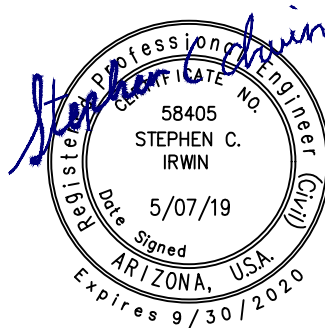




**SPECIAL PROVISIONS  
FLAGSTAFF STREET MAINTENANCE PROGRAM 2019  
CHIP SEAL**

**PROJECT NO. 01-19001**



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**Shephard  Wesnitzer, Inc.**

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**CITY OF FLAGSTAFF, ARIZONA**

**FLAGSTAFF STREET MAINTENANCE PROGRAM 2017- CHIP SEAL  
PROJECT NO. 01-16001**

**SPECIAL PROVISIONS**

The MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (with revisions through January, 2014), together with the CITY OF FLAGSTAFF REVISIONS TO MAG UNIFORM STANDARD SPECIFICATIONS AND MAG UNIFORM STANDARD DETAILS are hereby amended to include the following:

**SECTION 100 – GENERAL CONDITIONS**

**SECTION 104 – SCOPE OF WORK**

**104.1.3 WATER SUPPLY:**  
(revise to read as follows)

The Contractor is advised that except for public water main flushing and testing, the City will not authorize the use of potable water for construction purposes. Prior to submitting a bid contractors shall determine the availability of reclaimed water for construction purposes by contacting the City of Flagstaff Utilities Department.

Prior to loading, hauling, and applying reclaim water, the Contractor shall be required to obtain the necessary permit (no fee) at the Wildcat Hill Wastewater Treatment Plant and will be responsible for complying with all permit requirements.

No measurement or payment for construction water shall be made.

**104.1.6 RECORD DRAWINGS**  
(add new subsection)

The Contractor shall continuously maintain on-site a set of record (As-Built) drawings which depict the status of the various items of work as the project progresses. These drawings shall be made available to the Engineer for review during construction upon request.

Prior to the City' final approval of the project, final record drawings in digital format shall be submitted in digital (Autocad™ dwg format, or Adobe™ pdf format).

Record drawings shall contain, but are not limited to, the following information:

The plans shall verify the type and details of construction as shown on the original as-bid construction plans, together with any Engineer-approved variations from the original documents.

The plans shall indicate the depth and location of all existing underground utilities encountered during construction, whether or not shown on the original plans.

All public improvements (water, sanitary sewer, storm drain, streets) shall be as-built. The elevation of gravity (sewer, drainage) features shall be confirmed by survey. Contractor shall conform to the requirements to the City's As-Built" checklist.

As-built survey data shall be based upon the same site benchmarks as the construction plans.

Record drawings shall bear the signature and seal of either a currently registered engineer or land surveyor in the State of Arizona. Record drawings shall be furnished to the City in both digital and full-sized reproducible mylar (one set) format.

No separate payment shall be made for record drawings, The cost shall be included within the appropriate associated items of work.

**SECTION 105 – CONTROL OF WORK**

**105.8 CONSTRUCTION STAKES, LINES AND GRADES:**

(revise to read)

The contractor shall provide all construction staking necessary for the project based upon control points shown on the plans or provided by the Engineer. Construction staking shall proceed under the supervision of a Land Surveyor licensed to practice in the State of Arizona.

The contractor shall provide appropriate identification and verification of furnished control points prior to commencing survey.

**SECTION 106 - CONTROL OF MATERIALS**

**106.2 SAMPLES AND TESTS OF MATERIALS**

(third paragraph; revise second sentence to read as follows)

Unless otherwise specified, samples and tests will be made in accordance with either: the Materials Testing Manual of the Contracting Agency; the standard methods of AASHTO, ASTM, or ADOT, which were in effect and published at the time of advertising for bids.

**SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC**

**107.1.2 MAINTENANCE OF TRAFFIC**

(revise to include the following)

Should it be necessary to close access to private property, business, driveways or alley entrances, the closure must be for as short a time as possible and be restored at the end of the work shift. If primary access cannot be restored, the Contractor shall provide an alternative, which will be coordinated with the owner and pre-approved by the City prior to any restrictions being implemented.

Sanitation Pickup:

Regular residential sanitation pickup in the area of this project is scheduled twice per week. Commercial dumpster pick up varies from location to location. Coordinate with the City's Environmental Division for pick-up days. When construction activity interferes with sanitation pickup, the Contractor shall provide for sanitation vehicle access to the affected properties or relocate the trash containers where access is acceptable. The Environmental Division of the Public Works Department contact person is Rudy Almendarez at (928) 774-0668. If trash or recycle pick up is obstructed by construction activity, the Contractor will be responsible for proper disposal.

**107.6 PUBLIC CONVENIENCE AND SAFETY**

**REMOVAL OF PARKED VEHICLES**

(revise to include the following)

The Contractor shall give written notice, describing the proposed work and parking restrictions, to each adjacent business or residence. Written notice (with specific dates of anticipated construction work) shall be given at least 24 hours in advance of the work and no more than three working days before the work is scheduled to begin. In the event that the work requires removal of parked vehicles, they will be removed to the nearest convenient side street at the Contractor's expense. No separate payment will be made for this work.

The contractor shall give written notification to each affected resident at least 48 hours prior to any disruption to water or sewer service in the construction area. The notice must include the exact time of the disruption and the expected duration of the loss of service. Disruption of water or sewer services shall only be between the hours of 9:00 AM and 4:00 PM.

**107.7 BARRICADES AND WARNING SIGNS**

(revise to include the following)

The Traffic Barricade Manual referred to under this section and thereafter in the Standard Specifications shall be part of VI of the Federal Highway Administration’s Manual on Uniform Traffic Control Devices (MUTCD).

**107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE:**

(revise to include the following)

The Contractor shall take special care to control construction-related dust and noise and to keep the project site cleaned up to the greatest extent possible. The Contractor is responsible to coordinate alternate measures for any impacted operations as mentioned which are acceptable to the parties involved.

Survey monuments and property corners shall be protected and not disturbed unless specifically called out on the plans for replacement. All costs associated with protecting or re-establishing disturbed survey monuments and property corners shall be borne solely by the Contractor.

Concrete curb and gutter that is not designated for removal and replacement shall be protected. All costs associated with unauthorized removal and replacement or damage shall be borne solely by the Contractor.

The Contractor is responsible for replacing and/or restoring landscaping including but not limited to fences and walls of any type, plantings, pea gravel, grass (sod and seeded), brick pavers, concrete driveways, asphalt driveways, landscape rock, and owner improvements associated with the project. All replacement and restoration costs shall be included in the bid. The Contractor is responsible for removing existing improvements and salvaging items for replacement at the same location or relocation as directed by the Owner after the public improvements are finished. The Contractor is responsible for replacing materials in like kind. This may necessitate close coordination with property owners.

**SECTION 108 - COMMENCEMENT, PROSECUTION AND PROGRESS**

**108.4 CONTRACTOR’S CONSTRUCTION SCHEDULE:**

(revise to include the following)

It is the intention of the City of Flagstaff that the following streets be re-stripped prior to opening to traffic.

Chip Seal Streets:

Map ID	Street Name	Start	Stop
7	Cherry Ave.	Humphreys St.	Thorpe Rd.
8	Cochise Dr.	Lake Mary Rd.	Zuni Dr.
13	Leupp Dr.	Zuni Dr.	North End
14	Kofa Dr.	Zuni Dr.	South End
15	Northwestern St.	Route 66	North End
17	Railroad Springs Blvd.	Adirondack Ave.	Route 66
21	Mohawk Dr.	Walapai Dr.	Lake Mary Rd.
24	Pinal Dr.	Mohawk Dr.	Papago Dr.
28	Gila Dr.	Zuni Dr.	Pima Dr.
31	Sitgreaves St.	Birch Ave.	Elm Ave.
32	Thompson St.	Kaibab Ln.	Route 66
33	Birch Ave.	Thorpe Rd.	Park St.

35	Box Canyon Tr.	Cattle Drive Trl.	South End
37	Kilte Ln.	Woody Mountain Rd.	North End
39	Mission Timber Cir.	Presidio Dr.	Pardo Calle
40	Presidio Dr.	Woody Mountain Rd.	Mission Timber Cir.
41	Patio Del Presidio	Woody Mountain Rd.	Pais Del Norte
42	Pais Del Norte	Mission Timber Cir.	Patio Del Presidio
43	Pardo Calle	Presidio Dr.	Mission Timber Cir.
53	Lake Mary Rd.	Mohawk Dr.	Beulah Blvd.
54	Pulliam Dr.	High Country Trl.	End of Curb
55	Pulliam Dr.	End of Curb	End of Curb
56	Pulliam Dr.	J.W. Powell	End of Curb
57	High Country Trl.	Wild West Trl.	Pulliam Dr.
58	Lake Mary Rd.	Walapai Dr.	City Limits
59	Forest Ave.	Fort Valley Rd.	Beaver St.
60	Cedar Ave (slip lane)	West St.	Cedar Ave.

If the scheduling of the work does not permit re-striping of these streets prior to opening to traffic, lighted vertical panels shall be installed and maintained on 40' spacing, separating the opposing lanes of traffic and delineating designated turn lanes., until the required re-striping is completed. In all cases, restriping shall be completed within 48 hours of completion of the surface treatment and opening to traffic. All preformed plastic markings shall be placed within one week of completion of surface treatment and opening to traffic.

## **SECTION 200      EARTHWORK**

### **SECTION 211 - FILL CONSTRUCTION**

#### **211.2            PLACING**

(fourth paragraph, revise last sentence to read)

However, such material shall not be placed within 3 feet of the finished subgrade of the fill.

#### **211.3            COMPACTING**

(fifth paragraph; revise last sentence to read)

Each layer shall be compacted to a uniform density of not less than 95 percent, or as directed by the Engineer.

(sixth paragraph; revise first sentence to read)

When fill material contains by volume over 25 percent of rock larger than 6 inches in the greatest dimension, the fill (up to 4 feet below finished subgrade) may be constructed in layers of a loose thickness not exceeding the maximum size of rock in the material. In no case shall such layers exceed 3 feet in thickness.

## SECTION 300 – STREETS / RELATED WORK

### SECTION 301 – SUBGRADE PREPARATION

#### **301.2.2 UNSTABLE SUBGRADE**

(revise to include the following)

If it is determined by the owner's representative that the subgrade is unstable for compaction and placement of aggregate base the contractor shall use one of the following methods to make subgrade stable. This work shall be accomplished at no additional cost to the Owner.

Remove unsuitable subgrade and replace with additional subbase (minimum of 2 feet of stockpiled asphalt millings or (ABC) or as directed by Engineer. Contractor should consult with Engineer prior to performing work.

Once the suspect areas are stabilized to the satisfaction of the engineer, the normal ABC sub-base should then be installed. The contractor shall take all reasonable efforts to eliminate or reduce construction traffic on the repaired areas.

#### **301.3 RELATIVE COMPACTION**

(revise phase in the first line of the first paragraph as follows)

"...depth of 6 inches." (deleted)

"...depth of 9 inches." (inserted).

(revise last three paragraphs to read)

The subgrade shall be scarified and loosened to a depth of 9 inches. When fill material is required a layer of approximately 3 inches may be spread and compacted with the subgrade material to provide a better bond. The subgrade cut and fill areas shall be constructed to achieve a uniform soil structure having the following density when tested in accordance with AASHTO T-99, Method A; T-191 or ASTM D-2922; and D-3017 with the percent of density adjusted in accordance with the rock correction procedures for maximum density determination, standard detail #190, to compensate for the rock content larger than that which will pass a No. 4 sieve:

- a. Major streets - 95 percent
- b. Other streets and traffic ways - 95 percent
- c. Curbs, gutter and sidewalks - 95 percent

(modify to add: )

Moisture content shall be within two percent of optimum.

#### **301.4 SUBGRADE TOLERANCES:**

(revise to read)

Subgrade upon which pavement, sidewalk, curb and gutter, driveways, or other structures are to be directly placed shall not vary more than ¼ inch from the specified grade and cross-section. Subgrade upon which sub-base or base material is to be placed shall not vary more than ¼ inch from the specified grade and cross-section. Variations within the above specified tolerances shall be compensating so that the average grade and cross-section specified are met.

#### **301.8 PAYMENT:**

(revise to read)

No separate payment shall be made for subgrade preparation.

**SECTION 305 STREET REBUILDING**

(revise to include a new section)

**305.1 DESCRIPTION**

Certain small areas of the streets to be overlaid are to be rebuilt before overlay. These areas will be marked in the field by the Engineer. This work shall consist of removal and disposal of existing materials, subgrade preparation, and furnishing and placing asphaltic concrete.

**305.2 CONSTRUCTION**

The areas may vary in size. The existing pavement, base, and subgrade will be removed to an elevation that will facilitate minimum City of Flagstaff asphalt structural sections in detail 10-09-010. The subgrade will be compacted to 95%. The existing pavements shall be wheel or saw cut back to a neat straight line. The asphaltic concrete (3/4") will be placed and compacted so that it meets the following requirements:

1. The density of the asphaltic concrete is as specified under Section 321.
2. The finished grade of new asphalt can be up to 1/4" above but no lower than the adjacent existing pavement or as directed by owner's representative.
3. The maximum thickness of the new asphaltic concrete is 6" placed in 2 lifts or as necessary to match existing pavement grade.

**305.3 MEASUREMENT AND PAYMENT**

Measurement and payment will be made at the contract unit price for each square yard of pavement removed and replaced as directed by the Engineer. Payment will be accepted as full compensation as for all equipment, labor and materials used under this item.

**SECTION 310 – PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE**

**310.1 DESCRIPTION**

(revise to read)

Aggregate base shall be a crushed Aggregate Base Course in accordance with Section 702.2.

**310.2 PLACEMENT AND CONSTRUCTION:**

(revise 3rd paragraph to read)

After placement, the aggregate base course surface shall be true, even and uniform conforming to the grade and cross-section specified. In no case shall the aggregate base course vary by more than ¼ inch above or below required grade.

Untreated base compaction shall be 95% under curb/gutter, sidewalk, driveway and alley entrances, handicap ramps, and catch basins. Under streets untreated base compaction shall be 100%. Moisture content shall be within two percent of optimum.

(modify to add)

Should suspension of operations take place between time of initial base placement and commencement of paving operations, contractor shall place additional aggregate base as required, and reestablish the specified grade and cross sections and compaction prior to paving.

Finish grading of aggregate base may be checked and verified by the Engineer. In areas of new paving, paving cannot commence until the grades have been checked and verified by the Engineer. The Engineer shall be notified once finish grading is ready for verification. The Engineer shall complete his or her checking and verification within 24 hours of notification. If the grades in these areas are found to be unacceptable by the Engineer, the Contractor shall regrade the areas to the satisfaction of the Engineer, at no additional expense to the Owner.

If, during the paving operations “soft spots” in the ABC are noted, they shall be excavated to a sufficient depth and backfilled with compacted ABC material (8” lifts) so that they are eliminated. No additional pavements will be made for soft spot repairs, the cost is to be included in the bid price.

**310.4 PAYMENT**

(revise to read)

The cost for aggregate base shall be included in the appropriate bid price for which aggregate base is required. .

**SECTION 311 - PLACEMENT AND CONSTRUCTION OF CEMENT TREATED SUBGRADE**

**311.2 MATERIALS**

(second sentence, revise to read)

The soil for the mixture shall consist of the material in the area to be paved or approved selected material.

(last sentence, revise to read)

The cement content shall be determined by the procedures set forth in AASHTO T136-50 or ASTM D560-67. The selection of a cement content based on compressive strength requirements without regard to freeze-thaw durability will not be allowed.

**311.4 CONSTRUCTION METHODS**

(second paragraph, modify to add)

Soil cement base course shall not be mixed with or placed on any frozen material. At the time of mixing and placing the air temperature shall be a minimum of 40°F (5°C) and rising, and the surface temperature shall be a minimum of 45°F (10°C). The soil cement base course shall be protected from freezing for a minimum period of seven (7) days.

**SECTION 321 – PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT**

**321.2 MATERIALS AND MANUFACTURE**

(modify to add)

For patching and remove and replacements asphalt concrete shall be a Type 3/4” dense surface course PG 58-28 for all asphalt paving, unless modified by the Engineer.

In addition to the requirements of M.A.G. Section 710, the aggregates and mix to be incorporated into the work must also meet the following requirements:

Test	Test Results
Index of Retained Strength	60 Min.

Compaction of asphalt concrete shall be a minimum of 95% of ASTM D1559-75 Blow Method.

Minimum temperature as measured at lay down machine to be 275 degrees F.

**321.4 APPLICATION OF TACK COAT**

(modify to add)

Tack coat applied to vertical surfaces shall be sprayed (pressurized sprayer) or brushed on to ensure total (100%) coverage of the surface. Dribbling, spray bottle, or pouring on will not be approved.

**321.8.1 PLACING**

(modify to add)

Asphalt concrete shall only be placed upon a surface of at least 70°F. The temperature of the asphalt concrete of any course, just prior to the dumping of the material from the hauling vehicle, shall be at least 275°F; a lower temperature is allowed if written approval is given by the Engineer. Compaction and finishing shall be completed before the mix has cooled to 180°F. The Engineer may authorize placement of asphalt concrete upon surfaces having a temperature of 45°. For above, providing those mentioned above and the following conditions are met.

- a. The underlying surface is dry.
- b. The weather is dry and without threat of precipitation.
- c. The temperature of the asphalt concrete mixture is such that the sum of the air temperature plus the temperature of the mixture when placed is at least 320°F – 345°F pending on above surface temperatures.
- d. Asphalt concrete shall not be placed on grade that appears to be frozen.

Self-propelled lay down machines shall be used for all paving. This shall include patches larger than ±40 S.Y. (depending on patch shape) and as directed by the Engineer. Smaller patches may be placed by hand methods if the Contractor can demonstrate adequate placement and finishing control to the satisfaction of the Engineer. The size of the paver shall be approved by Engineer prior to beginning paving.

### **321.8.2 JOINTS**

(modify to add)

Cold transverse and longitudinal joints shall be either trimmed backed and tacked, or heated with a joint heater. A cold joint shall be defined as any joint which has been placed for 6 hours or longer before adjoining asphalt is placed, unless approved by the Engineer.

The Contractor shall provide sufficient rollers (size and number) to compact the asphalt to the specified density. If the rollers being used do not appear capable of reaching the minimum density (as shown by field test results) paving operations shall be suspended until proper equipment is available.

Coarse aggregate from any and all raking operations shall be removed from the fresh asphalt surface prior to rolling.

### **321.8.3 ASPHALT LEVELING COURSE**

(modify to add)

An acceptable surface shall not vary more than 1/4 inch from the lower edge of a 10 foot straightedge when placed parallel to the centerline of the roadway.

### **321.8.4 COMPACTION: ASPHALT BASE COURSE AND SURFACE COURSE**

(add the following after the Table 321-2)

The Engineer at his sole discretion may authorize placement of asphalt concrete outside of the parameters of Table 321-2. Said authorization, if given, shall be in writing.

Asphalt shall not be placed on grade that is frozen.

### **321.8.5 SMOOTHNESS**

(modify to add)

The contractor is to supply the 12 foot straightedge. The straightedge shall meet the approval of the Engineer prior to testing.

### **321.10.3 GRADATION, BINDER CONTENT AND AIR VOIDS**

(modify first two sentences of the fourth paragraph)

The asphalt cement content shall be considered acceptable if it is within -0.30% to +0.40% of the mix design target value. If the asphalt binder content deviates more that the above amounts from the target value...

(modify next-to-last sentence from the fourth paragraph)

If the resulting average of the asphalt binder content deviates by more than -0.30% to +0.40% from the mix design target value...

**321.10.4 ASPHALT PAVEMENT THICKNESS**

(modify to add #4)

(4) Notwithstanding the provisions of (2) and (3) above, the following shall be considered the default remedial action for pavements of insufficient thickness:

When the deficiency of the pavement thickness exceeds 1/4 inch, the pavement shall be overlaid on the area affected. In no case shall this overlay be less than one City block or 660 feet in length, whichever is less. This overlay shall be placed over the full width of pavement with a new mat of material specified by the Engineer; equal in thickness to the deficiency, but not less than 1 inch in any instance.

Any remedial action other than that outlined under (4), including those addressed as a part of (2) and (3), as well as reduced payment provisions under Table 321-6, shall be at the sole discretion and written approval of the Engineer.

**321.13 PAYMENT**

Modify to add:

The cost for asphalt concrete pavement, including tack coat, shall be paid for as a part of the appropriate unit bid price for the thickness and type of asphalt concrete specified.

**SECTION 330 - ASPHALT CHIP SEAL**

**330.2.1 ASPHALT**

(modify to add)

Emulsified asphalt Type CRS-2P shall be used for the chip seal coat. Refer to Section 713.

**330.3 TIME OF APPLICATION AND WEATHER CONDITIONS**

(second paragraph; revise second sentence to read)

The ambient air temperature shall be at least 70°F and rising.

(third paragraph, revise to read)

Asphalt chip seal shall not be performed between October 1 and May 1 unless specifically permitted by the City Engineer.

**330.4.8 PROTECTION TO ADJACENT PROPERTY**

(add new subsection)

The Contractor shall protect all manhole covers, water valve boxes, survey monuments, catch basins and other man-made features so that no bituminous material or cover material remains, and so that covers can be easily accessed after sweeping. All adjacent sidewalks and driveways shall be swept and maintained clear of loose cover material.

**SECTION 336 - PAVEMENT MATCHING AND SURFACING REPLACEMENT**

**336.2.2 PAVEMENT TO BE REMOVED**

(modify to add)

The Engineer or his representative will field mark (in white or pink paint) approximate areas for removal and replacement. The contractor is to call Blue Stake (1-800-STAKE IT) PRIOR to digging or removing pavement.

### 336.2.3 TEMPORARY PAVEMENT REPLACEMENT

(modify to add)

Temporary pavement replacement, as required in Section 601, shall be with UPMTM or an approved equal with a minimum thickness of 2 inches and shall conform to the following requirements:

#### DESCRIPTION:

1. The paving material shall be composed of an aggregate, as specified herewith, and plant mixed with Unique Paving Material (U.P.M.t<sub>m</sub>) liquid asphalt blend from the Sylvax Corporation or approved equal. The bituminous material shall be capable of coating wet aggregates without stripping, shall be available in various grades, and permit any one grade to be stockpiled and remain pliable and workable at a temperature of -15°F for a minimum period of 12 months.
2. The paving material shall be capable of maintaining adhesive qualities in an uncovered stockpile or in paved areas which were damp or wet at the time of application for a minimum period of 12 months.

#### MATERIALS:

1. The aggregate gradation shall meet the following requirements:

Size	% Passing
3/8 inch Sieve	100
No. 4	85-100
No. 8	10-40
No. 16	10
No. 50	0-5
No. 200	2 maximum

2. The aggregate shall also meet the following criteria:

Sand equivalent	45 min.
Crushed faces	70% min.
Flakiness index	25 max.
Absorption	1.0 – 2.5%
Specific gravity	2.55 – 2.75%

3. Bituminous material:

The bituminous material shall be UPMTM liquid asphalt blend from the Sylvax Corporation or approved equal. When prepared from a base asphalt stock of either AC-10 or AC-20 and blended, it shall meet the following requirements:

Flash point (TOC)	200°F (94°C) min.
Kinematic Viscosity @140°F (60°C)	1000 – 4000 cSt
Water	0.2% max.

#### Distillate Test

(volume of original sample)

To 437°F	0%
To 500°F	0 – 55%
To 600°F	0 – 20%
Residue from Distillate @ 680°F	78 – 95%

#### Residue Test:

Absolute Viscosity @ 140°F	125 poises
Penetration	200 min.

Ductility @ 39°F	100 min.
Solubility in Trichloroethylene	99% min.

4. Composition of Mixture:

The mixture shall consist of an aggregate as specified and a bituminous material as specified mixed in such a manner as to contain approximately 6% of bituminous material per finished ton.

5. Preparation of Mixture:

The asphalt shall be heated to a temperature between 150°F and 300°F and mixed with the heated aggregate until all aggregates are uniformly coated. The mixed temperature shall not exceed 170°F.

6. Plant and Equipment:

A batch-type mixer of approved design and capacity shall be used in mixing the ingredient materials.

**336.2.4 PERMANENT PAVEMENT REPLACEMENT**

(modify to add)

Reconstruct Areas

Pavement reconstruction (reconstruct areas) shall be replaced as per the details shown on the plans for all reconstruction areas. The geotextile fabric shall be a nonwoven material (Geotex™ 801 [8 oz/sq. yd.] ) or approved equal. Installation shall be as per Arizona Department of Transportation; “Standard Specifications for Road and Bridge Construction”, Section 306; the manufacturer’s recommended procedures, and to the approval of the Engineer.

If the plans or Engineer calls for a soil stabilization geotextile the specified triaxial soil stabilizing material is to be Tensar TriAx(tm) TX160 or approved equal and installed over a nonwoven fabric as specified above, per manufacturer’s specifications.

Any and all asphalt reconstruct areas located on “free” asphalt edges to include thickened asphalt as per MAG S.D. 201, Type “B”. All pavement replacement asphalt shall be M.A.G. PG 58-28 mm as specified in Section 710

**336.2.5.1 EXCESSIVE CRACKS / VOID FILLER**

(modify to add)

Prior to any overlay construction the contractor is to fill in all pavements cracks per Section 337.

**336.2.5.2 EXCESSIVE RUTTING AND SHOVING FILLER**

(Modify to add section)

Prior to any overlay construction the contractor is to fill (microsurface) in all pavements rutting / shoving in excess of ½” (depth) with the appropriate size (gradation) of hot mix asphalt.

**336.5 PAYMENT**

(modify to add:)

Payment for pavement matching (patch) will be made on the basis of square yards under the Street Rebuilding (contingency) line item. Payment for crack / void excessive rutting and shoving filling will be made on the basis of tons of material placed.

**SECTION 337 CRACK SEALING**

(revise Section to read)

**337.1 GENERAL**

Crack sealing shall consist of blowing out loose material and sealing all cracks wider than 1/4 inch and narrower than 1 3/4" with an approved crack sealant.

For edge mill streets: Crack sealing shall take place prior to milling.  
 For full-width mill areas: Crack sealing shall take place after any specified milling and prior to placement of overlay.  
 Locations identified in Appendix D shall receive only crack sealing.

**337.2 MATERIALS**

The crack sealant shall be composed of asphalt, reclaimed and or virgin synthetic rubber, and polymer modifiers. The material shall be approved by the Engineer prior to notice to proceed and shall meet the following requirements:

TEST	METHOD	REQUIREMENT
Softening point	ASTM D-36	200° F. Min.
Cone penetration @77°F	ASTM D-3407	30 Min.
Resilience @77° F	ASTM D-3407	40% Min.
Flow	ASTM D-3407	3 mm Max.
Safe heating Temperature		410° F. Min.

Crack sealant shall be applied in accordance with manufacturer's recommendations.

**337.4 APPLICATION**

Cracks in existing pavements 1/4 inch wide or wider shall be sealed. Cracks that are wider than 1-3/4" shall not be filled with crack sealant, but shall be filled with 3/8" hot mix asphalt. **Those cracks that are filled with dirt shall be blown out to a depth of no more than 1 1/2".**

Crack sealant shall be placed to an elevation approximately 1/4" below the pavement surface. Sealant on the pavement surface shall be minimized. Should traffic pick up the crack seal material, the contractor shall provide and apply sand or a **very light** application of fine graded sand to protect the sealant. If the contractor opens the roadway to traffic before the sealant is set, sand application will be done at the contractor's expense.

**337.8 MEASUREMENT**

Crack sealant shall be measured by the ton of sealant complete in place. The method of accounting for the material shall be discussed at the preconstruction conference and shall be acceptable to the Engineer. No separate measurement will be made for any sand necessary to prevent pickup by traffic.

**337.9 PAYMENT**

Payment will be full compensation for furnishing and placing all materials specified and used and shall include all labor, traffic control, equipment, tools and incidentals necessary to complete the work as prescribed and directed by the Engineer. All costs for sand or Portland cement will be included in the unit price for crack sealant.

## SECTION 400 – RIGHT-OF-WAY TRAFFIC CONTROL

### SECTION 401 - TRAFFIC CONTROL

#### **401.4 TRAFFIC CONTROL MEASURES**

(modify to add)

The streets shall remain open to traffic at all times. The traffic control for the following streets shall be:

Chip Seal Streets:

<b>Map ID</b>	<b>Street Name</b>	<b>Start</b>	<b>Stop</b>	
15	Northwestern St.	Route 66	North End	1 Lane, 2 Directions with flagmen
17	Railroad Springs Blvd.	Adirondack Ave.	Route 66	1 Lane, 2 Directions with flagmen
21	Mohawk Dr.	Walapai Dr.	Lake Mary Rd.	1 Lane, 2 Directions with flagmen
32	Thompson St.	Kaibab Ln.	Route 66	1 Lane, 2 Directions with flagmen
37	Kilte Ln.	Woody Mountain Rd.	East End	1 Lane, 2 Directions with flagmen
40	Presidio Dr.	Woody Mountain Rd.	Mission Timber Cir.	1 Lane, 2 Directions with flagmen
41	Patio Del Presidio	Woody Mountain Rd.	Pais Del Norte	1 Lane, 2 Directions with flagmen
53	Lake Mary Rd.	Mohawk Dr.	Buelah Blvd.	1 Lane, 2 Directions with flagmen
54	Pulliam Dr.	High Country Tr.	End of Curb	1 Lane, 2 Directions with flagmen
55	Pulliam Dr.	End of Curb	End of Curb	1 Lane, 2 Directions with flagmen
56	Pulliam Dr.	JW Powell Blvd.	End of Curb	1 Lane, 2 Directions with flagmen
57	High Country Tr.	Wild West Tr.	Pulliam Dr.	1 Lane, 2 Directions with flagmen
58	Lake Mary Rd.	Walapai Dr.	City Limits	1 Lane, 2 Directions with flagmen
59	Forest Ave.	Fort Valley Rd.	Beaver St.	1 Lane, 2 Directions with flagmen
60	Cedar Ave. Slip Lane	West St.	Cedar Ave.	1 Lane, 2 Directions with flagmen

Prior to any construction, the contractor is to submit a traffic and pedestrian (if applicable) control plan for revisions and approval.

The Contractor is to supply and install, at 40-foot spacing, temporary raised pavement markers along the existing pavement stripes on the streets identified on the plans. Temporary raised pavement markers shall be a supplied by Davidson Plastics Company or approved equal. The furnishing and installation of temporary raised pavement markers shall be considered incidental and included in the price for traffic control.

#### **401.5 GENERAL TRAFFIC REGULATIONS**

(modify to add)

The contractor will reinstall all permanent traffic control devices as required by the approved construction plans and specifications.

Existing traffic signs, including stop, yield and street name signs shall be maintained by the contractor until such time as construction renders them obsolete. The contractor shall be responsible for furnishing and installing all permanent traffic signs as required by the construction plans and specifications.

#### **401.6 MEASUREMENT**

(revise to read)

Traffic control shall be measured as a single lump sum over the duration of the project.

#### **401.7 PAYMENT**

(modify to add)

Payment for traffic controls shall be a single lump sum.

## **SECTION 405 - MONUMENTS**

### **405.2 MATERIALS**

(revise second paragraph to read)

All concrete shall be Class A with 5 to 7% air entrainment

### **405.4 INSTALLATION**

(revise to read)

Existing survey monuments shall be referenced, and if necessary reestablished by a surveyor registered in the State of Arizona.

The surveyor shall provide reference marks and dimensions to the survey monuments. A minimum of two "permanent" reference marks shall be established for each right-of-way control monument. The angle formed by the control point and the two reference points shall be approximately 90 degrees. Examples of permanent reference marks include an "x" chiseled into curb, PK nail in concrete and a nail in a power pole. Any suitable reference marks found to be existing may be used.

Alternatively, the surveyor may determine and record the location of existing survey monuments using global positioning satellite (GPS) equipment and procedures of appropriate survey-grade accuracy.

No new survey monument locations shall be incorporated into this project without prior approval from the City Engineer or representative.

Any survey monuments with boxes and covers shall be adjusted to grade by the Contractor without disturbing the survey monument.

The location of existing survey monuments must be referenced and made accessible to the City. The monuments are to be reset after overlay as per COF Std. Dwg. 11-01-010. The work shall be performed under the supervision of a registered land surveyor. The Engineer will designate the monuments to be reset. Monumentation shall consist of a reinforcing bar and cap, with the registrants number, that shall be driven or secured by a means approved by the Engineer. Monuments shall be furnished by the Contractor. A results of survey map shall be prepared and recorded with the office of the Coconino County recorder by the Contractors surveyor to show the monuments found and set.

## **SECTION 700 - MATERIALS**

### **SECTION 702 - BASE MATERIALS**

#### **702.1 GENERAL**

(modify to add)

The aggregate base course will be clean, free of organic matter, and be of such a nature to be compacted to a dense, firm layer capable of supporting loaded trucks and self-propelled pavers without rutting. Volcanic cinders shall not be used for base materials.

#### **702.2 PHYSICAL PROPERTIES**

(revise Table 702-1 as follows)

For aggregate base, the percentage by weight passing the No. 200 sieve shall be limited to no more than 10 percent.

### **SECTION 703 - RIPRAP**

#### **703.2 PHYSICAL PROPERTIES**

(modify to add)

Waste concrete may not be used.

**SECTION 710 - ASPHALTIC CONCRETE**

**710.2.1 ASPHALT BINDER**

(revise the section to read)

The asphalt to be mixed with the mineral aggregate shall be paving grade asphalt conforming to AASHTO Designation MP1, *Standard Specification for Performance Grade Asphalt Binder* and shall be 58-28 for pavement and patching, and 68-28TR+ for MAC unless otherwise specified in these Special Provisions.

**710.3 MIX DESIGN REQUIREMENTS**

**710.3.2.1 MARSHALL MIX DESIGN**

(revise to include the following)

Marshall mix design criteria will be used for both ¾ mix and MAC. The aggregates and mix to be incorporated into the work shall also meet the following additional requirements:

Test	Acceptable	Test Results
AC TYPE Test	3/4"	½" MAC
Absorbed Asphalt Range (ASTM 1559)	0 - 1%	0 - 1%
Combined Water Absorption (AASHTO T-84)	0 - 2.25%	0 - 2.25%
Marshall Stability (ASTM D1559)	1800 min	1,000 min
Flow (ASTM D1559) Units of .01 inches	8 to 18	15 min
Air Voids Content (mix)	3% to 5%	3% to 5%
Tensile Strength Ratio (TSR) (AASHTO T 283, with optional freeze cycle)	0.75 min	0.75 min
Sodium Sulfate Soundness (AASHTO T-104)	12 % max	12 % max
Percent Carbonates (Arizona test Method 238)	30 % max	30 % max
Binder Content	5.3% to 6.0%	5.5% to 7%

All asphaltic concrete and modified asphaltic concrete shall contain a minimum of 1% Portland cement or dry hydrated lime by weight of total aggregate added to the aggregate in a pug mill prior to addition of the binder. The moisture content of the aggregate immediately prior to the addition of the admixture shall be a minimum of 3.0 %.

The contractor shall furnish the engineer with a job-mix formula for asphalt concrete not less than ten (10) days in advance of actual placement of the material. The job-mix formula, upon approval of the Engineer, shall be used to establish the standards to which field test results will be compared and to determine compliance of the materials furnished with all physical properties of the composite mix and its individual components as shown on the approved job-mix formula. The job-mix formula, with the allowable tolerances for a single test shall be used for monitoring compliance with the specifications. The maximum permissible variation in the daily Marshall Plug unit weight from the unit weight shown in the approved job-mix shall be +/- 3%. If the unit weight of the Marshall Plug deviates from the permissible variation by more than 1%, production shall be halted until such time as the excess variation is corrected.

The aggregate and mix to be incorporated into the work shall also meet the following requirements:

TEST	ACCEPTABLE TEST RESULTS
Loss on Abrasion (ASTM C0131 and/or AASHTO 96) after 500 revolutions	40 Max.

Absorbed Asphalt Range (AASHTO T-245)	0 – 1%
Combine Water Absorption (AASHTO T-84)	0 – 2.25%

All asphalt concrete shall contain a minimum of 1% Portland cement or dry hydrated lime by weight of total mixture.

The percent of asphalt range for all 3/4 inch asphaltic concrete shall be from 5.3% to 6.0%.

The asphalt cement content shall be considered acceptable if it is within -0.30% to +0.40% of the mix design target value.

See Section 719 for additional requirements for Modified Asphaltic Concrete.

## **SECTION 713 - EMULSIFIED ASPHALT MATERIALS**

### **713.1 GENERAL**

(modify to add)

REQUIREMENTS FOR ANIONIC/CATIONIC EMULSIFIED ASPHALT

CATIONIC RAPID-SETTING POLYMER-MODIFIED ASPHALTIC EMULSION, CRS-2P

Test Description	Test Method	Min	Max
<b>TEST OF EMULSION</b>			
Viscosity, SFS @ 122 F	D244	125	400
Settlement, 5 days, %	D244		5
Storage Stability 1 Day, %	A244		1
Class, Un-coated Par	A502	60	
Particle Charge Test	D244		+
Sieve Test, %	D244		0.30
Oil Distillate, % V of Emulsion	D244		3
Residue by Distillation, %	D244	66	
Tests on Residue by VACUUM RECOVERY A512			
Viscosity, ABS, Poise @ 140 F	D2171	1800	2800
Pen @ 77F, 100g/5 sec, Dmm	D5	40	90
Ductility, 77F, 5 cm/min, Cm	D113	40	
Solubility in TCE, %	D2042	97.5	
Toughness, inch-pounds	(1)	150	
Elastic Recovery by means of Durometer, %	T301	58	
Tenacity, inch-pounds	(1)	110	
Polymer Content (by wt. Of solids) %	CAL-401	2.5	
<b>TEST ON RTFO RESIDUE</b>			
Aging Ratio, ABS viscosities	D2171		2.5
<b>POLYMER REQUIREMENTS</b>			
Melt flow rate, dg/min 190 C	D1238		45

- 1) Benson method of toughness and tenacity: Scott tester, inch-pounds @ 77°F, 20 inches per minute pull. Tension head 7/8" diameter.
- 2) Upon standing undisturbed for a period of 24 hours, the emulsion shall show no white milky film upon the surface.
- 3) The base asphalt shall be modified prior to emulsification.
- 4) The emulsion shall be precertified prior to use. A one-quart sample each of the base asphalt and polymer shall be supplied to the agency 10 days in advance to the project start.

**SECTION 716 - COVER MATERIAL**

**716.1 GENERAL**

(modify first paragraph to add)

No volcanic cinders will be acceptable for cover material.

**716.2.3 GRADATION**

(revise Table 716-1 and 716-2 to read)

GRADATION CM-11

Sieve Size	% Passing
3/8 inch	100
No. 4	0-40
No. 8	0-5
No. 200	0-2.0

**SECTION 725 - PORTLAND AND CEMENT CONCRETE**

**725.1 GENERAL**

(modify to add)

As tested in accordance with ASTM C-39, the maximum slump shall be 4 inches, or as specified in the Special Provisions, when tested in accordance with ASTM C-143.

Class AA concrete, with 5 to 7% entrained air, shall be used for all valley gutters and as specified.

Class A concrete shall be used for concrete structures, either reinforced or non-reinforced. Additionally, Class A concrete with 5 to 7% entrained air shall be used for all curbs, gutters, sidewalks, and exposed structures except as may be specified otherwise.

Class B concrete shall be used as specified, except 5 to 7% entrained air shall be included for all exposed structures.

Class C concrete may be used for thrust blocks, encasements, fill or over excavation, and/or other purposes as approved by engineer.

**725.3 AGGREGATES**

(first paragraph after the second sentence: modify to add)

Aggregates must be subjected to five cycles of the sodium sulfate soundness test in accordance with the requirements of AASHTO T-104. The total loss shall not exceed ten percent by weight of the aggregate as a result of the test.

**725.4 WATER**

(last paragraph, modify to add)

Water shall be sampled and tested in accordance with AASHTO T-26.

**SECTION 797 – PAVEMENT MARKINGS**

(add new section)

**797.1 GENERAL**

This work shall consist of cleaning and preparing the pavement surface, and applying longitudinal and transverse pavement markings as indicated on the plans or as specified herein.

Reference and incorporate appropriate portions of the Arizona Department of Transportation *Standard Specifications for Road and Bridge Construction – 2008* (hereinafter ADOT SS) as indicated below.

## **797.2 MATERIALS AND INSTALLATION**

### **797.2.1 LONGITUDINAL PAVEMENT MARKINGS**

This item of work shall apply to all longitudinal pavement markings, as well as any other markings not specified to be pre-formed plastic.

Permanent Markings: All permanent pavement markings shall be furnished and installed in accordance with ADOT SS 708.

Temporary Markings: Temporary longitudinal pavement markings, when approved, shall be furnished and installed in accordance with ADOT SS 701-3-05

### **797.2.2 TRANSVERSE MARKINGS, SYMBOLS AND LEGENDS**

This item of work shall apply to all lane use arrows, all transverse pavement markings such as crosswalks and stop bar markings, and all pavement legend markings, except for bicycle lanes

Permanent transverse pavement markings shall be either:

Applied thermoplastic, vurnished and installed in accordance with ADOT SS 704, with a minimum 70 mil applied thickness, or

Preformed markings, furnished and installed in accordance with ADOT SS 705.

Temporary Markings: Temporary transverse pavement markings, when approved, shall be furnished and installed in accordance with ADOT SS 701-3-05

## **797.3 CONSTRUCTION PROVISIONS**

The Contractor shall as-built and reference the existing lane striping and markings prior to construction. Unless noted otherwise on the plans or in these Special Provisions, the configuration of new lane striping and marking shall match that of the existing. Revised striping drawings are included in Appendix F.

The contractor is responsible for layout of the revised striping. The striping quantities do not include the revised striping for these revisions. The contractor shall estimate the cost of the pavement markings necessary to make the revisions indicated and include those costs in the amount bid.

All new painted pavement markings placed under this contract shall receive a double application of traffic paint. The second application shall be applied no sooner than 3 hours after the first application. All existing bike lane stripes are to be replaced as 6" wide solid white stripes. (Existing bike lane stripes may now be 4" wide) The existing bike lane symbols and cross walks are to be replaced in accordance with bike lane assembly details and piano key cross walk details shown on the plans. Bike lane diamonds are no longer required.

Double yellow centerline is to be replaced with a 6" space between the two 4" stripes. Revised striping drawings are included in Appendix F.

All crosswalks and stop bars shall be replaced with thermoplastic paint. Crosswalks shall be striped in a "piano key" configuration as shown in Appendix F. All lengths of crosswalks are given in the lengths of the crossing at the intersection, not the length of thermoplastic needed for the crosswalk. It is the contractor's responsibility to determine how much thermal plastic paint is needed to install the piano key crosswalk at the given lengths of the crosswalks.

All turn lane symbols, and bike assembly markers must be replaced with thermoplastic or preformed tape. If the striping is not a typical longitudinal lane marker stripe, it must be thermoplastic or preformed.

## **797.4 MEASUREMENT AND PAYMENT**

Pavement markings shall be measured and paid for as a single lump sum, to include the cost of all preparation, materials, layout and application, including the cost of those changes shown on the plans or included in the Special Provisions.

**APPENDIX – A (COF MATERIAL TESTING COST SHEET)**

CITY OF FLAGSTAFF MATERIALS TESTING LABORATORY COST SHEET

HOURS	SOIL AND AGGREGATE	CHARGE
1.50	Abrasion test	82.50
6.50	California bearing ratio	357.50
0.50	Composite gradings	27.50
0.75	Coarse sieve test	41.25
1.00	Density, sand cone, balloon	55.00
1.00	Density, nuclear (one hour minimum charge per trio) **	55.00
1.00	Drill rig (per hole)	55.00
1.00	Fine sieve test	55.00
1.00	Flakiness index	55.00
1.75	Fractured faces	96.25
2.75	Maximum density (Proctor)	151.25
1.00	Plastic index	55.00
1.00	Sand equivalent	55.00
2.25	Soil support - R value (gradation only)	123.75
5.50	Soundness sodium sulfate	302.50
1.50	Specific gravity and absorption	82.50

\*\* All retests will be \$35.00 each.

CONCRETE

1.00	Air content and slump	55.00
1.25	Concrete beams, mold cap & break (per beam)	68.75
0.50	Concrete cylinders, mold cap & break (per cylinder)	27.50
6.50	Concrete mix design check	357.50
0.75	Cores (per core)	41.25
1.00	Drill rig (per hole)	55.00
1.75	Sieve analysis	96.25

ASPHALT

1.00	Anti strip	55.00
6.50	Asphalt mix design check	357.50
0.75	Bitumen content (content gauge)	41.25
1.25	Bitumen content (ignition oven)	68.75
0.75	Core drilling (per core)	41.25
1.00	Density, nuclear (one hour minimum charge per trio) **	55.00
1.00	Drill rig (per hole)	55.00
2.50	Cytratory	157.50
1.25	Marshall pluss, set of three	68.75
5.50	Maximum density, Rice test	302.50
1.25	Moisture determination	68.75
1.75	Sieve analysis	96.25
1.00	Specific gravity, three set core	55.00
0.50	Specific gravity, per sample	21.50
1.25	Stability and flow, set of three	68.75
1.00	Voids, set of three	55.00

## **APPENDIX – B (REUSE OF WASTEWATER)**

## REUSE OF WASTEWATER FOR CONSTRUCTION ORIENTED PROJECTS

1. Reuse of Wastewater shall be limited to a 90-day period commencing on the date of signature of this form.
2. The cleanest, best disinfected effluent available at the wastewater treatment plant shall be used.
3. The effluent shall be chlorinated to an extent which will produce a free available chlorine residual in the hauling truck of at least 2.0 mg/l after 20 minutes contact time. A daily log shall be kept which indicates the chlorine residual at the point of discharge.
4. Warning signs shall be posted at the pumping station, the road, and on all spray trucks.
5. The water truck may not be utilized to haul anything except effluent, until it is thoroughly disinfected following completion of this project.
6. Where applicable, the following guidelines for occupational health shall be followed.
  - a. Avoid skin contact and overspray.
  - b. Truck operator should not spray if the water or mist could contaminate other employees or equipment.
  - c. If exposed to this water, wash the affected areas thoroughly.
  - d. If clothing becomes contaminated, shower and change clothes.
  - e. All employees are instructed to keep a spare set of clothing in their lockers. Alternatively, the employer may keep an adequate supply of disposal suits on hand.
  - f. If a non-employee is accidentally contaminated by the water, please instruct them to wash immediately. The on-site washrooms should be made available as needed. Immediately inform the foreman or superintendent if contamination occurs.
  - g. Anyone working on the water truck (mechanics) should wash their hands and arms thoroughly after contact. Ideally, the truck should be washed prior to repairs.
  - h. A worker who has had any contact with the water or associated equipment, shall wash their hands before smoking or eating.

- i. The Manager is responsible for reviewing guidelines with all employees and ensuring that a copy of the guidelines are issued to each.
  - j. Attendance rosters should be maintained identifying all employees completing the review session. The attendance rosters should be filed at the Manager's office.
7. Employees who may have occasional hand contact with wastewater shall be restricted if cuts or open sores are present on the hands.
8. Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) shall be used to control odor if needed.

The above list requirements may be supplemented by additional precautions deemed necessary by the consulting engineer, construction contractor, and other governmental agencies. Because the reuse of wastewater is temporary, will not include use on crops and will not result in any general public contact, the Water Permits Unit has determined that it is not necessary to obtain a Wastewater Reuse Permit. In addition, the lack of available potable water in the vicinity of the construction project makes reuse of wastewater a sound natural resource conservation measure.

This form shall be signed in the space provided by the party responsible for the wastewater application and returned within 14 days to:

Wastewater Reuse Permits Unit  
Arizona Department of Environmental Quality  
2005 N. Central Avenue  
Phoenix, Arizona 85004

A signed form will be taken by the Department as agreement by the signatory to the above conditions.

Notify this office prior to modifying the above reuse plan. If there are any additional questions, please contact the Reuse Permits Unit at 257-2270.

\_\_\_\_\_  
Signature of Responsible Party

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

**APPENDIX – C (ADDITIVE ADDITIONAL CRACK SEAL)**

## **APPENDIX – D (STRIPING REVISIONS)**

**APPENDIX – E (AS-BUILT PLANS/RECORD DRAWING CHECKLIST)**



# AS-BUILT PLANS/RECORD DRAWINGS CHECKLIST

for  
City of Flagstaff Public Improvements  
April 27, 2015

**Project Name:** \_\_\_\_\_

**Project No.:** \_\_\_\_\_

**Date:** \_\_\_\_\_

All items listed below shall be provided on As-Built/Record Drawings unless identified with N/A.

## General (applies to entire plan set)

- \_\_\_\_\_ As-Built/Record Drawings plan set shall contain all sheets from the approved design/construction plan set (cover sheet to last sheet including details).
- \_\_\_\_\_ As-Built/Record Drawings shall contain all horizontal and vertical design information, sizes, thicknesses, and material types of improvements shown on the design/construction plan set (even if unchanged during construction).
- \_\_\_\_\_ All plan sheets shall have an Engineer seal per B.T.R. rules.
- \_\_\_\_\_ If the As-Built Engineer is different from the Design Engineer, provide the As-Built Engineer contact info on cover sheet.
- \_\_\_\_\_ Place "As-Built" or "Record Drawing" lettering and date in lower right hand corner of all sheets.
- \_\_\_\_\_ Improvements deleted in the field shall be crossed out with an "x" and labeled "not built".
- \_\_\_\_\_ Improvements changed from the approved design plans shall be reflected and clearly called out by "clouding".
- \_\_\_\_\_ Plan sheets that represent improvements that were not changed from the approved design plans shall have "Per Plan" placed in the lower right hand corner.

## Sanitary Sewer Plans

- \_\_\_\_\_ Improvements built exactly per design plan shall have the elevations/stations noted within parenthesis and marked "AB".
- \_\_\_\_\_ Stations for all manholes, cleanouts, services and lateral stub-outs.
- \_\_\_\_\_ Manhole pipe invert elevations (in and out) and manhole rim elevations shall be determined by field surveying.
- \_\_\_\_\_ Pipe lengths indicated on both plan and profile.
- \_\_\_\_\_ Recalculate longitudinal pipe slopes for all pipe segments. (All measurements to MH Centers)

- \_\_\_\_\_ Stations and length of pipe encasements/extra protection.
- \_\_\_\_\_ Anode locations and tracer wire connection stations and cross ties to two permanent structures.

### **Water Plans**

- \_\_\_\_\_ Stations of all water services including landscape and fire lines.
- \_\_\_\_\_ Stations of all fire hydrants.
- \_\_\_\_\_ Stations of all valve boxes, blow-offs, and air release valves.
- \_\_\_\_\_ Stations of all bends, tees, and bell restraints.
- \_\_\_\_\_ Profile view of all pipeline vertical alignments, including stations of all fittings, depth to finish grade, and pipe separation dimensions.
- \_\_\_\_\_ Stations and length of pipe encasements/extra protection.
- \_\_\_\_\_ Horizontal cross ties to two permanent structures (fire hydrants, light poles & ID #, power poles & ID #, etc.) for all valve boxes.
- \_\_\_\_\_ Anode locations and tracer wire connection stations and cross ties to two permanent structures.

### **Drainage Plans**

- \_\_\_\_\_ Inverts for storm sewer pipes at inlets and manholes shall be determined by field surveying.
- \_\_\_\_\_ Recalculate longitudinal pipe slopes for all pipe segments.

### **Street/Trail Plans**

- \_\_\_\_\_ Stations of all survey monuments.
- \_\_\_\_\_ Sleeve/conduit/casing types, sizes, locations and stations.
- \_\_\_\_\_ Provide spot elevations at intersections as well as pavement and curb every 500 ft.

### **Street Lights and Traffic Signal Plans**

- \_\_\_\_\_ Stations for all street illumination lights.
- \_\_\_\_\_ Locations of all traffic signal poles, cabinets, J-boxes and related conduits.
- \_\_\_\_\_ Abandonment of existing conduits and facilities.
- \_\_\_\_\_ Location of signage related to traffic signal.

### **Miscellaneous**

- \_\_\_\_\_ Major unexpected dry utility crossings of water and sewer mains
- \_\_\_\_\_ Unforeseen underground structures exposed during water and sewer main construction such as vaults
- \_\_\_\_\_ Major constructed dry utilities