**DISPUTE REVIEW BOARD REPORT AND RECOMMENDATIONS**

**Project: I-25 Managed Lanes – 120th to SH 7 Adams County, CO**

**CDOT Project No. IM 0253-234**

**DISPUTE No. 1 – Grade Elevation Discrepancies**

**Hearing Date:** May 29-30, 2018

**Hearing Location:** North Holly CDOT Office - 4670 Holly St, Denver, CO

**Party Attendees:**

**Hamon Infrastructure, Inc.** **CDOT**

Bruce Hamon - President Stephanie Alanis - Resident Engineer Brad Davis – Project Manager Jason Lucerna – Project Engineer

Muriel Agnelli – Vice President Andy Stratton – Program Engineer

Debbie Eurich – Project Admin Laura Zamora – Area Engineer

Brad Amy – Project Manager Andrea Hebard – Assistant Project Engineer

Calvin Tow – Party Chief Daniel Smith – Survey Manager

Greg Collar – Surveyor Jerald Buffington – Surveyor

Austin Konkel – General Supt. Richard Zamora – Region 1

Elvia Loya – Public Information Leo Milan, Jr. – Asst. Attorney General

Skip Smith - Sherman and Howard Bob Garcia – Geocal

Gary Self – Expert Witness Ryan Sisson – TSH

Mitch Kumar – Expert Witness Fred Holderness – TSH

Ken Ekstrom – Consultant Jim Zufall – Atkins

Anthony Meneghetti – HPTE

Chris Horn - FHWA

**Background**

The North I-25 Segment 3 Express Lanes Project is the second express lanes project in the I-25 corridor, extending the managed lanes system over six miles from the current termini near 120th Avenue north to E-470. This project is similar in scope to the previous project, Segment 2 (84th Avenue to 120th Avenue). The current project includes:

* Widening to accommodate an additional lane (Express Lane) in each direction, along with standard widths of lanes and shoulders
* Supporting roadway infrastructure, including pavement; drainage and water quality systems; bridge widenings and replacements; retaining and sound walls; intelligent transportation systems (ITS), ramp metering, and tolling equipment
* Reconstruction of 13 ramps and associated construction detours
* 2-inch mill and overlay of existing pavement with stone matrix asphalt (SMA), including distinct areas of crown and superelevation correction for highway drainage improvements. In all areas of cross slope correction, the construction detail includes a

“wedge” of asphalt leveling course to “fill” to the required cross slope.

* New, uniform driving surface of SMA pavement over both existing and new, widened pavement.

CDOT awarded Hamon Infrastructure, Inc. (Hamon) (Contractor) a Design-Bid-Build Contract for $56,390,000 on March 16, 2016 and issued a Notice to Proceed on July 5, 2016. Construction of the Project began in July 2016. In early 2017, the parties began discussions on the Plan grades resulting in CDOT eventually directing Hamon to “match existing” on December 13, 2017. Hamon submitted an Initial Notice of Dispute on January 10, 2018 followed by a Request for Equitable Adjustment on January 25, 2018 which was followed with three Supplements. On February 2, 2018, the Project Engineer (PE) issued a denial of merit letter which was eventually followed by the Resident Engineer’s (RE) final determination letter of March 19, 2018 which affirmed the PE’s position and stated that the parties also remained at an impasse with regard to whether or not the Plans are in error. The RE denial letter also added that the dispute shall be presented to the Dispute Review Board in accordance with subsection 105.23.

**Joint Statement of the Dispute**

Hamon submitted this REA on January 25, 2018, and submitted the following supplements thereto: Supplement 1, dated February 10, 2018 (Sent to CDOT on February 12, 2018); Supplement 2, dated March 2, 2018; Supplement 3, dated March 15, 2018.

Hamon contends it estimated and bid this project based on its interpretation of the plans and specifications and concluded it was required to construct the new lanes to the design elevations shown on the plans. Hamon contends it thereafter constructed the new lanes to the design elevations shown on the plans.

CDOT contends 1) The contract requirements are that the grades shown in the plans are representative of the existing conditions as established by the allowable tolerances prescribed in the Contract; 2) CDOTs directive to match existing is not a change to the contract but is a fundamental requirement of the Contract Documents and as clarified through specific clarifications prior to the start of the work in question; and 3) Hamon did not construct the widenings in accordance with the contract documents.

The dispute involves interpretation of the plans and specifications and whether Hamon’s pre-bid interpretation and post-bid construction to the plan elevations met the contract requirements. Hamon requests a determination whether CDOT’s direction to “match existing” constitutes a change.

There are additional issues that derive from the major issue summarized above. These additional issues include: Whether CDOT is required to issue revised drawings providing direction on how to match existing, and whether Hamon is entitled to compensation and time.

This hearing is limited to whether Hamon has established merit. If the DRB finds that CDOT’s direction to ‘match existing’ constitutes a change and that Hamon is entitled to compensation and time, Hamon will submit another REA.

**Pre-hearing Submittals**

Both parties provided the DRB with Pre-hearing Submittals per Subsection 105.23(e) which included Position Papers and documentary evidence relevant to the issues and a set of Common Reference Documents. Both parties provided the DRB with their list of attendees and Hamon disclosed two expert witnesses with a summary of their presentations and qualifications. Some documents in CDOT’s Pre-hearing Submittal were considered “new information” by Hamon and CDOT contended some of the post Pre-hearing Submittal information from Hamon was also “new information”. After discussions and emails, the parties agreed that the information that had been submitted to the DRB could be used at the hearing.

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**Grade Elevation Discrepancies**

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**Summary of Contractor Presentation on Grade Elevation Discrepancies**

CDOT’s directive to “match existing” constitutes a change from the design data that was given in the Plans at bid time. Any after-bid information or documents are not relevant unless it is given as a change to the Contract Documents. Based on the Spearin Doctrine, CDOT impliedly warranted the accuracy of the bid Plans and Specifications and that the Plans were suitable for construction. CDOT also had superior knowledge of how the survey data in the Plans was obtained and used.

At bid time, based on the Plan cross sections, Hamon considered the Project to be widening, reconstruction and overlay and presented its interpretation of Plan Sheet No. 121 – Survey Tabulation. Hamon then referred to Plan Sheet No. 202 which gives elevations at the Profile Grade Line (PGL), the Inside Edge of Pavement (IEOP) and the Sawcut Line (SC). Hamon pointed out that there were differences in the Profile Sheets prepared by CH2M and TSH depending where you are along the Project. The profiles give over 9,000 points and elevations on the Project. The grades shown in the Plans show that the grade profiles are actuallychords and not a smooth curve. Hamon showed a picture on how the existing pavement is wavy at the sawcut (SC).

Hamon began the widening portion first along with the new drainage structures and piping. Plan Sheet No. 600 – I-25 Drainage Profiles Line K4 was referenced to give an example of the grades it used to construct the drainage structures. Plan Sheet No. 14-X2 shows typical Sections and the roadway Cross Sections show the existing grades and the new grades and in some cases there is a

difference between the lines as shown on Plan Sheet No. 202 at NB Station 3070. The Cross Sections show that 40% of the existing and final grade lines are different like on Plan Sheet. No. 1305. Thus, Hamon used the Plan grades for construction and nothing in the Contract says to disregard Plan elevations.

CDOT told Hamon the elevations on the Plans were used as the basis of the design and representative of the existing. There is nothing in the Contract Documents that defines “basis of the design” or “representative”. The Contract says to build to Plan elevations and the Plans show design elevations. If there is a problem, there are reconstruction bid items for planing and filling to cover it. CDOT stopped work for not “matching existing”. This is a change to the Contract because the Contract says to construct per the Plans and the Plans give elevations.

**Expert Presentations**

Gary Self

Gary Self, a former CDOT employee, said CDOT needed to be fair and reasonable any pay for its mistakes. He made reference to Specification Section 101.47 – Plans, Section 105.02(a) – Plans, and Section 105.03 – Conformity to the Contract which all make reference to the *location, character, dimensions and details of the work to be done.*

Contract Section 1 – Scope of Work states, *The Contractor shall, in a good and workmanlike manner at his own cost and expense, and strictly in accordance with this Contract, furnish all materials and do all work not herein specifically excepted, necessary or incidental to the complete construction of* (the) *Project. … The work is described in the plans and specifications for the project*.

Contract Section 19 - Entire Understanding states, *This Contract is intended as the complete integration of all understandings between the parties.* Therefore if it is not in the Contract, it has no force.

Forty percent of the Cross Sections show a difference between the existing and final grades. This is not “match existing” the way they are drawn differently. “Design intent” is not in the Contract and design intent is the designer’s responsibility. Deciding on the accuracy of the survey data is not something the contractor is required to do. The designer is the one responsible to reconcile survey and design. If the designer wanted to “match existing”, he should have clearly shown such on the Plans.

Survey Tabulation (Plan Sheet No. 121) General Note 7 requires tying plan grades to field grades which would be at SC. If there is a difference in elevation, you cut or fill. CDOT’s engineer developed the Plan elevations at the SC line.

Specification Section 105.14 – Authority and Duties of the Project Engineer: The PE cannot change the Contract from the Plan elevations unless he does so by a change order and revised plans. There is nothing in the Contract that tells the contractor to ignore the Plans and use “design intent”.

Mitch Kumar

Mitch Kumar, a former CDOT employee, said the Plans give the contractor the design elevations that the designer intended to be used for construction. As an example, as shown on Plan Sheet No. 202, grade elevations are required to be to 0.01’. The Contract requires construction per the Plans. The Plans do not say to disregard Plan elevations and “match existing” and there is no tolerance given for “match existing”. “Match existing” is for the cross slope of the existing pavement from the IEOP to SC as called out under Abbreviations on the Profile Plans. The cross slopes for the widened sections are shown on the cross sections.

This is a Design-Bid-Build job and the Contract tells the contractor what to do. The contractor is not responsible to stamp the plans if they change. There are two pay items for planing which provides for the planing to make the Plans work. The “design intent” is to plane to match the existing. If the design intent was to match existing, the correct way to show it would be like on the plans from another project (Hamon Exhibit B18) and he is familiar with that project.

Hamon Exhibit B9 shows a revision on Plan Sheet No. 236 where the vertical curve data was changed. Although CDOT says in red on the sheet that *This is not a “Revised Plan Sheet”,* thedesigner changed the design and this was a change by the Owner.

Hamon Wrap-up

Referring to Exhibit B9, Hamon reported the elevations differences to CDOT as required by the Contract. CDOT finally said that if Hamon asked for anymore revised drawings, they would suspend Hamon and kick them off the job. Hamon’s surveyors are experienced and they are not going to change the Plans. They are not professional engineers. Hamon provided survey information to CDOT and CDOT finally had CDOT’s surveyors come to the job.

CDOT and TSH’s (CDOT’s designer) design concept was to match existing conditions and TSH has said “closely match” which is not in the Contract. This statement shows there can be some changes from “match existing”. When Hamon brought up the differences in the Plans prepared by CH2M and TSH, CDOT said the differences were due to “drafting styles” which is not defined in the Contract. Per Ryan Sisson (TSH), the geometric profile is not appropriate for construction and the old SC grade becomes the control.

CDOT has said the HMA Hamon has constructed to date is not right. The question is, what is the cross section to be used for construction? If Hamon is lower than the Plan grades in the widening, CDOT gets more asphalt and Hamon pays.

It took CDOT 17 months after Hamon began the widening construction for CDOT to say Hamon’s construction was wrong. CDOT said Hamon could have “measured down” to determine how to build the widening. CDOT gave the direction to “build down”. How can Hamon certify the grades by measuring down instead of using the Plan grades? How can you meet the pavement construction tolerances by building from the top down?

The real point is, if Hamon was not building properly, why did CDOT wait 17 months to tell them? Hamon turned in the subgrade certifications showing the base to +/- 0.02’ and CDOT saw the shots being taken.

“Meet existing” is a Contract change and Hamon’s dispute has merit. At bid time, the information Hamon had was to use the elevations in the Plans. CDOT is responsible for the accuracy of the Plans and Specifications and had superior knowledge about the development of elevations given in the Plans. If CDOT wants 9,000 new elevation points, they need to provide them. CDOT recorded the survey meeting that was held and has said it would take two years to do a level loop of the Project for design purposes and that is why they used LiDAR which does not meet the grade tolerances required for construction. The Plans are not good for the intended use as expected by CDOT.

**Summary of CDOT Presentation on Grade Elevation Discrepancies**

The dispute started as stated in Hamon’s REA due to:

1. CDOT's determination that Hamon did not construct widened portions of I-25 pursuant to Plan elevations
2. Apparent errors in design elevations

Early in the construction of the widening, some of the HMA that was placed looked correct and then it began to look wavy. In response to Hamon RFI’s, CDOT sent Form 105’s 841 and 917 requesting the Hamon as-built survey since CDOT’s survey indicated the Plan grades were correct and that the mainline widening had not been built to Plan.

CDOT has made many efforts over time to try to understand the problem and validate Hamon’s position through:

* RFI’s and Form 105’s
* CDOT performed surveys
* Coring new roadway sections
* Doing a smoothness study

CDOT’s position is based on the facts and industry standards.

Hamon’s Position Paper says the work was built per the Plans but the widening does not match the existing. Hamon showed inlet construction and Plan grades but the elevations are not within the required tolerances for inlets. CDOT did not stop work but did stop paving work. CDOT has requested survey data from Hamon but Hamon has not provided it. Design tolerances are different from construction tolerances. Hamon is taking the mill and fill in the specifications out of context. Design intent was given to Hamon to tell them what was meant for “meet existing”.

CDOT has been frustrated in getting grade certifications in a timely manner and paving started before certifications were received. CDOT does not give directions to the contractor. CDOT gets Method Statements. Hamon did not put a ski on the existing pavement and the base course

was uneven. In a meeting with Aggregate Industries, AI said they did not plan to “match existing”. The base course has to meet tolerances for the asphalt to meet tolerances.

Some RFI’s were for isolated areas and CDOT provided Plan revisions when they thought they were necessary. The 2016 Hamon survey showed some elevations changed in spots but Plan Sheet No. 7 – General Note 7 states, *The Contractor shall be responsible for promptly notifying the engineer of any problems or potential problems in conforming to the design line and grade for any element of the construction within seven (7) days. Prior to construction, the Contractor shall be responsible for notifying the Engineer of site conditions that differ from those shown on the approved plans.*

CDOT did not withhold comments on survey or construction and did a smoothness test. Plan Sheet No. 7 – General Note 38 calls out for the smoothness to meet HR11. The loss of survey control affects everything. The resurvey was a waste of time and money. Hamon just needs to “match existing”. CDOT’s survey shows the new asphalt at the SC was as much as 1” high to 6” low.

CDOT went through a timeline of the Project and noted that CDOT discovered discrepancies in October 2017 after the HMA work had begun and requested a Corrective Action Plan in December 2017.

CDOT Surveyor Dan Smith

There are two phases concerning surveying. The first is pre-construction – before the bid - and the second is post bid.

The pre-construction survey was done using LiDAR, which per CDOT Survey Manual 5.5.3 – Minimum Horizontal Accuracy Tolerance is CDOT Class C or 0.20feet. Per CDOT Survey Manual 5.9.6 – Minimum Vertical Accuracy Tolerance for Class A and B Surveys and for a project six miles long the formula results in a tolerance of 0.086 feet. (It should be noted that elevations for asphalt surfaces falls under CDOT Class C.) The note on Plan Sheet - Preliminary Land Survey Control Diagram states, *Basis of Elevations: Project elevations are GPS derived using CEDID 09 …*

The post bid surveying began with the Pre-survey meeting on June 22, 2016 where the CDOT Survey Manual was discussed. The Profile Grade was not a designed grade but was based on the CDOT LiDAR survey. “Match existing” is a field condition and if there is a difference, the contractor must adjust. If there was a question on “match existing”, the question should have been asked earlier.

Prior to the start of construction, CDOT had set 25 monuments. When CDOT went back to do the check surveying, they could only locate 13 monuments – the rest had been destroyed. Hamon worked off of 4 monuments when they started and now 2 are gone. Hamon should have confirmed CDOT’s survey data from 2008 and 2010.

In January 2018, CDOT surveyed 3,050 LF of the SC line at 50 foot stations with results that 59 SC points were within 0.20’ tolerance and 2 (3.4%) exceeded the tolerance. At the top of inlet

grates, 5 points were within 0.20’ tolerance and none exceeded the tolerance. The CDOT Survey Report of March 2018 based on 20,150 LF at 50 foot stations with results that 387 SC points were within 0.20’ tolerance and 16 (4.1%) exceeded the tolerance. At the top of inlets grates, 26 points were within 0.20’ tolerance and none exceeded the tolerance. The survey also covered 1,300 LF of Wall Monuments with results that 48 points were within 0.20’ tolerance and 1 (2.1%) exceeded the tolerance. Survey tolerances are 0.20’ but construction tolerances are 0.02’.

Field revisions were needed not Plan revisions. Hamon built to the design grades rather than to “match existing”.

CDOT Summary

Per Specification Section 625 – Construction Surveying, the contractor is tied to existing. CDOT offered to help. If the Plans are not clear, why didn’t Hamon ask a question? CDOT did not receive the REA until January 2018. CDOT Project staff elevated the dispute to the RTD for a quality check, looking for some common place to agree. The decision was “match existing”. Hamon is losing quality and the Project is late. The DRB has to look at the whole picture.

**Contractor Rebuttal**

The time to get the CDOT surveyor involved was not in the midst of construction after much of the work was done. CDOT’s surveyor should have been involved as soon as Hamon said there were grade problems

Hamon used the same documents it had at bid time to do the construction and they did not bid to “match existing”. Specification Section 105.02 says, **the** **Contract and not the contractor will show…**This is a mill and overlay job. The Plan defects are latent defects which Hamon did not know at bid time. The design elevations are really survey elevations shown to 0.01’ and Hamon built to design elevations.

The information on the Plans is what Hamon had at bid time. Stephanie (RE) said to make it work. Hamon received clarification from CDOT **after** the bid. Some cross sections and some places on the profile show different lines indicating there are some cuts.

Hamon is concerned with final roadway smoothness but some of the SC locations will result in wavy asphalt. Jason said the existing asphalt cannot be milled to provide a transition edge for traffic switches.

Hamon Exhibit F3 is the transcript of the Survey Meeting. CDOT should know that Hamon’s GPS machine work is checked using bench marks along the way. Hamon’s surveyors know how to survey.

Hamon spot checked SC elevations and design elevations. Hamon set secondary controls when CDOT monuments had to be destroyed for construction Hamon discovered grade problems with an 8” difference at one sidewalk. Ten of 13 ramps had problems and CDOT was notified.

Hamon submitted RFI’s 93, 93A and 96. CDOT’s responded to RFI 96 (Form 105 No. 374) stating, … *additional variable depth milling and leveling course material may be utilized.* The “design intent” was to “closely match”.

CDOT rounded the survey tolerance of 0.086 up to 0.1. It should be 0.086. CDOT posted the survey data after award. The “match existing” in the Plans is referring to the cross slope. The documents say what they say. Hamon’s question on the grades was submitted early – RFI 93 was submitted 12/15/16.

**CDOT Rebuttal**

CDOT agrees that if Hamon could build what is in the Plans, we would not be here today. Hamon needs to show they built what is in the Plans.

CDOT survey has confirmed the Plan elevations are correct. CDOT stands on what they have presented.

**Discussions by Parties**

Hamon said Stephanie is saying to ignore the Plans and Specifications and the elevations in the Plans. Bob said nothing was said to ignore the Plan elevations. The Plans call for “match existing”.

**DRB Questions**

1. **To Both:** Were Method Statements for the widening submitted by Hamon and reviewed by

CDOT?

Both parties said they were. CDOT provided the Methods Statement for Construction Surveying - 625

1. **To Both:** Is “design intent” or what the engineer wants called out in the Contract

Documents?

Both parties said “No”.

1. **To CDOT:** Did CDOT say in their rebuttal that if Hamon built what is shown in the Plans

(e.g. Plan and Profile) we would not be here today but Hamon has to show they did?

CDOT said that is what they said.

1. **To Both:** What was discussed in the Pre-survey meeting on survey requirements related to

Plan Data?

Both said nothing was discussed.

1. **To Both:** Do the Plans and Specifications give direction on the use of the Plan and Profile

data?

CDOT said “yes” and Hamon said “no”.

1. **To CDOT:** Is “match existing” defined anywhere other than the on note to ‘match existing”

on  **t**he Cross Slope diagram?

CDOT said “no”.

1. **To Hamon:** Was the actual sawcut location or the Plan SC location used when they shot

their elevations?

They used the Plan SC line.

1. **To Hamon:** Why has the survey data requested by CDOT not been submitted?

CDOT asked for top of HMA because the cores CDOT had taken showed variances from Plan requirements as shown on CDOT Position Paper Page 45 and they are not done with the HMA.

1. **To Hamon:** Does the work constructed to date meet the Plan and Profile sheets at the

various layers (e.g. base, HMA) in the pavement section?

Hamon said it does. (There was a long discussion on the grade certifications and Hamon submitting their field books.)

1. **To CDOT:** How will incentive/disincentive calculations for pavement smoothness be

applied?

CDOT said that is something that has to be reviewed.

**Hamon Summary**

The question is, “Was Hamon’s interpretation at bid time reasonable?” CDOT says they should have constructed from the top down. Hamon constructs from the bottom up using Plan elevations.

The cross section lines show variations between existing and new. Nothing in the Plans said there was a difference between survey elevations and design elevations. Hamon used the Plan elevations.

Hamon will provide a full depth roadway section. The question is how this relates to the old road?

**CDOT Summary**

The dispute is that the roadway is not built per the Plans – Plan clarifications and Specification Section 625 say what is required.

CDOT has Facts as they relate to the Plans and Contract

* CDOT has a survey. They have nothing from Hamon.
* CDOT field observations say there is a problem
* Roadway Section Corings show there are problems
* HMA is not smooth

The survey data on the Plan grades have tolerances. Specification Section 625 says tie to existing.

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After reviewing the documents that were submitted and listening to both parties' presentations, the DRB has determined that all the parties, including the design engineer, share in the blame for this dispute.

* The plans could have more clearly designated that the existing grades were to be matched rather than using Plan elevations for construction.
* The contractor should have pursued the grade issue more diligently and provided the survey information requested by CDOT.
* The design engineer could have been more clear in his RFI responses and direction to match the existing roadway grades.
* The surveyor should have resolved survey discrepancies prior to starting actual construction.

Accordingly, the DRB provides the following Findings.

**Findings**

1. Specification Section 105.03 - Conformity to the Contractstates**,** *All work performed and all materials furnished shall conform to the lines, grades, cross sections, dimensions, and*

*material requirements, including tolerances, shown in the Contract.* There is nothing in the Contract Documents that states the Project should be built to the design engineer’s “design Intent”.

1. The only place in the Contract Documents that the term “match existing” appears is on the I-25 Roadway Profile Plan sheets under **ABBREVIATIONS** which states, *M.E. = MATCH EXISTING (CROSS SLOPE DETERMINED BY THE STRAIGHT-LINE SLOPE BETWEEN I.E.O.P. AND S.C.*  At some stations “ME” appears, as shown on the extract from the Plans below. It should be noted that wherever “M.E.” appears on the Profiles it is always above the symbol for the HCL/PGLand not the S.C. .



Although there is no “ME” shown on the Typical Sections or the Cross Sections for the I-25 widening, the Sections all show that the widening matches the existing pavement at the SC line.

1. The Plan and Profile sheets for the ramps make no reference to “match existing”. The ramp gore details, as shown below, make no reference to “match existing” but state, *See Mainline Plans, Profiles, and Typical Sections.* Similarly, there is nothing on the I-25 Roadway Plans and Paving Plans. 
2. If the design engineer wanted the widened section to match the existing asphalt, a Typical Section should have been included similar to the Typical Section from the CDOT I-225 and C-470 Project below which indicates “M.E”. C:\Users\Test\Documents\My Documents\DRB's\CDOT DRB's\I-25 120th to SH 7\Dispute 1 - Grades\Hamon\!-225 M.E. Example.tiff
3. It should be noted that the elevations shown on the Roadway Profile sheets are to 0.01’ while the elevations shown on the Cross Section sheets are to 0.1’. An example is at Sta. 3219+00 below. Which elevation should the contractor build to since the difference is more than the tolerance 0.02’ for paving? In addition, Note 6 on the Survey Tabulation sheet (Plan Sheet No. 121) states, *Prior to beginning work on any subsequent operation, such as placing base course or paving, the Contractor* ***shall certify*** (emphasis added) *in writing to the Engineer that the final grade is within the specified tolerance.* Is the Contractor to certify to the Profile Grade or the Cross Section grade?

|  |  |  |  |
| --- | --- | --- | --- |
| Sta. 3219+00 | Profile Plans | Cross Sections | Difference from Profile |
| I.E.O.P. | 5184.44 | 5184.4 | -0.04 |
| S.C. | 5183.55 | 5183.6 | +0.05 |
| PGL | 5184.26 | 5184.3 | +0.04 |

1. The Drainage Profile Plans give elevation for all components of a drainage line and inlet grades are important for proper drainage as designed by the engineer. There is nothing in the Contract Documents to instruct the contractor on what to do if the “match existing” requirement affects the inlet elevations. This would also be true for concrete barrier elevations.
2. Based on the many Plan revisions and numerous RFI/Form 105’s, there were some grade/elevation problems in the Plans that required Plan revisions or revised information.

On December 15, 2016, Hamon sent RFI 093 concerning asphalt grades from Sta. 3040+50 to Sta. 3044+00. The answer from TSH, Form 105-367 states, *Localized areas of bumps, dips, ruts, etc. may be encountered. To provide a smooth pavement surface, the grades between the Inside Edge of Pavement* *and the Sawcut location may be adjusted to fit actual field condition*s *or* *the additional variable depth milling and leveling course material may be utilized in accordance with the plans and specifications.* This seems to support Hamon’s solution of milling out the elevation differences in the asphalt. There is nothing mentioned in the 105 about “match existing”. On January 10, 20017, Hamon sent RFI 096 concerning grades and drivability. The answer from TSH, Form 105-374 states, *A conventional, geometric profile was not appropriate for the project, which is a mill/overlay of existing pavement with widening.* What does this mean? It does not tell the contractor to “match existing”. The 105 went on to include the same language from Form 105-367 beginning with, *To provide a smooth surface.*

On February 13, 20017, Hamon sent RFI 093A concerning elevations at the Sawcut line. The answer from TSH, Form 105-470 states, *The design elevation for the NB Sawcut line was derived from LiDAR survey completed in October 2015. The horizontal location for the sawcut was established from the Segment 2* (Previous I-25 project on the south end of this Project) *Proposed Edge of Pavement. After reviewing the LiDAR survey, it appears the section had been overlaid; however, no widening had been completed at the time. The sawcut elevation in this area reflects an elevation slightly outside the existing edge of pavement.* This indicates that the Plans for this Project did not portray the existing conditions and CDOT had administered Segment 2.

It wasn’t until November 10, 2017 that CDOT issued Form 105-803 stating, *the newly constructed pavements for the widened sections do not appear to have been correctly constructed in accordance with the plans.*  Hamon then provided its grade certifications and survey data showing that the SC elevations did not match the existing. On December 13, 2017, CDOT issued Form 105-817 which stated, *You are therefore directed to: Construct all new widening pavements from this point forward in accordance with the requirement to “match existing”.* This was the first time CDOT brought up “match existing”, a year since grade problems had first been brought up by Hamon.

1. When questioned by the DRB at the hearing, both parties said that nothing concerning the survey data in the Plans was discussed at the Pre-survey meeting. During the hearing, CDOT’s surveyor **could not overemphasize enough** about the elevations and how they were developed and the differences in the tolerances between the survey data and construction tolerances. The data development and tolerances were discussed in length at the April 12, 2018 survey meeting. Accordingly, it appears CDOT was remiss in not bringing up the data development at the Pre-survey meeting, Also, explaining in the Plans that the elevations were derived by surveying the existing pavement using Lidar, would have been useful, and would have emphasized the true target for the project's finished grades.
2. During the DRB question period, CDOT said that if it could be proven that Hamon had constructed the widenings and ramps to the Plan Grade Elevations, then CDOT should be able to accept the construction since 95% of the shots taken by CDOT survey of the existing pavement at the SC matched the Plan grades. Accordingly, if Hamon can prove that they have met the Plan Grade Elevations, the construction to date that closely matches the existing grades will be acceptable and any further adjustments to “meet existing” will be reviewed by CDOT and Hamon to determine any corrective actions required.
3. It appears to the DRBthat this dispute was a product of a major communications break down between the parties and that both parties are at fault.  To avoid future disputes both parties are advised to revisit their Project First initiative.
4. Although the DRB is required to make its Findings and Recommendations based on the Contract and within the “Four Corners of the Contract”, the DRB can’t overlook the law. The Spearin Doctrine, which has been applied in Colorado courts, says the Owner (CDOT) is responsible for the adequacy, completeness and constructability of the Plans and Specifications. Accordingly, if CDOT wanted the contractor to “match existing”, it should have made it clear in the Contract Documents, which it did not. Additionally, why did CDOT go to all the expense of determining the elevations at 9,000 points if they were not to be used for construction? With all of the Plan and Profile problems that have come up on the Project, it appears that the Bid Plans contained discrepancies. The errors at Segment 2 highlight that CDOT had not properly reviewed the Plans. CDOT also had knowledge about the accuracy/tolerances of the survey data that was not readily apparent to any bidder as well as the “design intent”. Statements on both should have been provided to the bidders by CDOT.

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**Recommendations:**

1. As discussed in Finding 9 above and based on CDOT’s response during the DRB question period, CDOT said that if it could be proven that Hamon had constructed the widenings and ramps to the Plan Grade Elevations, then CDOT should be able to accept the construction since 95% of the shots taken by CDOT survey of the existing pavement matched the Plan grades. Accordingly, if Hamon can show that they have met the Plan Grade Elevations and that the construction to date closely matches the existing grades, then the “as constructed” should be acceptable and any further adjustments to use the “as constructed” roadway will be reviewed by CDOT and Hamon to determine any corrective actions required. CDOT should provide written direction to Hamon on what work will be required to resolve any grade differences at the sawcut line.
2. As discussed in Finding 5 above, the parties need to discuss which Plan elevations will be used to determine if the construction is within the tolerances.
3. Since CDOT’s surveyor questioned the loss of monuments and the correctness of any reference reestablished points that had been used by Hamon and the survey methods used by Hamon, it is recommended that prior to any additional surveying by Hamon or CDOT, the parties agree to the reference points that will be used and the survey methods and any applicable tolerances.

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**Revised Drawings and Directions for Final Grade**

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**Summary of Contractor Presentation on** **Revised Drawings and Directions for Final Grade**

Do the Bid Plans say “match existing” or use Plan and Profile? Hamon was reasonable at bid time in assuming they were to use the Plan and Profile. Hamon has offered solutions to overcome the problems at the SC line but revised drawings have time impact if they can’t finish on time. What CDOT wants is not defined in the Contract but a Plan revision would settle the issue. What is needed are the facts and not an interpretation of words. CDOT says the two separate grade lines in profiles and cross section are really one line. The Plan cross sections show the new roadway under the old roadway in some places.

The SC elevations show what exists and Hamon did level loops for SC points at 50’ stations and at ramps. If you match existing at SC, the roadway will be different from the Plan profile. The designer should have clearly defined what was wanted at the SC line. You have to have constructability and the old roadway has a lot of issues with bumps and turtlebacks. They bid the Project based on revising grades where shown in the Plans and there was nothing in the Plans that said to ignore the two different lines shown on the Plans.

Was the Plan intent to ignore the elevations shown on the inlets and match existing with all the irregularities? The documents are ambiguous and deficient. If CDOT does not want the Project built to the Plan elevations, then they need Plan revisions. CDOT said “they decide” if revisions are required but Hamon can’t build on oral adjustments. The change needs to be memorialized in the Contract. Hamon is not a professional engineer and does not do design. At one location, the vertical curve had to be changed by the design engineer but CDOT stamped on the revised plan sheet, *This is not a “Revised Plan Sheet”.* Without the revision, the public could have been in danger. Revised Plan sheets show the Engineer approves the change and the change meets all requirements. Revisions protect all parties but the revisions must come from the Engineer.

The ramps and tie-ins are a big problem and Hamon does not want design responsibility. At bid time, Hamon assumed the Plans were ok. Hamon’s experts said what CDOT wants to do is not the correct way to make changes – revisions are needed.

**Summary of CDOT Presentation on** **Revised Drawings and Directions for Final Grade**

CDOT is not asking Hamon to take on more responsibility. Tying into existing is not a new *concept and has been done many times before. Maybe CDOT needs to work on the wording that* Hamon is not liable. It is the contractor’s surveyor’s duty to tie into existing.

There are areas where “match existing” is required and other areas where it is not. Specification Section 625 lays out the survey requirements. Time extensions and more money are not needed for this issue. When they are, CDOT gives them.

**Contractor Rebuttal**

The roadway cross sections do not show “match existing”. The roadway cross sections do not show mill and overlay.

Hamon bid the Project to meet the Plan elevations. If the Project is not to be built per the cross sections and Plan elevations, revised plans are needed.

A PLS (Processional Land Surveyor) is not a PE (Professional Engineer). A PE is required to change the design and not a PLS. What happens if the new roadway that CDOT wants Hamon to build causes puddles that result in hydroplaning? Who is responsible?

**CDOT Rebuttal**

CDOT referenced Specification Section 625.01 which states:

*This work consists of the construction surveying, calculating, and staking necessary for the construction of all elements of the project. The work shall be done under the supervision of a Professional Land Surveyor (PLS) or Professional Engineer (PE) who is* ***experienced and competent in road and bridge construction surveying***(emphasis added) *and licensed in the State of Colorado.*

The cross slope drives the design factor.

**DRB Questions**

1. **To Hamon:** What is the sequence of lane construction?

The specifications call for any milled areas to be covered with SMA within five days. They start by closing the first lane as soon as lane closures are allowed at night and begin the milling, the second and successive lanes are then closed when allowed and milling begins. The SMA follows as soon as enough area is available.

CDOT said the SMA is just like Segment 7 on the north end of the Project which Hamon did. Mill from the outside of the roadway to the inside and then pave from the inside to the outside. Except in the superelevated sections, any turtlebacks will be left.

Hamon said they take CDOT’s comment to mean that they are just to mill and overlay with no regard to Plan elevations.

1. **To CDOT:** Is milling 2” of the existing surface constant if they don’t get to the bottom of a

rut or hump?

They want 2” milled and the SMA installed. CDOT will live with the resulting surface.

1. **To Hamon:** Explain Hamon’s proposed solution where new construction per the Plan profile and the SC don’t match.

Hamon drew a cross section where the new construction might be above or below the asphalt at the SC line. If the new surface is below the SC, the old asphalt would be milled off for a smooth cross section.

This led to considerable discussion and CDOT saying that if Hamon’s new construction met the Plan elevations, that would be acceptable since 95% of the SC shots taken by CDOT’s surveyor showed the shots were very close to the Plan elevations.

Hamon had no further comments and CDOT said that the contractor’s survey work was mandated by the specifications and CDOT needed a decision on the dispute.

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**Findings**

1. The Findings in the Grade Elevation Discrepancies issue above also apply, where applicable, to this issue of Revised Drawings and Directions for Final Grade.
2. Based on the answers to DRB Questions 2 and 3 above, the DRB understood that other that other than in the superelevated areas, CDOT. said the 2” milling depth was the controlling factor and not the cross slope shown in the Plan Cross Sections. CDOT just wants 2” milled off the existing asphalt surface and replaced with 2” of SMA. CDOT would live with the resulting surface. This seems to be contrary to what is shown on Plan Sheet No. 9 as shown below since CDOT also mentioned the removal of ruts. The change to ignore the Plan elevations and cross slopes should be communicated to Hamon in writing 

**NOTE 8:** 

1. In reply to Hamon’s statement that they are not a Professional Engineer (PE), CDOT referenced Specification Section 625.01 inferring that a PE should be able to revise the Plans. Section 625.01 states, *This work consists of the construction surveying, calculating, and staking necessary for the construction of all elements of the project*. *The work shall be done under the supervision of a Professional Land Surveyor (PLS) or Professional Engineer (PE) who is experienced and competent in road and bridge construction* ***surveying***(emphasis added) *and licensed in the State of Colorado.* CDOT is misconstruing the statement that the PE should do design. The statement only relates to **construction surveying**.

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**Recommendations:**

1. As discussed in Finding 2 above, CDOT should provide written direction to Hamon on the exact milling and overlay procedures to be used on the existing asphalt, except in areas where variable milling might be required and the superelevated sections. The written direction should delete the requirements for Hamon to meet Plan elevations and cross section slopes as relates to the mill and overlay work.
2. Unless the mill and overlay work affects structure or incidental items where grade adjustment might be required, the DRB sees no requirement for revised Plans.

Respectfully submitted this 6th day of July 2018

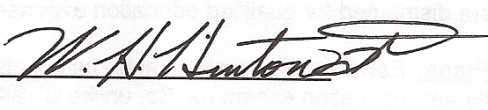
Dispute Review Board

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L. G. Duncan

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Rick Yowell

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W. H. Hinton II