## Appendix L. Roadway Design Criteria Sheets

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|  |  |  |  |  | November 25, 2020 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| I-5: Rose Quarter Improvements |  |  |  |  |  |
| Ramp Geometric Design Criteria |  |  |  |  |  |
| DESIGN FEATURE | Existing | Standard | Proposed | $\begin{gathered} \text { Design } \\ \text { Exception (Y/N) } \\ \hline \end{gathered}$ | REMARKS |
| Weidler NB exit ramp - "pD4" LINE |  |  |  |  |  |
| Right Shoulder Width | $2^{\prime}$ | 10' + 2' shy | $8^{\prime}$ | Y | Assumes 2 Lane exit with 2' E added when next to barrier |
| Left Shoulder Width | $2^{\prime}$ | $6^{\prime}$ | $4^{\prime}$ | Y | 2' Left shoulder shy not required on ramps (per HDM section 9.6) |
| Lane width | $12^{\prime}$ | 12' | $12^{\prime}$ | N |  |
| Vertical Curve Data - Vertical Curve 1 |  |  |  |  |  |
| K Value (indicate crest or sag) |  | 19 | 34 (crest) | N | HDM Figure 3-9: 35 mph |
| Vertical Curve Length |  | $115{ }^{\prime}$ | 100' | - |  |
| Design Speed Achieved |  | 30 mph | 35 mph | - |  |
|  |  |  |  |  |  |
| K Value (indicate crest or sag)Vertical Curve Length |  | 96 | 67 (sag) | Y | HDM Figure 3-8: 35 mph |
|  |  | 492' | 350' | - |  |
| Design Speed Achieved |  | 50 mph | 40 mph | - | Sag occurs before adequate separation from freeway takeoff point allows for vehicle to decel to 40 mph |
|  |  |  |  |  |  |
| DESIGN FEATURE | Existing | Standard | Proposed | Design Exception (Y/N) | REMARKS |
| Weidler SB entrance ramp - "pWSB" LINE |  |  |  |  |  |
| Right Shoulder Width | $0^{\prime}$ | $6^{\prime}+2^{\prime}$ shy | Var. $8^{\prime}$ to 13' | N | 3rd lane is a shoulder ramp meter lane |
| Left Shoulder Width | $0^{\prime}$ | $4^{\prime}$ | $4{ }^{\prime}$ | N |  |
| Lane width | $12^{\prime}$ | $12^{\prime}$ | $12^{\prime}$ | N |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Vertical Curve Length |  | $115{ }^{\prime}$ | $12{ }^{\prime}$ | - |  |
| Design Speed Achieved |  | 30 mph | 30 mph | - |  |
|  |  |  |  |  |  |
| K Value (indicate crest or sag) |  | 49 | 54 Sag | N | HDM Figure 3-9: 35 mph |
| Vertical Curve Length |  | $340^{\prime}$ | 375 ' | - |  |
| Design Speed Achieved |  | 35 mph | 35 mph | - |  |








| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Radius | 200' | 333 | 242.5 | Y | AASHTO Table 3-13, minimum Radius @ 30 mph and $-2 \% \mathrm{e}$ - Matching existing roadway geometry at horizontal curve (Confirm design speed at corner) |
| Horizontal Alignment - Curve 1 |  |  |  |  |  |
| Radius (R1) | 200' | 333' | 243' | Y | AASHTO Table 3-13, minimum Radius @ 30 mph and $-2 \% \mathrm{e}$ - DE may not be needed, matching existing roadway geometry at horizontal curve (Confirm design speed at corner) |
| Superelevation (e) for D1 | -2.0\% | -2.0\% | -2.0\% | N |  |
| Superelevation Runoff for D1 | N/A | N/A | N/A | N |  |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 37 | 26 | N | AASHTO Table 3-37, 30 mph |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 19 | 21 | N | AASHTO Table 3-35, 30 mph - Matching existing curve at Williams |
| Vertical Grade |  |  |  |  |  |
| Maximum Grade | 5 | 12 | 5 | N | PBOT, Section 5 Street Grades, neighborhood collector streets, asphalt pavement |
| Vertical Alignment - Curve 1* |  |  |  |  | Station 'pWE' 40+00.00 |
| Grade In | N/A |  | +0.6\% |  |  |
| Grade Out | N/A |  | +3.65\% |  |  |
| Minimum Grade | N/A |  | +0.6\% |  |  |
| K Value | N/A | 37-Sag | $28-$ Sag | Y | K not met but meets design for comfort and sight distance (EQ 3-43 and 3-52) |
| Vertical Curve Length | N/A | 90 | 85 | Y | Lmin not met but meets design for comfort and sight distance (EQ 3-43 and 3-52) |
| Vertical Alignment - Curve 2* |  |  |  |  | Station 'pWE' 41+00.30 |
| Grade In | N/A |  | +3.65\% |  |  |
| Grade Out | N/A |  | -1.2\% |  |  |
| Minimum Grade | N/A |  | -1.2\% |  |  |
| K Value | N/A | 19 - Crest | 22 - Crest | N |  |
| Vertical Curve Length | N/A | 90 | 105 | N |  |
| Vertical Alignment - Curve 3* |  |  |  |  | Station 'pWE' 42+13.11 |
| Grade In | N/A |  | -1.2\% |  |  |
| Grade Out | N/A |  | +1.6\% |  |  |
| Minimum Grade | N/A |  | -1.2\% |  |  |
| K Value | N/A | $37-$ Sag | 27 - Sag | Y | K not met but meets design for comfort and sight distance (EQ 3-43 and 3-52) |
| Vertical Curve Length | N/A | 90 | 75 | Y | Lmin not met but meets design for comfort and sight distance (EQ 3-43 and 3-52) |
| Clearance |  |  |  |  |  |
| Bridge Vertical Clearance | N/A | N/A | N/A | N | $17^{\prime} 4$ " vertical clearance to be provided over I-5 facilities and within interchange area |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 11' to 12' | 11' (12' curbtight) | $11^{\prime}$ to 14' | N |  |
| Bike Buffer Zone | $0 '$ | 4.5' (including curb) | $\begin{gathered} 0.5^{\prime} \text { to } 4.5^{\prime} \\ \text { (including curb) } \end{gathered}$ | Y | To avoid impact to adjacent properties |
| Bike Thru Zone | $6^{\prime}$ | $7{ }^{\prime}$ | 7' | N |  |
| Ped Buffer Zone | $5 '$ | $2^{\prime}$ | 0' to 2' | Y | To avoid impact to adjacent properties |
| Ped Thru Zone | $7^{\prime}$ | $8{ }^{\prime}$ | $5^{\prime}$ to 8' | Y | To avoid impact to adjacent properties |
| Frontage Zone | N/A | $2.5{ }^{\prime}$ | $0^{\prime}$ to 2.5 ' | Y | To avoid impact to adjacent properties |
| Tapers |  |  |  |  |  |
| Transition from narrower street to wider street |  |  |  |  |  |
| Transition from wider street to narrower street |  |  |  |  |  |
| Barrier Taper | N/A | N/A | N/A |  |  |
| Barrier Type |  |  |  |  |  |
| Rt (Exterior) Roadside Barrier |  |  |  |  |  |
| Bridge Rail |  |  |  |  |  |

## ROADWAY TECHNICAL MEMORANDUM - DESIGN CRITERIA

I-5: Rose Quarter Improvements
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| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Radius | 130' | 333 | 136.42 | Y | AASHTO Table 3-13, minimum Radius @ 30 mph and $-2 \% \mathrm{e}-$ Matching existing roadway geometry at horizontal curve (Confirm design speed at corner) |
| Horizontal Alignment - Curve 1 |  |  |  |  |  |
| Degree of Curve (D1) |  |  |  |  |  |
| Radius (R1) | 130' | 333' | 136' | Y | AASHTO Table 3-13, minimum Radius @ 30 mph and -2\% e - DE may not be needed, matching existing roadway geometry at horizontal curve (Confirm design speed at corner) |
| Superelevation (e) for D1 | -2.0\% | -2.0\% | -2.0\% | N |  |
| Superelevation Runoff for D1 | N/A | N/A | N/A | N |  |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 37 | 51 | N | AASHTO Table 3-37, 30 mph |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 19 | 32 | N | AASHTO Table 3-35, 30 mph |
|  |  |  |  |  |  |
| Maximum Grade | 5 | 12 | 5 | N | PBOT, Section 5 Street Grades, neighborhood collector streets, asphalt pavement |
| Vertical Alignment - Curve 1* |  |  |  |  | Station 'pBR' 15+13.74 |
| Grade In | N/A |  | 2.85\% |  |  |
| Grade Out | N/A |  | 4.90\% |  |  |
| Minimum Grade | N/A |  | +2.85\% |  |  |
| K Value | N/A | 37 - Sag | 51- Sag | N |  |
| Vertical Curve Length | N/A | 90 | 105 | N | Meets heasecomfort per AASHTO Equation 3-52 |
| Vertical Alignment - Curve 2* |  |  |  |  | Station 'pBR' 16+31.37 |
| Grade In | N/A |  | 4.90\% |  |  |
| Grade Out | N/A |  | 1.72\% |  |  |
| Minimum Grade | N/A |  | +1.72\% |  |  |
| K Value | N/A | 19 - Crest | 33 - Crest | N |  |
| Vertical Curve Length | N/A | 90 | 105 | N | AASHTO Equation 3-45 |
| Vertical Alignment - Curve 3* |  |  |  |  | Station 'pBR' 18+59.27 |
| Grade In | N/A |  | 1.72\% |  |  |
| Grade Out | N/A |  | 1.87\% |  |  |
| Minimum Grade | N/A |  | +1.72\% |  |  |
| K Value | N/A | 37 - Sag | 678-Sag | N |  |
| Vertical Curve Length | N/A | 90 | 105 | N | Assuming Lmin=3V. Since Algebraic Difference is $<2.5 \%$, use grade break instead. |
|  |  |  |  |  |  |
| Bridge Vertical Clearance | N/A | N/A | N/A | N | 17' 4" vertical clearance to be provided over l-5 facilities and within interchange area |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 11' to 12' | 11' (12' curbtight) | 11' to 14' | N |  |
| Bike Buffer Zone | 0'-1.5' | 4.5' (including curb) | $\begin{gathered} 0.5^{\prime} \text { to } 4.5^{\prime} \\ \text { (including curb) } \end{gathered}$ | Y | To avoid impact to adjacent properties |
| Bike Thru Zone | 5 ' | $7{ }^{\prime}$ | $7{ }^{\prime}$ | N |  |
| Ped Buffer Zone | 0' to 5' | $2{ }^{\prime}$ | $0^{\prime}$ to 2' | Y | To avoid impact to adjacent properties |
| Ped Thru Zone | $7{ }^{\text {' to }}{ }^{\prime \prime}$ | $8{ }^{\prime}$ | $8{ }^{\prime}$ | N |  |
| Frontage Zone | N/A | 2.5 | $0^{\prime}$ to 2.5 ' | Y | To avoid impact to adjacent properties |
|  |  |  |  |  |  |
| Transition from narrower street to wider street |  |  |  |  |  |
| Transition from wider street to narrower street |  |  |  |  |  |
| Barrier Taper | N/A | N/A | N/A |  |  |
| Barrier Type |  |  |  |  |  |
| Rt (Exterior) Roadside Barrier |  |  |  |  |  |
| Bridge Rail |  |  |  |  |  |

## ROADWAY TECHNICAL MEMORANDUM - DESIGN CRITERIA

I-5: Rose Quarter Improvements
Note: Pavement Reconstruction ranges


| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 26 | 8 | Y | AASHTO Table 3-37, 25 mph |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 12 | 11 | Y | AASHTO Table 3-35, 25 mph |
| Vertical Grade |  |  |  |  |  |
| Maximum Grade | 10 | 12 | 4 | N | PBOT, Section 5 Street Grades, neighborhood collector streets, asphalt pavement |
| Vertical Alignment - Curve 1* |  |  |  |  | Station 'pWI' $35+45.00$ |
| Grade In |  |  | -2.00\% |  |  |
| Grade Out |  |  | 4.16\% |  |  |
| Minimum Grade |  |  | -2.0\% |  |  |
| K Value |  | 26 - Sag | $10-\mathrm{Sag}$ | Y | At Weidler Intersection - will revist intersection grading at 30\% to try and eliminate DE |
| Vertical Curve Length |  | 75 | 60 | Y | Meets 20mph comfort. Illuminate |
| Vertical Alignment - Curve 2* |  |  |  |  | Station 'pWI' 35+90.00 |
| Grade In |  |  | 4.16\% |  |  |
| Grade Out |  |  | 1.51\% |  |  |
| Minimum Grade |  |  | +1.51\% |  |  |
| K Value |  | 12 - Crest | 11 - Crest | Y | Between Weidler and cover - will revisit grading at 30\% to try and eliminate DE |
| Vertical Curve Length |  | 75 | 30 | Y | Meets Sight Distance but not Lmin = 3V |
| Vertical Alignment - Curve 3* |  |  |  |  | Station 'pWI' 37+00 |
| Grade In |  |  | +1.51\% |  |  |
| Grade Out |  |  | +0.35\% |  |  |
| Minimum Grade |  |  | +0.35\% |  |  |
| K Value |  | 12 - Crest | 26 - Crest | N |  |
| Vertical Curve Length |  | 75 | 30 | Y | Meets Sight Distance but not Lmin $=3 \mathrm{~V}$. <br> Between Weidler and cover - will revisit grading at $30 \%$ to try and eliminate DE |
| Vertical Alignment - Curve 4* |  |  |  |  | Station 'pWI' 37+30.00 |
| Grade In |  |  | +0.35\% |  |  |
| Grade Out |  |  | +2.0\% |  |  |
| Minimum Grade |  |  | +0.35\% |  |  |
| K Value |  | $26-\mathrm{Sag}$ | 12 - Sag | Y | At Broadway Intersection - will revist intersection grading at 30\% to try and eliminate DE |
| Vertical Curve Length |  | 75 | 20 | Y | Meets 20mph comfort. Meets Headlight Sight Distance. |
| Vertical Alignment - Curve 5* |  |  |  |  | Station 'pWI' 37+80.00 |
| Grade In |  |  | -2.10\% |  |  |
| Grade Out |  |  | 2.85\% |  |  |
| Minimum Grade |  |  | -2.10\% |  |  |
| K Value |  | $26-\mathrm{Sag}$ | 8-Sag | Y | At Broadway Intersection - will revist intersection grading at 30\% to try and eliminate DE |
| Vertical Curve Length |  | 75 | 40 | Y | Meets 20mph comfort. Illuminate |
| Vertical Alignment - Curve 6* |  |  |  |  | Station 'pWI' 38+30 |
| Grade In |  |  | 2.85\% |  |  |
| Grade Out |  |  | 2.21\% |  |  |
| Minimum Grade |  |  | +2.21\% |  |  |
| K Value |  | 12 - Crest | 63 - Crest | N |  |
| Vertical Curve Length |  | 75 | 40 | N | 6' betwenn Broadway and Vancouver where not reconstructing existing sidewalk |
| Vertical Alignment - Curve 7* |  |  |  |  | Station 'pWI' 40+00 |
| Grade In |  |  | 2.21\% |  |  |
| Grade Out |  |  | 0.66\% |  |  |
| Minimum Grade |  |  | +0.66\% |  |  |
| K Value |  | 12 - Crest | 48 - Crest | N |  |
| Vertical Curve Length |  | 75 | 75 | N |  |
| Clearance |  |  |  |  |  |


| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Bridge Vertical Clearance | N/A | N/A | N/A | N | $17^{\prime} 4^{\prime \prime}$ vertical clearance to be provided over I-5 facilities and within interchange area |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 11' to 12' | 11' (12' curbtight) | 11' - 14' | N |  |
| Bike Buffer Zone | 0' to 2' | 4.5' (including curb) | Varies 0.5' to 4.5' (including curb) | Y | To avoid impact to adjacent properties |
| Bike Thru Zone | $6^{\prime}$ | 7 ' to 14' | $7{ }^{\prime}$ to 12' | N | In Williams median betwenn Broadway and Weidler, will increase from 12' to 14' |
| Ped Buffer Zone | $0^{\prime}$ to $5^{\prime}$ | $2^{\prime}$ | Varies 0 ' to 4' | Y | To avoid impact to adjacent properties. Post $20 \%$, in Williams median betwenn Broadway and Weidler, will decrease from 4' to 2 '. |
| Ped Thru Zone | $6^{\prime}$ to 8' | $8{ }^{\prime}$ | $8{ }^{\prime}$ | N |  |
| Frontage Zone | N/A | $2.5{ }^{\prime}$ | Varies 0' to 2.5' | Y | To avoid impact to adjacent properties |
| Tapers |  |  |  |  |  |
| Transition from narrower street to wider street |  |  |  |  |  |
| Transition from wider street to narrower street |  |  |  |  |  |
| Barrier Taper |  |  |  |  |  |
| Barrier Type |  |  |  |  |  |
| Rt (Exterior) Roadside Barrier |  |  |  |  |  |
| Bridge Rail |  |  |  |  |  |


| Bridge Rail |
| :--- |
| Note: |

Note:
 Pavement Reconstruction ranges


| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Radius | 83 | 198' | 350' | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e; Matching Existing |
| Horizontal Alignment - Curve 1 |  |  |  |  |  |
| Radius (R1) |  | 198' | 350 |  |  |
| Superelevation (e) for D1 | N/A | -2.0\% | -2.0\% | N |  |
| Superelevation Runoff for D1 | N/A | N/A | N/A | N |  |
| Horizontal Alignment - Curve 2 |  |  |  |  |  |
| Degree of Curve (D) |  |  |  |  |  |
| Radius (R) |  | 198' | $350 '$ | N |  |
| Superelevation (e) for D1 | N/A | -2.0\% | -2.0\% | N |  |
| Stopping Sight Distance for D1 | N/A | N/A | N/A | N |  |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 26 | 13 | Y | AASHTO Table 3-37, 25 mph - Non-standard location under consideration at Broadway connection |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 12 | 46 | N | AASHTO Table 3-35, 25 mph |
| Vertical Grade |  |  |  |  |  |
| Maximum Grade | 10 | 12 | 4 | N | PBOT, Section 5 Street Grades, neighborhood collector streets, asphalt pavement |
| Vertical Alignment - Curve 1* |  |  |  |  | Station 'pVA' 12+13.93 |
| Grade In |  |  | 1.76\% |  |  |
| Grade Out |  |  | 2.64\% |  |  |
| Minimum Grade |  |  | 1.76\% |  |  |
| K Value |  | 26-Sag | $45-\mathrm{Sag}$ | N |  |
| Vertical Curve Length |  | 75 | 40 | N | PBOT Section 6 Vertical Curves/Grade Breaks: PBOT prefers grade breaks for Algebraic Grade Difference less than $2.5 \%$. Remove Vertical Curve. |
| Vertical Alignment - Curve 2* |  |  |  |  | Station 'pVA' 13+12.81 |
| Grade In |  |  | -0.50\% |  |  |
| Grade Out |  |  | 5.00\% |  |  |
| Minimum Grade |  |  | -0.5\% |  |  |
| K Value |  | 26-Sag | 14-Sag | Y | Meets comfort per AASHTO Equation 3-52 |
| Vertical Curve Length |  | 75 | 75 | Y | Meets comfort per AASHTO Equation 3-52. |
| Vertical Alignment - Curve 3* |  |  |  |  | Station 'pVA' 14+53.73 |
| Grade In |  |  | 5.00\% |  |  |
| Grade Out |  |  | 3.30\% |  |  |
| Minimum Grade |  |  | +3.3\% |  |  |
| K Value |  | 12-Crest | 44 - Crest | N |  |
| Vertical Curve Length |  | 75 | 75 | N |  |
| Vertical Alignment - Curve 4* |  |  |  |  | Station 'pVA' 17+06.93 |
| Grade In |  |  | 3.30\% |  |  |
| Grade Out |  |  | -0.74\% |  |  |
| Minimum Grade |  |  | -0.74\% |  |  |
| K Value |  | 12-Crest | 19 - Crest | N |  |
| Vertical Curve Length |  | 75 | 75 | N |  |
| Vertical Alignment - Curve 5* |  |  |  |  | Station 'pVA' 19+82.37 |
| Grade In |  |  | -0.74\% |  |  |
| Grade Out |  |  | 1.18\% |  |  |
| Minimum Grade |  |  | -0.74\% |  |  |
| K Value |  | 26 - Sag | $39-$ Sag | N |  |
| Vertical Curve Length |  | 75 | 75 | N |  |


| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Clearance |  |  |  |  |  |
| Bridge Vertical Clearance | N/A | N/A | N/A | N | 17' 4" vertical clearance to be provided over I-5 facilities and within interchange area |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 11' to 12' | 11' (12' curbtight) | 11' - 14' | N |  |
| Bike Buffer Zone | 2' to 3' | 4.5' (including curb) | Varies 0.5' to 4.5' (including curb) | Y | To avoid impact to adjacent properties |
| Bike Thru Zone | $6^{\prime}$ | $7{ }^{\prime}$ | $7{ }^{\prime}$ | N |  |
| Ped Buffer Zone | 0' to 5' | 2' | Varies 0' to 2' | Y | To avoid impact to adjacent properties |
| Ped Thru Zone | 7 ' to ${ }^{\prime}$ | 8' | $6^{\prime}$ to 8' | Y | 6' betwenn Broadway and Vancouver where not reconstructing existing sidewalk |
| Frontage Zone | N/A | 2.5 | 0 ' to 2.5' | Y | To avoid impact to adjacent properties |
| Tapers |  |  |  |  |  |
| Transition from narrower street to wider street |  |  |  |  |  |
| Transition from wider street to narrower street |  |  |  |  |  |
| Barrier Taper |  |  |  |  |  |
| Barrier Type |  |  |  |  |  |
| Rt (Exterior) Roadside Barrier |  |  |  |  |  |
| Bridge Rail |  |  |  |  |  |

Bridge Rail
Note:
Depth Pavement Reconstruction ranges



Bridge Rail

* Only vertical curves within the Full Depth Pavement Reconstruction range are listed. Vertical curves within the Grind/Inlay ranges will match existing and are not listed. See brackets at bottom of profiles windows in App C for Grind/Inlay and Full Depth Pavement Reconstruction ranges


| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Horizontal Alignment - Curve 1 |  |  |  |  |  |
| Radius (R1) | N/A | 198' | 409' | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
| Superelevation (e) for D1 | N/A | -2.0\% | -2.0\% | N | Normal crown section |
| Superelevation Runoff for D1 | N/A | N/A | N/A | N |  |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 17 | 9 | Y | AASHTO Table 3-37, 20 mph - Non standard location under consideration at Dixon/Wheeler Intersection |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 7 | 9 | N | AASHTO Table 3-35, 20 mph |
| Vertical Grade |  |  |  |  |  |
| Maximum Grade | N/A | 18 | 7 | N | PBOT, Section 5 Street Grades, local service streets, asphalt pavement |
| Vertical Alignment - Curve 1* |  |  |  |  | Station 'pHD' 51+67.39 |
| Grade In | N/A |  | -0.50\% |  |  |
| Grade Out | N/A |  | -5.00\% |  |  |
| Minimum Grade | N/A |  | -0.50\% |  |  |
| K Value | N/A | 7 - Crest | 13-Crest | N |  |
| Vertical Curve Length | N/A | 60 | 60 | N | Assuming Lmin=3V |
| Vertical Alignment - Curve 2* |  |  |  |  | Station 'pHD' 52+88.01 |
| Grade In | N/A |  | -5.00\% |  |  |
| Grade Out | N/A |  | 7.00\% |  |  |
| Minimum Grade | N/A |  | -5.0\% |  |  |
| K Value | N/A | 17-Sag | 9-Sag | Y | Sag is ok with Illumination |
| Vertical Curve Length | N/A | 204 | 110 | Y | Meets Comfort. Meets L=3V. Illuminate |
| Vertical Alignment - Curve 3* |  |  |  |  | Station 'pHD' 58+50.00 |
| Grade In | N/A |  | 7.00\% |  |  |
| Grade Out | N/A |  | 0.92\% |  |  |
| Minimum Grade | N/A |  | 0.92\% |  |  |
| K Value | N/A | 7 - Crest | 12 - Crest | N |  |
| Vertical Curve Length | N/A | 60 | 75 | N | AASHTO Equation 3-45 |
| Vertical Alignment - Curve 4* |  |  |  |  | Station 'pHD' 60+07.89 |
| Grade In | N/A |  | -0.92\% |  | PBOT Section 6 Vertical Curves/Grade Breaks: PBOT prefers grade breaks for Algebraic Grade Difference less than $2.5 \%$. Removed Vertical Curve. |
| Grade Out | N/A |  | 2.03\% |  |  |
| Minimum Grade | N/A |  | -0.92\% |  |  |
| K Value | N/A | 17-Sag | N/A | N |  |
| Vertical Curve Length | N/A | 75 | N/A | N | Assuming Lmin=3V |
| Clearance |  |  |  |  |  |
| Bridge Vertical Clearance | N/A | N/A | N/A | N | No proposed overhead obstructions. 17' 4" to be provided over l-5 facilities. Assume AASHTO 16.5' would apply to any overhead obstructions. |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 10' + 8' Parking | $10^{\prime}$ | $11^{\prime}$ | N |  |
| Bike Buffer Zone | None | $2 '$ | $2^{\prime}$ | N |  |
| Bike Thru Zone | None | $6^{\prime}$ (Street Level OK) | $6^{\prime}$ | N |  |
| Ped Buffer Zone | 0' to 4' | 4.5' (including curb) | 0' to 4.5' | Y | 0' buffer where matching existing |
| Ped Thru Zone | $6^{\prime}$ to 10' | $6^{\prime}$ | 7.5' to $9^{\prime}$ | N |  |
| Frontage Zone | N/A | $1.5{ }^{\prime}$ | $1.5{ }^{\prime}$ | N |  |
| Tapers |  |  |  |  |  |
| Transition from narrower street to wider street | $2^{\prime}$ to 3' |  |  |  |  |
| Transition from wider street to narrower street | $6^{\prime}$ |  |  |  |  |
| Barrier Taper | N/A | N/A | N/A |  |  |





| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Design Speed |  | 25 mph | 25 mph | N | Confirm Design speed with PBOT |
| Stopping Sight Distance |  |  |  |  |  |
| SSD |  | 165' | 178' | N | AASHTO Table 3-2, $25 \mathrm{mph} 6 \%$ downgrade |
| Horizontal Alignment Controlling Criteria |  |  |  |  |  |
| Degree of Curve | N/A | 28. ${ }^{\circ} 56{ }^{\prime \prime} 14{ }^{\prime \prime}$ | 18. ${ }^{\circ} 25^{\prime 2} 23$ " | N |  |
| Radius | N/A | 198 | 311 | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
|  |  |  |  |  |  |
| Degree of Curve (D1) |  |  | 6. ${ }^{11} 3^{\prime} 40^{\prime \prime}$ | N |  |
| Radius (R1) |  |  | 920' | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
| Superelevation (e) for D1 | -2.0\% | -2.0\% | -2.0\% | N |  |
| Superelevation Runoff for D1 |  |  |  |  |  |
| Horizontal Alignment ${ }^{\text {Curve }} 2$ |  |  |  |  |  |
| Degree of Curve (D2) |  |  | 11. ${ }^{\circ} 022^{\prime 2} 3^{\prime \prime}$ | N |  |
| Radius (R2) |  |  | 519' | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
| Superelevation (e) for D2 | -2.0\% | -2.0\% | -2.0\% | N |  |
| Superelevation Runoff for D2 |  |  |  |  |  |
| Horizontal Alignment ${ }^{\text {Curve }} 3$ |  |  |  |  |  |
| Degree of Curve (D3) |  |  | 18. ${ }^{\circ} 25^{\prime} 23^{\prime \prime}$ | N |  |
| Radius (R3) |  |  | 311' | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
| Superelevation (e) for D3 | -2.0\% | -2.0\% | -2.0\% | N |  |
| Superelevation Runoff for D3 |  |  |  |  |  |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 26 | 48 | N | AASHTO Table 3-37, 25 mph |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 12 | 40 | N | AASHTO Table 3-35, 25 mph |
|  |  |  |  |  |  |
| Maximum Grade | 5 | 18 | 5 | N | PBOT Design Guide, 5-10 Maximum - Asphalt Pavement |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Grade Out |  |  | 4.71\% |  |  |
| Minimum Grade |  |  | +1.04\% |  |  |
| K Value |  |  | 55 |  |  |
| Vertical Curve Length |  |  | 200 |  |  |
| Vertical Alignment Curve $_{2}$ |  |  |  |  |  |
| Grade In 2 |  |  | 4.71\% |  |  |
| Grade Out |  |  | 0.86\% |  |  |
| Minimum Grade |  |  | +0.86\% |  |  |
| K Value |  |  | 75 |  |  |
| Vertical Curve Length |  |  | 290 |  |  |
| Vertical Alignment Curve $_{3}$ |  |  |  |  |  |
| Grade In |  |  | 0.86\% |  |  |
| Grade Out |  |  | 3.77\% |  |  |
| Minimum Grade |  |  | +0.86\% |  |  |
| K Value |  |  | 48 |  |  |
| Vertical Curve Length |  |  | 140 |  |  |
| Vertical Alignment Curve 4 |  |  |  |  |  |
| Grade In ${ }_{4}$ |  |  | 3.77\% |  |  |
| Grade Out |  |  | 1.27\% |  |  |
| Minimum Grade |  |  | +1.27\% |  |  |
| K Value |  |  | 40 |  |  |


| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Vertical Curve Length |  |  | 100 |  |  |
| Clearance |  |  |  |  |  |
| Bridge Vertical Clearance | N/A | N/A | N/A | N/A | No objects anticipated. Assume 18.0' city preference applies |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 11 | 11 (12 curbtight) | 11 | N |  |
| Bike Buffer Zone | N/A | 4.5 | 1.5 | Y | Constrianed Environment between MODA center and the freeway. Provided maximum amount of space while providing safety |
| Bike Thru Zone | 7 | 14 | 13 | Y | Constrianed Environment between MODA center and the freeway. Provided maximum amount of space while providing safety |
| Ped Buffer Zone | 4 | 2 | 1.3 to 4.0 | Y | Constrianed Environment between MODA center and the freeway. Provided maximum amount of space while providing safety |
| Ped Thru Zone | 8 | 8 | 8 | N |  |
| Frontage Zone | 0 | 2.5 | 0 | Y | Matching existing |
|  |  |  |  |  |  |
|  |  |  |  |  |  |



| I-5: Rose Quarter Improvements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Design Speed |  | 25 mph | 25 mph | N | Confirm Design speed with PBOT |
| Stopping Sight Distance |  |  |  |  |  |
| SSD |  | $155{ }^{\prime}$ | 155' | N | AASHTO Table 3-1, 25 mph |
|  |  |  |  |  |  |
| Degree of Curve | N/A | 28. ${ }^{\circ} 56$ '14" | 28. ${ }^{\circ} 56{ }^{\prime} 14{ }^{\prime \prime}$ | N |  |
| Radius | N/A | 198 | 198 | N | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
| Horizontal Alignment Curve ${ }_{4}$ |  |  |  |  |  |
| Degree of Curve (D1) |  |  | 28. ${ }^{\circ} 56{ }^{\prime} 14{ }^{\prime \prime}$ |  |  |
| Radius (R1) |  |  | 198' |  | AASHTO Table 3-13, minimum Radius @ 25 mph and -2\% e |
| Superelevation (e) for D1 |  |  | -2.0\% |  |  |
| Superelevation Runoff for D1 |  |  |  |  |  |
| Vertical Curve (Sag) |  |  |  |  |  |
| Sag K Value | N/A | 26 | 53 | N | AASHTO Table 3-37, 25 mph |
| Vertical Curve (Crest) |  |  |  |  |  |
| Crest K Value | N/A | 12 | N/A | N/A | AASHTO Table 3-35, 25 mph |
| Vertical Grade |  |  |  |  |  |
| Maximum Grade | 4 | 18 | 5 | N | PBOT Design Guide, 5-10 Maximum - Asphalt Pavement |
|  |  |  |  |  |  |
| Grade In |  |  | 3.84\% |  |  |
| Grade Out |  |  | 5.29\% |  |  |
| Minimum Grade |  |  | +5.29\% |  |  |
| K Value |  |  | 53 |  |  |
| Vertical Curve Length |  |  | 75 |  |  |
| Clearance |  |  |  |  |  |
| Bridge Vertical Clearance | N/A | N/A | N/A | N/A | No objects anticipated. Assume 18.0' city preference applies |
| Typical Section |  |  |  |  | See Typical Section Criteria Table |
| Travel Lane(s) | 11 (12 curbtight) | 11 (12 curbtight) | 12 | N |  |
| Bike Buffer Zone | N/A | 4.5 | 0,3 | Y | Buffer is 0 when separating Cyclists and Pedestrains on MUP only. $3^{\prime}$ when in-street with limited vehicle traffic except during event egress |
| Bike Thru Zone | N/A | 7 | 7 | N |  |
| Ped Buffer Zone | 4 | 2 | 3.5,6 | N |  |
| Ped Thru Zone | 8 | 8 | 8 | N |  |
| Frontage Zone | 10 | 2.5 | 10 | N |  |
|  |  |  |  |  |  |

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