OS

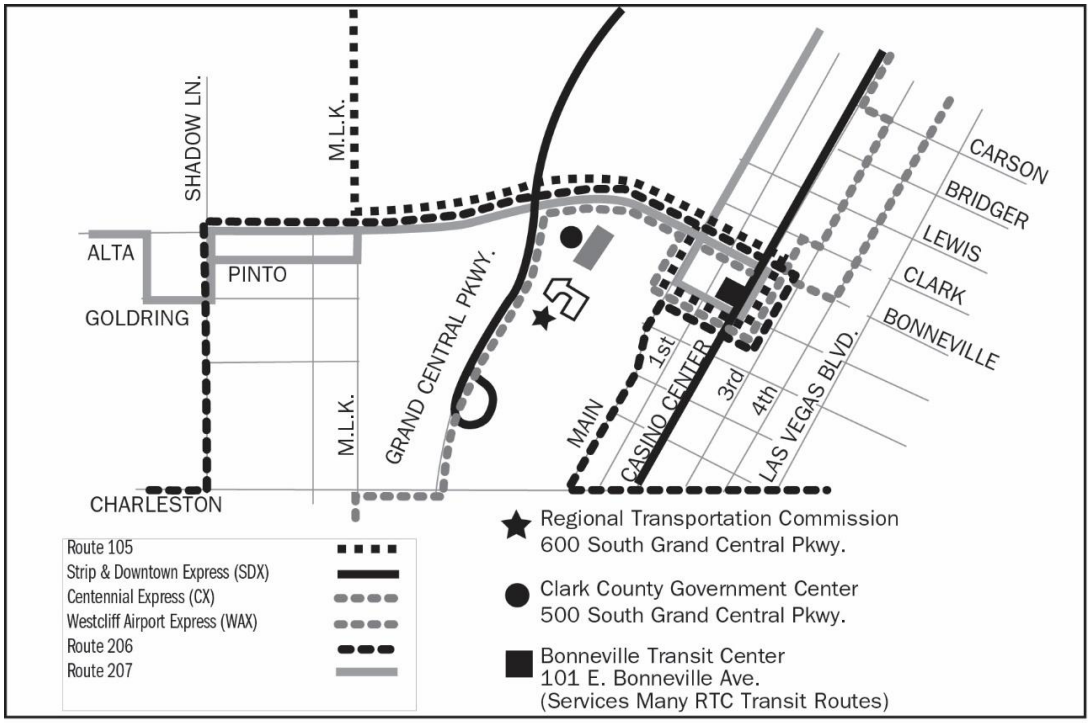
REGIONAL TRANSPORTATION COMMISSION
RTC
OF SOUTHERN NEVADA

NOTICE AND AGENDA OF PUBLIC MEETING

SPECIFICATIONS SUBCOMMITTEE

1:30 P.M. MARCH 11, 2020

RTC/RFCD ADMINISTRATION BUILDING
600 S. GRAND CENTRAL PARKWAY, ROOM 108
LAS VEGAS, NV 89106
(702) 676-1500



This agenda with full backup is available at the Regional Transportation Commission Administration Building, 600 S. Grand Central Pkwy, Las Vegas, Nevada; the Regional Transportation Commission's website, http://www.rtcsnv.com; or by contacting David Gloria at 702-676-1623.

THIS MEETING HAS BEEN PROPERLY NOTICED AND POSTED IN THE FOLLOWING LOCATIONS:

Clark County Government Center
500 S. Grand Central Pkwy.
Las Vegas, NV 89155

City of Henderson
Office of the City Clerk
240 Water Street
Henderson, NV 89015

CC Regional Justice Center
200 Lewis Ave.
Las Vegas, NV 89155

RTC
600 S. Grand Central Pkwy.
Las Vegas, NV 89106

RTC website
www.rtcsnv.com

Nevada Public Notice website
https://notice.nv.gov

BY: DocuSigned by: David Gloria 506E9A3EFE50461...

Specifications Subcommittee
Meeting Schedule
2020

Meeting Date	Deadline to Call Meeting
January 08, 2020	Scheduled Meeting
February 12, 2020	January 22, 2020
March 11, 2020	Scheduled Meeting
April 08, 2020	March 18, 2020
May 13, 2020	Scheduled Meeting
June 10, 2020	May 20, 2020
July 08, 2020	Scheduled Meeting
August 12, 2020	July 22, 2020
September 09, 2020	Scheduled Meeting
October 14, 2020	September 23, 2020
November 11, 2020	Scheduled Meeting
December 09, 2020	November 18, 2020

Items 2 through 4 are items for possible action. Items 1 and 5 through 7 are discussion items and no action can be taken. Please be advised that the Specifications Subcommittee has the discretion to take items on the agenda out of order, combine two or more agenda items for consideration, remove an item from the agenda or delay discussion relating to an item on the agenda any time.

1. CONDUCT A COMMENT PERIOD FOR CITIZENS PARTICIPATION

2. APPROVAL OF THE MINUTES: January 8, 2020 (FOR POSSIBLE ACTION)

3. APPROVE REVISIONS TO THE UNIFORM STANDARD SPECIFICATION SECTIONS 401 "PLANTMIX BITUMINOUS PAVEMENTS – GENERAL", 404 "HOT PLANTMIX RECYCLED BITUMINOUS PAVEMENT", AND 703 "BITUMINOUS MATERIALS" (FOR POSSIBLE ACTION)

4. APPROVE REVISIONS TO UNIFORM STANDARD DRAWINGS WITH RESPECT TO CURRENT ACCESSIBILITY BEST PRACTICES WITHIN THE RIGHT-OF-WAY (FOR POSSIBLE ACTION)

5. RECEIVE A REPORT REGARDING THE CURRENT STATUS OF REVISIONS TO UNIFORM STANDARD SPECIFICATIONS AND DRAWINGS

6. DISCUSS TOPICS OF INTEREST

7. CONDUCT A COMMENT PERIOD FOR CITIZENS PARTICIPATION

During the initial Citizens Participation, any citizen in the audience may address the Subcommittee on an item featured on the agenda. During the final Citizens Participation, any citizens in the audience may address the Subcommittee on matters within the Subcommittee's jurisdiction, but not necessarily featured on the agenda. No vote can be taken on a matter not listed on the posted agenda; however, the Subcommittee can direct that the matter be placed on a future agenda.

Each citizen must be recognized by the Chair. The citizen is then asked to approach the microphone at the podium, to state his or her name, and to spell the last name for the record. The Chair may limit remarks to three minutes' duration, if such remarks are disruptive to the meeting or not within the Subcommittee's jurisdiction.

The Regional Transportation Commission keeps the official record of all proceedings of the meeting. In order to maintain a complete and accurate record, copies of documents used during presentations should be submitted to the Recording Secretary.

The Regional Transportation Commission appreciates the time citizens devote to be involved in this important process.

In compliance with Nevada Revised Statute 241.035(4), the Regional Transportation Commission of Southern Nevada shall create an audio and/or video recording of the meeting and retain such recording(s) for the required period of time.

The Regional Transportation Commission Meeting Room and Conference Room are accessible to the disabled. Assistive listening devices are available for the hearing impaired. A sign language interpreter for the deaf will be made available with a forty-eight hour advance request to the Regional Transportation Commission offices. Phone: 702-676-1500 TDD: 702-676-1834

Any action taken on these items is an advisory to the Regional Transportation Commission.

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REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

AGENDA ITEM

Metropolitan Planning Organization [X]	Transit [ ]	Administration and Finance [ ]

SUBJECT: INITIAL CITIZENS PARTICIPATION

PETITIONER: M.J. MAYNARD, CHIEF EXECUTIVE OFFICER
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

RECOMMENDATION BY PETITIONER:
THAT THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA SPECIFICATIONS SUBCOMMITTEE CONDUCT A COMMENT PERIOD FOR CITIZENS PARTICIPATION

GOAL: MAINTAIN AND IMPROVE TRANSPORTATION SYSTEM INFRASTRUCTURE

FISCAL IMPACT:

None

BACKGROUND:

In accordance with State of Nevada Open Meeting Law, the Regional Transportation Commission of Southern Nevada Specifications Subcommittee shall invite interested persons to make comments. For the initial Citizens Participation, the public should address items on the current agenda. For the final Citizens Participation, interested persons may make comments on matters within the Specifications Subcommittee's jurisdiction, but not necessarily on the current agenda.

No action can be taken on any matter discussed under this item, although the Specifications Subcommittee can direct that it be placed on a future agenda.

Respectfully submitted,

DocuSigned by:
Joseph Damiani for
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JOHN R. PEÑUELAS, JR., P.E.
Senior Director of Engineering

SPECS Item #1
March 11, 2020

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MINUTES
SPECIFICATIONS SUBCOMMITTEE
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA
JANUARY 8, 2020

These minutes are prepared in compliance with NRS 241.035. Text is in summarized rather than verbatim format. For complete contents, please refer to meeting recordings on file at the Regional Transportation Commission.

THIS MEETING WAS PROPERLY NOTICED AND POSTED IN THE FOLLOWING LOCATIONS ON DECEMBER 30, 2019

Clark County Government Center 500 S. Grand Central Pkwy. Las Vegas, NV 89155	City of Henderson Office of the City Clerk 240 Water Street Henderson, NV 89015	CC Regional Justice Center 200 Lewis Ave. Las Vegas, NV 89155	RTC 600 S. Grand Central Pkwy. Las Vegas, NV 89106	RTC Website www.rtcsnv.com Nevada Public Notice https://notice.nv.gov

CALL TO ORDER

Mr. Lance Olson, called the meeting to order at 1:32 p.m. in Meeting Room 108 of the Regional Transportation Commission Administration Building.

MEMBERS PRESENT:
Lance Olson, Chair, City of Henderson
Jeremy Leavitt, Vice-Chair, City of Las Vegas
Brandon Bentley, City of Mesquite (via telephone)
Tom Brady, City of North Las Vegas
Jimmy Floyd, Clark County Public Works
Jim Keane, City of Boulder City
Abi Mayrena, Clark County Regional Flood Control District (Non-voting)

MEMBERS ABSENT:
Jody Belsick, Commercial Real Estate Development Association (Non-voting)
Michael Cuddy, Southern Nevada Home Builders Association (Non-voting)
Mario Gomez, Nevada Department of Transportation (Non-voting)
Andy Michalsky, Nevada Contractors Association (Non-voting)

RTC STAFF:
Joe Damiani, Manager of Engineering
Julia Uravich, Senior Project Engineer
Chris Schwarz, Project Engineer
David Gloria, Administrative Specialist
Salma Flores, Office Specialist

INTERESTED PARTIES:
Mark Bliss, CalPortland
Matt Bliss, Aggregate Industries
Jared Englehart, Aggregate Industries
Greg Hunt, Ergon Asphalt & Emulsions
Joshua Mendenhall, Las Vegas Paving Corporation
Jim Ray, Aggregate Industries
Sean Stewart, Nevada Contractors Association
Thomas Van Dam

Item:
1. CONDUCT A COMMENT PERIOD FOR CITIZENS PARTICIPATION

Comments:
No comments were made.

Motion:
No motion was necessary.

Vote/Summary:
No vote was taken.

Item:
2. APPROVAL OF THE MINUTES: October 09, 2019 (FOR POSSIBLE ACTION)

Comments:
No comments were made.

Motion:
Mr. Jim Keane, City of Boulder City, made a motion to approve the minutes.

Vote/Summary:
6 Ayes. 0 Nays. The motion carried.
Ayes: Brandon Bentley, Tom Brady, Jimmy Floyd, Tom Hayes, Jim Keane, Lance Olson
Nays: None
Absent: None

Item:
3. APPROVE REVISIONS TO THE UNIFORM STANDARD SPECIFICATION SECTIONS 401 "PLANTMIX BITUMINOUS PAVEMENTS – GENERAL", 404 "HOT PLANTMIX RECYCLED BITUMINOUS PAVEMENT", AND 703 "BITUMINOUS MATERIALS" (FOR POSSIBLE ACTION)

Comments:
Mr. Jimmy Floyd, Clark County Public Works, explained that this revision involved moving away from the existing asphalt grading criteria, asphalt cement grade (AC), to a performance grade (PG) that could be applied uniformly across commercial and residential roadways.

Chair Lance Olson, City of Henderson (Henderson), stated that Henderson staff held working groups along with various entities to get input, noting there might be some variables yet to change. He asked when these changes could occur, if necessary. Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), replied that the process involves the Specifications Subcommittee (Subcommittee) approving revisions, sending the revisions out for industry review, and then getting approval of the Executive Advisory Committee (EAC). It can then be brought back to the Subcommittee to address any comments or changes that need to be looked at.

Chair Olson mentioned that he would like to read in several of the most substantive changes for the record. Mr. Floyd spoke to provide a rundown of the changes, which included the following:

- Under Uniform Standard Specification (Specification) 401.02.04 "Bituminous Materials," Section B, Mr. Floyd requested to strike "An AC-30 or AC-20P asphalt cement shall be used for open-graded mixes as specified in Subsection 403.02.02, "Composition of Mixture."
- Strike Section B of Specification 401.03.05 "Weather Limitations"
- Specification Section 703, Table 2A - Performance Grade For Original Materials
  - For "Ductility at 4°C, 5 cm/min. cm – minimum" under the column "PG 70-22CC Modified," strike "30" and put "N/A."

- As well as column "PG 70-10 and PG 64-22," strike "30" and put "N/A."
- For "Elastic Recovery at 4°C, percent (%) – minimum" under column "PG 70-22CC Modified," strike "30" and put "N/A."

Mr. Tom Brady, City of North Las Vegas, asked about the cases where there was still open grading. Mr. Floyd replied that it was not the standard, but exceptions could be used if necessary.

Chair Olson mentioned that the polyphosphoric acid for PG mixes would be limited to a half percent. He suggested this point be added to a footnote. Mr. Floyd suggested language for this note:

- Add section 703.03.08, label it "Polyphosphoric Acid," Section A shall read: "Use of polyphosphoric acid shall not exceed half percent by max"

From there, Chair Olson opened the floor to public comment. Mr. Greg Hunt, made the first comment:

Greg Hunt, with Ergon Asphalt and Emulsions. The question I had is, can the suppliers, agency, whatever, get a copy of that in writing? Not just the changes to it, but also the spec itself. Can we get that after this meeting for review?"

Mr. Damiani briefly explained the approval process, stating that revisions would be available during the industry review stage, also noting that the information is a public record and can be accessed on the RTC's website. Ms. Julia Uravich, Senior Project Engineer for the RTC, said that it was possible to subscribe to the website and receive notifications on the status of changes.

Mr. Brady then asked about specification section 401.01.02, noting that current City of North Las Vegas (North Las Vegas) policy requires independent design on all projects. The language in this specification does not conflict with this, but he suggested adding an exception for agency approvals for the jurisdiction, as the requirements exceeded the minimum noted in the specification. Mr. Damiani stated that his goal was to get these types of regional specifications out of the standard drawings, but that for now, Mr. Brady could potentially add a note stating that designs would need to be submitted independently to North Las Vegas. However, Chair Olson stated that, in his opinion, this language does not belong in the standard specification. The Subcommittee members deliberated the matter further before deciding to continue the conversation at a future meeting.

Next, Chair Olson called on Mr. Matt Bliss, who made the following comment:

Matt Bliss, Aggregate Industries. Considering the half percent PPA spec to be added in there for this oil, would we be removing that one percent polymer requirement or putting it in either or. Like one percent polymer added or no more than .05 percent PPA added.

Chair Olson responded that the requirements were standalone.

Mr. Bliss, made the following comment:

Okay. Because it's our understanding that just that one percent polymer content would exclude some suppliers. It would exclude the use of a neat oil that would meet those specifications.

Chair Olson agreed that some suppliers may not have the ability to add polymer, but based on his research and conversations, there is desire to have polymer added to prolong the life of the pavement.

Adding polymer after the fact would not be the same, though he is open to further conversations. He also noted the timetable on these changes, asking when these changes would be phased in. Mr. Damiani replied that enforcement could begin on a pre-determined date that would be included in the specification revision.

Mr. Brady asked if the intent was to phase these changes in with the next round of 2021 Inter-Agency Quality Assurance Committee approvals. Chair Olson said that idea had been suggested, though this may change. Mr. Damiani pointed out that the earliest these revisions could be approved is at the RTC Board of Commissioners meeting in May 2020.

Motion:

Chair Lance Olson, City of Henderson, made a motion to approve with changes as discussed and send the revisions to industry review.

Vote/Summary:

6 Ayes. 0 Nays. The motion carried.
Ayes: Brandon Bentley, Tom Brady, Jimmy Floyd, Tom Hayes, Jim Keane, Lance Olson
Nays: None
Absent: None

Item:

4. APPROVE REVISIONS TO THE UNIFORM STANDARD SPECIFICATION SECTIONS 501 "PORTLAND CEMENT CONCRETE", 702 "CONCRETE CURING MATERIALS AND ADMIXTURES", AND 729 "FLY ASH" (FOR POSSIBLE ACTION)

Comments:

Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), stated that Mr. Mark Bliss, CalPortland, had reached out to the RTC, wanting to see some changes in these Uniform Standard Specifications. He said that the Specifications Subcommittee (Subcommittee) would hear Mr. Bliss' proposed changes and then act accordingly.

Chair Lance Olson, City of Henderson, opened the floor to public Comment. Mr. Mark Bliss made the first comment.

Mark Bliss with CalPortland. Hello again. The reason for this request really is twofold. What we've got is a diminishing supply that we're dealing with with Fly Ash. For some of you that may not know, Fly Ash is a byproduct of burning coal. The smoke can't go up in the smoke stack, so they clarify it, it's gray, we use it in concrete because it's got a high percentage of silicon dioxide. So it's a product we use. The problem right now is we're dealing with sources that are either, one, shutting down, or two, they're switching over to gas-fired power. So what we're dealing with, Page Arizona supplied probably 90-95% of the Fly Ash. They shut down permanently in November. And we switched to three different sources that is marketed, we're pulling one of the sources, we're pulling Fly Ash out of Delta, Utah. That source is switching to gas power within the next two to three years, so that will no longer be a Fly Ash source available.

Four Corners, New Mexico is also a source. They have a terminal there that blends from two different coal generating facilities, and one of those sources is also going to be shutting down within two to three years, switching over to gas fire power. The terminal, there is a terminal in Pomona, California, they're currently pulling Fly Ash from Bridger, Wyoming, and they're blending it with some Delta, and that source is nearly dedicated to the Los Angeles market, so we don't really bother to send trucks there, because they'll just tell us, "We can't load you."

So, what's happening is, we've taken our market and we're moving it out, and now in a couple years, we're moving it further out. So the request to add a Class C Fly Ash, which the requirements only call for a Class F, to add a Class C as an available Fly Ash, and a Class N, which is a natural pozzolan, are my requests so that we have additional material sources that we can use, and these are also, this also puts, as a request, puts the county specification more in line with what NDOT specification is also. Because NDOT specifies in basically one sentence, class F Fly Ash, which is what we use, but they also say class C and Class N, natural pozzolan.

So right now, that'd put us more in line with NDOT, and we do have crossover issues, when we do permit work or large contract work, it's typical for poor foreman to do areas that are county, and then they wind up using the same mix, and if that mix has, for example, a natural pozzolan in it, I can see where that would be a serious conflict, or a class C Fly Ash. That'd be in direct conflict with the Clark County standards. So, we're looking to expand that. These are all covered by the requirements of ASTMC 618, which also includes Class F, so we're just looking to expand that, and again, be more in line with NDOT, and at the same time, we're gonna have to keep reaching further and further and further out to bring Fly Ash in because it's mandated that we put it in the concrete, and it's used as a replacement cement, so that requirement is to meet the durability requirements that the county has, that NDOT has, and pretty much the FAA and any other agencies in the southern part of the state. So, we have to use it, but it's becoming more and more limited for use.

Mr. Sean Steward, Nevada Contractors Association, asked if the standard proposed by Mr. Bliss matches NDOT's current standards.

Mr. Bliss: *It does. And then I'm looking to change some of the verbiage where it says "just Fly Ash" to "pozzolan" because pozzolan is just kind of the blanket, and it all refers back to ASTMC 618, which is the certification for each individual material, so there's chemical requirements, and there's physical requirements, and yes, it would align with NDOT.*

Mr. Damiani said that these revisions were based on Mr. Bliss's recommendations and ready for review and approval.

Mr. Thomas Van Dam made the following comment:

My name's Tom Van Dam, a consultant with NCE in town, I'm a licensed professional engineer in the state, I am also very involved with concrete durability, and so that it is my concern today. Former Chair of ACI 201, which is Durability of Concrete Committee. I'm also a voting member of the Natural Pozzolan Committee at ACI. I'm also a consulting member of the Fly Ash Committee, a voting member, but I rolled off of that because I'm now on the Technical Activities Committee at ACI. So my background, I don't have a dog in the fight other than the fact that my concern is durability.
We are in this area using Class F Fly Ash to mitigate two specific types of durability problems. One is sulfate attack from the sulfates in the soil; the second is alkali-silica reactivity. And that would be on a case-by-case basis, depending on the aggregate source. Class F Fly Ash is very, very effective at mitigating those two distresses. So, at a 20 percent minimum amount, you will mitigate alkali-silica reactivity, and you'll typically mitigate sulfate attack. We have not had any problems.

Class C Fly Ash, on the other hand, will not mitigate sulfate attack. That is stated specifically in the ACI documentation. Class C Fly Ash will typically make ASR worse up to a pessimum limit of 10 percent, 12 percent, at which case, it can start to mitigate, but you typically need a much higher amount of C Ash. Class F, Class N, natural pozzolans, are all over the board. I could take a Class N pozzolan

out of California; it is inert. It is chemically inert; it's rock flower. I could take another source I know in Arizona, highly effective pozzolan. Pozzolanicity refers to a reactivity between the material and the calcium hydroxide within the concrete. So, I am a huge believer in using these materials. My expertise and my involvement shows that I want to see us use more and more and more of these materials. It's a great thing to do.

But we want to, if we just remove the requirement for F, and make it F, C, and N, without adding performance requirements regarding sulfate attack, and alkali-silica reactivity, we may find ourselves with a lot of durability problems in this market. And I have a lot of data I brought if anybody wants to sit down around a cocktail and we can bring on more four-syllable words for Tom, that's five, that's awesome man, make you very exciting at the next dinner party.

And so that's my concern. I think it's something that we want to do, and there is one other note that the spec, as written, right after, under the section 729 Fly Ash, the 729.02.01 requirement, where you would change it to allow for Class C, item two is a sulfate resistance factor R. Under that requirement there's no C Ash that I know of that will pass. C ashes don't even come close. So, you'd still be keeping C ashes out of the market if you keep in that item too. Half ash is typically passed, I don't know of any C ashes that pass or could pass. So, thought I would add that as well. Thank you.

Next, Mr. Bliss made the following comment:

One of the things to consider is that section 706, in the aggregate section, requires submitting ASR mortar bar tests. So, if you specify a material to meet 618, even with the current Fly Ash, you may not meet that. You have to meet the expansion limits by passing the mortar bar tests that are required under 706, so if the specification, for example, were to stand, when I submit my concrete mixes, I have to turn in the T-303 mortar bar test, and they have to fall in under the point one percent expansion. If they don't, I can't submit you concrete mixes with those materials because it's in your own spec.

Chair Olson noted the complexities of these issues and said that a separate working group might need to convene to review some of these concerns.

Then, Mr. Bliss made the following comment:

Like you said, there's two durability issues. There is ASR, alkali-silica reactivity with the aggregates, and we don't really have a problem with highly reactive aggregates out there, but that's for that test; then there's sulfate attack. There's nothing in your specs anywhere that really lists a requirement or a test for sulfate. There are tests that the industry uses, but there's nothing in the specs other than to use 20 percent Fly Ash, but there is an ASR reactivity test, which is the T-303s, so that just accelerates the alkali-silica reactivity, which expands, it breaks apart the concrete. If you go down to the dam, that concrete wall, you can see the ASR attack there. It's these large, darkened kind of pattern type cracking. But that test is used for you to identify if there's going to be some potential reactivity, and I have to submit that when I turn my concrete mixes in for approval and listening to the IAQAC list. So I'm just letting you know, and one of the things that, and him and I can argue about this, but with sulfate attack, it's what, what we've seen, it's more of a permeability issue, the permeability of the concrete, when you place concrete, it's plastic. The heavy ingredients settle, and it bleeds and it creates these little microscopic channels. Fly Ash lowers the permeability. It lowers bleed so there's less ability for the water with sulfates to go into solution when there's water, to integrate into the concrete. So, Fly Ash is essentially just lowering the permeability. We can do that with any kind of a Fly Ash. We can do that with a Class C, we can do that with a Class F.

Mr. Damiani noted that some of these issues were not imminent concerns and suggested tabling further discussion until the Subcommittee can gather a panel of experts to detail the matters further. Chair Olson agreed, stating that Subcommittee members could continue the discussion after a deeper review of the proposed changes.

Continuing, Mr. Bliss made the following comment:

Okay. But we are going to wind up moving forward, at least with some of our NDOT mixes, and basically to start with, we've got a natural pozzolan source. There's a new one out in Mojave, and natural pozzolan just means they're digging it out of the ground. It doesn't come from burning coal. There is a source out there, it looks like it's going to be ready; we're going to get some in a silo and we are going to begin testing it, and based on our results, we would like to get some NDOT mixes approved using that. And at the same time, we're starting the conversation with the RTC here to look at our specs.

Motion:
Mr. Jimmy Floyd, Clark County Public Works, made a motion to hold the item for a future Specifications Subcommittee meeting.

Vote/Summary:
6 Ayes. 0 Nays. The motion carried.
Ayes: Brandon Bentley, Tom Brady, Jimmy Floyd, Tom Hayes, Jim Keane, Lance Olson
Nays: None
Absent: None

Item:
5. APPROVE REVISIONS TO UNIFORM STANDARD DRAWINGS WITH RESPECT TO CURRENT ACCESSIBILITY BEST PRACTICES WITHIN THE RIGHT-OF-WAY (FOR POSSIBLE ACTION)

Comments:
Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), detailed that this item involved reviewing the next batch of drawing revisions to the Uniform Standard Drawings related to Public Access Right-of-Way Accessibility Guidelines (PROWAG), including minor notes and discontinuities. The January 2020 Operation Subcommittee meeting will have a majority of other PROWAG drawings, including ramps and driveways. Mr. Damiani pointed out several of these revisions.

Drawing 332 "Service Pedestal Foundation Street Lighting And/Or Traffic Signal"
Mr. Damiani described that this is a combination of two revisions, one of which involved adding additional conduits into the foundation to meet PROWAG, as well as adding a new sheet that showed a plan view schematic of what the foundation should look like. Also, per previous discussion, the revisions include removing the design criteria notes for electrical requirements.

From there, RTC staff recommended that these revisions be sent off to the Executive Advisory Committee (EAC) for approval.

Chair Lance Olson, City of Henderson, asked about Drawing 320, "Lighting Standard Setback", and the asterisk in the note, questioning what the asterisk meant. Ms. Julia Uravich, Senior Project Engineer for the RTC, replied that the asterisk referred to a detail on the four-foot minimum measurement and that the explanation was included in the drawing. Chair Olson agreed that it was there, but mentioned that it

was hard to see. Mr. Damiani agreed and said RTC staff would move the description to a more visible area.

Mr. Jim Keane, City of Boulder City, commented on the references of 4-foot versus 48-inches and whether those could be the same for consistency purposes. He also pointed out a missing figure on the taper reference on Drawing 332.

Then, Chair Olson remarked on Drawing 332, referring to the wireless box, noting that the City of Henderson would be getting a separate power source and would not be using the specification in its current format. He also brought up the conduit on Sheet 2, asking if there would be another one specifically for the street light bases. Mr. Damiani said there had been some issues with those, noting that these were for specialty poles.

Mr. Jimmy Floyd, Clark County Public Works, referred back to Drawing 332, Sheet 2, suggesting a change to the verbiage to reflect that different jurisdictions are using multi-strand and single strand copper. Adding "or" would help improve consistency. Mr. Floyd also mentioned another note that referenced Grounding Plate Per NEC 250-83, noting it should specify 20 feet of #4 bare copper.

Motion:
Mr. Jimmy Floyd, Clark County Public Works, made a motion to follow staff recommendation.

Vote/Summary:
6 Ayes. 0 Nays. The motion carried.
Ayes: Brandon Bentley, Tom Brady, Jimmy Floyd, Tom Hayes, Jim Keane, Lance Olson
Nays: None
Absent: None

Item:
6. RECEIVE A REPORT ON THE CURRENT STATUS OF SPECIFICATIONS AND DRAWINGS

Comments:
Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), mentioned that if any Specifications Subcommittee members had questions or comments to add to make the review process more beneficial, RTC staff would like to hear them.

Motion:
No motion was necessary.

Vote/Summary:
No vote was taken.

Item:
7. DISCUSS TOPICS OF INTEREST

Comments:
No comments were made.

Motion:
No motion was necessary.

Vote/Summary:
No vote was taken.

Item:
8. CONDUCT A COMMENT PERIOD FOR CITIZENS PARTICIPATION

Comments:

No comments were made.
Motion: No motion was necessary.
Vote/Summary: No vote was taken.

ADJOURNMENT

The meeting adjourned at 2:26 p.m.

Respectfully submitted,

DocuSigned by:
David Gloria
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David Gloria, Recording Secretary

DocuSigned by:
Marek Biernacinski
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Marek Biernacinski, Transcription Secretary

REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

AGENDA ITEM

Metropolitan Planning Organization [X]	Transit [ ]	Administration and Finance [ ]
SUBJECT: STANDARD SPECIFICATIONS AND DRAWINGS		
PETITIONER: M.J. MAYNARD, CHIEF EXECUTIVE OFFICER REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA		
RECOMMENDATION BY PETITIONER: THAT THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA SPECIFICATIONS SUBCOMMITTEE APPROVE REVISIONS TO THE UNIFORM STANDARD SPECIFICATION SECTIONS 401 "PLANTMIX BITUMINOUS PAVEMENTS – GENERAL", 404 "HOT PLANTMIX RECYCLED BITUMINOUS PAVEMENT", AND 703 "BITUMINOUS MATERIALS" (FOR POSSIBLE ACTION)		
GOAL: MAINTAIN AND IMPROVE TRANSPORTATION SYSTEM INFRASTRUCTURE		

FISCAL IMPACT:

Not determined

BACKGROUND:

At the April 11, 2018 Specifications Subcommittee (Subcommittee) meeting, a presentation on the testing specifications of liquid asphalt prompted the discussion by the Subcommittee members regarding the use of Performance Grade 70-16 (PG 70-16) instead of Asphalt Cement (AC-30). The referenced sections are included for review and approval.

Respectfully submitted,

DocuSigned by:
Joseph Damiani for
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JOHN R. PEÑUELAS, JR., P.E.
Senior Director of Engineering

SPECS Item #3
March 11, 2020

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Regional Transportation Commission

AGENDA ITEM DEVELOPMENT REPORT

Agenda Item Recommendation (as submitted):
APPROVE REVISIONS TO THE UNIFORM STANDARD SPECIFICATIONS SECTIONS 401, "PLANTMIX BITUMINOUS PAVEMENTS – GENERAL," 404, "HOT PLANTMIX RECYCLED BITUMINOUS PAVEMENT," AND 703, "BITUMINOUS MATERIALS" (FOR POSSIBLE ACTION)

Agenda Item Requestor: Regional Transportation Commission

Meeting Date: 1/8/2020	Specifications Subcommittee

Discussion:
Comments:
Mr. Jimmy Floyd, Clark County Public Works, explained that this revision involved moving away from the existing asphalt grading criteria, asphalt cement grade (AC), to a performance grade (PG) that could be applied uniformly across commercial and residential roadways. Chair Lance Olson, City of Henderson (Henderson), stated that Henderson staff held working groups along with various entities to get input, noting there might be some variables yet to change. He asked when these changes could occur, if necessary.

Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), replied that the process involves the Specifications Subcommittee (Subcommittee) approving revisions, sending the revisions out for industry review, and then approval by the Executive Advisory Committee (EAC). It can then be brought back to the Subcommittee to address any comments or changes that need to be looked at.

Chair Olson mentioned that he would like to read in several of the most substantive changes for the record. Mr. Floyd spoke to provide a rundown of the changes.

•401.02.04 "Bituminous Materials," Section B: The second to last sentence references "open-graded mixes"; Mr. Floyd requested to strike "An AC-30 or AC-20P asphalt cement shall be used for open-graded mixes as specified in Subsection 403.02.02, "Composition of Mixture.""

Mr. Tom Brady, City of North Las Vegas, asked about the cases where there was still open grading. Mr. Floyd replied that it was not the standard, but exceptions could be used if necessary. He then read the next revision to the specifications:

•Strike Section B of 401.03.05 "Weather Limitations"

•Section 703, Table 2A - Performance Grade For Original Materials
oFor "Ductility at 4°C, 5 cm/min. cm – minimum" under the column "PG 70-22CC Modified"
□Strike "30" and put "N/A"
oAs well as column "PG 70-10 and PG 64-22"
□Strike "30" and put "N/A"
oFor "Elastic Recovery at 4°C, percent (%) – minimum" under column "PG 70-22CC Modified"
□Strike "30" and put "N/A"

Mr. Olson mentioned that the PPA for PG mixes would be limited to a half percent. He suggested this point be added to a footnote. Mr. Floyd suggested language for this note:

•Add section 703.03.08, label it "Polyphosphoric Acid," Section A shall read: "Use of polyphosphoric acid shall not exceed half percent by max"

From there, Chair Olson opened the floor to public comment. Mr. Greg Hunt, made the first comment:

"Greg Hunt, with Ergon Asphalt and Emulsions. The question I had is can the suppliers, agency, whatever, get a copy of that in writing? Not just the changes to it but also the spec itself. Can we get that after this meeting for review?"

Mr. Damiani briefly explained the approval process, stating that revisions would be available during the industry review stage, also noting that the information is a public record and can be accessed on the RTC's website. Ms. Julia Uravich,

Senior Project Engineer for the RTC, said that it was possible to subscribe to the website and receive notifications on the status of changes.

Mr. Brady then asked about specification section 401.01.02, noting that current City of North Las Vegas (North Las Vegas) policy requires independent design on all projects. The language in this specification does not conflict with this, but he suggested adding an exception for agency approvals for the jurisdiction, as the requirements exceeded the minimum noted in the specification. Mr. Damiani stated that his goal was to get these types of regional specifications out of the standard drawings, but that for now, Mr. Brady could potentially add a note stating that designs would need to be submitted independently to North Las Vegas. However, Chair Olson stated that, in his opinion, this language does not belong in the standard specification. The Subcommittee members deliberated the matter further before deciding to continue the conversation at a future meeting.

Next, Chair Olson called on Mr. Matt Bliss, who made the following comment:

"Matt Bliss, Aggregate Industries. Considering the half percent PPA spec to be added in there for this oil, would we be removing that one percent polymer requirement or putting it in either or. Like one percent polymer added or no more than .05 percent PPA added."

Chair Olson responded that the requirements were standalone.

Mr. Bliss, made the following comment:

Okay. Because it's our understanding that just that one percent polymer content would exclude some suppliers. It would exclude the use of a neat oil that would meet those specifications.

Chair Olson agreed that some suppliers may not have the ability to add polymer, but based on his research and conversations, there is desire to have polymer added to prolong the life of the pavement. Adding polymer after the fact would not be the same, though he is open to further conversations. He also noted the timetable on these changes, asking when these changes would be phased in. Mr. Damiani replied that enforcement could begin on a pre-determined date that would be included in the specification revision.

Mr. Brady asked if the intention was to phase these changes in with the next round of 2021 Inter-Agency Quality Assurance Committee approvals. Chair Olson said that idea had been suggested, though this may change. Mr. Damiani pointed out that the earliest these revisions could be approved is at the RTC Board of Commissioners meeting in May 2020.

Motion:
Chair Lance Olson, City of Henderson, made a motion to approve with changes as discussed and send the revisions to industry review

Advisory Action (check one):	***Approval** ☑	**Disapproval** ☐	**Item Held** ☐

***Conditions (if applicable):**

Meeting Date: 4/10/2019	Specifications Subcommittee

Discussion:

Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), explained that this item had been discussed at a previous Specifications Subcommittee (Subcommittee) meeting and solicited feedback from Subcommittee members.

Chair Jimmy Floyd, Clark County Public Works, opened the floor to public comments. He called on Mr. Greg Hunt, Ergon Asphalt & Emulsions, who explained that he works for a local asphalt producer.
He agreed that many of the current asphalt grades may be too soft for the area, noting that similar areas nearby Southern Nevada used products such as performance-grade (PG) 70-10 and PG 70-16 on roadways. However, the RTC's asphalt cement (AC)-30 standard was considered an older grading format. Although it would cost more, he recommended a PG grade product that suits the area better.

Mr. Damiani remarked that this specification changes mentions of AC-30 in section 401 of the Uniform Standard Specifications to PG 70-16. Mr. Hunt stated that the Subcommittee would need to consider the time it would take for industry to implement an entirely new product when moving from AC-30 to PG 70-16. Chair Jimmy Floyd, Clark County Public Works, asked Mr. Damiani when the changes would take effect, should the specification be approved. Mr. Damiani remarked that if the specification received approval it would be placed on the agenda for the Executive

Advisory Committee meeting in May, followed by final approval by the RTC Board of Commissioners at its June meeting. Chair Floyd mentioned that there might be a need for a waiting period to help the contractors accommodate the change and update mix designs.
The Subcommittee members reviewed the characteristics of different PG grades. Vice-Chair Lance Olson, City of Henderson, stated the goal was to eliminate AC-30 all together from the specifications, which would reduce costs as manufacturers would not have to manage multiple products. The Subcommittee members briefly discussed the challenges with determining pricing across suppliers and products. Chair Floyd asked if there was an intermediary product between PG 64-22 and PG 70-16, noting a desire to avoid cracking. This was a particular problem in residential areas. Mr. Hunt said that custom mixes could be made if the agencies wished and that a PG 70-16 mix would perform better than PG 70-10.
Mr. Jeremy Leavitt, City of Las Vegas, brought up the issue of storage for different oils, asking if requiring multiple kinds would create logistic problems that would raise costs. Mr. Hunt explained that storage costs for PG 70-16 and PG 70-22 would be fine, but it could be problematic for a combination of multiple types, such as AC-30, PG 76-22, and PG 70-16.

The Subcommittee members reviewed the language in the specifications, as each region would have needs that may benefit from different mixes.
Chair Floyd mentioned a desire for PG 76-22 to be used everywhere. Previous surveys have shown that it provided less cracking on residential neighborhoods and roadways. It performed the best on lifecycle analyses that had been performed. He explained that this is the direction Clark County would like to go, but would need the support of industry to see the cost implications.
Mr. Damiani remarked that if the direction is for PG 76-22 to be used everywhere; more information on the maintenance cycle costs would be helpful. It could justify the initial costs from the developer compared to the lifetime maintenance costs that the entities incur.
Chair Floyd suggested for the use of PG 76-22 within 200 feet of intersections and on all bus lanes, which would provide for reduced rutting. He remarked that AC-30 could be used elsewhere. Mr. Damiani commented that it would be helpful to clean up the language for any contradictions of asphalt use.
Mr. Jade Rosenberg, Wells Cargo, inquired on the timeframe for implementation of the new asphalt grade. Specifically, if the specifications require a change from AC-30 to PG 70-16. He asked if there would there be a trial period to see how the PG 70-16 performs before replacing throughout Southern Nevada. He suggested using PG 70-16 on certain projects to get more information before submitting the full mix designs in June. Vice-Chair Olson assured him that a rollout period could be implemented.

Chair Floyd asked Mr. Hunt about the time it would take to use the remainder of the AC-30 inventory. Mr. Hunt assured that the remaining stock was not an issue. It was more important to figure out thefuture mix designs, ensure contractors are aware of future changes, and stressed the need for a roll out period to accomodate the transition. Chair Floyd queried on the amount of AC-30 a typical supplier might have. Mr. Hunt stated that a supplier could have up to 10,000 tons of AC-30 product.
Mr. Jim Keane, City of Boulder City, questioned if the PG products would fix the issue of pavement marking durability and tracking problems. Chair Floyd there were tests being conducted to examine the issue, but no definitive answer had been found.
Vice-Chair Olson stated that he and Chair Floyd would review the different options and that the discussion appears to be moving in the right direction.

Motion:
Vice-Chair Lance Olson, City of Henderson, made a motion to hold the item for a future Specifications Subcommittee meeting.

Advisory Action (check one): ***Approval** ☐ **Disapproval** ☐ **Item Held** ☑

***Conditions (if applicable):**

Meeting Date: 3/21/2019	Staff

Discussion:
Joe will fill in the background and the rest of the recommendation

Advisory Action (check one): ***Approval** ☑ **Disapproval** ☐ **Item Held** ☐

***Conditions (if applicable):**

SECTION 401

PLANTMIX BITUMINOUS PAVEMENTS – GENERAL

01DESCRIPTION

401.01.01 GENERAL

A. These specifications include general requirements that are applicable to all types of bituminous pavements of the plantmix type irrespective of gradation of aggregate, kind, and amount of bituminous material, or pavement use. Deviations from these general requirements will be indicated in the specific requirements for each type.

B. This work shall consist of one or more courses of bituminous mixture constructed on the prepared foundation in accordance with these specifications and the specific requirements of the type under contract, and in conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.

C. The testing and inspection of the asphalt concrete shall comply with this specification. In Clark County unincorporated areas and if required by other Contracting Agencies, all field and laboratory sampling and testing for project control shall be performed by NAQTC certified technicians in an AASHTO Materials Reference Laboratory (AMRL) or Construction Materials Engineering Council (CMEC) R-18 AASHTO accredited laboratory. The accreditation shall extend to the test method used on the particular project. The accreditation shall include ASTM D3666.

401.01.02 PAVEMENT STRUCTURAL DESIGN

A. All public pavement sections shall be designed in accordance with the 1993 AASHTO Guide for Design of Pavement Structures. The following parameters, based upon the AASHTO Guide and the 1996 Nevada Department of Transportation Pavement Structural Design and Policy Manual, shall be used in the design calculations. Parameters which are specific to a road classification are identified by the right-of-way dimension. The design shall be stamped and signed by a professional engineer registered in the state of Nevada.

1. The reliability factor will be a minimum of 80 percent with a standard normal deviate (ZR) of -0.841 for 51-foot, 60-foot, and 80-foot rights-of-way, and a minimum 90 percent with a standard normal deviate (ZR) of -1.282 for 100-foot rights-of-way.
2. The standard deviation will be 0.45 for all classifications.
3. The initial service index will be 4.2 and the final service index 2.5 for all classifications.
4. Drainage coefficients shall not exceed 1.0.
5. The structural coefficient for asphalt will be 0.35.
6. For materials meeting ***Subsection 704.03.04, "Type II Aggregate Base,"*** the elastic modulus shall be 25,000 psi and the structural coefficient shall be 0.12.
7. For materials meeting ***Subsection 704.03.03, "Type I Aggregate Base,"*** the elastic modulus shall be 15,000 psi and the structural coefficient shall be 0.11.
8. Prior to design, soil testing will be performed in accordance with ASTM D2844 or AASHTO T190 to determine a representative Resistance (R) value for the prepared subgrade. The subgrade shall be prepared in accordance with the Geotechnical Soils Investigation Report, and soil sampling performed subsequent to rough

grading to confirm the original results. An average of the R-values may be used if the soil classification results are consistent, or if the values do not differ by more than 10. The minimum testing requirements are 1 right-of-way R-value test and post grading soil classifications every 1,000 linear feet of roadway, with a minimum of 2 classifications per project.

9. The subgrade R-value (psi) shall be converted to a Resilient Modulus (M_R, psi) using the following correlation: MR=145*(10^((0.0147*R)+1.23)).

10. The minimum AC sections are 2.0 inches for a residential street, 3.0 inches for a minor collector, 4.0 inches for a major collector, and 4.0 inches for an arterial street.

11. All designs require a minimum of 4 inches Type II aggregate base material.

12. The subgrade shall be scarified and recompacted to a minimum of 95 percent, to minimum depth of 8 inches.

13. Expansive soils may require additional design compensation. If native soils classify as either an AASHTO A-6 or A-7 (more than 36 percent passing the #200 sieve and a PI equal to or greater than 11), the design may include stabilization, over-excavation, or utilization of a geomembrane, as recommended by the geotechnical engineer.

14. Hydro-collapsible soils, or the presence of soluble materials, may require additional design compensation, as recommended by the geotechnical engineer.

B. The minimum design equivalent axial loads (EAL) based on a 20-year design are 7.2E+3 for a residential street, 3.3E+4 for a minor collector, 3.7E+5 for a major collector, and 1.0E+6 for an arterial street. Locations with heavier than normal traffic shall be designed accordingly. A traffic study may be required for roads with a projected TI greater than 9.5. If required by the Contracting Agency, actual vehicle count data and assigned axle factors shall be used in the design of the pavement section. Definition of the roadway classifications, for design purposes, are listed below:

1. Residential roadways are those that provide access for residential areas only: Most 51-foot right-of-way roads are residential. The normal design TI is 5.0. A Residential road is considered to have heavy traffic, and a TI of 5.5, if minor amounts of thru-traffic use the road or bus traffic is encountered due to an adjacent school. Category II mix designs shall be used on residential streets.

2. Minor Collector roadways are those that collect residential traffic or service limited commercial facilities: Most 60-foot and some 51-foot right-of-way roads fit this classification. The normal design TI is 6.0. A Minor Collector is assumed to have heavy traffic and a TI of 6.5 if there is substantial commercial truck traffic or bus traffic due to an adjacent school.

3. Major Collector roadways are those that serve as destination roadways or service normal commercial or light industrial facilities: Most 80-foot, and some 60-foot, right-of-way roads fit this classification. The normal design TI is 8.0. A Major Collector is assumed to have heavy traffic, and a TI of 8.5, if there is substantial commercial or industrial truck traffic.

4. Arterial roadways are those that provide primary traffic routes or service heavy industrial facilities: All 100-foot, and some 80-foot and 60-foot, right-of-way roads fit this classification. The normal design TI is 9.5. An arterial may have light traffic, if there is a disruption or decrease in the road capacity, in which case the design TI is 9.0. An Arterial is assumed to have heavy traffic if it is at full capacity with substantial truck traffic, or if there is heavy industrial traffic. A traffic study is recommended in those situations.

02MATERIALS

401.02.01 COMPOSITION OF MIXTURES

A. The bituminous plantmix shall be composed of a mixture of aggregate, mineral filler if required, and bituminous material. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the job-mix formula.

B. Before starting work, the Contractor shall submit a proposed job-mix formula in writing, for use by the Engineer in setting the job-mix formula to be used.

1. The proposed job-mix formula shall be determined by a testing laboratory under the direction and control of a registered professional engineer, based on tests performed in accordance with the "Marshall Method of Mix Design" as described in the Asphalt Institute Manual Series No. 2 (MS-2), latest edition.

2. The number of compaction blows to be applied to the specimens will be based on the appropriate traffic category.

3. Traffic Category I will use a 75-blow design and will apply to all arterial streets and wherever "heavy" traffic is expected.

4. Traffic Category II will use a 50-blow design and will apply to collector and local streets.

5. Unless otherwise specified, voids determinations and effective asphalt contents will be determined and reported in accordance with procedures described herein.

C. The job-mix formula shall be selected in accordance with the following procedures:

1. Determine asphalt content required for 4 percent air voids, and

2. Determine the average asphalt content for:

a. Maximum density.

b. Maximum stability.

c. 4 percent air voids.

3. The lower of the asphalt contents obtained for a. or b. above will be used as the design asphalt content for the job-mix formula.

D. The job-mix formula asphalt content shall satisfy all Marshall design criteria as shown in the following table:

MARSHALL DESIGN CRITERIA

TRAFFIC CATEGORY*	**I TRAFFIC INDEX (TI) ≥ 7.0**		**II TRAFFIC INDEX (TI) < 7.0**	
Compaction Blows Each End of Specimen	**75**		**50**	
Test Property	**Min.**	**Max.**	**Min.**	**Max.**
Stability, Lb.	1800	--	1500	--
Flow, 0.01 In.	8	14	8	16
Percent Total Air Voids	3	5	3	5

MARSHALL DESIGN CRITERIA

TRAFFIC CATEGORY*	I TRAFFIC INDEX (TI) ≥ 7.0		II TRAFFIC INDEX (TI) < 7.0	
Compaction Blows Each End of Specimen	**75**		**50**	
Test Property	**Min.**	**Max.**	**Min.**	**Max.**
Percent Voids Filled With Asphalt	65	75	65	78
Minimum Voids In Mineral Aggregate - Percent	See Table In Asphalt Institute MS-2 Manual			

* Traffic Category I - Applies to arterials and major collectors. See roadway classification in ***Subsection 401.01.02, "Pavement Structural Design."***
Traffic Category II - Applies to minor collectors and residential streets. See roadway classification in ***Subsection 401.01.02, "Pavement Structural Design."***

E. In addition to the Marshall Design Criteria set forth herein, the job-mix formula shall also meet the following tensile strength requirements for all traffic categories:

TEST PROPERTY	TEST METHOD	REQUIREMENTS
Indirect Tensile Strength (Unconditioned)	AASHTO T283	65 psi minimum (50 psi minimum with AC-10 asphalt)
Indirect Tensile Strength (Retained Strength)	AASHTO T283	70 percent minimum

F. Should the job-mix formula fail to meet the tensile strength requirements, the Contractor shall add hydrated lime (hereinafter referred to as mineral filler) to the plantmix bituminous aggregates as specified in ***Subsection 401.03.08, "Preparation of Aggregates."*** If the addition of mineral filler fails to achieve the minimum tensile strengths, the Contractor will be required to change sources of material, and submit a new job-mix formula that will satisfy all design criteria.

G. The test report shall show the curves and data tabulations used to determine the following characteristics:

1. Unit weight per cubic foot.
2. Percentage of air voids.
3. Percent voids filled with asphalt.
4. Marshall stability.
5. Percent voids in mineral aggregate (VMA).
6. Marshall flow.
7. Indirect tensile strength (Unconditioned and Retained strength).

H. Data tabulations shall include indications of the water absorption, aggregate bulk specific gravities for both coarse (retained on No. 8 sieve) and fine (passing No. 8 sieve) aggregate, theoretical specific gravity of bituminous mixture, absorbed asphalt, and effective asphalt content as determined in accordance with referenced Asphalt Institute procedures. ASTM D2041 will be used for determination of theoretical maximum specific gravity of bituminous paving mixtures.

I. The test report shall give the recommended asphalt content and the values for:

1. Unit weight per cubic foot (bulk density).

2. Stability.
3. Flow.
4. Air voids.
5. Voids filled with asphalt.
6. Voids in mineral aggregate (VMA).
7. Indirect tensile strength (Unconditioned and Retained strength).

J. The formula submitted shall propose definite single values for:

1. The percentage of aggregate passing each specified sieve.
2. The percentage of bitumen to be added (to 0.1 percent) based on weight of total mix.
3. The percentage of mineral filler to be added to the aggregate.
4. The temperature of the mixture leaving the mixer.
5. The temperature of the mixture in the hopper of the paving machine.

K. The job-mix formula aggregate with the allowable tolerances herein shall conform to ***Section 705, "Aggregates for Bituminous Courses,"*** for plantmix bituminous base aggregates, plantmix bituminous surface aggregate, or plantmix bituminous open-graded aggregate, as applicable.

L. The Engineer will determine a job-mix formula with single values for ***Subsection 401.02.01.J, "Composition of Mixtures,"*** paragraphs 1 through 5 above, and so notify the Contractor in writing. This job-mix formula shall not be modified except with the written approval of the Engineer. The mix furnished shall conform to this job-mix formula, within the following range of tolerances:

1. Aggregate passing the No. 4 and larger sieves: ±7 percent
2. Aggregate passing the No. 8 to No. 100 sieves: ±4 percent
3. Aggregate passing the No. 200 sieve: ± 2 percent, but not to exceed upper limit of specification. Mineral filler is not considered as part of the aggregate.
4. Bitumen content: ±0.3 percent
5. Temperature leaving the mixer: ± 20 degrees F
6. Temperature in hopper of paving machine: ± 20 degrees F

M. Should there be a change in sources of materials, a new job-mix formula shall be established before the new material is used. Check tests of properties of the plantmix bituminous materials shall be made on the first day of production and as requested by the Engineer during period of construction to confirm that all properties are in compliance with Marshall Design Criteria and tensile strength requirements. Adjustments in gradation, mineral filler content, and asphalt content shall be made as necessary to meet design criteria.

N. The temperature of the bituminous material just prior to mixing and of the completed mixture in the hauling vehicle just prior to leaving the plant shall conform to the following table:

PLANTMIX BITUMINOUS MIXTURE WITH ASPHALT CEMENT

Grade of Asphalt Cement	Bituminous Material		Plantmix Bituminous Base of Surface Mixtures		Plantmix Bituminous Open-Graded Mixtures	
	Min.	Max.	Min.	Max.	Min.	Max.
PG76-22CC, PG70-22CC, PG64-34CC	275°F	350°F	275°F	350°F	--	--
AC-40	275°F	350°F	255°F	350°F	245°F	275°F
AC-20, AC-30	265°F	330°F	245°F	325°F	245°F	275°F
AC-10	255°F	325°F	235°F	325°F	--	--
AC-20P	280°F	350°F	300°F	350°F	300°F	350°F

401.02.02 AGGREGATES

A. Aggregates shall comply with ***Section 705, "Aggregates for Bituminous Courses."***

401.02.03 COMMERCIAL MINERAL FILLER

A. Commercial mineral filler shall comply with ***Subsection 705.03.04, "Commercial Mineral Filler."***

401.02.04 BITUMINOUS MATERIALS

A. The bituminous material shall comply with ***Section 703, "Bituminous Materials."*** Bituminous material may be conditionally accepted at the source.

B. Unless otherwise specified in the Special Provisions for Category I pavements, the grade of bituminous material for dense-graded mixes shall be ~~AC-30~~PG70-22 asphalt cement, except in the City of Las Vegas and the Clark County unincorporated areas, where PG76-22CC and PG64-34CC materials shall be used according to Table 1 of ***Section 703, "Bituminous Materials"***, PG70-10 may be used in Laughlin. A~~n~~ AC-30 or AC-20P asphalt cement shall be used for open-graded mixes as specified in ***Subsection 403.02.02, "Composition of Mixture."*** The grade may be changed one step by the Engineer.

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C. Unless otherwise specified in the Special Provisions, for Category II pavements the grade of bituminous material for dense-graded mixes shall be ~~AC-30 or AC-20~~ PG70-22 asphalt cement, except in the Clark County unincorporated areas, where PG76-22CC and PG64-34CC materials shall be used according to Table 1 of ***Section 703, "Bituminous Materials"***, PG70-10 may be used in Laughlin. The grade may be changed one step by the Engineer.

D. Certificates of Compliance for the asphalt, showing test values necessary for specification compliance, shall be made available upon request by the Engineer.

401.02.05 FIELD COMPACTION AND MIX DESIGN CORRELATION

A. Type 2 coarse mix design annual submittals only.

B. In an effort to establish the "point of refusal," if it has been determined that the in-place air voids are less than 6 percent or more than 8 percent, the mix design bitumen content shall be adjusted. This procedure will be required as a part of all new mix designs, and any field adjustment shall be noted.

C. The field compaction shall be as required in ***Section 401.03.11, "Rolling and Compaction."***

1. The in-place air voids, as based on the Maximum Theoretical Specific Gravity and 10 correlated nuclear tests or 5 cores, shall then be calculated.
2. If the mean percent air voids is outside the limits noted above, the bitumen content shall be mathematically increased or reduced and noted on the mix design submittal. If adjustment is made, then a new control strip is required.
3. Once the control strip meets the above requirements, it becomes the control strip for subsequent mix placements.

D. Subsequent compaction testing lots shall be tested in accordance with ***Section 401.03.12, "Acceptance Sampling and Testing of Bituminous Mixture."*** If the compaction cannot be maintained between the above limits, a new control strip shall be implemented to re-establish the mean density for testing.

03CONSTRUCTION

401.03.01 BITUMINOUS MIXING PLANT

A. Sufficient storage space shall be provided for the aggregate, or for each size aggregate when required. The storage yard shall be maintained neat and orderly and the stockpile, or separate stockpiles when required, shall be readily accessible for sampling.

B. Mixing plants shall be of sufficient capacity and coordinated to adequately handle the proposed bituminous construction.

C. **Mixing Plants.** Plants used for the preparation of bituminous mixtures shall conform to the following requirements:

1. Equipment for Preparation of Bituminous Material:
   a. Tanks for the storage of bituminous material shall be equipped to heat and hold the material at the required temperatures.
   b. The heating shall be accomplished by steam coils, electricity, or other approved means so that no flame shall be in contact with the tank or contents.
   c. The circulating system for the bituminous material shall be designed to ensure proper and continuous circulation during the operating period.
   d. Provisions shall be made for measuring and sampling storage tanks.
2. Drier: The plant shall include a drier or driers which continuously agitate the aggregate during the heating and drying process.
3. Thermometric Equipment:
   a. An armored thermometer of adequate range in temperature reading shall be fixed in the bituminous feed line at a suitable location near the charging valve at the mixer unit.
   b. The plant shall be equipped with either an approved dial-scale, mercury-actuated thermometer, an electric pyrometer, or other approved thermometric instrument so placed at the discharge chute of the drier as to register automatically or indicate the temperature of the heated aggregate.

c. The Engineer may require replacement of any thermometer by an approved temperature-recording apparatus for better regulation of the temperature of aggregates.

4. Smoke and Dust Control: The Contractor will be required to install satisfactory precipitation devices, or use other methods which will meet local conditions, city and county regulations as set forth by the Clark County Air Pollution Control Officer, and state laws pertinent to air pollution.

5. Truck Scales:

a. Except as allowed in ***Subsection 401.04.01, "Measurement,"*** bituminous mixture shall be weighed on approved scales furnished by the Contractor or on public scales at no cost to the Contracting Agency.

b. Such scales shall be platform scales and conform to the provisions of ***Subsection 109.01, "Measurement of Quantities."***

6. Safety Requirements:

a. Adequate and safe stairways to the mixer platform and sampling points shall be provided and guarded ladders to other plant units shall be placed at all points where accessibility to plant operations is required.

b. Accessibility to the top of truck bodies shall be provided by a platform or other suitable device to enable the Engineer to obtain sampling and mixture temperature data.

c. A hoist or pulley system shall be provided to raise scale calibration equipment, sampling equipment, and other similar equipment from the ground to the mixer platform and return.

d. All gates, pulleys, chains, sprockets, and other dangerous moving parts shall be thoroughly guarded and protected.

e. Ample and unobstructed passage shall be maintained at all times in and around the truck loading area.

f. This area shall be kept from drippings from the mixing platform.

D. **Batching Plants.** Batch mixing plants shall conform to the following requirements:

1. Plant Scales:

a. Scales shall be accurate to 0.5 percent of the minimum load that may be required. Poises shall be designed to be locked in any position to prevent unauthorized change of position.

b. Scales shall be as described in ***Subsection 109.01, "Measurement of Quantities."*** In lieu of truck scales, the Contractor may provide an approved automatic printer system which will print the weights of the material delivered, provided the system is used in conjunction with an approved automatic batching control system. Such weights shall be evidenced by a weight ticket for each load.

c. The amount of filler material shall be determined by weighing on springless dial scales separate from the plant weigh hopper or by some method that uniformly feeds the mixer within 10 percent of the required amount.

2. Feeder for Drier: The plant shall be provided with accurate mechanical means for uniformly feeding the aggregate into the drier so that uniform production and uniform temperature will be obtained.
3. Screens: Plant screens capable of screening the aggregate to the specified sizes will be required.
4. Bins:
    a. The plant shall include storage bins of sufficient capacity to supply the mixer when it is operating at full capacity.
    b. Bins shall be arranged to ensure separate and adequate storage of appropriate fractions of the mineral aggregates.
    c. Separate dry storage shall be provided for mineral filler when used and the plant shall be equipped to feed such material into the mixer.
    d. Each bin shall be provided with overflow pipes, of such size and at such locations as to prevent backing up of material into other compartments or bins.
        1) Each compartment shall be provided with its individual outlet gate constructed so that when closed there shall be no leakage.
        2) The gates shall cut off quickly and completely.
        3) Bins shall be so constructed that samples representative of the entire material in the bin can be readily obtained.
5. Weigh Box or Hopper:
    a. All materials shall be proportioned by weight.
    b. Aggregate scales shall be one of the following:
        1) Multiple beam scale.
        2) Springless dial type scale.
        3) Fully automatic solid-state digital strain gauge transducer measuring device.
    c. Aggregate scales shall have a capacity exceeding 1-1/4 times the total amount of materials to be weighed in one operation. Each scale gradation shall be approximately 1/1000 of the total capacity of the scale.
    d. All scales used for proportioning materials shall be accurate to within 1 percent.
        1) The scales shall be sealed and certified by the State Sealer of Weights and Measures.
        2) Certifications shall be dated within the past 12 months and shall be renewed whenever required by the Engineer.
        3) If the plant is moved, a new certificate will be required.
    e. All scales shall be of such size and so arranged that they may be read easily from the operator's platform.
        1) The scales shall indicate the true net weight without the application of any factor.

2) The dials of scales shall not be less than 12 inches in diameter.

3) The figures on the scale dials shall be clearly legible.

f. Weighing equipment shall be so insulated against the vibration or movement of other operating equipment in the plant that the error in weighing with the entire plant running will not exceed 1-1/2 percent for any batch.

6. Bituminous Control Unit: Satisfactory means, either by weighing or metering, shall be provided to obtain the proper amount of bituminous material in the mix within the tolerance specified. Means shall be provided for checking the quantity or rate of flow of bituminous material into the mixer.

7. Bituminous Control:

a. The equipment used to measure the bituminous material shall be accurate to plus or minus 0.5 percent.

1) The bituminous material bucket shall be a non-tilting type with a loose sheet metal cover.

2) The length of the discharge opening or spray bar shall be not less than three-fourths the length of the mixer and it shall discharge directly into the mixer.

3) The bituminous material bucket, its discharge valve or valves, and spray bar shall be adequately heated.

4) Steam jackets, if used, shall be efficiently drained and all connections shall be so constructed that they will not interfere with the efficient operation of the bituminous scales.

5) The capacity of the bituminous material bucket shall be at least 15 percent in excess of the weight of bituminous material required in any batch.

6) The plant shall have an adequately heated quick-acting, non-drip, charging valve located directly over the bituminous material bucket.

b. Bituminous material shall be measured by means of springless dial scales or metering devices. Springless dial scales shall have a capacity of not more than 1,000 pounds in 2-pound gradations.

1) The indicator dial shall have a capacity of at least 15 percent in excess of the quantity of bituminous material used in a batch.

2) The controls shall be constructed so that they may be locked at any dial setting and will automatically reset to that reading after the addition of bituminous material to each batch.

3) The dial shall be in full view of the mixer operator.

c. The flow of bituminous material shall be automatically controlled so that it will begin when the dry mixing period is over.

1) All of the bituminous material required for one batch shall be discharged in not more than 15 seconds after the flow has started.

2) The size and spacing of the spray bar openings shall provide a uniform application of bituminous material the full length of the mixer.

3) The section of the bituminous line between the charging valve and the spray bar shall be provided with a valve and outlet for checking the accuracy of the meter when a metering device is substituted for a bituminous material bucket.

8. Mixer:

a. The batch mixer shall be of a twin pugmill type, steam jacketed, or heated by other approved means and capable of producing uniform mixtures within the specified tolerances.

b. It shall be equipped with a sufficient number of paddles or blades set in proper order and operated at such speed as to produce a properly and uniformly mixed batch.

c. At the beginning of the mixing operation, the clearance between paddle tips and liner shall not exceed half the maximum aggregate diameter for the specified job mix.

d. The clearance of the paddles or blades from all fixed and moving parts shall not exceed 1 inch.

e. Badly worn or defective paddles or blades shall not be used in mixing operations.

9. Control of Mixing Time:

a. The mixer shall be equipped with an accurate time lock to control the operations of a complete mixing cycle.

1) It shall lock the weigh box gate after the charging of the mixer until the closing of the mixer gate at the completion of the cycle.

2) It shall lock the mixer gates throughout the dry and wet mixing periods.

3) The dry mixing period is defined as the interval of time between the opening of the weigh box gate and the start of introduction of bituminous material.

4) The wet mixing period is the interval of time between the start of introduction of bituminous material and the opening of the mixer gate.

b. The mixer shall be equipped with a timing device which will indicate by a definite audible or visual signal the expiration of the mixing period.

1) The device shall measure the time of mixing within an accuracy of 2 seconds.

2) A suitable automatic device for counting the number of completely mixed batches shall be provided and maintained in proper working condition.

c. When the aggregate and the bituminous material have been combined, the entire mass shall be mixed in a approved mixer.

1) The mixing shall continue until homogeneity and a uniform coating are achieved.

2) The output rate shall not exceed the manufacturer's capacity rating.

E. **Drier Drum Mixing Plants.** Drier drum mixing plants shall conform to the following requirements:

1. Aggregate Stockpiles: Comply with ***Subsection 401.03.08, "Preparation of Aggregates"*** paragraphs A through C.

2. Aggregate Proportioning:

   a. The plant shall include a means for accurately proportioning each bin size of aggregate prior to the drying operation.

   b. The plant shall have a mechanical feeder mounted under each compartment bin.

      1) Each compartment bin shall have an accurately controlled individual gate for volumetrically measuring the material drawn from each compartment.

      2) The feeding orifice shall be rectangular with one dimension adjustable by positive means.

      3) Indicators shall be provided for each gate to show the respective gate opening in inches.

   c. A meter for determining the rate of each feeder, or a revolution counter, shall be provided. Commercial filler material introduced into the mixer shall be drawn from storage bins by a continuous mechanical feeder which will uniformly feed the mixer within 10 percent of the required amount.

3. Weight Calibration of Aggregate: The plant shall include a means for calibration for each aggregate feeder by weighing test samples.

4. Bituminous Metering Device: The bituminous material shall be introduced into the mixer through a gallonage meter by a positive displacement metering device, equipped with a ready means of varying the bituminous material delivery rate.

5. Synchronization of Aggregate Feed and Bituminous Material Feed:

   a. Satisfactory means shall be provided to afford a positive interlocking control between the flow of aggregate from each feeder and the flow of bituminous material.

   b. The interlocking control shall indicate a visible or audible signal when the level of material in any one feeder approaches the strike off capacity of the feed gate, or shut the plant down.

6. Mixer:

   a. The plant shall include a mixing device which will obtain homogeneity and a uniform coating.

   b. The mixing output shall not exceed the manufacturer's capacity rating.

   c. The moisture content of the bituminous mixture shall not exceed 3 percent at the discharge end of the dryer.

7. Surge Bins: The plant will be equipped with an approved surge bin at the discharge. This surge bin will be in excess of 20 tons, and shall be equipped with an approved surge batcher or other approved method satisfactory to the Engineer that will prevent segregation of the bituminous mixture as it is being discharged into the hauling vehicle.

401.03.02 HAULING EQUIPMENT

A. Trucks used for hauling bituminous mixtures shall have tight, clean, smooth beds which have been thinly coated with a minimum amount of paraffin oil, lime solution, or other approved material to prevent the mixture from adhering to the beds.

401.03.03 PAVERS

A. Bituminous pavers shall be self-contained, self-propelled units provided with an activated screed or strike-off assembly, heated if necessary, and capable of spreading the finishing courses of bituminous plantmix material in lane widths applicable to the specified typical section and thicknesses shown on the plans.

B. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of bituminous plantmix material in widths shown on the plans.

C. The asphalt paver shall operate independently of the vehicle being unloaded and shall be capable of propelling the vehicle being unloaded in a satisfactory manner.

1. If necessary, the load of the haul vehicle shall be limited to that which will ensure satisfactory spreading.

2. While being unloaded, the haul vehicle shall be in contact with the machine at all times, and the brakes on the haul vehicle shall not be depended upon to maintain contact between the vehicle and the machine.

D. Pavers shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.

E. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

F. Pavers shall be capable of placing the bituminous mixture to meet the surface tolerances specified under the respective sections of bituminous pavement.

401.03.04 ROLLERS

A. Rollers shall be vibratory, steel-wheeled or pneumatic-tired type, in good condition.

1. Rollers shall be capable of reversing without backlash and operating at slow speeds to avoid displacement of the bituminous mixture.

2. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density without detrimentally affecting the completed material as determined by the Engineer.

3. Comply with ***Subsection 401.03.11, "Rolling and Compaction."***

B. Rollers for the test strip shall meet the following requirements:

1. Breakdown rollers shall be either a 3-wheeled steel roller or a 2-axle tandem or a 3-axle tandem weighing not less than 10 tons.

2. Except as hereinafter permitted, pneumatic-tired rollers shall comply with the following:

a. Rollers shall consist of not less than 9 wheels equipped with pneumatic tires of equal size and diameter.

b. Tires shall be mounted on 2 axles attached to a rigid frame, equipped with a loading platform or body suitable for ballast loading, so that the total weight of the roller can be varied to produce an operating weight per tire of between 1,000 and 2,000 pounds.

c. The tires shall have treads satisfactory to the Engineer.

d. The tires on the rear axle shall be so spaced that the entire gap between adjacent tires on the front axle will be covered by 1 tread of the following tires.

e. The tires shall be uniformly inflated so that the air pressure in the several tires will not vary more than 5 pounds per square inch. Inflation pressure in pounds per square inch shall be the tire manufacturer's recommendation.

f. Minimum tire size shall be 7.50 x 15 inches, 4 ply.

3. The use of pneumatic-tired rollers with fewer wheels and a greater maximum operating weight per tire than that specified herein will be permitted subject to the following requirements:

a. The minimum width between the outer edge of the outside tires on a given axle shall be 60 inches.

b. The weight of the roller and the tire pressure can be varied to produce a ground contact pressure between 50 and 70 psi.

4. The finish roller shall be a 2-axle tandem weighing not less than 8 tons.

401.03.05 WEATHER LIMITATIONS

A. The bituminous mixture shall not be placed upon any wet surface or when the surface temperatures of the underlying course is less than specified in Table 1. The temperature requirements may be modified, but only when so directed by the Engineer.

TABLE 1 - BASE TEMPERATURE LIMITATIONS

Mat Thickness	Base Temperature (Minimum ºF)
3 Inches or Greater	40
Greater than 1 Inch but Less than 3 Inches	45
1 Inch or Less	50

B. The open-graded plantmix surface shall be placed only when the pavement surface temperature is above 60 degrees F.

401.03.06 PREPARATION OF EXISTING SURFACE

A. When the surface of the existing pavement or old base is irregular, it shall be brought to a uniform grade and cross section as shown on the plans.

B. The subgrade to receive asphalt concrete, or asphalt concrete base immediately prior to applying prime coat, shall conform to the compaction and elevation tolerance specified for the material involved and shall be free of loose or extraneous material.

C. If the plantmix bituminous surface is being constructed directly upon an existing hard-surfaced pavement, a tack coat emulsified asphalt, diluted 50/50 at an approximate rate of 0.05 to 0.10 gallons per square yard, shall be uniformly applied upon the existing

pavement preceding the placement of the asphalt concrete. Comply with ***Section 405, "Tack Coat."***

1. The surface shall be free of water, foreign material, or dust when the tack coat is applied.
2. To minimize public inconvenience, no greater area shall be treated in any one day than is planned to be covered by plantmix during the same day, unless otherwise authorized by the Engineer.

D. A similar tack coat shall be applied to the surface of any previous course even if the course is placed the same day. Also, if as determined by the Engineer, the surface is such that a satisfactory bond cannot be obtained between it and a succeeding course.

E. The contact surfaces of all cold pavement joints, curbs, gutters, manholes, and similar structures shall be painted with emulsified asphalt immediately before the new asphalt concrete is placed. Comply with ***Section 405, "Tack Coat."***

F. When specified in the contract, longitudinal and transverse joints and cracks shall be sealed by the application of an approved joint sealing compound before spreading the mixture upon a Portland cement concrete surface. Excess bituminous material shall be removed from joints and cracks prior to spreading the mixture.

401.03.07 PREPARATION OF BITUMINOUS MATERIALS

A. The bituminous material shall be heated to the specified temperature in a manner that will avoid local overheating and provide a continuous supply of the bituminous material to the mixer at a uniform temperature at all times.

401.03.08 PREPARATION OF AGGREGATES

A. Aggregates proportioned prior to the heating and drying process shall be separated into at least two general sizes:

1. That portion of the material having a minimum of 80 percent passing No. 4 sieve.
2. That portion of the material having a minimum of 80 percent retained on a No. 4 sieve.

B. The material shall be maintained within the limits above with a uniformity of plus or minus 5 percent. Each portion of the material shall be stored separately.

C. When moving the aggregate from storage to compartment bins, any method may be used which will not cause segregation, degradation, or combinations of aggregate which fail to meet the specified gradation requirement. Plantmix operations shall not commence until sufficient aggregate material is stockpiled to ensure one day's run.

D. Aggregate proportioned immediately after the heating and drying process shall be screened into a minimum of 2 fractions when minus 1/2-inch aggregate is used, and into a minimum of 3 fractions when larger sized aggregate is used. The screened material shall be conveyed to separate compartments ready for proportioning and mixing with bituminous material.

E. If the Contractor elects to introduce baghouse fines into the mix, the material shall be drawn from a storage facility in which the material is kept in a uniform free flowing condition.

1. The baghouse fines for delivery to the plant shall be from a vane type metering device which is interlocked (electrical driven feeders shall be activated from the same circuit) to the flow of each aggregate feeder.

2. The drive shaft on the baghouse fines vane feeder shall be equipped with a revolution counter accurate to 1/10 of a revolution, and a means for varying the rate.
3. In a continuous mix and/or dryer drum plant, the baghouse fines shall be added at the asphalt feed line to ensure a uniform mix.
4. In batch plants, the baghouse fines shall be added by the use of a separate bin.
5. The baghouse fines shall be introduced at a point as approved by the Engineer at a percentage determined by the Engineer, not to exceed 2 percent by dry weight of the aggregate.
6. Baghouse fines shall be considered as part of the aggregate, and not as a mineral filler.

F. If mineral filler is required to meet the tensile strength requirements of the job-mix formula, it shall be added by one of the following methods:

1. Cold Feed Method:
   a. Hydrated lime (hereinafter referred to as mineral filler) shall be added to all plantmix bituminous aggregates at the rate of not less than 1 percent nor more than 2-1/2 percent of the weight of the dry aggregate. The exact rate of application shall be as determined by the job mix formula.
   b. Mineral filler shall be drawn from a storage facility in which the mineral filler is agitated by air or other means to keep it in a uniform free flowing condition.
      1) The mineral filler for delivery to the mixer shall be from a vane type metering device which is interlocked, (electrical driven feeders shall be actuated from the same circuit) to the flow of each aggregate feeder.
      2) The drive shaft on the mineral filler vane feeder shall be equipped with a revolution counter reading to 1/10 of a revolution, and a means for varying the rate.
   c. In continuous mix and/or drum dryer plants, the mineral filler shall be added to the aggregate after the aggregate is proportioned.
   d. In batch plants, the mineral filler shall be added to the aggregate prior to drying.
   e. Regardless of which type of plant is used, the following methods shall be utilized:
      1) Prior to the introduction of the mineral filler, sufficient moisture shall be added using spray bars at the aggregate bins to bring the aggregate to a moisture content where enough free surface moisture is available to thoroughly wet the aggregate and wet the lime.
         a) This content shall be a minimum of 4 percent.
         b) The actual amount of moisture required will be determined by the Engineer.
         c) After the addition of water and mineral filler, the aggregate shall be mixed using a horizontal twin-shaft pugmill.
         d) The mixing paddles shall be adjustable for angular position on the shaft to permit altering of the mixing pattern or retarding the flow

to ensure that the aggregate is thoroughly coated with mineral filler.

e) The volume of material in the pugmill shall not extend above the vertical position of the blade tips.

f) The completed mixture shall be directly introduced into the hot plant.

g) Stockpiling of the completed mixture is strictly prohibited.

2) The moisture control valve shall be interlocked with the hot plant control room so the moisture control valve is automatically turned off when the cold feed belts are shut off. The control valve shall also turn on automatically when the cold feed belts are activated.

2. Marination Method:

a. Hydrated lime (hereinafter referred to as mineral filler) shall be added to all fractions of the plantmix bituminous aggregates.

1) The coarse aggregates shall be wet cured with mineral filler at a rate of 1 percent of the weight of dry aggregate.

2) The fine aggregates shall be wet cured with mineral filler at a minimum rate of 2 percent of the weight of the dry aggregate.

b. The aggregates shall be marinated (wet cured) in the stockpiles for a minimum of 48 hours.

c. The wet cured aggregate in the stockpile shall be used within 45 calendar days. Material marinated in stockpile in excess of 45 calendar days shall not be used for the production of plantmix bituminous aggregates unless otherwise approved by the Engineer.

d. Prior to the introduction of the mineral filler, sufficient moisture shall be added using spray bars at the aggregate bins to bring the aggregates to a moisture content where enough free surface moisture is available to thoroughly wet the aggregate and activate the lime.

1) This content is recommended to be a minimum of 3 percent for coarse aggregates and 6 percent for the fine aggregates.

2) The actual amount of moisture required will be determined by the Engineer.

3) After the addition of water and mineral filler, the aggregate shall be mixed using a horizontal twin-shaft pugmill.

4) The mixing paddles shall be adjustable for angular position on the shaft to permit altering of the mixing pattern or retarding the flow to ensure that the aggregate is thoroughly coated with mineral filler.

5) The volume of material in the pugmill shall not extend above the vertical position of the blade tips.

e. Mineral filler shall be drawn from a storage facility in which the mineral filler is agitated by air or other means to keep it in a uniform free flowing condition.

1) The mineral filler for delivery to the mixer shall be from a vane type metering device which is interlocked (electrical driven feeders shall be actuated from the same circuit) to the flow of each aggregate feeder.

2) The drive shaft on the mineral filler vane feeder shall be equipped with a revolution counter reading to 1/10 of a revolution, and a means for varying the rate.

3. Slurry Method:

a. Hydrated lime or slaked quicklime (hereinafter referred to as mineral filler) shall be added to all plantmix bituminous aggregates in slurry form.

1) Add at a rate of not less than 1 percent nor more than 2-1/2 percent of dry mineral filler based on the weight of the dry aggregate.

2) The exact rate of application shall be as determined by the job-mix formula.

b. A slurry containing 1 part mineral filler and 2 parts water by weight is recommended.

1) The actual amount of water required in the production of the slurry will be determined by the Engineer after a visual inspection to ensure that the aggregate is thoroughly and uniformly coated with the mineral filler.

2) The addition of moisture to the aggregate prior to mixing of the mineral filler and aggregate will not normally be required.

c. The slurry shall be prepared in a central mixing tank provided with agitation for keeping the mineral filler in suspension until applied to the aggregate.

1) The slurry mixing tanks shall be capable of producing sufficient slurry for the hot mix asphalt manufacturing facility production rate, and shall produce a uniform slurry consistency.

2) The plant shall be equipped with suitable pumps and meters for introducing the required amount of slurry to the aggregate. A suitable device shall be provided to the Engineer for determining the weight of mineral filler per gallon of slurry.

d. If quicklime is used as the mineral filler, it shall be converted to hydrated lime by using one or more slaking tanks. The slaking unit shall be capable of:

1) Complete slaking or hydration of the quicklime.

2) Providing agitation for mixing and keeping the mineral filler in suspension until use.

e. After the addition of the mineral filler slurry, the aggregate shall be mixed using a horizontal twin-shaft pugmill.

1) The mixing paddles shall be adjustable for angular position of the shaft to permit altering of the mixing pattern or retarding the flow to ensure that the aggregate is thoroughly coated with mineral filler.

2) The volume of material in the pugmill shall not extend above the vertical position of the blade tips.

3) The completed mixture shall be directly introduced into the hot plant.

4) Stockpiling of the completed mixture is strictly prohibited.

401.03.09 MIXING

A. The permissible moisture content of the bituminous mixture just behind the paver shall not exceed 1-1/2 percent as determined by test method ASTM D1461 or equivalent.

1. Should the aggregate contain excessive moisture when heated within the temperature limits, the Contractor will be required to take satisfactory corrective action before resuming plantmix operations.

2. When an approved dryer drum mixing process is used, the moisture content of the bituminous mixture at discharge from the mixer shall not exceed 3 percent, and the resulting product at the discharge end of the drier shall be a homogenous mixture of uniformly distributed and properly coated aggregates of unchanging appearance.

B. The drier aggregate shall be combined in the mixer in the amount of each fraction of aggregates required to meet the job-mix formula. The bituminous material shall be measured or gauged and introduced into the mixer in the amount specified by the job-mix formula.

C. Commercial filler material, when required, shall be added to the mixer separately and shall be thoroughly dry. If the materials are mixed in a batching plant, the filler material shall be fed directly into the mixer as near the center as possible.

D. The time of mixing a batch shall begin on the charging stroke of the weight hopper dumping mechanism and shall end when discharge is started.

1. Mixing shall continue until a homogenous mixture of uniformly distributed and properly coated aggregates of unchanging appearance is produced.

2. In general, the time of mixing shall not be less than 30 seconds, except that the time may be reduced when, in the opinion of the Engineer, the sizes of aggregates are uniformly distributed and all particles are thoroughly and uniformly coated with asphalt binder.

3. The output rate shall not exceed the manufacturer's capacity rating.

E. Should the mixture, at the plant or in place, show an excess or deficiency of bitumen, show injury or damage due to burning or overheating, or show an improper combination of aggregates, due to the Contractor's failure to conform to the specified requirements, it shall be rejected and if still in the truck shall be disposed of as required. If an unsatisfactory mix, as referred to above, has been placed, it shall be disposed of and replaced as directed. No compensation will be allowed for rejected material.

401.03.10 SPREADING AND FINISHING

A. The mixture shall be laid upon an approved surface, and shall be spread and struck off to the grade and elevation established. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

B. The forward rate of travel of the paving machine(s) shall be regulated to a speed dependent upon the capacity of the mixing plant to furnish the mixture and the rate at which the rollers can obtain the required compaction. The machine shall be operated so that material does not accumulate and remain along the sides of the receiving hopper.

C. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked, and

compacted by hand tools. For such areas, the mixture shall be dumped, spread, and screeded to give the required compacted thickness, correct grade, and cross section.

D. The Contractor may windrow plantmixed bituminous base or surface material in front of the spreading and finishing machine, provided that the following conditions and requirements are strictly adhered to:

1. The windrow is properly sized, thereby ensuring the delivery of the correct amount of material to the spreading and finishing machine at all times.

2. The bituminous mixture shall be transferred from the windrow to the spreading and finishing machine in such a manner that the materials in the spreading machine will be a uniform mixture. The base upon which the windrow was formed shall not be disturbed, and there shall be no paving material remaining on this base between the pickup device and the spreading and finishing machine.

3. The temperature requirements for the material in the hopper of the spreading and finishing machine are complied with. Plantmix bituminous mixture that does not meet the minimum temperatures specified shall not be incorporated in the work, but shall be wasted in a manner satisfactory to the Engineer.

E. Should any course of bituminous mixture placed by utilizing a windrow be inferior, as determined by the Engineer, to that placed by transferring the bituminous mixture directly from the hauling vehicle to the spreading machine, the use of a windrow shall be discontinued.

F. The bituminous mixture spread through the paving machine during one day's operation shall come from a single plant manufacturer. Intermixing from more than one source shall not be allowed.

401.03.11 ROLLING AND COMPACTION

A. The initial or breakdown rolling shall consist of one complete coverage of the bituminous mixture with a steel-wheeled roller.

1. Initial rolling shall commence at the lower edge and shall progress toward the highest portion of the roadbed.

2. Under no circumstances shall the center be rolled first.

B. The initial or breakdown rolling shall be followed by rolling such that uniform density is obtained throughout the depth of the layer of the material being compacted.

1. At least two rollers, one steel-wheeled, the other pneumatic-tired, shall be used.

2. The total number of rollers used shall be sufficient to obtain the required compaction while the mixture is in a workable condition.

C. The final rolling of the bituminous mixture shall be performed with the same type of roller used for breakdown rolling.

D. Rolling shall be performed in such a manner that cracking, shoving, or displacement will be avoided.

1. All rollers shall be in good condition and the reversing mechanism maintained so that the roller is capable of changing directions smoothly.

2. The roller shall be kept in continuous motion while rolling so that all parts of the pavement receive equal compression.

3. The motion of the roller shall be slow enough at all times to avoid displacement of the pavement.

4. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected immediately by the use of rakes and fresh mixture when required.

E. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly maintained.

1. The use of diesel oil on pneumatic-tired rollers shall be kept to a minimum as determined by the Engineer.

2. Preferably, a water soluble oil or an asphalt release agent shall be used.

401.03.12 ACCEPTANCE SAMPLING AND TESTING OF BITUMINOUS MIXTURE

A. At no cost to the Contracting Agency, field thickness and density determinations of the bituminous mixture shall be made in lots, each lot representing one day's placement.

1. A lot shall be divided into 5 equal sublots, and 1 test shall be made for each sublot.

2. The location of the field tests may be chosen on a random basis using ASTM D3665, Section 4.3, except that any random location given shall be set back 2 feet from a curb or 3 feet from an edge, joint, or seam.

3. A summary of the random number chart used and the lot description shall be completed and approved by the Engineer prior to sampling and shall be included in the finished test results.

B. Determination of the field thickness of the compacted bituminous mixture, as required by the Engineer, shall be accomplished by ASTM D3549, "Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens."

C. Determination of the field density of the compacted bituminous mixture shall be accomplished by either of the methods listed below. In case of dispute, ASTM D1188 as modified shall govern.

1. ASTM D2950, "Density of Bituminous Concrete in Place by Nuclear Method." When this method is used, the nuclear device shall first be correlated with the density of core samples.

2. ASTM D1188, "Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens." When this method is used, the procedure shall be modified to require the use of “Coated Specimens” (Parafilm or Paraffin) only. The use of Bulk Specific Gravity determinations by SSD (surface saturated dry) method are prohibited.

D. The use of ASTM D2950 shall include correlation of test results to drilled cores.

1. A minimum of 1 lot (one full day’s production), and not less than 5 sublots, shall be used for this correlation.

2. Should any nuclear test density in the first lot differ from its corresponding drilled core density by more than 3.00 percent relative compaction, a second lot shall be correlated and the average of all sublots in the first and second lots, but not less than 10 sublots, shall be used for the correlation. The 4-inch cores shall be transferred to the Engineer along with the random number generator listing station/offset locations.

E. The theoretical maximum density of the bituminous mixture shall be determined by taking random samples of the mixture delivered to the job site and testing in accordance with ASTM D2041, "Theoretical Maximum Specific Gravity of Bituminous Paving Mixtures."

1. At least 2 theoretical maximum density determinations shall be made for each day's production of bituminous mixture used in the work.

2. If the day's production is less than 500 tons, then only 1 theoretical maximum density determination is required.

F. As a quality control measure, the Contractor shall, at no cost to the Contracting Agency, make periodic checks of the field density of the compacted bituminous mixture at any time during paving operations. The testing performed by the Contractor may be used by the Engineer in part or in whole as the basis of acceptance in addition to the Quality Assurance testing to be done by the Engineer.

G. The pavement thickness acceptance criteria are as listed below:

1. If the average of all measurements meets or exceeds the design thickness, with no core more than 10 percent less than the design thickness, the placement is acceptable.

2. If there is only an isolated thin area, the limits of the area should be identified to determine if a construction resolution is necessary.

3. If the core results indicate a consistently thin section, with no core more than 15 percent less than the design thickness and with the approval of the Engineer, the Contractor has the option of proposing a construction resolution or contributing an amount equivalent to the reduction in the asset value. Calculation of the lost asset value is accomplished with the following steps:

a. Determine the annual numbers of 18-kip equivalent single axle loads (ESAL), based upon the design traffic index (TI), a 20-year design life and an assumed traffic growth rate.

b. Calculate the composite structural number of the designed road section (i.e., the AC and aggregate base sections).

c. Using the average AC thickness, calculate the structural number of the constructed road section.

d. Determine the ESAL value that correlates with the reduced structural number.

e. Based upon the annual ESAL counts, determine the corresponding design life of the reduced section.

f. Using a 3 percent inflation factor and the unit cost of the AC (on a $/square yard basis) determine the equivalent uniform annual cost (EUAC) of each section.

g. Multiply the reduction in design life by the EUAC to determine the reduced value of the pavement, on a unit cost basis.

h. Multiply the unit cost by the pavement area.

i. As an alternative, use the following unit cost values for the 4 road classifications (dollars per square yard per inch deviation from design thickness): Residential = $6.97, Minor Collector = $7.10, Major Collector = $6.14, and Arterial = $7.20.

4. If the core results yield an average thickness greater than the design thickness, but are alternately very high and very low (more than 10 percent out), the Engineer may reject the placement.

H. The pavement density acceptance criteria for production placements shall be as listed below, otherwise specified in the project plans or contract documents:

1. The average density for Residential roadway pavement shall be 92 percent ± 2.0 percent (90.0 percent - 94.0 percent), with no single density deviating more than 4 percentage points (all measurements between 88 percent - 96 percent). If the average is between 2.0 percent - 4.0 percent out (88 percent - 90.0 percent or 94.0 percent - 96 percent), with no density more than 5.0 percent out (all measurements between 87 percent - 97 percent), the Contractor has the option of contributing the lost asset value of $1.22 per square yard per percentage point deviation from the acceptance range.

2. The average density for Minor Collector roadway pavement shall be 93.0 percent ± 2.0 percent (91.0 percent - 95.0 percent), with no single density deviating more than 4 percentage points (all measurements between 89 percent - 97 percent). If the average is between 2.0 percent - 4.0 percent out (89 percent - 91.0 percent or 95 percent - 97 percent), with no density more than 5.0 percent out (all measurements between 88 percent - 98 percent), the Contractor has the option of contributing the lost asset value of $1.22 per square yard per percentage point deviation from the acceptance range.

3. The average density for Major Collector roadway pavement shall be 93.0 percent ± 1.5 percent (91.5 percent - 94.5 percent), with no single density deviating more than 4 percentage points (all measurements between 89 percent - 97 percent). If the average is between 1.5 percent - 4.0 percent out (89 percent - 91.5 percent or 94.5 percent - 97 percent), with no density more than 5.0 percent out (all measurements between 88 percent - 98 percent), the Contractor has the option of contributing the lost asset value of $0.81 per square yard per percentage point deviation from the acceptance range.

4. The average density for Arterial roadway pavement shall be 93.0 percent ± 1.5 percent (91.5 percent - 94.5 percent), with no single density deviating more than 4 percentage points (all measurements between 89 percent - 97 percent). If the average is between 1.5 percent - 4.0 percent out (89 percent - 91.5 percent or 94.5 percent - 97 percent), with no density more than 5.0 percent out (all measurements between 88 percent - 98 percent), the Contractor has the option of contributing the lost asset value of $0.81 per square yard per percentage point deviation from the acceptance range.

401.03.13 MAINTAINING TRAFFIC

A. Traffic shall not be allowed on newly placed pavement for at least 24 hours or until the bituminous paving mix in-place temperature has dropped below 104 degrees F.

B. Exceptions shall be made at the discretion of the Engineer. Artificial means to reduce the pavement temperature may be used as approved by the Engineer.

401.03.14 JOINTS

A. Placing of the bituminous paving shall be as continuous as possible.

1. Rollers shall not pass over the unprotected end of the freshly laid mixture unless authorized by the Engineer.
2. Transverse joints shall be conformed by cutting back on the previous run to expose the full depth of the course.
3. A brush coat of asphalt emulsion shall be used on contact surface of transverse joints just before additional mixture is placed against the previously rolled material.

B. Longitudinal joints shall be spaced so that joints in succeeding courses will be at least 6 inches horizontally from joints in any preceding course. Lanes will be evened up each day to eliminate cold longitudinal joints insofar as practicable.

C. Transverse joints shall be spaced so that joints in succeeding courses will be a minimum of 5 feet horizontally from joints in any adjacent course. Lanes shall be evened up each day to eliminate cold transverse joints insofar as practicable.

D. Comply with ***Subsection 401.03.10, "Spreading and Finishing."***

401.03.15 SURFACE TOLERANCES

A. Surface tolerances will be specified under the respective sections of bituminous pavement.

401.03.16 SURFACING MISCELLANEOUS AREAS

A. Surfacing of road approaches and connections, street intersection areas, frontage roads, island areas, sidewalks, dikes, curbs, gutters, gutter flares, ditches, downdrains, spillways, aprons at the ends of drainage structures, and other designated areas outside the travelled way shall conform to the provisions specified in these specifications.

B. The combined aggregate grading for bituminous mixtures placed on miscellaneous areas shall conform to that specified for the bituminous mixture placed on the travelled way, except the aggregates used in the construction of island areas and dikes shall be constructed of aggregate conforming to the requirements of Plantmix Surface Aggregate, Type 3.

1. The amount of bituminous material used in the bituminous mixture placed in dikes, gutters, gutter flares, downdrains, spillways, aprons at the end of drainage structures, and other designated areas outside the travelled ways shall be increased not less than 1 percent by weight of the aggregate over the amount of bituminous material used in the bituminous mixture placed on the travelled way.
2. Submittal of a revised job-mix formula will not be necessary.

C. The bituminous mixture placed in island areas, sidewalks, dikes, gutters, gutter flares, ditches, downdrains, spillways, aprons at the end of drainage structures, and other designated areas outside the travelled way may be spread in 1 layer. The material shall be compacted to the required lines, grades, cross section, and density requirements for Category II pavements in accordance with ***Subsection 401.03.12, "Acceptance Sampling and Testing of Bituminous Material."***

D. Dikes shall be shaped and compacted with an extrusion machine or other equipment capable of shaping and compacting the material to the required correct grade and cross section.

04METHOD OF MEASUREMENT

401.04.01 MEASUREMENT

A. The quantity of bituminous plantmix to be measured for payment shall be the number of tons used in the accepted work, and will be determined by weighing the completed mixture of aggregate, mineral filler if required, and bituminous material.

B. The quantity of shoulder dikes constructed of bituminous plantmix to be measured for payment shall be the number of linear feet and will be determined from measurement taken along the top of the completed dikes to the nearest 1-foot length.

C. All measurements will be made in accordance with ***Subsection 109.01, "Measurement of Quantities."*** Batch weights will not be permitted as a method of measurement unless the alternate provisions of ***Subsection 401.03.01.D.1, "Plant Scales,"*** are met, in which case the cumulative weight of all the acceptable batches will be used for payment.

D. Due to possible variations in the specific gravity and voids of the payment, the tonnage used may vary from the proposal quantities and no adjustment in contract unit price will be made because of such variation.

05BASIS OF PAYMENT

401.05.01 PAYMENT

A. All accepted work and materials measured as prescribed above will be paid for as provided in the representative sections for each type specified.

B. Full compensation for furnishing and applying bituminous material or asphaltic emulsion as provided for in ***Subsection 401.03.06, "Preparation of Existing Surface,"*** including tack coat, and ***Subsection 401.03.14, "Joints,"*** shall be considered as included in the contract price paid for the principal items involved and no further compensation will be allowed.

C. When bituminous plantmix, Type III, is used in the construction of island areas or dikes, and there is no separate payment for said mixture, this bituminous plantmix shall be included in the payment for plantmix bituminous surface of the major type shown in the list of bid items and the proposal.

SECTION 404

HOT PLANTMIX RECYCLED BITUMINOUS PAVEMENT

01DESCRIPTION

404.01.01 GENERAL

A. This work shall consist of recycling a bituminous pavement in a central plant and re-laying the reprocessed bituminous mixture on a prepared surface in accordance with the line, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.

B. Recycled hot plantmix bituminous pavement, conforming to the requirements specified herein, may be substituted at the Contractor's option for conventional base course or surface course mixtures (***Section 303, "Plantmix Bituminous Base,"*** and ***Section 402, "Plantmix Bituminous Surface"***). Comply with ***Section 401, "Plantmix Bituminous Pavements - General,"*** except as herein specified.

02MATERIALS

404.02.01 COMPOSITION OF MIXTURES

A. The recycled bituminous plantmix shall be composed of a mixture of reclaimed bituminous pavements, additional virgin aggregate, mineral filler, if required, recycling agent, and/or additional bituminous material.

1. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the job-mix formula.

2. Unless otherwise specified in the Special Provisions, the proportion of reclaimed bituminous pavement used in the mix shall not exceed 15 percent.

3. A greater percentage (more than 15 percent) of the reclaimed bituminous pavement material may be used in the recycling process if the Engineer determines that the resultant mixture satisfies the requirements specified for the mix design.

4. A new job-mix formula shall be established should there be a change in source of materials or a change in the percentage of reclaimed material used in the mix.

B. Before starting work, the Contractor shall submit a proposed job-mix formula in writing, for use by the Engineer in setting the job-mix formula to be used. The proposed job-mix formula shall be determined by a testing laboratory under the direction and control of a registered professional engineer, in accordance with ***Subsection 401.02.01, "Composition of Mixtures."***

C. The formula submitted for the combined mix shall also indicate the recommended grade and amount of recycling agent and/or additional bituminous material to be used in the mix.

1. This shall be determined by recovering the asphalt cement from representative samples of the pavement to be recycled and testing the properties of the asphalt cement after adding various amounts of the recycling agent and/or additional bituminous material.

2. The test report shall show the curves for the following properties of the recycled asphalt cement after adding various amounts of recycling agent and/or bituminous material:

a. Penetration at 77 degrees F (before and after RTFC test).

b. Absolute Viscosity at 140 degrees F (before and after RTFC test).

D. The grade and amount of recycling agent and/or additional bituminous material to be used will be that which will produce paving grade asphalt cement conforming to ***Section 401, "Plantmix Bituminous Pavements-General"*** and ***Section 703, "Bituminous Materials."***

1. For Traffic Category I pavements, the combined bituminous materials shall meet all of the requirements of ***Section 401, "Plantmix Bituminous Pavements-General"*** and ***Section 703, "Bituminous Materials."*** ~~an AC-30 or AC-20 grade.~~

2. For Traffic Category II pavements, the combined bituminous material shall meet all the requirements of ***Section 401, "Plantmix Bituminous Pavements-General"*** and ***Section 703, "Bituminous Materials."*** ~~an AC-20 or AC-10 grade.~~

3. All properties specified for a paving grade asphalt cement shall be tested on the combined bituminous material, and the results shall be submitted with the proposed job-mix formula.

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404.02.02 AGGREGATES

A. **Reclaimed Bituminous Pavement Aggregate.** The aggregate shall be the product of crushed, milled, or planed bituminous pavement.

B. **Virgin Aggregates.** Virgin aggregates shall meet the requirements of ***Section 705, "Aggregates for Bituminous Courses."***

404.02.03 BITUMINOUS MATERIAL

A. The bituminous material shall be an asphalt cement and shall comply with ***Section 703, "Bituminous Materials."***

B. The grade shall be determined by the job-mix formula.

404.02.04 RECYCLING AGENT

A. The recycling agent shall conform to the requirements in the following table.

B. The grade shall be determined by the job-mix formula.

SPECIFICATIONS FOR HOT-MIX RECYCLING AGENT[1]

TEST	ASTM Test Method	RA-5		RA-25		RA-75		RA-250		RA-500	
		min	max	min	max	min	max	min	max	min	max
Viscosity @ (140°F), cSt	D2170	200	800	1,000	4,000	5,000	10,000	15,000	35,000	40,000	60,000
Flash Point COC, °F	D92	400	--	425	--	450	--	450	--	450	--
Saturates, wt. %	D2007	--	30	--	30	--	30	--	30	--	30
Viscosity Ratio[3]	--	--	3	--	3	--	3	--	3	--	3
RTFC Oven Weight Change ±%	D2872[2]	--	4	--	3	--	2	--	2	--	2

SPECIFICATIONS FOR HOT-MIX RECYCLING AGENT[1]

TEST	ASTM Test Method	RA-5		RA-25		RA-75		RA-250		RA-500	
		min	max	min	max	min	max	min	max	min	max
Specific Gravity	D70 or D1298	Report		Report		Report		Report		Report	

[1] The final acceptance of recycling agents meeting this specification is subject to the compliance of the reconstituted asphalt blends with current asphalt specifications.
[2] The use of ASTM D1754 has not been studied in the context of this specification; however, it may be applicable. In cases of dispute, the reference method shall be ASTM D2872.
[3] Viscosity Ratio = $\frac{\text{RTFC Viscosity at 140°F cSt}}{\text{Original Viscosity at 140°F cSt}}$

03CONSTRUCTION

404.03.01 GENERAL

A. Construction shall conform to the ***Subsection 401.03.01, "Bituminous Mixing Plant,"*** through ***Subsection 401.03.15, "Surface Tolerances,"*** with the exceptions below.

404.03.02 BITUMINOUS MIXING PLANT

A. The plant shall comply with ***Subsection 401.03.01, "Bituminous Mixing Plant."*** In addition, the control and handling of the recycling agent shall be in a manner similar to that specified for the bituminous material.

B. If a batch plant is used, the plant shall be modified so that:

1. Virgin aggregate can be superheated to a temperature required to produce a resultant mix temperature as specified in ***Subsection 401.02.01, "Composition of Mixtures,"*** after adding the ambient temperature reclaimed bituminous pavement aggregate.

2. Reclaimed aggregate shall be fed to the aggregate weigh hopper in a manner to ensure uniform proportioning.

C. If a drier drum plant is used, the plant shall be modified so that:

1. Either the virgin aggregate can be superheated to a temperature required to produce the required resultant mix temperature, or the combination of reclaimed bituminous pavement aggregate and virgin aggregate can be heated to a temperature needed for a resultant mix temperature as specified in ***Subsection 401.02.01, "Composition of Mixtures."***

2. The reclaimed aggregate shall be introduced into the plant in such a manner to ensure uniform proportioning and to protect the material from direct contact with the burner flame.

D. Regardless of the type of bituminous mixing plant used, the air pollution requirements as set forth by the Clark County Air Pollution Control Division and state law shall apply to the manufacture of recycled bituminous pavement.

404.03.03 PREPARATION OF AGGREGATES

A. Virgin aggregates shall be prepared as specified in ***Subsection 401.03.08, "Preparation of Aggregates."***

B. Reclaimed bituminous pavement aggregates shall be prepared so that 100 percent will pass a 1-1/2-inch sieve. The moisture content of the reclaimed bituminous pavement aggregate at the time of introduction into the mixer shall not exceed 3 percent as determined by Test Method ASTM D2216.

C. The stockpiling area for the reclaimed bituminous pavement aggregate shall be graded and compacted so a firm level base can be maintained at all times.

1. Layer placing or alternate approved methods shall be used to prevent coning or segregation of component sizes.
2. The stockpile will be limited to 10 feet in height and no equipment of any type will be allowed on top of the stockpile.
3. The stockpile shall be maintained in a loose and uncompacted state.
4. To prevent premature consolidation, reclaimed bituminous pavement aggregate shall not be stored in confined metal bins or hoppers unless slated for immediate processing.

D. Immediately prior to feeding the reclaimed bituminous pavement aggregate into the mixing plant, the material shall first pass through a grizzly with bars spaced 2 inches apart.

04METHOD OF MEASUREMENT

404.04.01 MEASUREMENT

A. Hot plantmix recycled bituminous pavement shall be measured as specified in ***Subsection 401.04.01, "Measurement."***

05BASIS OF PAYMENT

404.05.01 PAYMENT

A. The accepted quantity of hot plantmix recycled bituminous pavement will be paid for at the contract unit price bid per ton, which shall include all asphalt cement and recycling agent.

B. The above price shall be full compensation for furnishing all the material, mixing, loading, hauling, placing, compacting, and incidentals necessary for doing the work involved in constructing hot plantmix recycled bituminous pavement as shown on the plans or established by the Engineer.

C. All payments will be made in accordance with ***Subsection 109.02, "Scope of Payment."***

D. Partial payments for hot plantmix recycled bituminous pavement may be made as set forth under ***Subsection 109.06, "Partial Payment."***

E. Payment will be made under:

PAY ITEM	PAY UNIT
Hot Plantmix Recycled Bituminous Pavement	Ton

SECTION 703

BITUMINOUS MATERIALS

01SCOPE

703.01.01 MATERIALS COVERED

A. This specification covers the quality of asphalt cement, liquid asphalt, emulsified asphalt, cationic emulsion, anionic emulsion and rubber-asphalt crack sealant.

02REQUIREMENTS

703.02.01 CONTRACTOR'S RESPONSIBILITY

A. Bituminous material failing the test requirements of this section, including tolerances, shall be subject to ***Subsection 109.02, "Scope of Payment."***

703.02.02 MATERIAL SOURCE RESPONSIBILITY

A. Bituminous materials supplied under these specifications shall be provided from a source authorized by the Engineer and/or IQAC. The process for authorization may be obtained from the Contracting Agency's Public Works Construction Management Division.

703.02.03 SHIPPING NOTICE

A. Shipping notices shall be mailed upon making shipment and shall contain the following information:

1. Consignee and destination,
2. Agency contract number,
3. Delivery point,
4. Date shipped,
5. Car initials or number of truck transport delivery ticket number,
6. Type and grade of material,
7. Quantity loaded,
8. Loading temperature,
9. Net quantity,
10. Signature of shipper or authorized representative,

B. When shipments of materials arrive on the project after normal working hours, the Contractor shall notify the Engineer sufficiently in advance to make arrangements for an inspector to be present when the material is sampled. All sampling by the Vendor or Contractor shall be performed or observed by an NAQTC certified technician.

C. Three copies of the shipping notice shall be mailed to the Contracting Agency.

03PHYSICAL PROPERTIES AND TESTS

703.03.01 REFINERY TEST REPORT

A. Refinery test reports shall be mailed to the Engineer as soon as tests have been completed, and the report shall contain the following data:

1. Date of shipment,
2. Car initials or number of truck transport delivery ticket number,
3. Destination and consignee,
4. Contracting Agency contract number (or purchase order number, if applicable),
5. Type and grade of material,
6. Certificate of grade (certify that material conforms to these specifications, and itemize results on tests performed and date of test),
7. Signature of refinery's authorized representative,

B. The certificate of compliance shall be used as a basis of permitting immediate use of the material on the job and shall represent conditional acceptance only. The certificate of compliance shall include a copy of the tests for that lot shipment.

703.03.02 ASPHALT CEMENTS

A. Asphalt cement shall be prepared by the distillation of crude petroleum. This asphalt shall be homogeneous, free from water, and shall not foam when heated to 347 degrees F.

B. These specifications cover the following viscosity grades: AC-2.5, AC-5, AC-10, AC-20, AC-30, AC-40 and the Superpave Performance Grades (PG) for the Southern Nevada region as listed in Table 1, Table 2, Table 2A, and Table 2B.

TABLE 1 - LOCATION OF BITUMINOUS GRADE USE

Location	Viscosity Grades
Clark County Region below 5,000 feet elevation	PG 76-22CC, PG 70-22CC, PG 70-10[1], AC-~~30~~[1]30[2], or PG 64-22~~*~~[1][2]
Roads at and above 5,000 feet elevation	PG 64-34CC

1. ~~1.~~ Only for use in Laughlin.
2. Only for use in detours, ~~below~~ PCCP underlayment, ~~permanent pavement patches,~~ pedestrian and bike paths, or other locations as determined by the Engineer.

C. The various grades set forth above shall conform to the requirements and the methods of testing shown in Table 2, Table 2A, and Table 2B.

1. Performance grade material must have been prepared from crude petroleum product.
2. The asphalt cements shall be homogenous, free from water and shall not foam when heated to 347 degrees F.
3. Blending of asphalt cements to produce a specified performance grade shall result in a uniform, homogenous blend with no separation.

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4. Modified binders shall be blended at the source of supply and delivered as a completed mixture to the job site.
5. It shall not be transported via railroad car.
6. Only elastomeric Styrene Butadiene Styrene (SBS), Styrene-Butadiene (SB), Styrene-Butadiene Rubber (SBR), and Styrene Ethylbutylene Styrene (SEBS) rubber shall be added to the base binder asphalt cement, to produce a binder that complies with specification requirements.

703.03.03 LIQUID ASPHALTS

A. Liquid asphalts shall consist of materials conforming to the following classifications:
   1. Rapid curing (RC) products: Paving asphalt with a penetration of approximately 85 to 100 fluxed or blended with a naphtha solvent.
   2. Medium curing (MC) products: Paving asphalt fluxed or blended with a kerosene solvent.
   3. Slow curing (SC) products: Natural crude oils or residual oils from crude asphaltic petroleum.

B. When tested in accordance with the standard methods of AASHTO and ASTM, the grades of liquid asphalt shall conform to the requirements specified in Table 2, Table 3, and Table 4.

703.03.04 EMULSIFIED ASPHALT

A. Emulsified asphalt for slurry seal shall conform to CQS-1h as specified in Table 6 when tested in accordance with AASHTO and ASTM.

703.03.05 SLURRY SEAL

A. The slurry seal and its components shall conform to the requirements of Table 7 when tested in accordance with AASHTO, ASTM, and ISSA procedures.

703.03.06 MICROSURFACING

A. The microsurfacing and its components shall conform to the requirements of Table 8 when tested in accordance with AASHTO, ASTM, and International Slurry Seal Association (ISSA) procedures.

703.03.07 POLYMER MODIFIED EMULSION MEMBRANE

A. This material shall consist of a polymer modified asphalt emulsion. Its role is to form a water impermeable seal at the existing pavement surface and to bond the new hot mix to the existing surface. The product shall be smooth and homogeneous and conform to the requirements in Table 10.

TABLE 2 - NEVADA TABLE 2 REQUIREMENTS
FOR ASPHALT CEMENT GRADED BY VISCOSITY AT 140°F
(Grading Based on Original Asphalt)

Test	AASHTO Test Method	VISCOSITY GRADE					
		~~AC-2.5~~	~~AC-5~~	AC-10	AC-20	AC-30	AC-40
Viscosity at 140°F poise	T202	~~200 - 300~~	~~400 - 600~~	800 - 1,200	1,600 - 2,400	2,400 - 3,600	3,200 - 4,800
Viscosity at 275°F cSt, minimum	T201	~~125~~	~~175~~	250	300	350	400
Penetration at 77°F 100 g/5 seconds, minimum	T49	~~220~~	~~140~~	80	60	50	40
Flash point (C.O.C., °F minimum)	T48	~~325~~	~~350~~	425	450	450	450
Solubility in Trichloroethylene (percent, minimum)	T44	~~99~~	~~99~~	99	99	99	99
Ductility at 39°F 1 cm/min. cm minimum	T51	~~50~~	~~25~~	15	5	--	--
Tests on Residue From RTFO							
Loss on heating, percent maximum	T240	~~--~~	~~1~~	0.5	0.5	0.5	0.5
Viscosity at 140°F poise maximum	T202	~~1,000~~	~~2,000~~	4,000	8,000	12,000	16,000

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TABLE 2A - PERFORMANCE GRADE FOR ORIGINAL MATERIALS

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Test	Test Method	PG 76-22CC Modified	PG 70-22CC Modified	PG 64-34CC Modified	PG 70-10 and PG 64-22
Original Materials					
Flash Point Degrees (°C) - minimum	AASHTO T48	230			
Viscosity (Brookfield) @135°C, Pa·s Maximum	ASTM D4402	3.0	3.0	3.0	3.0
Dynamic Shear G*/sin ä = minimum @ 10 rad/s at Grade Test Temp. °C	AASHTO T315	1.3	1.0	1.0	1.0
Ductility at 4°C, 5 cm/min. cm - minimum	NDOT T746	20	30	30	30
#10 Sieve Test, Particulates retained	NDOT T730	0			
Solubility in Trichloroethylene, percent (%) - minimum	AASHTO T44	99			
Polymer Content, % by mass minimum	(1)	3.0	1.0	3.0	N/A
~~Toughness in-lb – minimum(2)~~	~~NDOT T745~~	~~150~~		~~75~~	~~N/A~~
~~Tenacity in-lb - minimum~~	~~NDOT T745~~	~~100~~		~~50~~	~~N/A~~
~~If T&T fails,~~ Elastic Recovery at 4°C, percent (%) – minimum	AASHTO T 301	60	30	60	N/A

(1) Certificates of compliance provided for the material shall certify that the minimum polymer content is present.
(2) NV T 745 Method of Toughness and Tenacity: Scott Tester (or equivalent), inch-pounds @ 77º F., 20 inches per minute pull with tension head 7/8-inch diameter.

TABLE 2B - PERFORMANCE GRADE FOR RTFO AND PAV CONDITIONING

Tests On Residue From RTFO NDOT T728					
Test	**Test Method**	**PG 76-22CC Modified**	**PG 70-22CC Modified**	**PG 64-34CC Modified**	**PG 70-10 and PG 64-22**
Ductility at ~~54~~°C, 5 cm/min. cm - minimum	NDOT T746	10	10	10	10
Mass Loss, Percent (%) - maximum	NDOT T728	1.0	1.0	1.0	1.0
Dynamic Shear, G*/sin ä = minimum kPa @ 10 rad/s at Test Temp. in °C	AASHTO T315	2.2	2.2	2.2	2.2
Test On Residue After PAV					
PAV, Test Temp. in °C	AASHTO R28	110	110	100	100
Dynamic Shear, G*/sin ä = Max kPa @ 10 rad/s at Grade Test Temp. in °C	AASHTO T315	5,000	5,000	5,000	5,000
BBR - Creep Stiffness, S -MPa maximum @ 60 sec, at Grade Test Temp. in °C	AASHTO T313	300	300	300	300
BBR m-value = minimum @ 60s, at Grade Test Temp. in °C	AASHTO T313	0.300	0.300	0.300	0.300
Direct Tension, Failure Strain = % minimum @ 1.0 mm/min, at Grade Test Temp. in °C	AASHTO T314	1.0	1.0	1.0	1.0

TABLE 3 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR RAPID CURING (RC) LIQUID ASPHALTS

Test	AASHTO Test Method	ASTM Test Method	GRADES							
			RC-70		RC-250		RC-800		RC-3000	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Kinematic Viscosity at 140°F cSt	--	D2170	70	140	250	500	800	1,600	3,000	6,000
Flash Point (Tag Open Cup), °F	T79	D1310	--	--	80	--	80	--	80	--
Distillation										
Distillate percent of total distillate to 680°F	--	--	10	--	--	--	--	--	--	--
to 437°F	T78	D402	50	--	30	--	15	--	--	--
to 500°F	--		70	--	60	--	45	--	25	--
to 600°F	--	--	85	--	80	--	75	--	70	--
Residue from distillation to 680°F, volume percent by difference	--	--	55	--	65	--	75	--	80	--
Test on Reside from Distillation										
Penetration, 77°F, 100g/5 seconds	T49	D5	80	120	80	120	80	120	80	120
Ductility, 77°F, cm*	T51	D113	100	--	100	--	100	--	100	--
Solubility in Trichloroethylene, %	T44	D2042	99.5	--	99.5	--	99.5	--	99.5	--

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TABLE 3 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR RAPID CURING (RC) LIQUID ASPHALTS

Test	AASHTO Test Method	ASTM Test Method	GRADES							
			RC-70		RC-250		RC-800		RC-3000	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water, %	T55	D95	--	0.2	--	0.2	--	0.2	--	0.2
GENERAL REQUIREMENT: The material shall not foam when heated to application temperature recommended by the Asphalt Institute.										
* If ductility is less than 100, material will be accepted if ductility at 60°F is 100 minimum at a pull rate of 5 cm/min										

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TABLE 4 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR MEDIUM CURING (MC) LIQUID ASPHALTS

Test	AASHTO Test Method	ASTM Test Method	GRADES							
			MC-70		MC-250		MC-800		MC-3000	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Kinematic Viscosity at 140°F cSt	T201	D2170	70	140	250	500	800	1,600	3,000	6,000
Flash Point (Tag Open Cup), °F	T79	D1310	100	--	150	--	150	--	150	--
Distillation										
Distillate percent of total distillate to 680°F	--	--	--	--	--	--	--	--	--	--
to 437°F	--	--	--	20	--	10	--	--	--	--
to 500°F	T78	D402	20	60	15	55	--	35	--	15
to 600°F	--	--	65	90	60	87	45	80	15	75
Residue from distillation to 680°F, volume percent by difference	--	--	55	--	67	--	75	--	80	--
Test on Reside from Distillation										
Penetration, 77°F, 100g/5 seconds	T49	D5	120	250	120	250	120	250	120	250
Ductility, 77°F, cm*	T51	D113	100	--	100	--	100	--	100	--
Solubility in Trichloroethylene, %	T44	D2042	99.5	--	99.5	--	99.5	--	99.5	--
Water, %	T55	D95	--	0.2	--	0.2	--	0.2	--	0.2
GENERAL REQUIREMENT: The material shall not foam when heated to application temperature recommended by the Asphalt Institute.										
* If penetration of residue is more than 200 and ductility at 77°F is less than 100, material will be accepted if ductility at 60°F is 100+										

TABLE 5 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR SLOW CURING (SMC) LIQUID ASPHALTS

Test	AASHTO Test Method	ASTM Test Method	GRADES							
			SC-70		SC-250		SC-800		SC-3000	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Kinematic Viscosity at 140°F cSt	T201	D2170	70	140	250	500	800	1,600	3,000	6,000
Flash Point (Tag Open Cup), °F*	T48	D1310	150	--	175	--	200	--	250	--

TABLE 5 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR SLOW CURING (SMC) LIQUID ASPHALTS

Test	AASHTO Test Method	ASTM Test Method	GRADES							
			SC-70		SC-250		SC-800		SC-3000	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Distillation										
Total Distillate to 680°F, % by volume	T78	D402	10	30	4	20	2	12	--	5
Tests on Residue From Distillation										
Kinematic Viscosity of Distillation Residue at 140°F, stokes	T201	D2170	4	70	8	85	20	140	40	350
Ductility at 77°F, 5cm/min., cm	T51	D113	100	--	100	--	100	--	100	--
Solubility in Trichloroethylene, %	T44	D2042	99.5	--	99.5	--	99.5	--	99.5	--
Water, %	T55	D95	--	0.5	--	0.5	--	0.5	--	0.5
* Flash point by Cleveland Open Cup may be used for products having a flash point greater than 175°F										

TABLE 6 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR ANIONIC EMULSIFIED ASPHALTS

Test	AASHTO Test Method	ASTM Test Method	Rapid Setting				Slow Setting			
			RS-1		RS-2		SS-1		SS-1h	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Test on Emulsions										
Viscosity SSF @ 77°F, sec.	T72	D88	20	100	--	--	20	100	20	100
Viscosity SSF @ 122°F, sec.	T72	D88	--	--	75	400	--	--	--	--
Settlement, 5 days, % [1]	T59	D244	--	5	--	5	--	5	--	5
Storage Stability, 1 day, % [2]	T59	D244	--	1	--	1	--	1	--	1
Demulsibility, 35ml .02N, Calcium Chloride. % [3]	T59	D244	60	--	60	--	--	--	--	--
Cement Mixing Test, %	T59	D244	--	--	--	--	--	2.0	--	2.0
Sieve Test, %	D59	D244	--	0.10	--	0.10	--	0.10	--	0.10
Residue by distillation, %	T59	D244	55	--	63	--	57	--	57	--
Test on Residue from Distillation Test [4]										
Penetration @ 77°F, 100g, 5sec.	T49	D5	100	200	100	200	100	200	40	90
Ductility @ 77°F, 5m/min., cm	T51	D113	40	--	40	--	40	--	40	--
Solubility in Trichloroethylene, %	T44	D2042	97.5	--	97.5	--	97.5	--	97.5	--

[1] The test requirement for settlement may be waived when the emulsified asphalt is used in less than 5 days' time, or the purchaser may require that the settlement test be run from the time the sample is received until it is used, if the elapsed time is less than 5 days.

[2] The 24-hour 1-day storage stability test may be used instead of the 5-day settlement test.

[3] The demulsibility test shall be made within 30 days from the date of shipment.

[4] A harder base asphalt meeting current paving asphalt specifications may be specified with the provision that the test requirements on the Residue from Distillation be waived.

TABLE 7 - UNIFORM PACIFIC COAST SPECIFICATIONS FOR CATIONIC EMULSIFIED ASPHALTS

Test	Test Method		Rapid Setting				Medium Setting				Slow Setting				Quick Setting [6]			
			CRS-1		CRS-2		CMS-2S		CMS-2		CMS-2H		CSS-1		CSS-1h		CQS-1h	
	AASHTO	ASTM	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Test on Emulsions																		
Viscosity SSF @ 77°F, sec.	T72	D88	--	--	--	--	--	--	--	--	--	--	20	100	20	100	20	100
Viscosity SSF @ 122°F, sec.	T72	D88	20	100	100	400	50	450	50	450	50	450	--	--	--	--	--	--
Settlement, 5 days, % [1]	T59	D244	--	5	--	5	--	5	--	5	--	5	--	5	--	5	--	5
Storage Stability, 1 day [2]	T59	D244	--	1	--	1	--	1	--	1	--	1	--	1	--	1	--	1
Demulsibility, 35 ml 0.8% sodium dioctyl sulfosuccinate, % [3]	T59	D244	40	--	40	--	--	--	--	--	--	--	--	--	--	--	--	--
Coating Ability/Water Resistance:	T59	D244	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coating, dry aggregate			--	--	--	--	Good	--	Good	--	Good	--	--	--	--	--	--	--
Coating, after spraying			--	--	--	--	Fair	--	Fair	--	Fair	--	--	--	--	--	--	--
Coating, wet aggregate			--	--	--	--	Fair	--	Fair	--	Fair	--	--	--	--	--	--	--
Coating, after spraying			--	--	--	--	Fair	--	Fair	--	Fair	--	--	--	--	--	--	--
Particle Charge Test	T59	D244	Positive		Positive		Positive		Positive		Positive		Positive [5]		Positive [5]		Positive	
Sieve Test, %	T59	D244	--	0.10	--	0.10	--	0.10	--	0.10	--	0.10	--	0.10	--	0.10	--	0.10
Cement Mixing Test, %	T59	D244	--	--	--	--	--	--	--	--	--	--	--	2.0	--	2.0	--	--
Distillation																		
Oil Distillate by volume of emulsion, %	T59	D244	--	3	--	3	--	20	--	12	--	12	--	--	--	--	--	--
Residue, %	T59	D244	60	--	65	--	60	--	65	--	65	--	57	--	57	--	60	--
Tests on Residue from Distillate Test [4]																		
Penetration, 77°F, 100g, 5sec.	T49	D5	100	250	100	250	100	250	100	250	40	90	100	250	40	90	45	60
Ductility, 77°F, 5cm/min., cm	T51	D113	40	--	40	--	40	--	40	--	40	--	40	--	40	--	40	--
Solubility in Trichloroethylene, %	T44	D2042	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--	97.5	--

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[1] The test requirement for settlement may be waived when the emulsified asphalt is used in less than 5 days' time, or the purchaser may require that the settlement test be run from the time the sample is received until it is used, if the elapsed time is less than 5 days.

[2] The 24-hour 1-day storage stability test may be used instead of the 5-day settlement test.

[3] The demulsibility test shall be made within 30 days from the date of shipment.

[4] A harder base asphalt meeting current paving asphalt specifications may be specified with the provision that the test requirements on the Residue from Distillation be waived.

[5] Must meet a PH requirement of 6.7 maximum (ASTM E70) if the Particle Charge Test result is inconclusive.

[6] Does not apply to polymer modified emulsion.

TABLE 8 SPECIFICATION FOR SLURRY SEAL MIX

TEST ON MIXTURE	TEST METHOD	REQUIREMENTS
Residual Asphalt, % of dry wt. of aggregate	--	7.5 - 13.5
Consistency, flow	ASTM D3910/ISSA T106	2 - 3 cm
Wet Cohesion, 30-minute set	ISSA T139	12 -13 kg/cm
Wet Cohesion, 60-minute set	ISSA T139	20 - 21 kg/cm
Set Time, 30 minutes	ASTM D3910	Negative
Excess Asphalt by LWT and Sand Adhesion	ASTM T109	50 g/ft² max.
Wet Stripping, % coating	ASTM T114	90 min.
Wet track Abrasion (6-day soak)	ASTM D3910/ISSA T100	75 g/ft² max.
Wet track Abrasion (1-hour soak)	ASTM D3910/ISSA T100	75 g/ft² max.
System Compatibility	ISSA T115	Pass
Mix time @ 77°F	ASTM D3910/ISSA T113	Controllable to 180 sec. minimum

TABLE 9 SPECIFICATION FOR MICRO-SURFACING MIX

TEST ON MIXTURE	TEST METHOD	REQUIREMENTS
Residual Asphalt, % of dry wt. of aggregate	--	5.5 - 9.5
Wet Cohesion, 30-minute set	ISSA T139	12 kg/cm
Wet Cohesion, 60-minute set	ISSA T139	20 kg/cm
Excess Asphalt by LWT and Sand Adhesion	ISSA T109	50 g/ft² max.
Wet Stripping, % coating	ISSA T114	90 min.
Wet track Abrasion (6-day soak)	ASTM D3910/ISSA T100	75 g/ft² max.
Wet track Abrasion (1-hour soak)	ASTM D3910/ISSA T100	50 g/ft² max.
Mix time @ 77°F	ASTM D3910/ISSA T113	Controllable to 120 sec minimum
Mix time @ 104°F	ASTM D3910/ISSA T113	Controllable to 120 sec minimum
Lateral Displacement	ISSA T147	5% max.
Classification Compatibility	ISSA T144	(AAA, BAA) 11 grade points minimum

Table 10 - SPECIFICATION FOR POLYMER MODIFIED EMULSION MEMBRANE

TEST ON EMULSION	Method	Min.	Max.
Viscosity @ 77°F, SSF	ASTM D88	20	100
Sieve Test, %	AASHTO T59	--	0.05
24-Hour Storage Stability, % [1]	AASHTO T59	--	1
Residue from Distillation @ 400°F, %	AASHTO T59	63	--
Oil portion from distillation ml of oil per 100 g emulsion [2]	AASHTO T59	63	--

Table 10 - SPECIFICATION FOR POLYMER MODIFIED EMULSION MEMBRANE

TEST ON EMULSION	Method	Min.	Max.
TEST ON RESIDUE FROM DISTILLATION			
Solubility in TCE, % [3]	AASHTO T44	97.5	--
Elastic Recovery @ 50°F, % [4]	AASHTO T301	58	--
Penetration @ 77°F, 100 g, 5 sec, dmm	AASHTO T49	60	150

[1] After standing undisturbed for 24 hours, the surface shall show no white, milky colored substance, but shall be a smooth homogeneous color throughout.

[2] ASTM D244 with modifications to include a 400°F ± 10°F maximum temperature to be held for a period of 15 minutes. Alternatively, ASTM D244 (Sections 21-27) Residue by Evaporation may be utilized as a surrogate procedure. However, Residue by Distillation is preferred and shall be used as the reference procedure.

[3] ASTM D5546, "Standard Test Method for Solubility of Asphalt Binders in Toluene by Centrifuge," may be substituted where polymers block the filter in Method D2042.

[4] ASTM D5976, "Standard Specification for Type I Polymer Modified Asphalt Cement for Use in Pavement Construction," Section 6.2 with exception that the elongation is 20 cm and the test temperature is 50°F.

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6458

REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

AGENDA ITEM

Metropolitan Planning Organization [X]	Transit [ ]	Administration and Finance [ ]

SUBJECT: STANDARD SPECIFICATIONS AND DRAWINGS

PETITIONER: M.J. MAYNARD, CHIEF EXECUTIVE OFFICER
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

RECOMMENDATION BY PETITIONER:
THAT THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA SPECIFICATIONS SUBCOMMITTEE APPROVE REVISIONS TO UNIFORM STANDARD DRAWINGS WITH RESPECT TO CURRENT ACCESSIBILITY BEST PRACTICES WITHIN THE RIGHT-OF-WAY (FOR POSSIBLE ACTION)

GOAL: MAINTAIN AND IMPROVE TRANSPORTATION SYSTEM INFRASTRUCTURE

FISCAL IMPACT:

Undetermined

BACKGROUND:

Kimley-Horn and Associates (Kimley-Horn) recently completed an audit of the regional standard drawings to determine the extent to which they reflect and adhere to current accessibility law and guidelines. The Americans with Disabilities Act (ADA) and the proposed Public Right-Of-Way Accessibility Guidelines (PROWAG) both give direction and guidance on how to provide safe and effective infrastructure for all road users regardless of physical or mental capabilities. The drawing revisions suggested by Kimley-Horn, based on the audit, were presented in the form of redlined drawings at the March 19, 2019, Operations Subcommittee (Subcommittee) meeting, and Subcommittee members were asked to provide comments on the suggested revisions. Following review of the comments, Regional Transportation Commission of Southern Nevada staff refined Kimley-Horn's redlines and prepared a set of drawings that depict the proposed revisions of the Subcommittee to consider sending to industry review.

The revised drawings are recommended for approval.

Respectfully submitted,

DocuSigned by:
Joseph Damiani
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for

JOHN R. PEÑUELAS, JR., P.E.
Senior Director of Engineering

SPECS Item #4
March 11, 2020

ssf

Regional Transportation Commission

AGENDA ITEM DEVELOPMENT REPORT

Agenda Item Recommendation (as submitted):
APPROVE REVISIONS TO UNIFORM STANDARD DRAWINGS WITH RESPECT TO CURRENT ACCESSIBILITY BEST PRACTICES WITHIN THE RIGHT-OF-WAY (FOR POSSIBLE ACTION)

Agenda Item Requestor: Regional Transportation Commission

Meeting Date: 1/9/2020	Specifications Subcommittee

Discussion:
Comments:
Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC), detailed that this item involved reviewing the next batch of drawing revisions to the Uniform Standard Drawings related to Public Access Right-of-Way Accessibility Guidelines (PROWAG), including minor notes and discontinuities. The January 2020 Operation Subcommittee meeting will have a majority of other PROWAG drawings, including ramps and driveways. Mr. Damiani pointed out several of these revisions.

Drawing 332 “Service Pedestal Foundation Street Lighting And/Or Traffic Signal”
Mr. Damiani described that this is a combination of two revisions, one of which involved adding additional conduits into the foundation to meet PROWAG, as well as adding a new sheet that showed a plan view schematic of what the foundation should look like. Also, per previous discussion, the revisions include removing the design criteria notes for electrical requirements.

From there, RTC Staff recommended that these revisions be sent off to the Executive Advisory Committee (EAC) for approval.

Chair Lance Olson, City of Henderson, asked about Drawing 320, “Lighting Standard Setback”, and the asterisk in the note, questioning what the asterisk meant. Ms. Julia Uravich, Senior Project Engineer for the RTC, replied that the asterisk referred to a detail on the four-foot minimum measurement and that the explanation was included in the drawing. Chair Olson agreed that it was there but mentioned that it was hard to see. Mr. Damiani agreed and said RTC staff would move the description to a more visible area.

Mr. Jim Keane, City of Boulder City, commented on the references of 4-foot versus 48-inches and whether those could be the same for consistency purposes. He also pointed out a missing figure on the taper reference on Drawing 332.

Then, Chair Olson commented on Drawing 332, referring to the wireless box, noting that the City of Henderson would be getting a separate power source and would not be using the specification in its current format. He also brought up the conduit on Sheet 2, asking if there would be another one specifically for the street light bases. Mr. Damiani said there had been some issues with those, noting that these were for specialty poles.

Mr. Jimmy Floyd, Clark County Public Works, referred back to Drawing 332, Sheet 2, suggesting a change to the verbiage to reflect that different jurisdictions are using multi-strand and single strand copper. Adding “or” would help improve consistency. Mr. Floyd also mentioned another note that referenced Grounding Plate Per NEC 250-83, noting it should specify 20 feet of #4 bare copper.

Motion:
Mr. Jimmy Floyd, Clark County Public Works, made a motion to follow staff recommendation

Advisory Action (check one): ***Approval** ☑ **Disapproval** ☐ **Item Held** ☐

***Conditions (if applicable):**

Meeting Date: 10/9/2019	Specifications Subcommittee

Discussion:
Comments:
Mr. Joe Damiani, Manager of Engineering, Regional Transportation Commission of Southern Nevada (RTC), stated

that for these Public Access Right-of-Way Accessibility Guidelines (PROWAG) revisions, he would go through each drawing to list the proposed changes. He noted that these were for PROWAG compliance only, and any other issues would need to be addressed at a later date in a more thorough review of Blue Book drawings.

201 Series
The 201 drawings had removed references to sidewalk and right-of-way, as developers would use only the back of the curb as dimensional lines. Note 9 was also added to indicate that for anything over a 100-foot street, the developer should refer to the policy of geometrical design for highway and streets.

202
The RTC had issues with the maximum deflections, requiring language stating "…shall have no vertical surface discontinuities greater than 1/4", regardless of construction tolerances." In essence, this would help eliminate discrepancies in the language for the sake of the contractors. This would help everyone meet construction tolerances.

203.1.S1
Mr. Damiani noted that revisions to Drawings 203.1.S1 were similar, also noting a language change from "entity" to "agency."

203
Mr. Damiani said changes here were the same as noted above.

205.1.S1
These revisions were similar to above, with Mesquite and Boulder City also being added.

205.2.S1
Changes were similar to those noted above.

205.3.S1
Changes were similar to those noted above.

205
Changes were similar to those noted above.

206.1.S1
Changes were similar to those noted above.

206.S1
Changes were similar to those noted above, with the removal of the three-and-a-half foot sidewalk replaced with a five-foot minimum, reducing the width of the street.

206.S2
Changes were similar to those noted above.

206.S3
Changes were similar to those noted above.

210.S1
Changes were similar to those noted above.

234.2
Changes were similar to those noted above, with the removal of the quarter-inch tolerance, adding a "no steeper than 2%" requirement. Also, removal of references to "ramp" term, with "pedestrian access route" being the preferred terminology.

234.3
Changes were similar to those noted above.

234.5
Changes were similar to those noted above while also removing reference to the 6" dimension and the letter "C."

234
Changes were similar to those noted above, with the addition of a 2% maximum.

256 Series
Mr. Damiani then listed out a series of drawings that were recommended for removal, as they were not adequate standard drawings. They were shared-use paths that would need to be designed differently.

•256.1
•256.2
•256.3
•256.4
•256.5
•256.6
•256.7

323
This drawing was also recommended for removal because they do not use metal lids anymore.

326
This item has the vertical surface discontinuity comment, as well as the removal of the “cast iron” and “non-conductive” and replaced with the more commonly used “polymer.”

328
Changes to continuity were similar to those noted above.

402
Changes were similar to those noted above.

403.1, 403, 408.1, 408.1.S1, 408, 408.S1, 417
For the mentioned drawings, Mr. Damiani described how language was changed to add that grates shall not be installed in pedestrian access routes and that grates must be bicycle-safe.

705
Changes to continuity were similar to those noted above along with changes to specify polymer lids.

706
Changes to were similar to those noted above.

706.1
Recommended that this drawing be removed because no agencies currently use the plastic mortar reinforced boxes.

707
Changes to continuity and polymer lids were similar to those noted above.

707.1
Recommend that this drawing be removed.

Ms. Abi Mayrena, Clark County Regional Flood Control District, asked about Drawing 417 and whether there was guidance on where these bicycle safe grates could be found. Mr. Damiani said that he believed that there are grate catalogs that specify this information.

Then, Mr. Jim Keane, City of Boulder City, referenced Drawing 234, asking if it was important to specify the top of the sidewalk in the language for additional clarity.

Motion:
Mr. Jim Keane, City of Boulder City, made a motion to approve the item with changes as discusse

Advisory Action (check one):	***Approval** ☑	**Disapproval** ☐	**Item Held** ☐

***Conditions (if applicable):**

Meeting Date: 8/14/2019	Specifications Subcommittee

Discussion:

Comments:
Mr. Joe Damiani, Manager of Engineering for the Regional Transportation Commission of Southern Nevada (RTC),

explained that the Operations Subcommittee is reviewing Public Right-of-Way Accessibility Guidelines (PROWAG) revisions to the Uniform Standard Drawings (Drawings). Once the Operations Subcommittee approves revisions, it will be sent out for industry review followed by review from the Specifications Subcommittee. Simple revisions that are received would be addressed, but if additional comments that would require extensive revision would be tabled for later discussion. Mr. Damiani explained that after PROWAG revisions are addressed, RTC staff intends to conduct a wholesale review of the Drawings.

Chair Lance Olson, City of Henderson, asked to clarify that this item pertained to approving Drawings 706.1 "Reinforced Plastic Mortar Service Box Assembly No. 5" and 707.1 "Reinforced Plastic Mortar Service Box Assembly No. 7." Mr. Damiani confirmed this, noting that there are about 70 drawings that are currently under review by the Operations Subcommittee. He remarked that as the Operations Subcommittee approves the drawings they will be brought to Specifications Subcommittee. This item pertained to the two drawings that were included in the item back up. Mr. Damiani added that this revision was unique, as it did not need to go out for industry review. Clark County requested to be removed as an approving agency. RTC staff requested the Operations Subcommittee members relay to the respective Specifications Subcommittee representative to help determine whether agencies followed this standard or not. The intention was to delete the said drawings if no other agency follows the standard. RTC staff recommended deleting the drawings included in the backup.

Mr. Tom Brady, City of North Las Vegas, asked if RTC staff received feedback from the City of North Las Vegas Operations Subcommittee member. Mr. Damiani replied that they had not. He clarified that RTC staff was asking whether the jurisdictions still used plastic mortar service box designs and if the drawings should still be in use. Mr. Brady explained that he was not aware of this and asked for this item to be held so that he could get the information from his department.

Mr. Damiani said that after the next Specifications Subcommittee meeting agenda is posted, he would notify the jurisdictions about the topics so that the Specifications Subcommittee members had time to review.
Motion:
Mr. Tom Brady, City of North Las Vegas, made a motion to hold the item

Advisory Action (check one):	***Approval** ☐	**Disapproval** ☐	**Item Held** ☑

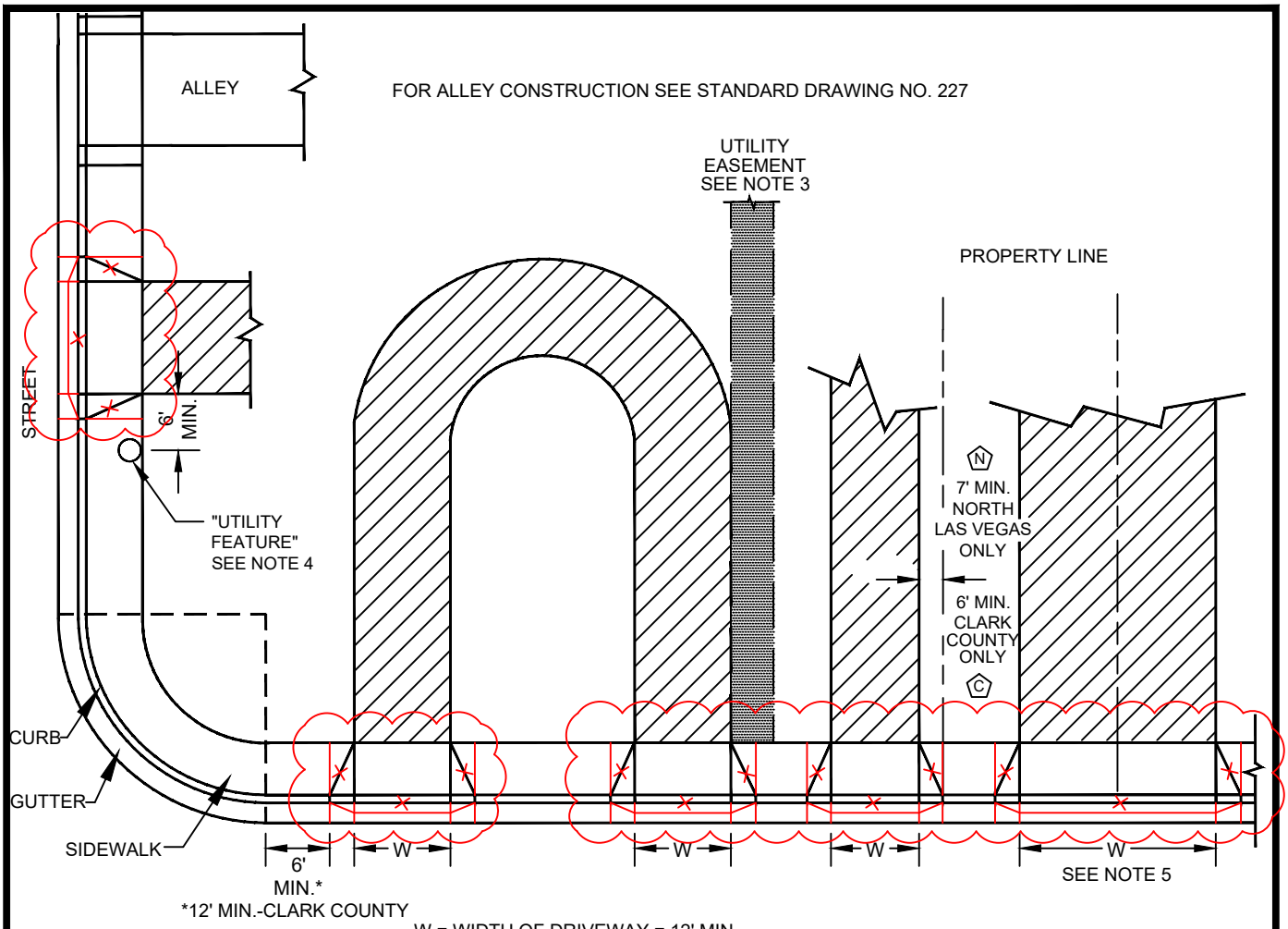
***Conditions (if applicable):**

Meeting Date: 11/15/2018	Staff

Discussion:

Advisory Action (check one):	***Approval** ☑	**Disapproval** ☐	**Item Held** ☐

***Conditions (if applicable):**



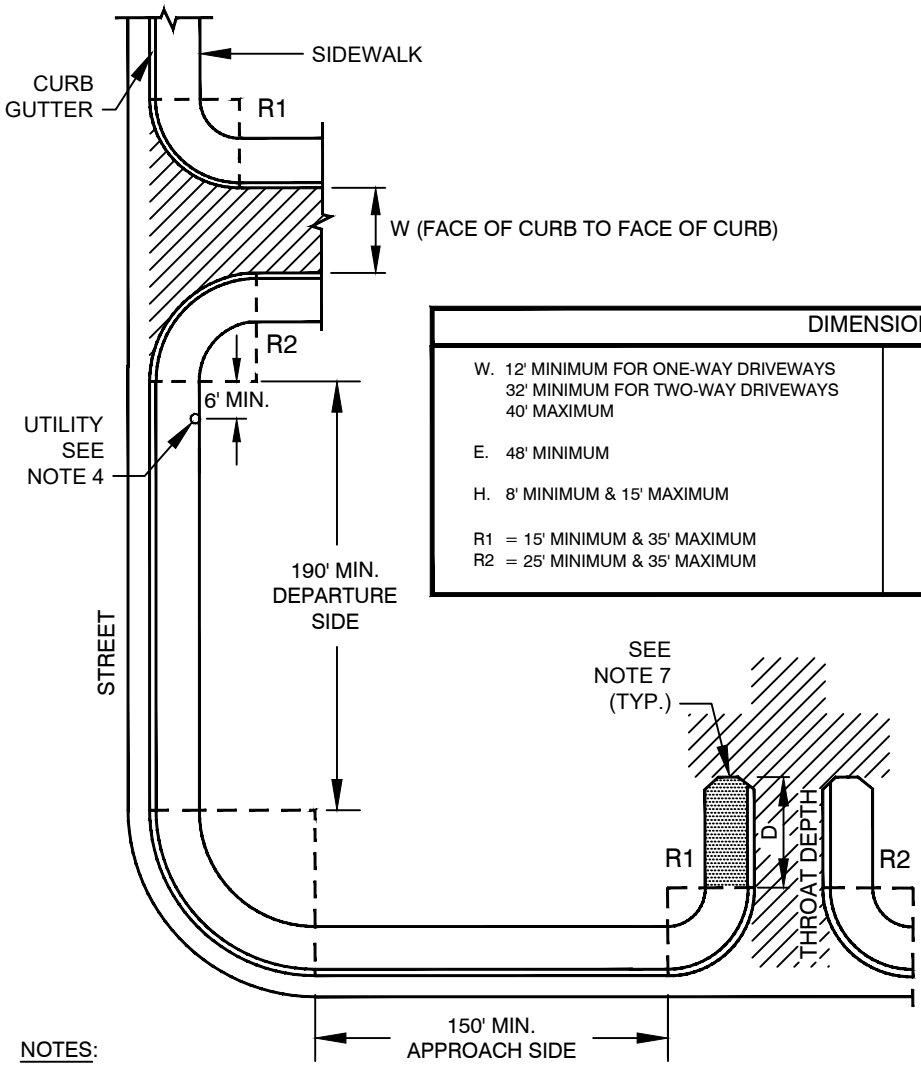
W = WIDTH OF DRIVEWAY = 12' MIN.,
16' MAX. FOR 1 OR 2 CAR GARAGE, OR
28' MAX. FOR 3+ GARAGE

NOTES

1. ALL RESIDENTIAL PROPERTIES MAY HAVE ONLY ONE CURB CUT EXCEPT CIRCULAR DRIVEWAYS AS SHOWN.
2. LOCAL ORDINANCES MAY APPLY AND SHALL HAVE PREFERENCE.
3. NO DRIVEWAY SHALL BE LOCATED WHOLLY OR PARTIALLY, ON OR OVER A UTILITY EASEMENT WHICH RUNS PERPENDICULAR TO THE CURB LINE.
4. NO DRIVEWAY SHALL BE LOCATED WITHIN 6 FEET OF A LIGHT POLE (UNLESS ACCEPTED BY THE ENTITY TRAFFIC ENGINEER), FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX, BLOCK WALL HIGHER THAN 2 FEET, OR THE CURB RETURN AT A STREET INTERSECTION OR ALLEY.
5. (C) COMMON DRIVEWAY CONSTRUCTION MAY BE PERMITTED AT ANY TWO RESIDENTIAL PROPERTIES OF 60 FEET IN WIDTH OR LESS. THE WIDTH OF THE JOINT DRIVEWAY SHALL BE A MAXIMUM OF 24 FEET. A JOINT DRIVEWAY AGREEMENT SHALL BE REQUIRED. (EXCEPT CLARK COUNTY)
6. GEOMETRICS APPLY TO NEW CONSTRUCTION ONLY, AND MAY VARY IN EXISTING SUBDIVISIONS SUBJECT TO APPROVAL OF THE ENGINEER.
7. MULTI-FAMILY RESIDENTIAL AND ALL NON-RESIDENTIAL DRIVEWAYS SHALL CONFORM TO THE COMMERCIAL DRIVEWAY STANDARDS.
8. ALL DRIVEWAY LOCATIONS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.
9. FOR CURB DEPRESSION AND DRIVEWAY APRON DETAIL, SEE STD. DWG. NO. 223.

AGENCY APPROVED	B	(C)	H	L	M	(N)	R

SPECIFICATION REFERENCE	UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA
	RESIDENTIAL DRIVEWAY GEOMETRICS
	DATE 8-12-99 / DWG. NO. 222



DIMENSIONS	
W. 12' MINIMUM FOR ONE-WAY DRIVEWAYS 32' MINIMUM FOR TWO-WAY DRIVEWAYS 40' MAXIMUM	D. THROAT DEPTH 25' MINIMUM 50' MINIMUM FOR PARKING LOTS > 50 PARKING SPACES 75' MINIMUM FOR PARKING LOTS 51 TO 100 PARKING SPACES 100' MINIMUM FOR PARKING LOTS 101 TO 200 PARKING SPACES 150' MINIMUM FOR PARKING LOTS > 201 PARKING SPACES
E. 48' MINIMUM	
H. 8' MINIMUM & 15' MAXIMUM	
R1 = 15' MINIMUM & 35' MAXIMUM R2 = 25' MINIMUM & 35' MAXIMUM	

NOTES:

1. COMMERCIAL AND MULTI-FAMILY DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWING NUMBERS 224, 225, 228, 235 AND 235.1.
2. ~~LOCAL ORDINANCES AND POLICIES MAY APPLY AND SHALL HAVE PRECEDENCE. SEE NDOT ACCESS POLICY FOR STATE ROADWAYS.~~ ACCESS MANAGEMENT SYSTEM AND STANDARDS FOR STATE ROADWAYS.
3. ~~THE TOTAL WIDTH "W" OF DRIVEWAY CURB OPENINGS SHALL NOT EXCEED 65% OF FRONT FOOTAGE.~~
4. NO DRIVEWAY SHALL BE LOCATED WITHIN 6 FEET OF A LIGHT POLE (UNLESS APPROVED BY THE ENTITY TRAFFIC ENGINEER), FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX, OR BLOCK WALL HIGHER THAN 2 FEET.
5. THE CENTERLINES OF THE DRIVEWAYS ON OPPOSITE SIDES OF THE STREET AT A MEDIAN OPENING SHOULD BE WITHIN 10' FROM EACH OTHER AT THE MEDIAN OPENING.
6. GEOMETRICS APPLY TO NEW CONSTRUCTION ONLY, AND EXCEPTIONS MAY BE GRANTED BY THE APPROVAL OF THE AGENCY TRAFFIC ENGINEER BASED ON SITE CONSTRAINTS.
7. ~~HANDICAPPED ACCESSIBLE~~ SIDEWALKS SHALL BE PROVIDED ADJACENT TO DRIVEWAYS TO THE P.C. OF THE ONSITE CURB RETURN, MINIMUM, OR AT AN ALTERNATE LOCATION.
8. WHEN A PROPERTY LINE FALLS IN A MEDIAN OPENING A JOINT DRIVEWAY AGREEMENT SHALL BE REQUIRED OR NO DRIVEWAY WILL BE ALLOWED.
9. WHERE A PEDESTRIAN ACCESS ROUTE CROSSES A DRIVEWAY, THE PEDESTRIAN ACCESS ROUTE ACROSS THE DRIVEWAY SHALL HAVE A CROSS SLOPE NO GREATER THAN 2%, REGARDLESS OF CONSTRUCTION TOLERANCES.

AGENCY APPROVED	B	C	H	L	M	N	R

SPECIFICATION REFERENCE	
.	

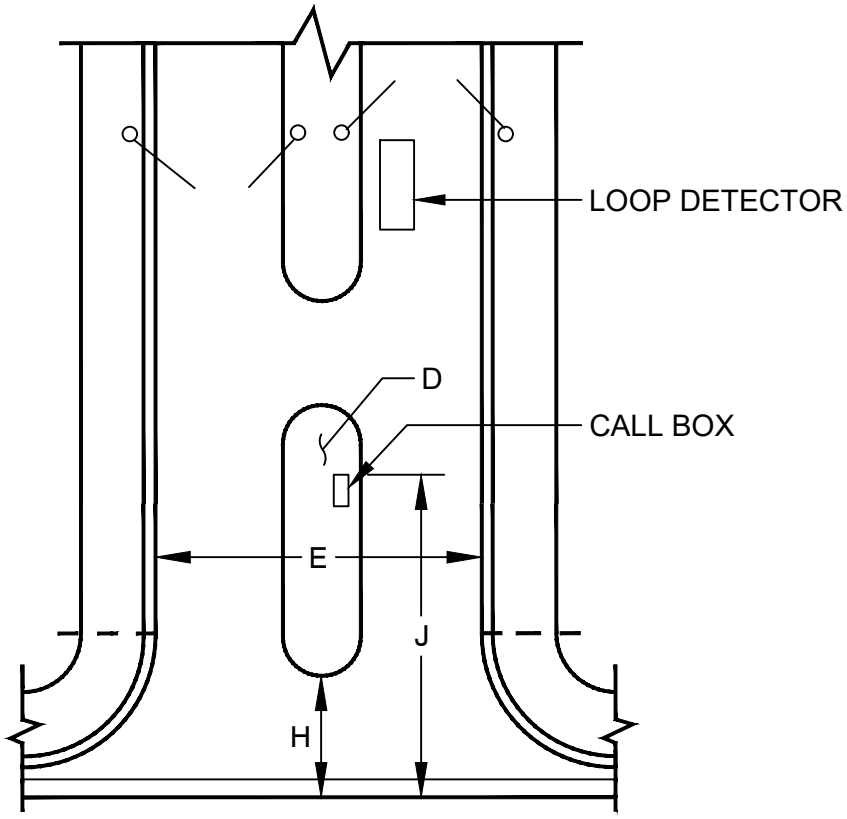
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

COMMERCIAL AND MULTI-FAMILY DRIVEWAY GEOMETRICS

DATE 02-09-06	DWG. NO. 222 .1	SHEET 1 OF 2

DIMENSIONS
J. THROAT DEPTH FOR SECURITY GATE 50' MINIMUM FOR 1 TO 49 HOMES OR APT. UNITS TO VISITOR CALL BOX. 100' MINIMUM FOR 50 TO 100 HOMES OR APT. UNITS TO VISITOR CALL BOX. GREATER THAN 100 HOMES OR APT. UNITS REQUIRE TRAFFIC STUDY

DIMENSIONS FOR SECURITY GATE CONTROLLED DRIVEWAY DETAIL
D. ISLAND : LENGTH-20' MINIMUM WIDTH- 4' MINIMUM G. 15' MINIMUM E. 48' MINIMUM H. 8' MINIMUM & 15' MAXIMUM



DETAIL FOR SECURITY GATE
CONTROLLED DRIVEWAYS

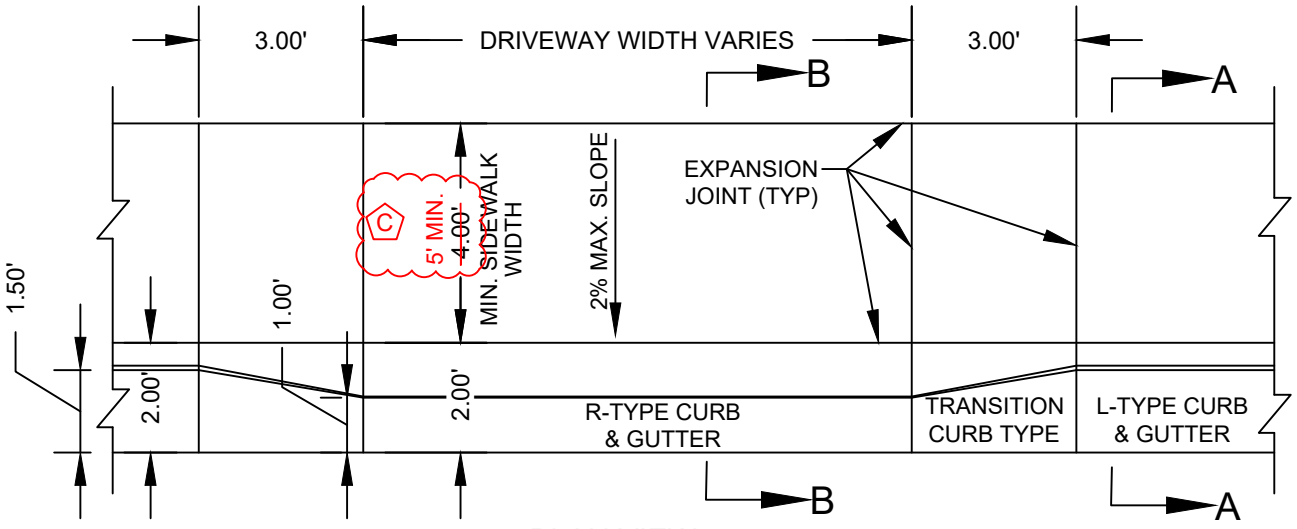
AGENCY APPROVED	B	C	H	L	M	N	R

SPECIFICATION REFERENCE	

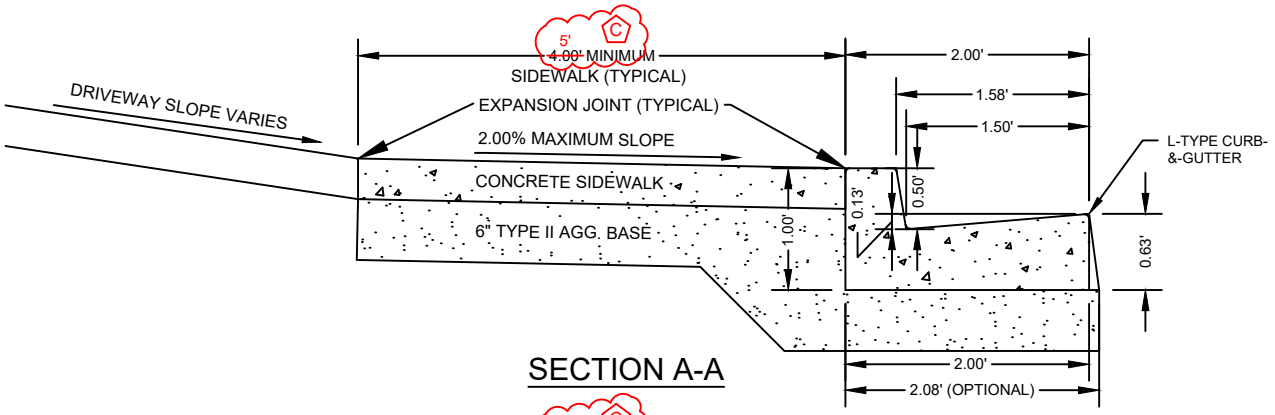
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

COMMERCIAL AND MULTI-FAMILY SECURITY GATE GEOMETRICS

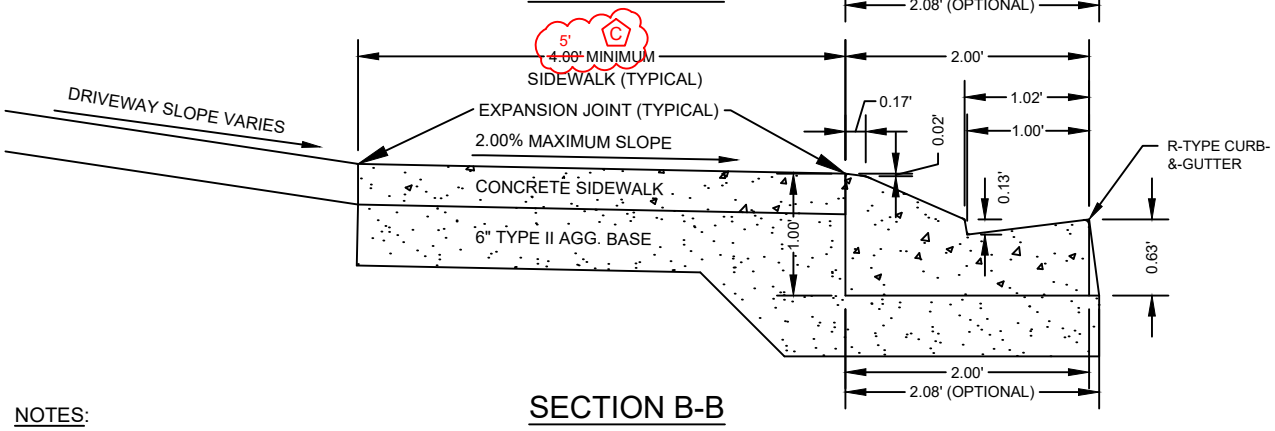
DATE 02-09-06	DWG. NO. 222 .1	SHEET 2 OF 2



PLAN VIEW



SECTION A-A



SECTION B-B

NOTES:

1. WHEN CONSTRUCTING DRIVEWAY WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE INTERFERING PORTIONS OF EXISTING CURB AND GUTTER. DRIVEWAYS MAY BE MONOLITHIC TO A.C. LINE.
2. WEAKENED PLANE JOINTS SHALL BE UNIFORMLY PLACED BETWEEN 5' AND 7' INTERVALS, SEE STANDARD DRAWING 234.
3. WHERE A PEDESTRIAN ACCESS ROUTE CROSSES A DRIVEWAY, THE PEDESTRIAN ACCESS ROUTE ACROSS THE DRIVEWAY SHALL HAVE A CROSS SLOPE NO GREATER THAN 2%, REGARDLESS OF CONSTRUCTION TOLERANCES.
4. (C) MINIMUM SIDEWALK WIDTH OF 4' ALLOWED IN CLARK COUNTY ONLY. WHERE THE CLEAR WIDTH OF A PEDESTRIAN ACCESS ROUTE IS LESS THAN 5', PASSING SPACES OF 5' MINIMUM BY 5' MINIMUM SHALL BE PROVIDED AT INTERVALS OF 200' MAXIMUM.

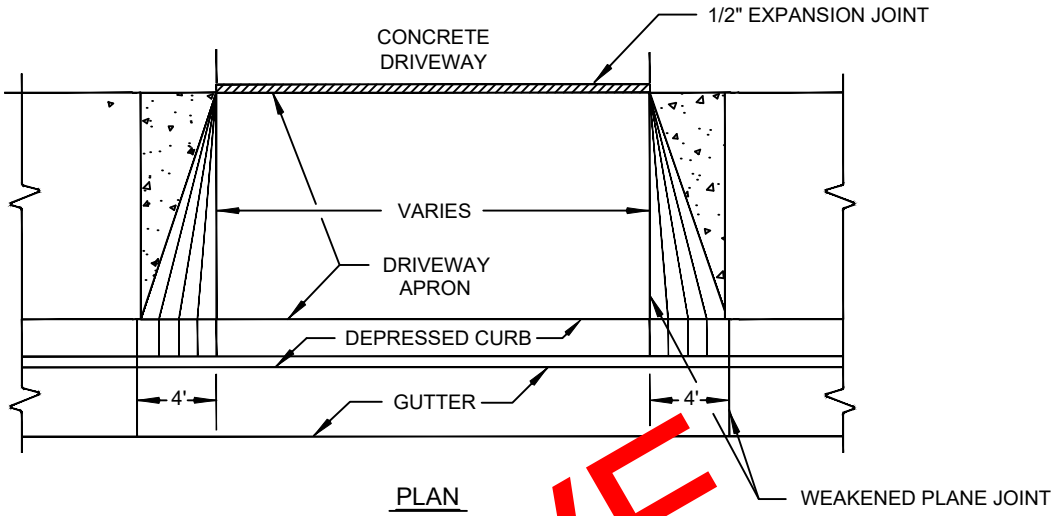
AGENCY APPROVED		C		L	M	N	R

SPECIFICATION REFERENCE	
302	AGGREGATE BASE
501	CONCRETE
502	CONCRETE STRUCTURES
707	JOINT MATERIAL

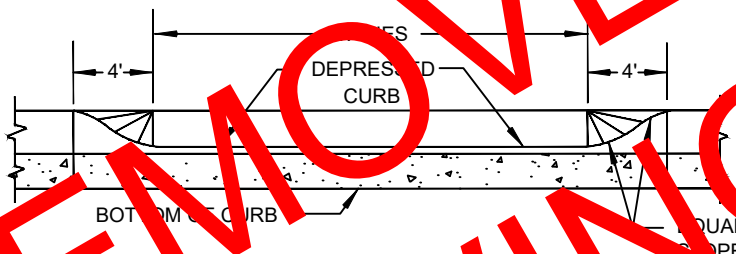
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

RESIDENTIAL DRIVEWAY

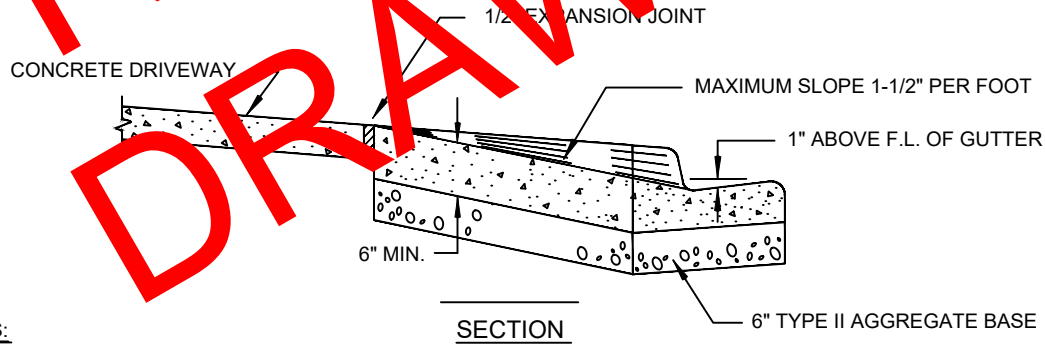
DATE 11-14-19	DWG. NO. 223	



PLAN



ELEVATION



SECTION

NOTES:

1. WHEN CONSTRUCTING DRIVEWAY WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE INTERFERING PORTIONS OF EXISTING CURB AND GUTTER. DRIVEWAYS MAY BE MONOLITHIC TO A.C. LINE.
2. WEAKENED PLANE JOINTS SHALL BE UNIFORMLY PLACED BETWEEN 5' AND 7' INTERVALS, SEE STANDARD DRAWING NO. 234.
3. STANDARD DRAWING 223.1 SHALL NOT BE ALLOWED WHEN SIDEWALK IS ATTACHED TO CURB.
4. THE "DUSTPAN" DRIVEWAY CANNOT BE A PART OF THE PEDESTRIAN ACCESS ROUTE SINCE THE DEPRESSED AREA IS NOT COMPLIANT WITH ADAAG.

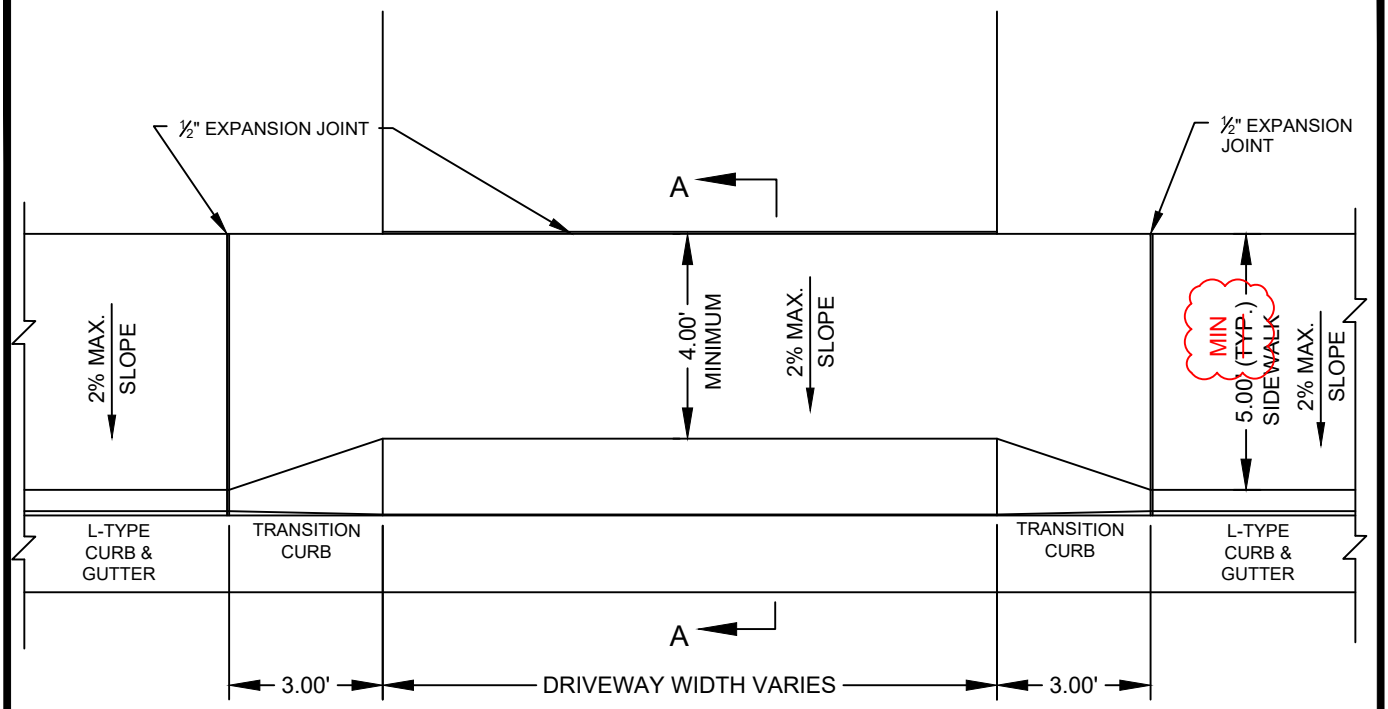
AGENCY APPROVED	B	C	H	L	M	N

SPECIFICATION REFERENCE	
302	AGGREGATE BASE
501	CONCRETE
502	CONCRETE STRUCTURES
707	JOINT MATERIAL

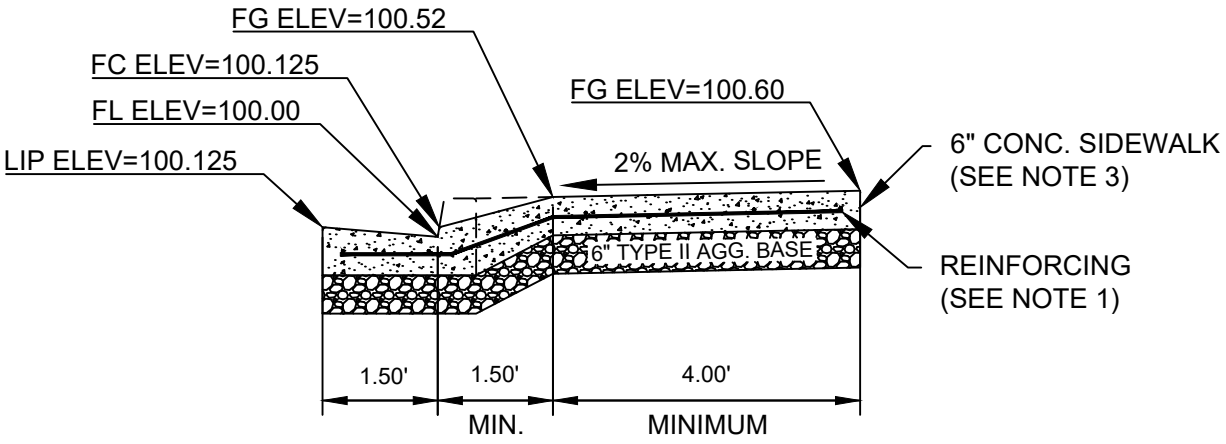
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

RESIDENTIAL DRIVEWAY WITHOUT ADJACENT SIDEWALK

DATE 07-01-16	DWG. NO. 223.1	



PLAN VIEW



SECTION A-A

NOTE: ELEVATIONS SHOWN ARE TYPICAL

NOTES

1. NO. 4 BARS AT 16" O.C. BOTH WAYS EXTENDING INTO GUTTER. NO. 4 BARS SHALL BE PLACED 3" ABOVE BOTTOM OF CONCRETE SUPPORTED BY NON-FERROUS CHAIRS APPROVED BY THE ENGINEER.
2. WHEN CONSTRUCTING DRIVEWAY WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE INTERFERING PORTIONS OF EXISTING CURB AND GUTTER. DRIVEWAY SHALL BE MONOLITHIC TO A.C. LINE.
3. DRIVEWAY THICKNESS FOR INDUSTRIAL USE SHALL BE 8" MIN.
4. WEAKENED PLANE JOINTS SHALL BE EQUALLY SPACED AT 15' MAX. INTERVALS, SEE STANDARD DRAWING NO. 234.
5. NO UTILITY BOXES AND COVERS ADJACENT TO R-TYPE CURB SHALL BE ALLOWED AT DRIVEWAY LOCATIONS.
6. PEDESTRIAN ACCESS ROUTE SHALL HAVE A CROSS SLOPE NO GREATER THAN 2%, REGARDLESS OF CONSTRUCTION TOLERANCES.

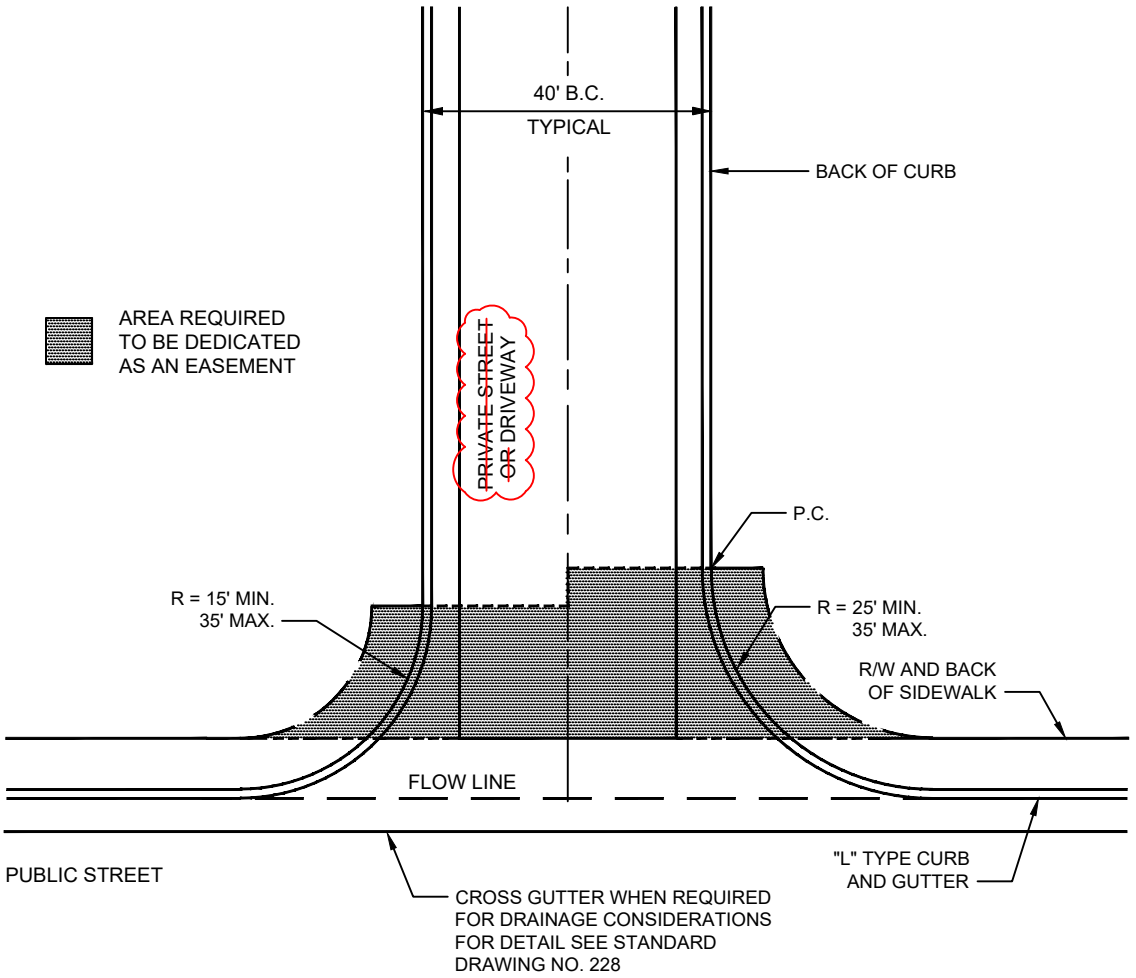
AGENCY APPROVED	B	C	H	L	M	N	R

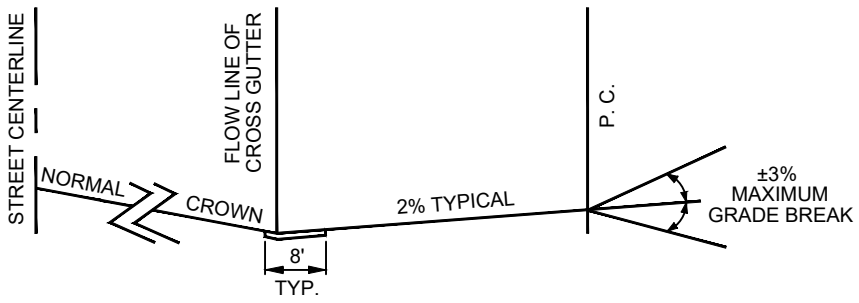
SPECIFICATION REFERENCE	
302	AGGREGATE BASE
501	CONCRETE
502	CONCRETE STRUCTURES
505	REINFORCING STEEL
707	JOINT MATERIAL
-	

UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

COMMERCIAL AND INDUSTRIAL DRIVEWAY (OPTION A)

DATE 01-01-17	DWG. NO. 224	





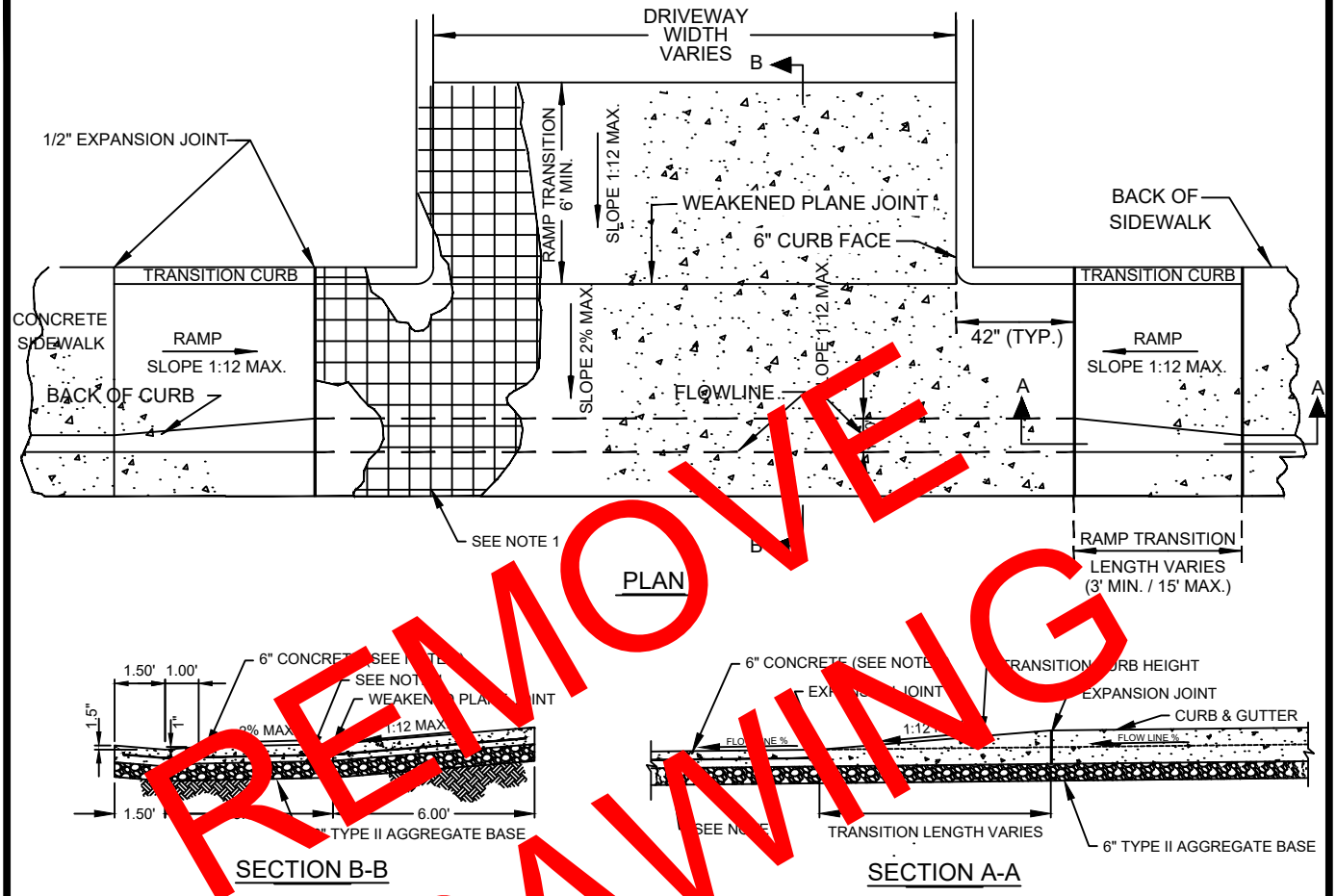
TYPICAL CROSS SECTION

NOTES

1. SEPARATION OF PEDESTRIAN AND VEHICLE TRAFFIC MUST BE MAINTAINED ON SITE.
2. FOR GRADE CHANGES GREATER THAN 3%, VERTICAL CURVES OF AT LEAST 10 FEET MUST BE USED.
3. ~~WHEELCHAIR~~ CURB RAMPS SHALL BE CONSTRUCTED IN THE CURB RETURN IN ACCORDANCE WITH STANDARD ~~DRAWING~~ NO. 235.
4. WHERE A PEDESTRIAN ACCESS ROUTE CROSSES A DRIVEWAY, THE PEDESTRIAN ACCESS ROUTE ACROSS THE DRIVEWAY SHALL HAVE A CROSS SLOPE NO GREATER THAN 2%, REGARDLESS OF CONSTRUCTION TOLERANCES.

AGENCY APPROVED	B	C	H	L	M	N	R

SPECIFICATION REFERENCE	UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA
	COMMERCIAL AND INDUSTRIAL DRIVEWAY (OPTION B) ~~OR~~ ~~PRIVATE STREET ACCESS~~
	DATE 2-11-93 | DWG. NO. 225



1. NO. 4 BARS AT 16" O.C. BOTH WAYS EXTENDING INTO GUTTER. NO. 4 BARS SHALL BE PLACED 3" ABOVE BOTTOM OF CONCRETE SUPPORTED BY NON-FERROUS CHAIRS APPROVED BY THE ENGINEER.
2. WHEN CONSTRUCTING DRIVEWAY WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE INTERFERING PORTIONS OF EXISTING CURB AND GUTTER. DRIVEWAY SHALL BE MONOLITHIC TO A.C. LINE.
3. DRIVEWAY THICKNESS FOR INDUSTRIAL USE SHALL BE 8" MIN.
4. WEAKENED PLANE JOINTS SHALL BE EQUALLY SPACED AT 15' MAX. INTERVALS.
5. THIS DRIVEWAY DESIGN SHALL ALSO BE USED FOR ALLEY INTERSECTIONS, 8" MIN. THICKNESS.
6. SPECIAL DESIGNS SUBJECT TO APPROVAL OF THE ENGINEER.

AGENCY APPROVED			H			N

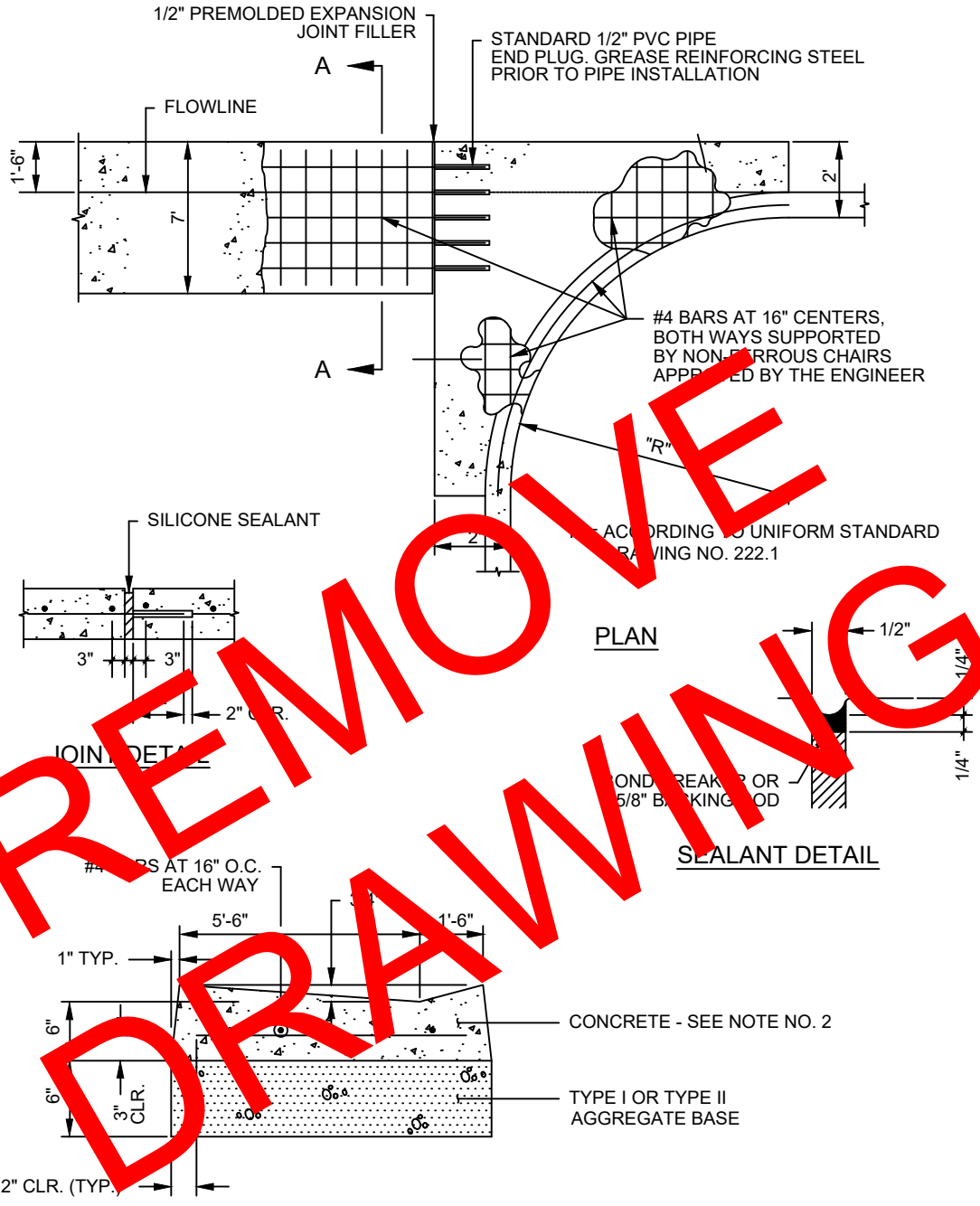
SPECIFICATION REFERENCE	
302	AGGREGATE BASE
501	CONCRETE
502	CONCRETE STRUCTURES
505	REINFORCING STEEL
707	JOINT MATERIAL
-	

UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

SUPPLEMENTAL DRAWING

COMMERCIAL AND INDUSTRIAL DRIVEWAY (OPTION C)

DATE 07-01-15	DWG. NO. 226.S1	



SECTION A-A

NOTES:

1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
2. ADJACENT SPANDREL SHALL BE 6" THICK P.C.C.

AGENCY APPROVED			H			

SPECIFICATION REFERENCE	
302	AGGREGATE BASE
501	CONCRETE
502	CONCRETE STRUCTURES
505	REINFORCING STEEL
707	EXPANSION JOINT MATERIAL
TT-S-00153A CLASS A SEALANT ·	

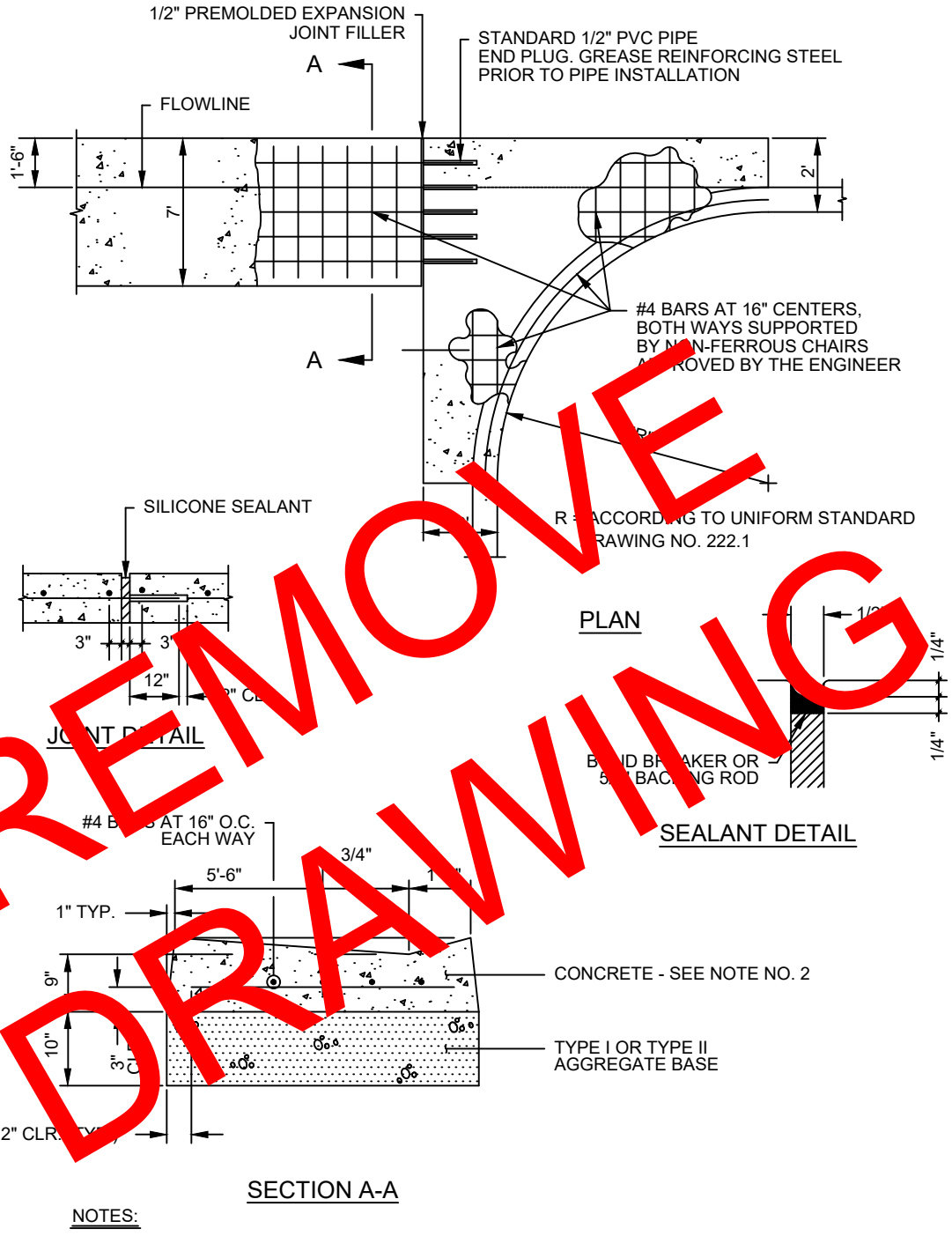
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

SUPPLEMENTAL DRAWING

LIGHT DUTY COMMERCIAL DRIVEWAY

(OFFICES, CHURCHES, SCHOOLS, RESTAURANTS, ETC.)

DATE 12-14-00	DWG. NO. 226.S2	



NOTES:

1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
2. ADJACENT SPANDREL SHALL BE 9" THICK P.C.C.

AGENCY APPROVED			H			

SPECIFICATION REFERENCE	
302	AGGREGATE BASE
501	CONCRETE
502	CONCRETE STRUCTURES
505	REINFORCING STEEL
707	EXPANSION JOINT MATERIAL
TT-S-00153A CLASS A SEALANT ·	

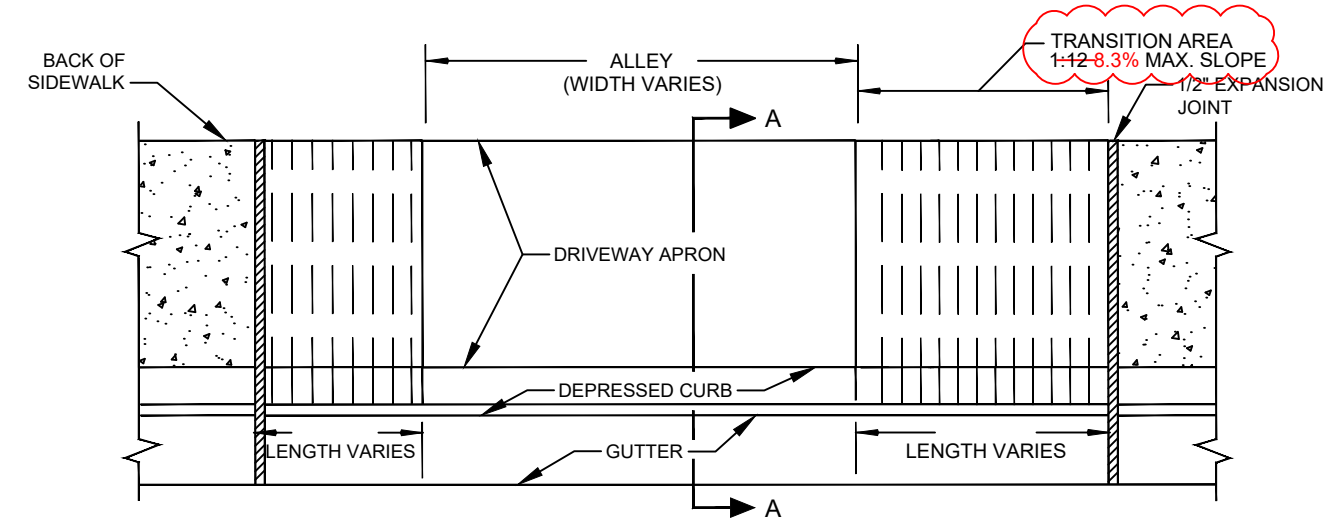
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

SUPPLEMENTAL DRAWING

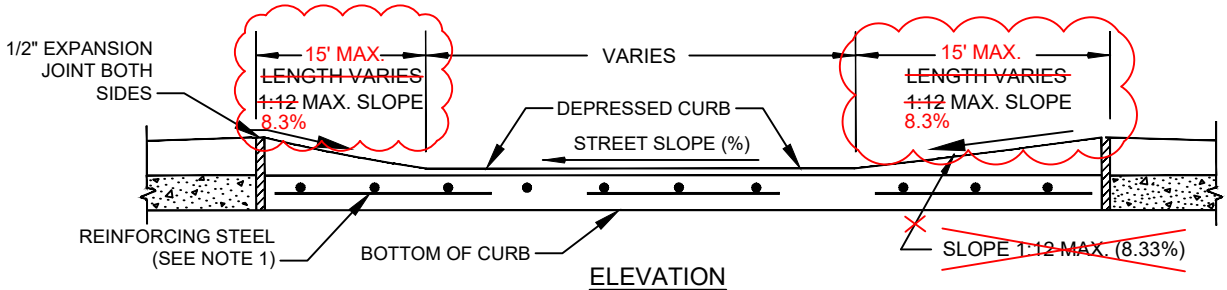
HEAVY DUTY COMMERCIAL DRIVEWAY

(SERVICE STATIONS, INDUSTRIAL, LOADING DOCKS, ETC.)

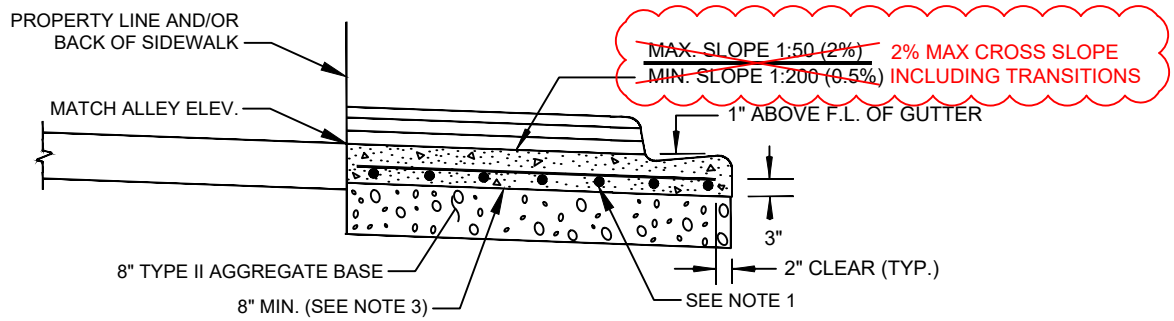
DATE 12-14-00	DWG. NO. 226.S3	



PLAN



ELEVATION



SECTION A-A

NOTES

1. NO. 4 BARS AT 16" O.C. BOTH WAYS CONTINUOUS THROUGH GUTTER. NO. 4 BARS SHALL BE PLACED 3" ABOVE BOTTOM OF CONCRETE.
2. WHEN CONSTRUCTING DRIVEWAY WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE INTERFERING PORTIONS OF EXISTING CURB AND GUTTER. DRIVEWAY SHALL BE MONOLITHIC TO A.C. LINE.
3. DRIVEWAY THICKNESS SHALL BE 8" MIN.
4. PEDESTRIAN ACCESS ROUTES SHALL HAVE A CROSS SLOPE NO GREATER THAN 2%, REGARDLESS OF CONSTRUCTION TOLERANCES.
5. THE RUNNING SLOPE AND LENGTH OF TRANSITION WITHIN THE PEDESTRIAN ACCESS ROUTE SHALL BE MAXIMUM DIMENSIONS, REGARDLESS OF CONSTRUCTION TOLERANCES.

AGENCY APPROVED	B	C	H	L		N	R

SPECIFICATION REFERENCE	UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA
	SUPPLEMENTAL DRAWING
	DEPRESSED ALLEY DRIVEWAY
	DATE 07-01-15 | DWG. NO. 227.S1

6761

REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

AGENDA ITEM

Metropolitan Planning Organization [X]	Transit [ ]	Administration and Finance [ ]

SUBJECT: STANDARD SPECIFICATIONS AND DRAWINGS

PETITIONER: M.J. MAYNARD, CHIEF EXECUTIVE OFFICER
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

RECOMMENDATION BY PETITIONER:
THAT THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA SPECIFICATIONS SUBCOMMITTEE RECEIVE A REPORT REGARDING THE CURRENT STATUS OF REVISIONS TO UNIFORM STANDARD SPECIFICATIONS AND DRAWINGS

GOAL: ENHANCE PUBLIC AWARENESS AND SUPPORT OF THE REGIONAL TRANSPORTATION SYSTEM

FISCAL IMPACT:

None

BACKGROUND:

This item will provide the status of proposed revisions to the Uniform Standard Specifications and Drawings. The attached tracking spreadsheet sets forth information about the revisions as the modifications are addressed by the Operations and Specifications Subcommittees, Executive Advisory Committee, and the Regional Transportation Commission of Southern Nevada Board of Commissioners.

Respectfully submitted,

DocuSigned by:
Joseph Damiani
1296E0A5F05745F...

for

JOHN R. PEÑUELAS, JR., P.E.
Senior Director of Engineering

SPECS Item #5
March 11, 2020

ssf

Uniform Standard Drawings

Drawing No.	Sheet	Name	Associated Specification	OPS	Sent to IR	SPEC	Sent to IR	EAC	RTC
Drawings Pending Ops									
244.9.S1		Bicycle Lane Delineation, Legend and Signage		3/17/20					
249		Standard Street Name Sign Post Installation	631	3/17/20					
249.1		Sign Installation Detail	631	3/17/20					
255.2		Typical Transition Section From Shared Use Path Along Roadway to Sidewalk	628, 633	3/17/20					
724		Type "I" Foundation	501, 623	3/17/20					
725		Type "J" & "K" Foundations	501, 623	3/17/20					
745		30 ft. Pole w/School Flashing Sign		3/17/20					
763	S1	ITS Communication Conduit and Pull Box Detail (For Existing Curb & Gutter)		3/17/20					
763	S2	ITS Communication Conduit and Pull Box Detail (For Existing Curb & Gutter)		3/17/20					
764		ITS Communication Conduit and Pull Box Detail Installed Under Sidewalk		3/17/20					
805	S1	Pedestrian Push Button Post for Special Sign (8 ft.-6inches high)		3/17/20					
805	S2	Pedestrian Push Button Post for 2 1/2 Inches Posttop Mounting		3/17/20					
885	S1	Pole Location & Signal Mounting at Intersection (Two Pole) Curbside Sidewalk		3/17/20					
885	S2	Pole Location & Signal Mounting at Intersection (Single Pole) Curbside Sidewalk		3/17/20					
886	S1	Pole Location & Signal Mounting at Intersection (Two Pole) Offset Sidewalk		3/17/20					
886	S2	Pole Location & Signal Mounting at Intersection (Single Pole) Offset Sidewalk		3/17/20					
887		Pole Location and Signals Mounting on Right Turn Island		3/17/20					
888.1		Future Pole Location Case II		3/17/20					
888.S1		Future Pole Location Case I		3/17/20					
Ops Drawings in IR									
Drawings Pending Spec									
222		Residential Driveway Geometrics		1/21/20	2/4/20	3/11/20			
222.1	1	Commercial and Multi-family Driveway Geometrics		1/21/20	2/4/20	3/11/20			

Uniform Standard Drawings

Drawing No.	Sheet	Name	Associated Specification	OPS	Sent to IR	SPEC	Sent to IR	EAC	RTC
222.1	2	Commercial and Multi-family Security Gate Geometrics		1/21/20	2/4/20	3/11/20			
223		Residential Driveway	302, 501, 502, 707	1/21/20	2/4/20	3/11/20			
223.S1		Residential Driveway	302, 501, 502, 707	1/21/20	2/4/20	3/11/20			
223.1		Residential Driveway without Adjacent Sidewalk	302, 501, 502, 707	1/21/20	2/4/20	3/11/20			
224		Commercial and Industrial Driveway (Option A)	302, 501, 502, 505, 707	1/21/20	2/4/20	3/11/20			
225		Commercial and Industrial Driveway (Option B) or Private Street Access		1/21/20	2/4/20	3/11/20			
226.S1		Commercial and Industrial Driveway (Option C)	302, 501, 502, 505, 707	1/21/20	2/4/20	3/11/20			
226.S2		Light Duty Commercian Driveway	302, 501, 502, 505, 707, TT-S-00153A	1/21/20	2/4/20	3/11/20			
226.S3		Heavy Duty Commercial Driveway	302, 501, 502, 505, 707, TT-S-00153A	1/21/20	2/4/20	3/11/20			
227.S1		Depressed Alley Driveway		1/21/20	2/4/20	3/11/20			
Spec Drawings in IR									
Drawings Pending EAC									
Drawings Pending RTC Board									
236		Sidewalk Drain	302, 501, 710	9/17/19	10/29/19	1/8/20	-	2/27/20	3/12/20
244.9		Bicycle Lane Delineation, Legend and Signage		9/17/19	10/29/19	1/8/20	-	2/27/20	3/12/20
255.4		Delineation and Bollard Usage On Shared Use Path	628, 633	9/17/19	10/29/19	1/8/20	-	2/27/20	3/12/20
320		Lighting Standard Setback	501, 623	9/17/19	10/29/19	1/8/20	-	2/27/20	3/12/20
321.S.S1		Modified Existing Streetlight Foundation for Installation of Underground Conduit	501, 623	9/17/19	10/29/19	1/8/20	-	2/27/20	3/12/20
332	2	Service Pedestal Foundation Street Lighting and/or Traffic Signal	501, 623	9/17/19	10/29/19	1/8/20	-	2/27/20	3/12/20

Uniform Standard Specifications

Spec No.	Name	OPS	Sent to IR	SPEC	Sent to IR	EAC	RTC
Specifications Pending Ops							
Ops Specficiations in IR							
Specifications Pending Spec							
401	Plantmix Bituminous Pavements - General	-	-	1/8/20	1/30/20	3/26/20	
404	Hot Plant Mix Recycled Bituminous Pavement	-	-	1/8/20	1/30/20	3/26/20	
702	Concrete Curing Materials and Admixtures	-		1/8/20		3/26/20	
703	Bituminous Materials	-	-	1/8/20	1/30/20	3/26/20	
Spec Specifications in IR							
Specifications Pending EAC							
Specifications at RTC Board							

5409

REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

AGENDA ITEM

Metropolitan Planning Organization [X]	Transit [ ]	Administration and Finance [ ]

SUBJECT: TOPICS OF INTEREST

PETITIONER: M.J. MAYNARD, CHIEF EXECUTIVE OFFICER
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

RECOMMENDATION BY PETITIONER:
THAT THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA SPECIFICATIONS SUBCOMMITTEE DISCUSS TOPICS OF INTEREST

GOAL: MAINTAIN AND IMPROVE TRANSPORTATION SYSTEM INFRASTRUCTURE

FISCAL IMPACT:
None

BACKGROUND:

The Specifications Subcommittee members can share information about activities, meetings, news and other topics of interest in an informal manner.

While no action may be taken on the subjects discussed, this item provides an opportunity for the exchange of information and may serve as the forum to recommend future Specifications Subcommittee agenda items.

Respectfully submitted,

DocuSigned by:
Joseph Damiani for
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JOHN R. PEÑUELAS, JR., P.E.
Senior Director of Engineering

SPECS Item #6
March 11, 2020

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REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

AGENDA ITEM

Metropolitan Planning Organization [X]	Transit [ ]	Administration and Finance [ ]

SUBJECT: FINAL CITIZENS PARTICIPATION

PETITIONER: M.J. MAYNARD, CHIEF EXECUTIVE OFFICER
REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA

RECOMMENDATION BY PETITIONER:
THAT THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA SPECIFICATIONS SUBCOMMITTEE CONDUCT A COMMENT PERIOD FOR CITIZENS PARTICIPATION

GOAL: MAINTAIN AND IMPROVE TRANSPORTATION SYSTEM INFRASTRUCTURE

FISCAL IMPACT:
None

BACKGROUND:

In accordance with State of Nevada Open Meeting Law, the Regional Transportation Commission of Southern Nevada Specifications Subcommittee shall invite interested persons to make comments. For the initial Citizens Participation, the public should address items on the current agenda. For the final Citizens Participation, interested persons may make comments on matters within the Specifications Subcommittee's jurisdiction, but not necessarily on the current agenda.

No action can be taken on any matter discussed under this item, although the Specifications Subcommittee can direct that it be placed on a future agenda.

Respectfully submitted,

DocuSigned by:
Joseph Damiani for
1296E0A5F05745F...
JOHN R. PEÑUELAS, JR., P.E.
Senior Director of Engineering

SPECS Item #7
March 11, 2020

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