



Bryant Planning Commission Meeting

Monday, October 11, 2021

5:00 PM

Boswell Municipal Complex-City Hall Courtroom
210 SW 3rd Street

Or watch live on YouTube at:

<https://www.youtube.com/c/BryantArkansas>

Agenda

CALL TO ORDER

PRESENTATION

1. City of Bryant Public Works - Presentation on Proposed Update for Master Street Plan Specifications

QUESTIONS AND COMMENTS

1. Planning Commission Comments and Questions about Proposal
2. Public Comments and Questions about Proposal
3. Final Comments and Discussion from Commission

ADJOURNMENT



2021 Bryant Public Works - Minimum Street Specification Update

1.6 Modifications

- Need Planning Commission Approval

2.7 Work within ROW

- No new excavations or bores after 1pm on Fridays/weekend
- Insurance, performance bond, maintenance guarantee

2.9 Acceptance by the City

- Detailed list before city accepts street/drainage
- Street acceptance: Bond 2 years/100% of cost (previous 1 year/25%)

2.12 Off-site Street and Drainage improvements

- Detail when and why and review/approval by City
- Previous spec conflicted with current SW manual

3.0 Traffic Study

- Previous spec set at 5000 ADT, only applies to very large development

5.4 Intersections

- Figure 1 defines sight distance spec

5.8 Driveways

- Permit/Sight plan
- ROW construction materials and requirements (none in previous spec)

5.12 Street Lights

- Previous spec conflicted with adopted Master Street Lighting Plan

6.0 Pavement Design

- Subgrade and pavement thickness based on ADT and classification of street
- Based on recommended practices of ARDOT

6.3 Geotechnical Requirements

- more details, expands past moisture and density only (outdated method)

7.4 Boring and Jacking

- Depth requirements (provides safety to existing infrastructure)

9.0 Quality Control Testing and Inspections

- Established multiplying fee for repeat proof roll testing
- Defines locations, testing intervals, for density and coring locations

Appendix A Street Profiles

- Profiles match Master Transportation Plan - Walk, Bike, Drive
- Previous spec had conflicting dimensions
- DRC/Planning Commission as defining bodies
- Sidewalk dimension match Master Transportation Plan



Driveway Access Permit

Application & Checklist

Access application at www.cityofbryant.com/916/Street-Department

OFFICE USE ONLY

Permit #: _____ Fee: \$ _____

Approved By: _____

Approved Date: _____

PERMIT FEES WILL DOUBLE IF WORK BEGINS BEFORE PERMIT IS APPROVED

Owner should contact City prior to submitting plans for review. Incomplete applications will not be accepted.

Property Information	Site Address _____ Parcel No. encompassing Site _____ Subdivision _____ Lot-Block _____ Phase _____ Acreage _____ Zoning _____ Permit associated with approval for: <input type="checkbox"/> Final Plat <input type="checkbox"/> Preliminary Plat <input type="checkbox"/> Site Plan <input type="checkbox"/> Small Scale Development <input type="checkbox"/> Large Scale Development Access Management Plan? (Y/N) _____ <small>(see with O-2009-08; O-2012-01; O-2018-5; O-2020-21)</small> Driveway Type <input type="checkbox"/> Residential <input type="checkbox"/> Non-Residential Joint Access Agreement (Y/N) _____ Cross Access Agreement (Y/N) _____	Driveway Description	<input type="checkbox"/> Commercial Driveway <input type="checkbox"/> Non-Commercial Driveway <input type="checkbox"/> Existing Driveway Repair <input type="checkbox"/> Additional Driveway Distance between driveway access point and nearest existing driveway _____ feet * existing public street _____ feet * <i>* Sec. 5 of Street Specifications and/or AMP</i> Proposed driveway surface width: _____ feet ** <i>** shall not exceed max width requirements</i> Proposed driveway surface type: _____ Drainage Culvert Type: _____ Drainage Culvert Size: _____ Length: _____ To be located _____ feet from edge of pavement. Road Right-of-way: _____ feet
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Owner	Name _____ Phone _____ Address _____ Fax _____ City, State, Zip _____ E-mail _____	<input type="checkbox"/> Select if this is the primary contact
--------------	--	--

Contractor	Name _____ Phone _____ Address _____ Fax _____ City, State, Zip _____ E-mail _____	<input type="checkbox"/> Select if this is the primary contact
-------------------	--	--

SUBMITTAL CHECKLIST: (All items must be submitted before the application will be processed)

- 1. Fee.**
- 2. Site Plan.** Scaled site plan showing property lines, apron, curb/gutter, culverts, north arrow, rights-of-way, distance relative to adjacent streets, drives, or other access points ~~intersection encroachments into 'visibility triangle' prohibited by Code.~~
See residential driveway example drawing at back of application for example site plan for residential driveways. Commercial driveways shall be designed and stamped by a professional engineer.

Property Owner/ Authorized Agent: I certify that the foregoing statements and answers herein made all data, information, and evidence herewith submitted are in all respects, to the best of my knowledge and belief, true and correct. I understand that submittal of incorrect or false information is grounds for invalidation of application completeness, determination, or approval. I understand that the City might not approve what I am applying for, or might set conditions on approval. I certify that I am the owner or authorized agent of the property that is the subject of this application.

Signature _____

Date _____



Driveway Access Agreement

In consideration of these regulations, the applicant and the City of Bryant subscribe to the following agreement:

1. That applicant is granted permission to construct a driveway(s) pursuant to the regulations of the City of Bryant. The City of Bryant waives none of its powers or rights to direct the removal, relocation and/or proper maintenance of any driveway within the right-of-way of a city street.
2. That all work will be performed in a neat and workmanlike manner, using materials acceptable to the City of Bryant, and as may be specified in its Code of Ordinances, and that the right-of-way will be cleaned up and left in presentable condition upon completion of the described work.
3. That the applicant will fully protect the traffic on the street during construction covered hereunder by the proper traffic control devices in accordance with Part 6, Temporary Traffic Control, of the Manual on Uniform Traffic Control Devices (MUTCD), latest edition, and to hold harmless and indemnify the City of Bryant, its officers and employees from all damages, expenses, claims or liability arising out of any alleged damages of any nature to any person or property, due to construction, performance or non-performance of work, or existence of said driveway.
4. Permittee shall be responsible for locating and protecting all utilities in the work area(s) and to hold harmless and indemnify the City of Bryant and its duly appointed agents, officers and employees, from all damages, expenses, claims or liability arising out of any alleged damages of any nature to any utilities due to the construction, performance, or non-performance of work.
5. That the applicant is either the owner or has the legal right to possession and control of the parcel of property adjacent to the right-of-way frontage within which the said proposed driveway(s) is to be constructed.
6. That no driveway shall be constructed such that there will be parking or servicing of vehicles on the street right- of-way.
7. That the profile grade of driveways shall be constructed as indicated on the requisite site plan(s) submitted.
8. Deposit or surety bond in the amount below must be deposited with the City of Bryant's Recorder/Treasurer at 210 S.W. 3rd St., Bryant Arkansas, prior to the issuance of any commercial driveway access permit. If the work is completed as specified, the deposit will be returned. However, if permitting requirements are not met, the City of Bryant shall revoke the permit, call for the deposit or bond, and remove the driveway.
9. The grantee shall maintain all existing street signage (i.e. regulatory, warning, guide and informational) in an effective location at all times for the duration of the work, and shall install said signage at the correct location upon completion of the work. Any signs damaged by the grantee shall be replaced at no cost to the City.
10. Mailbox support: If you are also going to install a new or replacement mailbox, please let us know and the City of Bryant will provide detailed information on approved mailbox installations including supports, boxes, and mountings. Please note there are in excess of 30 million mailboxes in the United States. As many as 100 fatalities a year occur as a result of vehicles colliding with these mailboxes. Reducing the risk of injury and/or civil action is accomplished when mailboxes are installed using approved methods and materials that are designed with road safety in mind. Remember, the mailbox owner may be held liable in case of collision.

SPECIAL PROVISIONS

Deposit/Surety Bond \$ _____

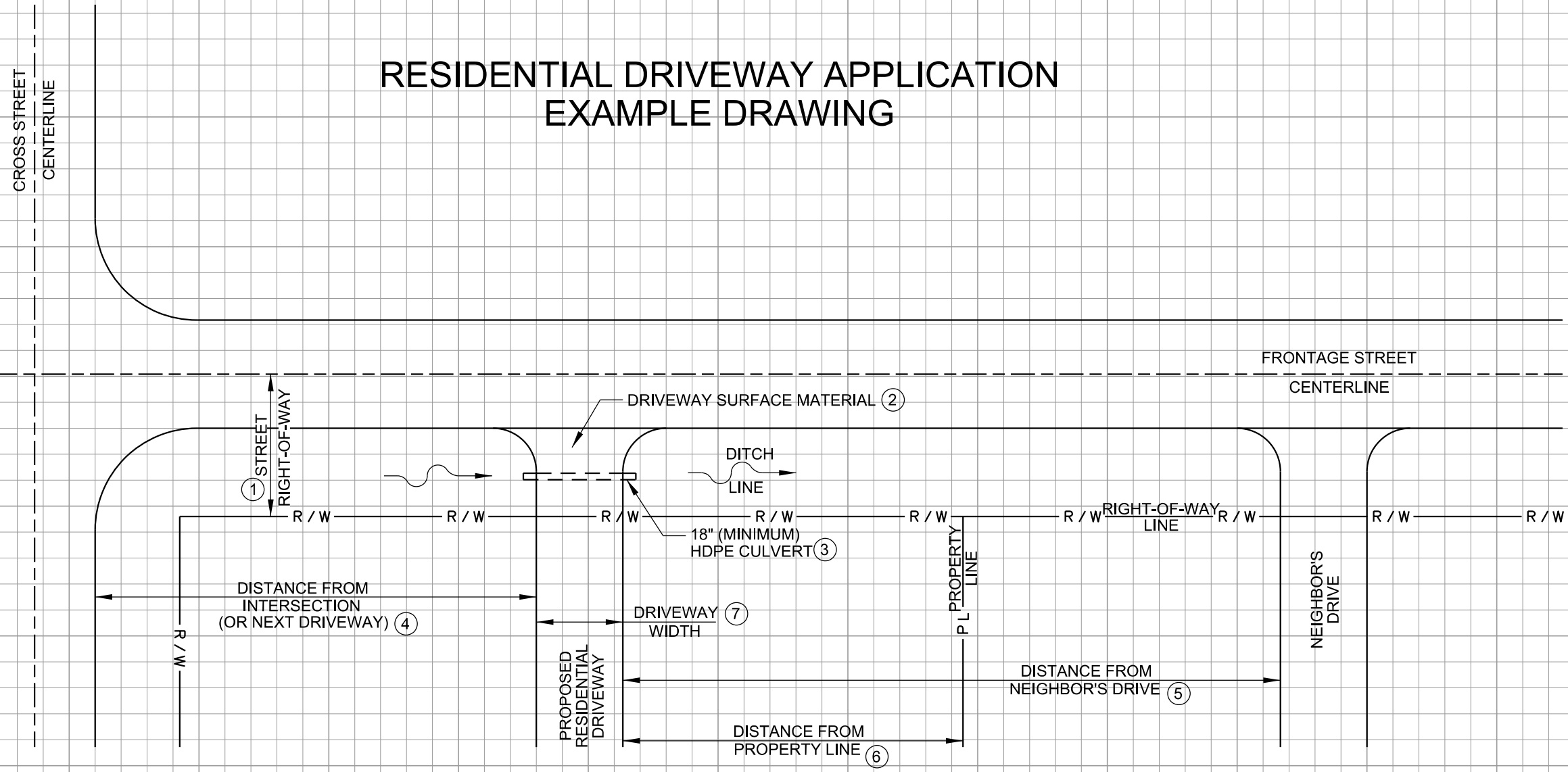
Expiration Date _____

Applicant

City of Bryant

Date

RESIDENTIAL DRIVEWAY APPLICATION EXAMPLE DRAWING



IMPORTANT INFORMATION

- EXAMPLE IS FOR RESIDENTIAL DRIVEWAYS ONLY. COMMERCIAL DRIVEWAYS MUST BE SUBMITTED BY A LICENCED PROFESSIONAL ENGINEER.
- APPLICANTS SHOULD REVIEW BRYANT'S MINIMUM STANDARD SPECIFICATIONS FOR STREETS BEFORE SUBMITTAL.
- APPLICANTS REQUESTING ALTERNATE METHODS OF DRIVEWAY DESIGNS & METHODS MUST HAVE PRIOR APPROVAL FROM BRYANT PUBLIC WORKS BEFORE CONSTRUCTION.

GENERAL NOTES

- ① STREET RIGHT OF WAY CAN BE DETERMINED FROM THE BRYANT PUBLIC WORKS
- ② SEE STREET SPEC. SECTION 5.8.D DRIVEWAY DESIGN STANDARDS
- ③ SEE STREET SPEC. SECTION 8.2 STORM DRAIN MAIN
- ④ SEE STREET SPEC. SECTION 5.8 FOR DRIVEWAYS
- ⑤ SEE STREET SPEC. SECTION 5.8.B FOR SPACING
- ⑥ SEE STREET SPEC. SECTION 5.8.B.2 FOR PROPERTY LINE SPACING
- ⑦ SEE STREET SPEC. SECTION 5.8.B.3 FOR DRIVEWAY WIDTHS

ADD TITLEBLOCK

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ADD TITLEBLOCK

Highlighted Version Documenting Changes to the
MINIMUM STANDARD
SPECIFICATIONS FOR STREETS



City of Bryant, Arkansas
August 2021

LEGEND

- TEXT** = Recommended New Text
- TEXT** = Additional Review Needed



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Appendix A STANDARD DETAILS



1.0 GENERAL PROVISIONS

1.1 PURPOSE

- A. These regulations govern the design, construction and maintenance of streets, alleys, driveway cuts, and sidewalks/trails which lie within the jurisdiction of the City of Bryant. These specifications are the minimum requirements, and it is understood that more stringent requirements may be mandated by a number of regulatory entities with regard to a specific project. Those entities include, but are not limited to the City Engineering Department, Public Works Department, Development Review Committee, and the Planning Commission.

1.2 JURISDICTION

- A. These regulations shall be applicable to all lands within the City of Bryant and to those areas within the City's duly adopted 'Planning Area', as enabled by State Statute – A.C.A. 14-56-413 – 'Territorial Jurisdiction'. Copies of the 'Planning Area' map, as adopted by the Planning Commission, are available at the City Planning and Community Development Department.

1.3 APPLICABILITY

- A. All construction and development within the jurisdiction of the City of Bryant is subject to these regulations.
- B. Nothing in these standards shall be construed to prevent the city from constructing incremental improvements to any existing city street, or any street shown on the Master Transportation Plan.

1.4 APPROVAL REQUIRED

- A. All street designs are subject to the review and approval by the City of Bryant and/or their respective designee(s). Street improvements associated with private development shall receive City Engineering Department, Public Works Department, Development Review Committee, and Planning Commission approval prior to commencing construction.

1.5 AMENDMENTS

- A. Amendments to these regulations shall be presented to the Bryant City Council for adoption.

1.6 MODIFICATIONS

- A. When strict interpretation of these regulations causes undue hardship, the City Planning Commission may consider a modification of specific requirements. Modification requests shall be submitted to the Planning Commission pursuant to the City's Development Regulations.



1.7 CONFLICTING REGULATIONS

- A. All city ordinances or parts of ordinances inconsistent or in conflict with these regulations are hereby repealed and amended to comply herewith by virtue of the ordinance adopting this regulation. In the event design and construction specifications prepared separately by a licensed professional engineer for improvements associated with private development conflict with these regulations, the more stringent requirement shall govern.



2.0 GENERAL REQUIREMENTS

2.1 PERMITS

- A. All permits required to accomplish the work shall be the responsibility of the Developer/Owner or Engineer of Record. Such permits may include but are not limited to Driveway Access Permit(s) from the City, permits for work within existing City right-of-way (ROW), permits for work within Arkansas Department of Transportation ROW, railroad crossing permits, Arkansas Department of Environmental Quality (ADEQ) permits, U.S. Army Corps of Engineers (USACE) permits, Federal Emergency Management Agency (FEMA), and other applicable city permits.

2.2 PLANS AND SPECIFICATIONS

- A. Detailed plans and specifications shall be required for all new streets, street extensions, and one-half street improvements. Plans and specifications shall be prepared by a licensed Professional Engineer (licensed in the State of Arkansas).
- B. Approval of the detailed plans and specifications by the City of Bryant does not constitute warranty of the plans and specifications and does not relieve the Engineer of Record of his professional responsibility in the design of the facilities or in the preparation of any engineering reports prepared in association with the project.
- C. The standard specifications for Highway Construction as promulgated by Arkansas Department of Transportation (ARDOT), latest edition, and the Standard Drawings of the Arkansas Department of Transportation shall be the basis for the preparation of street plans and specifications and shall apply in all cases except where these Minimum Standard Specifications for Streets are in direct conflict with ARDOT standards. ARDOT standard specifications and standard drawings may be obtained on their website at www.ardot.gov.

2.3 RESPONSIBILITY OF DEVELOPER/OWNER

- A. The Developer/Owner shall be responsible for construction of streets, including all design, construction, quality control testing, and for all costs associated therewith.
- B. The Developer/Owner shall provide all engineering services required for planning, design, investigations, inspection, testing, and related activities necessary for street development, and shall be responsible for construction of street improvements in accordance with the design approved by the City of Bryant as satisfying the requirements of these regulations.
- C. The City of Bryant shall have the right of access to sites during the planning, design, and construction phases of street development. The Developer/Owner shall schedule all activities to provide the City with adequate notice and review time.



2.4 ENGINEERING SERVICES

- A. All engineering services, including but not limited to, planning, design, investigations, inspection, and testing shall be under the supervision of a Professional Engineer licensed in the State of Arkansas.
- B. The design data, plans, specifications, and related information shall bear the name of the Engineer of Record. The seal of the Engineer of Record shall be placed on each sheet of the plans along with his/her signature.
- C. Soil's investigations, materials testing, and quality control testing shall be performed by a laboratory approved by the City of Bryant.
- D. Written certification by the Engineer of Record that materials and construction conform to the approved Plans and Specifications is required as stated in Section 4.6 of these specifications. Inspection and testing requirements are outlined in Section 9 of these specifications.

2.5 PLAN SUBMITTAL

- A. Plans, specifications, and all data submitted in conjunction with the plans and specifications shall constitute a complete design. Approval by the City of Bryant will not be issued until all requirements have been fulfilled. Approval of the plans and specifications shall remain in effect for one (1) year from the approval date. After that time, a new set of plans and specifications shall be submitted, and any regulations or rules promulgated between the time of the original submittal and the new submittal date shall be followed.
- B. All changes in the design or construction of a project or development, including all changes in the plans and/or specifications, shall be submitted to the City of Bryant for approval. The City of Bryant shall be notified immediately of all field changes in order that a timely approval may be issued.

2.6 OBSERVATION OF CONSTRUCTION BY THE CITY OF BRYANT

- A. The observation of street construction by the City of Bryant will be limited to general observations of the project at various stages as outlined in Section 9 of these specifications. The City of Bryant reserves the right to observe the construction at all times. The City of Bryant observer shall have authority, subject to the final decision of the City Engineer, to condemn and reject any defective work and to suspend the work when it is not being performed properly or pending the settlement of any controversy. The City of Bryant shall have the authority to issue a Stop Work Order in the form of a written instruction/notice from the City revoking the developer's or contractor's rights to continue work on the project due to nonconformance with these Standards.



2.7 WORK WITHIN PUBLIC RIGHT-OF-WAY

- A. All work within public right-of-way shall meet the requirements of these standards, Ordinance 2012-11, and all other applicable city ordinances, unless otherwise modified herein. All applicable permits shall be obtained by the Owner/Developer/Utility for any work taking place within public right-of-way.
- B. No new excavations or bores shall be allowed after 1:00pm on Fridays or on weekends.

2.8 INSURANCE, PERFORMANCE BOND AND MAINTENANCE GUARANTEE

- A. Insurance: Prior to any work beginning within the public right of way, the contractor or other appropriate person or entity shall provide proof of Liability Insurance with coverage limits acceptable to the City of Bryant. An insurance certificate naming the City of Bryant as additional insured, equipment liability insurance and any other proof of insurance coverage the city may deem necessary shall be provided to the City of Bryant Code Enforcement and Permit Department. The certificate of insurance shall cover liability for any injury to persons or property caused by the proposed project. Self-insurance is not acceptable. The City reserves the right to demand inspection of the entire insurance policy and endorsements and will require at least 30 days prior notification of cancellation or nonrenewable during the course of the proposed project.

B. Performance Bond: General.

In circumstances which the City allows or requires a performance bond for the completion of improvements required by a project, the following shall be required of the Contractor or other appropriate person or entity:

1. If a performance bond is posted to assure completion of the improvements, that performance bond shall also include provisions that automatically convert it to a maintenance bond upon completion of the improvements or on the date the performance bond lapses, whichever comes first, or a separate maintenance bond meeting the provisions of this article shall also be received by the city.
2. If the performance bond does in fact convert to a maintenance bond, said maintenance bond shall meet all the conditions in Certificate of Completion of Improvements stipulated in in these specifications.

C. Performance Bond: Improvements within Existing Right of Way

1. No person or contractor shall make any excavation in a public right-of-way unless a performance bond is first deposited with the City for the purpose of guaranteeing repair and replacement of city infrastructure in the public right-of-way. Said bond shall be in an amount equivalent to one-hundred twenty-five percent (125%) of the estimated cost of properly repairing and replacing city infrastructure in the public right-of-way, as estimated by the engineer-of-record, and agreed upon by the Public Works Department or the City Engineering Department.
2. Projects where half-street improvements and/or other improvements within the existing public right-of-way are required, all bonds for said improvements shall be separate and distinct from interior streets or other public infrastructure interior to the private development site associated with concurrent or future phases of the project.



3. A performance bond for 125% of the cost of the improvements shall be required prior to commencement of any work within the City's existing right of way and shall be in place for the duration of construction until acceptance of all improvements by the City.
 4. A person or contractor in the business of performing utility construction and/or maintenance that requires excavation in the public right-of-way or is engaged in a contract to perform work that includes excavation in the public right-of-way may provide a standing bond sufficient to cover the scope of the expected number of permits applicable to each and every site upon which to work is scheduled to take place and where a permit will be required. The standing bond will remain in place until the completion of all permitted work and all permitted work is fully inspected by the city and deemed to be satisfactory.
 5. The bond shall be forfeited, all or in part thereof, if within sixty (60) days after written notice, the person or contractor fails to reimburse the city for documented expenses incurred for its failure to comply with the rules of public safety, failure to close the opening within twenty-four (24) hours after the work has been completed, failure to complete the backfill and repair in accordance with specifications, failure to complete the necessary cleanup, or repair of damage to public property including but not limited to the street subgrade, asphalt surface, concrete surface, curb and gutter, sidewalk, and/or all infrastructure located within the public right-of-way or causing damage to vehicular or other traffic.
 6. Bond release: Upon completion of work within the public right-of-way, the person or contractor who obtained the permit shall contact the city to schedule an inspection. The city will inspect the work within five (5) business days to determine if work is complete and if any damages were caused.
 - a. If damage to the public right-of-way has occurred due to permitted work, the city will provide the person or contractor a list of required repairs. All repairs shall then be completed within thirty (30) days.
 1. Once repairs are completed, the city shall be notified for a follow up inspection. Once repairs have been confirmed, the bond will be released.
 2. If repairs are not completed within thirty (30) days and the person or contractor has failed to compensate the city for the city's expenses incurred in making such repairs within sixty (60) days after written notice, the bond will be forfeited.
 - b. If no damages were caused, the bond will be released.
- D. After the Final Inspection and Acceptable Completion of the required public improvements, but prior to the city's acceptance of the public improvements and filing of the final plat or large-scale development, the Contractor or other appropriate person or entity shall provide the following:
1. Certification of Completion of Improvements: In accordance with Section 2.4 of these specifications, a certificate of completion of improvements shall be submitted prior to filing of the final plat or large-scale development.
 2. Itemized Cost Estimate of Improvements: The Developer/Owner/Contractor shall provide an itemized cost estimate for all improvements within public ROW or to be dedicated to



the city, which shall be agreed upon by the City Engineer or their designee. The contractor shall also provide a separate itemized cost estimate for any portion of the stormwater management facilities, privately owned, within public ROW, or to be dedicated to the city.

3. Maintenance Guarantee: A maintenance guarantee shall be submitted to the City of Bryant which guarantees the maintenance, repair, and/or reconstruction of the project in whole or in part for a period of no less than two (2) years after the date of the Maintenance Guarantee. The maintenance guarantee shall meet the following conditions:
 - a. For improvements within the existing public right-of-way or infrastructure improvements outside the right of way proposed to be dedicated to the City, a maintenance guarantee for the period of no less than two (2) years and shall be in the amount of one hundred percent (100%) of the costs of construction, but not less than \$100,000, and shall be as estimated by the engineer-of-record and agreed upon by the City Engineer or their designee.
 - b. Any portion of the stormwater management facilities, privately owned or stormwater management improvements dedicated to the city, shall be covered under a separate maintenance agreement and one (1) year maintenance guarantee in accordance with City Stormwater Management Regulations (O-2019-32), Art. IV, Sec. 7. The value of the bond shall be an amount equal to 100% of the value of the stormwater improvements.
 - c. It shall be irrevocable and shall list the City as sole beneficiary.
 - d. It shall be in a form approved by the City Attorney.
 - e. At the end of the required guarantee period, by determination of City Staff and after consultation with the city's engineer, if the improvements do not perform and/or underperform as designed, the city shall be entitled to payment upon making demand for payment under the terms of the maintenance bond, cash deposit or letter of credit. The city shall be entitled to use all funds secured by the maintenance guarantee to assure the proper maintenance of the improvements.
 - f. The Developer/Owner shall not be entitled to any excess monies until the maintenance of the improvements have been satisfactorily completed.
 - g. The maintenance guarantee shall be in one of the following forms:
 1. Maintenance Bond
 - a. Such maintenance bond shall meet the requirements of the maintenance guarantee described in the section above.
 2. Irrevocable Letter of Credit.
 - a. If an irrevocable performance letter of credit is posted to assure completion of the improvements, that letter of credit shall include provisions that automatically convert it to an irrevocable maintenance letter of credit upon completion of the improvements or on the date the performance letter of credit lapses, whichever comes first.
 - b. Such Letter of Credit shall meet the requirements of the maintenance guarantee described in the section above.
 3. An alternate method approved in writing by the Mayor of the City of Bryant.



2.9 ACCEPTANCE BY THE CITY

A. The city will not formally accept the project if any of the following items are not complete.

1. Streets

- a. All curb and gutter and street drainage slopes completed and backfilled.
- b. Final layer of asphalt in-place to required thickness and density.
- c. Street signs installed.
- d. Pedestrian accommodations constructed per approved plan including accessible ramps.
- e. Road right-of-way restoration substantially complete.
- f. Low or ponding areas in public street corrected.
- g. Street illumination paid for.
- h. Maintenance guarantee provided as described above.

2. Drainage.

- a. Drainage swales in place, sodded or concrete-lined, properly dedicated with erosion control measures in place.
- b. Detention/retention facilities to grade and draining properly.
- c. Outlet structures, pilot channels, headwalls, flumes, and other appurtenances in place and constructed to approved plans and specifications.
- d. Any needed off-site improvements or easements in place.
- e. Sodding of detention/retention ponds completed and established.
- f. Fencing of detention/retention ponds in place.
- g. Aeration facilities for retention ponds in place.
- h. All drainage inlets, outlets, and conduits in proper location and constructed to approved plans and specifications.
- i. Final layer of drainage paving in-place as required by approved plan, including parking lots.

B. Formal acceptance of the project by the City of Bryant will be made in writing after all of the requirements of Section 2.8 have been met, and after the posting of the Maintenance Guarantee, with the date of the formal acceptance being the same as that of the Maintenance Guarantee.

2.10 DAMAGE TO EXISTING INFRASTRUCTURE OR PROPERTY

A. The Owner/Developer shall avoid damage, as a result of operations, to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, equipment, etc., and shall at the Owner/Developer's own expense completely repair any damage thereto caused by operations, to the satisfaction of the City. After damage discovery, the Owner/Developer shall immediately coordinate with the City on the complete repair and/or replacement work required. Following written notice of work required, the Owner/Developer shall expeditiously begin and finish this work with all labor and materials required. All repair and/or replacement work, labor, and materials shall be supplied and installed by the Owner/Developer. If the Owner/Developer fails to promptly perform the repair work and correct all deficiencies, the City shall have the option of remedying the defects at the Owner/Developer's cost.



- B. All street repairs shall be subject to the review and approval of the Public Works Department and/or the City Engineering Department
- C. The Public Works Department and/or the City Engineering Department shall make the determination whether damage to existing infrastructure or property has occurred as a result of the Owner/Developer's operations.

2.11 ONE-HALF STREET IMPROVEMENTS

- A. When subdivisions, commercial developments, industrial developments, etc. are located on only one side of an existing street, one-half of the required right-of-way, from the center line of the existing right-of-way or from the centerline of the street whichever is greater, shall be provided. Right-of-way shall meet the minimum right-of-way requirements shown in City of Bryant Master Transportation Plan. The Development Review Committee shall determine which version of street classification and what right-of-way will be required.
- B. When subdivisions, commercial developments, industrial developments, etc. are located on only one side of an existing street, one-half of the required street improvements, from the center line of the existing right-of-way or from the centerline of the street whichever is greater, shall be provided. Street improvements including asphalt or concrete paving, storm drainage, curb and gutter, sidewalks and other improvements shall be constructed in accordance with these specifications for that portion that adjoin existing streets.
- C. At a minimum, cross-section shall be in accordance with the City of Bryant Master Transportation Plan and the requirements of these specifications. Pavement reconstructions to the center line of the existing street shall be required when the existing street does not meet the requirements of these specifications.
- D. Geotechnical investigation requirements, for one-half street improvements, as stated in Section 6.3 may be waived by the Public Works Department.

2.12 OFF-SITE STREET AND DRAINAGE IMPROVEMENTS

- A. **Off-Site Improvements:** Off-site improvements are not adjacent to a project; off-site storm drainage improvements, off-site intersection improvements, and/or other similar improvements. Note: This is unique and separate from 'on-site improvements', which are directly adjacent to or within a project site, such as widening the street along the project street frontage, constructing interior streets and utilities, etc.
- B. **Standards Applicable:** Off-site improvements in the City and outside the City limits, but within the City's jurisdictional Planning Area shall be installed according to the City's standards; provided off-site improvements to roads located outside one mile of the City limits shall also be installed to the County's minimum standards. The Developer/Owner shall be required to bear that portion of the cost of off-site improvements which bears a rational nexus to the needs created by the development.



C. Required Infrastructure Improvements: Off-site improvements that are roughly proportional and bear a rational nexus to the impact of the development are required for all development within the City of Bryant's jurisdiction. The Developer/Owner shall be required to install off-site improvements where the need for such improvements is created in whole or in part by the proposed development.

D. Planning Commission, Public Works, Planning and Community Development: At the time the Planning Commission grants preliminary plat, preliminary large scale development, the Planning Commission along with recommendations from the Public Works Department and/or Planning Division shall determine whether the proposed development creates a need for off-site improvements and the portion of the cost of any needed off-site improvements which the Developer/Owner shall be required to bear; provided, that portion of the cost of off-site improvements to roads located outside the City's corporate limits but within the City's planning area shall require concurrence by the County. In determining that portion of the cost of off-site improvements which the Developer/Owner shall be required to bear, this amount may be agreed upon between the Developer/Owner and the City. If no agreement can be reached, the Planning Commission, along with recommendations from the Public Works Department and City Engineering Department shall consider potential impacts based on the rough proportion and rational nexus to impacts of the project.

E. Determining Necessity for Off-Site Improvements:

1. When a proposed development has access to paved streets or roads only by way of substandard or unimproved roads or streets leading from the development to the paved streets or roads, the Developer/Owner shall be responsible for contributing this proportionate share of the cost of improving the substandard access roads or streets to existing City or County standards. The Developer's/Owner's proportionate share of said costs may be agreed upon by the Developer/Owner and the Public Works Department. If no agreement can be reached the Public Works Department and City Engineering Department may determine in accordance with the provisions above or by the use of a detailed traffic study (paid for by the developer/owner and reviewed and approved by the City Engineering Department) where both existing and proposed traffic impact are evaluated.
2. When a proposed development has direct access to, or fronts on an existing road or street, which is below current standards, the Developer/Owner shall be responsible for contributing his/her proportionate share of the cost of improving said street or road to existing City or County standards. The Planning Commission, along with recommendations from the Public Works Department and City Engineering Department, shall determine the Developer's/Owner's proportionate share of said costs in accordance with the provisions above or in conjunction with the use of a detailed traffic study (paid for by the developer/owner and reviewed and approved by the City Engineering Department) where both existing and proposed traffic impact are evaluated.



3. Off-site drainage improvements associated with a proposed development shall be provided when required per the City's Stormwater Management Regulations. Scope of off-site drainage improvements shall be determined by the Planning Commission, along with recommendations from the Public Works Department and City Engineering Department and be based upon the rough proportion and rational nexus to impacts of the project.
- F. **Modifications:** Requests for modifications of off-site improvements shall be submitted to the Planning Commission pursuant to the City's Development Regulations.
- G. **Off-Site Dedication of Right-of-Way:** Off-site right-of-way dedication may be required as needed to construct off-site street improvements that are required based on the rough proportionality and rational nexus of the impacts of the project.
- H. **Off-Site Streets & Drainage:** Street widening and/or new street construction off-site may be required to address traffic impacts based on the rough proportion and rational nexus of the impacts of the project. Street grading, base, and paving according to existing City standards and specifications as adopted by the City Council. Curbs and gutters off-site may be required to address drainage and/or traffic impacts based on the rough proportion and rational nexus to impacts of the project. Curbs and gutters shall be installed according to existing City standards and specifications as adopted by the City Council.
- I. **Off-Site Sidewalks and Trails:** Sidewalks or Trails may be required to be installed off-site based on the rough proportionality and rational nexus of the impacts of the development.

2.13 DEFINITIONS

- A. The following words, terms, and phrases, when used in this article, shall have the meanings ascribed to them in this section.

AASHTO - American Association of State Highway and Transportation Officials.

Acceptable Completion - This term shall mean substantial completion of the street construction as agreed upon by the City of Bryant and Engineer of Record.

ADEQ - Arkansas Department of Environmental Quality

ARDOT - Arkansas Department of Transportation

ASTM - American Society for Testing and Materials

Average Daily Traffic – The total traffic volume passing a point or segment of a roadway in both directions during an average 24-hour period.



Capacity – The maximum sustainable hourly flow rate at which vehicles reasonably can be expected to traverse a point or a lane on a roadway during a given time period under prevailing roadway, traffic, and control conditions. It is expressed in vehicles per hour per lane.

City - The City of Bryant, Arkansas and its employees expressly authorized by the Mayor to accomplish the specified task.

Contractor - The licensed contracting company hired by the Developer/Owner to construct the street improvements.

Developer/Owner - The person, firm, partnership, corporation, or other entity planning, constructing, altering, or reconstructing a public street.

Engineer of Record - The Arkansas licensed Professional Engineer responsible for the design of the improvements, usually engaged by the Developer/Owner.

Existing Traffic - In a traffic impact study, current traffic in accordance with recent traffic counts on the current road network.

Final Inspection - The final inspection shall be the formal inspection of the street construction by the **Public Works Department**, the Engineer of Record, and the contractor, which results in a declaration of acceptable completion.

Formal Acceptance - Acceptance of the street construction in writing after a **Maintenance Guarantee** has been submitted to and approved by the **Public Works Department**.

Level of Service (LOS) - A measurement, defined by the Highway Capacity Manual (HCM), to describe operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Level Of Service Criteria - The Level of Service (LOS) for motorized vehicles, as defined by the Highway Capacity Manual, expressed via letter designations 'A' through 'F', as a ratio of base free-flow speed (mi./hr.) to actual or observed vehicle speeds.

Maintenance Guarantee -The security instrument which binds the Owner/Developer to a **post-completion** responsibility for street construction, repairs and/or reconstruction in the event of street construction failure.

Peak Hour - The one-hour period of greatest utilization of a transportation facility; weekdays normally have two peaks, one in the morning and one in the afternoon. It represents the most critical period of operation and the highest typical capacity requirements.

Peak Period - A three-hour or more period during which the transportation facility has significantly increased levels of use and includes the peak hour.



Peak Hour of Generation - The single hour of highest volume of traffic entering and exiting a site.

Street Construction - Where this or similar terms are used, it shall mean construction of the street, curb and gutter, drainage (whether on the street or not), sidewalks, and all other appurtenances normally associated with street construction and approved as part of the street plans, whether on-site or off-site.

Substantial Completion - The construction stage at which point all improvements and associated appurtenances have been fully constructed and are functional.

Traffic Generator - A designated land use (commercial, industrial, residential, office, etc.) or a change in land use that generates pedestrian and/or vehicular traffic to and from the site.

Traffic Impact - The effect of site traffic on the operations and safety of the road network

Traffic Impact Study - Study to assess the near term and long-term effects of specific development activity on the roadway system in a comprehensive manner. Development activity may include rezoning, platting and development plan approvals. The study shall include, but not be limited to, estimates of future traffic generation as well as recommended traffic mitigation improvements needed to reduce traffic impacts.

Traffic Mitigation - Reduction of traffic impacts on intersections and/or roadways to an acceptable level of service through the modification of the site plan, roadway construction improvements or improvements in the existing traffic control devices.

Trip - A one-way movement by a person or a vehicle having an origin and a destination

Trip Distribution - Allocation of the site generated trips to all possible routes to and from the site.

Trip Generation - The process of estimating the number of vehicle trips originating from or destined for the uses on a land parcel.

Trip Generation Manual - A comprehensive manual of quantifying trip generation, published by the Institute of Transportation Engineers (ITE), inclusive of common trip generation rates by common land use codes.

Volume-To-Capacity Ratio (V/C) - A performance measure computed using the ratio of an actual roadway volume to the capacity of a roadway.

2.14 REFERENCES

- A. References to various guidance materials, testing, construction, and assessment such as AASHTO, ASTM, ARDOT, ITE, MUTCD, etc. shall refer to the latest editions of the reference standard.



3.0 TRAFFIC IMPACT STUDY

3.1 PURPOSE AND NEED

- A. A formal Traffic Impact Study (TIS) may be required at the discretion of the City Engineer, Public Works Director, or Planning Commission in connection with a development if it is required to adequately assess future traffic impacts, including, but not limited to the following:
 - 1. To forecast the traffic impacts created by new development based on industry accepted practices and metrics.
 - 2. To determine improvements needed to accommodate new development.
 - 3. Determine how the proposed and existing land use impacts traffic.
- B. Should a traffic impact study be required, it shall be conducted by an engineer, licensed to do business in the State of Arkansas. All costs associated with the traffic study shall be paid by the Developer/Owner.

3.2 DETERMINATION OF STUDY AREA

- A. A key trigger for conducting a traffic impact study is "trip generation." The trip generation of a proposed development is the number of inbound and outbound vehicle trips expected to be generated by the proposed development during an average day or during a peak period.
- B. The size and components required for traffic impact study shall typically include all site access driveways and adjacent intersections with 1000 feet to ½ mile depending on the amount of trip generation expected, however, the extent of the study area is to be determined by the Public Works Department and/or City Engineering Department based on the unique characteristics of each individual proposed development.

3.3 ELEMENTS, FORMAT, AND ANALYSIS

Should a traffic study be required, it shall contain the following minimum elements, format, and analysis. Additional elements and analysis may be required by the Public Works Department and/or City Engineering Department. Deviations from these elements and analysis shall not be allowed without written approval from the Public Works Department and/or City Engineering Department.

- A. Executive Summary
 - 1. Descriptive Overview of the Project
- B. Study Area
 - 1. Size of Study Area
 - 2. Site Accessibility
 - 3. Land Use(s) in the Study Area
- C. Proposed Development
 - 1. Site Location / Vicinity Map(s)
 - 2. Land Use
 - 3. Site Plan
 - 4. Phasing & Timing



D. Existing Conditions

1. Physical Characteristics
2. Traffic Volume Counts
3. Critical Gap in Traffic Flow
4. Pedestrian and Bike Facilities
5. Background (non-Site) Traffic
6. Existing Level of Service (LOS)
 - i. Reference Federal / State LOS Standards
 1. Signalized
 2. Non-Signalized

E. Site Generated Traffic

1. Site Trip Generation
2. ITE Trip Generation
3. Trip reduction factors
 - i. Pass-by Trips
 - ii. Diverted Trips
 - iii. Multi-Use Development (Mixed Use)
4. Mode Choice
5. Trip Distribution
6. Site Traffic Assignment

F. Total Traffic Analysis

1. Site Access Driveway(s)
2. Future Level of Service Analysis (LOS)
3. Queue Analysis
4. Traffic Safety
5. Pedestrian Safety
6. Traffic Control Needs

G. Roadway and Intersection Mitigation or Improvements

1. Define what 'Mitigation' means
2. Define LOS thresholds that trigger required improvements.
3. Articulate circumstances where 'mitigation' may have a negative impact on other site characteristics – historical, environments, unique urban / design standards, etc.)
4. Establish process through which the City will work with the State if the operating agency is ArDOT.
5. Establish detailed 'mitigation measures' that the City will allow.
 - i. Transportation Demand Management (TDM)
 - ii. Site Plan / Land Use Techniques
 - iii. Roadway Improvements
 - iv. Operational Improvements
 - v. Access Management Techniques

H. Conclusions / Recommendations

I. Appendices / Tables



4.0 DESIGN DATA AND PLAN SUBMISSION

4.1 GENERAL

- A. The submittal shall be complete with all necessary information included for review of the project. The material required shall include, but not be limited to the plans, specifications, geotechnical report, and drainage report. The final review will be concurrent with the review of all public improvements including water, sewer and drainage as accomplished through the Development Review Committee and the Planning Commission. **Review based on partial submittals will not be allowed.**

4.2 DESIGN REPORT

- A. The design report shall contain all information not normally shown on the plans or given in the specifications, including design calculations, results of soil borings, soil reports, soil test results, and any other data used in the development of the plans and specifications. The design report shall be made available upon request by the City of Bryant.
- B. Geotechnical information shall be submitted in accordance with Section **6.0** of these specifications.

4.3 HORIZONTAL AND VERTICAL DATUM

- A. All street construction, including storm drainage facilities, shall be tied to the Arkansas State Plane Coordinate System, South Zone, using the North American Datum of 1983 (NAD83).
- B. Elevation of controlling points shall be based on USGS NAVD 88 datum.

4.4 PLANS

- A. The plans shall be submitted on **22" x 34"** sheets. No other size shall be permitted unless specifically approved by the City of Bryant. Three sets of plans, including one AutoCAD compatible digital format copy and one pdf format copy, shall be required.
- B. **All submitted sheets shall have a title block, the Engineer's signature and stamp, and the date. Scales, legends, and north arrows shall be on all applicable sheets.**

C. Plan Layout

Plans shall be submitted at the scale necessary to make the plans easily read and interpreted. Plans shall be on a scale of not less than 1" = 50'. The plans shall include, but not be limited to the following information:

1. Street right-of-way, proposed and existing
2. Existing and proposed utility and drainage easements
3. Existing and proposed property lines
4. Horizontal curve data



- a. P.C., P.I., P.T. Stations
 - b. Degree of Curve
 - c. Deflection Angles
 - d. Radius
 - e. Curve Length
 - f. Tangent Lengths
5. Plan data with street grades and elevations
 6. Centerline stationing
 7. Street names
 8. Intersection radii
 9. Soil boring locations
 10. Street and right of way dimensions
 11. Driveway location with dimensions
 12. Sidewalks and trails with dimensions
 13. Handicap access ramp locations
 14. Limits of cut and fill
 15. Location and size of proposed and existing storm drainage facilities
 16. Location and size of proposed and existing utilities
 17. Location of any mapped Special Flood Hazard Areas on the effective FEMA FIRM.
 18. Location (station, offset, and elevation) of all monuments/benchmarks used for vertical and horizontal control.

D. Street Profiles

Street profiles shall be shown on a horizontal scale to match the layout with a vertical scale of not less than 1" = 5'. Information to be shown with the profiles shall include, but not be limited to:

1. Proposed and existing profile elevations at centerline labeled every 50 feet
2. Vertical curve data
 - i. Curve length
 - ii. "e" value at maximum vertical offset (middle ordinate)
 - iii. PVC, PVI, PVT Stations and Elevations
 - iv. "K" value
 - v. Low/High point elevations
3. Proposed and existing drainage and utility line crossings (size, slope, and location)
4. Proposed finished grades at street centerline
5. Proposed finished grades at driveway centerline



E. Typical Sections

A typical street cross section for all classes of streets designed shall be included in the plans and shall show the following with associated dimensions:

1. Pavement type, width and thickness including subgrade and base layers
2. All materials and compaction density
3. Dimensions from back of curb to back of curb
4. Dimensions of all lanes, medians, and shoulders
5. Cross slope and crown
6. Location of centerline and profile grade
7. Curb and gutter (including type and width)
8. Existing and proposed grades
9. Side slope and side ditch grades including maximum slope labels
10. Right of way width
11. Sidewalks or trails. Include dimensions, buffer widths, and cross slope.
12. Landscaping, if required

F. Special Details (if required) – Special details should be provided if needed to clarify special construction issues or items.

G. Erosion Control Plan (if required) – Erosion control plans should be provided in accordance with the City of Bryant Stormwater Management Ordinance (O-2019-32), and the Stormwater Management Manual (O-2019-31).

H. Maintenance of Traffic Plan (if required) - Maintenance of traffic plans should be provided when it is necessary to detour traffic for extended periods of time or when traffic patterns will change during construction

I. Striping and Signing Plan (if required) - A striping and/or signing plan should be provided when the proposed project will install new or modify existing striping or signing.

J. Signalization Plan (if required) - A signalization plan should be provided if signalization is part of the on-site or off-site improvements.

K. Cross Sections (if required) - Cross sections at a maximum spacing of 50 feet should be provided if requested by the Public Works Department and/or City Engineering Department. Additional cross sections shall be where needed for clarification purposes.

L. Revisions to drawings shall show the nature of revisions and preparation date. Cloud revisions in plan and/or profile view(s).



4.5 SPECIFICATIONS

- A. Specifications shall be in accordance with Section 2.2C. Special provisions, outside of the items covered in Section 2.2C, shall include material requirements and methods of construction, quality control requirements, sampling, and testing procedures and frequency as specified in other sections of these specifications.

4.6 AS-BUILT PLANS

- A. As-Built plans shall depict an accurate account of the construction. Construction plans which are "rubber stamped" and submitted for the purpose of "As-Built" plans are not acceptable.
- B. Three sets of "As-Built" plans, including one AutoCAD compatible digital format copy and one pdf format copy, shall be required along with the final costs associated with the street construction, and shall be due prior to the filing of the Final Plat. Engineer of Record shall certify in writing that all improvements meet the requirements of the approved construction drawings and City of Bryant Minimum Standard Specifications for Streets along with the "As-Built" plans.



5.0 STREET DESIGN PRINCIPLES

5.1 GENERAL

- A. The principles governing the design of streets shall conform to the requirements of these specifications, and to the latest editions of ARDOT standard specifications, MUTCD, AASHTO - A policy on Geometric Design of Highway and Streets, and AASHTO - Guide for the Development of Bicycle Facilities, ITE - Highway Capacity Manual, Federal Americans with Disabilities Act - (A.D.A.) Regulations, to the standards that may be referenced herein, and to appropriate City Ordinances.
- B. General criteria with regard to street classification shall be as stated in the City of Bryant Master Transportation Plan, the 'Heart of Bryant Development Code', or the 'Mid-Town Bryant Code' and regulating plans. The Development Review Committee shall determine which version of street classification and what cross section components will be required, (i.e., Urban, Industrial, Median, Parking, etc.)
- C. Streets within commercial areas (commercial zoning) shall be constructed to "Collector" minimum standards unless otherwise identified on the Master Transportation Plan, the 'Heart of Bryant Development Code', or the 'Mid-Town Bryant Code' and regulating plans.
- D. The Public Works Department and/or Development Review Committee may, at their discretion, determine if certain streets will be constructed to an alternate minimum standard than the corresponding cross-section contained in the Master Transportation Plan.
- E. Storm drainage shall meet the requirements of the City of Bryant Stormwater Management Ordinance (O-2019-32), and the Stormwater Management Manual (O-2019-31). Valley gutters shall not be permitted.
- F. Landscaping shall meet the requirements of the City of Bryant Landscape Ordinance.

5.2 HORIZONTAL ALIGNMENT

- A. Horizontal curves shall be circular curves with minimum centerline radii based on **Table 1**. However, if the minimum centerline radius produces a curve with an arc length of less than 100 feet in length, the radius shall be increased to achieve a minimum arc length of 100 feet.
- B. The minimum tangent length between reverse curves shall be 100' for collector and arterial streets and 0' for local streets.
- C. The minimum Stopping Sight Distance (SSD) shall be based on **Table 1**. Roadways shall be designed to provide the minimum SSD at all locations along the roadway based on a driver's eye height of 3.5 feet and an object height of 2.0 feet. Stop signs, yield signs, signals, and at-grade railroad crossings shall be visible by approaching cars for the entire length of the SSD. All street designs shall be checked in both the vertical and horizontal plane for sight distance obstructions that limit SSD to below the required amount. Any such obstructions shall be removed.



Table 1: Horizontal Alignment Design Criteria

Horizontal Alignment Design Criteria						
Design Element	Design Speed, MPH					
	20	25	30	35	40	45
Centerline Radius, Minimum, Feet	107	198	333	510	762	1039
Centerline Arc Length, Minimum, Feet	100	100	100	100	100	100
Stopping Sight Distance, Minimum, Feet	115	155	200	250	305	360

5.3 VERTICAL ALIGNMENT

Grades, vertical curves, and related criteria shall conform to the minimum requirements provided in this section.

Table 2: Vertical Alignment Grades

Vertical Alignment Grades			
Design Element	Street Classification		
	Local	Collector	Arterial
Longitudinal Grade, Percent			
Minimum	0.5	0.5	0.5
Maximum	11	10	7-9 ^a
Maximum within 100 Feet of Intersection	6	6	6
Maximum within an existing or future crosswalk	2	2	2

^a 9% for 30 mph, 8% for 35-40mph, 7% for 45-50mph

All vertical curves shall be symmetrical parabolic type curves. Minimum vertical curve lengths shall be determined by the following formula, but shall not be less than 3 times the design speed:

$$L = KA \text{ and } K = L / A$$

Where:

L = Length of vertical curve, feet

K = Coefficient from **Table 3 and Table 4**

A = Algebraic Difference in Grades, Percent



Table 3: Design Controls for Crest Vertical Curves

Design Controls for Crest Vertical Curves			
Design Speed (mph)	Stopping Sight Distance (ft)	Rate of Vertical Curvature, K (Minimum)	
		Calculated	Design
20	115	6.1	7
25	155	11.1	12
30	200	18.5	19
35	250	29.0	29
40	305	43.1	44
45	360	60.1	61

Table 4: Design Controls for Sag Vertical Curves

Design Controls for Sag Vertical Curves			
Design Speed (mph)	Stopping Sight Distance (ft)	Rate of Vertical Curvature, K (Minimum)	
		Calculated	Design
20	115	16.5	17
25	155	25.5	26
30	200	36.4	37
35	250	49.0	49
40	305	63.4	64
45	360	78.1	79

5.4 INTERSECTIONS

- A. Intersection Curb Return Radii shall be as follows
 - a. Local Street: 25 feet
 - b. Collector Street: 35 feet minimum or individual design based on design vehicle, whichever is larger.
 - c. Industrial Collector: 75 feet



d. Minor Arterial Street: 50 feet minimum or individual design based on design vehicle, whichever is larger.

B. Design Vehicle: The Developer/Owner shall select an appropriate design vehicle for use in designing the project in accordance with these standards. Design vehicles are selected motor vehicles with the weight, dimensions, and operating characteristics used to establish highway design controls for accommodating vehicles of designated classes. The choice of design vehicle is influenced by the functional classification of a roadway, and by the proportions of the various types and sizes of vehicles expected to use the facility. Table 5 shows typical design vehicles by roadway classification that can be used as a general guide for design vehicle selection, however alternate design vehicles may be required by the Public Works Department or City Engineering Department if site specific conditions warrant.

Table 5: Typical Design Vehicle Based on Roadway Classification

Typical Design Vehicle Based on Roadway Classification	
Classification	Typical Design Vehicle*
Minor Arterial	Intermediate Semitrailer (WB-50) to Interstate Semitrailer (WB-67)
Industrial Collector	Intermediate Semitrailer (WB-50) to Interstate Semitrailer (WB-67)
Collector	Intermediate Semitrailer (WB-40)
Local	Large School Bus (S-BUS 40) or City Fire Truck

* The choice of design vehicle and vehicle tracking criteria shall be approved by the Public Works Department or City Engineering Department.

C. Vehicle tracking templates based the design vehicle shall be used to determine the location of other elements such as median noses, concrete islands, channelized right turns, etc. The turning templates must show that the design vehicle will not over track outside the edge of roadway or curb, onto island or medians, into oncoming lanes of traffic, etc. Turning templates shall be in accordance with AASHTO using AASHTO Turning Templates, AutoTurn, or other approved method or software.

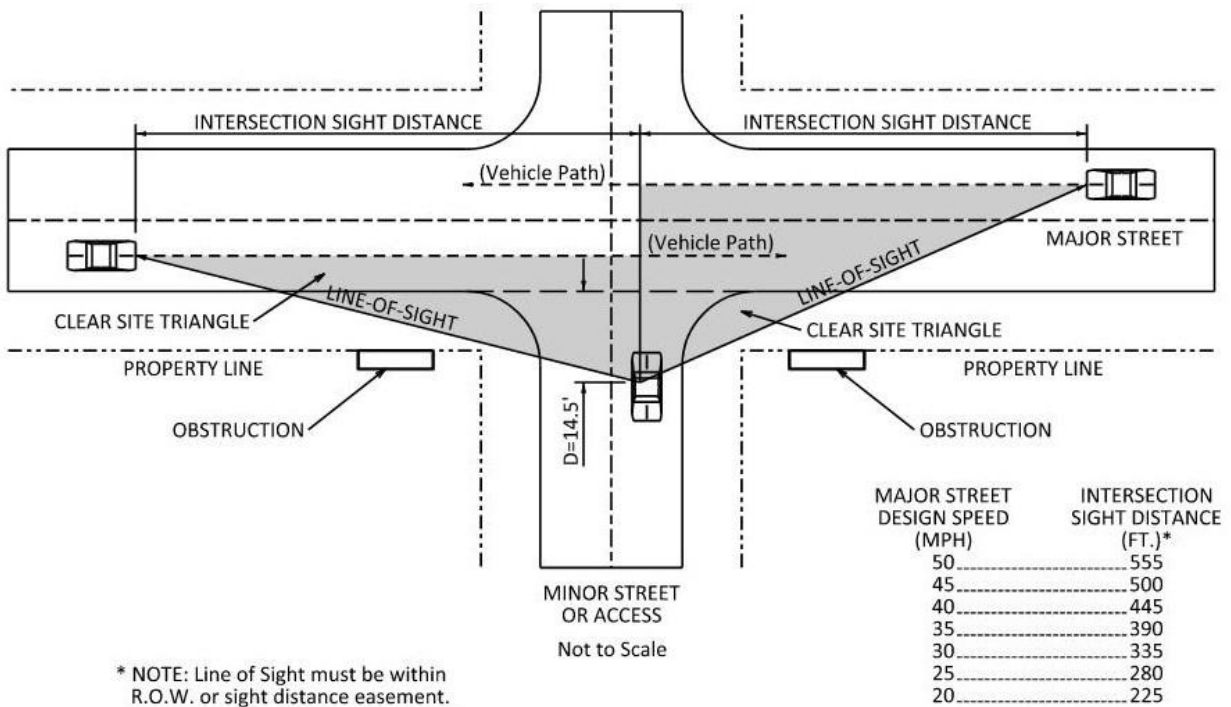
D. Street intersections shall be as nearly at right angles as possible but not less than 75 degrees. Where street intersections are less than 90 degrees, the curb radius shall be increased as determined by the Public Works Department and/or the City Engineering Department.

E. The minimum tangent length for street alignments approaching an intersection shall be 100 feet for collector and arterial streets and 30 feet for local streets.

F. The minimum centerline offset between two streets that intersect a common street shall adhere to any applicable Access Management Plan (AMP) duly adopted by the City. In the absence of an AMP, the minimum centerline offset between two streets that intersect a local or collector street shall be 150 feet. The minimum centerline offset between two streets that intersect an arterial street shall be 300 feet.



- G. The Distance between driveway access points and nearest public street and/or nearest driveway, shall adhere to alignment standards found in this Part, or as otherwise prescribed in any Access Management Plan (AMP) duly adopted by the City.
- H. Intersections shall be designed to adhere to the intersection sight distance details shown in **Figure 1**.
- I. The minimum Stopping Sight Distance (SSD) based on **Table 1** shall be provided for all intersection approaches.
- J. Roundabouts will be considered by the Public Works Department or City Engineering Department for qualifying intersections on a case-by-case basis. For intersections where a roundabout will be implemented, all design standards and minimum requirements found in the latest edition of "NCHRP Report 672: Roundabouts: An Informational Guide" shall be met.



1. Sight distance is measured from a point on the minor road at 14.5 feet back from the edge of the major traveled way.
2. These values apply to passenger cars on 2-lane roads with stop control on the minor approach only. For special conditions such as multi-lane roadways, approach grades steeper than +/- 3%, intersections serving a significant volume of trucks, skewed intersections, yield control intersections, all-way stops, and signals, separate analysis is required in accordance with the latest edition of AASHTO - A Policy on Geometric Design of Highways and Streets.
3. At the intersection of two residential streets, the "D" distance shall be ten feet (10') and the approaching vehicle path shall be along the centerline of the street.
4. At the intersection of two residential streets, the minimum sight distance allowed is the stopping sight distance.
5. No object shall be located within the sight triangle that would obstruct the driver's view of an approaching vehicle on the major road. Such objects may include buildings, parked vehicles, roadway structures, roadside hardware, hedges, trees, bushes, unmowed vegetation, tall crops, walls, fences and the terrain itself. The driver's eye height shall be 3.5 feet and the height of the approaching vehicle to be seen shall be 3.5 feet.
6. The profiles of the intersecting roadways shall be designed to provide the minimum sight distance for drivers on intersection approaches.

SIGHT DISTANCE AT INTERSECTIONS
(Intersections with stop control on minor road only)

Figure 1: Intersection Sight Distance



5.5 RIGHT OF WAY WIDTHS AND CROSS SECTIONS

- A. Cross sections shall adhere to the minimum dimensional standards found within the Master Transportation Plan, the 'Heart of Bryant Development Code', and 'Mid-Town Bryant Code'. This includes all elements within the entirety of the public right-of-way, and as shown within the applicable regulating plan.
- B. There are numerous cross section configurations depending on possible features including medians, center turn lanes, and bike lanes. The Planning Commission, Development Review Committee, Public Works Department, the City Engineering Department may require, at their discretion, different lane configurations and buffer zones for certain street segments, depending on the need for medians, turn lanes, bike lanes, alternate pavement widths, alternate right-of-way widths, etc.
- C. Curb and gutter is required unless specific authorization to construct a paved shoulder and open ditches is granted by the Public Works Department or City Engineering Department. Width of paved shoulder (if allowed) and street cross section shall be as determined by the Public Works Department or City Engineering Department.
- D. Cross slope on new construction shall be normal crown and shall be 2%. For existing roadway modifications, widenings and overlays, the Public Works Department or City Engineering Department may approve a cross slope of between 1.5% and 3% if required by existing constraints.
- E. Superelevated streets may only be used when other means of design will not work and is subject to review and approval by the Public Works Department or City Engineering Department. If allowed, superelevation shall not exceed 4.0% slope and the minimum runoff length shall be 100 feet. Superelevation shall not be used to reduce minimum radii on Local Streets.
- F. All streets shall have a minimum lateral offset of 1.5 feet between the curb face and obstructions such as utility poles, lighting poles, and fire hydrants. This lateral offset shall be increased to 3 feet within the limits of any intersection curb return.
- G. Side Slopes shall have a maximum slope of 3:1.

5.6 DESIGN SPEED

- A. The design speed shall be 25 mph for local streets, unless otherwise specified by the Public Works Department or City Engineering Department.
- B. The design speed shall be 25-35 mph for collector streets with final approval of design speed to be determined by the Public Works Department or City Engineering Department.
- C. The design speed for arterial streets shall be determined by the Public Works Department or City Engineering Department.



5.7 DEAD END STREETS/CUL-DE-SACS

- A. The maximum length for dead end streets/cul-de-sacs shall be 500 feet.
- B. Dead end streets/cul-de-sacs shall have a minimum turnaround right-of-way diameter of 100 feet.
- C. The minimum turnaround pavement street radius shall be 45 feet and shall be in accordance with Appendix D of the Arkansas Fire Prevention Code. Larger than normal radii should be considered in industrial areas where large design vehicles (such as WB-67) frequently travel or make deliveries.

5.8 DRIVEWAYS

A. Access Control for Driveways

- 1. The Distance between driveway access points and nearest public street and/or nearest driveway, shall adhere to alignment standards found in this sub-section, or as otherwise prescribed in any Access Management Plan (AMP) duly adopted by the City.

B. Driveways - Generally

- 1. Access to property shall be allowed only by way of driveways and no other portion of the lot frontage shall be used for ingress or egress. Continuous curb cuts are prohibited. At least one driveway shall be permitted for any lot; however, shared drives are allowable in lieu of an individual/single-user driveway, and shared driveways shall be recommended for lots that have less than one hundred twenty (120) feet of frontage.
- 2. Individual driveways shall be located a minimum of ten (10) feet from the side property lines. A separation of at least twenty (20) feet is required between the driveways on one lot and the driveways on the adjacent lots. Driveways on the same lot shall be no closer than fifty (50) feet to each other.
- 3. Driveways used for residential ingress and egress shall not exceed 25 feet in width, exclusive of curb returns.
- 4. Driveways used for commercial/industrial ingress and egress shall not exceed 40 feet in width, exclusive of curb returns. They shall have minimum lane widths of eleven (11) feet for each lane and shall not have more than three (3) lanes in one entrance/exit. Measurements shall be front from curb face to curb face or lane edge to lane edge.
- 5. Driveway design shall be such that minimization of interference with through street traffic is achieved and shall be subject to site plan approval. The types of vehicles that a driveway is intended to serve shall be a prime factor in determining the acceptable radii of driveways.
- 6. Provisions for circulation between adjacent parcels should be provided through a coordinated or joint parking system.

C. Driveway Spacing

- 1. Arterial streets. Direct access to arterial streets shall be regulated in accordance with the following standards:
 - i. **Spacing from controlled intersections:** All driveways providing access to arterial streets shall be constructed so that the point of tangency of the curb



return radius closest to a controlled intersection (i.e., signalized, or all-way stop-controlled) is at least one hundred twenty (120) feet from the perpendicular curb face of the intersecting street.

ii. **Spacing from other (non-controlled) access points:** All driveways providing access to arterial streets shall be constructed so that the point of tangency of the curb return radius closest to any non-controlled street or driveway intersection, is at least eighty (80) feet from the perpendicular curb face of the intersecting street or driveway.

2. Collector streets. Direct access to collector streets shall be regulated in accordance with the following standards:

i. **Spacing from controlled intersections:** All driveways providing access to collector streets shall be constructed so that the point of tangency of the curb return radius, closest to a controlled intersection (i.e., signalized, or all-way stop-controlled) is at least one hundred twenty (120) feet from the perpendicular curb face of an intersecting arterial street and eighty (80) feet from the perpendicular curb face of an intersecting collector or local street.

ii. **Spacing from other (non-controlled) access points:** All driveways providing access to collector streets shall be constructed so that the point of tangency of the curb return radius closest to a non-controlled street or driveway intersection is at least eighty (80) feet from the perpendicular curb face of the intersecting street or driveway.

3. In the event that any of these spacing standards cannot be met because of an unusually narrow or shallow lot size, a reduction in spacing may be approved by the City Engineering Department as long as the reduction does not result in an unsafe traffic condition.

D. Driveway Design Standards

1. Concrete thickness for drives within City right-of-way shall be a minimum of 6 inches.
2. Asphalt thickness for residential drives within City right-of-way shall be 2 inches of asphalt over 7 inches of compacted Class 7 Aggregate Base Course.
3. Asphalt thickness for commercial drives within City right-of-way shall be 3 inches of asphalt over 7 inches of compacted Class 7 Aggregate Base Course.
4. No gravel driveways will be allowed within public right-of-way.
5. The maximum slope for a driveway shall not exceed 15%.
6. The maximum grade change for a driveway shall be 10% with a 15' minimum length between grade changes.
7. Driveways with a sidewalk or trail crossing shall have a maximum slope of 2% for a minimum of 4 feet wide within the crossing area of the sidewalk or path.
8. Driveways shall be designed to prevent street stormwater from leaving the street and flowing down the driveway. Driveways shall slope upward to reach an elevation equivalent to the top of curb before the driveway crosses the inside edge of sidewalk/path if present or within 10 feet of the edge of roadway if no sidewalk/path is present. A reduction in height may be approved by the City Engineering Department if acceptable stormwater calculations are provided showing that current or future depth of gutter flows during the design storm will not be higher than the proposed height of the driveway.



5.9 PAVEMENT MARKINGS

- A. Pavement markings shall meet the requirements of the latest edition of ARDOT standard specifications, ARDOT Standard Roadway Drawings, MUTCD, AASHTO - A policy on Geometric Design of Highway and Streets, and AASHTO - Guide for the Development of Bicycle Facilities.
- B. Thermoplastic markings shall be used on all pavement marking unless otherwise approved by the City Engineering Department or Public Works Department.
- C. Typical striping widths for lane lines and centerlines are 6 inches.
- D. Preformed thermoplastic shall be used for all pavement markings words and symbols such as arrows, "onlys," crosswalks, railroad crossings, school crossings, stop lines, yield lines, bike symbols and any other symbol required by the City.
- E. Bike lanes shall be marked with the helmeted bicyclist symbol in accordance with the latest edition of the MUTCD.
- F. Pavement shall be striped and marked at the time of construction if required by Public Works Department.
- G. 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.

5.10 TRAFFIC SIGNS

- A. All traffic control devices shall meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD), latest edition. The developer/owner shall obtain written approval from the City of Bryant City Engineering Department and/or City of Bryant Public Works Department to utilize special or ornamental traffic signs within a subdivision/development. Maintenance of ornamental and/or special traffic signs shall be the responsibility of the Developer/Owner, Property Owners Association, or Improvement District. Maintenance of ornamental or special traffic signs shall not be the responsibility of the City of Bryant.
- B. The location of all traffic control devices shall be at the discretion of the City of Bryant Engineering Department and/or City of Bryant Public Works Department. No sign shall be placed where any portion of the sign encroaches on the roadway or restricts handicapped accessibility.
- C. Traffic control devices shall be installed prior to occupancy of any residence, building, or placing the street in service.
- D. The City of Bryant may require "No Parking" signs on one side of any street less than 30 feet wide face of curb to face of curb, or where vertical or horizontal alignment severely restricts sight distance.



- E. Traffic control devices within ARDOT right-of-way shall meet the requirements of the latest edition of ARDOT Standard Specifications and shall be approved and permitted by ARDOT District 6 prior to installation.
- F. Roundabouts signs shall be designed and installed in accordance with the latest edition of the NCHRP Report 672, Roundabouts: An Information Guide and the MUTCD

5.11 ALLEYS

- A. Alleys may be required at the rear of all lots to be used for business purposes but shall not be provided in residential areas except where the Developer/Owner provides evidence satisfactory to the Development Review Committee and/or Planning Commission of the need for alleys.

5.12 STREETLIGHTS

- A. Streetlights shall be required on all streets in accordance with the City of Bryant Master Transportation Plan and the Master Street Lighting Plan and shall be approved by the City Department and/or Public Works Department.
- B. Maximum spacing between streetlights shall be in accordance with the City of Bryant Master Street Lighting Plan.
- C. Streetlights including installation, materials, etc. shall be approved by the governing electric utility. All streetlights that are not approved and maintained by governing electric utility shall be maintained by Developer/Owner, Property Owners Association, or Improvement District, not by the City of Bryant.

5.13 ACCESS MANAGEMENT

- A. Access management, as it relates to frequency, spacing, roadway function classification, or use type shall be in accordance with the Master Transportation Plan, duly adopted Access Management Plan (AMP), or those standards specified in this document, with the more stringent standard governing where conflicts arise.
- B. If an Access Management Plan (AMP) has been adopted for particular corridors within the city, those AMP's supersede similar plans and/or guidance that may be found more generally in the Master Transportation Plan and/or in this document (see with O-2009-08; O-2012-01; O-2018-5; O-2020-21).



6.0 PAVEMENT DESIGN

6.1 PAVEMENT TYPES

- A. Street pavement sections **and shared-use trails** shall be flexible type with an asphalt concrete **hot mix pavement (ACHM)**. Curb and gutter and sidewalks shall be Portland Cement Concrete.
- B. Flexible pavements shall consist of a crushed stone base course with an **ACHM binder and/or surface course or a full-depth asphalt structure utilizing an ACHM Base Course**.
- C. Rigid type pavement structures consisting of a Portland Cement Concrete section and surface shall be used only with approval by the **City Engineering Department or City of Bryant Public Works Department**. Pavement design shall include full depth Portland Cement Concrete to the designed thickness with a crushed stone base course. Design thickness of concrete pavement and crushed stone base course shall be approved by the **City Engineering Department or City of Bryant Public Works Department**.

6.2 PAVEMENT MATERIALS AND CONSTRUCTION

- A. All pavement materials, construction methods, standards, time and temperature constraints, seasonal constraints, and performance requirements shall be in accordance with the latest edition of the **ARDOT** Standard Specifications for Highway Construction, and these specifications unless specifically approved otherwise in writing by the City of Bryant for a specific and individual exception.
- B. Mix designs shall meet the requirements of the latest edition of **ARDOT** Standard Specifications.

6.3 GEOTECHNICAL REQUIREMENTS

Pavement Design shall include a geotechnical investigation **which shall include the following minimum requirements:**

- A. **The** geotechnical investigation **shall be conducted** by a geotechnical engineer approved by the **City Engineering** Department and/or City of Bryant Public Works Department. The geotechnical engineer shall test and assess the soils under all proposed streets and provide a report of all testing reports, soil classifications, subsurface drainage requirements, and pavement design recommendations to the **City Engineering** Department and/or City of Bryant Public Works Department for review.
- B. Three copies of the geotechnical report, including one PDF format copy, shall be provided to the **City Engineering** Department and/or City of Bryant Public Works Department along with the proposed street design drawings prior to starting construction on any road.



C. Sampling and Testing

1. The investigation and sampling of soils shall conform to AASHTO R 13 (ASTM D 420), and test procedures referenced therein.
2. All sampling and testing of soils shall be performed under the direct supervision of an Engineer who shall sign and stamp the geotechnical report. A representative of the City Engineering Department and/or Public Works Department shall be on-site to witness the sampling and testing unless instructed otherwise.
3. The minimum sampling and testing frequency shall be one density test, one liquid limit, one plasticity index, and one gradation and soils classification for each 300 feet of street or section thereof with a minimum of three sets of tests per project. More locations may be required at curve radii. The minimum depth of boring or excavation for in-situ materials shall be five feet below the top of the elevation of the final compacted subgrade.
4. Gradation, Atterberg limits, maximum compaction, and load bearing strength testing shall be provided to determine suitability of soils for use as subgrade material within the street.
5. *Soils Classification:* Subgrade soils shall be classified in accordance with the AASHTO System (AASHTO M 145). All tests required for classification of soils as referenced in AASHTO M 145 shall be performed and reported unless specific tests are waived by the City. Select material used in subgrade or subbase construction shall be tested and classified. Select material shall meet the requirements of the ARDOT Standard Specifications
6. *Moisture Density Relationship:* Compaction testing of soils proposed for use as subgrade material shall be performed in accordance with AASHTO T-99 (Standard Proctor Test) methods.
7. *Load Bearing Strength:* Load bearing strength of soils shall be determined by the California Bearing Ratio Test (CBR) in accordance with AASHTO T 193 or ASTM D 1883. A minimum of one test shall be performed for each 300 linear feet of street; additional tests will be required where significant variation in soil conditions occurs.

For CBR testing, the specimen shall be molded at approximately the optimum moisture content and 95 percent of the maximum dry density as determined by the corresponding laboratory proctor tests.

CBR tests will be required for all in-situ soils, select material, and on-site borrow utilized in the subgrade construction.



6.4 SUBGRADE MATERIAL

- A. Subgrade soils shall be all materials used for subgrade including in-situ materials and fill materials.
- B. Subgrades for pavement shall be stabilized by mechanical compaction. Stabilization methods such as fabrics and chemical stabilization may be submitted for approval when supported by engineering data and calculations to substantiate the adequacy of the stabilized procedure.
- C. Subgrade shall be compacted to 95 percent modified proctor density minimum. Moisture content shall be +/- 3% of optimum moisture unless otherwise supported by the site-specific geotechnical data and approved by City of Bryant Public Works.
- D. Subgrade shall be prepared in such a manner that the aggregate base course shall be placed on a firm foundation that is stable and free from soft spots, pumping, dust pockets, wheel ruts, or other defects.
- E. The top 24 inches of the subgrade shall be a material not susceptible to frost action unless modified with cement, lime or another method approved specifically by the City of Bryant Public Works to resist frost action. Soils classified as A-4 and A-5 including sandy silts, fine silty sand or lean clays are highly susceptible to frost action.
- F. In-situ soils meeting the requirements outlined in these specifications may be utilized as subgrade material. In-situ soils used as subgrade shall be scarified to a minimum depth of 8-inches below finish subgrade, recompacted, and tested as described Section 8 of these specifications. Fill material for subgrade shall be placed in lifts not to exceed 8-inches compacted depth.
- G. Methods and procedures for establishing the total depth of soil replacement and/or modification shall be as specified by the design engineer and geotechnical investigations. The adequacy of in-situ soils and fill materials as pavement subgrade shall be evaluated based upon the soil's classification, liquid limit, and plasticity index.
- H. Soils with a liquid limit greater than 40, or a plasticity index greater than 15 shall be undercut and removed from the street section or improved by a design method of stabilization approved by City of City Engineering Department and/or City of Bryant Public Works.
- I. Subgrade support capacity for flexible type pavements shall be determined from the load bearing strength (CBR) of the soils based on the correlation provided in Section 6.5



J. At minimum, the subgrade shall meet the following specifications unless an individual design, with calculations, is provided:

a. AASHTO Soil Classification: A-1, A-2-4, or A-2-5
Passing no. 200 Sieve: 35% max.
California Bearing Ratio (CBR): ≥ 6

b. Material not meeting the soil classification and gradation requirements in Item a above but meeting the following specifications:

AASHTO Soil Classification A-2-6, A-6
California Bearing Ratio (CBR): ≥ 6
Plasticity Index: 15 max.

K. Replacement of soils up to 4' in depth may be required by the City dependent upon testing results in soils report and/or field conditions.

L. Quality control testing shall be as specified in Section 8 of these specifications.

6.5 PAVEMENT DESIGN REQUIREMENTS

A. Design Method: Pavement thickness shall be designed by the AASHTO Guide for Design of Pavement Structures, latest edition. Other design methods, including the Asphalt Institute method, may be approved on an individual basis.

Minimum criteria for thickness design for the AASHTO method is based on street classifications and is included in **Table 6**. Streets classified as arterial, and collector shall be designed on an individual basis and all criteria utilized shall be documented.

B. Design Period: A minimum design period (traffic analysis period) of 20 years shall be used for pavement designs.

C. Traffic Analysis: Maximum traffic characteristics, including traffic volumes and 18-kip equivalent single axle loads (ESALs), are provided in Section 6.5 for predetermined local street pavement sections. The developer/owner shall submit traffic data for all street classifications, including local, where traffic data is above the maximum criteria provided. The basis for traffic projections shall be included in data submitted.



The following equation shall be used when calculating the design traffic for 20-year projections:

$$\text{Design Traffic} = \text{ESALs} \times \text{DD} \times \text{LD} \times 365 \times 20$$

Where: ESALs = 18-kip Equivalent Single Axle Loads
 DD = Directional Distribution
 LD = Lane Distribution

Two Lane: ESALs x 0.5 x 1.0 x 365 x 20

Four Lane: ESALs x 0.5 x 0.8 x 365 x 20

D. Resilient Modulus Correlation: The correlation of California Bearing Ratio (CBR) and Resilient Modulus for pavement design input should be made using the NCHRP 1-37A equation shown below:

$$M_R \text{ (psi)} = 2555 \times \text{CBR}^{0.64}$$

E. Design Reliability and Serviceability: The design reliability percentage and serviceability index inputs are shown for each functional classification in **Table 6**.

Table 6: Design Reliability and Serviceability Inputs

Design Reliability and Serviceability Inputs						
Classification	Reliability	Standard Deviation		Initial Serviceability	Terminal Serviceability	Performance
		Flexible	Rigid			
Minor Arterial	95	0.45	0.35	4.5	2.5	2.0
Industrial Collector	90	0.45	0.35	4.5	2.5	2.0
Collector	85	0.45	0.35	4.5	2.5	2.0
Local	80	0.45	0.35	4.5	2.0	2.5

F. Pavement Material Parameters: **Table 7** provides pavement material parameters including standard specification reference, structural coefficients, and thickness constraints.



Table 7: Pavement Material Parameters

Pavement Material Parameters				
Material	Specification ¹	Structural Coefficient	Thickness (in.)	
			Minimum	Maximum
ACHM Surface Course	Section 407	0.44	2	4
ACHM Binder Course	Section 406	0.44	3	6
ACHM Base Course	Section 405	0.36	4	12
Aggregate Base Course	Section 303	0.14	6	12

¹ ARDOT Standard Specifications

G. Minimum Local Street Pavement Sections: **Table 8** provides minimum pavement sections, based on the AASHTO method, for local streets to be used in lieu of an individual pavement design if the project specific subgrade and traffic data fall within the given ranges. A geotechnical investigation shall be conducted to determine subgrade parameters prior to utilizing the minimum residential pavement sections. Traffic analyses shall be conducted to determine average daily traffic and 18-kip equivalent single axle loads (ESALs). For CBR values less than 6 and ESALs exceeding the maximum shown in Table 8, an individual pavement design, including calculations, shall be provided for City's approval.

H. Minimum rigid pavement (concrete) design thicknesses for all street classifications shall be as determined and recommended by the Geotechnical Investigation. Minimum rigid pavement thicknesses shall be approved by the City **Engineering Department**, City of Bryant Public Works and/or Development Review Committee.

1. Minimum concrete pavement thickness shall be determined by pavement design but no less than 6-inches.
2. Minimum base course thickness shall be determined pavement design.
3. Concrete pavement shall be Portland Cement Concrete with a minimum 28-day compressive strength of 4,000 psi. Concrete shall be air-entrained with a maximum 4-inch slump.



Table 8: Minimum Local Street Pavement Sections

Minimum Local Street Pavement Sections						
Local Street Classification		Local Street ¹				
		Low Volume 0 - 30 Lots	Mid Volume 31-150 Lots	High Volume 151 - 300 Lots		
Traffic Characteristics ²						
Average Daily Traffic (Two-Way)		200	700	1500		
20 Yr. Design Traffic - ESALs		14,600	36,500	73,000		
Minimum Pavement Sections (in.) ³						
CBR ⁴	Type ⁵	Materials				
< 6	Requires Individual Design					
≥ 6	F	ACHM Surface Course	2.0	2.5	2.5	
		Aggregate Base Course	7.0	8.0	9.0	
≥ 6	FD	ACHM Surface Course	2.0	2.0	2.0	
		ACHM Base Course	4.0	4.5	5.0	
≥ 10	F	ACHM Surface Course	2.0	2.0	2.5	
		Aggregate Base Course	6.0	7.5	7.0	
≥ 10	FD	ACHM Surface Course	2.0	2.0	2.0	
		ACHM Base Course	4.0	4.0	4.0	

¹ Number of single-family home lots - For a loop or cul-de-sac, it will equal the number of lots on that street. For a continuing (through) street, it will equal the number of lots that will use the street when entering/exiting the subdivision.

² Maximum values. If results of traffic analysis indicate higher values, an individual pavement design shall be required.

³ Additional base thickness or subbase may be necessary to meet all design requirements.

⁴ California Bearing Ratio (CBR)

⁵ Type of Pavement; F = ACHM Surface Course over Aggregate Base Course; FD = ACHM Surface Course over ACHM Base Course (Full Depth Asphalt Pavement)



6.6 PAVEMENT DESIGN REPORT

When required by the Public Works Department or City Engineering Department, an individual pavement design report shall include the following information to be considered for approval. The report shall be signed and stamped by an Engineer.

1. Study Area
 - a. Site vicinity map depicting project area.
 - b. Plat with street names labeled.
2. Traffic Data
 - a. Existing and Future Average Daily Traffic (ADT)
 - b. Heavy truck percentage
 - c. 18-kip Equivalent Single Axle Loads (ESAL) determination
3. Soils Report
 - a. Field Investigation
 - i. Method of subsurface exploration
 - ii. Boring locations on scaled drawings.
 - iii. Boring logs
 - b. Laboratory Testing (In-situ and borrow)
 - i. Load bearing strength – California Bearing Ratio (CBR)
 - ii. Natural water content
 - iii. Atterberg limits
 - iv. Sieve analyses
 - v. AASHTO soil classification
 - vi. Moisture-Density relationship (Procter Test)
 - c. General Conditions
 - i. Site conditions
 - ii. Subsurface conditions
 - iii. Subgrade support
 - iv. Subgrade preparation
 - d. Construction considerations
4. Pavement Design
 - a. AASHTO pavement design calculations
 - b. Recommended pavement sections

6.7 AGGREGATE BASE COURSE

- A. Aggregate base course material shall be crushed stone meeting the requirements of ARDOT Class 7 aggregate base course as specified in the latest edition of ARDOT Standard Specifications.
- B. Aggregate base course shall be compacted to 98 percent modified proctor density minimum. Moisture content shall be +/- 3% of optimum moisture.



6.8 ACHM COURSES

- A. Materials for asphalt concrete hot mix (ACHM) base, binder, and surface courses shall meet the requirements of the ARDOT Standard Specifications.

6.9 RIGID PAVEMENT

- A. Surface course for rigid pavement shall be Portland Cement Concrete as specified in the latest edition of ARDOT Standard Specifications.

- B. Joint layout details shall be provided in the construction plans when P.C. Concrete Pavement is utilized as a surface course.

6.10 CURB AND GUTTER

- A. Curb and gutter shall be Portland Cement Concrete with a minimum 28-day compressive strength of 4,000 psi. Concrete shall be air-entrained with a maximum 4-inch slump.
- B. Aggregate Base Course shall extend to a minimum of 1 foot behind the back of curb and gutter. Compaction requirements shall conform to the requirements for street subgrade materials and shall extend a minimum of 1 foot behind the back of curb and gutter removing all soft spots and replacing with suitable material.
- C. Curb and gutter shall conform to the typical detail within these specifications or ARDOT Standard Roadway Drawing Details for curbing.
- D. Expansion joints shall be made with 1/2-inch preformed expansion joint filler of a non-extruding type. Expansion joints shall be placed at intervals not exceeding 195 feet, intersection radii, driveways, stationary structures, and sidewalks.
- E. Contraction joints shall be sawed or formed at intervals not greater than 15 feet. Depth of saw-cut shall be 1 1/2-inch and have a width of 1/4-inch. Contraction joints shall be sealed in accordance with ARDOT Standard Specifications.
- F. Forms shall be made of metal or wood and shall be properly braced. The minimum length of each section often used shall be 10 feet. Each section of form shall be uniform and free from undesirable bends or warps. Forms shall be of such cross section and strength and so secured as to resist the pressure of the impact and vibration on any equipment which they support without springing or settlement.
- G. Curb and gutter placed with slip form or extruding equipment will be acceptable providing it complies with all of the above requirements.
- H. After curing, the curb shall be immediately backfilled to within 4 inches of the top curb to eliminate the possibility of washing beneath the curb. The remaining 4 inches shall be topsoil.



I. Cold weather protection shall meet the requirements of the latest edition of ARDOT Standard Specifications.

J. Any cuts to the curb and gutter after the curb and gutter has been formed and poured shall be approved by the Public Works Department.

6.11 SUBSURFACE DRAINAGE

A. Subsurface drainage shall be constructed where subsurface moisture will affect the stability of the subgrade and as recommended by the geotechnical investigations. Streets in cut sections and hillsides typically need subsurface drainage.



7.0 UTILITIES AND UTILITY CROSSINGS

7.1 GENERAL

- A. The Developer/Owner shall be responsible for coordinating the installation of franchise utility lines and water, wastewater, and storm drain lines relative to street development.
- B. Design and installation of water, wastewater and storm drainage facilities shall conform to the current design criteria and related regulations for those facilities.
- C. All utilities shall be designed and installed in a manner that minimizes utilities under streets and curbs. All utilities crossing streets shall be near perpendicular to the street. Utilities located parallel to the street shall remain outside of the limits of the street section unless crossing perpendicular to the street. Utilities shall ensure that parallel utilities do not cross into the limits of the street around curves, corners or cul-de-sacs unless otherwise approved by the Public Works Department.
- D. All non-metallic buried facilities placed within public right-of-way either parallel to or crossing the roadway, shall have an approved identification wrap of detectable tape or wire in order that the facility can be located by metal locators or other suitable devices.
- E. All underground electrical lines within public right-of-way either parallel to or crossing the roadway shall include 3-inch minimum width underground detectable warning tape with red background and black letter stating, "CAUTION BURIED ELECTRIC LINE BELOW". This tape shall be detectable, durable, highly visible, resistant to elements, and meeting or exceeding all industry standards.
- F. All work within public right-of-way shall meet the requirements of these standards, Ordinance 2012-11, and all other applicable city ordinances, unless otherwise modified herein. All applicable permits shall be obtained by the Utility for any work taking place within public right-of-way.
- G. Utilities shall be required to meet the Insurance, Performance Bond, and Maintenance Guarantee requirements outlined in Section 2.8 of these specifications.
- H. No new excavations or bores shall be allowed after 1:00pm on Fridays or on weekends.

7.2 FRANCHISED UTILITY LINES

- A. All franchised utility lines, which are underground, shall be installed in an encasement pipe under streets. The encasement pipe shall be installed by either the Developer/Owner or the utility before the subgrade is completed.
 - a. *Encasement Length* - The encasement length shall extend a minimum of six (6) feet beyond the back of curb or edge of pavement if no curb is present.
 - b. *Encasement Depth* - The minimum depth of cover for encasement pipe shall be thirty-six (36) inches measured from the top of the encasement pipe to the top of the subgrade or



forty-eight (48) inches measured from the top of encasement pipe to the top of pavement, whichever provides the greatest depth.

7.3 WATER, WASTEWATER, AND STORM DRAIN LINES

- A. Water, wastewater, and storm drain lines shall be installed before the subgrade is complete.

7.4 BORING AND JACKING

- A. All street, alley, sidewalk, road, highway or other public way, or curb and gutter crossings by utilities and other parties shall be required to be bored unless an open cut is approved by the City Engineering Department or Public Works Department. Open cut approvals shall not be withheld unreasonably and if required, shall meet the requirements of Section 7.5 or Section 7.6.
- B. The depth of bury on installations which are jacked or bored under any street shall have a minimum depth of bury of thirty-six (36) inches measured from the top of the pipe or casing to the top of the subgrade or forty-eight (48) inches measured from the top of pipe or casing to the top of pavement, whichever provides the greatest depth. In the case of a street section with a ditch section, the bury shall be a minimum of twenty-four (24) inches below flow line, but still a minimum of the above referenced depth below street section, whichever is greater. If the pavement or curb and gutter structure is damaged by the jacking or boring installation, it shall be repaired in a manner approved by the City Engineering Department or Public Works Department.

7.5 PAVEMENT CUTS - EXISTING STREETS

- A. Pavement cuts for drainage and/or utility lines under existing streets shall be repaired in accordance with **Detail 8 or 9** included in Appendix A of these specifications.
- B. Backfill material shall meet the requirements of ARDOT Class 7 aggregate base course as specified in the latest edition of ARDOT Standard Specifications.
- C. Backfill material shall be compacted to 98 percent modified proctor density minimum. Backfill material shall be compacted in maximum 6-inch lifts. Open trenches shall be inspected by the Public Works Department and/or City Engineering Department prior to backfill.

7.6 DRAINAGE AND/OR UTILITY CUT BACKFILL ON STREET UNDER CONSTRUCTION

- A. Trenches backfill for storm drains and/or utility lines for all trenches excavated in areas to be paved shall be in accordance with **Detail 7** included in Appendix A of these specifications.
- B. Backfill material shall meet the requirements of ARDOT Class 7 aggregate base course as specified in the latest edition of ARDOT Standard Specifications.
- C. Backfill material shall be compacted to 98 percent modified proctor density minimum. Backfill material shall be compacted in maximum 6-inch lifts. Open trenches shall be inspected by the Public Works Department and/or City Engineering Department prior to backfill.



8.0 STORM DRAINAGE AND DRAINAGE FACILITIES

8.1 GENERAL

- A. Design of storm drains and drainage facilities shall be by a licensed professional engineer in accordance with the City of Bryant Stormwater Management Ordinance (O-2019-32), and the Stormwater Management Manual (O-2019-31).
- B. All drainage structures for transporting of storm water located under the pavement shall be reinforced concrete pipe or reinforced concrete culvert.
- C. All box culverts shall be designed meeting the AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications or the AASHTO Standard Specifications for Highway Bridges.
- D. Precast box culverts shall be designed and constructed in accordance with Section 607 of the ARDOT Standard Specifications.
- E. Pipes and culverts shall have smooth flow lines with no depressions and no indentations or protrusions into the interior.
- F. Corrugated metal pipes and fiber glass pipes shall not be allowed.
- G. Lift holes shall be filled with non-shrink grout.
- H. Conflict boxes shall not be allowed unless approved by the Public Works Department

8.2 STORM DRAIN MATERIALS

- A. Storm drainpipe materials shall meet the requirements the City of Bryant Stormwater Management Manual and these specifications.
- B. Reinforced concrete pipe or reinforced concrete culvert shall be used for all storm drains and facilities under streets.
- C. HDPE or Polyvinyl Chloride (PVC) shall be permitted alongside (parallel to) streets. These shall not be permitted under streets.
- D. Driveway culverts shall be sized in accordance with the Bryant Stormwater Manual but shall be no smaller in diameter than 18 inches and shall be no smaller in diameter than the nearest upstream culvert unless otherwise approved by the Public Works Department.

8.3 BEDDING MATERIAL

- A. Bedding material for reinforced concrete pipe shall be in accordance with the manufacturer's recommendations.



- B. Bedding material for HDPE and PVC shall be granular bedding material. Bedding material shall extend to 6 inches above the top of the pipe and shall comply with ASTM D2321.

8.4 DROP INLETS AND JUNCTION BOXES

- A. Junction boxes and drop inlets shall meet the requirements of the City of Bryant Storm Water Management Manual and the latest edition of ARDOT Standard Specifications.
- B. Concrete shall be Portland Cement Concrete with a minimum 28-day compressive strength of 4,000 psi.
- C. All pipe entering and leaving the structure shall be cut flush with the inside face and grouted around the perimeter, as necessary.
- D. All concrete surfaces shall be free of honeycomb and cracks.

8.5 BRIDGES

- A. Bridges shall meet the requirements of the City of Bryant Storm Water Management Manual, the latest edition of the ARDOT Standard Specifications, and the latest edition of the AASHTO LRFD Bridge Design Specifications and ARDOT Bridge Division Policy Guidelines.



9.0 QUALITY CONTROL TESTING AND INSPECTIONS

9.1 GENERAL

- A. Materials and construction employed in street improvements shall be subject to inspection and quality control testing. All testing of materials and construction shall be provided and paid for by the Developer/Owner.
- B. The Developer/Owner shall provide for inspections of street improvements during construction. The inspections shall be accomplished under the supervision of the Engineer of Record. The Engineer of Record shall provide certification that all materials and construction conform to the approved plans and specifications and with these minimum street standards.
- C. The Engineer of Record shall furnish inspection whenever a critical construction activity is taking place. This means that a representative of the Engineer of Record **shall** be on-site whenever a critical construction activity is taking place.
- D. All field tests required for a project shall be witnessed by the City of Bryant, Engineer of Record, contractor, or their authorized representatives.
- E. The City of Bryant **Engineering** Department and/or Public Works Department shall be notified at least one day in advance of any test(s). It is the responsibility of the contractor to coordinate the scheduling of all tests with the City.
- F. **Mix designs for ACHM Pavement, Portland Cement Concrete Pavement, and Concrete for Structures shall be provided to and approved by the Public Works Department/City Engineering Department prior to placement.**

9.2 QUALITY CONTROL TESTING

- A. All testing shall be accomplished by a testing firm approved by the City of Bryant **Engineering** Department and/or Public Works Department and shall be performed under the supervision of a licensed Professional Engineer.
- B. Sampling and testing locations shall be subject to approval by the City of Bryant **Engineering** Department and/or Public Works Department.
- C. The City of Bryant reserves the right to require core sampling on asphalt streets. If required, asphalt streets shall be cored every 300 feet or portion thereof for the purpose of checking density and thickness, except that each cul-de-sac street shall have a minimum of **three** cores taken regardless of length, with one core being taken in the cul-de-sac. The location of the core shall be chosen by the **City Engineering** Department and/or Public Works Department so as to accurately represent the quality of the asphalt laid in a particular area. Core samples shall be used to indicate asphalt thickness, and in no case shall be more than 1/4-inch less than specified thickness. For cores that indicate thickness 1/4-inch to 1/2-inch less than that specified, "isolation" cores shall be required. To "isolate", the contractor, at no expense to the City of



Bryant, shall cut cores 10 feet either side of the initial core. If one or both of the cores are in the acceptable tolerance, the section will be accepted. If one or both cores fail, then additional cores shall be cut 25 feet away from the initial core in the failing directions. Subsequent cores shall be cut at 50 ft. intervals in the direction of failure until a core that passes tolerance is obtained. The isolated area shall be that which falls within the limits of acceptable thickness. The areas that fall within the 1/4-inch to 1/2-inch less than specified thickness shall be removed and replaced or warranted for five years at 150% of construction cost based on the estimate provided by the Engineer of Record. Areas that are determined to exceed the 1/2-inch less than specified thickness shall be removed and replaced within the limits of the acceptable thickness determined by the isolation method. Core holes shall be filled with non-shrink grout flush with final surface within 24 hours of test.

- D. The City of Bryant reserves the right to require core sampling on concrete streets. If required, concrete streets shall be cored every 300 feet or portion thereof for the purpose of checking thickness, except that each cul-de-sac street shall have a minimum of **three** cores taken regardless of length, with one core being taken in the cul-de-sac. The location of the core shall be chosen by the **City Engineering** Department and/or Public Works Department so as to accurately represent the quality of the asphalt laid in a particular area. Core samples shall be used to indicate thickness. Thickness shall not be more than 0.50-inches less than specified thickness. Core holes shall be filled with non-shrink grout flush with final surface within 24 hours of test.
- E. For concrete streets, one set of cylinders shall be taken at the beginning of every pour then for every **200 CY or portion thereof**. Concrete testing out less than 85% of design strength shall be removed and replaced. For concrete falling between 85% and 100% of design strength, an extended five-year warranty shall be provided at 150% of construction costs based on an estimate provided by the Engineer of Record.

9.3 SUBGRADE

- A. After the subgrade is prepared in accordance with these specifications, a wheel proof-roll test is to be completed by the Contractor/Developer/Owner. Using a loaded dump truck (62,000 lb.), or **other approved method**, drive over the surface looking for any movement, pumping, rutting, or tracking. All soft spots and areas that are pumping shall be removed and backfilled with ARDOT Class 7 base course material or other material approved by the **City Engineering** Department and/or Public Works Department in accordance with these specifications and the latest edition of **ARDOT** standard specifications.
- B. After the Contractor/Developer/Owner has completed the wheel proof-roll test and finds the subgrade to be stable, then and only then, is the **City Engineering** Department and/or Public Works Department to be notified to conduct a final wheel proof-roll test.
- C. A representative of the **City Engineering** Department and/or Public Works Department shall complete a proof-roll test **(or other approved method)** with a rubber-tired loaded dump truck weighing a minimum of 62,000 lbs. after the subgrade has been prepared and tested by the Contractor/Developer/Owner. **The Contractor/Owner/Developer shall provide a minimum 24-hour**



notice to the City Engineering Department and/or Public Works Department prior to the proof roll test. The appropriately loaded dump truck shall either be provided by the Contractor/Developer/Owner along with a weight ticket, or the Contractor/Owner/Developer can pay the City a fee of \$500 for the City to provide the loaded dump truck. If the subgrade fails the proof-roll test and a representative of the City of Bryant has to perform another test, there will be a \$250.00 fee for each additional proof-roll test which shall be paid by the Owner/Developer.

- D. Density tests are required in accordance with **Table 9** and the latest edition of **ARDOT** standard specifications. Density tests on subgrades shall be taken every 200 CY or portion thereof with a minimum of 1 per lift, except that each cul-de-sac street shall have a minimum of two tests taken regardless of volume and all curve radii shall have a minimum of 3 tests taken. Compaction shall be in accordance with Section 5 of these specifications. The **City Engineering** Department and/or Public Works Department shall be notified at least one day in advance of any density test(s). A representative of the **City Engineering** Department and/or Public Works Department shall be on-site to witness the test(s) unless instructed otherwise. Copies of all test results shall be sent to the City of Bryant Public Works.
- E. The subgrade shall meet all of the requirements of these specifications prior to **aggregate** base course being placed.
- F. If the succeeding **aggregate** base course is not placed immediately after the subgrade has been prepared and it becomes rutted, rough, or unstable, the subgrade shall be shaped and re-compacted in accordance with these specifications and the latest edition of **ARDOT** standard specifications.

9.4 **AGGREGATE BASE COURSE**

- A. After the **aggregate** base course is prepared in accordance with these specifications, a wheel proof-roll test is to be completed by the Contractor/Developer/Owner. Using a loaded dump truck (62,000 lb.), **or other approved method**, drive over the surface looking for any movement, pumping, rutting, or tracking. All soft spots and areas that are pumping shall be removed and backfilled with **ARDOT** Class 7 base course material or other material approved by the **City Engineering Department** and/or City of Bryant Public Works in accordance with these specifications and the latest edition of **ARDOT** standard specifications.
- B. After the Contractor/Developer/ Owner has completed the wheel proof-roll test and finds the **aggregate** base course to be stable, then and only then, is the **City Engineering** Department and/or Public Works Department to be notified to conduct a final wheel proof-roll test.



- C. A representative of the City Engineering Department and/or Public Works Department shall complete a proof-roll test (or other approved method) with a rubber-tired loaded dump truck weighing a minimum of 62,000 lbs. after the aggregate base course has been prepared and tested by the Contractor/Developer/Owner. The Contractor/Owner/Developer shall provide a minimum 24-hour notice to the City Engineering Department and/or Public Works Department prior to the proof roll test. The appropriately loaded dump truck shall either be provided by the Contractor/Developer/Owner along with a weight ticket, or the Contractor/Owner/Developer can pay the City a fee of \$500 for the City to provide the loaded dump truck. If the aggregate base course fails the proof- roll test and a representative of the City of Bryant has to perform another test, there will be a \$250.00 fee for each additional proof-roll test which shall be paid by the Owner/Developer.
- D. Density tests are required in accordance with Table 9 and the latest edition of ARDOT standard specifications. Density tests on aggregate base course shall be taken every 200 CY or portion thereof with a minimum of 1 per lift, except that each cul-de-sac street shall have a minimum of two tests taken regardless of its length and all curve radii shall have a minimum of 3 tests taken. Compaction shall be in accordance with Section 5 of these specifications. The City Engineering Department and/or Public Works Department shall be notified at least 24 hours in advance of any density test(s). A representative of the City Engineering Department and/or Public Works Department shall be on-site to witness the test(s) unless instructed otherwise. Copies of all test results shall be sent to the City of Bryant Public Works.
- E. Aggregate base course shall not be more than 1/4-inch less than specified thickness.
- F. The aggregate base course shall meet all of the requirements of these specifications and shall be approved by the City Engineering Department and/or Public Works Department prior to asphalt being placed. Approval of the aggregate base course will be revoked if asphalt is not placed on the aggregate base course within 24 hours of approval, or if a rain event occurs within 24 hours of approval.
- G. If the succeeding courses of asphalt are not within 24 hours after the aggregate base course has been prepared or before any rain event and it becomes rutted, rough, or unstable, the aggregate base course shall be shaped and re-compacted in accordance with these specifications and the latest edition of ARDOT standard specifications.



Table 9: Construction Quality Control

CONSTRUCTION QUALITY CONTROL						
Construction Stage	Test Required	Test Reference ^a			Frequency of Sampling and Testing	
		AASHTO	ASTM	ARDOT		
Subgrade						
	Sampling	T 87	D 421	---	One/Type of Soil	
	Soil Classification	M 145	---	---		
	Sieve Analysis	T 88	D 422	---		
	Moisture-Density Relationship	Standard Proctor or Modified Proctor	T 99	D 698		---
			T 180	D 1557	---	
	Moisture & Density (In-Place)		T 310	D 6938	---	One/200 CY/8" Lift (Subgrade) ^b
					---	One/200 CY/8" Lift (Fill)
				---	One/Crossing/300 LF/6" Lift (Trench Backfill) ^c	
				---	One/200 CY/6" lift (Structure Backfill) ^c	
Aggregate Base Course						
Aggregate Base Course						
	Sampling	T 2	D 75	---	One/Type of Aggregate	
	Percentage of Wear	T 96	C 131	---		
	Soundness	T 104	C 88	---		
	Sieve Analysis	T 27	C 136	---		
	Moisture-Density Relationship	T 180	D 1557	---		
	Moisture & Density (In-Place)	T 310	D 6938	---		
	Thickness	---	---	---	One/200 CY/8" Lift ^b	
				One/Crossing/300 LF/6" Lift (Trench Backfill) ^c		
				One/200 CY/6" lift (Structure Backfill) ^c		
ACHM Base Course (Refer to ACHM Surfacing)						
Curb & Gutter						
Portland Cement Concrete						
	Sampling	T 141	C 172	---	One/1000 LF of Curb & Gutter	
	Slump	T 119	C 143	---		
	Temperature	---	---	---		
	Air Content	T 152	C 231	---		
	Cylinders	T 22/T 23	C 39/C 31	---	One Set (4)/1000 LF of Curb & Gutter	
Asphalt Concrete Hot Mix (ACHM)						
Aggregates						
	Sampling	T 2	D 75	---	One/Source of Material	
	Percentage of Wear	T 96	C 131	---		
	Soundness	T 104	C 88	---		
	Sieve Analysis	T 27	C 136	---		
Bituminous Mixture						
	Sampling	T 168	---	465	One/500 TN/Type of Mixture	
	Air Voids (AV)	T269	---	---		
	Voids in Mineral Aggregate (VMA)	---	---	464		
	Water Sensitivity	---	---	455		
	Density – Maximum Theoretical	T 209	---	---		
	Density (Field)	T 166	---	461		
	Thickness (Core)	---	---	---		
Asphalt Binder Content	---	---	449/449A	One/500 TN ^{d,e}		
Aggregate Gradation	T 30	C 136	460	One/500 TN ^{d,e}		
Portland Cement Concrete Pavement and Structures						
Aggregates						
	Sampling	T 2	D 75	---	One/Source of Material	
	Organic Impurities	T 21	C 40	---		
	Sieve Analysis	T 27	C 136	---		
	Percentage of Wear	T 96	C 131	---		
	Soundness	T 104	C 88	---		
	Friable Particles	T 112	C 142	---		
Concrete Mixture						
	Sampling	T 141	C 172	---	Structures: One/100 CY Pavement: One/200 CY	
	Slump	T 119	C 143	---		
	Temperature	T 309	C 1064	---		
	Air Content	T 152	C 231	---		
Cylinders	T 22/T 23	C 39/C 31	---	Structures: One Set (4)/100 CY ^e Pavement: One Set (4)/200 CY ^e		
Thickness (Core)	T 24	C 42	---	See Section 9.2 D		

^a Additional Tests not listed herein may be referenced within the AASHTO or ASTM procedures.

^b A minimum of one test required for each individual street, cul-de-sac, and intersection.

^c Trench and structure backfill tests are in addition to subgrade tests.

^d Not less than one test per day.

^e A minimum of one test required for each type of material or mixture.

^f Structures includes concrete aprons and swales, drainage structures, driveways, sidewalks, etc.



10.0 EROSION CONTROL

10.1 GENERAL

- A. Erosion control measures shall be provided during construction to minimize soil erosion and to prevent silting of utility and storm drainage structures. Erosion control shall meet the requirements of the City of Bryant Storm Water Management Manual, applicable ADEQ General Stormwater NPDES Permits, and any other required permits. The City of Bryant is designated as a MS4.

10.2 PERMANENT EROSION CONTROL

- A. Permanent erosion control measures shall be solid sodding with a minimum of 4" of topsoil in all areas within rights-of-way and easements which are not covered by improvements.

10.3 PERMITS REQUIRED

- A. Contractor shall obtain permits, if required, from the Arkansas Department of Environmental Quality and Corps of Engineers, United State Corps of Engineers, City of Bryant, or Arkansas Department of Transportation. Permits that may be required include, but not limited to, ADEQ short term activity authorization, ADEQ General Stormwater NPDES permit, USACE Nationwide permit, and USACE Section 404 Permit



11.0 BICYCLE AND PEDESTRIAN FACILITIES

11.1 GENERAL

- A. Sidewalks and/or Shared-Use Trails shall be installed where shown on the Master Transportation Plan in accordance with those dimensions shown on cross-sections as found within the City Master Transportation Plan, and as provided within these standards.
- B. All pedestrian and bicycle facilities shall be designed in accordance with American Disabilities Act (ADA) regulations, AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO Guide for the Development of Bicycle Facilities, 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 Engineering Department prior to construction.
- C. Sidewalks shall be on both sides of streets in line with sidewalks on opposite corners of roads.
- D. Sidewalk and Trail 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.
- E. Longitudinal slope of sidewalks and trails shall be consistent with the adjacent street slopes.
- F. The subgrade under sidewalks shall be excavated or filled to the required grade. Soft and yielding material shall be removed and replaced with suitable material and the entire subgrade shall be thoroughly compacted with approved mechanical equipment. Sidewalks shall not be placed upon grassy or organic materials. Subgrade under sidewalks shall be compacted to 90 percent modified proctor density minimum. Density tests on subgrades shall be taken every 300 feet or portion thereof, or every lift, whichever is more often, and shall be witnessed by the City Engineering Department and/or Public Works Department. Compaction shall be in accordance with Section 6 of these specifications, except as modified in this section.
- G. The subgrade under trails shall meet the requirements of Section 6.4
- H. Sidewalks or trails which extend or link existing sidewalks or trails shall adjoin the existing sidewalks or trails to form a continuous, even pathway.
- I. Utility poles, utility boxes, mailboxes, fire hydrants, and other similar obstructions shall not be located in sidewalks and trails. Sidewalk and trail location may vary at the discretion of the Public Works Department to avoid such obstacles.
- J. 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.
- K. Sidewalks and trails located outside public ROW shall be maintained by the Owner and not by the City of Bryant



11.2 ACCESSIBILITY

- A. Wheelchair ramps shall be installed in accordance with current ADA requirements including the placement of detectable warning devices.
- B. Accessible ramps shall be constructed where sidewalks and trails intersect a curb, commercial driveway, street, or alley. Width of ramp shall match width of adjoining sidewalk or trail.
- C. Detectable warning device shall extend two (2) feet in the direction of travel and shall be the full width of the curb ramp or flush pedestrian access surface.
- D. Detectable warning device shall be placed such that the domes align in the predominant direction of pedestrian travel.
- E. Detectable warning device shall be located so that the nearest edge of the device is 6 inches from the face of curb.
- F. Maximum slope of ramp shall be 8.33% in the direction of travel. Cross-slope shall not exceed 2%.
- G. Sidewalk or Trail crossings of major roadways shall be required to have the appropriate pedestrian signal head or pedestrian hybrid beacon, roadway markings, and crosswalks per the recommendations of the MUTCD.

11.3 MINIMUM THICKNESS AND REINFORCEMENT

- A. All sidewalks not within a driveway shall have a minimum thickness of four (4) inches. All sidewalks within a driveway shall be a minimum thickness of six (6) inches.
- B. Sidewalks shall be reinforced, at a minimum, with woven wire fabric reinforcement.
- C. Sidewalks shall be Portland Cement Concrete with a minimum 28-day compressive strength of 4,000psi.
- D. Trail ACHM Pavement and aggregate base course shall be as shown in the typical cross section detail in these specifications. Concrete trails shall meet the same requirements as concrete for sidewalks and shall only be used with approval by the City Engineering Department and/or Public Works Department.

11.4 MINIMUM WIDTH

- A. Minimum width of pedestrian and bicycle facilities shall be as specified in the City of Bryant Master Transportation plan. Alternate widths may be required by the City Engineering Department and/or Public Works Department.



11.5 CONTRACTION AND EXPANSION JOINTS

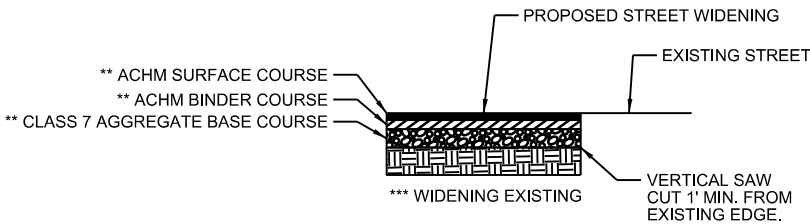
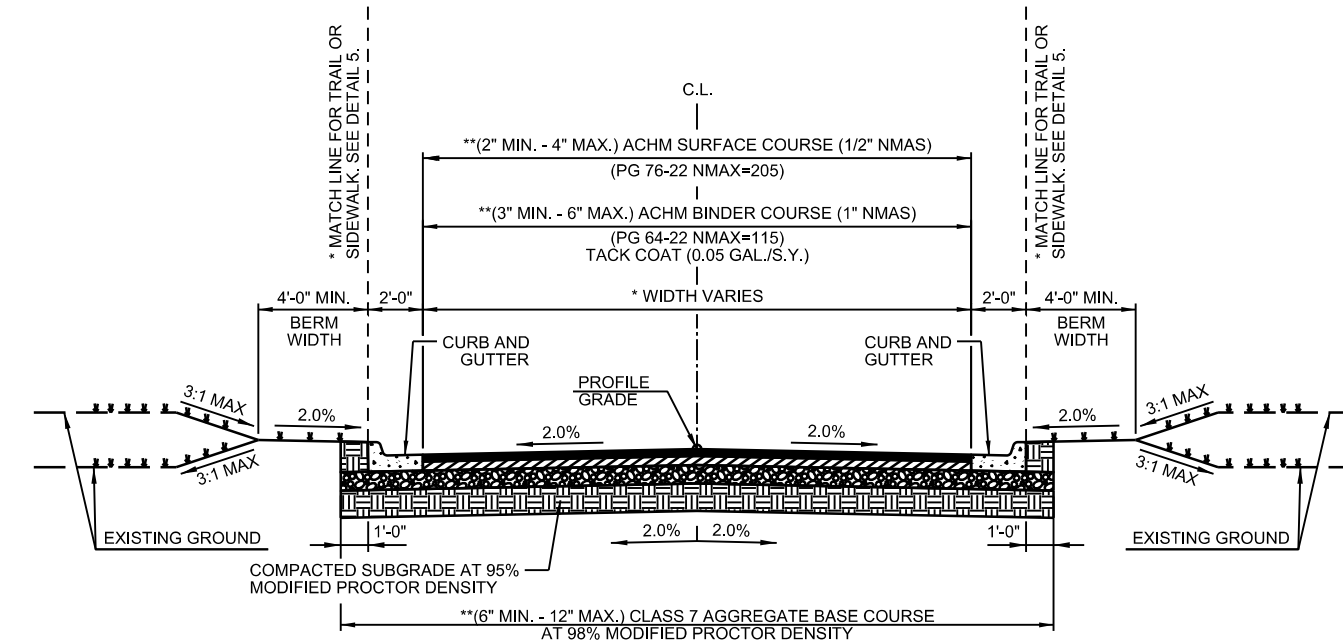
- A. Contraction joints shall be provided perpendicular to the sidewalk at intervals equal to the sidewalk width.
- B. Expansion joints shall be constructed perpendicular to the sidewalk at intervals equal to five times the sidewalk width. Expansion joints shall be made with 1/2-inch preformed expansion joint filler of a non-extruding type. Expansion joints shall be placed at driveways, drop inlets, and curbs.

11.6 QUALITY CONTROL TESTING AND INSPECTION BY CITY OF BRYANT

- A. Subgrade and formwork for sidewalks and trails shall be inspected by the City Engineering Department and/or Public Works Department prior to pouring of the sidewalk or trail.
- B. All testing of materials and construction shall be provided and paid for by the Developer/Owner.
- C. All field tests required for a project shall be witnessed by the City Engineering Department and/or Public Works Department.
- D. All testing shall be accomplished by a testing firm approved by the City Engineering Department and/or Public Works Department and shall be performed under the supervision of a licensed Professional Engineer.
- E. Sampling and testing locations shall be subject to approval by the City Engineering Department and/or Public Works Department.
- F. Density tests on sidewalk subgrades shall be taken every 300 feet or portion thereof, or every lift, whichever is more often, and shall be witnessed by the City Engineering Department and/or Public Works Department. Compaction shall be in accordance with Section 6 of these specifications, except as modified in this section.
- G. The City Engineering Department and/or Public Works Department shall be notified at least 24 hours in advance of the need to inspect subgrade and formwork of sidewalks and trails.



APPENDIX A



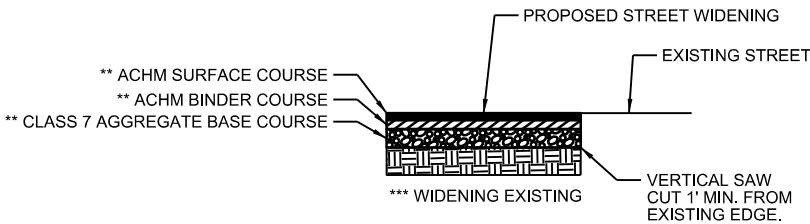
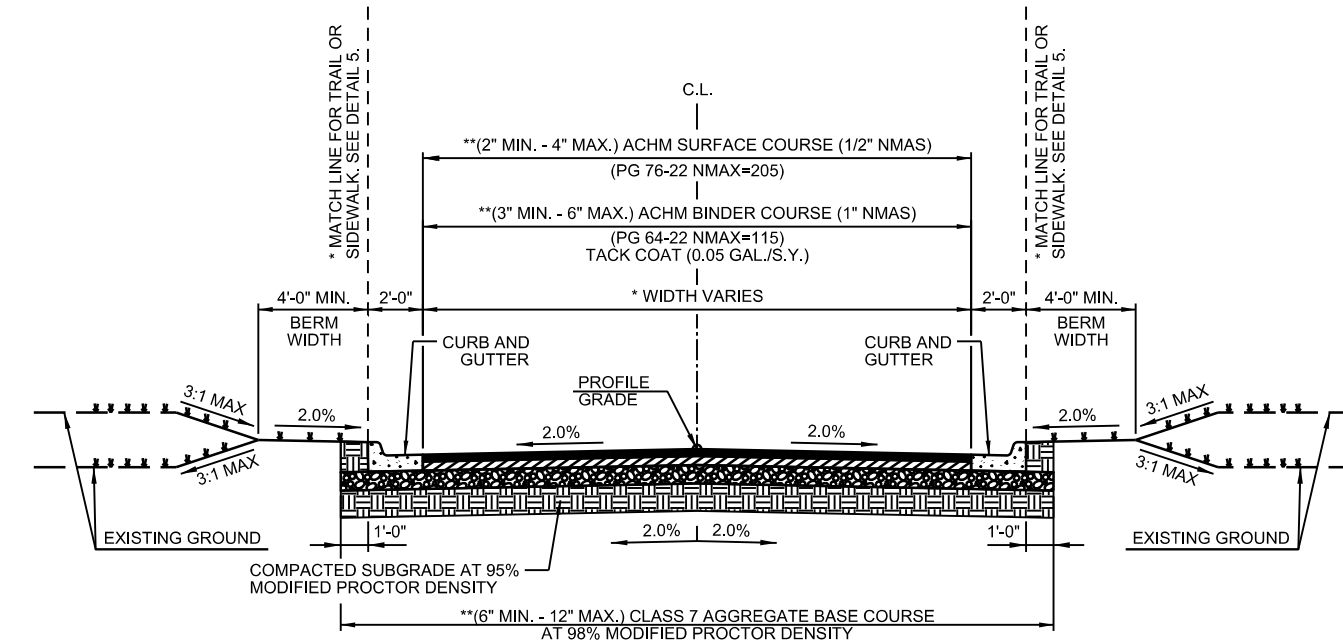
GENERAL NOTES

1. IN AREAS TO RECEIVE BITUMINOUS PAVING, CONCRETE DRIVEWAYS OR CURB AND GUTTER, SUBGRADE SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF MAXIMUM MODIFIED DENSITY OBTAINED AT OPTIMUM MOISTURE CONTENT.
2. FOR AREAS OF SUBGRADE PREPARATION TO RECEIVE CONCRETE SIDEWALKS, SUBGRADE SHALL BE COMPACTED TO DENSITY OF 90% MAXIMUM MODIFIED DENSITY.
3. CRUSHED STONE - MATERIAL IN EACH COURSE SHALL BE COMPACTED TO A DENSITY OF 98% MAXIMUM MODIFIED DENSITY.
4. ACHM BASE COURSE (4" MIN. - 12" MAX) (1 1/2" NMAS) MAY BE USED IF INCLUDED IN AN APPROVED PAVEMENT DESIGN.

* CROSS SECTIONS AND RIGHT-OF-WAY SHALL ADHERE TO THE MINIMUM WIDTH REQUIREMENTS SHOWN IN THE CITY OF BRYANT MASTER TRANSPORTATION PLAN. THE DEVELOPMENT REVIEW COMMITTEE SHALL DETERMINE WHICH VERSION OF STREET CLASSIFICATION AND WHAT WIDTHS WILL BE REQUIRED.

** THICKNESS TO BE DETERMINED BY PAVEMENT DESIGN IN ACCORDANCE WITH SECTION 5.0 OF THE MINIMUM STANDARD SPECIFICATIONS FOR STREETS.

*** PAVEMENT RECONSTRUCTION TO CENTERLINE IS REQUIRED WHEN EXISTING STREET DOES NOT MEET THESE STANDARDS.



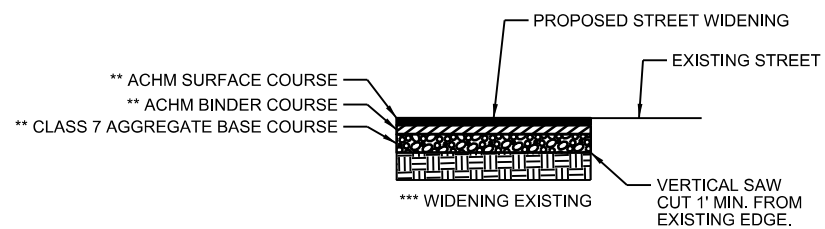
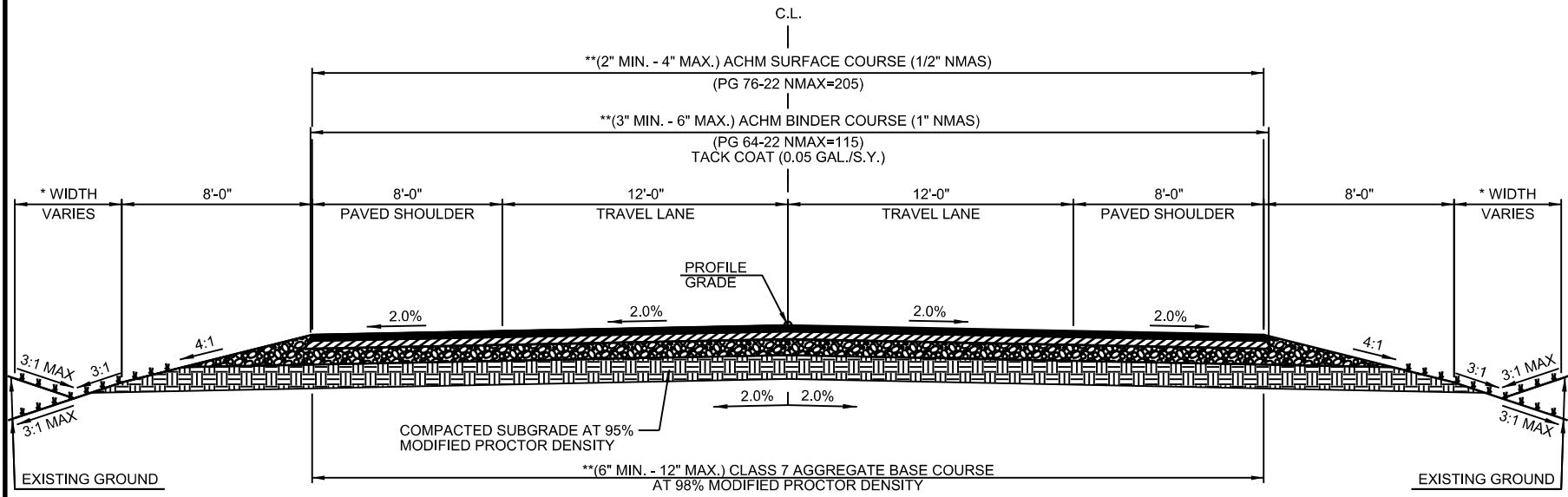
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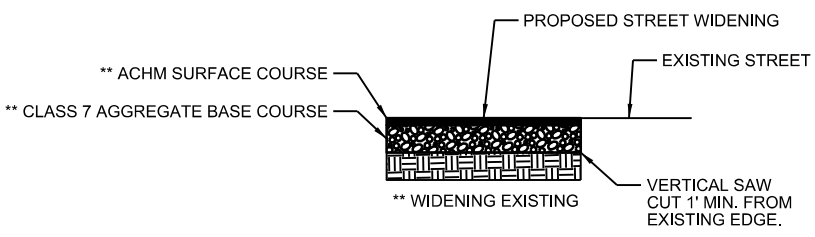
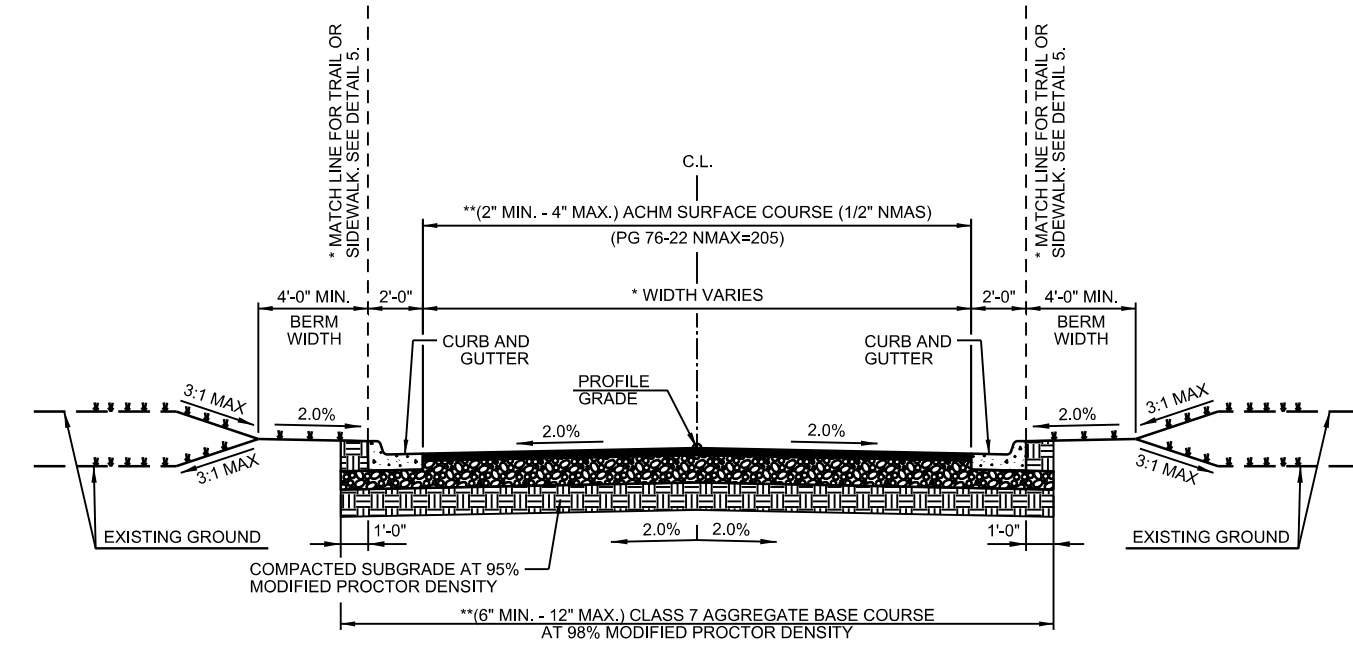
GENERAL NOTES

1. IN AREAS TO RECEIVE BITUMINOUS PAVING, CONCRETE DRIVEWAYS OR CURB AND GUTTER, SUBGRADE SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF MAXIMUM MODIFIED DENSITY OBTAINED AT OPTIMUM MOISTURE CONTENT.
2. FOR AREAS OF SUBGRADE PREPARATION TO RECEIVE CONCRETE SIDEWALKS, SUBGRADE SHALL BE COMPACTED TO DENSITY OF 90% MAXIMUM MODIFIED DENSITY.
3. CRUSHED STONE - MATERIAL IN EACH COURSE SHALL BE COMPACTED TO A DENSITY OF 98% MAXIMUM MODIFIED DENSITY.
4. ACHM BASE COURSE (4" MIN. - 12" MAX) (1 1/2" NMA) MAY BE USED IF INCLUDED IN AN APPROVED PAVEMENT DESIGN.

* ROADSIDE DITCHES SHALL BE DESIGNED TO COMPLY WITH THE CITY OF BRYANT STORM WATER MANAGEMENT MANUAL.

** THICKNESS TO BE DETERMINED BY PAVEMENT DESIGN IN ACCORDANCE WITH SECTION 5.0 OF THE MINIMUM STANDARD SPECIFICATIONS FOR STREETS.

*** PAVEMENT RECONSTRUCTION TO CENTERLINE IS REQUIRED WHEN EXISTING STREET DOES NOT MEET THESE STANDARDS.



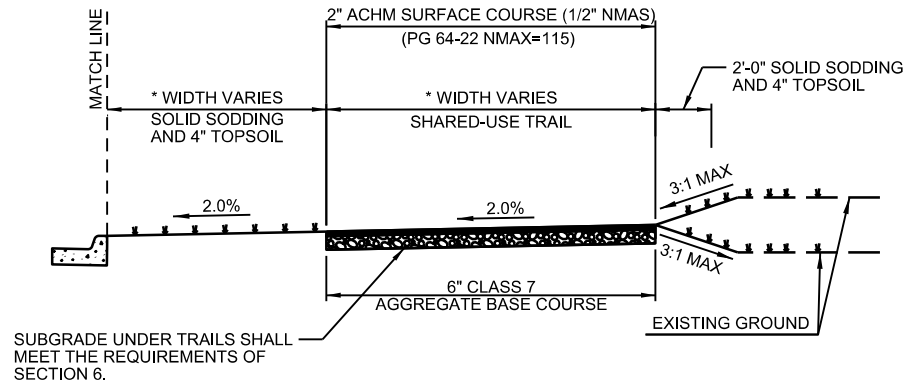
GENERAL NOTES

1. IN AREAS TO RECEIVE BITUMINOUS PAVING, CONCRETE DRIVEWAYS OR CURB AND GUTTER, SUBGRADE SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF MAXIMUM MODIFIED DENSITY OBTAINED AT OPTIMUM MOISTURE CONTENT.
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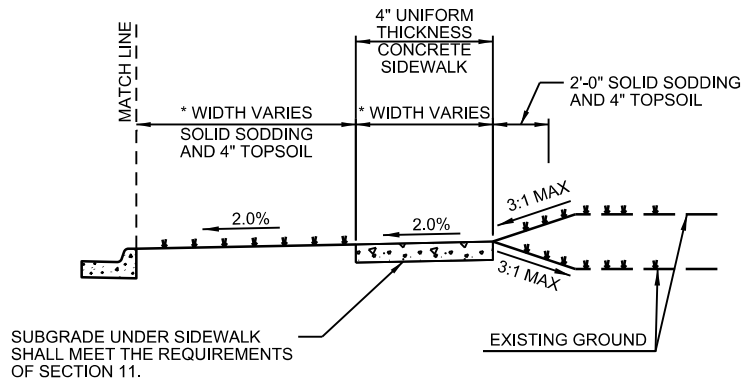
* CROSS SECTIONS AND RIGHT-OF-WAY SHALL ADHERE TO THE MINIMUM WIDTH REQUIREMENTS SHOWN IN THE CITY OF BRYANT MASTER TRANSPORTATION PLAN. THE DEVELOPMENT REVIEW COMMITTEE SHALL DETERMINE WHICH VERSION OF STREET CLASSIFICATION AND WHAT WIDTHS WILL BE REQUIRED.

** THICKNESS TO BE DETERMINED BY SECTION 6.5 AND TABLE 8 OF THE MINIMUM STANDARD SPECIFICATIONS FOR STREETS.

*** PAVEMENT RECONSTRUCTION TO CENTERLINE IS REQUIRED WHEN EXISTING STREET DOES NOT MEET THESE STANDARDS.

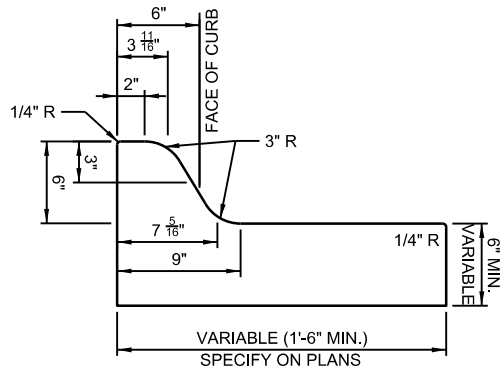


SHARED-USE TRAIL END CONDITION

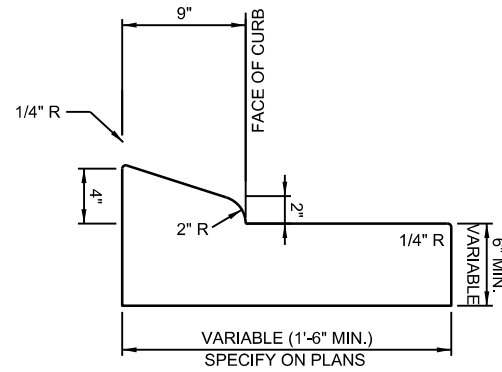


SIDEWALK END CONDITION

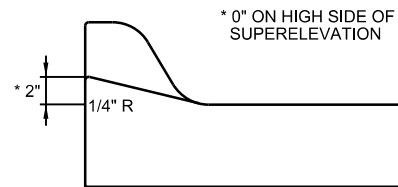
* WIDTH SHALL ADHERE TO THE MINIMUM WIDTH REQUIREMENTS SHOWN IN THE CITY OF BRYANT MASTER TRANSPORTATION PLAN. THE DEVELOPMENT REVIEW COMMITTEE SHALL DETERMINE WHICH VERSION OF STREET CLASSIFICATION AND WHAT WIDTHS WILL BE REQUIRED.



TYPE A



TYPE B

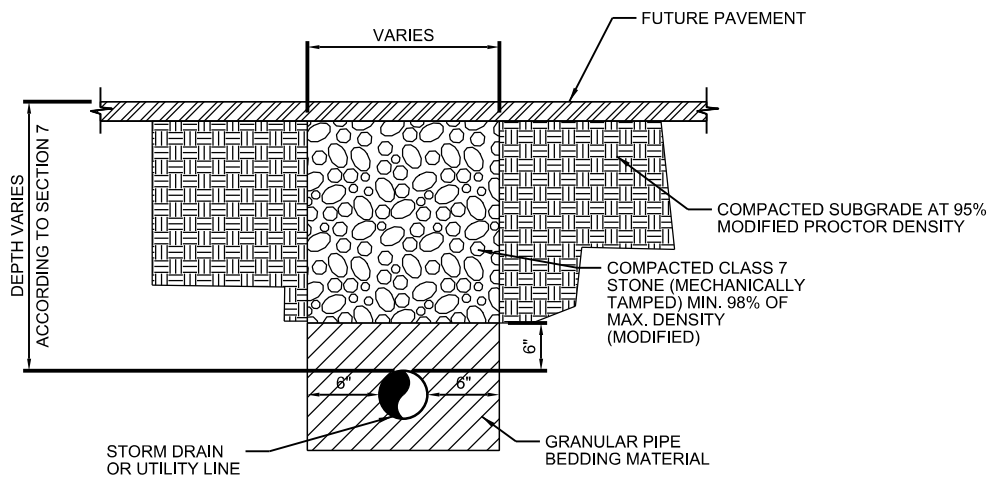


NOTE: THIS DETAIL SHALL ONLY BE USED ACROSS DRIVEWAY ENTRANCES.

MODIFIED CURB

GENERAL NOTES

1. ALL CURB AND GUTTER SHALL BE TYPE A, UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS DEPARTMENT OR CITY ENGINEER.
2. TYPE B CURB MAY BE USED FOR ISLANDS OR MEDIANS THAT ARE INTENDED TO BE MOUNTABLE BY VEHICLES, AND IS SUBJECT TO APPROVAL BY THE PUBLIC WORKS DEPARTMENT OR CITY ENGINEER.
3. MODIFIED CURB MAY BE USED ACROSS DRIVEWAY ENTRANCES.



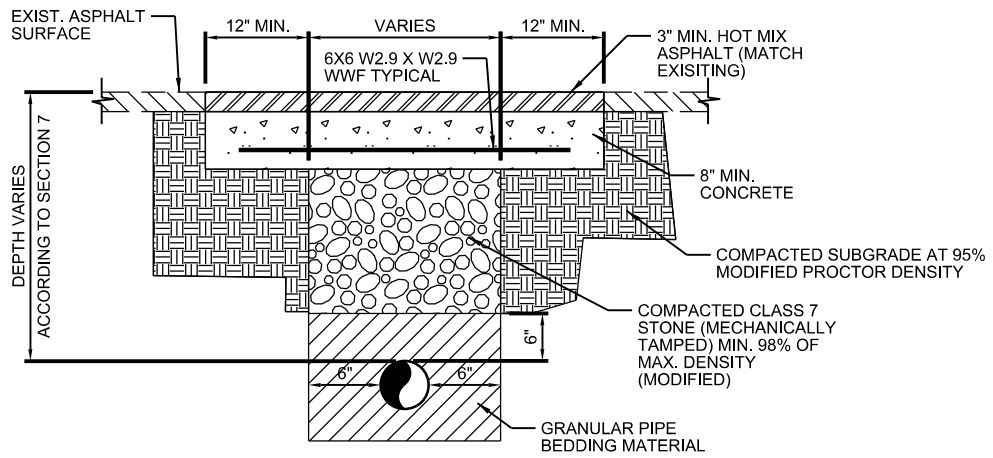
Note: This Backfill Procedure Shall Be Utilized For All Trenches Excavated In Area To Be Paved

TYPICAL SECTION
ASPHALT PAVEMENT
REPAIR ON
EXISTING STREET

ISSUE DATE
AUGUST 2021

REVISION DATE

DETAIL 8



TYPICAL SECTION
CONCRETE PAVEMENT
REPAIR ON EXISTING
STREET

ISSUE DATE
AUGUST 2021

REVISION DATE

DETAIL 9

