Red Hill Valley Parkway INQUIRY

OVERVIEW DOCUMENT #3.1:

RHVP DESIGN & GEOMETRY

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A. Introduction

1. Overview Document #3.1 will address the design and the geometric elements of the RHVP. Overview Document #3.1 contains annotated excerpts of the tender drawings that highlight certain geometric design features of the RHVP. This Overview Document has been prepared to complement Overview Document #3, which addresses the RHVP pre-construction phase to its completion.

2. The facts contained in Overview Document #3.1 have not been tested for their truth. Commission Counsel and the participants may call evidence from witnesses at the Inquiry that casts doubt on the truthfulness or accuracy of the content of the documents underlying this Overview Document. The participants will also be able to make submissions regarding what, if any, weight should be given to any of these documents.

B. Preliminary Design – 1990-2006

3. In December 1982, the Region of Hamilton-Wentworth prepared an Environmental Assessment Submission ("the 1982 EA") for the Mountain East-West and North-South Transportation Corridor.[1] A report prepared by CIMA in 2013 contained the following description of the 1982 EA:[2]

> In December of 1982, the original Environmental Assessment (EA) documents were filed by the former Region of Hamilton-Wentworth that outlined the need, scope and timing for the expansion of the Regional road network. The EA identified that a roadway connecting Highway 403 in Ancaster to the QEW in east Hamilton was required.

[1] CIM0016205 and CIM0016206

[2] HAM0041871_0001 at image 13

4. An “Executive Summary Preliminary Design Investigation” for the Mountain East-West and North-South Transportation Corridor Project was prepared by the Region of Hamilton-Wentworth in 1990.[3] A “Preliminary Design Report” was prepared on January 31, 1990 (“the 1990 PDR”) for the whole connection between Highway 403 and the QEW.[4] The 1990 PDR addressed the north-south section which became the RHVP, as well as the east-west section which became the Lincoln M. Alexander Parkway.

5. Section “2.1.2 Number of Lanes” of the 1990 PDR noted the fact that the Red Hill Creek Valley posed “physical restrictions in certain locations to the ultimate width of the roadway and its interchanges”[5] and provided for six basic lanes between Dartnall Road and the QEW.[6]

6. Section “2.1.3 Interchange Spacing” of the 1990 PDR noted the MTO standard for minimum spacing of 2.0 km between interchanges in relation to the east-west corridor but provided the following for the north-south corridor:[7]

> The spacing of interchanges in the north-south corridor was based on optimizing traffic distribution. Since the major east-west arterials in the Lower Mountain Area are located much closer than 3 km, appropriate design measures have to be taken to provide adequate weaving distances between ramps.

7. In relation to illumination, the 1990 PDR provided at Section “2.7 Illumination”:[8]

> Full illumination is warranted for the North-South Freeway, except for the section between Mud Street and Greenhill Avenue. However, full illumination in this section would improve safety related to:
>
> - the truck climbing lane;
> - the high embankments; and
> - and the section between two illuminated interchanges.

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[3] CIM0016107
[4] HAM0008905_0001
[5] HAM0008905_0001 at image 18
[6] HAM0008905_0001 at image 18
[7] HAM0008905_0001 at images 18 and 20
[8] HAM0008905_0001 at image 46

8. A technical memorandum prepared by McCormick Rankin in July 1994, titled "Technical Memorandum No. 2, Impact Assessment of Alternatives", outlined that the alignment of the RHVP was revised in 1994.[9] The re-alignment of the RHVP was also discussed in the November 8, 2002 "Red Hill Creek Expressway/Queen Elizabeth Way Preliminary Design Report" prepared by McCormick Rankin. Section "2.1 Project Background" contains the following text:[10]

> Since that time, public debate and government review of the original North-South section has led the Region to consider a number of roadway design changes to reduce impacts to environmental features / systems in both the Red Hill Creek Valley and the wetland areas along the QEW. In 1994, the Province proposed a four-lane arterial roadway link connecting the East-West section of the RHCE and the QEW. The Region investigated the Province's four-lane proposal as well as other north-south alternatives. Based on the Region's investigation, the Region proposed the 'C2' alignment including a new location and design for the RHCE interchange with the QEW. The 'C2' concept was approved by the Regional Council in July 1994.

9. The Preliminary Design Report was revised in 2003.[11] The revision of November 10, 2003 (the "November 2003 PDR"), supplemented the 1990 PDR. The Introduction section contains text stating that the "report is to be read in conjunction with the PDR for the entire East-West and North-South sections of the Red Hill Creek Expressway, dated January 31, 1990" and that the November 2003 PDR dealt mostly with engineering features.[12]

10. The six-lane configuration was reduced to four in the November 2003 PDR. Section "2.2 Number of Lanes" noted that "trends in motor vehicle usage indicate that the VISION 2020

[9] HAM0002099_0001

[10] HAM0000180_0001 at image 7

[11] See, for example, HAM0050707_0001 attached to HAM0050706_0001 (described on February 25, 2003 as the "latest version" ("the February 2003 PDR")) and HAM0031758_0001 (dated November 10, 2003). The February 2003 PDR is discussed in further detail in Overview Document #3 at paragraph 20.

[12] HAM0031758_0001 at image 3. This text is also included in the February 2003 PDR – see HAM0050707_0001 at image 3.

scenario projections may well be exceeded. The roadway should therefore be graded for future expansion to basic six lanes."[13]

11. Section "2.3 Interchanges" stated that the design of interchanges located at Mud Street/Trinity Church Road, Greenhill Avenue, King Street, Queenston Road and Barton Street, had been changed to improve traffic operations or environmental features, and/or accommodate the relocation of the Red Hill Creek and Red Hill Valley trail.[14]

12. The November 2003 PDR provided that the RHVP would have a design speed of 100 km/hr. Section "2.7 a) Speed Enforcement" stated:[15]

> The design speed of the North-South section is 100 km/hr. This speed has been set based on the topography and spacing of interchanges. The posted speed is 90 km/hr. While a reduction of the posted speed would likely raise traffic operational concerns, strict enforcement of the speed limit for trucks is recommended for safety reasons in view of the curvilinear alignment and the current practice of many truck drivers to exceed the posted speed limits. Consistent radar enforcement may be considered.

13. The November 2003 PDR provided a change in design for illumination from what was set out in the 1990 PDR. In Section "3.1 Design Criteria", it provided that there would be only partial illumination at decision points, i.e., at interchange ramps, which was similar to the illumination provided on the LINC. Illumination was to be "designed according to the IESNA and Provincial standards, and the City of Hamilton requirements."[16]

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[13] HAM0031758_0001 at image 5. This text is also included in the February 2003 PDR – see HAM0050707_0001 at image 5.

[14] HAM0031758_0001 at image 6. This text is also included in the February 2003 PDR – see HAM0050707_0001 at image 6.

[15] HAM0031758_0001 at image 9. This text is also included in the February 2003 PDR – see HAM0050707_0001 at image 9.

[16] HAM0031758_0001 at image 11. Similar text was included in Section "3.1 Design Criteria" of the February 2003 PDR, which stated "[o]nly partial illumination will be provided, i.e. at interchange ramps and City streets only" – see HAM0050707_0001 at image 11.

14. The geometry for the RHVP (Pritchard Road to Brampton Street) was described in Table 2 and provided for a maximum superelevation of 0.06, maximum grades of 4%, a minimum radius of turns of 420 m, and a posted speed of 90 km/hr.[17]

15. In Section "3.5.2 Pavement Design", the November 2003 PDR provided that modified HL1 or an SMA (Stone Mastic Asphalt) were being considered for the surface or wearing course asphalt mixes. SMA was described as "a stone-on-stone, binder rich surface mix that provides quality rutting and cracking resistance", was noise reducing and had been shown to have improved surface texture and skid resistance characteristics.[18]

16. The Inquiry has not received any final design reports to date. However, the City has produced documents that reflect that the Preliminary Design Report was further revised in a draft dated January 31, 2006 ("2006 PDR").[19] Section "2.2.1 Design Criteria" of the 2006 PDR states that roadway design criteria conforming to those in the MTO Geometric Design Manual had been adopted for this Project, and that the "Ontario Provincial Standard Drawings (OPSD) and Specifications (OPSS) were used as a guide for the design of roadways and structures."[20]

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[17] HAM0031758_0001 at image 12. This information is also included in the February 2003 PDR – see HAM0050707_0001 at image 12.

[18] HAM0031758_0001 at images 14 and 15. This text is also included in the February 2003 PDR – see HAM0050707_0001 at images 14 and 15. The City's contemplation of using an SMA surface course, as set out in the February 2003 PDR, is discussed in further detail in Overview Document #3 at paragraph 20.

[19] HAM0032181_0001 and HAM0032182_0001. These documents are Section 1 (Introduction) and Section 2 (Engineering Design) of the January 31, 2006 Preliminary Design Report, respectively. The Inquiry has not received a version of the 2006 PDR that contains all sections. Both sections contain a 'Draft' watermark.

[20] HAM0032182_0001 at image 1. There is similar or the same language to this in prior drafts of the Preliminary Design Report including the 1990 PDR (HAM0008905_0001 at image 20), the February 2003 PDR (HAM0050707_0001 at image 11) and the November 2003 PDR (HAM0031758_0001 at image 11).

C. Detailed Design

17. The detailed design of the RHVP was split between three consulting engineering firms: Stantec for the design of Part A - Mud Street Interchange to South of Greenhill Avenue[21]; Philips Engineering for the design of Part B – South of Greenhill Ave. to Queenston Road[22]; and McCormick Rankin for the design of Part C - Queenston Road to QEW Interchange.[23] Stantec also designed Part D, which included signage and pavement markings, stormwater management, and landscaping details for the RHVP between Mud Street Interchange to QEW Interchange.[24]

18. Interchange is defined as a grade-separated intersection with one or more turning roadways for travel between the through roads.[25] Interchanges are identified on drawings with reference to a station number. A station is the measurement of horizontal alignment from a given origin and is frequently used as a reference and a means of describing a point on the horizontal control line.[26] For example, on Stantec's drawings for Part A, the Mud Street Interchange is denoted with "POC 22+126.630 R.H.V.P.",[27] which translates to the interchange is 22.126.630 km from the origin. Accordingly, interchange spacing between Mud Street Interchange and Greenhill Avenue Interchange (denoted by "STA 24+649.032 Red Hill Creek Expressway"[28]) can

[21] DUF0002534.001. This is the 'for tender' version of the Part A drawings issued by the City. The City also issued 'for construction' drawings for Part A (see HAM0002482_0001).

[22] DUF0002535.001. This is the 'for tender' version of the Part B drawings issued by the City. The City also issued 'for construction' drawings for Part B (see HAM0002481_0001).

[23] DUF0002536.001. This is the 'for tender' version of the Part C drawings issued by the City. The City also issued 'for construction' drawings for Part C (see HAM0002484_0001).

[24] DUF0002537.001. This is the 'for tender' version of the Part D drawings issued by the City. The City also issued 'for construction' drawings for Part D (see HAM0002483_0001).

[25] RHV0000909 at image 8

[26] RHV0000910 at image 8

[27] DUF0002534.001 at images 2 and 4 (Mud Street Station is denoted with "POC 22+126.630 R.H.V.P.")

[28] DUF0002535.001 at image 23 (see intersection of Greenhill Avenue and Mainline marked with "STA 24+649.032 Red Hill Creek Expressway")

be calculated as the difference between their respective station numbers i.e., (24+649.032) – (22+126.630) = 2.522 km.

19. The design drawings provided details for the construction and described the radii for the turns along the mainline and ramps and interchange spacing. Extracts from the drawings for Parts A, B and C are as follows:

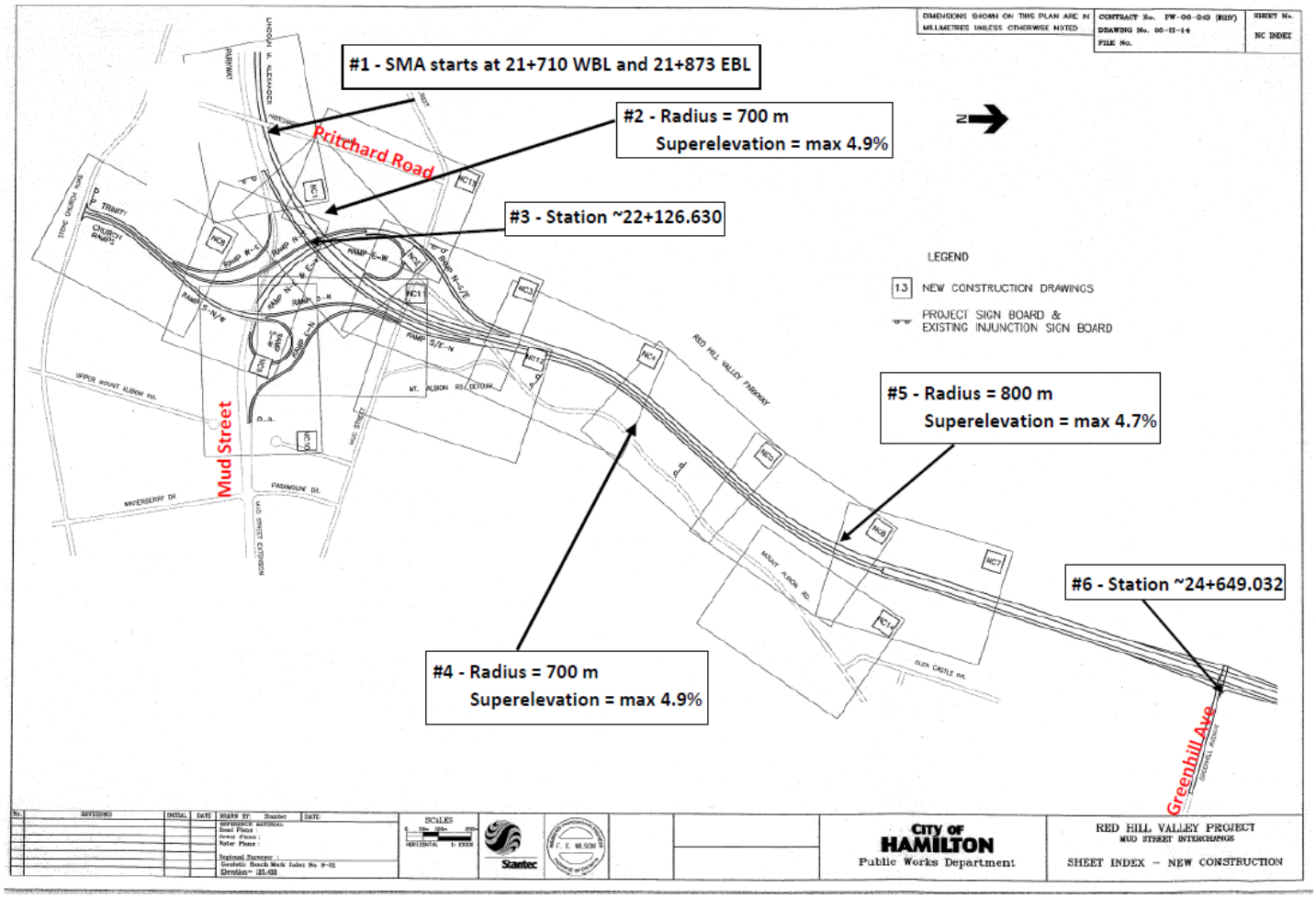
(a) **Part A:** The drawing below shows the entire portion of Part A (Mud Street Interchange to South of Greenhill Avenue),[29] and has been annotated with information contained in other pages of the Stantec drawings, and the Philips Engineering drawings, which corresponds to the chart below. The Stantec drawings contain the following design information: The SMA paving starts near Pritchard Road.[30] The mainline between Pritchard Road and Mud Street provides a curve radii of 700 m[31] (superelevation of 4.9%[32]) and 800m[33] (superelevation of 4.7%[34]), and longitudinal vertical grade of -1.789%[35], -2.409%[36] and -4%[37]. The interchange spacing is as follows:

[29] DUF0002534.001 at image 14
[30] DUF0002534.001 at image 15 (see "Limit of WBL Paving, STA 21+710" and "Limit of EBL Paving, STA 21+873")
[31] DUF0002534.001 at image 2 (for reference to radii, see second table from the left that are embedded in the figure and titled "Red Hill Valley Parkway")
[32] DUF0002534.001 at images 54 and 55 (superelevation is denoted on drawing with "S" for e.g., "S 4.9% max")
[33] DUF0002534.001 at image 2 (for reference to radii, see the two tables on the right that are embedded in the figure and titled "Red Hill Valley Parkway")
[34] DUF0002534.001 at image 56 (superelevation is denoted on drawing with "S" for e.g., "S 4.7% max")
[35] DUF0002534.001 at images 29, 30 and 31
[36] DUF0002534.001 at image 34 and 35
[37] DUF0002534.001 at images 32, 33 and 34

Dartnall Road to Mud Street = (22+126.630)[38] – (20+975.121)[39] = 1.152 km

Mud Street to Greenhill Avenue = (24+649.032)[40] – (22+126.630)[41] = 2.522 km

Part A – Stantec



Annotation	Pinpoint Source
#1	DUF0002534.001 at image 15 (see "Limit of WBL Paving, STA 21+710" and "Limit of EBL Paving, STA 21+873")
#2	• DUF0002534.001 at image 2 (for reference to radii, see second table from the left that are embedded in the figure and titled "Red Hill Valley Parkway")

[38] DUF0002534.001 at images 2 and 4 (Mud Street Station is denoted with "POC 22+126.630 R.H.V.P.")

[39] DUF0002537.001 at image 5 (Dartnall Road interchange is denoted with "20+975.121 Red Hill Valley Parkway")

[40] DUF0002535.001 at image 23 (see intersection of Greenhill Avenue and Mainline marked with "STA 24+649.032 Red Hill Creek Expressway")

[41] DUF0002534.001 at images 2 and 4 (Mud Street Station is denoted with "POC 22+126.630 R.H.V.P.")

	• DUF0002534.001 at images 54 and 55 (superelevation is denoted on drawing with "S" for e.g., "S 4.9% max")
#3	DUF0002534.001 at images 2 and 4 (Mud Street Station is denoted with "POC 22+126.630 R.H.V.P.")
#4	• DUF0002534.001 at image 2 (for reference to radii, see second table from the left that are embedded in the figure and titled "Red Hill Valley Parkway") • DUF0002534.001 at images 54 and 55 (superelevation is denoted on drawing with "S" for e.g., "S 4.9% max")
#5	• DUF0002534.001 at image 2 (for reference to radii, see the two tables on the right that are embedded in the figure and titled "Red Hill Valley Parkway") • DUF0002534.001 at image 56 (superelevation is denoted on drawing with "S" for e.g., "S 4.7% max")
#6	DUF0002535.001 at image 23 (see intersection of Greenhill Avenue and Mainline marked with "STA 24+649.032 Red Hill Creek Expressway")

(b) **Part B:** The drawing below shows the entire portion of Part B (South of Greenhill Ave. to Queenston Road),[42] and has been annotated with information contained in other pages of the Philips Engineering drawings, and the McCormick Rankin drawings, which corresponds to the chart below. The Philips drawings contain the following design information: the mainline South of King Street provides a curve radius of 420 m[43] (superelevation not described)[44]; and North of King Street

[42] DUF0002535.001 at image 12

[43] DUF0002535.001 at image 7 (see tables embedded in figure titled "Red Hill Creek Expressway" for reference to radii as well as figure itself) and image 9 (see the spiral curve data entry for station (25+704.381) in table titled "Red Hill Creek Expressway")

[44] From the drawing, it can be discerned that the 420 m curve radius is a right turn. Drawings that refer to superelevation for right turns are not included in the Philips drawings.

provides curve radii of 450 m[45] (superelevation of 6%[46]), 690 m[47] (superelevation not described)[48] and 525 m[49] (superelevation of 6%[50]), and longitudinal vertical grade of -0.60%[51], -0.61%[52] and -2.41%[53]. Interchange spacing is as follows:

Greenhill Avenue to King Street = (25+940.985)[54] – (24+649.032)[55] = 1.292 km

King Street to Queenston Road = (26+773.381)[56] – (25+940.985)[57] = 0.832 km

[45] DUF0002535.001 at image 8 (reference to radius in figure); and image 9 (see the spiral curve data entry for stations (25+882.215), (26+165.705), and (26+265.581) in table titled "Red Hill Creek Expressway")

[46] DUF0002535.001 at image 71 (the drawing refers to superelevation for left turns between Stations 23+900 and 27+500, which is denoted on the drawing with "S" for e.g., "S% or 6% MAX". Drawings that refer to superelevation for right turns are not included in the Philips drawings. From the drawing, it can be discerned that the curve radius of 450 m, which is North of King Street, is a left turn curve and accordingly the left turn superelevation design is applicable to it.)

[47] DUF0002535.001 at image 10 (for reference to radii, see the figure and the spiral curve data for stations (26+416.504), (26+927.919), (27+013.498) in the table embedded in the figure titled "Red Hill Creek Expressway")

[48] From the drawing, it can be discerned that the 690 m curve radius is a right turn. Drawings that refer to superelevation for right turns are not included in the Philips drawings.

[49] DUF0002535.001 at image 11 (see tables embedded in figure titled 'Red Hill Creek Expressway" for reference to radii as well as figure itself)

[50] DUF0002535.001 at image 71 (the drawing refers to superelevation for left turns between Stations 23+900 and 27+500, which is denoted on the drawing with "S" for e.g., "S% or 6% MAX". Drawings that refer to superelevation for right turns are not included in the Philips drawings. From the drawing, it can be discerned that the curve radius of 525 m, which is North of King Street, is a left turn curve and accordingly the left turn superelevation design is applicable to it.)

[51] DUF0002535.001 at images 44, 45, 46, 47 and 48

[52] DUF0002535.001 at images 48, 49, 50 and 51

[53] DUF0002535.001 at images 39, 40, 41 and 42

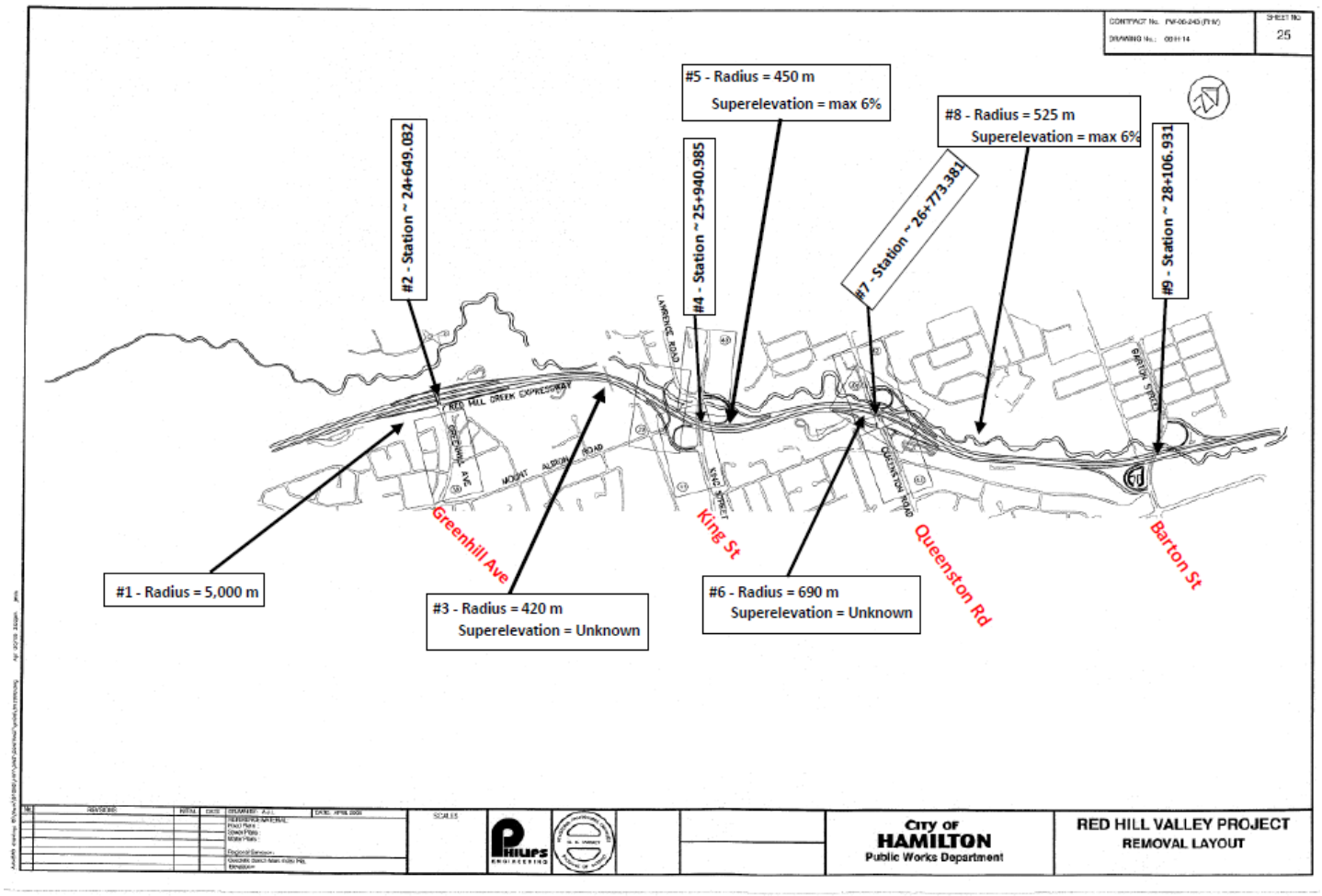
[54] DUF0002535.001 at image 8 (see intersection of King Street and Mainline marked with "PT 25+940.985 Red Hill Creek Expy")

[55] DUF0002535.001 at image 23 (see intersection of Greenhill Avenue and Mainline marked with "STA 24+649.032 Red Hill Creek Expressway")

[56] DUF0002535.001 at image 37 (see intersection of Queenston Road and Mainline marked with "STA 26+773.381 Expressway")

[57] DUF0002535.001 at image 8 (see intersection of King Street and Mainline marked with "PT 25+940.985 Red Hill Creek Expy")

Part B – Philips



Annotation	Pinpoint Source
#1	DUF0002535.001 at image 6 (see 'R=5000m' denoted below the mainline marked by 'Red Hill Creek Expressway')
#2	DUF0002535.001 at image 23 (see intersection of Greenhill Avenue and Mainline marked with "STA 24+649.032 Red Hill Creek Expressway")
#3	• DUF0002535.001 at image 7 (see tables embedded in figure titled "Red Hill Creek Expressway" for reference to radii as well as figure itself) and image 9 (see the spiral curve data entry for station (25+704.381) in table titled "Red Hill Creek Expressway") • The superelevation for this curve is unknown as this is a right turn and the superelevation information for right turns is not included in the Philips drawings.

#4	DUF0002535.001 at image 8 (see intersection of King Street and Mainline marked with “PT 25+940.985 Red Hill Creek Expy”)
#5	• DUF0002535.001 at image 8 (reference to radius in figure); and image 9 (see the spiral curve data entry for stations (25+882.215), (26+165.705), and (26+265.581) in table titled “Red Hill Creek Expressway”) • DUF0002535.001 at image 71 (the drawing refers to superelevation for left turns between Stations 23+900 and 27+500, which is denoted on the drawing with “S” for e.g., “S% or 6% MAX”. Drawings that refer to superelevation for right turns are not included in the Philips drawings. From the drawing, it can be discerned that the curve radius of 450 m, which is North of King Street, is a left turn curve and accordingly the left turn superelevation design is applicable to it.)
#6	• DUF0002535.001 at image 10 (for reference to radii, see the figure and the spiral curve data for stations (26+416.504), (26+927.919), (27+013.498) in the table embedded in the figure titled “Red Hill Creek Expressway”). • The superelevation for this curve is unknown as this is a right turn and the superelevation information for right turns is not included in the Philips drawings.
#7	DUF0002535.001 at image 37 (see intersection of Queenston Road and Mainline marked with “STA 26+773.381 Expressway”)
#8	• DUF0002535.001 at image 11 (see tables embedded in figure titled ‘Red Hill Creek Expressway’ for reference to radii as well as figure itself) • DUF0002535.001 at image 71 (the drawing refers to superelevation for left turns between Stations 23+900 and 27+500, which is denoted on the drawing with “S” for e.g., “S% or 6% MAX”. Drawings that refer to superelevation for right turns are not included in the Philips drawings. From the drawing, it can be discerned that the curve radius of 525 m, which is North of King Street, is a left turn curve and accordingly the left turn superelevation design is applicable to it.)
#9	DUF0002536.001 at image 4 (see intersection of Barton Street and Mainline marked with “HOT 28+106.931 Parkway”)

(c) **Part C:** The drawing below shows the entire portion of Part C (Queenston Road to QEW Interchange),[58] and has been annotated with information contained in other pages of the McCormick Rankin drawings, which corresponds to the chart below. The McCormick Rankin drawings contain the following design information: SMA paving ends short of Nash Road.[59] The mainline North of Barton Street provides curve radii of 475 m[60], 582.150 m[61] and 3,003.75 m[62] (superelevation not described)[63] and longitudinal vertical grade -0.55%[64]and 3.32%.[65] The mainline South of Barton Street provides a curve radius of 1,000 m[66] (superelevation of maximum 6%[67]) and longitudinal vertical grade changes from 0.4%[68] to -0.55%.[69] Interchange spacing is as follows:

[58] DUF0002536.001 at image 7

[59] DUF0002536.001 at image 13 (see "Limit of Parkway Construction, CONT PW-06-243 (RHV) PART C" in line with Station 29+004)

[60] DUF0002536.001 at image 5 (see table at the bottom titled "N.B.L." under "Curve Data")

[61] DUF0002536.001 at image 5 (see table at the bottom titled "S.B.L." under "Curve Data")

[62] DUF0002536.001 at image 5 (see table at the bottom titled "S.B.L." under "Curve Data")

[63] Only image 22 of DUF0002536.001 contains information related to superelevation and only for left turns between Stations 27+400 and 28+350, which is denoted on the drawing with "S" for e.g., "S% (6% MAX)". Barton Street Interchange is at Station 28+106.931 and Queenston Road Interchange is at Station 26+773.381. Therefore, it can be discerned that the information related to superelevation in the drawings are mainly applicable to South of Barton Street Interchange.

[64] DUF0002536.001 at image 17 and 18

[65] DUF0002536.001 at image 19

[66] DUF0002536.001 at image 3 (see radius under curve data for the upper half diagram for the Station 27+913.751. The curve is in between Stations 27+745.143 and 28+009.992, which is South of and proximate to Barton Street Interchange Station at 28+106.931)

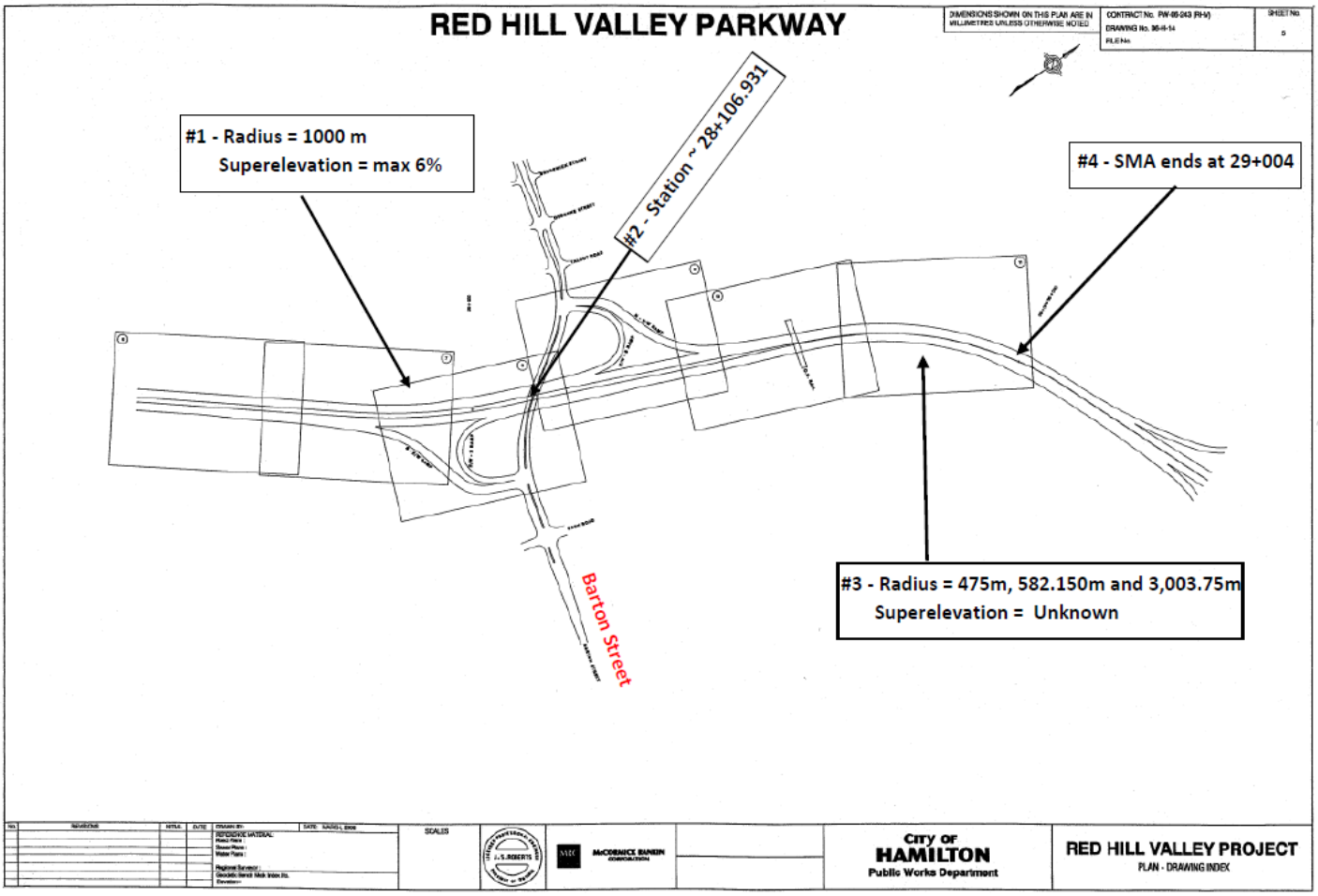
[67] DUF0002536.001 at image 22 (the drawing refers to superelevation for left turns between Stations 27+400 and 28+350, which is denoted on the drawing with "S" for e.g., "S% (6% MAX)". Barton Street Interchange is at Station 28+106.931 and Queenston Road interchange is at Station 26+773.381. Therefore, it can be discerned that the superelevation is applicable to South of Barton Street. Drawings that refer to superelevation for right turns are not included in the McCormick Rankin drawings.

[68] DUF0002536.001 at image 15

[69] DUF0002536.001 at image 17

Queenston Road to Barton Street = (28+106.931)[70] – (26+773.381)[71] = 1.334 km

Part C – McCormick Rankin



Annotation	Pinpoint Source
#1	• DUF0002536.001 at image 3 (see radius under curve data for the upper half diagram for the Station 27+913.751. The curve is in between Stations 27+745.143 and 28+009.992, which is South of and proximate to Barton Street Interchange Station at 28+106.931) • DUF0002536.001 at image 22 (the drawing refers to superelevation for left turns between Stations 27+400 and 28+350, which is denoted on the drawing with "S" for e.g., "S% (6% MAX)". Barton Street Interchange is at

[70] DUF0002536.001 at image 4 (see intersection of Barton Street and Mainline marked with "HOT 28+106.931 Parkway")

[71] DUF0002535.001 at image 37 (see intersection of Queenston Road and Mainline marked with "STA 26+773.381 Expressway")

	Station 28+106.931 and Queenston Road interchange is at Station 26+773.381. Therefore, it can be discerned that the superelevation is applicable to South of Barton Street. Drawings that refer to superelevation for right turns are not included in the McCormick Rankin drawings. From the drawing, it can be discerned that the curve radius of 1,000 m, which is South of Barton Street, is a left turn curve and accordingly the left turn superelevation design is applicable to it.)
#2	DUF0002536.001 at image 4 (see intersection of Barton Street and Mainline marked with "HOT 28+106.931 Parkway")
#3	• DUF0002536.001 at image 5 (see tables at the bottom titled "N.B.L." and "S.B.L." and under "Curve Data"). • Only image 22 of DUF0002536.001 contains information related to superelevation and only for left turns between Stations 27+400 and 28+350, which is denoted on the drawing with "S" for e.g., "S% (6% MAX)". Barton Street Interchange is at Station 28+106.931 and Queenston Road Interchange is at Station 26+773.381. Therefore, it can be discerned that the information related to superelevation in the drawings is mainly applicable to South of Barton Street Interchange.
#4	DUF0002536.001 at image 13. SMA placement corresponds with the end limit of the RHVP. The end limit of the RHVP (Hamilton contract PW-06-243) and the beginning of MTO contract 2004-2020 is noted on the right side of the drawing, below the compass. The City's SMA placement ends at North of Barton Street and the CNR underpass and just before the Nash Road underpass, which corresponds to Station 29+004 on the drawing.