

– Accepting The Risks –

A Contractor's Perspective on Performance Specs

PWL Specifications

Southeastern States Pavement Conference

Embassy Suites – Charleston, WV

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PWL Specs

- **Developed in 2 Phases :**
 - **Phase 1 – Joint Density Spec.**
 - Gauge correlation to cores
 - Joint Densities from Gauges
 - **Phase 2 – New PWL Special Provision**
 - New specification
 - 8 New Material Procedures

November 29, 2012

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 401

HOT MIX ASPHALT BASE, WEARING AND PATCHING AND LEVELING COURSES

DELETE THE ENTIRE CONTENTS AND THE TITLE AND REPLACE THE FOLLOWING:

SECTION 401

ASPHALT BASE, WEARING, AND PATCHING AND LEVELING COURSES

401.1 DESCRIPTION:

This work shall consist of constructing one or more courses of hot mix asphalt (HMA), warm mix asphalt (WMA) mixed mechanically in a plant, composed of aggregate and asphalt material, designed in accordance with either the Marshall or Superpave Design System as specified in the contract documents, on a prepared subgrade in accordance with base specifications and/or concrete slab conditions, with the final surface, wearing or finishing, and cross sections shown on the Plans or established by the Engineer.

The work will be executed in accordance with these Specifications and the applicable requirements of Sections 106, 106, and 109.

401.2 MATERIALS:

The materials shall conform to the following:

11/29/12

MP 401.07.21
JANUARY 2015

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

GUIDE FOR QUALITY CONTROL AND ACCEPTANCE REQUIREMENTS FOR ASPHALT MIXTURES ON COMPACTED SUBGRADE AND OVER EXISTING PAVEMENT

1. PURPOSE

1.1 Provide a method for daily monitoring and quality assurance of Superpave and Marshall asphalt mixtures.

1.2 Provide guidelines for adequate acceptance plans.

1.3 Provide plans prepared with criteria upon which to base decisions of sampling or testing plan adjustment.

1.4 Provide test procedures with criteria upon which to base decisions of accepting or rejecting material.

1.5 Provide an establish and uniform method for determining compliance or non-compliance with project specifications, and establishing corresponding price adjustments.

2. SCOPE

2.1 This acceptance procedure shall be applicable to all large quantity Superpave and Marshall asphalt mixtures (open-graded or conventional) with and without fibers (fiber appearance limits, as specified in the governing specifications).

3. DEFINITIONS

3.1 Job Mix Formula – The specification for a single mix produced at a single plant. This may or may not be a single proportion or multiple proportions (mix design change orders (design composition limits and H₂O) under grade) or the same.

3.2 Lot – The amount of material that is to be judged acceptable or unacceptable on the basis of a sample composed of the specified number of test samples. The acceptance decision in this multiple proportion a nominal lot size is 7,500 tons (2750 Mg) unless operational conditions or project size dictate otherwise.

3.3 Sublot – Equal subdivisions of the lot used for statistical process sampling and testing. For the acceptance procedure, a nominal sublot size is 500 tons (450 Mg) unless operational conditions or project size dictate otherwise.

3.4 Test Design Verification System and Tests – Three samples taken and tests performed by the contractor to verify that a mix design can be produced in the

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MATERIALS PROCEDURE

SAMPLING COMPACTED ASPHALT MIXTURES FROM THE ROADWAY

1. PURPOSE

1.1 This procedure has been written to provide a means for sampling compacted roadway asphalt mixtures.

2. SCOPE

2.1 This method covers the procedure for sampling of asphalt pavements taken from the finished pavement for determination of the characteristics of the compacted mixture. Alternative methods of sampling may be found in AASHTO T-205.

2.2 Samples obtained using this method will be selected for several reasons including but not limited to the following:

2.2.1 Visual observation

2.2.2 Measurement for layer thickness

2.2.3 Determination of bulk specific gravity, air voids, and other volumetric properties.

2.2.4 Determination of bond strength between consecutive layers.

3. REFERENCED DOCUMENTS

3.1 Special Provision

Special Provision Section 401, Asphalt Base, Wearing, and Patching and Leveling Courses, original issue February 2012.

3.2 Materials Qualities

MP 401.07.21, Quality Control and Acceptance of Asphalt Mixtures

MP 401.07.21, Sampling of Asphalt Mixtures

MP 401.07.22, Measurement for Thickness of Asphalt Pavement, Original Issue 2012

MP 401.07.29, Infrared Nondestructive Strength of Multi-layered Asphalt Pavement

MP 401.15.51, Determination of Percent Wettable Limits

MP 401.07.22
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MATERIALS PROCEDURE

STANDARD METHOD OF MEASUREMENT FOR THICKNESS OF ASPHALT PAVEMENT USING DRILLED CORES

1. PURPOSE

1.1 Establish a test method for accurately measuring Asphalt Pavement cores for the determination of constructed thickness.

2. SCOPE

2.1 This procedure shall be applicable to all Marshall and Superpave mix base, wear and leveling courses.

3. REFERENCED DOCUMENTS

3.1 Special Provision Section 401, Asphalt Base, Wearing, and Patching and Leveling Courses, original issue February 2012.

3.2 MP 401.07.21 Sampling Compacted Asphalt Mixtures in the Field

3.3 MP 401.15.50 Determination of Percent Wettable Limits

3.4 MP 109.01.01 Rounding of Numbers

3.5 Section 401 of the Interiors Spot-Repairs, Routs and Repairs

3.6 MP 109.01.05 Guide for Subcontract Equipment Control for Evaluation and Investigation

4. EQUIPMENT

4.1 A steel rule of at least 12 inches or 300 mm in length graduated in millimeters. Ensure that the rule used is of sufficient length to measure from the top surface to the bottom of the layer or course.

5. MEASUREMENT PROCEDURE

5.1 Measure and record the thickness of the pavement layer to be evaluated to the nearest 0.1 millimeter. This measurement shall be taken from the top surface to the bottom of the layer or course.

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MATERIALS PROCEDURE

GUIDE TO DETERMINING INTERFACE BOND SHEAR STRENGTH OF MULTI-LAYERED ASPHALT PAVEMENT SPECIMENS

1. PURPOSE

1.1 To establish an approved method for determining the interface bond shear strength between layers of asphalt concrete pavement in core samples taken from the roadway.

2. SCOPE

2.1 This test method covers the determination of the interface bond shear strength between layers of asphalt concrete pavement in core samples of both Marshall and Superpave mixes.

2.2 This test method is applicable for cores obtained from both newly constructed and previously existing asphalt concrete pavements. It could also be used to determine the interface bond strength between asphalt concrete and concrete or portland cement concrete.

2.3 This test is applicable to all surface drainage courses that are not used for hot rubberized mixes.

3. REFERENCED DOCUMENTS

3.1 AASHTO 308-2006

• T 109, Standard Practice for Sampling Hot Mix Asphalt Paving Mixtures

• T 275, Standard Method of Test for Resilience to Traffic Pore of Concrete Mixtures Using Marston Apparatus

3.2 ASTM Standards

• D 6951, Test Method to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (for non-laminar specimens)

4. APPARATUS

4.1 Bond Test Device – The device used for the bond shear test shall be designed to accommodate shear transfer test specimens. The device shall have a metal cylindrical specimen holder (inner) and a metal specimen holder (outer) (bearing frame). The reaction frame shall have the capability to hold the specimen tightly against the inner holder. The shearing frame shall have built-in hydraulic rams for load and torque coupling bearings. The shearing frame shall have a spherical loading nose. The gas pressure hydraulic rams shall be capable of exerting 145 kN.

4.2 Loading Machine – The loading machine shall provide a uniform vertical movement of the rams per minute. The Marshall stability test apparatus or other mechanism or

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MATERIALS PROCEDURE

STANDARD TEST METHOD FOR MEASURING AVERAGE DEPTH OF FILL USING A VOLUMETRIC TECHNIQUE

1. PURPOSE

1.1 This procedure was created in order to aid in the determination of the degree of segregation or flushed asphaltic pavements. It is directly applicable to Special Provision 401, Sections 7.3 and 7.4.

2. SCOPE

2.1 This test method describes a procedure for determining the average depth of pavement surface macrotexture by careful application of a known volume of material (typically glass beads) on the surface and subsequent measurement of the total area and calculation of the average depth between the bottom of the pavement surface voids and the tops of surface aggregate particles. The technique is designed to provide an average depth value of only the pavement macrotexture and is considered insensitive to pavement microtexture characteristics.

2.2 The results obtained using this procedure to determine average pavement macrotexture depths do not necessarily agree or correlate directly with those obtained by other pavement macrotexture measuring methods.

2.3 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3.0 MATERIALS AND EQUIPMENT

3.1 The essential elements of the testing apparatus are shown in Fig. 1 and generally consist of the material and equipment discussed below.

3.1.1 Material – Solid glass spheres meeting the requirements for a Type 1 pavement marking bead as per AASHTO M 247, Standard Specification for Glass Beads Used in Pavement Markings.

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MATERIALS PROCEDURE

GUIDE FOR EVALUATION OF ASPHALT PAVEMENTS WITH SUSCEPTIBLE PROPERTIES

1. PURPOSE

1.1 Provide a consistent approach and checklist for use by contractor project personnel when evaluating asphalt pavement with susceptible properties and not in any subsequent decision.

1.2 Identify pavement factors and the removal of the pavement to avoid.

1.3 Verify, if it is applicable, the removal of the pavement to avoid.

2. SCOPE

2.1 This procedure shall be applicable to all newly placed Marshall and Superpave mix base layers and over-layers.

2.2 All items of construction involving quality assurance, and independent assurance monitoring and testing, shall conform to project specifications and methods, and applicable standards and defects in the finished mat shall be corrected when continuing any other required to correct the mat (e.g. place asphalt concrete). It is generally necessary to consider all factors when to determine the cause of pavement properties and measures addressed, and the doctor on standard areas that need to be corrected.

3. REFERENCED DOCUMENTS

3.1 Special Provision Section 401, Asphalt Base, Wearing and Patching and Leveling Courses, original issue February 2012.

3.2 104 Mix Annual Fielding (March 2006)

3.3 WVDOT 1004 Asphalt wear Resistance Protocol

3.4 WVDOT 1004A Contractor Manual

4.0 REVIEW OF PROJECT DOCUMENTATION

4.1 Procedures and guidelines for testing, recording data and analyzing any deficiencies or observations encountered in the Standard Specifications and Materials Procedures. These steps are generally followed and in most cases done jointly

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MATERIALS PROCEDURE

GUIDE TO STATISTICAL ANALYSIS OF MATERIAL USING QUALITY LEVEL ANALYSIS PERCENT WITH LIMITS

1.0 PURPOSE

1.1 The procedure described herein was developed in order to evaluate a set of test results and determine the Percent Within Limits (PWL) of the test results in accordance with Specification requirements.

2.0 SCOPE

2.1 This procedure is directly applicable to the Special Provision for Section 401 of the Standard Specifications, and the material is left to the contractor's discretion for Asphalt (pavement material as per the Special Provisions). Please note that the resulting values for PWL determined with this procedure are affected by errors in the test results mean and by the sample standard deviation.

2.2 The resulting PWL values determined using this procedure are to be used to calculate pay factors as per the corresponding parts of the Special Provision 401, Section 401.15 - Basis of Payment.

3.0 PROCEDURE

3.1 All sampling and testing shall be performed as recorded in the appropriate AASHTO, ASTM, and WVDOT Material Procedures as required. The PWL will be calculated when evaluating test results with a specification containing both upper and lower target values to which evaluating test results with a specification containing a single target value. Calculations will occur in accordance with the procedures provided within AASHTO M 30, Standard Method for Subcontract Sampling Plans for Aggregate Construction Using Box-Whiskers provided by MCA&I and used for laboratory analysis and documentation of test results.

PWL Specs

WVDOH

NO
WHEELS
HERE

NO
NEW
TECHNOLOGY

NO

Contractors

PWL Specs

WVDOH



Contractors

CHANGE IS BAD!!!

➤ Implementation & Follow Through:

- 2012 – 2 Projects – “Shadow Spec”
- 2013 – 9 Projects
- 2014 – 4 Projects
- 2015 – 11 Projects
- 2016 – 13 Projects
- 2017 – 12 Projects
- 2018 – 16 Projects
 - 9 – Multilane Projects
 - 7 – 2 Lane Projects

➤ Contractor's Response:

➤ 65 PWL Projects Awarded

➤ 7 Different WV Contractors

➤ 2 Out-Of-State Contractors

➤ Varying degrees of success

PWL Specs

➤ Common Perspective:

- **“Make it black and don’t look back.”**
- **“When it rains, pray it drains.”**

PWL Specs

➤ Common Perspective:

- “Make it black and don’t look back.”
- “When it rains, pray it drains.”

➤ Contractor's Perspective:

- **Want to get PAID – Focus on the pay factors**
 - **Field Density + % Asphalt + % -#200**
 - **Joint Density**
 - **Thickness**
 - **Bond Strength**

➤ Contractor's Perspective:

➤ Practice “Best Practices” in the Field

- More attention to milling process
- Proper tack application (**Bond Strength**)
- Delivery truck management
- Proper paving speed
- More attention to rolling patterns
- Focus on joints – laying enough material

➤ Contractor's Perspective:

➤ Practice “Best Practices” at the Plant

- More attention to stockpiling
- Proper calibrations & frequent checks
- Monitoring stockpile gradations
- Monitoring RAP
- Balancing plant production rate
- Continuous communication w/ Field

PWL Specs

➤ Contractor's Perspective:

➤ Going above and beyond

- Laying extra width on first pass to be trimmed off before paving second pass
- Targeting higher Asphalt Contents at the plant to aid in field compaction
- Laying 1/8"– 1/4" extra thickness
- Experimenting with different tack materials / application rates

PWL Specs

➤ Contractor's Perspective:

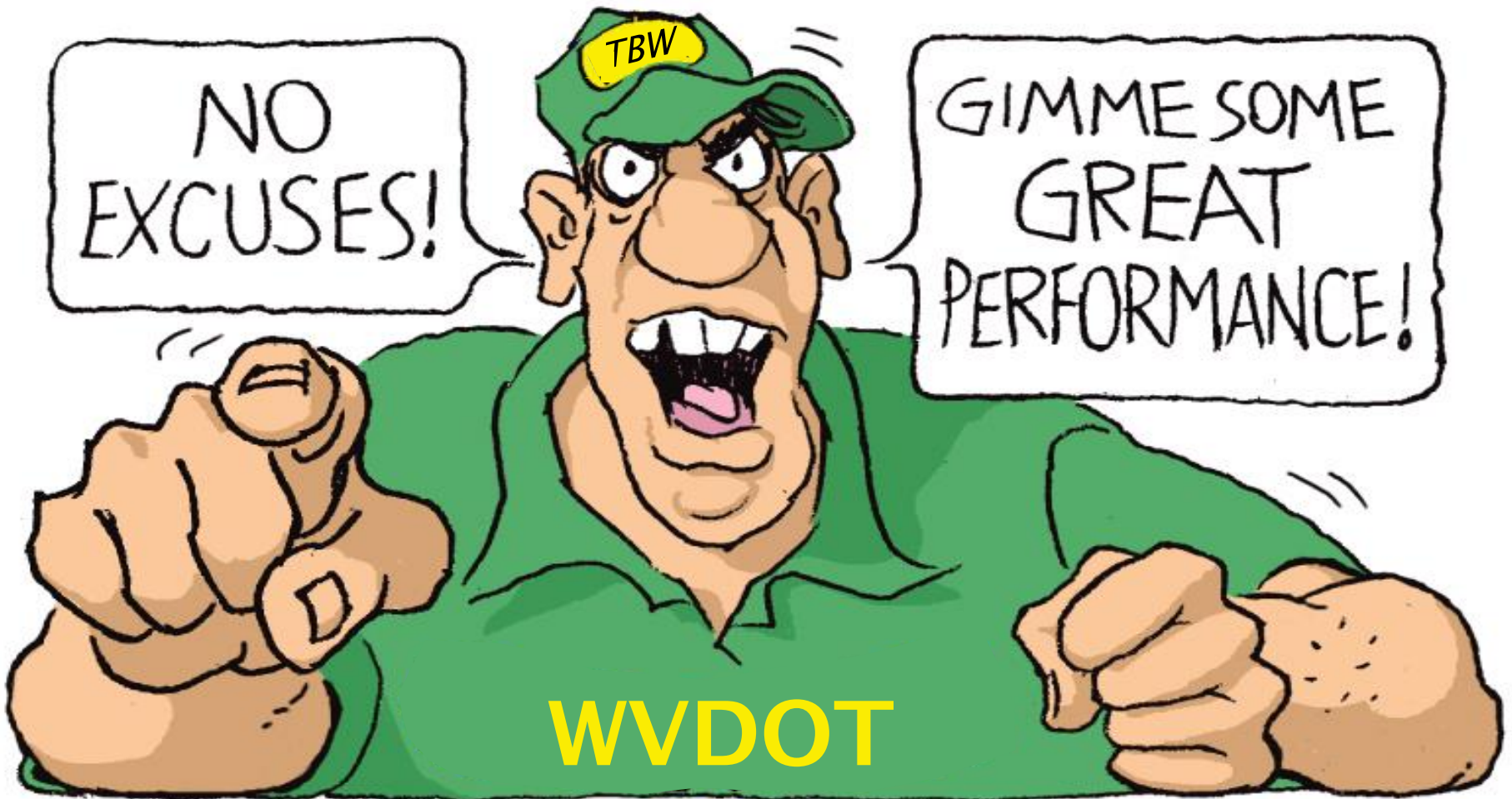
➤ **Consistency**

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➤ **Consistency**



Performance Management



➤ Accepting The Risks:

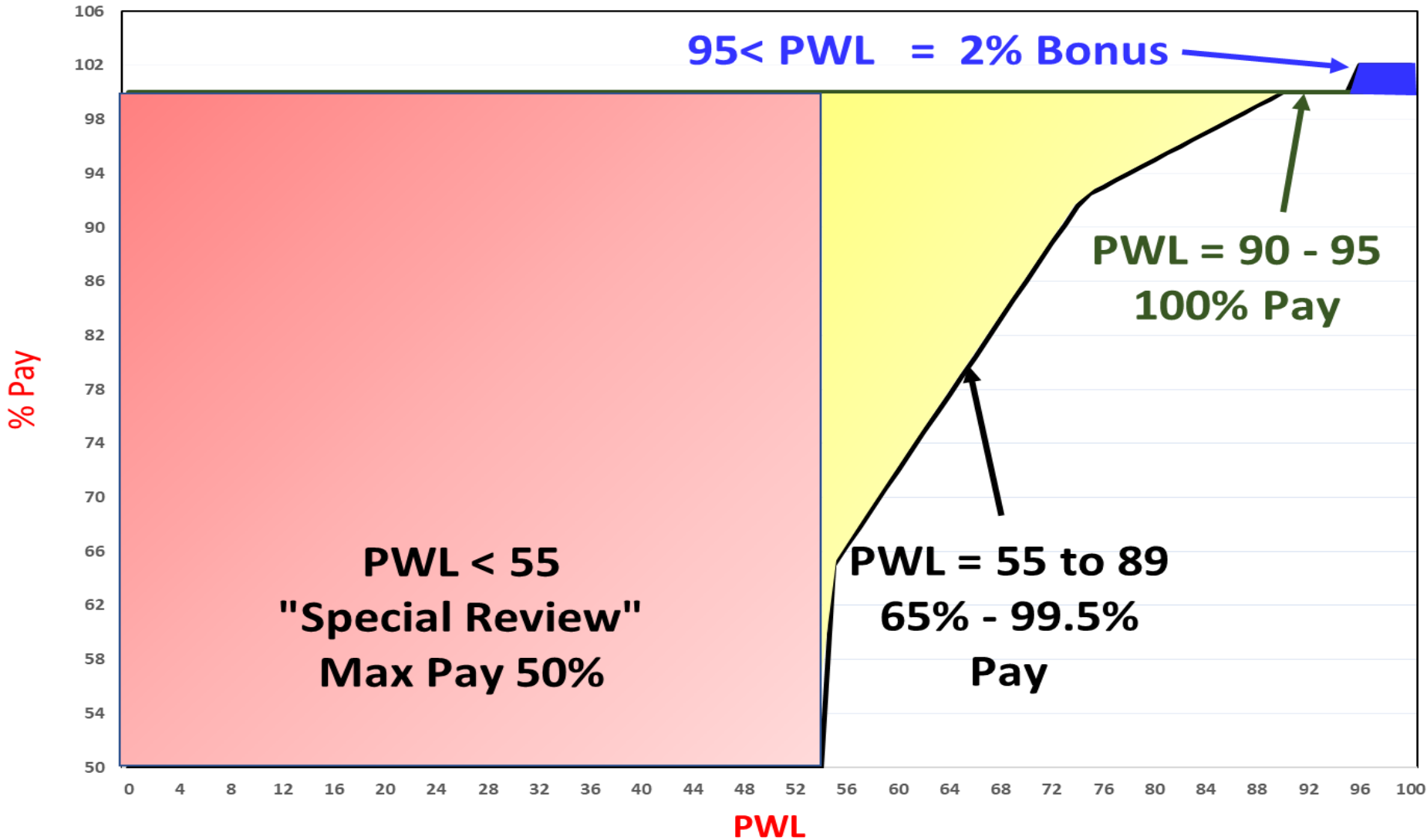
➤ End Results dictate pay on placed Asphalt

➤ Primary Pay Factor

(50%) Field Density + (25%) % AC + (25%) % -#200

PWL Specs

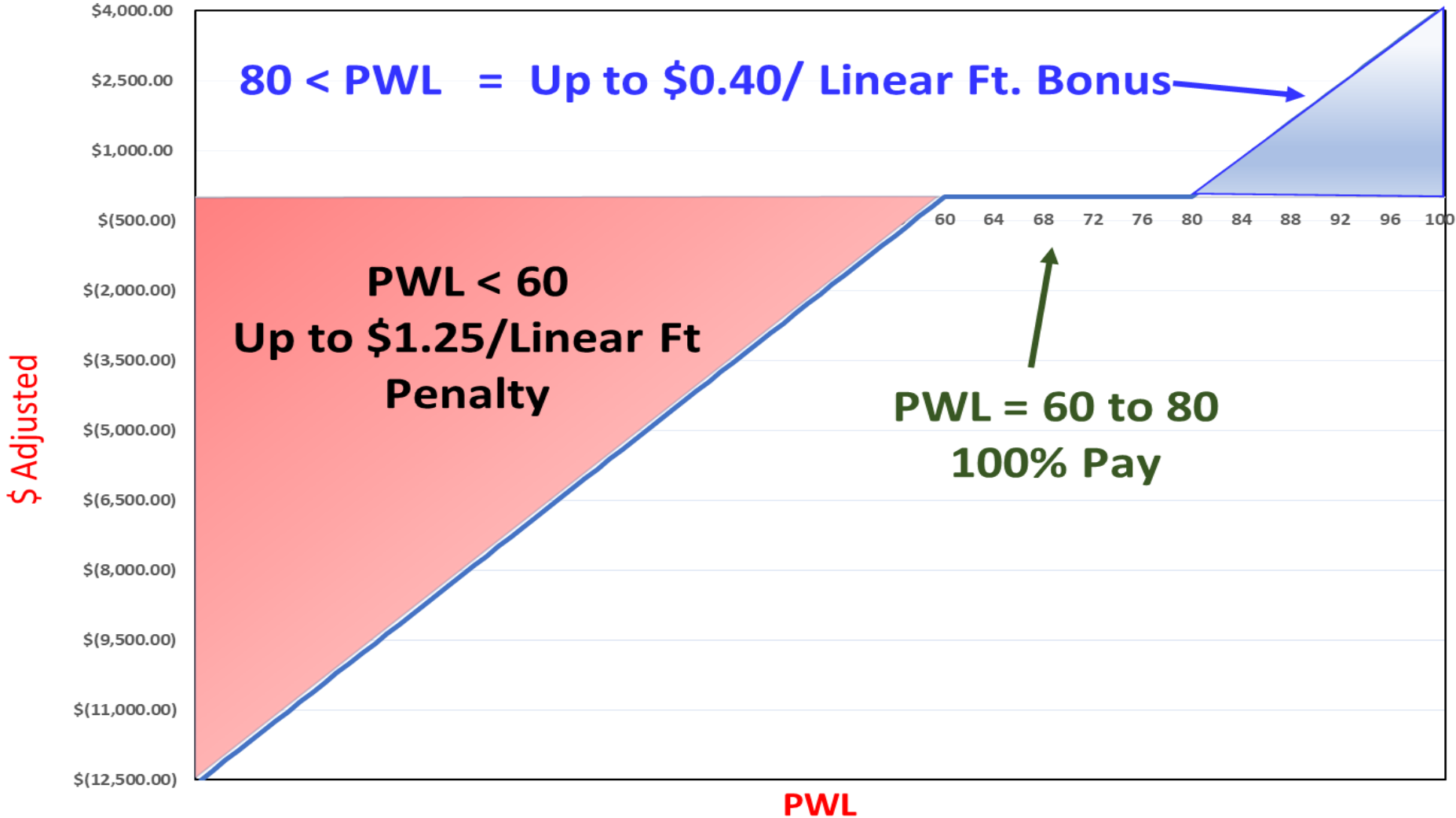
Pay Factor v/s Field Density/ %AC/ % -#200 PWL



- **Accepting The Risks:**
 - **End Results dictate pay on placed Asphalt**
 - **Secondary Price Adjustments**
 - **Joint Density**

PWL Specs

Incentive - Disincentive v/s Joint Density PWL

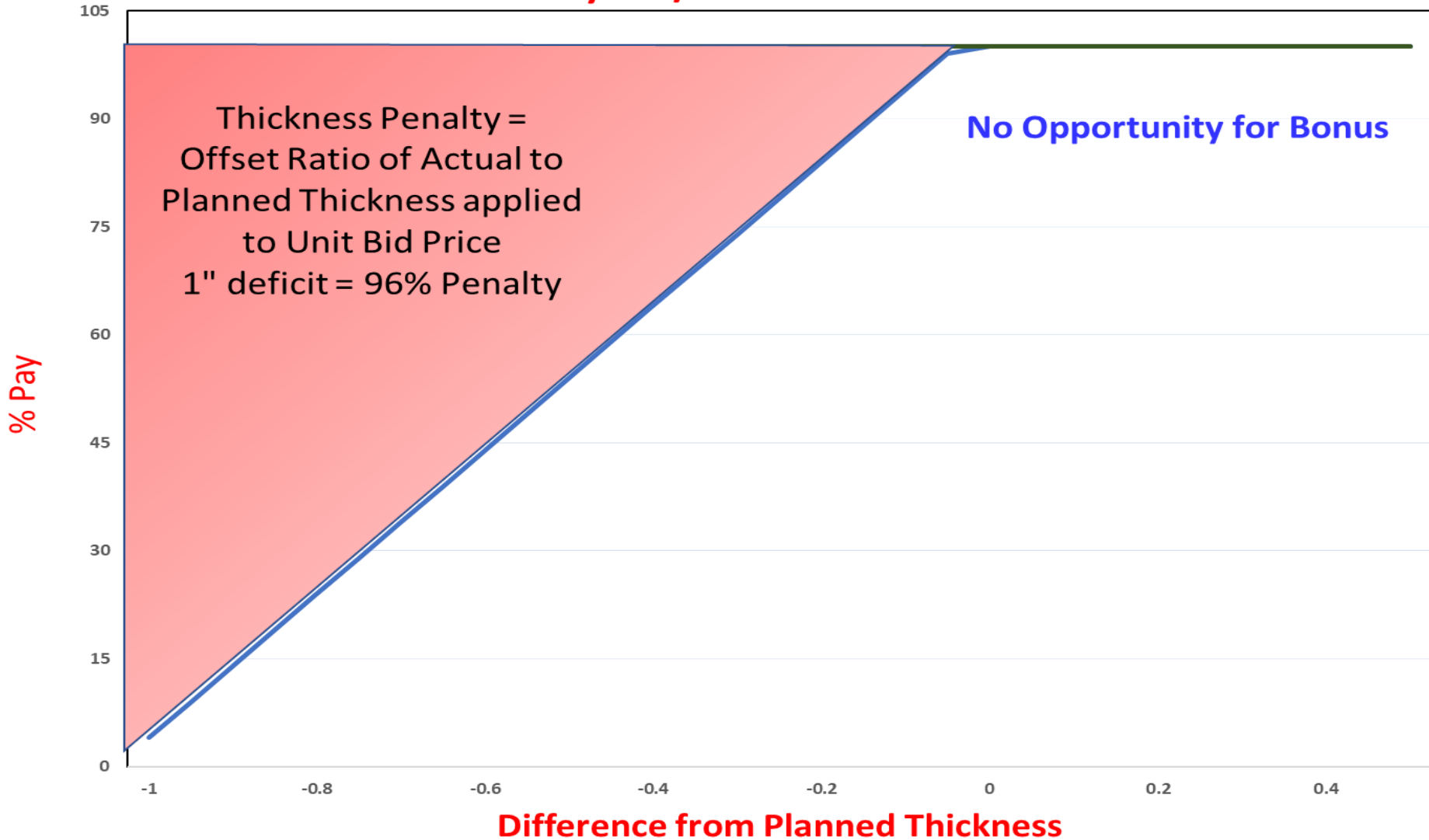


PWL Specs

- **Accepting The Risks:**
 - **End Results dictate pay on placed Asphalt**
 - **Secondary Price Adjustments**
 - **Joint Density**
 - **Thickness**

PWL Specs

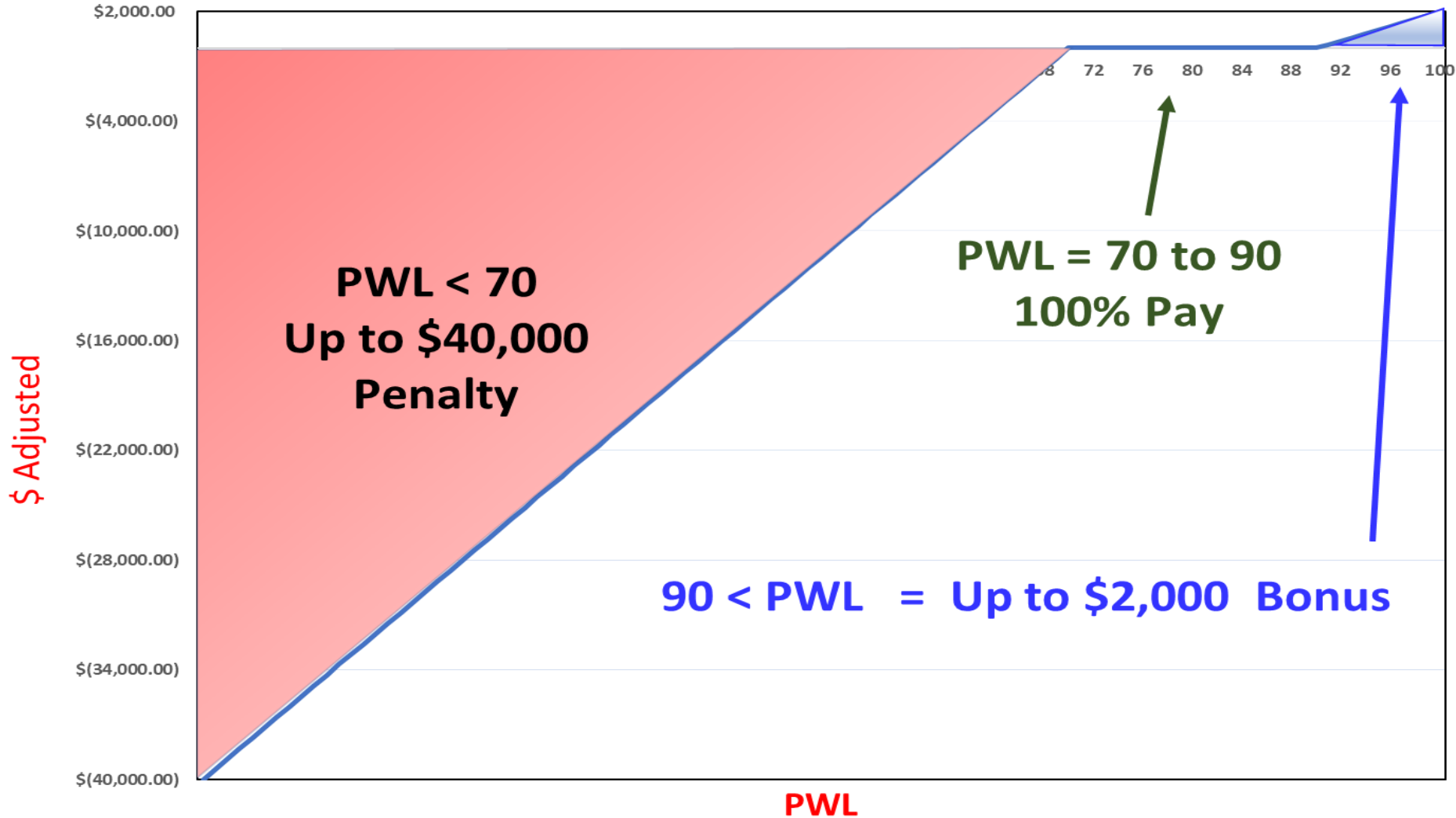
% Pay v/s Thickness



- **Accepting The Risks:**
 - **End Results dictate pay on placed Asphalt**
 - **Secondary Price Adjustments**
 - **Joint Density**
 - **Thickness**
 - **Bond Strength**

PWL Specs

Incentive - Disincentive v/s Bond Strength PWL



PWL Specs

➤ Contractor's Perspective:

➤ Things to Come:

- 2018 – First year for PWL on 2 Lane Roads
- 2019 – Bond Strength Penalty enforced
- ????? – PaveIR – Temp segregation Spec

PWL Specs

- **Summary – Contractor’s Perspective:**
 - **Good Things:**
 - **Attention to Detail / Consistency**
 - **Practices carry over to other jobs**
 - **Forces more Company–Wide Communication**

PWL Specs

- **Summary – Contractor’s Perspective:**
 - **Not-So-Good Things:**
 - **Our Risk v/s Reward needs balanced**
 - **Field variables hard to compensate for**
 - **Existing Subsurface Conditions**
 - **Composite Pavements**
 - **2 Lane Roads**

➤ Summary – Contractor’s Perspective:

➤ **Best Things:**

- From the original development, the Agency has worked with Contractors and have at least listened to our concerns / ideas.
- When situations arise in the field, we can generally discuss the issue immediately.

Questions ???



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