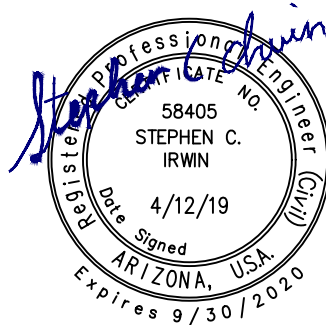




**SPECIAL PROVISIONS  
FLAGSTAFF STREET MAINTENANCE PROGRAM 2019  
OVERLAY**

**PROJECT NO. 01-19001**



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**Shephard  Wesnitzer, Inc.**

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**CITY OF FLAGSTAFF, ARIZONA**

**FLAGSTAFF STREET MAINTENANCE PROGRAM 2019- OVERLAY  
PROJECT NO. 00-00000**

**SPECIAL PROVISIONS**

The MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (with revisions through January, 2017), 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-striped prior to opening to traffic.

**Overlay Streets**

<b>Map ID</b>	<b>Street Name</b>	<b>Start</b>	<b>Stop</b>
1	Anita Ave.	Lake Mary Rd.	East End
2	Bonito St.	Elm St.	Dale Ave.
3	Bonito St.	Navajo Rd.	Elm St.
5	Thorpe Rd.	Bonito St.	Kinlani
6	Woodlands Village Blvd.	Route 66	Kaibab St.
7	Pinnacle St.	Route 66	Kaibab St.
8	Walapai Dr.	Lake Mary Rd.	Zuni Dr.
9	Thorpe Rd.	Cherry Ave.	Santa Fe Ave.
10	Thorpe Rd.	Kinlani	Cherry Ave.
11	Kaibab Ln.	Thompson	850' East
12	Kaibab Ln.	Woodlands Blvd.	900' West
13	Plaza Way	Yale St.	Milton Rd.
14	Forest Ave./Cedar Ave.	Beaver St. (East Side)	West St.
15	Chamber Dr.	Milton Rd.	Riordan Ranch Rd.
16	Metz Walk	Route 66	Riordan Rd.
17	Metz Walk	Riordan Rd.	University
20	Lake Mary Rd.	Mohawk Dr.	Walapai Dr.

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 phrase 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  $\pm 40$  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 than 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 326 - MODIFIED ASPHALT CONCRETE (MAC) OVERLAY**

(add new section)

**326.1 DESCRIPTION**

Modified asphalt concrete (MAC) overlay shall conform to the requirements of SECTION 325 – PLACEMENT AND COMPACTION OF ASPHALT-RUBBER ASPHALT CONCRETE, except as modified herein.

All references to ARAC in Section 325 shall be construed as applying to MAC overlay in section 326.

MAC concrete overlay consists of milling and overlay over existing asphaltic concrete pavement using MAC materials.

**326.2 MATERIALS**

(revise to read as follows)

The tack coat, asphaltic concrete mix, modified asphaltic concrete and transportation of the mix shall be as specified in Sections 321, 710, and 719, as modified by the Special Provisions.

Asphalt cement shall be Strategic Highways Research Program (SHRP) PG64-28TR+ (Terminal Blend) in accordance with Section 719.

The mix design(s) shall include an antistripping agent when tests on aggregate indicate that the proposed aggregate is subject to stripping. The Contractor shall submit a mix design certified by a registered Professional Engineer for approval not less than fourteen (14) days prior to the scheduled paving date. Engineer shall review the mix design in accordance with submittal procedures.

The aggregate gradation and percentage of binder for modified asphaltic concrete shall be in accordance with Section 701, 710, and 719 as amended by the Special Provisions.

## **326.7 PLACEMENT**

### **326.7.1 SURFACE PREPARATION**

(revise the to read as follows)

Before placing asphalt concrete overlay, severely raveled areas or cracked areas that are depressed more than  $\frac{3}{4}$  inch from the adjoining pavements shall be cut out and patched at least 48 hours prior to the resurfacing operation per Section 336. Over-asphalted areas or rough high spots shall be removed by milling, burning or blading. Small shrinkage cracks (between  $\frac{1}{4}$  inch to  $1\frac{3}{4}$  inch) shall be filled in with asphalt sealing compound per Section 337. Large shrinkage cracks (in excess of  $1\frac{3}{4}$  inch) shall be filled with  $\frac{3}{8}$ " hot mix asphalt per Section 337 and acceptable to the Engineer. If milling is required, crack filling shall take place after milling.

(revise to include the following after the second paragraph)

The Contractor is responsible for the removal of pavement as per the typical sections and plans. It is anticipated that the work would be performed with a CMI Roto-mill or similar machine. Milling shall conform to Section 317.

The pavement shall be removed with a minimum disturbance to the remaining pavement, curb and other improvements. All paving material removed by milling shall remain the property of the City. Portions of the millings may be used for shoulder build up as directed and determined by the Engineer. All remaining millings shall be delivered to City property, location to be determined at the pre-construction meeting. All loose material shall be removed from the pavement surface immediately following the milling operation. A pickup broom or other suitable means shall be provided by the Contractor to perform this work. Any cleanup work, by hand brooming or shoveling, needed to pick up loose material shall also be provided by the Contractor.

Where the pavement is milled across a street, causing a significant bump for the traffic, the Engineer may order the milled area patched with temporary pavement. The Contractor shall immediately place milled asphaltic concrete in the rough area and remove this material no more than two hours before that street is overlaid.

The Contractor shall locate and lower, as necessary, any water valve boxes, manhole covers, survey monument boxes or other objects that may interfere with the pavement milling operation. The plans indicate "potential conflicts"; the contractor is responsible for generating quantities and estimating accordingly. Payment will be made for lowering these facilities on a per-unit bases.

The Contractor shall schedule the pavement milling so that no street shall be milled more than ten calendar days prior to its scheduled date for overlay.

### **326.7.2 PLACING AND CONSTRUCTION METHODS**

(revise to include the following)

Although the great majority of the work is straight-run overlay, the Contractor is cautioned that certain areas require careful treatment. So that the Contractor may review these areas and may account for them fully in his proposal, the City of Flagstaff points out that:

1. In some cases, cross-streets shall be overlaid on the approach. The location and extent of work on cross-streets shall be as shown on the drawings, or as outlined by the Engineer prior to beginning the work. However, for estimating purposes, no more than 10 cross-street approaches are to be overlaid and included under items of work shown in the Bid Proposal.
2. In areas of odd configuration, care will be taken to tack and overlay, to smooth lines that match adjacent existing pavement, curb, gutter and other controls. Handwork may be necessary.
3. Special care and additional grade control may be required at intersections, at cross-gutters, around returns, along curbs without concrete gutters, at conforms to railroad tracks and cross street and drives, etc. The object is to provide a smooth, attractive surface and to maintain positive surface drainage.
4. Two (2) "screed" men may be required while the lay-down machine conforms at gutter, dips or other places of difficult conform.
5. It shall be the contractors' responsibility to immediately clean up any spillage. Failure to limit spillage and keep the job site cleaned up from such spillage shall be justification to shut the work down until adequate procedures and resources are provided to resolve the problem. Modified Asphalt Concrete shall be delivered and placed at a temperature no higher than necessary for placing, finishing, spreading and compacting, but shall be high enough to accomplish this work. The minimum temperature of the PMA, RAC, HMA, or MAC shall be 275°F. These temperatures will be taken at a point 1 inch below the surface at the point of delivery and may need to be higher if material is found unworkable by the Engineer. Asphalt concrete found deficient in temperature shall be rejected and removed from the job site at no cost to the contracting agency. No free treating fluid shall be present in the truck bodies at the time of asphalt concrete loading. Diesel fuel shall not be used as a treating fluid.

Section 321.6, Corrective Requirements for Deficiencies, shall apply to asphaltic concrete overlay in this contract.

### **326.7.5 ADJUSTMENTS**

(revise the first paragraph to read as follows)

After installation of an overlay course all necessary frame and cover adjustments for manholes, valve boxes, survey monuments, sewer clean-outs, etc. shall be completed by the contractor within the given segments being surfaced and shall be per City of Flagstaff typical details 9-03-060 and 9-03-62.

### **326.12 PAYMENT**

(revise the section to read as follows)

Payment for tack coat, asphaltic concrete and modified asphaltic concrete shall be in accordance with Section 321.

Payment for crack sealing shall be made in accordance with Section 337.

Payment for pavement milling shall be on a square yard basis in accordance with Section 317, and is to include trucking, disposal, pick up broom, and all work associated with pavement milling. Measurement for pavement milling will be made based on the length of pavement surface actually milled and the width specified or milled, whichever is less.

**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<sup>m</sup>) 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 SHOING 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 340 CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE**

**340.1 DESCRIPTION**

(modify to add)

The plans describe the location and approximate quantities of removals and replacements. Actual limits of removal and replacement will be as directed by the Engineer. Concrete valley gutter shall be constructed in accordance with City of Flagstaff Detail 8-06-010.

**340.2 MATERIALS**

(revise first paragraph to read)

Concrete shall be Class A, containing 5 to 7% air entrainment, and conforming to applicable requirements of Section 725.

**340.2.1 DETECTABLE WARNINGS**

(modify to add)

Detectable warnings shall consist of raised truncated domes aligned in a square grid pattern in conformity to the Americans with Disabilities Accessibility Guidelines. Truncated domes shall have the following nominal dimensions: base diameter of 0.9 inches, top diameter to 0.4 inches, height of 0.2 inches, and dome spacing center-to-center spacing of 2.35 inches, measured between the most adjacent domes on the square grid. Detectable warnings shall contrast visually with adjoining surfaces. The material is to be durable with non-slip surface not subject to spalling, chipping, or separation. Uncoated Cast iron per East Jordan Iron Works or approved equal is to be used. The owner shall specify the color of the panels.

The following is a table of the approved suppliers. Contractor is to use one of the following suppliers or an approved equal.

DURALAST® Cast Iron: Coated or Uncoated	East Jordan Iron Works	(800-874-4100) <a href="http://www.ejiw.com">http://www.ejiw.com</a>
Cast Iron: Coated or Uncoated	Neenah Foundry Co	(800-252-5801) <a href="http://www.nfco.com">http://www.nfco.com</a>
IRON PED Cast Iron: Coated or Uncoated	Manufactured by Neenah Foundry Co	(763-478-8128) <a href="http://www.ironped.com">http://www.ironped.com</a>
CAST-DWD™ or CAST CORP Cast Iron: Coated or Uncoated	Cast Corporation	(218-263-8510) <a href="http://www.castcorporation.com">http://www.castcorporation.com</a>
CAST-DWD™: Coated or Uncoated	Pioneer Detectable, LLC	(262-370-5355) (877-270-3663) <a href="http://www.metadome.com">http://www.metadome.com</a>

**340.3 CONSTRUCTION METHODS:**

(sixteenth paragraph, modify to add)

The longitudinal extent of any curb and gutter removal, replacement necessary because of nonconformity with the plans or specification, and replacement due to damage prior to acceptance shall not be less than the appropriate contraction joint spacing.

(after last paragraph, modify to add)

Curb & gutters, sidewalks, driveway aprons and handicapped sidewalk ramps shall be constructed on three (3) inches of aggregate base course. Valley gutters shall be constructed on eight (8) inches of aggregate base course. No direct payment will be made for aggregate base course. All costs associated with this work are to be included in the amount bid for the items of work to which it is incidental or appurtenant. The contractor is to field verify number of dome panels needed for each ramp and bid accordingly. No additional payment will be made for “wider” ramps.

The Contractor shall take extra precaution to protect all freshly poured concrete from vandalism. The Contractor shall coordinate placement of all new concrete with businesses and residences a minimum of forty-eight (48) hours in advance of the work. Night work, admixtures to accelerate hydration and setting of concrete and protective coverings should be considered by the Contractor to ensure that the finished concrete is free from any defects. Refer to MAG Specifications, Section 107.10.

Concrete finishes shall be as called-out on the plans, details and in these Special Provisions. Any concrete finish that does not meet these requirements shall be removed and replaced at the Contractor's expense.

The subgrade shall be compacted to a relative density of 95% max density.

**340.5 MEASUREMENT**

(modify to add)

No separate measurement or payment will be made for saw cutting necessary for removal of pavement, curb, valley gutter or aprons. No separate measurement or payment will be made for ABC under curb, sidewalk, valley gutters or sidewalk ramps. The cost of saw cutting and ABC is to be included in the related work items shown on the Bid Schedule.

Measurement or payment for Remove Sidewalk & Install Sidewalk Ramp shall include all costs associated with special forming and handwork to construct the MAG 235-3 or 235-4 curb ramps including the curb at the back of the ramps. Measurement and payment will also be made of the necessary curb and gutter removal and replacement for the curb ramp. Measurement and payment will also be made of the necessary sidewalk removal and replacement through the curb ramp.

Measurement or payment for Ramp Retro-Fit shall include all costs associated with special forming and handwork to construct the curb ramps (as detailed on the plan sheets) including the curb at the back of the ramps if applicable. Measurement and payment will also be made of the necessary curb and gutter removal and replacement for the curb ramp. Measurement and payment will also be made of the necessary sidewalk removal and replacement through the curb ramp.

**SECTION 345 - ADJUSTING FRAMES, COVERS, VALVE BOXES, AND WATER METER BOXES**

**345.1 DESCRIPTION**

(modify to add)

The adjustment of manhole frames and covers and water valve boxes shall be done in accordance with City Standard Drawing 9-03-060 and 9-03-062. The contractor is cautioned that only straight, centered (relative to adjustment pavement or concrete) valve boxes that conform to City Detail 9-03-060 will be acceptable. The Engineer will provide the contractor necessary direction for the appropriate adjustment or replacement of each valve box and cover.

In mill and overlay areas, all existing valve boxes, meter boxes, manhole covers, survey monument boxes, or similar items designated to remain in service shall be temporarily lowered prior to milling, so as to not impede milling operations.

At all water valve locations where valves are to be abandoned in place, the top section of the valve box, frame and cover shall be excavated and removed prior to backfilling the valve and box portions to remain.

At all water valve locations where existing valves are to remain in service, the entire valve box and cover shall be excavated, removed and replaced with a new complete valve box and cover as well as the adjustment to grade. The water valve box and covers that require removal and replacement shall be excavated and installed prior to paving or overlay. Final adjustments shall be made after completion of final surfacing.

Any usable valve box and covers removed under this contract shall remain the property of the City.

On the proposed streets where the existing manhole collars are bigger than current City of Flagstaff standards additional labor and materials will be needed. When the contractor lowers the existing manholes, they are to remove the existing collars and fill the void with HMA per section 321 and place a new collar around the manhole frame per the City of Flagstaff Standard Detail 9-03-062. Payment for the HMA for collar patching only will be per unit cost for manhole lowering on each street.

The Contractor will be required to keep a record of locations of each frame or box as per the following:

For those boxes and frames readily visible, the Contractor will make reference points which will allow him to accurately locate frames and boxes after they are covered. It will be the Contractor's responsibility to preserve these reference points.

For those boxes and frames not visible before surface treatment, utilities representatives will locate frames and boxes, making a mark at each location. It will be the Contractor's responsibility to preserve these marks and all reference marks as required and identified in item 1 above.

## 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:

#### Overlay Streets

Map ID	Street Name	Start	Stop	
1	Anita Ave.	Lake Mary Rd.	East End	1 Lane, 2 Directions with flagmen
2	Bonito St.	Elm St.	Dale Ave.	1 Lane, 2 Directions with flagmen
3	Bonito St.	Thorpe Rd.	Elm St.	1 Lane, 2 Directions with flagmen
4	Kaibab Ln.	Woodlands Village Blvd.	East End	1 Lane, 2 Directions with flagmen
5	Thorpe Rd.	Kinlani Rd.	Bonito St.	1 Lane, 2 Directions with flagmen
6	Woodlands Village Blvd.	Route 66	Kaibab Ln.	1 Lane, 2 Directions with flagmen
7	Pinnacle St.	Route 66	Kaibab Ln.	1 Lane, 2 Directions with flagmen
8	Walapai Dr.	Lake Mary Rd.	Zuni Dr.	1 Lane, 2 Directions with flagmen
9	Thorpe Rd.	Cherry Ave.	Sante Fe Ave.	1 Lane, 2 Directions with flagmen
10	Thorpe Rd.	Cherry Ave.	Kinlani Rd.	1 Lane, 2 Directions with flagmen
11	Kaibab Ln.	Thompson St.	850' East	1 Lane, 2 Directions with flagmen
12	Kaibab Ln.	Woodlands Village Blvd.	900' West	1 Lane, 2 Directions with flagmen
13	Plaza Way	Yale St.	Milton Rd.	1 Lane, 2 Directions with flagmen
14	Forest/Cedar Ave.	Beaver St. (East Side)	West St.	2 Lanes, 2 Directions with flagmen
15	Chamber Dr.	Milton Rd.	Riordan Ranch Rd.	1 Lane, 2 Directions with flagmen

16	Metz Walk	Route 66	Riordan Ranch Rd.	1 Lane, 2 Directions with flagmen
17	Metz Walk	Riordan Ranch Rd.	University Dr.	1 Lane, 2 Directions with flagmen
18	Monte Vista Dr.	Linda Vista Dr.	South End	1 Lane, 2 Directions with flagmen
19	Lois Ln.	Peak View St.	West End	1 Lane, 2 Directions with flagmen
20	Lake Mary Rd.	Mohawk Dr.	Walapai Dr.	2 Lane, 2 Directions with flagmen
21	Aztec St.	Beale St.	Thorpe Rd.	1 Lane, 2 Directions with flagmen
22	Thompson St.	Kaibab Ln.	North End	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.

**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  $\frac{3}{4}$  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%
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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 719 - MODIFIED ASPHALTIC CONCRETE**

(revise to include new section)

**719.1 GENERAL**

Modified Asphaltic Concrete (MAC) shall consist of a mixture of paving asphalt, modifiers and mineral aggregate which, with the addition of mineral filler and blending sand as may be required, shall be mixed at a central mixing plant in the proportions hereinafter specified to provide a homogeneous and workable mixture.

Modified Asphaltic Concrete (MAC) shall consist of furnishing asphaltic concrete with binder meeting the requirements of either:

- Rubberized Asphaltic Concrete (RAC)
- Polymer Modified Asphalt Concrete (PMA)
- Polymer Modified Rubberized Asphalt Concrete – Dry Process (PMRAC)
- SHRP graded PG64-28TR = (TR+)

Paving asphalt at the locations shown on the plans in accordance with the following specifications.

Within 10 calendar days of notice of award, the contractor shall submit in letter form, the name of the supplier and a type of MAC to be supplied.

Two weeks prior to construction the Contractor shall submit three (3) gallons of the modified asphalt binder for testing. Application and testing will be in accordance with MAG 321 as amended by the General Provisions and Special Provisions.

**719.2 MATERIAL:**

**719.2.1 BINDER**

The asphalt rubber binder in the mix shall comply with MAG 717 and 335 except the rubber shall be type II and the minimum rubber content for RAC shall be 17% as a percentage of total binder. Asphalt cement for all MAC shall meet the requirements of PG 64-28TR+ as per AASHTO MP-1 Table I. Polymer shall be Type SBS and shall be 5.5% to 7% of the total binder for PMA. Twenty percent of the modifier for PMA shall be ground tire rubber. The PMA shall be such that

the materials conform to the specification requirements. Ground rubber shall be Type II with the following gradation:

Gradation - Ground Rubber (Type II)

Sieve Size	% Passing
No. 10	100
No. 16	70-100
No. 30	25-60
No. 50	0-20
No. 200	0-5

Binder for Rubberized Asphaltic Concrete (RAC) shall conform to the following specifications:

Parameter	Requirement
Apparent viscosity, centipoise, 350°F, Spindle 3, 20 RPM (ASTM D2196)	1500-6000 Centipoise
Penetration, 77°F, dmm, 100g, 5 sec (ASTM D-5)	25 minimum 90 maximum
Penetration, 39.2°F, dmm, 200 g, 60 sec (ASTM D-5)	15 minimum
Cone Penetration, 77°F, dmm, 150g, 5 sec (ASTM D-5)	25 minimum
Resilience, 77°F, % (ASTM D-3407)	20 minimum
Softening Point, °F (ASTM D-36)	135 minimum
TFOT Residue (ASTM D1754) Penetration Retention, 39.2°F, %"	75 minimum

Haake type viscosity may be substituted for field control

Binder for Polymer Modified Asphaltic Concrete shall conform to the following specifications:

Specification:	ASTM	SPEC. LIMITS	
		MIN.	MAX.
ORIGINAL ASPHALT	METHOD		
Penetration, 39.2 F (200g/60 sec), dmm	D5	25	
Penetration, 77 F (100g/5 sec), dmm	D5	40	90
Softening point, F	D36	180	

Flash point, F	D92	450	
Ductility, 39.2, F (5 cm/min), cm	D113	30	
Ductility, 77 F (5 cm/min), cm	D113	100	
Viscosity, 275 F, cst	D2170	1000	
Recovery, 39.2 F, %	D113 MOD	60	
Solubility in Trichlorethylene %	D2042	99	

AGED ASPHALT (RTFO)	METHOD	MIN.	MAX.
Retained Penetration, 77 F, %	D5	60	
Viscosity Ratio, 275 F, %	D2170		1.5
Softening Point, F	D36	175	
Ductility, 39.2 F (5 cm/min), cm	D113	20	

The asphalt binder modifier for the PMA shall contain a minimum of 20% recycled material.

The Polymer Modified Rubberized Asphalt Concrete – Dry Process (PMRAC-DP) and SHRP graded PG64-28TR+ shall conform to requirements of Superpave Grade PG64-28 (AASHTO MP-1 and MAG Section 335) except as follows:

		PMRAC-DP	PG64-28TR+
Test Properties	Test Method	Specification	Specification
Scrap whole tire rubber (Type II) content, %, Minimum		17.0	8.0
Trans-polyoctenamer rubber polymer (TOR), %, Based on the weight of the tire rubber		4.5	
SBS Polymer content %, Minimum			2.0
Original Testing COC Flash Point, °C, Minimum	ASTM D92	232	232
Softening Point, °C, Minimum	ASTM D36	50	50
Elastic Recovery, 10°C, 10cm, % recovery/1hr, Minimum	ASTM D6084	55	55

Solubility in Trichloroethylene, Minimum, %	ASTM D2042	97.5	97.5
Dynamic Shear, 64°C, 10 rad/sec,	AASHTO TP5	1.00	1.00
Dynamic Shear, 25°C, 10 rad/sec, G*/sin delta, kPa, Maximum		75	75
RTFO Residue Testing	AASHTO TP5		
Dynamic Shear, 64°C, 10 rad/sec, G*/sin delta, kPa, Minimum		2.20	2.20
PAV Aging Residue Testing	AASHTO TP5		
Dynamic Shear, 25°C, 10 rad/sec, G*/sin delta, kPa, Maximum		5000	5000
Bending Beam Rheometer	AASHTO TP5		
Creep stiffness, -18°C, MPa/60 sec, Maximum		300	300
M-Value, -18°C, 60 sec, Minimum		0.300	0.300

### 719.2.2 AGGREGATE

Aggregate shall conform to Section 710.2.2 as amended by the Special Provisions. The aggregate gradation will be as follows:

Sieve Size	% Passing
5/8 inch	100
1/2 inch	96-100
3/8 inch	78-92
No. 4	28-42
No. 8	12-25
No. 30	10 +/- 5
No. 200	5 +/- 2

### **719.2.2.2 AGGREGATES CHARACTERISTICS**

Combined aggregates shall conform to 710.2.2 except the minimum sand equivalent shall be 65 and at least 85% by weight of the aggregate retained on the #8 sieve shall consist of particles with at least one rough, angular surface produced by crushing.

### **719.2.3 MINERAL FILLER AND ANTI-STRIPPING AGENT**

Mineral filler and anti-stripping agent shall be as per Section 710.2.3.

### **719.3 MIX DESIGN REQUIREMENTS:**

The provisions of 710.3 MIX DESIGN REQUIREMENTS shall apply to MAC except that:

References to asphalt, liquid asphalt, bituminous cement shall be changed to "binder conforming to 714.2.1."

For estimating purposes, the percentage of binder in the MAC shall be 7% for PMA and RAC. For estimating purposes, the percentage of binder in the MAC shall be 7% for TR+ and for PMRAC-DP. The exact amount of binder in the MAC shall be subject to the Engineer's approval after review of the contractor's job mix formula and materials submittals. Marshal mix design criteria will be used for MAC.

### **719.4 PRODUCTION TOLERANCES:**

The provisions of 710.4 PRODUCTION TOLERANCES shall apply to MAC except that:

References to asphalt, liquid asphalt, bituminous cement shall be changed to "binder conforming to 714.2.1."

### **719.5 PRODUCTION REQUIREMENTS:**

The provisions of 710.5 shall apply for MAC except that:

References to asphalt, liquid asphalt, bituminous cement shall be changed to "binder conforming to 714.2.1."

### **719.6 TRANSPORTATION AND DELIVERY REQUIREMENTS:**

The provisions of 710.6 shall apply for MAC.

## **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, furnished 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	Flackiness 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 of)	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)	68.25
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 plues, 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 (ADA QUANTITIES)**

Street	Improvement Location	R&R Valley gutter & apron	RETRO FIT ADA Ramp MAG 235-3	ADA Ramp MAG 235-3	ADA Ramp MAG 235-4	R&R Curb & Gutter (vertical)	R&R Curb in Apron	R&R Sidewalk (+ ramp area)	R&R Curb & Gutter (Roll)	R&R Driveway
		SF	EA	EA	EA	LF	LF	SF	LF	SF
Anita Ave.	10th panel east of light pole, north of 115 Camille (midpoint)							7.3		
Lake Mary - Pauline	15th panel east of driveway of Village at Lake Mary Crossing							14.8		
	2nd panel west of driveway of Village at Lake Mary Crossing							15.2		
	23rd panel west of Village at Lake Mary Crossing							16.0		
	West end of guardrail							25.5		
	Across Camille southeast corner							25.0		
	Across midpoint of scupper and mailbox on south							27.0		
	South of Table Rock apartment shed at light pole							25.0		
	East side of Table Rock apartment driveway							54.0		
	Anita & Camille Southwest corner	211.1		1			35.0	185.3		
	Anita & Camille Southeast corner	277.61		1			31.0	194.4		
	Anita & Camille	35								
	<b>Total</b>	<b>523.71</b>	<b>0.00</b>	<b>2.00</b>	<b>0.00</b>	<b>0.00</b>	<b>66.00</b>	<b>589.47</b>	<b>0.00</b>	<b>0.00</b>
Bonito St.	Bonito/Elm between northeast and southeast ramps	264								
Elm - Dale	At the FUTS trail				1		24.0	144.0		
	Southeast corner of Bonito & Elm	277		1			34.0	153.0		
	Northeast corner of Bonito & Dale			1			32.0	137.0		
	Just north of ramp at northwest corner of Dale and Bonito							109.8		
	±8' south of waer station							115.3		
	Behind water station							98.0		
	±10' North of water station							157.5		
	Between utility pole and light pole							33.0		
	In front of wall with free on top							36.6		
	±33' south of light pole (north end of wall)							72.0		
	30' north of fire hydrant							144.0		
	At south corner of chainlink fence at rio de flag							60.0		
	At north corner of chainlink fence at rio de flag							36.0		
	Just south of sidewalk ramp at FUTS trail							36.0		
	±12' north of sidewalk ramp at FUTS trail							36.0		
	Just south of sidewalk ramp at FJA stairs							43.8		
	Front of tree across from fire hydrant							30.0		
	Across from ligh pole and north end of wall on west side							30.0		
	Between bonito community garden and drainage channel							268.0		
	<b>Total</b>	<b>541.00</b>	<b>0.00</b>	<b>2.00</b>	<b>1.00</b>	<b>0.00</b>	<b>90.00</b>	<b>1,740.00</b>	<b>0.00</b>	<b>0.00</b>
Bonito St.	Just south of double grate inlet across from FHS dome					12.0				
Thorpe - Elm	From light pole to catch basin across from fire hydrant								222.0	
	North of catch basin double grate south of speed limit sign					12.0				
	Curb ramp at FJA stairs				1		30.0	150.0		
	Ramp across of south end of south drop off at Marshall Elementary		1					24.6		
	Ramp at south end of FJA drop off		1					21.9		
	South ramp of drop off island at FJA		1					28.0		
	Curb ramp at south end of south drop off at Marshall		1					24.6		
	Northeast corner at Bonito & Elm	312		1			40.0	125.0		
	Just north or double grate inlet across from light pole							36.0		
	±18' north of the double grate inlet across from light pole							36.0		
	Just north of double grate inlet across and south of FHS dome							66.0		
	±28' north of double grate inlet south and across of FHS dome							48.0		
	±6' south of double grate inlet across from FHS dome							36.6		
	±6' north of double grate inlet across from FHS dome							66.0		
	±58' south of fire hydrant							75.2		
	From fire hydrant north to front of green door at FJA							1,650.0		
	In front of east entrance to FJA							451.0		
	±60' north of east FJA entrance							220.0		
	±15' south of sidewalk ramp							132.6		
	±45' north of curb ramp							80.0		
	Drop off island at FJA							122.0		
	Drop off island in front of light pole at FJA							36.0		
	At sidewalk ramp by south end of rail							174.2		
	Across from south end curb at north Marshall drop off							55.2		
	±30' south of sidewalk ramp at Bonito & Thorpe							180.0		
	±10' south of sidewalk ramp at Bonito & Thorpe							51.0		



Street	Improvement Location	R&R Valley	RETRO FIT	ADA Ramp	ADA Ramp	R&R Curb	R&R Curb in	R&R Sidewalk	R&R Curb &	R&R Driveway
		gutter & apron	ADA Ramp	MAG 235-3	MAG 235-3	& Gutter (vertical)	Apron	(+ ramp area)	Gutter (Roll)	SF
		SF	EA	EA	EA	LF	LF	SF	LF	SF
	1130 Kaibab (Mini Storage)					17.0				
	1130 Kaibab North of northern driveway at storage units					30.0				
	North of southwest driveway at Department of Public Safety (DPS) building					15.0				
	Across from Pine Forest property corner, south of CATV box					20.0				
	South of Chevy Dealer back entrance gate					40.0				
	FAC west driveway					16.0				
	<b>Total</b>	0.00	0.00	0.00	0.00	619.00	0.00	380.50	0.00	586.60
<b>Thorpe Rd.</b>	± 10' west of "No Parking" sign by utility post 568							48.5		
Kinlani - Bonito	Angle point in sidewalk at utility post 1049							50.0		
	Angle point in sidewalk at CMP							50.0		
	±15' east of CMP							20.5		
	± 10' west of "Crosswalk Ahead" sign							26.0		
	± 8' west of "Dip" sign							25.0		
	± 30' west of bus stop							25.0		
	± 10' west of bus stop							59.0		
	± 5' east of bus stop at utility post							18.5		
	± 20' east of sidewalk ramp							26.5		
	± 35' east of sidewalk ramp							23.0		
	± 20' west of concrete scupper							21.4		
	± 6' east of concrete scupper							22.5		
	± 5' west of end of handrail at tennis courts							24.5		
	West end of driveway at tennis courts							24.5		20.0
	± 40' west of utility post each of handball court							25.5		
	± 30' west of sidewalk at FUTS Trail							25.0		
	At sidewalk ramp at FUTS trail							125.0		
	± 15' east of sidewalk ramp at FUTS trail							25.0		
	± 120' east of sidewalk ramp at futs trail							20.0		
	East of west driveway of parking area							24.0		
	At trail to Francis Short Pond							30.0		
	± 30' east of westerly driveway to FJA (west of Field)							25.0		
	West driveway at parking lot of FJA									59.5
	West driveway at parking lot of FJA (manhole in concrete)						27.0			162.0
	Island between driveways for FJA parking lot						37.0		110.0	
	east driveway of FJA parking									234.0
	Wings at curb ramp on northwest corner of Thorpe & Bonito								36.0	
	Driveway at parking lot across from Marshall Elementary								26.0	54.0
	East end of fence at parking across from Marshall								25.5	
	Just west of sidewalk ramp at walkway to baseball field								19.0	
	West of driveway at Clark Homes (units 1 & 2)								38.0	
	In front of fenced shed at Clark Homes (unit 3)								13.7	
At end of chain link fence (at Clark Homes on southwest corner)								16.0		
West of CMP								80.0		
Just west of concrete scupper						10.0				
east driveway of FJA parking lot						34.0				
east of eastern driveway at FJA parking lot						12.0				
± 15' east of bus stop, west of valley gutter						52.0				
Sidewalk ramp at FUTS trail					1			72.0		
southwest corner of Thorpe & Bonito			1					29.4		
Northwest corner of Thorpe & Bonito			1					29.4		
Northwest corner at Thorpe & Clark Cir	55		1				38.0	104.0		
Northeast corner at Thorpe & Clark Homes driveway			1				34.0	100.0		
Southeast corner at Thorpe & Clark Homes driveway	104		1				31.0	96.0		
Northeast corner of Thorpe & Clark Homes driveway	40									
<b>Total</b>		199.00	2.00	3.00	1.00	172.00	103.00	1,559.37	0.00	529.50
<b>Woodlands</b>	Just southeast of curb ramp at Woodlands/Kaibab							25.5		
Route 66 - Kaibab	±15' northwest of FAC West driveway/parking							23.5		
	Just east of FAC West parking/driveway							24.0		
	± 16' east of FAC parking/driveway							28.5		
	±60' west of southwest corner on Woodlands & Route 66							24.5		
	FAC West main driveway						36.0			
	±15' east of stop sign on Woodlands & Kaibab						10.0			
	Southeast corner of Woodlands & Kaibab			1				42.0	150.0	

Street	Improvement Location	R&R Valley	RETRO FIT	ADA Ramp	ADA Ramp	ADA Ramp	R&R Curb	R&R Curb in	R&R Sidewalk	R&R Curb &	R&R Driveway
		gutter & apron SF	ADA Ramp MAG 235-3 EA	MAG 235-3 EA	MAG 235-4 EA	& Gutter (vertical) LF	Apron LF	(+ ramp area) SF	Gutter (Roll) LF	SF	
Total		0.00	0.00	1.00	0.00	46.00	42.00	276.00	0.00	0.00	
Pinnacle Route 66 - Kaibab	Northwest corner of Pinnacle & Route 66		1					30.0			
	Northeast corner of Pinnacle & Kaibab		1					20.0			
	± 10' east of Loven east driveway							25.0			
	West of Loven east driveway							16.0			
	Southeast corner of Pinnacle & Kaibab					30.0					
	Northwest corner at Pinnacle & Route 66					5.0					
	South driveway to Wicked AZ Coffee					35.0					
	Midpoint Pinnacle north side at storage area					80.0					
	Loven east driveway					20.0					
	Total		0.00	2.00	0.00	0.00	170.00	0.00	91.00	0.00	0.00
Walapai Drive Lake Mary - Zuni	Northeast corner of Walapai & Lake Mary		1					36.0			
	Southeast corner of Walapai & Yaqui (south end)	114		1				30.0	108.0		
	Northeast corner of Walapai & Yaqui (south end)	83		1				29.0	112.0		
	Southeast corner of Walapai & Yaqui (north end) at Forest Ridge sign	117		1				33.0	109.0		
	Northeast corner of Walapai & Yaqui (north end) at Forest Ridge Sign	108		1				28.0	100.0		
	East side Walapai/Yaqui	180									
	Just south of double scupper by carwash							25.0			
	Just south of single scupper at Chevron station							11.7			
	Northeast driveway at Chevron station									26.0	
	Just south of 3710 Walapai south driveway								36.7		
	3710 Walapai south driveway									36.0	
	Just north of 3710 Walapai north driveway								20.0		
	±20' north of 3710 Walapai north driveway								12.8		
	North of Walapai/Yaqui intersection at Forest Ridge sign								40.0		
	± 10' south of backyard driveway of 423 Zuni					23.0					
	Driveway of 3825 Walapai					16.0					
	Southeast corner of Walapai/Lake Mary					18.0					
	Covenant Church driveway					35.0					
	South of east bound bus stop at Walapai/Yaqui					10.0					
	Just north of mailboxes at apartment driveway					13.0					
Pinebrook Apartment driveway					31.0						
Driveway of Forest Ridge Apartments (3614-3670 Malapai/3745-3775 Walapai)					32.0						
3524 Walapai Driveway					9.0						
±20' north of 3524 Walapai driveway					13.0						
3520 Walapai Driveway					18.0						
3516 Walapai driveway					18.0						
3510 Walapai driveway					18.0						
Total		602.00	1.00	4.00	0.00	254.00	120.00	611.18	0.00	62.00	
Thorpe Rd. Cherry - Sante Fe	NE sidewalk ramp @ Thorpe/Birch (to be replace with MAG 235-4 on curve)				1	23.0		107.0			
	Thorpe & Birch - East to West	370									
	SE sidewalk ramp @ Thorpe/Birch (to be replace with MAG 235-4 on curve)				1	16.0		102.0			
	Just south of southeast corner of Thorpe & Birch at 823 Birch "C"							165.0			
	North of walkway to 873 Birch "D"							24.5			
	Driveway to 823 Birch building E garages									130.0	
	Backyard fence midpoint at 824 Aspen							25.0			
	±10 south of Gate/entrance tat 824 Aspen							25.0			
	NE sidewalk ramp @ Thorpe/Aspen (to be replace with MAG 235-4 on curve)				1	18.0		107.0			
	SE sidewalk ramp @ Thorpe/Aspen (to be replace with MAG 235-4 on curve)				1	18.0		92.0			
	Just south of southeast corner of Thorpe & Aspen at 823 Aspen							23.5			
	In front of door at 823 Aspen #5							22.5			
	In front of garage door #1 at 10 Thorpe									26.0	
	In front of yard wall opening at 822 Sante Fe							100.0			
	NE sidewalk ramp @ Thorpe/Santa Fe (to be replace with MAG 235-4 on curve)				1	19.0		127.0			
	NW sidewalk ramp @ Thorpe/Santa Fe (to be retro-fitted, extend to existing sidewalk withing wall)			1				24.0			
	West of Thorpe & Birch - South to North	65									
NW sidewalk ramp @ Thorpe/Birch			1				34.0	83.0			
South of flag pole at 245 Thorpe								33.6			
Between drive thru and parking lot entrance of 245 Thorpe								156.0			
Total		435.00	1.00	1.00	5.00	94.00	34.00	1,217.15	0.00	156.01	







Street	Improvement Location	R&R Valley	RETRO FIT	ADA Ramp	ADA Ramp	R&R Curb	R&R Curb in	R&R Sidewalk	R&R Curb &	R&R Driveway
		gutter & apron	ADA Ramp	MAG 235-3	MAG 235-3	& Gutter (vertical)	Apron	(+ ramp area)	Gutter (Roll)	SF
		SF	EA	EA	EA	LF	LF	SF	LF	SF
	At wooden tree well and ±15' east of wooden tree well, located across east end of guardrail (12 panels)							303.5		
	±50' west and ±25' east of light pole w/speed limit sign, located across CHS exit (3 panels)							67.3		
	At SMH in WB bike lane							24.5		
	Just east of sign (adopt-an-ave)							100.5		
	±40' east of sign (adopt-an-ave) to NW ramp @ Cedar/West							625.0		
	At SW corner of Cedar/West (Sidewalk ramp area, excluding landing)							184.9		
	±10' south of EB bus stop @ Forest/Gemini							50.0		
	±50' south of EB bus stop @ Forest/Gemini							30.0		
	±25' north of NE ramp @ Forest/Gemini							96.2		
	At EB bus stop @ Forest/ Turquoise							334.9		
	At concrete headwall and ±30' west of concrete headwall (4 panels)							100.0		
	At angle point, west end of EB bus stop pull out @ Forest/Turquoise							145.0		
	At curb inlet @ SE corner of Forest/Turquoise							48.0		
	±5' and ±35' west of SW ramp @ Forest/Turquoise (5 panels)							125.0		
	±35' east of green CATV box on northside of Summit Center							225.0		
	±15' east of green CATV box on northside of Summit Center to the two newer concrete panels							605.0		
	At speed limit sign and ±40' west of speed limit sign, located east of Forest/San Francisco (9 panels)							270.0		
	±25' east of traffic signal pole on SE corner of Forest/San Francisco							18.7		
	At traffic signal pole on SW corner of Forest/San Francisco							82.3		
	East and west sides of curb inlet @ SW corner Forest/San Francisco (2 panels)							30.0		
	±40' west of "keep left" warning sign							100.0		
	±35' east of 77 forest driveway							28.5		
	East and west sides of curb inlet @ 77 forest driveway (2 panels)							34.5		
	77 forest driveway and just west of 77 forest driveway							26.0		112.0
	At speed limit sign, located across 104 forest							50.0		
	±10 west of communication cabinet #77WF, located across 110 beaver							24.5		
	±15' east of sign (adopt-an-ave)							25.0		
	Just east of curb inlet at SE corner of Forest/Beaver							47.5		
	Just east f SW ramp @ Forest/Beaver							55.0		
	<b>Total</b>	0.00	0.00	2.00	0.00	74.00	0.00	10,589.51	0.00	211.00
<b>Chambers Dr.</b>	Southwest corner of Chambers/Milton			1			35.0	288.0		
Milton - Riordan	Southeast corner of Chambers/Riordan	234		1			48.0	370.0		
	Northeast corner of Chambers/Riordan	250		1			47.0	280.0		
	Northwest corner of Chambers/Milton			1			44.0	331.0		
	Chambers/Riordan	152								
	Chambers & ± 10' west of Chilis north driveway							34.8		
	Chilis north driveway									175.0
	Chambers (north) ±40' west of intersection							32.5		
	Chambers northeast ±60' west of intersection (north side)							29.5		
	Chambers - midpoint 5 panels west of "no parking" sign (north side)							38.4		
	Chambers 2nd panel east of "turn only" & "no parking" sign (north side)							85.2		
	3rd panel west of "turn only" & "no parking" sign (north side)							33.0		
	East of chilis north driveway							31.8		
	<b>Total</b>	636.00	0.00	4.00	0.00	0.00	174.00	1,554.16	0.00	175.00
<b>Metz Walk</b>	±50' south of Goodwill driveway behind transformer							25.0		
Rute 66 - Riordan	Speedi car wash northly driveway									60.0
	In front of northly wash bay at Speedi							55.0		
	In front of Speedi 2nd wash bay from north									31.5
	In front of Speedi wash bay building									30.0
	In front of Speedi building corner							25.0		
	Cabinet on landscape island between Walgreens north driveway and Speedi property									25.0
	±15' sputh of walgreens north driveway							14.0		
	±40' south of walgreens north driveway at start of curve							25.0		
	±55' north of intersection of Metz/Riordan							28.1		
	Howard Johnson Inn south driveway					17.0		25.0		
	Speedi car wash northernly driveway					24.0				
	Northeast corner of Metz/Riordan		1					20.0		
	<b>Total</b>	0.00	1.00	0.00	0.00	41.00	0.00	217.08	0.00	146.50

Street	Improvement Location	R&R Valley gutter & apron	RETRO FIT ADA Ramp	ADA Ramp	ADA Ramp	R&R Curb & Gutter (vertical)	R&R Curb in Apron	R&R Sidewalk (+ ramp area)	R&R Curb & Gutter (Roll)	R&R Driveway
		SF	EA	EA	EA	LF	LF	SF	LF	SF
<b>Metz Walk</b> Riordan - University	±18' north of gate on adjacent property					16.0				
Total		0.00	0.00	0.00	0.00	16.00	0.00	0.00	0.00	0.00
<b>Monte Vista Dr.</b> Linda Vista - South End	Just south of southwest corner ramp							13.6		
	±4' north of 3319							30.4		
	±8' north of 3319							14.0		
	driveway of 3319									64.0
	Just south of driveway at 3319							32.0		
	Driveway of 3316									132.0
	Just north of driveway at 3316							44.8		
	±10' south of 3316							16.0		
	Just south of southeast corner ramp							11.9		
	Southwest corner ramp		1					18.0		
	Southeast corner ramp		1					18.0		
Total		0.00	2.00	0.00	0.00	0.00	0.00	198.70	0.00	196.00
<b>Lois Ln.</b> Peak View - West End	At stop sign southwest corner of Lois & Peak View							28.0		
	Driveway of 3501 Lois									64.4
	At light pole by drainage							46.0		
	Spillway at drainage							36.0		
	Just west of spillway at drainage							49.6		
	Driveway of 3505 Lois									32.8
	±4' west of driveway at 3505 Lois							16.0		
	Just east of driveway at 3509 Lois							48.8		
	Driveway at 3509 Lois									32.8
	±8' west of driveway at 3509 Lois							49.2		
	±8' west of fire hydrant at 3515 Lois							14.0		
	Driveway at 3515 Lois									64.0
	Near mailbox at 3519 Lois							16.0		
	Driveway at 3519 Lois									64.8
	Driveway at 3525 Lois									67.2
	Near mailbox of 3529 Lois							16.0		
	Driveway at 3535 Lois									61.2
	Just north of driveway od 3535 Lois							16.0		
	±10' north of mailbox at 3535 Lois							16.0		
Total		0.00	0.00	0.00	0.00	0.00	0.00	351.60	0.00	387.20
<b>Lake Mary Rd.</b> Mohawk - Walapai	Southwest ramp @ Lake Mary/Mohawk		1					19.0		
	Just south of southwest ramp @ Lake Mary/Mohawk							90.0		
	At SB bus stop @ Lake Mary/Mohawk							52.5		
	Northern driveway @ 3955 Lake Mary									600.0
	Just south of northern driveway @ 3955 Lake Mary							26.0		
	At wooden utility pole @ 3955 Lake Mary							25.5		
	±25' south of wooden utility pole @ 3955 Lake Mary							25.5		
	±10' north of southern driveway @ 3955 Lake Mary							47.0		
	Southern driveway @ 3955 Lake Mary									125.0
	South end of southern driveway @ 3955 Lake Mary									48.8
	±10' south of southern driveway @ 3955 Lake Mary							27.0		
	±10' north of fire hydrant (north of driveway @ 4005 Lake Mary)							19.0		
	Just north of driveway @ 4005 Lake Mary							26.0		
	Driveway @ 4005 Lake Mary									123.5
	±10' south of driveway @ 4005 Lake Mary							21.5		
	At sign for 4005 Lake Mary (just south of curb inlet)							29.0		
	±12' north of "no parking/bike lane" sign (at high point of concrete retaining wall)							96.2		
	±20' north of concrete walkway @ 4025 Lake Mary							50.0		
	Just north of driveway @ 4025 Lake Mary (by utility pole)							55.0		
	Driveway @ 4025 Lake Mary									200.0
	±45' south of "no parking/bike lane" sign @ 4025 Lake Mary							50.5		
	In front of drain pipe w/ end section (@ 4025 Lake Mary parking lot)							27.0		



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

## **APPENDIX – E (MANHOLE QUANTITIES)**

Appendix E  
Manhole Quantities

Street	Improvement Location	Manhole Adjustment Total	Manhole Rebuild Number #	Lower Manhole Frame and Cover
Anita Ave.	Lake Mary Rd. - East End	2		1
Bonito St.	Elm St. - Navajo Rd. (north side)	2		5
Kaibab Ln.	Woodlands Village Blvd. - East End	5		1
Thorpe Rd.	Kinlani Rd. - Bonito St.	2		4
Woodlands Village Blvd.	Route 66 - Kaibab Ln.			1
Pinnacle St.	Route 66 - Kaibab Ln.	1		1
Walapai Dr.	Lake Mary Rd. - Zuni Dr.			18
Kaibab Ln.	Thompson St. - 850' East	2		1
Kaibab Ln.	Woodlands Village Blvd. - 900' West			3
Plaza Way	Yale St. - Milton Rd.			1
Forest/Cedar Ave.	Beaver St. (east side) - West St.	2		10
Chamber Dr.	Milton Rd. - Riordan Ranch Rd.			1
Metz Walk	Route 66 - Riordan Ranch Rd.	2		3
Lois Ln.	Peak View St. - West End	1		
Lake Mary Rd.	Mohawk Dr. to Walapai Dr.			9
Thompson St.	Kaibab Ln. - North End	5		
Total Contract Quantities		24	0	59

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

**APPENDIX – G (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