Plans.

*New construction* (flood damage prevention). For floodplain management purposes, structures for which the "start of construction" commenced on or after the effective date of this development code.

*New development* (water and wastewater impact fees). Construction of a new single family home and the construction or expansion of any other building or structure. The change in use of a building or structure that results in increased demand from water and wastewater facilities shall also be considered new development.

*Nonconforming sign* (signs). A sign existing on 12-19-72 which could not be built under the terms of the UDC.

*Nonconforming use* (Airport Zone). Any pre-existing structure, object of natural growth, or use of land which does not conform to the provisions of Chapter 165 or an amendment thereto.

*Nonconforming structures, uses, and lots.* A structure or building, use or activity, or lot which was lawful prior to the adoption, revision, or amendment of the zoning ordinance but that fails by reason of such adoption, revision or amendment to conform to the present requirements of the zoning district.

*Non-native woodlands* (tree preservation and protection). A biological community of trees and woody shrubs, covering the area of 10,000 square feet or greater, descended from non-native species brought to the area during urban settlement. A list of typical non-native species may be found in the City of Fayetteville Tree Preservation, Protection, and Landscape Manual.

*Nudity or state of nudity* (zoning).

- (A) The appearance of the bare human buttocks, anus, male genitals, female genitals or female breast.
- (B) A state of dress which fails to opaquely cover a human buttock, anus, male genitals, female genitals, or areola of the female breast.

## O

*Obstruction* (Airport Zone). Any structure, growth or other object, including a mobile object, which exceeds a limiting height set forth in Chapter 165.

*Off-site sign* (signs). A sign which directs attention to a business, commodity, service, entertainment or attraction sold, offered or existing elsewhere than upon the same lot where such sign is displayed. The term of-site sign shall include an outdoor advertising sign (billboard) on which space is leased or rented by the owner thereof to others for the purpose of conveying a commercial or noncommercial message.

*One-hundred (100) year flood* (flood damage prevention). A flood which has a one percent annual probability of being equaled or exceeded. It is identical to the "base flood," which will be the term used throughout Chapter 168.

*On-site sign* (signs). A sign which directs attention to a business, commodity, service, entertainment or attraction sold, offered or existing on the same lot where such sign is displayed; provided, an on-site sign may also display a noncommercial message.

*Operator's permit* (manufactured homes and parks) (manufactured homes and parks opened or expanded after 4-20-72). A written permit issued by the enforcement officer permitting the manufactured home park to operate under Chapter 175 and regulations promulgated thereunder.

*Original tower height* (wireless telecommunications facilities). Height of a tower, not including any antennas, on the date of the passage of this ordinance.

*Outdoor advertising business* (zoning). Provision of outdoor displays or display space on a lease or rental basis only.

*Outdoor music establishment* (zoning). Any business or establishment that has a garden, patio, rooftop or premises not wholly enclosed by solid walls and fully roofed in which amplified or loud music is played that could be audible at nearby residences or businesses.

*Outfall* (stormwater management, drainage and erosion control). The terminus of a storm drain, where the contents are released.

## P

*Parapet.* A low guarding wall at the edge of a roof, terrace, or balcony.

*Parcel* (development). An area under one (1) ownership.

*Parking garage* (DDOD). Layers of parking stacked vertically.

*Parking informational sign* (Signs). A wall sign or a freestanding sign indicating the location of a motor vehicle parking lot and designating the persons authorized to park in said lot. The size of a parking information sign shall not exceed 4 square feet. The number of parking informational signs on a parking lot shall not exceed the number of entrances for the parking lot.

*Parking lot* (zoning). An off-street, surfaced, ground level open area, for the temporary storage of five (5) or more motor vehicles.

*Parking pad* (Hillside/Hilltop Overlay District). Parking areas for multi-family residential, residential office, and commercial use in the Hillside/Hilltop Overlay District.

*Parking space, off-street* (parking and loading). A space adequate for parking an auto manufactured with room for opening doors on both sides, together with properly related access to a public street or alley and maneuvering room.

*Passive open space* (development). An area intended for tranquil activities such as walking, sitting, observing and the less active games like shuffleboard and croquet.

*Pavement width* (development). The distance from inside edge of curb to inside edge of curb (flow line to flow line).

*Peak flow* (stormwater management, drainage and erosion control). The maximum rate of flow of water at a given point and time resulting from a given storm event.

*Peak flow attenuation* (stormwater management, drainage and erosion control). The reduction of the peak discharge of storm runoff by storage and gradual release of that stored flow.

*Pedestal* (DDOD). The base or support of an upright structure.

*Percent minimum canopy* (tree preservation and protection). The amount of existing tree canopy an applicant must preserve based on the zoning designation of the land to be developed.

*Perennial stream* (physical alteration of land). A stream that carries water year round.

*Permeable pavers* (stormwater). A solid surface that allows natural drainage and migration of water into the earth by permitting water to drain through the surface itself or through spaces between the pavers.

*Person* An individual, firm, limited or general partnership, corporation, company, business, association, joint stock association, organization, group of individuals, other legal entity or government entity, including a trustee, a receiver or assignee or a similar representative of any of them.

*Personal use* (wireless telecommunications facilities). "Personal use" refers to a non-commercial use by a resident of the subject property. If any revenues are generated from the operation of the tower, it will not be for personal use as such term is used.

*Pet shop* (zoning). A commercial establishment or facility which regularly sells pets such as dogs, cats, birds, rodents, reptiles and/or fish to the general public.

*Plan, General* (development). The plan made and adopted by the Planning Commission and adopted by the City Council that includes studies and analysis of the population, housing and economics of the city and includes the future land use plan and the master street plan.

*Plan, Future Land Use* (development). A part of the Comprehensive Land Use Plan made and adopted by the Planning Commission and adopted by the City Council that establishes long-range planning policies and implementation strategies to manage and guide future growth and development, consisting of a map and text. It includes general recommendations for locations of land uses.

*Plan, Master Street* (development). A part of the Comprehensive Land Use Plan made and adopted by the Planning Commission and adopted by the City Council that classifying certain streets within the planning area jurisdiction as arterial or collector streets, consisting of a map and text.

*Planned Zoning District* (zoning, development). A zoning district that allows for comprehensively planned developments for either single-use or mixed-use and permits development and zoning review as a simultaneous process.

*Plat, concept* (development). A generalized sketch of an area intended to be subdivided and containing sufficient information to allow the Planning Commission to determine whether a subdivide can comply with the regulations.

*Plat, final* (development). A complete and exact subdivision plat, prepared for official recording as required by state law, to define property boundaries and proposed streets and other improvements.

*Plat, preliminary* (development). A preliminary plat for a subdivision shall be a formal plan, drawn to scale, indicating prominent existing features of a tract and its surroundings and the general layout of the proposed subdivision and shall meet the requirements outline in Chapter 166.

*Platform sign* (signs). A single or double-face sign attached to a supporting base place on the ground surface.

*Plinth* (Hillside/Hilltop Overlay District). A foundation or base, usually on the upslope side of the Hillside/Hilltop, on which a house is located. Most often a plinth is constructed by erecting a retaining wall at the street with backfill creating a level building pad for the home.

*Plumbing fixture* (building regulations). For the purposes of establishing plumbing permit fees for additions, alterations, repairs, and new installations, a plumbing fixture shall be defined as any service line and/or pipe replacement or extension and any device and equipment that receives, stores, consumes, transfers, and/or discharges liquid and/or waste.

*Pole sign* (signs). A freestanding sign that is affixed, attached, or erected on a pole or poles that is not itself an integral part of or attached to a building or structure.

*Porch* (DDOD). An open, roofed structure attached to and structurally a part of the main building that is not more than 75% enclosed by walls and is not heated or cooled.

*Portable swinger sign and A-frame or sandwich sign* (signs). An advertising device which is ordinarily in the shape of an "A" or some variation thereof, located on the ground, easily movable, not permanently attached thereto and which is usually two (2) sided.

*Portable temporary attraction sign board* (signs). A single or double-surface painted or poster panel type sign or some variation thereof, which is temporary in nature, usually mounted on wheels, easily movable, and not permanently attached thereto.

*Precision instrument runway* (Airport Zone). A runway having an existing instrument approach procedure utilizing an instrument landing system (ILS) or a precision approach radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated on an approved airport layout plan or any other planning document.

*Prefabricated construction* (zoning). Any structure built off-site excluding manufactured homes.

*Primary surface* (airport zone). A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; for military runways or when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway. The width of the primary surface is set forth in §165.01. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.

*Principal dwelling unit* (zoning). A principal dwelling unit is the primary and larger of two dwelling units located on a single lot.

*Principal façade*. The front plane of a building that faces a public street including porches and balconies, but not including stoops, awnings or canopies (whether or not attached to the building).

*Principal use ground mounted solar energy system*: A solar energy system that is the principal use of the property and is structurally mounted to the ground.

*Private open space* (development). The outdoor living area directly adjoining a dwelling unit or building, intended for the private enjoyment of the residents or occupants of the dwelling unit or building and defined in such a manner that its boundaries are evident.

*Projected bay* (DDOD). A window or series of windows forming a bay in a room and projecting outward from the wall.

*Projecting sign* (signs). Any sign that shall be affixed at an angle or perpendicular to the wall of any building in such a manner to read perpendicular or at an angle to the wall on which it is mounted.

*Public grounds* (tree preservation and protection). Areas including street rights-of-way, alleys, parks, medians, substations, treatment plants, plazas, squares, public buildings and any other area designated for public use.

*Public open space* (development). Open space, including but not limited to, any park, lake, stream, playground, or natural area commonly open to the public.

## **R**

*Rain barrels* (stormwater). A stormwater containment vessel that captures runoff generated by impervious surfaces such as roofs. Rain barrels usually include a hole at the top to allow water to flow in, a sealed lid, an overflow pipe or hose, and a spigot to dispense water. By holding and reusing rainwater, rain barrels reduce stormwater runoff from sites and conserve potable water.

*Rain garden* (stormwater). An attractive landscaping feature planted with perennial native plants. It is a bowl-shaped garden, designed to absorb stormwater run-off from impervious surfaces such as roofs and parking lots.

*Real estate sign* (signs). Temporary sign placed upon property for the purpose of advertising to the public the sale or lease of said property.

*Rear access lane* A publicly or privately owned secondary way that affords access to the side or rear of abutting property.

*Recreational structure* (development). Anything constructed or erected with a fixed location on the ground, or attached to something having a fixed location on the ground that has a primary use that is recreational in nature. Among other things, recreation structures include tennis courts, basketball courts, swimming pools and jogging trails.

Regional Link. A street or road intended to carry local and regional multi-modal traffic, serving low-density residential area and open spaces. Equivalent to a Minor Arterial Street in previous Master Street Plans.

Regional Link, High Activity. A street or road intended to carry local and regional multi-modal traffic through a variety of densities and land uses. Equivalent to a Major Arterial Street in previous Master Street Plans.

*Regulatory area* (stormwater management, drainage and erosion control). That portion of the floodplain subject to inundation by the one hundred (100) year flood is defined as the regulatory area. Its width is determined by the one hundred (100) year flood. Its length or reach is determined by natural bounds such

as a lake, or by structures such as a dam or bridge, or by political or legal bounds. In the absence of complete information to define or estimate a one hundred (100) year flood, an interim regulatory area may be designated on the basis of satisfactory existing floodplain information.

*Regulatory floodway* (flood damage prevention). See: "Floodway."

*Relic orchard* (tree preservation and protection). Groups of fruit trees originally planted for agricultural purposes, but since taken out of production.

*Remedy a violation* (flood damage prevention). To bring the structure or other development into compliance with state or local floodplain management regulations, or, if it is possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of this development code, or otherwise deterring future similar violations, or reducing federal financial exposure with regard to the structure or other development.

*Remove* (signs). Remove shall mean:

- (A) The sign face, along with the posts, columns, or supports of freestanding signs, shall be taken down and removed from the property.
- (B) The sign face and supporting structures of "projecting", "roof" or "wall" signs shall be taken down and removed from the property.
- (C) The sign face of "painted wall signs" shall be removed by painting over the wall sign in such a manner as to completely cover up and hide from sight the sign in question.

*Residential driveway* (streets and sidewalks). A driveway on public property adjacent to a public street or highway to provide entrance to or exit from residential property for the exclusive use and benefit of those residing therein.

Residential Link. Intended to be the standard in neighborhoods and low-volume streets outside of downtown. Equivalent to a Local Street in previous Master Street Plans.

Residential Link, Alternative. Intended to reduce the footprint of the residential streetscape in areas where historic precedent, environmental characteristics, traffic volumes, or land uses support reduced rights-of-way. Equivalent to a Residential or Residential Low-Impact Development Streets in previous Master Street Plans.

*Residential zone* (streets and sidewalks). Any one (1) side of a block in which 50% or more of the frontage of that side is used for residential purposes.

*Retail* (DDOD). The sale of commodities or goods in small quantities to ultimate consumers.

*Retail liquor store* (zoning). Any business engaged primarily in the retail sale of spirituous, vinous or malt beverages or light wine or beer as said terms are defined by A.C.A. §3-1-102, §3-1-103 and §3-5-202 for off-premises consumption.

*Retaining wall* (physical alteration of land). A structure erected between lands of different elevation to protect structures and/or prevent erosion from the upper slope.

*Retaining wall height* (physical alteration of land). The height of a retaining wall, for setback purposes, shall be defined as the vertical distance from the top of the wall to the ground surface of the low side.

*Retention* (stormwater management, drainage and erosion control). The use of complete storage to prevent the discharge of a given volume of stormwater runoff into surface waters.

*Right-of-way* (development). The land opened, reserved or dedicated for street, walk, drainage or other public purposes.

*Riparian* (tree preservation and protection). Of, relating to, or located on the bank of a river or stream.

*Riparian buffer* (tree preservation and protection). A biological community consisting of trees, woody shrubs and groundcover that exists along the banks of rivers, creeks or intermittent and perennial streams.

*Rip-rap* (physical alteration of land). A loose assemblage of stones placed on ground to prevent erosion. Rip-rap shall be sized so that displacement does not occur due to velocity of water.

*Riverine* (flood damage prevention). Relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

*Roof sign* (signs). Any sign wholly erected, constructed or maintained on the roof structure or parapet wall of any building.

*Runway* (Airport Zone). A defined area on an airport prepared for landing and take-off of aircraft along its length.

*Rural street* (development). A street located, or to be located, outside the city limits of the city but within the planning area jurisdiction of the city.

## S

*Safety zone* (streets and sidewalks). All parts of the street or highway right-of-way between the curb or shoulder line and the right-of-way line along the property frontage, except those areas contained in the access driveways.

*Sediment basin* (physical alteration of land). A depression in a waterway designed to trap sedimentation before entry into the stormwater system.

*Separate offense* (tree preservation and protection). In relation to trees, each tree is a separate offense.

*Service building* (manufactured homes and parks) (manufactured homes and parks opened or expanded after 4-20-72). A building housing toilet and bathing facilities for men and women with laundry facilities and such other facilities as may be required by Chapter 175.

*Setback* (zoning). A required open space other than a court unoccupied and unobstructed by any structure or portion of a structure 30 inches above the general ground level of the graded lot upward, provided, however, that fences, walls, poles, posts and other customary yard accessories, ornaments, and furniture may be permitted in any yard subject to height limitations and requirements limiting obstruction of visibility. An architectural projection, such as an eave, utility chase, chimney or bay window shall not be considered to be in violation of a setback requirement as long as the projection does not intrude into a public right-of-way or extend more than 3 feet into a setback. A projection which encroaches into a setback shall not come closer than 3 feet to a property line.

*Setback lines* or *building lines* (development). A line on a plat generally parallel to the street right-of-way, indicating the limit beyond which buildings or structures may not be erected except as provided in ordinances.

*Setback, front* (zoning).

- (A) A setback extending between side lot lines across the front of a lot adjoining a public street. In the case of through lots, unless the prevailing front setback pattern on adjoining lots indicates otherwise, front setbacks shall be provided on all frontages.
- (B) Depth of required front setbacks shall be measured at right angles to a straight line joining the foremost point of the side lot line, in the case of rounded property corners at street intersections, shall be assumed to be the point at which the side and front lines would have met without such rounding.



*Setback, rear* (zoning).

- (A) A setback extending across the rear of the lot between inner side setback lines. In the case of through lots and corner lots, there will be no rear setbacks, but only front and side setbacks.
- (B) Width of a required rear setback shall be measured in such a manner that the setback established is a strip of the minimum width required by the district regulation with its inner edge parallel with the rear lot line.

*Setback, side* (zoning).

- (A) A setback extending from the rear line of the required front yard to the rear lot line, or in the absence of any clearly defined rear lot line, or in the absence of any clearly defined rear lot line to the point on the lot farthest from the intersection of the lot line involved with the public street. In the case of through lots, side setbacks shall extend from the rear lines of front setbacks required. In the case of corner lots, yards remaining after full front setbacks have been established shall be considered side setbacks.
- (B) Width of a required side setback shall be measured in such a manner that the setback established is a strip of the minimum width required by district regulations with its inner edge parallel with the side lot line.

*Setback, special* (zoning). A setback behind any required setback adjacent to a public street, required to perform the same functions as a side or rear setback, but adjacent to a lot line so placed or oriented that neither the term "side setback" nor the term "rear setback" clearly applies.

*Sexually oriented business* (zoning). An adult arcade, adult bookstore or adult video store, adult cabaret, adult motion picture theater, or adult theater.

*Shall* (zoning). Is mandatory.

*Shed roof* (DDOD). A roof type with one high pitched plane covering the entire structure.

*Shielding* (outdoor lighting) means that no part of the lamp or bulb is visible below the horizontal plane of the fixture where light is emitted. The lamp or bulb shall be completely enclosed within the fixture. The top and sides of the fixture above the horizontal plane shall be 100% opaque.

*Shopping center* (signs). Two (2) or more retail stores and/or service establishments, or one (1) retail store and one (1) service establishment, sharing customer parking areas, regardless of whether said stores and/or establishments occupy separate structures or are under separate ownership.

*Sign* (signs). Only those commercial and non-commercial signs that are in view of the general public from a public right-of-way or public property shall be regulated pursuant to Chapter 174, Signs. Signs within buildings not generally visible outside the building are not regulated.

- (1) *Non-commercial sign*. A device or display including flags and attraction devices commonly referred to as a sign that does not advertise a product or service or relate to a business purpose, does not propose a commercial transaction nor relate to economic interests including offices and studios.
- (2) *Commercial sign*. A device or display including flags and attraction devices commonly referred to as a sign that does not meet the definition of a non-commercial sign nor a government sign.
- (3) *Government sign*. A device or display including flags commonly referred to as a sign that is installed, owned, required or controlled by the City of Fayetteville, County of Washington, State of Arkansas, the United States of America or any agencies or subdivisions of such governmental bodies.

- (4) *Artistic murals*. Artistic murals hand painted on a building's wall without advertising, commercial logos or depictions of commercial activities are not signs for the purposes of Chapter 174, Signs.

*Significant tree* (tree preservation and protection). A tree with a diameter at breast height (DBH) of 24 inches or more for fast growth species, 18 inches or more for slow and moderate growth species, and 8 inches or more for understory species, as set forth in the City of Fayetteville Tree Preservation, Protection, and Landscape Manual. A tree may also be considered significant because of advanced age for its species, or because it represents an uncommon or endangered species, or due to its location on a site designated as historic by local, state or federal authorities.

*Single housekeeping unit* (zoning). A dwelling unit with common access to and common use of all living and eating areas and all areas and facilities for the preparation, serving and storage of food within the dwelling unit.

*Site* (physical alteration of land). Any lot or parcel of land or contiguous combination thereof, under the same ownership, where grading is performed or permitted.

*Slope* (physical alteration of land). An inclined ground surface, the inclination of which is expressed as a ratio of horizontal distance to vertical distance.

*Specified anatomical areas* (zoning).

- (A) Less than completely and opaquely covered human genitals, pubic region, buttock(s), and female breast below a point immediately above the top of the areola; and
- (B) Human male genitals in a discernible turgid state, even if completely and opaquely covered.

*Specified sexual activities* (zoning).

- (A) Human genitals in a state of sexual stimulation or arousal;
- (B) Acts of human masturbation, sexual intercourse, or sodomy;
- (C) Fondling or other erotic touching of human genitals, pubic region, buttock(s) or female breast.

*Spotlight or floodlight* (outdoor lighting) means any lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.

*Spot light illumination* (signs). Illumination which comes from lamps, lenses or devices designed to focus or concentrate the light rays of the source.

*Stabilization* (physical alteration of land). That which is attained once the site is restored to its pre-development state in terms of soil stability and irritability.

*Start of construction* (flood damage prevention). The date the building permit is issued for either new construction or substantial improvement, provided the actual start of construction, repair, reconstruction, replacement, or other improvement was within one hundred eighty (180) days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, beyond excavation, or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation or the installation of streets and/or walkways, nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

*Stealth technology* (wireless telecommunications facilities). Systems, components and materials used in the construction of wireless communications facilities to make it compatible with the surrounding property.

*Stoop* (DDOD). A small platform and / or entrance stairway at a door, commonly covered by a secondary roof or awning.

*Storefront.* The portion of a building at the first story of a retail frontage that is made available for retail use.

*Stormwater* (stormwater management, drainage and erosion control). The flow of water that results from and occurs immediately following a rainfall event.

*Stormwater facility* (landscape regulations). A facility designed to meet the requirements for stormwater management. For the purposes of this section, stormwater facilities refer primarily to detention ponds.

*Stormwater management, drainage and erosion control permit* (stormwater management, drainage and erosion control). A construction permit issued by the City of Fayetteville in compliance with the provisions of Chapter 170.

*Stormwater management plan* (stormwater management, drainage and erosion control). A plan for receiving, handling, and transporting storm and surface waters within the city's stormwater management system.

*Stormwater management system* (stormwater management, drainage and erosion control). All natural and man-made elements used to convey stormwater from the first point of impact with the surface of the earth to a suitable outlet location internal or external to the boundaries of the City of Fayetteville. The stormwater management system includes all pipes, channels, streams, ditches, wetlands, sinkholes, detention/retention basins, ponds, lakes, and other stormwater conveyance and treatment facilities whether public or private.

*Story* (building height). Building height when measured in stories shall be as defined by the International Building Code.

*Stream* (flood damage prevention). A watercourse having a source and terminus, banks, and channel through which waters flow at least periodically. Streams do not lose their character as a watercourse even though the water may dry up. For the purpose of this ordinance, streams are defined on the Flood Insurance Rate Map as single lines with no floodplain or floodway defined.

*Stream corridor* (stormwater management, drainage and erosion control). The landscape and physical features on both sides of a stream, including soils, slope, and vegetation, whose alteration can directly impact the stream's physical characteristics and biological properties.

*Street* (development). A strip of land, including the entire right-of-way, intended primarily as a means of vehicular and pedestrian travel which may also be used to provide space for sewers, public utilities, trees and sidewalks.

~~*Street, arterial* (development). A street or road of considerable continuity which serves or is intended to serve as the principal traffic way between separated areas or districts which is the main means of access to the primary street system or expressways.~~

~~*Street, collector* (development). A street which in addition to serving abutting properties, intercepts minor streets, connects with community facilities and carries neighborhood traffic to the major arterial street system. Where possible, houses should not front on collector streets.~~

*Street, frontage* (development). A minor street which is generally parallel to and adjacent to a major highway or railroad right-of-way and which provides access to abutting properties and protection from through traffic.

*Street line* (zoning) (streets and sidewalks). The right-of-way line of street.

*Street, minor* (development). A street used primarily to provide access to abutting properties.

*Street right-of-way* (development). The area designated for city improvements on both sides of the street.

*Streets* (streets and sidewalks). Of higher use designation than collector street, including arterial streets and expressways as defined in Ordinance No. 1750 of the City of Fayetteville, Arkansas.

*Structure* (Airport Zone). An object, including a mobile object, constructed or installed by man, including but without limitation, buildings, towers, cranes, smokestacks, earth formation, and overhead transmission lines.

*Structure or building* (zoning). Anything constructed or erected with a fixed location on the ground, or attached to something having a fixed location on the ground. Among other things, structures include buildings, manufactured homes, walls, fences, billboards and poster panels.

*Subdivider* (development). A person, firm or corporation undertaking a subdivision as defined in Chapter 166, Development.

*Subdivision* (development). The subdividing of land into lots and blocks, the parceling of land resulting in the need for access or utilities, or the dividing of an existing lot or parcel into two (2) or more lots or parcels.

*Substantial damage* (flood damage prevention). Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.

*Substantial improvement* (flood damage prevention). Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure either:

- (A) Before the improvement or repair is started; or
- (B) If the structure has been damaged, and is being restored, before the damage occurred.

For the purpose of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either:

- (a) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions; or
- (b) Any alteration of a structure listed on the National Register of Historic Places, or a state inventory of historic places.

*Suburban* (development). Located outside the corporate city limits, but within the city's planning area.

## **I**

*Tandem lot*. A lot which has less than 50% of the required frontage on a public street and which is located behind a conforming lot or a portion of a conforming lot.

*Telecommunications* (wireless telecommunications facilities). The transmission, between or among points as specified by the user of information of the user's choosing, without change in the form or content of the information as sent and received.

*Terne* (DDOD). An alloy of lead with about 15% tin. Used to coat sheet steel to inhibit corrosion.

*Terrace* (physical alteration of land). A relatively level step constructed in the face of a graded slope surface for drainage and maintenance purposes.

*Topping* (tree preservation and protection). Also referred to as stubbing, dehorning, pollarding and heading; it is the severe removal of the tree canopy back to large stubs.

*Tower or communications tower* (wireless telecommunications facilities). Any structure that is designed and constructed for the primary purpose of supporting one or more antennas, including lattice towers, guy towers, or monopole towers. The term includes radio and television transmission towers, microwave towers, common-carrier towers, cellular telephone towers, alternative tower structures, and the like. This term is not intended to describe buildings or other structures that have been constructed primarily for a purpose other than supporting one or more antennas, despite the fact that such structure may currently, or in the future, actually support one (1) or more antennas.

*Towing impound yard* (Zoning). A facility operated for the temporary storage of towed motor vehicles that are to be claimed by their title holders or agents, or transported to a repair shop.

*Towing service* (Zoning). An establishment that provides for the removal of a motor vehicle by towing, carrying, hauling or pushing from public or private property when such vehicle has been ordered to be impounded to a public or private impound yard. This shall not include a "motor vehicle repair and body shop" use that has a tow truck and services vehicles on-site.

*Transitional surfaces* (Airport Zone). A surface extending outward at 90 degree angles to the runway centerline and the runway centerline extended at a slope of 7 feet horizontally for each foot vertically from the sides of the primary and approach surfaces to where they intersect the horizontal and conical surfaces.

*Travel trailer* (zoning). A vehicular, portable structure built on a chassis, designed to be used as a temporary dwelling for travel and recreational purposes, having a body width not exceeding 8 feet.

*Tree* (Airport Zone). Any object of natural growth.

*Tree* (tree preservation and protection). Any self-supporting woody perennial plant, usually having a main stem or trunk and many branches, and at maturity normally attaining a trunk diameter greater than 3 inches at DBH and a height of over 10 feet.

*Tree preservation area* (tree preservation and protection). Those areas designated for the protection of both preserved and planted trees depicted on a tree preservation plan, abbreviated tree preservation plan, preliminary plat, large scale development, or site plan.

*Tree preservation plan* (tree preservation and protection). A site plan that delineates tree preservation areas and details measures to be taken to ensure protection and survivability of trees to be saved, prior to and during construction.

*Tree registry* (tree preservation and protection). A list of trees registered with the city due to documented historic association, rare tree species or extraordinary value because of their age, size or type.

*Tree surgery* (tree preservation and protection). Includes cavity filling/repair, bracing, cabling, and wound treatment.

*Turret* (DDOD). A small tower or tower-shaped projection on a building.

## U

*Unified Soil Classification System* (physical alteration of land). A system adopted jointly by the Corps of Engineers and Bureau of Reclamation in 1952 to classify soils according to texture, plasticity, and performance as engineering construction material.

*Unit* (building regulations). A product or equipment used in heating and air conditioning, refrigeration, ventilation, or process cooling and heating system.

*Universal soil loss equation* (physical alteration of land). An equation that was developed by USDA to determine erosion based rainfall, soil irritability, slope, length of slope, plant cover, and mulching.

*Urban* (development). Located within the corporate city limits.

*Urban Forester* (tree preservation and protection, landscape regulations). The person who is responsible for the administration of Tree Preservation and Protection, Chapter 167 and Landscape Regulations, Chapter 177. Also known as Landscape Administrator.

*Urban Forestry Advisory Board* (tree preservation and protection). An advisory committee appointed by the City Council to assist the Urban Forester with city beautification and the management of its trees.

*Urban street* (development). A street located, or to be located, within the city limits.

*Use buffer* (tree preservation and protection). Trees or other woody shrubs that serve to screen incompatible land uses, unwanted light, or noise.

*Used or occupied* (zoning). Include the words "intended", "designed", or "arranged to be used or occupied."

## V

*Variance* (flood damage prevention). A grant of relief to a person from the requirements of this ordinance when specific enforcement would result in unnecessary hardship. A variance, therefore, permits construction or development in a manner otherwise prohibited by this ordinance. (For full requirements see §60.6 of the National Flood Insurance Program regulations.

*Variance* (zoning). A variance is a relaxation of the terms of zoning, Chapters 160 through 165, where such variance will not be contrary to the public interest and where, owing to conditions peculiar to the property and not the result of the actions of the applicant, a literal enforcement would result in unnecessary and undue hardship.

*Veterinary small animal out-patient clinic* (zoning). An office where vaccination and treatment of small animals is performed; where no x-rays, surgery or treatments requiring hospitalization are performed; where no overnight boarding is permitted; and where no after-hours or weekend emergency services are performed.

*View obscuring vegetation* (zoning). A screen of live plant material that is opaque from the ground to a height of at least 6 feet intended to exclude visual contact between uses and to create a strong impression of special separation during all seasons of the year. At maturity, the screen shall be considered to be view obscuring if there are no openings of greater than one square foot.

*Violation* (flood damage prevention). The failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Chapter 168 is presumed to be in violation until such time as that documentation is provided.

*Visual runway* (Airport Zone). A runway intended solely for the operation of aircraft using visual approach procedures.

## W

*Wall sign* (signs). Any sign that shall be affixed parallel to the wall or printed on the wall of any building in such a manner as to read parallel to the wall on which it is mounted; provided, however, said wall sign shall not project above the top of the wall or beyond the end of the building. For the purpose of Chapter 174, any sign display surface that is affixed flat against the sloping surface of a mansard roof shall be considered a wall sign. Any sign that is affixed to the face of the building marquee, building awning, or a building canopy shall be considered a wall sign.

*Wastewater system improvements* (water and wastewater impact fees). Capacity-enhancing improvements to the facilities for the transmission, treatment, reclamation and disposal of wastewater. Lift

stations, force mains and gravity mains or excluded from the definition of wastewater system improvements.

*Water surface elevation* (flood damage prevention). The height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929 (or other datum where specified) of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

*Water system improvements* (water and wastewater impact fees). Capacity-enhancing improvements to the facilities for the supply, storage, transmission and distribution of potable water, excluding water lines less than 8 inches in diameter and other lines that are the minimum size needed to serve an individual development project.

*Windblown sign* (signs). Any flag, pennant, balloon, spinner, or blimp.

*Wireless communications facility (WCF)* (wireless telecommunications facilities). A land use facility that transmits and/or receives electromagnetic signals for the purpose of transmitting analog or digital voice or data communications. It includes antennas, microwave dishes, horns and other types of monopoles, or similar structures supporting said equipment, equipment buildings, shelters or cabinets, and other accessory development. Wireless communications facility includes personal wireless services as defined in the Federal Telecommunications Act of 1996, and as subsequently amended.

(Code 1965, §§13A-1; 13B-1; 17B-7(a), 19-24, 1713-2; App. A, Art. 17; App. B, §1; App. C, Art. 1, §D; Ord. No. 1509, 8-8-66; Ord. No. 1747, 6-20-70; Ord. No. 1790, 3-15-71; Ord. No. 1801, 6-21-71; Ord. No. 1859, 3-20-72; Ord. No. 1893, 12-19-72; Ord. No. 1998, 5-7-74; Ord. No. 2581, 12-4-79; Ord. No. 2697, 1-20-81; Ord. No. 2753, 8-18-81; Ord. No. 2789, 1-18-82; Ord. No. 2934, 8-2-83; Ord. No. 2948, 9-20-83; Ord. No. 3011, 6-5-84; Ord. No. 3024, 8-21-84; Ord. No. 3231, 12-2-86; Ord. No. 4024, §2, 3-28-87; Ord. No. 3298, 10-6-87; Code 1991, §§98.60, 118.01, 150.02, 156.001, 156.065, 158.03, 158.35, 159.04, 160.002, 160.096(A), 160.121, 161.06, 162.02, 163.02; Ord. No. 3551, 6-4-91; Ord. No. 3138, 11-5-85; Ord. No. 3165, 2-4-86; Ord. No. 3699, §2, 4-20-93; Ord. No. 3780, §1, 4-19-94; Ord. No. 3794, §1 5-17-94; Ord. No. 3870, §1, 4-1-94; Ord. No. 3895, 6-20-95; Ord. No. 3901, §1, 2, 7-5-95; Ord. No. 3908, §1, 7-18-95; Ord. No. 3970, §1, 7-18-95; Ord. No. 3913, §1, 8-1-95; Ord. No. 3963, §1, 4-16-96; Ord. No. 3970, §1, 5-7-96; Ord. No. 3971, §1, 5-21-96; Ord. No. 4100, §2 (Ex. A), 6-16-98; Ord. No. 4113, 8-18-98; Ord. No. 4127, 12-15-98; Ord. No. 4178, 8-31-99; Ord. No. 4226, 2-15-00; Ord. No. 4285, 1-2-01; Ord. No. 4321, 6-19-01; Ord. No. 4340, 10-2-01; Ord. 4714, 6-21-05; Ord. No. 4817, 1-03-06; Ord. No. 4847, 3-7-06; Ord. No. 4855, 4-18-06; Ord. No. 4919, 09-05-06; Ord. No. 4930, 10-03-06; Ord. No. 5028, 6-19-07; Ord. No. 5029, 6-19-07; Ord. No. 5056, 9-04-07; Ord. No. 5128, 4-15-08; Ord. No. 5206, 12-16-08; Ord. No. 5238, 5-5-09; Ord. No. 5296, 12-15-09; Ord. No. 5304, 1-19-10; Ord. No. 5312, 4-20-10; Ord. No. 5313, 4-20-10; Ord. No. 5327, 6-1-10; Ord. No. 5339, 8-3-10; Ord. No. 5352, 9-7-10; Ord. No. 5348, 9-7-10; Ord. No. 5375, 12-21-10; Ord. No. 5453, 10-18-11; Ord. No. 5490, 4-3-12; Ord. No. 5526 9-18-12; Ord. No. 5559, 01-03-13; Ord. No. 5592, 06-18-13; Ord. No. 5634, 11-05-13; Ord. No. 5653, 01-21-14; Ord. No. 5679, 4-15-14; Ord. No. 5735, 1-20-15; Ord. No. 5793, 8-18-15; Ord. No. [5866](#), §1, 4-5-16; Ord. No. [5888](#), §1, 6-21-16; Ord. No. [5901](#), §1, 9-6-16; Ord. No. [5951](#), §1, 2-7-17; Ord. No. [5986](#), §3, 7-6-17; Ord. No. [6015](#), §2, 11-21-17; Ord. No. [6087](#), §1, 9-4-18; [Ord. No. 6245](#), §1, 10-15-19)

## 166.08 - Street Design And Access Management Standards

- (A) *Intent.* These standards are intended to ensure that development is designed to be inherently safe, walkable, and efficient for the facilitation of traffic and pedestrian movements.
- (B) *Fitness for Development.* Based on topographic maps, soil surveys prepared by the Department of Agriculture and drainage information from the Future Land Use Plan and the Hillside/Hilltop Overlay District, the Planning Commission may require that steep grades, unstable soil and flood plains be set aside and not subdivided until corrections are made to protect life, health, and property.
- (C) *Applicability.* The standards set forth herein shall apply to land which is proposed to be developed with new primary structures and all other developments where the creation of public streets are required, or proposed, or in which new or existing access is created or modified; or developments or expansions containing non-conforming access features which meet the thresholds set forth in subsection (G).
- (D) *Street Design Principles.*
  - (1) Extensions. All street extensions shall be constructed to minimum street standards. Street extension stub-outs to adjacent properties are required to meet block layout/connectivity standards unless existing development or physical barriers prohibit such.
  - (2) Substandard Widths. Developments that adjoin existing streets shall dedicate additional right-of-way to meet the Master Street Plan.
  - (3) Street Names. Names of streets shall be consistent with natural alignment and extensions of existing streets, and new street names shall not duplicate or be similar to existing street names. Developers shall coordinate the naming of new streets through the GIS Office during the plat review process.
  - (4) Pedestrian. Pedestrian-vehicular conflict points should be controlled through signalized intersections and proven traffic calming design principles.
  - (5) Street Standards. All street requirements shall be met as set forth in the City of Fayetteville Master Street Plan and adopted minimum street standards.
- (E) *Block Layout/Connectivity.*
  - (1) Block Length. Block lengths and street intersections are directly tied to the functional hierarchy of the street pattern that exists or is proposed.
    - (a) ~~Principal and Minor Arterial Streets~~Regional and Regional High Activity Links. Signalized intersections should be located at a minimum of one (1) every 2,640 feet (half a mile) along regional links ~~principal and minor arterials~~ and should be based on traffic warrants.
    - (b) ~~Collectors~~Neighborhood Links. Intersections should be located at a minimum of one (1) every 1,320 feet (quarter of a mile) along neighborhood link~~collector streets~~.
    - (c) ~~Local and Residential~~Residential Link and Downtown/Urban Street. Intersections shall occur at a minimum of one (1) every 660 feet.
    - (d) Variances. Block length standards may be varied by the Planning Commission when terrain, topographical features, existing barriers or streets, size or shape of the lot, or other unusual conditions justify a departure.
  - (2) With the exception of corner lots, double-street frontage lots are prohibited except where such lots front on access restricted roadways such as expressways. Alleys are not considered as frontage. Double frontage lots may be permitted by the Planning Commission for topographical problems, feasibility issues relating to the parcel's dimensions, or other good cause which must be established and proven by the developer. The Planning Commission may impose additional landscape requirements along the back of such double-frontage lots. Unless otherwise approved by the Planning Commission, all primary structures shall be oriented toward the higher functional classification street.



- (3) **Connectivity.** Wherever a proposed development abuts undeveloped land, street stub-outs shall be provided as deemed necessary by the Planning Commission to abutting properties or to logically extend the street system.
  - (4) **Topography.** Local streets should be designed to relate to the existing topography and minimize the disturbance zone.
  - (5) **Dead-End Streets.** Dead end streets are discouraged and should only be used in situations where they are needed for design and development efficiency, reduction of necessary street paving, or where proximity to floodplains, creeks, difficult topography or existing barriers warrant their use. All dead end streets shall end in a cul-de-sac with a radius of 50 feet, or an alternative design approved by the city and the Fire Department. The maximum length of a dead end street (without a street stub-out) shall be 500 feet.
- (F) **Access Management.** Safe and adequate vehicular, bicycle, and pedestrian access shall be provided to all parcels. ~~Local-Residential link~~ streets and driveways shall not detract from the safety and efficiency of bordering arterial routes. Property that fronts onto more than one (1) public street shall place a higher priority on accessing the street with the lowest functional classification, e.g., ~~residential and neighborhood links-local-and-collector~~. In a case where the streets have the same classification, access shall be from the lower volume street, or as determined by the City Engineer.
- (1) **Curb Cut Separation.** For purposes of determining curb cut or street access separation, the separation distance shall be measured along the curb line from the edge of curb cut to the edge of curb cut/intersection. The measurement begins at the point where the curb cut and intersecting street create a right angle, i.e., the intersection of lines drawn from the face-of-curb to face-of-curb. The measurement ends at the point along the street where the closest curb cut or street intersection occurs; again, measured to the point where the curb cut or intersecting streets create a right angle at the intersection of face-of-curb. In all cases curb cuts shall be a minimum of five feet from the adjoining property line, unless shared.
  - (2) **Separation for two (2) family, three (3) family, multi-family and nonresidential development.**
    - (a) ~~Principal and Minor Arterial Streets~~**Regional and Regional High Activity Links.** Where a street with a lower functional classification exists that can be accessed, curb cuts shall access onto those streets. When necessary, curb cuts along ~~arterial-streets~~**regional links** shall be shared between two (2) or more lots. Where a curb cut must access the ~~arterial street~~**regional link**, it shall be located a minimum of 250 feet from an intersection or driveway.
    - (b) ~~Collector Streets~~**Neighborhood Links.** Curb cuts shall be located a minimum of 100 feet from an intersection or driveway. When necessary, curb cuts along ~~collector street~~**neighborhood links** shall be shared between two (2) or more lots.
    - (c) ~~Local and Residential Streets~~**Residential Links.** Curb cuts shall be located a minimum of 50 feet from an intersection or driveway. In no case shall a curb cut be located within the radius return of an adjacent curb cut or intersection.
  - (3) **Separation for Single-Family Homes.**
    - (a) For all street classifications, curb cuts shall be located a minimum of ten feet from another driveway. Driveways serving corner lots shall be located as far from the street intersection as possible while still meeting a five-foot separation from an adjoining property line. In no case shall a curb cut be located within the radius of an adjacent curb cut or street intersection.
    - (b) ~~Arterial and Collector Streets~~**Regional and Neighborhood Links.** Individual curb cuts ~~for~~ along ~~arterial and collector~~**regional and neighborhood links** streets shall be discouraged. When necessary, curb cuts along ~~arterial and collector~~**regional and neighborhood links** streets shall be shared between two (2) or more lots.
  - (4) **Reduction in separation distance.** In order to protect the ingress and egress access rights to a street of an abutting property owner, the City Engineer may reduce the separation distance of

existing and proposed access points where strict compliance proves impractical, provided that joint access driveways and cross access easements are provided wherever feasible, and the ingress/egress curb cut is placed at the safest functional location along the property.

(5) Speed. All streets should be designed to discourage excessive speeds.

(G) Non-Conforming Access Features.

(1) Existing. Permitted access connections in place on the date of the adoption of this ordinance that do not conform with the standards herein shall be designated as nonconforming features and shall be brought into compliance with the applicable standards under the following conditions:

(a) When new access connection permits are requested;

(b) Upon expansion greater than 50% of the property's appraised or market value as established by the Washington County Assessor; or

(c) As roadway improvements allow.

(d) With development of a new primary structure on the property.

(H) *Easements*. Utility and drainage easements shall be located along lot lines and/or street right-of-way where necessary to provide for utility lines and drainage. The Planning Commission may require larger easements for major utility lines, unusual terrain or drainage problems.

(Code 1965, App. C., Art. IV, §§C, D, F—H; Ord. No. 1750, 7-6-70; Ord. No. 1801, 6-21-71; Ord. No. 2196, 2-17-76; Ord. No. 2353, 7-5-77; Code 1991, §§159.45, 159.58, 159.51—159.53; Ord. No. 4100, §2 (Ex. A), 6-16-98; Ord. No. 4757, 9-6-05; Ord. No. 4919, 9-05-06; Ord. No. 5156, 8-5-08; Ord. No. 5296, 12-15-09; Ord. No. 5546, 12-04-12; Ord. No. 5642, 12-03-13; Ord. No. [6179](#), §1, 4-16-19; Ord. No. [6207](#), §§1—4, 7-16-19; [Ord. No. 6244](#), §1, 10-1-2019)

#### 166.11 - Conformance To Plans And Regulations

- (A) *Conform to Plans and Regulations.* The subdivision shall conform to the official plans and regulations that make up the Comprehensive Land Use Plan including the Future Land Use Plan, the Master Street Plan, access control, setback ordinances, the Community Facilities Plan and Zoning, Chapters 160 through 164.
- (B) *Reserve Sites for Public Use.*
  - (1) For a period of six (6) months after submitting application for approval of a preliminary plat with the Planning Commission, the Planning Commission may require the subdivider to reserve sites for public use that are indicated within the boundaries of the proposed subdivision which are indicated on an officially adopted plan, to permit the public board, commission, or body having jurisdiction, or financial responsibility, the opportunity to acquire said sites.
  - (2) The subdivider at his option may provide such areas or may be required to make them available for acquisition by the city under statutory procedure. All such areas shall be maintained at the expense of the city or other body which may be involved.
- (C) *Future Acquisition.* The Planning Commission may require the subdivider to establish building lines to allow for future acquisition of right-of-way for ~~arterial~~ streets on the Master Street Plan.

(Code 1965, App. A., Art. 8(10.1); Ord. No. 1747, 6-29-70; Ord. No. 3073, 3-19-86; Code 1991, §160.119; Ord. No. 4100, §2 (Ex. A), 6-16-98; Ord. No. 4919; 9-05-06)



## 171.06 - Procedure For Closing Public Utility Easements And Street Rights-Of-Way

The procedure for closing of streets, public easements, and alleys shall hereafter be as follows:

- (A) *Information to City Planning Division.* Petitioners shall present to the City Planning Division ~~in duplicate~~ the following information before processing shall begin:
- (1) *Petition.* Petition to vacate public easement or right-of-way, including a certified or photostatic copy of the plat on record in the Circuit Clerk's office.
  - (2) *Documentation of Ownership.* Abstractor's certificate of ownership or other acceptable documentation of ownership of the area to be vacated and properties adjacent to the vacated area.
  - (3) *Utilities comments.* Comments from owners or agents, of all utility companies concerning public easements or rights of way to be vacated and its relationship to existing or planned utilities, with recommendations, as to what action should be taken. If a franchise utility company fails to provide comments within a reasonable time, evidence of the petitioner's solicitation of comment may be sufficient for that utility company. This evidence shall be a letter or other correspondence that includes the date of contact and contact information of the utility representative contacted.
- ~~(B) *Information to Planning Commission.* The above shall be presented by the Planning Division to the Planning Commission for rights of way considered for vacation. The Planning Commission shall review and make recommendation to forward to the City Council.~~
- ~~(C) *Information to City Council/Planning Commission.* One (1) copy of the above shall be presented by the Planning Division directly to the Planning Commission/City Council for public easements considered for vacation, for review and recommendation.~~
- ~~(G) *Recommendation to City Council.* The recommendation of the Planning Commission shall be forwarded to the City Council.~~
- (D) *Record with Circuit Clerk.* If an ordinance is adopted vacating the public easement or right of way, it shall be published and reported in the Circuit Clerk's office.
- ~~(E) *Exception.* The vacation request need not be presented to the Planning Commission before being submitted to the City Council if the City Council finds the following by a vote of at least two-thirds (2/3) of its membership and the Mayor:~~
- ~~(1) The public easement or right of way to be vacated has not been constructed or has not been used by the public for at least five (5) years or the easement does not contain any utilities within the area to be vacated; and~~
  - ~~(2) Special circumstances exist which require prompt consideration of the vacation request and justify the bypass of the Planning Commission.~~

(Code 1965, §18-15; Ord. No. 1685, 7-7-69; Ord. No. 1898, 1-16-73; Code 1991, §98.13; Ord. No. 3925, §1, 10-3-95; Ord. No. 4100, §2 (Ex. A), 6-16-98; Ord. No. 5127, 4-01-08; Ord. No. 5789, Repealed & Replaced Chp. 171, 8-4-15)

### 171.13 - Property Owner To Construct Sidewalk Or Contribute Cost Of Sidewalk

- (A) *Requirement.* The owner of any property abutting a public street or highway for which a sidewalk is required by the city's Master Street Plan shall construct a sidewalk in accordance with this chapter, along said street or highway upon the receipt of notice issued at the time a building ~~or parking lot permit is issued.~~
- (1) The property owner shall construct the sidewalk in accordance with the specifications provided in the Minimum Street Standards.
  - (2) The property owner may request a waiver to §171.13(A)(1) requiring sidewalk construction. The City Engineer shall review the following factors to determine whether or not to grant a waiver:
    - (a) Pedestrian traffic generators such as parks and schools in the area.
    - (b) The existence of a sidewalk network in the area.
    - (c) The density of current and future development in the area.
    - (d) The amount of pedestrian traffic likely to be generated by the proposed development.
    - (e) Whether the terrain is such that a sidewalk is physically practical and feasible, and the extent to which trees, ground cover and natural areas would be adversely impacted by the construction of the sidewalk.
    - (f) The overall need for a sidewalk to be constructed on the lot.
  - (3) If the City Engineer grants the waiver to construct a sidewalk, the owner shall have an option to construct the sidewalk, or to contribute money in lieu of construction as set forth below:
    - (a) The amount of money in lieu of construction to be dedicated shall be determined based upon the rough proportionality of the impact of the development upon the sidewalk infrastructure needs near the development including consideration of the persons served by the development and approximate pedestrian trip generation rates of the development.
    - ~~(b) To facilitate administration of this ordinance for certain recurrent types of development, the City Council has determined that the city will accept, as the roughly proportionate impact, the amount shown below:~~
      - ~~(i) Single family house: \$630.00.~~
      - ~~(ii) Duplex: \$720.00.~~
    - (c) Unless the developer presents evidence that the number of persons served by the development and the pedestrian trip generation rates of the development justify a reduced contribution in lieu of the construction of sidewalks, all ~~industrial, commercial, and multi-family~~ developments shall make a cash contribution in lieu of the construction of the sidewalk at a rate of ~~\$53.00~~ per square foot of the sidewalk that normally would have been required. The amount per square foot ~~and amounts for a single family house and a duplex~~ shall be reviewed by the City Council at least every five (5) years.
    - (d) Contribution in lieu of construction of sidewalks shall be paid or construction of the sidewalks shall be completed before receiving final plat approval, or issuance of a certificate of occupancy.
    - (e) Contributions must be expended within one (1) year to build a sidewalk close enough to serve the project being constructed.
    - (f) If the owner voluntarily consents in writing, the contributions may be used to construct sidewalk projects where most needed as determined by the City Engineer.

- (4) An owner/builder may appeal the City Engineer's refusal to grant a waiver or the administrator's determination of the amount of contribution in lieu of construction to the Planning Commission pursuant to §155.06(D).

(B) *Application of Provisions.* The provisions of this section shall only apply to the following property:

- (1) *New Structure.* On which a new structure is being built;
- (2) *Existing Residential Structure.* On which an existing residential structure is being modified so as to increase the number of dwelling units located therein or to change the use of the nonresidential use.
- (3) *Parking Lot/Garage.* On which a [new or expanded](#) parking lot, or parking garage having a minimum capacity of five (5) automobiles is constructed.
- (4) *Building Additions .* Additions of 2,500 square feet or larger.
- (5) *Conditional Use.* Any development which requires conditional use approval.

(Code 1965, §18-31; Ord. No. 2653, 8-5-80; Ord. No. 2780, 11-17-81; Ord. No. 2917, 5-3-83; Ord. No. 3113, 9-3-85; Code 1991, §98.66; Ord. No. 4100, §2 (Ex. A), 6-16-98; Ord. No. 4311, 5-1-01; Ord. No. 4387, 4-16-02; Ord. No. 5789, Repealed & Replaced Chp. 171, 8-4-15)

- (4) *Entrances and Internal Aisle Design for Parking Lots Containing Nine (9) or More Parking Spaces.* The driveway width into parking lots shall meet the following requirements:

(a) *Entrances.*

- (i) *One-Way Access to Parking Lots.* If the driveway is a one-way in or one-way out, then the driveway width shall be a minimum of 12 feet and a maximum of 16 feet.
- (ii) *Two-Way Access to Parking Lots.* For two (2) way access, the driveway width shall be a minimum 20 feet and a maximum width of 24 feet, unless otherwise required by the Fire Department.
- (iii) ~~Neighborhood and Regional Links~~*Collector and Arterial Streets.* Driveways that enter ~~collector and arterial~~*neighborhood and regional link* streets may be required to have two (2) outbound lanes (one for each turning direction) and one inbound lane for a maximum total driveway width of 39 feet.
- (iv) *Effective Curb Radius.* All driveways serving 9 or more parking spaces shall have an effective curb radius of 15 feet for curb cuts on ~~local residential link~~ streets and an effective curb cut radius of 20 feet for ~~collector, minor arterial and arterial~~*neighborhood and regional link* streets.

(b) *Internal Aisle Design.*

- (i) Aisles shall be designed so that they intersect at 90 degrees with other aisles and driveways where practical.
- (ii) Aisles shall be designed to discourage cut-through traffic by use of landscape islands, and shall meet the requirements of Chapter 177: Landscape Regulations.
- (iii) Aisles shall conform to the dimensional requirements of §172.04(C).

Parking Lots With Nine (9) Spaces or More	
	Driveway Dimensional Requirement
One Way Access	12 feet Minimum - 16 feet Maximum
Two Way Access	2 Drive Lanes 10 feet Minimum Each - 24 feet Maximum Total Driveway Width
<del>Collector/Arterial</del> <i>Neighborhood/Regional</i>	3 Drive Lanes - Maximum of



<u>Link Streets</u>	39 feet
Effective Curb Radius - <del>Local</del> <u>Residential Link</u>	15 feet
Effective Curb Radius - <del>Collector/ Arterial</del> <u>Neighborhood/Regional Link</u>	20 feet

# **Exhibit A**

## **§ 151.01 Definitions**

1. Repeal and replace the definition of Collector Street as follows: "Collector Street. Equivalent to a Neighborhood Link in the 2040 Master Street Plan."
2. Insert the following definitions:

Neighborhood Link. A street in which in addition to serving abutting properties, provides a bridge between minor streets and community facilities and the larger arterial/regional link street system. Equivalent to a Collector Street in previous Master Street Plans.

Regional Link. A street or road intended to carry local and regional multi-modal traffic, serving low-density residential areas and open spaces. Equivalent to a Minor Arterial Street in previous Master Street Plans.

Regional Link, High Activity. A street or road intended to carry local and regional multi-modal traffic through a variety of densities and land uses. Equivalent to a Major Arterial Street in previous Master Street Plans.

Residential Link. Intended to be the standard in neighborhoods and low-volume streets outside of downtown. Equivalent to a Local Street in previous Master Street Plans.

Residential Link, Alternative. Intended to reduce the footprint of the residential streetscape in areas where historic precedent, environmental characteristics, traffic volumes, or land uses support reduced rights-of-way. Equivalent to Residential or Low-Impact Development Streets in previous Master Street Plans."

3. Repeal the references to and definitions of "Street, arterial" and "Street, collector."

## **Exhibit B**

**Repeal and Replace § 166.04(B)(3)(g) as shown below:**

(g) *Streetlights*. Standard 8,000 lumen streetlights (or equal alternative approved by the Planning Division) shall be installed at each intersection or cul-de-sac and along one side of each street or cul-de-sac at intervals of no more than 300 feet; provided, streetlights of higher intensity may be required at intersections with neighborhood or regional links. Developers are encouraged to utilize high-efficiency (LED or similar) streetlights where possible.

# **Exhibit C**

## **Repeal and Replace § 166.08 as shown below:**

### **166.08 - Street Design And Access Management Standards**

- (A) *Intent.* These standards are intended to ensure that development is designed to be inherently safe, walkable, and efficient for the facilitation of traffic and pedestrian movements.
- (B) *Fitness for Development.* Based on topographic maps, soil surveys prepared by the Department of Agriculture and drainage information from the Future Land Use Plan and the Hillside/Hilltop Overlay District, the Planning Commission may require that steep grades, unstable soil and flood plains be set aside and not subdivided until corrections are made to protect life, health, and property.
- (C) *Applicability.* The standards set forth herein shall apply to land which is proposed to be developed with new primary structures and all other developments where the creation of public streets are required, or proposed, or in which new or existing access is created or modified; or developments or expansions containing non-conforming access features which meet the thresholds set forth in subsection (G).
- (D) *Street Design Principles.*
  - (1) *Extensions.* All street extensions shall be constructed to minimum street standards. Street extension stub-outs to adjacent properties are required to meet block layout/connectivity standards unless existing development or physical barriers prohibit such.
  - (2) *Substandard Widths.* Developments that adjoin existing streets shall dedicate additional right-of-way to meet the Master Street Plan.
  - (3) *Street Names.* Names of streets shall be consistent with natural alignment and extensions of existing streets, and new street names shall not duplicate or be similar to existing street names. Developers shall coordinate the naming of new streets through the GIS Office during the plat review process.
  - (4) *Pedestrian.* Pedestrian-vehicular conflict points should be controlled through signalized intersections and proven traffic calming design principles.
  - (5) *Street Standards.* All street requirements shall be met as set forth in the City of Fayetteville Master Street Plan and adopted minimum street standards.
- (E) *Block Layout/Connectivity.*
  - (1) *Block Length.* Block lengths and street intersections are directly tied to the functional hierarchy of the street pattern that exists or is proposed.
    - (a) *Regional and Regional High Activity Links.* Signalized intersections should be located at a minimum of one (1) every 2,640 feet (half a mile) along regional links and should be based on traffic warrants.
    - (b) *Neighborhood Links.* Intersections should be located at a minimum of one (1) every 1,320 feet (quarter of a mile) along neighborhood links.
    - (c) *Residential Link and Downtown/Urban Street.* Intersections shall occur at a minimum of one (1) every 660 feet.
    - (d) *Variances.* Block length standards may be varied by the Planning Commission when terrain, topographical features, existing barriers or streets, size or shape of the lot, or other unusual conditions justify a departure.
  - (2) With the exception of corner lots, double-street frontage lots are prohibited except where such lots front on access restricted roadways such as expressways. Alleys are not considered as

frontage. Double frontage lots may be permitted by the Planning Commission for topographical problems, feasibility issues relating to the parcel's dimensions, or other good cause which must be established and proven by the developer. The Planning Commission may impose additional landscape requirements along the back of such double-frontage lots. Unless otherwise approved by the Planning Commission, all primary structures shall be oriented toward the higher functional classification street.

- (3) **Connectivity.** Wherever a proposed development abuts undeveloped land, street stub-outs shall be provided as deemed necessary by the Planning Commission to abutting properties or to logically extend the street system.
  - (4) **Topography.** Local streets should be designed to relate to the existing topography and minimize the disturbance zone.
  - (5) **Dead-End Streets.** Dead end streets are discouraged and should only be used in situations where they are needed for design and development efficiency, reduction of necessary street paving, or where proximity to floodplains, creeks, difficult topography or existing barriers warrant their use. All dead end streets shall end in a cul-de-sac with a radius of 50 feet, or an alternative design approved by the city and the Fire Department. The maximum length of a dead end street (without a street stub-out) shall be 500 feet.
- (F) **Access Management.** Safe and adequate vehicular, bicycle, and pedestrian access shall be provided to all parcels. Residential link streets and driveways shall not detract from the safety and efficiency of bordering arterial routes. Property that fronts onto more than one (1) public street shall place a higher priority on accessing the street with the lowest functional classification, e.g., residential and neighborhood links. In a case where the streets have the same classification, access shall be from the lower volume street, or as determined by the City Engineer.
- (1) **Curb Cut Separation.** For purposes of determining curb cut or street access separation, the separation distance shall be measured along the curb line from the edge of curb cut to the edge of curb cut/intersection. The measurement begins at the point where the curb cut and intersecting street create a right angle, i.e., the intersection of lines drawn from the face-of-curb to face-of-curb. The measurement ends at the point along the street where the closest curb cut or street intersection occurs; again, measured to the point where the curb cut or intersecting streets create a right angle at the intersection of face-of-curb. In all cases curb cuts shall be a minimum of five feet from the adjoining property line, unless shared.
  - (2) **Separation for two (2) family, three (3) family, multi-family and nonresidential development.**
    - (a) **Regional and Regional High Activity Links.** Where a street with a lower functional classification exists that can be accessed, curb cuts shall access onto those streets. When necessary, curb cuts along regional links shall be shared between two (2) or more lots. Where a curb cut must access the regional link, it shall be located a minimum of 250 feet from an intersection or driveway.
    - (b) **Neighborhood Links.** Curb cuts shall be located a minimum of 100 feet from an intersection or driveway. When necessary, curb cuts along neighborhood links shall be shared between two (2) or more lots.
    - (c) **Residential Links.** Curb cuts shall be located a minimum of 50 feet from an intersection or driveway. In no case shall a curb cut be located within the radius return of an adjacent curb cut or intersection.
  - (3) **Separation for Single-Family Homes.**
    - (a) For all street classifications, curb cuts shall be located a minimum of ten feet from another driveway. Driveways serving corner lots shall be located as far from the street intersection as possible while still meeting a five-foot separation from an adjoining property line. In no case shall a curb cut be located within the radius of an adjacent curb cut or street intersection.

- (b) Regional and Neighborhood Links. Individual curb cuts along regional and neighborhood links streets shall be discouraged. When necessary, curb cuts along regional and neighborhood link streets shall be shared between two (2) or more lots.
  - (4) Reduction in separation distance. In order to protect the ingress and egress access rights to a street of an abutting property owner, the City Engineer may reduce the separation distance of existing and proposed access points where strict compliance proves impractical, provided that joint access driveways and cross access easements are provided wherever feasible, and the ingress/egress curb cut is placed at the safest functional location along the property.
  - (5) Speed. All streets should be designed to discourage excessive speeds.
- (G) Non-Conforming Access Features.
- (1) Existing. Permitted access connections in place on the date of the adoption of this ordinance that do not conform with the standards herein shall be designated as nonconforming features and shall be brought into compliance with the applicable standards under the following conditions:
    - (a) When new access connection permits are requested;
    - (b) Upon expansion greater than 50% of the property's appraised or market value as established by the Washington County Assessor; or
    - (c) As roadway improvements allow.
    - (d) With development of a new primary structure on the property.
- (H) *Easements*. Utility and drainage easements shall be located along lot lines and/or street right-of-way where necessary to provide for utility lines and drainage. The Planning Commission may require larger easements for major utility lines, unusual terrain or drainage problems.

## **Exhibit D**

**Repeal and replace § 166.11 as shown below:**

166.11 - Conformance To Plans And Regulations

- (A) *Conform to Plans and Regulations.* The subdivision shall conform to the official plans and regulations that make up the Comprehensive Land Use Plan including the Future Land Use Plan, the Master Street Plan, access control, setback ordinances, the Community Facilities Plan and Zoning, Chapters 160 through 164.
- (B) *Reserve Sites for Public Use.*
  - (1) For a period of six (6) months after submitting application for approval of a preliminary plat with the Planning Commission, the Planning Commission may require the subdivider to reserve sites for public use that are indicated within the boundaries of the proposed subdivision which are indicated on an officially adopted plan, to permit the public board, commission, or body having jurisdiction, or financial responsibility, the opportunity to acquire said sites.
  - (2) The subdivider at his or her option may provide such areas or may be required to make them available for acquisition by the city under statutory procedure. All such areas shall be maintained at the expense of the city or other body which may be involved.
- (C) *Future Acquisition.* The Planning Commission may require the subdivider to establish building lines to allow for future acquisition of right-of-way for streets on the Master Street Plan.

# **Exhibit E**

**Repeal and replace § 171.06 as shown below:**

171.06 - Procedure For Closing Public Utility Easements And Street Rights-Of-Way

The procedure for closing of streets, public easements, and alleys shall hereafter be as follows:

- (A) *Information to City Planning Division.* Petitioners shall present to the City Planning Division the following information before processing shall begin:
  - (1) *Petition.* Petition to vacate public easement or right-of-way, including a certified or photostatic copy of the plat on record in the Circuit Clerk's office.
  - (2) *Documentation of Ownership.* Abstractor's certificate of ownership or other acceptable documentation of ownership of the area to be vacated and properties adjacent to the vacated area.
- (3) *Utilities comments.* Comments from owners or agents, of all utility companies concerning public easements or rights of way to be vacated and its relationship to existing or planned utilities, with recommendations, as to what action should be taken. If a franchise utility company fails to provide comments within a reasonable time, evidence of the petitioner's solicitation of comment may be sufficient for that utility company. This evidence shall be a letter or other correspondence that includes the date of contact and contact information of the utility representative contacted. (B) *Information to Planning Commission.* The above shall be presented by the Planning Division to the Planning Commission for rights of way considered for vacation. The Planning Commission shall review and make recommendation to forward to the City Council.
- (C) *Information to City Council.* The above shall be presented by the Planning Division directly to the City Council for public easements considered for vacation.
- ((D) *Record with Circuit Clerk.* If an ordinance is adopted vacating the public easement or right of way, it shall be published and reported in the Circuit Clerk's office.



# **Exhibit F**

## **Repeal and replace § 171.13 as shown below:**

### **171.13 - Property Owner To Construct Sidewalk Or Contribute Cost Of Sidewalk**

- (A) *Requirement.* The owner of any property abutting a public street or highway for which a sidewalk is required by the city's Master Street Plan shall construct a sidewalk in accordance with this chapter, along said street or highway upon the receipt of notice issued at the time a building permit is issued.
- (1) The property owner shall construct the sidewalk in accordance with the specifications provided in the Minimum Street Standards.
  - (2) The property owner may request a waiver to §171.13(A)(1) requiring sidewalk construction. The City Engineer shall review the following factors to determine whether or not to grant a waiver:
    - (a) Pedestrian traffic generators such as parks and schools in the area.
    - (b) The existence of a sidewalk network in the area.
    - (c) The density of current and future development in the area.
    - (d) The amount of pedestrian traffic likely to be generated by the proposed development.
    - (e) Whether the terrain is such that a sidewalk is physically practical and feasible, and the extent to which trees, ground cover and natural areas would be adversely impacted by the construction of the sidewalk.
    - (f) The overall need for a sidewalk to be constructed on the lot.
  - (3) If the City Engineer grants the waiver to construct a sidewalk, the owner shall have an option to construct the sidewalk, or to contribute money in lieu of construction as set forth below:
    - (a) The amount of money in lieu of construction to be dedicated shall be determined based upon the rough proportionality of the impact of the development upon the sidewalk infrastructure needs near the development including consideration of the persons served by the development and approximate pedestrian trip generation rates of the development.
    - (b) Unless the developer presents evidence that the number of persons served by the development and the pedestrian trip generation rates of the development justify a reduced contribution in lieu of the construction of sidewalks, all developments shall make a cash contribution in lieu of the construction of the sidewalk at a rate of \$5.00 per square foot of the sidewalk that normally would have been required. The amount per square foot shall be reviewed by the City Council at least every five (5) years.
    - (c) Contribution in lieu of construction of sidewalks shall be paid or construction of the sidewalks shall be completed before receiving final plat approval, or issuance of a certificate of occupancy.
    - (d) Contributions must be expended within one (1) year to build a sidewalk close enough to serve the project being constructed.
    - (e) If the owner voluntarily consents in writing, the contributions may be used to construct sidewalk projects where most needed as determined by the City Engineer.
  - (4) An owner/builder may appeal the City Engineer's refusal to grant a waiver or the administrator's determination of the amount of contribution in lieu of construction to the Planning Commission pursuant to §155.06(D).
- (B) *Application of Provisions.* The provisions of this section shall only apply to the following property:
- (1) *New Structure.* On which a new structure is being built;

- (2) *Existing Residential Structure.* On which an existing residential structure is being modified so as to increase the number of dwelling units located therein or to change the use of the nonresidential use.
- (3) *Parking Lot/Garage.* On which a new or expanded parking lot, or parking garage having a minimum capacity of five (5) automobiles is constructed.
- (4) *Building Additions.* Additions of 2,500 square feet or larger.
- (5) *Conditional Use.* Any development which requires conditional use approval.

# Exhibit G

**Repeal and replace § 172.04(F)(4) as shown below:**

(4) *Entrances and Internal Aisle Design for Parking Lots Containing Nine (9) or More Parking Spaces.* The driveway width into parking lots shall meet the following requirements:

(a) *Entrances.*

- (i) *One-Way Access to Parking Lots.* If the driveway is a one-way in or one-way out, then the driveway width shall be a minimum of 12 feet and a maximum of 16 feet.
- (ii) *Two-Way Access to Parking Lots.* For two (2) way access, the driveway width shall be a minimum 20 feet and a maximum width of 24 feet, unless otherwise required by the Fire Department.
- (iii) *Neighborhood and Regional Links.* Driveways that enter neighborhood and regional link streets may be required to have two (2) outbound lanes (one for each turning direction) and one inbound lane for a maximum total driveway width of 39 feet.
- (iv) *Effective Curb Radius.* All driveways serving 9 or more parking spaces shall have an effective curb radius of 15 feet for curb cuts on residential link streets and an effective curb cut radius of 20 feet for neighborhood and regional link streets.

(b) *Internal Aisle Design.*

- (i) Aisles shall be designed so that they intersect at 90 degrees with other aisles and driveways where practical.
- (ii) Aisles shall be designed to discourage cut-through traffic by use of landscape islands, and shall meet the requirements of Chapter 177: Landscape Regulations.
- (iii) Aisles shall conform to the dimensional requirements of §172.04(C).

Parking Lots With Nine (9) Spaces or More	
	Driveway Dimensional Requirement
One Way Access	12 feet Minimum - 16 feet Maximum
Two Way Access	2 Drive Lanes 10 feet Minimum Each - 24 feet Maximum Total Driveway Width
Neighborhood/Regional Link	3 Drive Lanes - Maximum of 39 feet
Effective Curb Radius - Residential Link	15 feet
Effective Curb Radius - Neighborhood/Regional Link	20 feet