

# Appendix H

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## **Master Plan Model Results**



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope   | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|---------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |         |                |                     |         |                        |
| 2       | 8747             | Old Model          | Old Model          | JCT_MP-454         | Record Drawings    | Record Drawings    | 35          | 10        | 387.34    | 383.31    | 383.18      | 4.03          | 0.38%   | 0.001          | 0.26                | 0.04    | 0.48                   |
| 4       | 8754             | Old Model          | Straight Grade     | 8753               | Old Model          | Record Drawings    | 357         | 15        | 375.00    | 366.19    | 362.00      | 8.81          | 1.17%   | 0.322          | 3.51                | 0.18    | 4.58                   |
| 5       | 9018             | AsBuilts           | AsBuilts           | 9019               | AsBuilts           | AsBuilts           | 399         | 36        | 369.74    | 345.77    | 345.42      | 23.97         | 0.09%   | 7.974          | 4.27                | 0.56    | 5.45                   |
| 9       | 8773             | Old Model          | Old Model          | 8780               | Old Model          | Old Model          | 373         | 10        | 373.50    | 363.50    | 360.13      | 10.00         | 0.90%   | 0.006          | 1.19                | 0.05    | 1.39                   |
| 12      | 8780             | Old Model          | Old Model          | 8781               | Old Model          | Old Model          | 400         | 12        | 370.13    | 360.13    | 357.39      | 10.00         | 0.68%   | 0.024          | 1.36                | 0.32    | 2.12                   |
| 21      | 6004             | Old Model          | Old Model          | 6003               | Inv+10             | Straight Grade     | 103         | 12        | 359.96    | 349.96    | 348.97      | 10.00         | 0.97%   | 0.015          | 0.20                | 0.06    | 2.44                   |
| 69      | 8700             | COR Sewer Map Book | COR Sewer Map Book | 8699               | Assumed            | Straight Grade     | 31          | 12        | 374.20    | 360.24    | 359.86      | 13.96         | 1.24%   | 0.096          | 2.37                | 0.13    | 2.68                   |
| 87      | 7878             | COR Sewer Map Book | COR Sewer Map Book | 7854               | Old Model          | Record Drawing     | 300         | 12        | 391.56    | 383.66    | 377.11      | 7.90          | 2.18%   | 0.023          | 1.38                | 0.06    | 3.66                   |
| 115     | 7888             | Old Model          | Record Drawings    | 7890               | Old Model          | Record Drawings    | 512         | 12        | 389.79    | 380.25    | 379.25      | 9.54          | 0.20%   | 0.258          | 1.76                | 0.33    | 0.84                   |
| 127     | 7792             | Old Model          | Record Drawing     | 7781               | Old Model          | Record Drawings    | 354         | 12        | 384.23    | 374.06    | 368.98      | 10.17         | 1.43%   | 0.050          | 1.38                | 0.09    | 2.94                   |
| 128     | 7903             | COR Sewer Map Book | COR Sewer Map Book | 7792               | Old Model          | Record Drawing     | 297         | 12        | 383.70    | 375.55    | 374.06      | 8.15          | 0.50%   | 0.041          | 1.56                | 0.11    | 1.73                   |
| 129     | 7901             | Old Model          | Record Drawing     | 7903               | COR Sewer Map Book | COR Sewer Map Book | 308         | 12        | 386.11    | 375.88    | 375.55      | 10.23         | 0.11%   | 0.029          | 0.77                | 0.14    | 0.79                   |
| 130     | 7855             | Old Model          | Record Drawing     | 7901               | Old Model          | Record Drawing     | 239         | 12        | 386.95    | 376.63    | 375.88      | 10.32         | 0.31%   | 0.027          | 0.79                | 0.10    | 1.37                   |
| 131     | 7854             | Old Model          | Record Drawing     | 7855               | Old Model          | Record Drawing     | 140         | 12        | 387.44    | 377.11    | 376.63      | 10.33         | 0.34%   | 0.025          | 1.03                | 0.09    | 1.44                   |
| 148     | 6016             | Record Drawing     | Old Model          | 6015               | Record Drawing     | Old Model          | 522         | 42        | 362.42    | 348.73    | 348.26      | 13.69         | 0.09%   | 6.883          | 2.67                | 0.42    | 14.25                  |
| 149     | 6008             | AsBuilts           | AsBuilts           | 6034               | AsBuilts           | AsBuilts           | 84          | 42        | 362.02    | 347.84    | 347.58      | 14.18         | 0.31%   | 6.896          | 2.52                | 0.45    | 32.40                  |
| 150     | 6025             | AsBuilts           | AsBuilts           | 9018               | AsBuilts           | AsBuilts           | 391         | 42        | 369.20    | 346.15    | 345.77      | 23.05         | 0.10%   | 7.975          | 2.78                | 0.46    | 13.11                  |
| 157     | 6115             | Record Drawings    | Record Drawings    | JCT_MP-382         |                    |                    | 294         | 12        | 369.59    | 353.97    | 0.00        | 15.62         | 120.40% | 0.447          | 2.55                | 0.39    | 1.01                   |
| 170     | 6100             | Record Drawings    | Record Drawings    | 6089               | Record Drawings    | Record Drawings    | 604         | 12        | 409.60    | 398.18    | 396.01      | 11.42         | 0.36%   | 1.523          | 3.89                | 1.95    | -0.14                  |
| 171     | 6095             | Record Drawings    | Record Drawings    | 6096               | Record Drawings    | Record Drawings    | 402         | 12        | 427.27    | 414.45    | 410.44      | 12.82         | 1.00%   | 0.911          | 4.16                | 0.42    | 1.56                   |
| 173     | 6105             | Record Drawings    | Record Drawings    | 6106               | Record Drawings    | Record Drawings    | 399         | 12        | 444.86    | 426.92    | 425.05      | 17.94         | 0.47%   | 0.904          | 4.14                | 0.63    | 0.74                   |
| 174     | 6060             | Record Drawings    | Record Drawings    | 6124               | Record Drawings    | Record Drawings    | 401         | 12        | 419.11    | 408.23    | 406.19      | 10.88         | 0.51%   | 0.001          | 0.61                | 0.02    | 1.73                   |
| 175     | 6065             | Old Model          | Old Model          | 6070               | Record Drawings    | Record Drawings    | 359         | 21        | 377.10    | 367.10    | 366.54      | 10.00         | 0.16%   | 1.021          | 2.25                | 0.34    | 3.36                   |
| 176     | 6074             | Record Drawings    | Record Drawings    | 6075               | Record Drawings    | Record Drawings    | 254         | 14        | 427.08    | 396.73    | 396.18      | 30.35         | 0.22%   | 0.951          | 3.59                | 0.66    | 0.60                   |
| 177     | 6076             | Old Model          | Old Model          | 6070               | Record Drawings    | Record Drawings    | 311         | 15        | 400.56    | 389.37    | 366.54      | 11.19         | 7.35%   | 0.951          | 2.07                | 0.74    | -0.23                  |
| 178     | 6080             | Record Drawings    | Record Drawings    | 6077               | Record Drawings    | Record Drawings    | 616         | 15        | 413.82    | 401.79    | 400.57      | 12.03         | 0.20%   | 0.761          | 2.22                | 0.44    | 1.17                   |
| 180     | 6078             | Record Drawings    | Record Drawings    | 6080               | Record Drawings    | Record Drawings    | 420         | 12        | 417.00    | 402.85    | 401.79      | 14.15         | 0.25%   | 0.759          | 2.69                | 0.66    | 0.42                   |
| 182     | 6051             | Record Drawing     | Old Model          | 6050               | Record Drawing     | Record Drawing     | 465         | 42        | 360.00    | 350.30    | 349.90      | 9.70          | 0.09%   | 6.874          | 2.83                | 0.42    | 13.80                  |
| 185     | 6062             | Old Model          | Old Model          | 6064               | Old Model          | Old Model          | 516         | 21        | 375.40    | 365.40    | 364.38      | 10.00         | 0.20%   | 1.856          | 2.70                | 0.43    | 3.08                   |
| 186     | 6077             | Record Drawings    | Record Drawings    | 6123               | Record Drawings    | Record Drawings    | 515         | 14        | 406.32    | 400.57    | 399.84      | 5.75          | 0.14%   | 0.764          | 2.05                | 0.58    | 0.57                   |



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| Pipe ID | Upstream Manhole |                        |                   | Downstream Manhole |                        |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|------------------------|-------------------|--------------------|------------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source             | Invert Source     | ID                 | Rim Source             | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 187     | 6124             | Record Drawings        | Record Drawings   | 6944               | Record Drawings        | Record Drawings   | 338         | 12        | 415.27    | 406.19    | 404.55      | 9.08          | 0.49%  | 0.692          | 3.21                | 0.45    | 1.05                   |
| 190     | 6089             | Record Drawings        | Record Drawings   | 6083               | Record Drawings        | Record Drawings   | 400         | 18        | 412.57    | 396.01    | 395.28      | 16.56         | 0.18%  | 1.474          | 2.68                | 0.55    | 1.40                   |
| 191     | 6083             | Record Drawings        | Record Drawings   | 6081               | Record Drawings        | Record Drawings   | 352         | 18        | 417.70    | 395.28    | 394.47      | 22.42         | 0.23%  | 1.474          | 3.67                | 0.50    | 2.06                   |
| 192     | 6081             | Record Drawings        | Record Drawings   | 6082               | Record Drawings        | Record Drawings   | 350         | 18        | 406.05    | 394.47    | 383.12      | 11.58         | 3.24%  | 1.476          | 7.95                | 0.26    | 11.75                  |
| 193     | 6082             | Record Drawings        | Record Drawings   | 6084               | Record Drawings        | Record Drawings   | 479         | 18        | 391.72    | 383.12    | 371.41      | 8.60          | 2.44%  | 1.476          | 5.36                | 0.24    | 9.98                   |
| 194     | 6084             | Record Drawings        | Record Drawings   | 6085               | Record Drawings        | Record Drawings   | 500         | 18        | 384.04    | 371.41    | 369.00      | 12.63         | 0.48%  | 1.476          | 4.04                | 0.39    | 3.56                   |
| 195     | 6085             | Record Drawings        | Record Drawings   | 6086               | Record Drawings        | Record Drawings   | 508         | 18        | 381.52    | 369.00    | 366.50      | 12.52         | 0.49%  | 1.476          | 3.44                | 0.37    | 3.62                   |
| 196     | 6086             | Record Drawings        | Record Drawings   | 6087               | Record Drawings        | Record Drawings   | 50          | 18        | 377.70    | 366.50    | 366.29      | 11.20         | 0.42%  | 1.480          | 3.15                | 0.47    | 2.68                   |
| 197     | 6087             | Record Drawings        | Record Drawings   | 6121               | Record Drawings        | Record Drawings   | 502         | 18        | 377.54    | 366.29    | 363.84      | 11.25         | 0.49%  | 1.995          | 5.17                | 0.48    | 2.93                   |
| 201     | 6169             | Old Model              | Old Model         | 6162               | Record Dwg             | Old Model         | 222         | 18        | 395.70    | 385.70    | 386.20      | 10.00         | -0.23% | 0.750          | 1.22                | 0.74    | 2.74                   |
| 205     | 6150             | Old Model              | Old Model         | 6153               | Old Model              | Old Model         | 78          | 18        | 393.46    | 383.46    | 383.25      | 10.00         | 0.27%  | 0.769          | 2.34                | 0.33    | 3.06                   |
| 216     | 6151             | Old Model              | Old Model         | 6200               | Old Model              | Old Model         | 206         | 18        | 393.05    | 383.05    | 382.43      | 10.00         | 0.30%  | 0.771          | 2.48                | 0.30    | 3.26                   |
| 219     | 6863             | Record Drawing         | Record Drawing    | 6186               | Old Model              | Old Model         | 111         | 21        | 397.54    | 371.26    | 371.23      | 26.28         | 0.03%  | 1.013          | 2.01                | 0.41    | 0.81                   |
| 224     | 6208             | Benton Cnty Z - NGVD29 | Default to Legacy | 6207               | Benton Cnty Z - NGVD29 | Default to Legacy | 310         | 12        | 446.36    | 436.36    | 435.68      | 10.00         | 0.22%  | 0.479          | 2.64                | 0.51    | 0.69                   |
| 252     | 482              | Old Model              | Old Model         | 271                | Old Model              | Old Model         | 218         | 12        | 396.40    | 392.76    | 391.28      | 3.64          | 0.68%  | 0.210          | 2.10                | 0.22    | 1.85                   |
| 253     | 464              | Old Model              | Old Model         | 456                | Old Model              | Old Model         | 272         | 12        | 401.00    | 389.40    | 388.71      | 11.60         | 0.25%  | 0.237          | 1.95                | 0.33    | 0.96                   |
| 254     | 442              | Old Model              | Old Model         | 443                | Old Model              | Old Model         | 456         | 12        | 486.80    | 466.80    | 453.08      | 20.00         | 3.01%  | 1.109          | 5.60                | 0.35    | 3.22                   |
| 256     | 305              | Old Model              | Old Model         | 304                | Old Model              | Old Model         | 398         | 12        | 405.70    | 384.72    | 383.74      | 20.98         | 0.25%  | 0.048          | 1.20                | 0.14    | 1.19                   |
| 269     | 466              | Old Model              | Old Model         | 449                | Old Model              | Old Model         | 335         | 30        | 359.74    | 348.74    | 348.41      | 11.00         | 0.10%  | 3.804          | 2.53                | 0.48    | 5.21                   |
| 272     | 332              | Old Model              | Old Model         | 366                | Old Model              | Old Model         | 416         | 21        | 457.00    | 444.42    | 443.85      | 12.58         | 0.14%  | 2.446          | 2.40                | 0.58    | 1.66                   |
| 273     | 469              | Old Model              | Old Model         | 466                | Old Model              | Old Model         | 116         | 18        | 362.66    | 352.66    | 348.74      | 10.00         | 3.38%  | 0.419          | 5.24                | 0.14    | 11.26                  |
| 274     | 471              | Old Model              | Old Model         | 469                | Old Model              | Old Model         | 396         | 15        | 363.58    | 353.58    | 352.66      | 10.00         | 0.23%  | 0.417          | 2.76                | 0.33    | 1.76                   |
| 275     | 483              | Old Model              | Old Model         | 482                | Old Model              | Old Model         | 129         | 12        | 405.50    | 392.86    | 392.76      | 12.64         | 0.08%  | 0.209          | 1.59                | 0.40    | 0.49                   |
| 276     | 285              | Old Model              | Old Model         | 303                | Old Model              | Old Model         | 130         | 12        | 393.89    | 383.89    | 382.80      | 10.00         | 0.84%  | 0.019          | 0.93                | 0.07    | 2.26                   |
| 277     | 281              | Old Model              | Old Model         | 282                | Old Model              | Old Model         | 361         | 12        | 369.18    | 362.80    | 360.95      | 6.38          | 0.51%  | 0.073          | 1.57                | 0.14    | 1.71                   |
| 284     | 1036             | Old Model              | Old Model         | 306                | Old Model              | Old Model         | 400         | 12        | 402.00    | 386.60    | 385.70      | 15.40         | 0.22%  | 0.048          | 1.17                | 0.22    | 1.19                   |
| 295     | 342              | Old Model              | Old Model         | 396                | Old Model              | Old Model         | 206         | 12        | 426.33    | 416.33    | 397.63      | 10.00         | 9.06%  | 0.697          | 4.25                | 0.21    | 6.83                   |
| 318     | 682              | Old Model              | Old Model         | 443                | Old Model              | Old Model         | 56          | 15        | 467.59    | 453.55    | 453.08      | 14.04         | 0.84%  | 1.274          | 4.14                | 0.44    | 2.86                   |
| 327     | 301              | Old Model              | Old Model         | 474                | Old Model              | Old Model         | 367         | 12        | 400.50    | 394.00    | 352.30      | 6.50          | 11.35% | 0.711          | 5.57                | 0.20    | 7.72                   |
| 328     | 302              | Old Model              | Old Model         | 484                | Old Model              | Old Model         | 25          | 15        | 369.96    | 359.96    | 357.69      | 10.00         | 9.08%  | 0.008          | 0.12                | 0.02    | 13.65                  |
| 378     | 286              | Old Model              | Old Model         | 405                | Old Model              | Old Model         | 17          | 12        | 370.01    | 360.01    | 359.15      | 10.00         | 5.09%  | 0.073          | 2.15                | 0.08    | 5.56                   |
| 405     | 537              | Default to Legacy      | Default to Legacy | 395                | Old Model              | Old Model         | 231         | 10        | 408.32    | 398.32    | 396.95      | 10.00         | 0.59%  | 0.017          | 0.16                | 0.08    | 1.17                   |
| 412     | 538              | Default to Legacy      | Default to Legacy | 537                | Default to Legacy      | Default to Legacy | 154         | 10        | 408.67    | 398.67    | 398.32      | 10.00         | 0.23%  | 0.016          | 0.88                | 0.11    | 0.72                   |
| 413     | 539              | Default to Legacy      | Default to Legacy | 538                | Default to Legacy      | Default to Legacy | 348         | 10        | 409.76    | 399.76    | 398.67      | 10.00         | 0.31%  | 0.015          | 0.79                | 0.09    | 0.84                   |



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| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|-------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source     |             |           |           |           |             |               |       |                |                     |         |                        |
| 469     | 592              | Default to Legacy  | Default to Legacy  | 643                | Old Model          | Old Model         | 315         | 10        | 533.82    | 527.21    | 525.95      | 6.61          | 0.40% | 0.003          | 0.22                | 0.04    | 0.97                   |
| 509     | 681              | Old Model          | Old Model          | 679                | Old Model          | Old Model         | 460         | 10        | 482.95    | 472.95    | 471.53      | 10.00         | 0.31% | 0.600          | 2.66                | 0.66    | 0.25                   |
| 510     | 693              | Old Model          | Old Model          | 684                | Old Model          | Old Model         | 448         | 12        | 477.42    | 467.42    | 454.77      | 10.00         | 2.83% | 0.465          | 2.19                | 0.23    | 3.73                   |
| 511     | 632              | Old Model          | Old Model          | 652                | Old Model          | Old Model         | 420         | 10        | 540.23    | 530.23    | 529.11      | 10.00         | 0.27% | 0.007          | 0.64                | 0.07    | 0.79                   |
| 515     | 649              | Old Model          | Old Model          | 640                | Old Model          | Old Model         | 422         | 10        | 534.71    | 524.71    | 523.56      | 10.00         | 0.27% | 0.033          | 0.96                | 0.14    | 0.77                   |
| 516     | 711              | Old Model          | Old Model          | 706                | Old Model          | Old Model         | 464         | 10        | 510.00    | 500.00    | 484.25      | 10.00         | 3.39% | 0.183          | 5.05                | 0.18    | 2.64                   |
| 517     | 646              | Old Model          | Old Model          | 644                | Old Model          | Old Model         | 424         | 10        | 531.27    | 521.27    | 520.17      | 10.00         | 0.26% | 0.064          | 1.32                | 0.19    | 0.72                   |
| 518     | 647              | Old Model          | Old Model          | 646                | Old Model          | Old Model         | 308         | 10        | 532.25    | 522.25    | 521.27      | 10.00         | 0.32% | 0.063          | 1.37                | 0.18    | 0.80                   |
| 519     | 648              | Old Model          | Old Model          | 647                | Old Model          | Old Model         | 138         | 10        | 532.64    | 522.64    | 522.25      | 10.00         | 0.28% | 0.062          | 1.36                | 0.19    | 0.75                   |
| 530     | 689              | Default to Legacy  | Default to Legacy  | 685                | Default to Legacy  | Default to Legacy | 221         | 10        | 481.22    | 471.22    | 470.14      | 10.00         | 0.49% | 0.013          | 1.01                | 0.08    | 1.06                   |
| 531     | 685              | Default to Legacy  | Default to Legacy  | 688                | Default to Legacy  | Default to Legacy | 267         | 10        | 481.40    | 470.14    | 467.72      | 11.26         | 0.91% | 0.020          | 1.11                | 0.08    | 1.44                   |
| 534     | 443              | Old Model          | Old Model          | 422                | Old Model          | Old Model         | 324         | 21        | 477.20    | 453.08    | 448.02      | 24.12         | 1.56% | 2.352          | 4.27                | 0.28    | 11.52                  |
| 535     | 440              | Old Model          | Old Model          | 442                | Old Model          | Old Model         | 228         | 12        | 481.19    | 469.33    | 466.80      | 11.86         | 1.11% | 1.108          | 5.34                | 0.51    | 1.52                   |
| 568     | 880              | Old Model          | Old Model          | 926                | Old Model          | Old Model         | 150         | 10        | 536.00    | 519.84    | 518.50      | 16.16         | 0.89% | 0.063          | 2.27                | 0.15    | 1.39                   |
| 583     | 441              | Old Model          | Old Model          | 440                | Old Model          | Old Model         | 201         | 12        | 483.46    | 473.46    | 469.33      | 10.00         | 2.05% | 1.107          | 5.05                | 0.38    | 2.47                   |
| 613     | 4075             | Old Model          | Old Model          | 4074               | Old Model          | Old Model         | 330         | 12        | 531.88    | 521.88    | 519.17      | 10.00         | 0.82% | 0.285          | 3.01                | 0.24    | 1.98                   |
| 614     | 4074             | Old Model          | Old Model          | 4073               | Old Model          | Old Model         | 384         | 12        | 529.17    | 519.17    | 515.05      | 10.00         | 1.07% | 0.286          | 3.83                | 0.24    | 2.30                   |
| 615     | 3953             | Old Model          | Old Model          | 4075               | Old Model          | Old Model         | 277         | 12        | 533.69    | 523.69    | 521.88      | 10.00         | 0.65% | 0.284          | 2.85                | 0.26    | 1.73                   |
| 697     | 4073             | Old Model          | Old Model          | 4072               | Old Model          | Old Model         | 332         | 12        | 525.05    | 515.05    | 503.09      | 10.00         | 3.60% | 0.287          | 4.94                | 0.17    | 4.45                   |
| 701     | 926              | Old Model          | Old Model          | 927                | Old Model          | Old Model         | 185         | 10        | 528.50    | 518.50    | 514.34      | 10.00         | 2.25% | 0.063          | 2.53                | 0.11    | 2.24                   |
| 702     | 927              | Old Model          | Old Model          | 916                | Old Model          | Old Model         | 127         | 10        | 524.34    | 514.34    | 512.08      | 10.00         | 1.79% | 0.065          | 3.08                | 0.13    | 1.99                   |
| 703     | 916              | Old Model          | Old Model          | 915                | Old Model          | Old Model         | 272         | 10        | 522.08    | 512.08    | 490.49      | 10.00         | 7.95% | 0.068          | 3.70                | 0.09    | 4.26                   |
| 705     | 915              | Old Model          | Old Model          | 914                | Old Model          | Old Model         | 317         | 10        | 500.49    | 490.49    | 481.50      | 10.00         | 2.83% | 0.069          | 2.29                | 0.11    | 2.51                   |
| 766     | 1040             | Old Model          | Old Model          | 1039               | Old Model          | Old Model         | 303         | 12        | 404.80    | 390.50    | 389.50      | 14.30         | 0.33% | 0.022          | 0.97                | 0.09    | 1.32                   |
| 820     | 1098             | Old Model          | Old Model          | 1101               | Old Model          | Old Model         | 355         | 12        | 403.60    | 395.70    | 395.61      | 7.90          | 0.03% | 0.003          | 0.26                | 0.08    | 0.39                   |
| 821     | 1101             | Old Model          | Old Model          | 1100               | Old Model          | Old Model         | 427         | 12        | 403.40    | 395.61    | 393.64      | 7.79          | 0.46% | 0.004          | 0.51                | 0.04    | 1.69                   |
| 822     | 1100             | Old Model          | Old Model          | 1099               | Old Model          | Old Model         | 425         | 12        | 406.20    | 393.64    | 392.60      | 12.56         | 0.24% | 0.008          | 0.68                | 0.06    | 1.19                   |
| 823     | 1042             | Old Model          | Old Model          | 1041               | Old Model          | Old Model         | 260         | 12        | 408.00    | 391.70    | 391.04      | 16.30         | 0.25% | 0.022          | 0.84                | 0.09    | 1.24                   |
| 832     | 1049             | Old Model          | Old Model          | 1047               | Old Model          | Old Model         | 388         | 10        | 357.48    | 347.48    | 345.97      | 10.00         | 0.39% | 0.348          | 2.52                | 0.43    | 0.61                   |
| 859     | 1048             | Old Model          | Old Model          | 1049               | Old Model          | Old Model         | 223         | 10        | 357.50    | 347.50    | 347.48      | 10.00         | 0.01% | 0.335          | 1.53                | 0.77    | -0.19                  |
| 864     | 1047             | Old Model          | Old Model          | 1102               | Old Model          | Old Model         | 479         | 10        | 355.40    | 345.97    | 343.30      | 9.43          | 0.56% | 0.363          | 3.35                | 0.42    | 0.78                   |
| 866     | 1102             | Old Model          | Old Model          | 1104               | Old Model          | Old Model         | 312         | 10        | 348.40    | 343.30    | 336.50      | 5.10          | 2.18% | 0.369          | 3.03                | 0.27    | 1.90                   |
| 874     | 6353             | Old Model          | Old Model          | 6354               | Old Model          | Old Model         | 329         | 12        | 376.63    | 366.63    | 365.71      | 10.00         | 0.28% | 0.170          | 2.02                | 0.26    | 1.15                   |
| 884     | 7104             | Old Model          | Old Model          | 7235               | Old Model          | Old Model         | 178         | 10        | 403.16    | 393.16    | 392.74      | 10.00         | 0.24% | 0.081          | 0.98                | 0.22    | 0.67                   |
| 893     | 6313             | Old Model          | Old Model          | 6308               | Inv+10             | Record Drawings   | 262         | 10        | 403.60    | 393.60    | 386.28      | 10.00         | 2.80% | 0.097          | 0.87                | 0.13    | 2.47                   |
| 898     | 6303             | Record Drawings    | Record Drawings    | 6305               | Record Drawings    | Record Drawings   | 507         | 12        | 387.61    | 377.61    | 376.81      | 10.00         | 0.16% | 0.539          | 2.07                | 0.58    | 0.45                   |
| 907     | 6287             | Old Model          | Old Model          | 1197               | Record Drawings    | Record Drawings   | 638         | 54        | 341.92    | 331.92    | 330.42      | 10.00         | 0.23% | 13.241         | 3.76                | 0.33    | 43.91                  |
| 921     | 6346             | Inv+10             | Record Drawings    | 6333               | COR Sewer Map Book | Straight Grade    | 48          | 10        | 360.16    | 350.16    | 349.97      | 10.00         | 0.39% | 0.020          | 0.89                | 0.10    | 0.94                   |
| 923     | 6336             | AsBuilts           | AsBuilts           | 6334               | AsBuilts           | Old Model         | 85          | 12        | 358.45    | 347.17    | 341.90      | 11.28         | 6.17% | 0.108          | 3.27                | 0.12    | 3.71                   |
| 929     | 6342             | Inv+10             | Record Drawings    | 6346               | Inv+10             | Record Drawings   | 293         | 10        | 361.33    | 351.33    | 350.16      | 10.00         | 0.40% | 0.020          | 1.11                | 0.10    | 0.95                   |
| 931     | 6339             | COR Sewer Map Book | COR Sewer Map Book | 6335               | Old Model          | Old Model         | 273         | 10        | 353.61    | 348.28    | 347.57      | 5.33          | 0.26% | 0.108          | 1.80                | 0.30    | 0.62                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                   |                   | Downstream Manhole |                   |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source        | Invert Source     | ID                 | Rim Source        | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 943     | 6390             | Old Model         | Old Model         | 6389               | Old Model         | Old Model         | 303         | 12        | 353.82    | 343.82    | 342.96      | 10.00         | 0.28%  | 0.010          | 0.69                | 0.06    | 1.32                   |
| 946     | 6288             | Old Model         | Old Model         | 6292               | Record Drawings   | Record Drawings   | 535         | 10        | 400.03    | 390.03    | 388.68      | 10.00         | 0.25%  | 0.125          | 1.60                | 0.27    | 0.65                   |
| 947     | 6304             | Old Model         | Record Drawings   | 8929               | Record Drawings   | Record Drawings   | 741         | 12        | 386.42    | 376.42    | 342.65      | 10.00         | 4.55%  | 0.715          | 6.34                | 0.27    | 3.67                   |
| 983     | 6423             | Old Model         | Old Model         | 6426               | Old Model         | Old Model         | 258         | 10        | 366.34    | 356.34    | 355.69      | 10.00         | 0.25%  | 0.056          | 1.01                | 0.18    | 0.71                   |
| 992     | 6426             | Old Model         | Old Model         | 6425               | Old Model         | Old Model         | 273         | 12        | 365.69    | 355.69    | 355.22      | 10.00         | 0.17%  | 0.098          | 1.20                | 0.21    | 0.94                   |
| 1133    | 6427             | Old Model         | Old Model         | 6422               | Old Model         | Old Model         | 183         | 10        | 367.61    | 357.61    | 356.84      | 10.00         | 0.42%  | 0.043          | 1.11                | 0.14    | 0.95                   |
| 1134    | 6575             | Inv+10            | Min Slope         | 6427               | Old Model         | Old Model         | 213         | 10        | 368.21    | 358.21    | 357.61      | 10.00         | 0.28%  | 0.009          | 0.46                | 0.07    | 0.81                   |
| 1135    | 6460             | Inv+10            | Min Slope         | 6427               | Old Model         | Old Model         | 294         | 10        | 368.43    | 358.43    | 357.61      | 10.00         | 0.28%  | 0.033          | 1.10                | 0.14    | 0.78                   |
| 1138    | 6425             | Old Model         | Old Model         | 6429               | Old Model         | Old Model         | 394         | 12        | 365.22    | 355.22    | 354.69      | 10.00         | 0.13%  | 0.104          | 1.03                | 0.23    | 0.81                   |
| 1139    | 6429             | Old Model         | Old Model         | 6446               | Old Model         | Old Model         | 403         | 12        | 364.69    | 354.69    | 354.40      | 10.00         | 0.07%  | 0.106          | 0.99                | 0.28    | 0.56                   |
| 1151    | 6444             | Old Model         | Old Model         | 6686               | Old Model         | Old Model         | 371         | 12        | 362.87    | 352.87    | 352.32      | 10.00         | 0.15%  | 0.253          | 1.47                | 0.35    | 0.71                   |
| 1154    | 6443             | Old Model         | Old Model         | 6576               | Default to Legacy | Default to Legacy | 231         | 12        | 363.47    | 353.47    | 353.12      | 10.00         | 0.15%  | 0.160          | 1.39                | 0.28    | 0.81                   |
| 1155    | 6576             | Default to Legacy | Default to Legacy | 6444               | Old Model         | Old Model         | 165         | 12        | 363.12    | 353.12    | 352.87      | 10.00         | 0.15%  | 0.162          | 1.19                | 0.28    | 0.81                   |
| 1156    | 6446             | Old Model         | Old Model         | 6534               | Default to Legacy | Default to Legacy | 230         | 12        | 364.40    | 354.40    | 353.87      | 10.00         | 0.23%  | 0.156          | 1.61                | 0.25    | 1.04                   |
| 1162    | 6422             | Old Model         | Old Model         | 6423               | Old Model         | Old Model         | 262         | 10        | 366.84    | 356.84    | 356.34      | 10.00         | 0.19%  | 0.055          | 1.16                | 0.20    | 0.62                   |
| 1167    | 6534             | Default to Legacy | Default to Legacy | 6443               | Old Model         | Old Model         | 176         | 12        | 363.87    | 353.87    | 353.47      | 10.00         | 0.23%  | 0.158          | 1.48                | 0.25    | 1.03                   |
| 1278    | 6726             | Default to Legacy | Default to Legacy | 6692               | Old Model         | Old Model         | 237         | 12        | 361.41    | 351.41    | 351.05      | 10.00         | 0.15%  | 0.298          | 1.63                | 0.39    | 0.68                   |
| 1280    | 6702             | Old Model         | Old Model         | 6726               | Default to Legacy | Default to Legacy | 50          | 12        | 361.48    | 351.48    | 351.41      | 10.00         | 0.14%  | 0.296          | 1.58                | 0.41    | 0.64                   |
| 1281    | 6725             | Default to Legacy | Default to Legacy | 6702               | Old Model         | Old Model         | 134         | 12        | 361.69    | 351.69    | 351.48      | 10.00         | 0.16%  | 0.296          | 1.58                | 0.39    | 0.69                   |
| 1287    | 6716             | Default to Legacy | Default to Legacy | 6684               | Old Model         | Old Model         | 143         | 12        | 362.11    | 352.11    | 351.90      | 10.00         | 0.15%  | 0.272          | 1.54                | 0.38    | 0.69                   |
| 1288    | 6715             | Default to Legacy | Default to Legacy | 6716               | Default to Legacy | Default to Legacy | 113         | 12        | 362.28    | 352.28    | 352.11      | 10.00         | 0.15%  | 0.271          | 1.56                | 0.38    | 0.70                   |
| 1289    | 6686             | Old Model         | Old Model         | 6715               | Default to Legacy | Default to Legacy | 29          | 12        | 362.32    | 352.32    | 352.28      | 10.00         | 0.14%  | 0.271          | 1.50                | 0.40    | 0.65                   |
| 1294    | 7020             | Record Drawings   | Record Drawings   | 6623               | Record Drawings   | Record Drawings   | 424         | 54        | 355.19    | 335.39    | 335.22      | 19.80         | 0.04%  | 12.271         | 2.37                | 0.50    | 15.31                  |
| 1295    | 6623             | Record Drawings   | Record Drawings   | 6626               | Record Drawings   | Record Drawings   | 210         | 54        | 355.52    | 335.22    | 335.11      | 20.30         | 0.05%  | 12.284         | 2.39                | 0.50    | 19.26                  |
| 1296    | 6626             | Record Drawings   | Record Drawings   | 6610               | Record Drawings   | Record Drawings   | 512         | 54        | 355.61    | 335.11    | 334.82      | 20.50         | 0.06%  | 12.287         | 2.34                | 0.50    | 20.48                  |
| 1300    | 6608             | Record Drawings   | Record Drawings   | JCT_MP-348         | Record Drawings   | Straight Grade    | 216         | 54        | 355.09    | 334.84    | 334.88      | 20.25         | -0.02% | 12.286         | 2.58                | 0.49    | 6.45                   |
| 1301    | 6697             | Record Drawings   | Record Drawings   | JCT_MP-350         | Record Drawings   | Straight Grade    | 539         | 54        | 357.40    | 334.30    | 334.16      | 23.10         | 0.03%  | 12.307         | 2.81                | 0.47    | 9.89                   |
| 1302    | 6695             | Old Model         | Record Drawings   | JCT_MP-350         | Record Drawings   | Straight Grade    | 17          | 12        | 360.56    | 350.14    | 334.16      | 10.42         | 96.57% | 0.319          | 16.04               | 0.10    | 33.02                  |
| 1303    | 6666             | Record Drawings   | Record Drawings   | 6665               | Record Drawings   | Record Drawings   | 415         | 12        | 356.70    | 344.83    | 344.23      | 11.87         | 0.14%  | 0.049          | 0.89                | 0.16    | 0.90                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|-------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |       |                |                     |         |                        |
| 1305    | 6664             | Record Drawings    | Record Drawings    | 6666               | Record Drawings    | Record Drawings    | 368         | 12        | 357.80    | 345.63    | 344.83      | 12.17         | 0.22% | 0.048          | 1.06                | 0.14    | 1.12                   |
| 1306    | 6688             | Record Drawings    | Record Drawings    | 6664               | Record Drawings    | Record Drawings    | 452         | 12        | 357.60    | 346.25    | 345.63      | 11.35         | 0.14% | 0.034          | 0.86                | 0.13    | 0.89                   |
| 1307    | 6689             | Record Drawings    | Record Drawings    | 6688               | Record Drawings    | Record Drawings    | 386         | 12        | 357.30    | 347.02    | 346.25      | 10.28         | 0.20% | 0.035          | 0.99                | 0.12    | 1.08                   |
| 1317    | 6694             | Old Model          | Old Model          | 6695               | Old Model          | Record Drawings    | 205         | 12        | 360.86    | 350.86    | 350.14      | 10.00         | 0.35% | 0.320          | 3.28                | 0.40    | 1.16                   |
| 1321    | 6642             | Inv+10             | Record Drawings    | 6648               | Inv+10             | Record Drawings    | 446         | 10        | 393.03    | 383.03    | 381.86      | 10.00         | 0.26% | 0.179          | 1.78                | 0.33    | 0.61                   |
| 1387    | 6862             | Record Drawing     | Record Drawing     | 6863               | Record Drawing     | Record Drawing     | 113         | 10        | 397.21    | 374.79    | 371.26      | 22.42         | 3.13% | 0.132          | 3.60                | 0.16    | 2.26                   |
| 1389    | 6850             | Record Drawing     | Record Drawing     | 6851               | Record Drawing     | Record Drawing     | 222         | 10        | 399.76    | 379.96    | 378.88      | 19.80         | 0.49% | 0.067          | 1.62                | 0.18    | 0.89                   |
| 1390    | 6851             | Record Drawing     | Record Drawing     | 6852               | Record Drawing     | Record Drawing     | 238         | 10        | 394.93    | 378.88    | 377.88      | 16.05         | 0.42% | 0.067          | 1.53                | 0.18    | 0.90                   |
| 1391    | 6852             | Record Drawing     | Record Drawing     | 6853               | Record Drawing     | Record Drawing     | 242         | 10        | 394.17    | 377.88    | 376.88      | 16.29         | 0.41% | 0.095          | 1.63                | 0.25    | 0.72                   |
| 1392    | 6853             | Record Drawing     | Record Drawing     | 6860               | Record Drawing     | Record Drawing     | 246         | 10        | 396.23    | 376.88    | 376.11      | 19.35         | 0.31% | 0.110          | 2.46                | 0.37    | 0.68                   |
| 1393    | 6860             | Record Drawing     | Record Drawing     | 6861               | Record Drawing     | Record Drawing     | 136         | 10        | 398.56    | 376.11    | 375.45      | 22.45         | 0.48% | 0.096          | 1.74                | 0.23    | 0.81                   |
| 1395    | 6854             | Record Drawing     | Record Drawing     | 6850               | Record Drawing     | Record Drawing     | 222         | 10        | 404.17    | 381.32    | 379.96      | 22.85         | 0.61% | 0.066          | 1.73                | 0.17    | 1.04                   |
| 1396    | 6861             | Record Drawing     | Record Drawing     | 6862               | Record Drawing     | Record Drawing     | 194         | 10        | 399.57    | 375.45    | 374.79      | 24.12         | 0.34% | 0.132          | 1.68                | 0.31    | 0.60                   |
| 1445    | 1846             | Default to Legacy  | Default to Legacy  | 1845               | Default to Legacy  | Default to Legacy  | 256         | 10        | 509.94    | 506.59    | 506.02      | 3.35          | 0.22% | 0.002          | 0.28                | 0.04    | 0.72                   |
| 1447    | 1845             | Default to Legacy  | Default to Legacy  | 1847               | Default to Legacy  | Default to Legacy  | 398         | 10        | 516.48    | 506.02    | 503.51      | 10.46         | 0.63% | 0.009          | 0.60                | 0.06    | 1.21                   |
| 1448    | 1837             | Default to Legacy  | Default to Legacy  | 1836               | Default to Legacy  | Default to Legacy  | 192         | 10        | 513.22    | 507.03    | 506.74      | 6.19          | 0.15% | 0.002          | 0.23                | 0.04    | 0.59                   |
| 1449    | 1836             | Default to Legacy  | Default to Legacy  | 1835               | Old Model          | Old Model          | 332         | 10        | 514.46    | 506.74    | 505.56      | 7.72          | 0.36% | 0.012          | 0.77                | 0.08    | 0.90                   |
| 1476    | 7780             | COR Sewer Map Book | COR Sewer Map Book | 8703               | COR Sewer Map Book | COR Sewer Map Book | 433         | 12        | 385.48    | 368.48    | 367.46      | 17.00         | 0.24% | 0.094          | 1.83                | 0.21    | 1.12                   |
| 1488    | 7703             | Old Model          | Old Model          | 8783               | Old Model          | Old Model          | 134         | 12        | 377.67    | 367.67    | 359.54      | 10.00         | 6.07% | 0.009          | 1.45                | 0.03    | 6.14                   |
| 1515    | 6935             | Inv+10             | Straight Grade     | 8521               | Record Drawings    | Record Drawings    | 174         | 10        | 394.91    | 384.91    | 383.65      | 10.00         | 0.72% | 0.021          | 1.79                | 0.10    | 1.29                   |
| 1596    | 1199             | Old Model          | Old Model          | 1194               | Old Model          | Old Model          | 487         | 30        | 345.19    | 335.19    | 334.72      | 10.00         | 0.10% | 3.790          | 2.95                | 0.48    | 5.13                   |
| 1602    | 2122             | Old Model          | Old Model          | 2121               | Old Model          | Old Model          | 483         | 10        | 528.83    | 518.83    | 517.47      | 10.00         | 0.28% | 0.015          | 0.22                | 0.09    | 0.80                   |
| 1608    | 2156             | Old Model          | Old Model          | 2158               | Old Model          | Old Model          | 336         | 12        | 398.20    | 388.20    | 364.70      | 10.00         | 7.00% | 1.349          | 10.03               | 0.31    | 5.26                   |
| 1611    | 2189             | Old Model          | Old Model          | 2187               | Old Model          | Old Model          | 105         | 21        | 439.07    | 429.07    | 428.79      | 10.00         | 0.27% | 0.698          | 2.23                | 0.24    | 5.03                   |
| 1612    | 2195             | Old Model          | Old Model          | 2196               | Old Model          | Old Model          | 145         | 21        | 439.62    | 429.62    | 429.45      | 10.00         | 0.12% | 0.698          | 1.93                | 0.30    | 3.10                   |
| 1614    | 1193             | Old Model          | Record Drawings    | 1197               | Record Drawings    | Record Drawings    | 396         | 36        | 343.28    | 333.33    | 330.42      | 9.95          | 0.73% | 16.132         | 6.80                | 0.72    | 4.73                   |
| 1616    | 2153             | Old Model          | Old Model          | 2154               | Old Model          | Old Model          | 616         | 12        | 476.93    | 466.93    | 442.15      | 10.00         | 4.02% | 1.349          | 9.53                | 0.39    | 3.66                   |
| 1617    | 2155             | Old Model          | Old Model          | 2156               | Old Model          | Old Model          | 161         | 16        | 411.12    | 401.12    | 388.20      | 10.00         | 8.05% | 1.349          | 9.38                | 0.20    | 13.92                  |
| 1618    | 2162             | Old Model          | Old Model          | 2161               | Old Model          | Old Model          | 119         | 24        | 354.83    | 344.83    | 344.37      | 10.00         | 0.39% | 2.156          | 3.92                | 0.36    | 7.70                   |
| 1620    | 2161             | Old Model          | Old Model          | 2157               | Old Model          | Old Model          | 813         | 24        | 354.37    | 344.37    | 338.75      | 10.00         | 0.69% | 2.156          | 3.79                | 0.27    | 11.02                  |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                               |                   | Downstream Manhole |                               |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------------------|-------------------|--------------------|-------------------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source                    | Invert Source     | ID                 | Rim Source                    | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 1622    | 2159             | Old Model                     | Old Model         | 2160               | Old Model                     | Old Model         | 442         | 15        | 358.92    | 348.92    | 347.23      | 10.00         | 0.38%  | 1.349          | 4.03                | 0.54    | 1.45                   |
| 1623    | 2158             | Old Model                     | Old Model         | 2159               | Old Model                     | Old Model         | 242         | 12        | 374.70    | 364.70    | 348.92      | 10.00         | 6.52%  | 1.349          | 5.38                | 0.31    | 5.03                   |
| 1625    | 2183             | Old Model                     | Old Model         | 2177               | Old Model                     | Old Model         | 401         | 21        | 437.99    | 428.04    | 427.44      | 9.95          | 0.15%  | 0.697          | 1.75                | 0.27    | 3.60                   |
| 1627    | 2157             | Old Model                     | Old Model         | 2179               | Old Model                     | Old Model         | 683         | 24        | 348.75    | 338.75    | 337.29      | 10.00         | 0.21%  | 2.156          | 3.04                | 0.37    | 5.17                   |
| 1636    | 2129             | Asbuilts - Check vs Old Model | Asbuilts          | 2131               | Old Model                     | Old Model         | 392         | 15        | 526.20    | 514.30    | 512.00      | 11.90         | 0.59%  | 0.322          | 2.91                | 0.21    | 3.15                   |
| 1641    | 2143             | Old Model                     | Old Model         | 2182               | Old Model                     | Old Model         | 394         | 16        | 459.78    | 430.34    | 429.79      | 29.44         | 0.14%  | 0.688          | 2.11                | 0.44    | 1.32                   |
| 1685    | 4049             | Old Model                     | Old Model         | 316                | Old Model                     | Old Model         | 326         | 12        | 465.53    | 455.53    | 446.75      | 10.00         | 2.69%  | 0.057          | 2.98                | 0.08    | 4.04                   |
| 1687    | 316              | Old Model                     | Old Model         | 447                | Old Model                     | Old Model         | 407         | 12        | 456.75    | 446.75    | 429.21      | 10.00         | 4.31%  | 0.061          | 3.51                | 0.08    | 5.12                   |
| 1703    | 2201             | Old Model                     | Old Model         | 2202               | Asbuilts - Check vs Old Model | Asbuilts          | 598         | 16        | 533.47    | 523.47    | 521.60      | 10.00         | 0.31%  | 0.318          | 2.68                | 0.24    | 2.69                   |
| 1704    | 2202             | Asbuilts - Check vs Old Model | Asbuilts          | 2129               | Asbuilts - Check vs Old Model | Asbuilts          | 310         | 15        | 533.00    | 521.60    | 514.30      | 11.40         | 2.35%  | 0.323          | 3.32                | 0.15    | 6.62                   |
| 1723    | 2232             | Old Model                     | Old Model         | 2231               | Old Model                     | Old Model         | 551         | 12        | 507.78    | 498.33    | 497.03      | 9.45          | 0.24%  | 0.427          | 2.29                | 0.45    | 0.78                   |
| 1725    | 2233             | Old Model                     | Old Model         | 2232               | Old Model                     | Old Model         | 600         | 12        | 513.46    | 499.81    | 498.33      | 13.65         | 0.25%  | 0.343          | 1.81                | 0.36    | 0.90                   |
| 1726    | 2235             | Old Model                     | Old Model         | 2234               | Old Model                     | Old Model         | 430         | 12        | 518.06    | 502.22    | 500.63      | 15.84         | 0.37%  | 0.343          | 2.10                | 0.32    | 1.17                   |
| 1729    | 2236             | Old Model                     | Old Model         | 2235               | Old Model                     | Old Model         | 493         | 12        | 517.69    | 502.79    | 502.22      | 14.90         | 0.12%  | 0.018          | 0.23                | 0.10    | 0.83                   |
| 1730    | 2238             | Old Model                     | Old Model         | 2237               | Old Model                     | Old Model         | 329         | 12        | 515.30    | 504.90    | 503.98      | 10.40         | 0.28%  | 0.001          | 0.07                | 0.02    | 1.32                   |
| 1732    | 2234             | Old Model                     | Old Model         | 2233               | Old Model                     | Old Model         | 398         | 12        | 516.03    | 500.63    | 499.81      | 15.40         | 0.21%  | 0.343          | 1.97                | 0.39    | 0.79                   |
| 1733    | 2237             | Old Model                     | Old Model         | 2236               | Old Model                     | Old Model         | 528         | 12        | 516.34    | 503.98    | 502.79      | 12.36         | 0.23%  | 0.019          | 0.80                | 0.09    | 1.17                   |
| 1778    | 2357             | Default to Legacy             | Default to Legacy | 2320               | Default to Legacy             | Default to Legacy | 58          | 10        | 516.40    | 509.25    | 508.02      | 7.15          | 2.13%  | 0.053          | 2.53                | 0.11    | 2.10                   |
| 1780    | 2320             | Default to Legacy             | Default to Legacy | 2321               | Default to Legacy             | Default to Legacy | 167         | 10        | 515.07    | 508.02    | 507.26      | 7.05          | 0.46%  | 0.053          | 1.55                | 0.16    | 0.96                   |
| 1781    | 2300             | Default to Legacy             | Default to Legacy | 2299               | Default to Legacy             | Default to Legacy | 185         | 10        | 513.91    | 505.34    | 504.57      | 8.57          | 0.42%  | 0.066          | 1.45                | 0.17    | 0.93                   |
| 1794    | 2326             | asbuilts                      | asbuilts          | 2322               | asbuilts                      | asbuilts          | 329         | 10        | 517.33    | 509.12    | 508.08      | 8.21          | 0.32%  | 0.002          | 0.60                | 0.05    | 0.82                   |
| 1795    | 2322             | asbuilts                      | asbuilts          | 2321               | Default to Legacy             | Default to Legacy | 169         | 10        | 515.84    | 508.08    | 507.26      | 7.76          | 0.48%  | 0.003          | 0.25                | 0.04    | 1.04                   |
| 1804    | 2299             | Default to Legacy             | Default to Legacy | 2294               | Default to Legacy             | Default to Legacy | 236         | 10        | 514.72    | 504.57    | 503.85      | 10.15         | 0.31%  | 0.072          | 0.43                | 0.20    | 0.78                   |
| 1805    | 2294             | Default to Legacy             | Default to Legacy | 2293               | Default to Legacy             | Default to Legacy | 235         | 10        | 514.69    | 503.85    | 504.21      | 10.84         | -0.15% | 0.072          | 0.37                | 0.77    | 0.53                   |
| 1806    | 2293             | Default to Legacy             | Default to Legacy | 2292               | Default to Legacy             | Default to Legacy | 179         | 10        | 515.58    | 504.21    | 502.72      | 11.37         | 0.83%  | 0.303          | 2.47                | 0.32    | 1.10                   |
| 1861    | 2359             | Assumed                       | Straight Graded   | 2358               | Assumed                       | Straight Graded   | 371         | 12        | 522.74    | 512.74    | 511.25      | 10.00         | 0.40%  | 0.006          | 0.41                | 0.04    | 1.57                   |
| 1905    | 4743             | Asbuilts                      | Straight Graded   | 2402               | Inv+10                        | Straight Graded   | 412         | 12        | 680.93    | 550.86    | 541.79      | 130.07        | 2.20%  | 0.079          | 1.73                | 0.10    | 3.62                   |
| 1916    | 7083             | Record Drawings               | Record Drawings   | 7034               | Record Drawings               | Record Drawings   | 362         | 54        | 353.20    | 337.61    | 337.64      | 15.59         | -0.01% | 11.831         | 2.25                | 0.53    | 0.70                   |
| 1946    | 7057             | Old Model                     | Old Model         | 7048               | Old Model                     | Old Model         | 259         | 12        | 362.00    | 352.00    | 349.69      | 10.00         | 0.89%  | 0.257          | 2.81                | 0.22    | 2.10                   |
| 1949    | 7033             | Old Model                     | Old Model         | 7042               | Record Drawings               | Record Drawings   | 519         | 10        | 358.99    | 348.99    | 346.49      | 10.00         | 0.48%  | 0.015          | 1.00                | 0.10    | 0.86                   |
| 1952    | 7335             | Old Model                     | Old Model         | 7334               | Old Model                     | Old Model         | 391         | 10        | 392.10    | 382.10    | 377.12      | 10.00         | 1.27%  | 0.010          | 1.10                | 0.05    | 1.72                   |
| 1953    | 7064             | Old Model                     | Old Model         | 7057               | Old Model                     | Old Model         | 411         | 10        | 372.65    | 362.65    | 352.00      | 10.00         | 2.59%  | 0.243          | 3.74                | 0.21    | 2.23                   |
| 1954    | 9005             | Asbuilts                      | Asbuilts          | 7060               | Old Model                     | Old Model         | 248         | 10        | 378.98    | 368.98    | 366.76      | 10.00         | 0.89%  | 0.232          | 3.47                | 0.30    | 1.22                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |        |                |                     |         |                        |
| 1958    | 7035             | Assumed            | Old Model          | 7036               | Assumed            | Straight Grade     | 35          | 10        | 355.00    | 342.31    | 342.17      | 12.69         | 0.41%  | 0.027          | 1.62                | 0.13    | 0.95                   |
| 1959    | 7039             | COR Sewer Map Book | COR Sewer Map Book | JCT_MP-358         | Record Drawings    | Record Drawings    | 26          | 12        | 355.00    | 342.30    | 337.27      | 12.70         | 19.21% | 0.015          | 1.75                | 0.05    | 3.73                   |
| 1984    | 7071             | Old Model          | Old Model          | 7070               | Record Drawings    | Record Drawings    | 270         | 10        | 356.40    | 346.40    | 343.93      | 10.00         | 0.92%  | 0.084          | 2.16                | 0.17    | 1.30                   |
| 2009    | 7012             | Old Model          | Straight Grade     | 7024               | Inv+10             | Record Drawings    | 250         | 12        | 357.83    | 347.50    | 346.95      | 10.33         | 0.22%  | 0.065          | 1.30                | 0.17    | 1.11                   |
| 2020    | 7480             | Old Model          | Old Model          | 7053               | Old Model          | Old Model          | 217         | 10        | 362.08    | 352.08    | 352.00      | 10.00         | 0.04%  | 0.009          | 0.46                | 0.15    | 0.29                   |
| 2021    | 7053             | Old Model          | Old Model          | 7054               | Old Model          | Old Model          | 257         | 10        | 362.00    | 352.00    | 350.60      | 10.00         | 0.54%  | 0.010          | 0.90                | 0.07    | 1.12                   |
| 2022    | 7054             | Old Model          | Old Model          | 7033               | Old Model          | Old Model          | 384         | 10        | 360.60    | 350.60    | 348.99      | 10.00         | 0.42%  | 0.012          | 0.77                | 0.08    | 0.98                   |
| 2031    | 7517             | Record Drawings    | Old Model          | 7089               | Record Drawings    | Record Drawings    | 357         | 54        | 357.40    | 338.27    | 338.12      | 19.13         | 0.04%  | 11.719         | 2.21                | 0.51    | 16.50                  |
| 2032    | 7044             | Old Model          | Old Model          | 7043               | Old Model          | Old Model          | 178         | 12        | 354.48    | 344.48    | 342.98      | 10.00         | 0.84%  | 0.014          | 1.04                | 0.06    | 2.28                   |
| 2033    | 7037             | Old Model          | Old Model          | 7044               | Old Model          | Old Model          | 320         | 12        | 355.66    | 345.66    | 344.48      | 10.00         | 0.37%  | 0.007          | 0.70                | 0.05    | 1.51                   |
| 2044    | 7034             | Record Drawings    | Record Drawings    | JCT_MP-356         | Record Drawings    | Record Drawings    | 251         | 54        | 354.20    | 337.64    | 337.46      | 16.56         | 0.07%  | 11.852         | 2.34                | 0.49    | 25.05                  |
| 2045    | JCT_MP-358       | Record Drawings    | Record Drawings    | 7040               | Record Drawings    | Record Drawings    | 13          | 54        | 355.20    | 337.27    | 337.16      | 17.93         | 0.87%  | 11.879         | 2.34                | 0.49    | 116.71                 |
| 2046    | 7040             | Record Drawings    | Record Drawings    | JCT_MP-400         | Record Drawings    | Record Drawings    | 60          | 54        | 355.32    | 337.16    | 337.21      | 18.16         | -0.08% | 11.879         | 2.39                | 0.50    | 27.76                  |
| 2048    | 7005             | Record Drawings    | Record Drawings    | 6999               | COR Sewer Map Book | COR Sewer Map Book | 459         | 54        | 357.14    | 336.51    | 336.16      | 20.63         | 0.08%  | 12.189         | 2.49                | 0.47    | 25.83                  |
| 2050    | 7045             | COR Sewer Map Book | COR Sewer Map Book | 7047               | Record Drawings    | Record Drawings    | 448         | 12        | 354.30    | 344.81    | 344.06      | 9.49          | 0.17%  | 0.400          | 1.90                | 0.46    | 0.62                   |
| 2058    | 6991             | Old Model          | Old Model          | 6981               | Old Model          | Old Model          | 475         | 10        | 366.06    | 356.06    | 348.06      | 10.00         | 1.68%  | 0.026          | 1.85                | 0.08    | 1.96                   |
| 2059    | 6959             | Default to Legacy  | Default to Legacy  | 6990               | Old Model          | Old Model          | 332         | 10        | 367.59    | 357.59    | 356.66      | 10.00         | 0.28%  | 0.025          | 1.17                | 0.13    | 0.79                   |
| 2060    | 7007             | Default to Legacy  | Default to Legacy  | 6959               | Default to Legacy  | Default to Legacy  | 134         | 10        | 367.97    | 357.97    | 357.59      | 10.00         | 0.28%  | 0.019          | 0.78                | 0.10    | 0.80                   |
| 2064    | 7073             | Old Model          | Old Model          | 7071               | Old Model          | Old Model          | 349         | 10        | 356.64    | 346.64    | 346.40      | 10.00         | 0.07%  | 0.082          | 1.04                | 0.38    | 0.32                   |
| 2066    | 6981             | Old Model          | Old Model          | 7035               | Assumed            | Old Model          | 464         | 10        | 358.06    | 348.06    | 342.31      | 10.00         | 1.24%  | 0.027          | 1.28                | 0.09    | 1.68                   |
| 2080    | 7067             | Old Model          | Old Model          | 9005               | Asbuilts           | Asbuilts           | 62          | 10        | 379.54    | 369.54    | 368.98      | 10.00         | 0.90%  | 0.229          | 2.77                | 0.27    | 1.23                   |
| 2087    | 7098             | Inv+10             | Straight Grade     | 7097               | Inv+10             | Straight Grade     | 23          | 10        | 355.66    | 345.66    | 345.57      | 10.00         | 0.39%  | 0.108          | 1.67                | 0.25    | 0.84                   |
| 2088    | 7099             | Inv+10             | Straight Grade     | 7098               | Inv+10             | Straight Grade     | 74          | 10        | 355.96    | 345.96    | 345.66      | 10.00         | 0.40%  | 0.108          | 1.71                | 0.23    | 0.87                   |
| 2089    | 7097             | Inv+10             | Straight Grade     | 7096               | Inv+10             | Straight Grade     | 61          | 10        | 355.57    | 345.57    | 345.32      | 10.00         | 0.41%  | 0.108          | 1.78                | 0.23    | 0.87                   |
| 2090    | 7096             | Inv+10             | Straight Grade     | 7045               | COR Sewer Map Book | COR Sewer Map Book | 128         | 10        | 355.32    | 345.32    | 344.81      | 10.00         | 0.40%  | 0.108          | 1.00                | 0.23    | 0.86                   |
| 2111    | 7237             | Old Model          | Old Model          | 7234               | Old Model          | Old Model          | 290         | 10        | 405.00    | 395.00    | 394.30      | 10.00         | 0.24%  | 0.030          | 1.07                | 0.14    | 0.72                   |
| 2207    | 7234             | Old Model          | Old Model          | 7235               | Old Model          | Old Model          | 422         | 10        | 404.30    | 394.30    | 392.74      | 10.00         | 0.37%  | 0.031          | 0.50                | 0.13    | 0.90                   |
| 2208    | 7235             | Old Model          | Old Model          | 7236               | Old Model          | Old Model          | 325         | 10        | 402.74    | 392.74    | 392.37      | 10.00         | 0.11%  | 0.113          | 1.21                | 0.35    | 0.41                   |
| 2209    | 7236             | Old Model          | Old Model          | 7131               | Old Model          | Old Model          | 436         | 10        | 402.37    | 392.37    | 391.33      | 10.00         | 0.24%  | 0.114          | 1.54                | 0.27    | 0.64                   |
| 2210    | 7131             | Old Model          | Old Model          | 6288               | Old Model          | Old Model          | 512         | 10        | 401.33    | 391.33    | 390.03      | 10.00         | 0.25%  | 0.115          | 1.52                | 0.26    | 0.66                   |
| 2217    | 7253             | Inv+10             | Record Drawings    | 7168               | Inv+10             | Record Drawings    | 45          | 12        | 399.89    | 389.89    | 389.78      | 10.00         | 0.25%  | 0.177          | 1.55                | 0.27    | 1.06                   |
| 2218    | 7254             | Inv+10             | Record Drawings    | 7253               | Inv+10             | Record Drawings    | 175         | 12        | 400.35    | 390.35    | 389.89      | 10.00         | 0.26%  | 0.177          | 1.68                | 0.25    | 1.10                   |
| 2241    | 7376             | Old Model          | Old Model          | 7375               | Old Model          | Old Model          | 346         | 10        | 395.50    | 385.50    | 378.88      | 10.00         | 1.91%  | 0.181          | 2.97                | 0.20    | 1.94                   |
| 2323    | 7378             | Straight Grade     | Inv+10             | 7376               | Old Model          | Old Model          | 260         | 10        | 396.07    | 386.07    | 385.50      | 10.00         | 0.22%  | 0.163          | 1.99                | 0.37    | 0.56                   |
| 2387    | 7439             | Survey             | Survey             | 7441               | Survey             | Survey             | 332         | 18        | 356.50    | 345.35    | 344.82      | 11.15         | 0.16%  | 0.653          | 2.97                | 0.38    | 2.00                   |
| 2397    | 7475             | Old Model          | Old Model          | 7431               | Old Model          | Old Model          | 170         | 10        | 363.31    | 353.31    | 352.56      | 10.00         | 0.44%  | 0.030          | 0.97                | 0.12    | 0.99                   |





**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                 |                 | Downstream Manhole |                   |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-----------------|-----------------|--------------------|-------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source      | Invert Source   | ID                 | Rim Source        | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 2406    | 7429             | Record Drawings | Record Drawings | 7440               | Survey            | Survey            | 56          | 10        | 358.30    | 343.19    | 342.67      | 15.11         | 0.93%  | 0.045          | 0.29                | 0.42    | 1.20                   |
| 2409    | 7443             | Old Model       | Old Model       | 7427               | Old Model         | Record Drawings   | 174         | 10        | 355.50    | 346.60    | 346.07      | 8.90          | 0.30%  | 0.039          | 1.21                | 0.15    | 0.81                   |
| 2430    | 7435             | Old Model       | Old Model       | 7436               | Old Model         | Old Model         | 295         | 10        | 361.29    | 351.29    | 350.40      | 10.00         | 0.30%  | 0.035          | 0.49                | 0.14    | 0.81                   |
| 2431    | 7431             | Old Model       | Old Model       | 7432               | Old Model         | Old Model         | 485         | 10        | 362.56    | 352.56    | 351.73      | 10.00         | 0.17%  | 0.033          | 0.96                | 0.17    | 0.60                   |
| 2444    | 7444             | Old Model       | Old Model       | 7465               | Old Model         | Old Model         | 271         | 10        | 378.80    | 368.64    | 367.73      | 10.16         | 0.34%  | 0.324          | 2.15                | 0.42    | 0.57                   |
| 2448    | 7465             | Old Model       | Old Model       | 7466               | Old Model         | Old Model         | 7           | 12        | 377.73    | 367.73    | 367.70      | 10.00         | 0.44%  | 0.333          | 1.91                | 0.39    | 1.32                   |
| 2472    | 7508             | Old Model       | Record Drawings | 7394               | Record Drawings   | Old Model         | 37          | 10        | 354.67    | 344.71    | 338.68      | 9.96          | 16.22% | 0.037          | 4.12                | 0.06    | 5.14                   |
| 2473    | 7491             | Old Model       | Old Model       | JCT_MP-404         | Record Drawings   | Record Drawings   | 34          | 10        | 353.72    | 343.72    | 338.45      | 10.00         | 15.56% | 0.066          | 7.36                | 0.12    | 4.84                   |
| 2483    | 7492             | Record Drawings | Record Drawings | JCT_MP-404         | Record Drawings   | Record Drawings   | 27          | 54        | 358.80    | 338.47    | 338.45      | 20.33         | 0.07%  | 11.687         | 2.20                | 0.52    | 26.00                  |
| 2484    | 7510             | Old Model       | Old Model       | 7491               | Old Model         | Old Model         | 168         | 10        | 354.92    | 344.92    | 343.72      | 10.00         | 0.71%  | 0.042          | 2.19                | 0.14    | 1.25                   |
| 2485    | 7507             | Old Model       | Old Model       | 7510               | Old Model         | Old Model         | 257         | 10        | 355.42    | 345.42    | 344.92      | 10.00         | 0.19%  | 0.041          | 1.11                | 0.19    | 0.64                   |
| 2486    | 7428             | Record Drawings | Record Drawings | 7395               | Record Drawings   | Record Drawings   | 330         | 18        | 358.20    | 342.87    | 342.46      | 15.33         | 0.12%  | 0.691          | 2.86                | 0.40    | 1.90                   |
| 2494    | 7764             | Old Model       | Old Model       | 7504               | Old Model         | Old Model         | 458         | 10        | 359.35    | 349.35    | 347.30      | 10.00         | 0.45%  | 0.034          | 0.78                | 0.12    | 0.99                   |
| 2495    | 7504             | Old Model       | Old Model       | 7505               | Old Model         | Old Model         | 529         | 10        | 357.30    | 347.30    | 346.92      | 10.00         | 0.07%  | 0.037          | 0.76                | 0.24    | 0.37                   |
| 2496    | 7505             | Old Model       | Old Model       | 6930               | Default to Legacy | Default to Legacy | 367         | 10        | 356.92    | 346.92    | 346.13      | 10.00         | 0.22%  | 0.038          | 1.07                | 0.16    | 0.67                   |
| 2497    | 7506             | Old Model       | Old Model       | 7507               | Old Model         | Old Model         | 224         | 10        | 355.92    | 345.92    | 345.42      | 10.00         | 0.22%  | 0.040          | 0.99                | 0.16    | 0.69                   |
| 2498    | 7394             | Record Drawings | Old Model       | JCT_MP-360         | Record Drawings   | Record Drawings   | 326         | 54        | 355.20    | 338.68    | 338.57      | 16.52         | 0.03%  | 11.249         | 2.05                | 0.53    | 10.31                  |
| 2499    | 7509             | Record Drawings | Record Drawings | JCT_MP-360         | Record Drawings   | Record Drawings   | 44          | 10        | 357.50    | 344.50    | 338.57      | 13.00         | 13.34% | 0.027          | 0.14                | 0.05    | 5.60                   |
| 2501    | 7499             | Old Model       | Old Model       | 7509               | Record Drawings   | Record Drawings   | 201         | 10        | 355.06    | 345.06    | 344.50      | 10.00         | 0.28%  | 0.026          | 1.06                | 0.15    | 0.71                   |
| 2502    | 7498             | Old Model       | Old Model       | 7499               | Old Model         | Old Model         | 85          | 10        | 355.34    | 345.34    | 345.06      | 10.00         | 0.33%  | 0.024          | 0.89                | 0.11    | 0.85                   |
| 2503    | 7497             | Old Model       | Old Model       | 7498               | Old Model         | Old Model         | 69          | 10        | 355.56    | 345.56    | 345.34      | 10.00         | 0.32%  | 0.022          | 1.02                | 0.11    | 0.84                   |
| 2504    | 7496             | Old Model       | Old Model       | 7497               | Old Model         | Old Model         | 89          | 10        | 355.85    | 345.85    | 345.56      | 10.00         | 0.32%  | 0.022          | 1.03                | 0.11    | 0.85                   |
| 2505    | 7494             | Old Model       | Old Model       | 7496               | Old Model         | Old Model         | 217         | 10        | 356.49    | 346.49    | 345.85      | 10.00         | 0.29%  | 0.020          | 0.98                | 0.11    | 0.81                   |
| 2508    | 7511             | Old Model       | Record Drawings | 7508               | Old Model         | Record Drawings   | 93          | 10        | 354.98    | 344.92    | 344.71      | 10.06         | 0.23%  | 0.037          | 0.98                | 0.20    | 0.49                   |
| 2509    | 7501             | Old Model       | Record Drawings | 7511               | Old Model         | Record Drawings   | 84          | 10        | 355.02    | 345.07    | 344.92      | 9.95          | 0.18%  | 0.037          | 0.93                | 0.19    | 0.49                   |
| 2510    | 7502             | Old Model       | Record Drawings | 7501               | Old Model         | Record Drawings   | 158         | 10        | 355.27    | 345.31    | 345.07      | 9.96          | 0.15%  | 0.037          | 0.94                | 0.21    | 0.50                   |
| 2513    | 7500             | Old Model       | Old Model       | 7502               | Old Model         | Record Drawings   | 349         | 10        | 355.76    | 345.79    | 345.31      | 9.97          | 0.14%  | 0.034          | 0.87                | 0.19    | 0.50                   |
| 2514    | 7512             | Old Model       | Record Drawings | 7500               | Old Model         | Old Model         | 377         | 10        | 356.31    | 346.31    | 345.79      | 10.00         | 0.14%  | 0.033          | 0.87                | 0.20    | 0.51                   |
| 2515    | 7741             | Old Model       | Record Drawings | 7512               | Old Model         | Record Drawings   | 414         | 10        | 356.85    | 346.85    | 346.31      | 10.00         | 0.13%  | 0.031          | 0.84                | 0.19    | 0.50                   |
| 2519    | 7495             | Old Model       | Old Model       | 7494               | Old Model         | Old Model         | 248         | 10        | 357.14    | 347.14    | 346.49      | 10.00         | 0.26%  | 0.018          | 0.89                | 0.10    | 0.77                   |
| 2520    | 7503             | Old Model       | Old Model       | 7495               | Old Model         | Old Model         | 155         | 10        | 358.50    | 348.50    | 347.14      | 10.00         | 0.88%  | 0.016          | 1.02                | 0.07    | 1.42                   |
| 2526    | 7646             | Record Drawings | Record Drawings | 7396               | Record Drawings   | Record Drawings   | 427         | 54        | 353.50    | 339.14    | 339.00      | 14.36         | 0.03%  | 11.216         | 2.06                | 0.52    | 13.71                  |
| 2529    | 7396             | Record Drawings | Record Drawings | 7487               | Record Drawings   | Record Drawings   | 496         | 54        | 353.20    | 339.00    | 338.85      | 14.20         | 0.03%  | 11.225         | 2.06                | 0.52    | 12.72                  |
| 2530    | 7440             | Survey          | Survey          | 7428               | Record Drawings   | Record Drawings   | 100         | 18        | 357.32    | 342.67    | 342.87      | 14.65         | -0.20% | 0.691          | 1.25                | 0.58    | 2.60                   |
| 2531    | 7426             | Old Model       | Record Drawings | 7429               | Record Drawings   | Record Drawings   | 281         | 10        | 354.40    | 345.51    | 343.19      | 8.89          | 0.83%  | 0.042          | 1.24                | 0.17    | 0.72                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                   |                   | Downstream Manhole |                   |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source        | Invert Source     | ID                 | Rim Source        | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 2532    | 7442             | Old Model         | Record Drawings   | 7443               | Old Model         | Old Model         | 408         | 12        | 356.89    | 347.82    | 346.60      | 9.07          | 0.30%  | 0.039          | 1.13                | 0.12    | 1.33                   |
| 2537    | 7436             | Old Model         | Old Model         | 7439               | Survey            | Survey            | 650         | 15        | 360.40    | 350.40    | 345.35      | 10.00         | 0.78%  | 0.572          | 2.45                | 0.26    | 3.40                   |
| 2538    | 7437             | Old Model         | Old Model         | 7436               | Old Model         | Old Model         | 59          | 12        | 360.65    | 350.65    | 350.40      | 10.00         | 0.42%  | 0.537          | 2.99                | 0.45    | 1.09                   |
| 2539    | 7432             | Old Model         | Old Model         | 7435               | Old Model         | Old Model         | 158         | 10        | 361.73    | 351.73    | 351.29      | 10.00         | 0.28%  | 0.033          | 1.11                | 0.14    | 0.78                   |
| 2543    | 7662             | Old Model         | Old Model         | 7475               | Old Model         | Old Model         | 402         | 10        | 364.25    | 354.25    | 353.31      | 10.00         | 0.23%  | 0.029          | 1.06                | 0.15    | 0.71                   |
| 2544    | 7477             | Default to Legacy | Default to Legacy | 7670               | Default to Legacy | Default to Legacy | 177         | 10        | 368.08    | 358.08    | 357.59      | 10.00         | 0.28%  | 0.009          | 0.75                | 0.07    | 0.80                   |
| 2545    | 7476             | Default to Legacy | Default to Legacy | 7477               | Default to Legacy | Default to Legacy | 155         | 10        | 368.52    | 358.52    | 358.08      | 10.00         | 0.28%  | 0.007          | 0.67                | 0.07    | 0.81                   |
| 2546    | 6913             | Default to Legacy | Default to Legacy | 7476               | Default to Legacy | Default to Legacy | 218         | 10        | 369.13    | 359.13    | 358.52      | 10.00         | 0.28%  | 0.005          | 0.55                | 0.06    | 0.81                   |
| 2551    | 7424             | Survey            | Survey            | 7444               | Old Model         | Old Model         | 48          | 10        | 380.62    | 368.57    | 368.64      | 12.05         | -0.15% | 0.311          | 1.70                | 0.67    | 0.00                   |
| 2553    | 7466             | Old Model         | Old Model         | 7453               | GIS Base          | Old Model         | 285         | 12        | 377.70    | 367.70    | 366.80      | 10.00         | 0.32%  | 0.340          | 2.66                | 0.36    | 1.06                   |
| 2559    | 7468             | Old Model         | Old Model         | 7451               | Old Model         | Old Model         | 268         | 10        | 369.22    | 359.22    | 358.64      | 10.00         | 0.22%  | 0.178          | 1.80                | 0.38    | 0.54                   |
| 2560    | 7451             | Old Model         | Old Model         | 7398               | Old Model         | Old Model         | 131         | 12        | 368.64    | 358.64    | 354.08      | 10.00         | 3.48%  | 0.528          | 5.39                | 0.23    | 4.13                   |
| 2561    | 7455             | Old Model         | Old Model         | 6927               | Default to Legacy | Default to Legacy | 45          | 12        | 374.00    | 364.00    | 363.46      | 10.00         | 1.21%  | 0.348          | 3.45                | 0.26    | 2.40                   |
| 2562    | 7453             | GIS Base          | Old Model         | 7455               | Old Model         | Old Model         | 212         | 12        | 381.00    | 366.80    | 364.00      | 14.20         | 1.32%  | 0.348          | 3.57                | 0.24    | 2.52                   |
| 2569    | 7399             | Old Model         | Old Model         | 7437               | Old Model         | Old Model         | 301         | 12        | 361.16    | 351.16    | 350.65      | 10.00         | 0.17%  | 0.537          | 2.12                | 0.55    | 0.49                   |
| 2570    | 7452             | Old Model         | Old Model         | 7399               | Old Model         | Old Model         | 50          | 12        | 362.00    | 352.00    | 351.16      | 10.00         | 1.67%  | 0.530          | 2.68                | 0.27    | 2.70                   |
| 2571    | 7398             | Old Model         | Old Model         | 7452               | Old Model         | Old Model         | 105         | 12        | 364.08    | 354.08    | 352.00      | 10.00         | 1.98%  | 0.530          | 4.76                | 0.27    | 2.98                   |
| 2584    | 7420             | Old Model         | Old Model         | 6926               | Survey            | Survey            | 148         | 10        | 381.49    | 371.43    | 370.62      | 10.06         | 0.55%  | 0.280          | 2.76                | 0.37    | 0.82                   |
| 2585    | 6926             | Survey            | Survey            | 7414               | Survey            | Survey            | 152         | 10        | 381.67    | 370.62    | 369.73      | 11.05         | 0.59%  | 0.281          | 2.73                | 0.35    | 0.86                   |
| 2586    | 7414             | Survey            | Survey            | 7424               | Survey            | Survey            | 264         | 10        | 381.38    | 369.73    | 368.57      | 11.65         | 0.44%  | 0.302          | 1.62                | 0.37    | 0.72                   |
| 2635    | 7530             | Straight Grade    | Inv+10            | 7532               | Straight Grade    | Inv+10            | 82          | 12        | 402.52    | 392.52    | 392.34      | 10.00         | 0.21%  | 0.014          | 0.73                | 0.08    | 1.14                   |
| 2639    | 7528             | Straight Grade    | Inv+10            | 7530               | Straight Grade    | Inv+10            | 285         | 12        | 403.15    | 393.15    | 392.52      | 10.00         | 0.22%  | 0.014          | 0.77                | 0.08    | 1.16                   |
| 2647    | 7570             | Inv+10            | Straight Grade    | 7568               | Inv+10            | Straight Grade    | 276         | 12        | 390.53    | 380.53    | 379.92      | 10.00         | 0.22%  | 0.014          | 0.62                | 0.08    | 1.16                   |
| 2648    | 7572             | Inv+10            | Straight Grade    | 7567               | Inv+10            | Straight Grade    | 136         | 12        | 392.05    | 382.05    | 381.76      | 10.00         | 0.21%  | 0.001          | 0.17                | 0.03    | 1.15                   |
| 2757    | 7702             | Old Model         | Old Model         | 7697               | Old Model         | Old Model         | 168         | 12        | 365.07    | 355.07    | 354.29      | 10.00         | 0.46%  | 0.016          | 0.91                | 0.07    | 1.68                   |
| 2775    | 6911             | Inv+10            | Straight Grade    | 7730               | Inv+10            | Straight Grade    | 74          | 10        | 375.30    | 365.30    | 365.09      | 10.00         | 0.29%  | 0.140          | 1.48                | 0.28    | 0.69                   |
| 2780    | 7666             | Old Model         | Old Model         | 7669               | Record Drawings   | Record Drawings   | 252         | 10        | 358.67    | 348.67    | 344.69      | 10.00         | 1.58%  | 0.018          | 1.03                | 0.11    | 0.84                   |
| 2817    | 7742             | Old Model         | Record Drawings   | 7741               | Old Model         | Record Drawings   | 196         | 10        | 357.17    | 347.15    | 346.85      | 10.02         | 0.15%  | 0.029          | 0.85                | 0.18    | 0.52                   |
| 2819    | 7740             | Old Model         | Record Drawings   | 7742               | Old Model         | Record Drawings   | 190         | 10        | 358.59    | 347.44    | 347.15      | 11.15         | 0.15%  | 0.028          | 0.86                | 0.18    | 0.52                   |
| 2821    | 7739             | Old Model         | Record Drawings   | 7740               | Old Model         | Record Drawings   | 109         | 10        | 358.60    | 347.60    | 347.44      | 11.00         | 0.15%  | 0.027          | 0.82                | 0.18    | 0.46                   |
| 2824    | 7751             | Old Model         | Record Drawings   | 7739               | Old Model         | Record Drawings   | 275         | 10        | 358.62    | 348.07    | 347.60      | 10.55         | 0.17%  | 0.028          | 1.41                | 0.21    | 0.54                   |
| 2831    | 7750             | Old Model         | Record Drawings   | 7751               | Old Model         | Record Drawings   | 414         | 10        | 358.66    | 348.65    | 348.07      | 10.01         | 0.14%  | 0.019          | 0.72                | 0.17    | 0.50                   |
| 2832    | 7758             | Old Model         | Old Model         | 7748               | Old Model         | Record Drawings   | 498         | 10        | 360.46    | 350.46    | 348.79      | 10.00         | 0.34%  | 0.016          | 1.01                | 0.10    | 0.85                   |
| 2837    | JCT_MP-370       | Record Drawings   | Record Drawings   | JCT_MP-368         | Record Drawings   | Record Drawings   | 189         | 54        | 361.00    | 339.72    | 339.65      | 21.28         | 0.04%  | 11.138         | 2.01                | 0.53    | 15.39                  |
| 2849    | 7697             | Old Model         | Old Model         | 7698               | Old Model         | Old Model         | 388         | 15        | 364.29    | 354.29    | 353.53      | 10.00         | 0.20%  | 0.018          | 0.60                | 0.07    | 1.98                   |
| 2850    | 7698             | Old Model         | Old Model         | 7681               | Old Model         | Old Model         | 291         | 15        | 363.53    | 353.53    | 353.24      | 10.00         | 0.10%  | 0.023          | 0.67                | 0.09    | 1.41                   |
| 2855    | 7660             | Record Drawings   | Record Drawings   | 7659               | Record Drawings   | Record Drawings   | 144         | 10        | 353.48    | 344.11    | 343.56      | 9.37          | 0.38%  | 0.037          | 1.28                | 0.15    | 0.82                   |
| 2856    | 7667             | Record Drawings   | Record Drawings   | 7660               | Record Drawings   | Record Drawings   | 155         | 10        | 353.00    | 344.60    | 344.11      | 8.40          | 0.32%  | 0.023          | 1.74                | 0.16    | 0.75                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                   |                   | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------|-------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source        | Invert Source     | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |        |                |                     |         |                        |
| 2860    | 7663             | Old Model         | Old Model         | 7664               | Old Model          | Old Model          | 325         | 15        | 361.80    | 351.80    | 351.08      | 10.00         | 0.22%  | 0.039          | 1.04                | 0.10    | 2.09                   |
| 2861    | 7681             | Old Model         | Old Model         | 7676               | Old Model          | Old Model          | 294         | 15        | 363.24    | 353.24    | 352.52      | 10.00         | 0.24%  | 0.028          | 0.93                | 0.08    | 2.21                   |
| 2862    | 7670             | Default to Legacy | Default to Legacy | 6914               | Default to Legacy  | Default to Legacy  | 60          | 10        | 367.59    | 357.59    | 357.42      | 10.00         | 0.28%  | 0.010          | 0.62                | 0.08    | 0.81                   |
| 2864    | 7674             | Old Model         | Old Model         | 7662               | Old Model          | Old Model          | 484         | 10        | 364.92    | 354.92    | 354.25      | 10.00         | 0.14%  | 0.027          | 0.82                | 0.15    | 0.54                   |
| 2865    | 7673             | Old Model         | Old Model         | 7674               | Old Model          | Old Model          | 173         | 10        | 366.00    | 356.00    | 354.92      | 10.00         | 0.62%  | 0.022          | 0.90                | 0.09    | 1.19                   |
| 2866    | 6914             | Default to Legacy | Default to Legacy | 7673               | Old Model          | Old Model          | 508         | 10        | 367.42    | 357.42    | 356.00      | 10.00         | 0.28%  | 0.017          | 0.95                | 0.10    | 0.79                   |
| 2874    | 8783             | Old Model         | Old Model         | 7649               | Old Model          | Old Model          | 155         | 12        | 369.54    | 359.54    | 357.07      | 10.00         | 1.59%  | 0.013          | 1.43                | 0.05    | 3.14                   |
| 2884    | 7692             | Inv+10            | Straight Grade    | 7691               | Inv+10             | Straight Grade     | 31          | 10        | 377.56    | 367.56    | 367.47      | 10.00         | 0.29%  | 0.008          | 0.16                | 0.17    | 0.82                   |
| 2886    | 7691             | Inv+10            | Straight Grade    | 7654               | Inv+10             | Straight Grade     | 441         | 10        | 377.47    | 367.47    | 366.24      | 10.00         | 0.28%  | 0.134          | 1.66                | 0.27    | 0.68                   |
| 2887    | 7654             | Inv+10            | Straight Grade    | 6911               | Inv+10             | Straight Grade     | 335         | 10        | 376.24    | 366.24    | 365.30      | 10.00         | 0.28%  | 0.139          | 1.71                | 0.28    | 0.67                   |
| 2923    | 7732             | Old Model         | Old Model         | 7469               | Old Model          | Old Model          | 660         | 10        | 374.78    | 364.78    | 360.00      | 10.00         | 0.72%  | 0.169          | 3.27                | 0.27    | 1.14                   |
| 2930    | 7891             | Old Model         | Record Drawings   | 7897               | Old Model          | Old Model          | 476         | 12        | 387.75    | 378.35    | 377.35      | 9.40          | 0.21%  | 0.290          | 1.85                | 0.35    | 0.85                   |
| 2931    | 8733             | Record Dwg        | Straight Grade    | 8734               | Record Dwg         | Straight Grade     | 360         | 12        | 392.10    | 378.01    | 377.22      | 14.09         | 0.22%  | 0.049          | 1.14                | 0.14    | 1.12                   |
| 2932    | 7776             | Old Model         | Old Model         | 7777               | COR Survey         | COR Survey         | 405         | 12        | 395.31    | 385.31    | 382.76      | 10.00         | 0.63%  | 0.009          | 0.75                | 0.07    | 1.19                   |
| 2935    | 8699             | Assumed           | Straight Grade    | 8017               | Old Model          | COR Sewer Map Book | 396         | 12        | 374.20    | 359.86    | 355.00      | 14.34         | 1.23%  | 0.113          | 2.60                | 0.14    | 2.65                   |
| 2937    | 7795             | Old Model         | Old Model         | 7783               | Record Drawings    | Record Drawings    | 348         | 12        | 389.62    | 385.49    | 384.54      | 4.13          | 0.27%  | 0.003          | 0.47                | 0.03    | 1.30                   |
| 2960    | 8093             | Inv+10            | Record Drawings   | 7909               | Record Drawings    | Record Drawings    | 275         | 24        | 359.00    | 349.00    | 348.90      | 10.00         | 0.04%  | 0.560          | 1.59                | 0.29    | 2.46                   |
| 2961    | 8096             | Old Model         | Old Model         | 8079               | Old Model          | Old Model          | 186         | 12        | 364.36    | 354.36    | 353.23      | 10.00         | 0.60%  | 0.051          | 1.10                | 0.11    | 1.89                   |
| 2962    | 8057             | Old Model         | Old Model         | 7908               | Record Drawings    | Record Drawings    | 82          | 10        | 361.84    | 351.84    | 350.00      | 10.00         | 2.24%  | 0.060          | 2.35                | 0.13    | 1.74                   |
| 2969    | 7914             | Record Drawings   | Record Drawings   | 7915               | Old Model          | Old Model          | 589         | 54        | 357.00    | 340.61    | 340.45      | 16.39         | 0.03%  | 10.519         | 1.89                | 0.54    | 12.18                  |
| 2970    | 7909             | Record Drawings   | Record Drawings   | JCT_MP-450         | Assumed            | Record Drawings    | 18          | 24        | 360.00    | 348.90    | 346.75      | 11.10         | 11.73% | 0.560          | 2.90                | 0.17    | 13.77                  |
| 2972    | 7968             | From COR - SSA    | From COR - SSA    | 7967               | Record Drawings    | Record Drawings    | 25          | 24        | 357.16    | 350.16    | 342.77      | 7.00          | 29.76% | 2.007          | 14.12               | 0.14    | 79.52                  |
| 2977    | 8133             | Survey            | Survey            | 8007               | Survey             | Survey             | 323         | 10        | 362.71    | 353.77    | 353.07      | 8.94          | 0.22%  | 0.048          | 0.95                | 0.18    | 0.67                   |
| 2978    | 8011             | Survey            | Survey            | 7968               | From COR - SSA     | From COR - SSA     | 280         | 24        | 357.66    | 350.51    | 350.16      | 7.15          | 0.12%  | 1.994          | 4.09                | 0.51    | 4.56                   |
| 2980    | 8013             | Record Drawings   | Record Drawings   | 8014               | COR Sewer Map Book | Record Drawings    | 455         | 15        | 357.60    | 351.89    | 351.78      | 5.71          | 0.02%  | 0.362          | 1.38                | 0.50    | 0.34                   |
| 2984    | 8756             | Old Model         | Old Model         | 8028               | Old Model          | Old Model          | 264         | 10        | 358.83    | 348.83    | 347.46      | 10.00         | 0.52%  | 0.053          | 1.34                | 0.15    | 1.05                   |
| 2986    | 8762             | Old Model         | Record Drawings   | 8030               | Old Model          | Straight Grade     | 341         | 15        | 363.41    | 354.08    | 353.57      | 9.33          | 0.15%  | 0.351          | 1.63                | 0.30    | 1.40                   |
| 2988    | 7911             | Survey            | Survey            | 7923               | Survey             | Survey             | 42          | 18        | 356.10    | 349.68    | 349.73      | 6.42          | -0.12% | 0.696          | 1.74                | 0.44    | 1.83                   |
| 2990    | 8099             | Survey            | Survey            | 7913               | Survey             | Survey             | 23          | 42        | 354.64    | 341.34    | 341.16      | 13.30         | 0.80%  | 8.043          | 2.05                | 0.58    | 54.81                  |
| 2995    | 7959             | Old Model         | Old Model         | JCT_MP-372         | Record Drawings    | Record Drawings    | 237         | 54        | 364.10    | 339.89    | 339.82      | 24.21         | 0.03%  | 11.124         | 1.96                | 0.54    | 12.56                  |
| 2999    | 7910             | Record Drawings   | Record Drawings   | 7911               | Survey             | Survey             | 746         | 12        | 358.10    | 351.30    | 349.68      | 6.80          | 0.22%  | 0.515          | 3.02                | 0.74    | 0.44                   |
| 3002    | 8080             | From COR - SSA    | From COR - SSA    | 8093               | Inv+10             | Record Drawings    | 373         | 24        | 359.46    | 349.76    | 349.00      | 9.70          | 0.20%  | 0.673          | 2.98                | 0.26    | 4.18                   |
| 3006    | 8086             | From COR - SSA    | From COR - SSA    | 8087               | From COR - SSA     | From COR - SSA     | 185         | 24        | 358.61    | 350.61    | 350.47      | 8.00          | 0.08%  | 0.509          | 1.59                | 0.24    | 3.85                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                   |                   | Downstream Manhole |                   |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source        | Invert Source     | ID                 | Rim Source        | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 3014    | 8006             | Survey            | Survey            | 8011               | Survey            | Survey            | 350         | 10        | 357.40    | 352.19    | 350.51      | 5.21          | 0.48%  | 0.071          | 2.08                | 0.24    | 0.63                   |
| 3015    | 8150             | From COR - SSA    | From COR - SSA    | 8011               | Survey            | Survey            | 305         | 24        | 359.21    | 350.61    | 350.51      | 8.60          | 0.03%  | 1.859          | 1.73                | 0.55    | 1.01                   |
| 3016    | 8007             | Survey            | Survey            | 8006               | Survey            | Survey            | 337         | 10        | 360.00    | 353.07    | 352.19      | 6.93          | 0.26%  | 0.055          | 1.37                | 0.23    | 0.73                   |
| 3032    | 8036             | Old Model         | Old Model         | 8042               | Old Model         | Old Model         | 242         | 10        | 364.06    | 354.06    | 353.55      | 10.00         | 0.21%  | 0.044          | 1.10                | 0.17    | 0.66                   |
| 3033    | 8042             | Old Model         | Old Model         | 8043               | Old Model         | Old Model         | 191         | 10        | 363.55    | 353.55    | 353.15      | 10.00         | 0.21%  | 0.046          | 1.04                | 0.17    | 0.66                   |
| 3034    | 8043             | Old Model         | Old Model         | 8047               | Old Model         | Old Model         | 177         | 10        | 363.15    | 353.15    | 352.79      | 10.00         | 0.20%  | 0.047          | 1.17                | 0.19    | 0.65                   |
| 3035    | 8047             | Old Model         | Old Model         | 8045               | Old Model         | Old Model         | 61          | 10        | 362.79    | 352.79    | 352.54      | 10.00         | 0.41%  | 0.047          | 1.04                | 0.15    | 0.94                   |
| 3036    | 8045             | Old Model         | Old Model         | 8057               | Old Model         | Old Model         | 364         | 10        | 362.54    | 352.54    | 351.84      | 10.00         | 0.19%  | 0.060          | 1.37                | 0.24    | 0.61                   |
| 3037    | 7935             | Record Drawings   | Record Drawings   | JCT_MP-374         | Record Drawings   | Record Drawings   | 490         | 54        | 362.10    | 340.09    | 339.92      | 22.01         | 0.03%  | 11.065         | 1.94                | 0.54    | 14.58                  |
| 3044    | 6899             | Default to Legacy | Default to Legacy | 7758               | Old Model         | Old Model         | 427         | 10        | 362.31    | 352.31    | 350.46      | 10.00         | 0.43%  | 0.013          | 0.82                | 0.08    | 1.00                   |
| 3045    | 8061             | Old Model         | Old Model         | 6899               | Default to Legacy | Default to Legacy | 34          | 10        | 362.46    | 352.46    | 352.31      | 10.00         | 0.44%  | 0.011          | 0.91                | 0.07    | 1.01                   |
| 3060    | 7916             | Record Drawings   | Record Drawings   | 7935               | Record Drawings   | Record Drawings   | 593         | 54        | 361.00    | 340.29    | 340.09      | 20.71         | 0.03%  | 11.067         | 1.99                | 0.53    | 14.22                  |
| 3061    | 7915             | Old Model         | Old Model         | JCT_MP-376         | Record Drawings   | Record Drawings   | 35          | 54        | 359.90    | 340.45    | 340.44      | 19.45         | 0.03%  | 10.517         | 1.89                | 0.54    | 12.65                  |
| 3062    | 8094             | Old Model         | Old Model         | 7989               | Old Model         | Record Drawings   | 222         | 12        | 361.01    | 351.01    | 350.65      | 10.00         | 0.16%  | 0.072          | 1.13                | 0.23    | 0.79                   |
| 3065    | 8089             | Old Model         | Old Model         | 8088               | Old Model         | Old Model         | 291         | 12        | 362.04    | 352.04    | 352.09      | 10.00         | -0.02% | 0.069          | 0.62                | 0.35    | 0.25                   |
| 3066    | 8078             | Old Model         | Old Model         | 8089               | Old Model         | Old Model         | 317         | 12        | 362.37    | 352.37    | 352.04      | 10.00         | 0.10%  | 0.067          | 0.61                | 0.20    | 0.74                   |
| 3067    | 8092             | Old Model         | Old Model         | 8094               | Old Model         | Old Model         | 158         | 12        | 361.92    | 351.92    | 351.01      | 10.00         | 0.57%  | 0.069          | 1.11                | 0.13    | 1.82                   |
| 3069    | 8081             | From COR - SSA    | From COR - SSA    | 8080               | From COR - SSA    | From COR - SSA    | 287         | 24        | 357.86    | 349.96    | 349.76      | 7.90          | 0.07%  | 0.552          | 1.33                | 0.25    | 3.63                   |
| 3070    | 8082             | From COR - SSA    | From COR - SSA    | 8081               | From COR - SSA    | From COR - SSA    | 320         | 24        | 356.14    | 349.89    | 349.96      | 6.25          | -0.02% | 0.543          | 1.06                | 0.35    | 1.80                   |
| 3071    | 8087             | From COR - SSA    | From COR - SSA    | 8082               | From COR - SSA    | From COR - SSA    | 340         | 24        | 357.32    | 350.47    | 349.89      | 6.85          | 0.17%  | 0.520          | 1.18                | 0.19    | 6.02                   |
| 3072    | 8074             | Old Model         | Old Model         | 8078               | Old Model         | Old Model         | 368         | 12        | 362.84    | 352.84    | 352.37      | 10.00         | 0.13%  | 0.058          | 0.91                | 0.17    | 0.83                   |
| 3073    | 8079             | Old Model         | Old Model         | 8074               | Old Model         | Old Model         | 374         | 12        | 363.23    | 353.23    | 352.84      | 10.00         | 0.11%  | 0.056          | 0.92                | 0.18    | 0.76                   |
| 3079    | 7989             | Old Model         | Record Drawings   | JCT_MP-380         | Record Drawings   | Record Drawings   | 36          | 12        | 360.78    | 350.65    | 340.30      | 10.13         | 28.53% | 0.075          | 6.48                | 0.06    | 12.25                  |
| 3080    | 7979             | Inv+10            | Straight Grade    | 7985               | Old Model         | Record Drawings   | 198         | 10        | 362.23    | 352.23    | 351.65      | 10.00         | 0.29%  | 0.058          | 1.33                | 0.21    | 0.67                   |
| 3086    | 8012             | Old Model         | Old Model         | 8010               | Old Model         | Old Model         | 292         | 10        | 364.49    | 354.49    | 353.30      | 10.00         | 0.41%  | 0.055          | 1.18                | 0.16    | 0.93                   |
| 3091    | 7967             | Record Drawings   | Record Drawings   | 7966               | Record Drawings   | Record Drawings   | 103         | 30        | 357.50    | 342.77    | 342.64      | 14.73         | 0.13%  | 2.007          | 2.22                | 0.33    | 8.17                   |
| 3092    | 8009             | Old Model         | Old Model         | 8011               | Survey            | Survey            | 312         | 10        | 361.45    | 351.45    | 350.51      | 10.00         | 0.30%  | 0.099          | 0.91                | 0.50    | -0.01                  |
| 3093    | 8008             | Old Model         | Old Model         | 8009               | Old Model         | Old Model         | 285         | 10        | 362.36    | 352.36    | 351.45      | 10.00         | 0.32%  | 0.091          | 0.81                | 0.22    | 0.77                   |
| 3095    | 7965             | Record Drawings   | Record Drawings   | 7964               | Record Drawings   | Record Drawings   | 224         | 30        | 358.80    | 342.39    | 342.14      | 16.41         | 0.11%  | 2.149          | 2.24                | 0.35    | 7.45                   |
| 3096    | 7964             | Record Drawings   | Record Drawings   | 7914               | Record Drawings   | Record Drawings   | 524         | 30        | 358.50    | 342.14    | 340.61      | 16.36         | 0.29%  | 2.656          | 2.92                | 0.40    | 7.38                   |
| 3097    | 7912             | Survey            | Survey            | 7914               | Record Drawings   | Record Drawings   | 292         | 42        | 352.53    | 341.13    | 340.61      | 11.40         | 0.18%  | 8.599          | 2.36                | 0.57    | 23.62                  |
| 3099    | 7913             | Survey            | Survey            | JCT_MP-364         | Record Drawings   | Straight Grade    | 267         | 42        | 354.46    | 341.16    | 341.16      | 13.30         | 0.00%  | 8.452          | 2.25                | 0.62    | 8.24                   |
| 3107    | 7923             | Survey            | Survey            | 7922               | Survey            | Survey            | 258         | 18        | 356.36    | 349.73    | 349.01      | 6.63          | 0.28%  | 0.676          | 2.36                | 0.34    | 2.47                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |        |                |                     |         |                        |
| 3108    | 8005             | Survey             | Survey             | 7911               | Survey             | Survey             | 88          | 15        | 357.36    | 349.96    | 349.68      | 7.40          | 0.32%  | 0.408          | 1.40                | 0.32    | 2.15                   |
| 3112    | 8002             | Old Model          | Record Drawing     | 8005               | Survey             | Survey             | 400         | 15        | 360.01    | 350.20    | 349.96      | 9.81          | 0.06%  | 0.403          | 1.49                | 0.45    | 0.70                   |
| 3142    | 8017             | Old Model          | COR Sewer Map Book | 8033               | COR Sewer Map Book | COR Sewer Map Book | 154         | 12        | 364.72    | 355.00    | 353.40      | 9.72          | 1.04%  | 0.114          | 2.12                | 0.14    | 2.43                   |
| 3143    | 8033             | COR Sewer Map Book | COR Sewer Map Book | 7917               | Record Drawings    | Record Drawings    | 73          | 12        | 361.28    | 353.40    | 352.69      | 7.88          | 0.97%  | 0.152          | 2.50                | 0.18    | 2.13                   |
| 3145    | 7917             | Record Drawings    | Record Drawings    | 7910               | Record Drawings    | Record Drawings    | 199         | 12        | 360.00    | 352.69    | 351.30      | 7.31          | 0.70%  | 0.154          | 1.79                | 0.19    | 1.85                   |
| 3174    | 8105             | AsBuilts           | AsBuilts           | 8107               | AsBuilts           | AsBuilts           | 270         | 12        | 357.50    | 346.08    | 345.17      | 11.42         | 0.34%  | 0.105          | 1.59                | 0.18    | 1.33                   |
| 3180    | 8127             | Old Model          | Old Model          | 8148               | From COR - SSA     | From COR - SSA     | 398         | 10        | 361.66    | 351.66    | 351.02      | 10.00         | 0.16%  | 0.023          | 0.60                | 0.24    | 0.28                   |
| 3187    | 8159             | From COR - SSA     | From COR - SSA     | 8136               | From COR - SSA     | From COR - SSA     | 166         | 24        | 363.25    | 351.80    | 351.48      | 11.45         | 0.19%  | 1.735          | 2.12                | 0.38    | 5.23                   |
| 3188    | 8183             | Old Model          | Old Model          | 8159               | From COR - SSA     | From COR - SSA     | 221         | 12        | 363.74    | 353.74    | 351.80      | 10.00         | 0.88%  | 0.153          | 0.69                | 0.17    | 2.18                   |
| 3190    | 8178             | From COR - SSA     | From COR - SSA     | 8167               | From COR - SSA     | From COR - SSA     | 93          | 24        | 364.85    | 354.30    | 354.34      | 10.55         | -0.04% | 1.637          | 2.49                | 0.45    | 1.65                   |
| 3210    | 8474             | From COR - SSA     | From COR - SSA     | 8286               | From COR - SSA     | From COR - SSA     | 306         | 18        | 366.96    | 355.11    | 354.40      | 11.85         | 0.23%  | 0.402          | 2.04                | 0.23    | 3.14                   |
| 3211    | 8273             | From COR - SSA     | From COR - SSA     | 8272               | From COR - SSA     | From COR - SSA     | 260         | 24        | 366.22    | 353.62    | 353.32      | 12.60         | 0.12%  | 0.451          | 1.42                | 0.20    | 4.93                   |
| 3212    | 8272             | From COR - SSA     | From COR - SSA     | 8250               | From COR - SSA     | From COR - SSA     | 290         | 24        | 362.32    | 353.32    | 353.10      | 9.00          | 0.08%  | 0.459          | 1.50                | 0.23    | 3.91                   |
| 3222    | 8250             | From COR - SSA     | From COR - SSA     | 8252               | From COR - SSA     | From COR - SSA     | 272         | 24        | 360.65    | 353.10    | 352.65      | 7.55          | 0.17%  | 0.480          | 1.43                | 0.18    | 5.97                   |
| 3232    | 8252             | From COR - SSA     | From COR - SSA     | 8242               | From COR - SSA     | From COR - SSA     | 329         | 24        | 366.85    | 352.65    | 352.50      | 14.20         | 0.05%  | 0.496          | 1.25                | 0.26    | 2.89                   |
| 3233    | 8242             | From COR - SSA     | From COR - SSA     | 8241               | From COR - SSA     | From COR - SSA     | 372         | 24        | 359.20    | 352.50    | 352.25      | 6.70          | 0.07%  | 0.497          | 1.35                | 0.24    | 3.61                   |
| 3235    | 8240             | From COR - SSA     | From COR - SSA     | 8233               | From COR - SSA     | From COR - SSA     | 359         | 24        | 358.22    | 351.97    | 351.58      | 6.25          | 0.11%  | 0.502          | 1.55                | 0.21    | 4.72                   |
| 3236    | 8233             | From COR - SSA     | From COR - SSA     | 8212               | From COR - SSA     | From COR - SSA     | 409         | 24        | 357.83    | 351.58    | 351.24      | 6.25          | 0.08%  | 0.504          | 1.40                | 0.22    | 4.06                   |
| 3237    | 8212             | From COR - SSA     | From COR - SSA     | 8211               | From COR - SSA     | From COR - SSA     | 369         | 24        | 357.49    | 351.24    | 350.99      | 6.25          | 0.07%  | 0.505          | 1.38                | 0.24    | 3.62                   |
| 3276    | 8265             | From COR - SSA     | From COR - SSA     | 8115               | From COR - SSA     | From COR - SSA     | 209         | 24        | 365.21    | 355.01    | 355.00      | 10.20         | 0.00%  | 1.558          | 1.52                | 0.53    | -0.46                  |
| 3277    | 8177             | From COR - SSA     | From COR - SSA     | 8178               | From COR - SSA     | From COR - SSA     | 388         | 24        | 364.26    | 354.96    | 354.30      | 9.30          | 0.17%  | 1.623          | 2.16                | 0.34    | 4.91                   |
| 3284    | 8163             | From COR - SSA     | From COR - SSA     | 8175               | Old Model          | From COR - SSA     | 165         | 24        | 366.96    | 354.76    | 354.66      | 12.20         | 0.06%  | 1.602          | 1.34                | 0.56    | 2.29                   |
| 3292    | 8161             | From COR - SSA     | From COR - SSA     | 8159               | From COR - SSA     | From COR - SSA     | 86          | 24        | 363.77    | 351.92    | 351.80      | 11.85         | 0.14%  | 1.642          | 2.27                | 0.39    | 4.28                   |
| 3293    | 8167             | From COR - SSA     | From COR - SSA     | 8161               | From COR - SSA     | From COR - SSA     | 526         | 24        | 365.74    | 354.34    | 351.92      | 11.40         | 0.46%  | 1.642          | 2.82                | 0.26    | 9.10                   |
| 3302    | 8136             | From COR - SSA     | From COR - SSA     | 8147               | From COR - SSA     | From COR - SSA     | 324         | 24        | 361.68    | 351.48    | 351.26      | 10.20         | 0.07%  | 1.740          | 1.91                | 0.47    | 2.39                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                |                | Downstream Manhole |                |                | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|----------------|----------------|--------------------|----------------|----------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source     | Invert Source  | ID                 | Rim Source     | Invert Source  |             |           |           |           |             |               |        |                |                     |         |                        |
| 3305    | 8147             | From COR - SSA | From COR - SSA | 8148               | From COR - SSA | From COR - SSA | 301         | 24        | 360.26    | 351.26    | 351.02      | 9.00          | 0.08%  | 1.795          | 2.09                | 0.45    | 2.67                   |
| 3320    | 8182             | Old Model      | Old Model      | 8183               | Old Model      | Old Model      | 311         | 12        | 365.10    | 355.10    | 353.74      | 10.00         | 0.44%  | 0.128          | 2.01                | 0.19    | 1.52                   |
| 3329    | 8354             | From COR - SSA | From COR - SSA | 8328               | From COR - SSA | From COR - SSA | 328         | 24        | 368.78    | 356.03    | 356.11      | 12.75         | -0.02% | 1.249          | 1.57                | 0.49    | 1.23                   |
| 3330    | 8364             | Old Model      | Old Model      | 8354               | From COR - SSA | From COR - SSA | 169         | 24        | 366.00    | 356.18    | 356.03      | 9.82          | 0.09%  | 1.239          | 1.33                | 0.45    | 3.49                   |
| 3331    | 8330             | From COR - SSA | From COR - SSA | 8335               | From COR - SSA | From COR - SSA | 387         | 24        | 365.24    | 355.74    | 355.43      | 9.50          | 0.08%  | 1.437          | 1.37                | 0.47    | 3.05                   |
| 3341    | 8383             | Old Model      | Old Model      | 8380               | Old Model      | Old Model      | 271         | 12        | 383.20    | 373.20    | 364.90      | 10.00         | 3.07%  | 0.090          | 3.85                | 0.11    | 4.28                   |
| 3344    | 8299             | Old Model      | Old Model      | 8315               | Old Model      | Old Model      | 267         | 12        | 375.77    | 365.77    | 362.42      | 10.00         | 1.26%  | 0.033          | 1.71                | 0.08    | 2.76                   |
| 3358    | 8366             | From COR - SSA | From COR - SSA | 8365               | From COR - SSA | From COR - SSA | 194         | 27        | 366.66    | 356.11    | 356.29      | 10.55         | -0.09% | 1.170          | 1.06                | 0.50    | 5.44                   |
| 3364    | 8382             | From COR - SSA | Old Model      | 8367               | From COR - SSA | From COR - SSA | 185         | 24        | 367.70    | 356.51    | 356.29      | 11.19         | 0.12%  | 1.172          | 1.36                | 0.40    | 4.29                   |
| 3372    | 8470             | Record Dwg     | Record Dwg     | 8273               | From COR - SSA | From COR - SSA | 42          | 12        | 366.35    | 354.80    | 353.62      | 11.55         | 2.79%  | 0.064          | 2.67                | 0.09    | 3.58                   |
| 3386    | 8457             | From COR - SSA | From COR - SSA | 8458               | From COR - SSA | From COR - SSA | 202         | 18        | 374.60    | 360.10    | 359.51      | 14.50         | 0.29%  | 0.245          | 1.88                | 0.17    | 3.73                   |
| 3388    | 8597             | From COR - SSA | From COR - SSA | 8489               | From COR - SSA | From COR - SSA | 598         | 24        | 379.46    | 362.21    | 361.18      | 17.25         | 0.17%  | 0.243          | 1.55                | 0.14    | 6.33                   |
| 3391    | 8500             | Record Dwg     | Record Dwg     | 8493               | Record Dwg     | Record Dwg     | 361         | 10        | 371.50    | 362.20    | 360.95      | 9.30          | 0.35%  | 0.047          | 1.30                | 0.15    | 0.85                   |
| 3411    | 8443             | Record Dwg     | Record Dwg     | 8412               | Record Dwg     | Record Dwg     | 323         | 10        | 377.69    | 359.77    | 358.80      | 17.92         | 0.30%  | 0.094          | 1.17                | 0.23    | 0.75                   |
| 3412    | 8425             | Record Dwg     | Record Dwg     | 8443               | Record Dwg     | Record Dwg     | 330         | 10        | 379.19    | 360.76    | 359.77      | 18.43         | 0.30%  | 0.093          | 1.55                | 0.23    | 0.75                   |
| 3414    | 8426             | Record Dwg     | Record Dwg     | 8425               | Record Dwg     | Record Dwg     | 359         | 10        | 378.87    | 361.84    | 360.76      | 17.03         | 0.30%  | 0.032          | 0.75                | 0.13    | 0.81                   |
| 3415    | 8429             | Record Dwg     | Record Dwg     | 8426               | Record Dwg     | Record Dwg     | 319         | 10        | 377.90    | 362.81    | 361.84      | 15.09         | 0.30%  | 0.031          | 1.14                | 0.13    | 0.81                   |
| 3425    | 8412             | Record Dwg     | Record Dwg     | 8466               | From COR - SSA | From COR - SSA | 329         | 10        | 371.83    | 358.80    | 358.00      | 13.03         | 0.24%  | 0.095          | 1.25                | 0.34    | 0.45                   |
| 3426    | 8460             | From COR - SSA | From COR - SSA | 8466               | From COR - SSA | From COR - SSA | 342         | 18        | 370.15    | 358.70    | 358.00      | 11.45         | 0.20%  | 0.291          | 1.55                | 0.20    | 3.04                   |
| 3430    | 8462             | Record Dwg     | Record Dwg     | 8461               | Old Model      | Old Model      | 337         | 10        | 369.92    | 359.92    | 359.00      | 10.00         | 0.27%  | 0.068          | 1.81                | 0.22    | 0.73                   |
| 3431    | 8490             | Record Dwg     | Record Dwg     | 8462               | Record Dwg     | Record Dwg     | 314         | 10        | 369.43    | 360.70    | 359.92      | 8.73          | 0.25%  | 0.066          | 1.24                | 0.20    | 0.70                   |
| 3432    | 8493             | Record Dwg     | Record Dwg     | 8490               | Record Dwg     | Record Dwg     | 57          | 10        | 370.95    | 360.95    | 360.70      | 10.00         | 0.44%  | 0.059          | 1.35                | 0.16    | 0.96                   |
| 3449    | 8416             | From COR - SSA | From COR - SSA | 8423               | From COR - SSA | From COR - SSA | 481         | 18        | 368.98    | 357.58    | 356.91      | 11.40         | 0.14%  | 0.380          | 1.69                | 0.26    | 2.36                   |
| 3453    | 8404             | From COR - SSA | From COR - SSA | 8408               | From COR - SSA | From COR - SSA | 112         | 18        | 364.91    | 355.56    | 355.32      | 9.35          | 0.21%  | 0.386          | 1.58                | 0.23    | 3.02                   |
| 3454    | 8406             | From COR - SSA | From COR - SSA | 8405               | From COR - SSA | From COR - SSA | 89          | 18        | 365.87    | 355.77    | 355.54      | 10.10         | 0.26%  | 0.385          | 1.55                | 0.22    | 3.36                   |
| 3455    | 8405             | From COR - SSA | From COR - SSA | 8404               | From COR - SSA | From COR - SSA | 59          | 18        | 365.34    | 355.54    | 355.56      | 9.80          | -0.03% | 0.386          | 1.52                | 0.32    | 0.97                   |
| 3456    | 8399             | From COR - SSA | From COR - SSA | 8403               | From COR - SSA | From COR - SSA | 116         | 18        | 367.37    | 356.07    | 355.96      | 11.30         | 0.09%  | 0.384          | 1.61                | 0.29    | 1.88                   |
| 3457    | 8423             | From COR - SSA | From COR - SSA | 8399               | From COR - SSA | From COR - SSA | 499         | 18        | 366.61    | 356.91    | 356.07      | 9.70          | 0.17%  | 0.383          | 1.59                | 0.24    | 2.63                   |
| 3461    | 8392             | Record Dwg     | Record Dwg     | 8395               | Record Dwg     | Record Dwg     | 372         | 12        | 373.14    | 362.30    | 360.30      | 10.84         | 0.54%  | 0.051          | 1.72                | 0.12    | 1.78                   |
| 3462    | 8395             | Record Dwg     | Record Dwg     | 8470               | Record Dwg     | Record Dwg     | 365         | 12        | 371.16    | 360.30    | 354.80      | 10.86         | 1.51%  | 0.058          | 2.38                | 0.10    | 3.01                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                 |                 | Downstream Manhole |                 |                 | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-----------------|-----------------|--------------------|-----------------|-----------------|-------------|-----------|-----------|-----------|-------------|---------------|-------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source      | Invert Source   | ID                 | Rim Source      | Invert Source   |             |           |           |           |             |               |       |                |                     |         |                        |
| 3490    | 8331             | Old Model       | Old Model       | 8330               | From COR - SSA  | From COR - SSA  | 223         | 12        | 368.00    | 358.00    | 355.74      | 10.00         | 1.01% | 0.187          | 1.70                | 0.32    | 0.87                   |
| 3491    | 8340             | Old Model       | Old Model       | 8333               | Old Model       | Old Model       | 275         | 12        | 383.37    | 373.37    | 363.77      | 10.00         | 3.49% | 0.155          | 4.29                | 0.13    | 4.51                   |
| 3492    | 8328             | From COR - SSA  | From COR - SSA  | 8329               | From COR - SSA  | From COR - SSA  | 240         | 24        | 367.31    | 356.11    | 355.63      | 11.20         | 0.20% | 1.256          | 1.45                | 0.34    | 5.83                   |
| 3493    | 8333             | Old Model       | Old Model       | 8332               | Old Model       | Old Model       | 88          | 12        | 373.77    | 363.77    | 358.75      | 10.00         | 5.71% | 0.185          | 3.69                | 0.12    | 5.78                   |
| 3494    | 8503             | Old Model       | Old Model       | 8339               | Old Model       | Old Model       | 111         | 12        | 400.69    | 390.69    | 379.65      | 10.00         | 9.95% | 0.094          | 4.95                | 0.08    | 7.80                   |
| 3502    | 8315             | Old Model       | Old Model       | 8310               | From COR - SSA  | From COR - SSA  | 549         | 12        | 372.42    | 362.42    | 355.47      | 10.00         | 1.26% | 0.041          | 0.17                | 0.09    | 2.76                   |
| 3503    | 8301             | Old Model       | Old Model       | 8300               | Old Model       | Old Model       | 447         | 12        | 402.76    | 392.76    | 365.96      | 10.00         | 5.99% | 0.025          | 1.15                | 0.05    | 6.09                   |
| 3513    | 762              | Old Model       | Old Model       | 761                | Old Model       | Old Model       | 288         | 12        | 595.95    | 585.95    | 583.92      | 10.00         | 0.71% | 0.201          | 2.50                | 0.21    | 1.90                   |
| 3514    | 761              | Old Model       | Old Model       | 3957               | Old Model       | Old Model       | 254         | 12        | 593.92    | 583.92    | 581.94      | 10.00         | 0.78% | 0.201          | 3.12                | 0.22    | 2.00                   |
| 3533    | 4124             | Old Model       | Old Model       | 4195               | Old Model       | Old Model       | 126         | 12        | 540.37    | 530.37    | 523.69      | 10.00         | 5.31% | 0.271          | 2.22                | 0.15    | 5.48                   |
| 3534    | 3957             | Old Model       | Old Model       | 3956               | Old Model       | Old Model       | 390         | 12        | 591.94    | 581.94    | 566.83      | 10.00         | 3.87% | 0.227          | 4.93                | 0.15    | 4.69                   |
| 3535    | 3956             | Old Model       | Old Model       | 3955               | Old Model       | Old Model       | 199         | 12        | 576.83    | 566.83    | 557.97      | 10.00         | 4.45% | 0.227          | 5.29                | 0.15    | 5.04                   |
| 3536    | 3955             | Old Model       | Old Model       | 3954               | Old Model       | Old Model       | 350         | 12        | 567.97    | 557.97    | 533.97      | 10.00         | 6.86% | 0.253          | 5.04                | 0.13    | 6.29                   |
| 3537    | 3954             | Old Model       | Old Model       | 4124               | Old Model       | Old Model       | 128         | 12        | 543.97    | 533.97    | 530.37      | 10.00         | 2.80% | 0.253          | 4.75                | 0.18    | 3.92                   |
| 3548    | 4143             | Old Model       | Old Model       | 4141               | Old Model       | Old Model       | 601         | 12        | 505.42    | 491.12    | 489.06      | 14.30         | 0.34% | 0.603          | 2.60                | 0.45    | 0.86                   |
| 3549    | 4140             | Old Model       | Old Model       | 4139               | Old Model       | Old Model       | 307         | 12        | 499.32    | 487.59    | 487.10      | 11.73         | 0.16% | 0.611          | 2.65                | 0.66    | 0.39                   |
| 3550    | 4141             | Old Model       | Old Model       | 4140               | Old Model       | Old Model       | 555         | 12        | 501.02    | 489.06    | 487.59      | 11.96         | 0.26% | 0.612          | 2.03                | 0.49    | 0.67                   |
| 3553    | 4144             | Old Model       | Old Model       | 4143               | Old Model       | Old Model       | 432         | 12        | 506.80    | 491.81    | 491.12      | 14.99         | 0.16% | 0.474          | 1.96                | 0.51    | 0.52                   |
| 3554    | 4145             | Old Model       | Old Model       | 4144               | Old Model       | Old Model       | 458         | 12        | 504.59    | 493.11    | 491.81      | 11.48         | 0.28% | 0.475          | 2.07                | 0.41    | 0.85                   |
| 3555    | 4146             | Old Model       | Old Model       | 4145               | Old Model       | Old Model       | 580         | 12        | 505.79    | 494.17    | 493.11      | 11.62         | 0.18% | 0.427          | 2.00                | 0.46    | 0.64                   |
| 3557    | 2231             | Old Model       | Old Model       | 4147               | Old Model       | Old Model       | 551         | 12        | 508.23    | 497.03    | 494.54      | 11.20         | 0.45% | 0.428          | 1.73                | 0.35    | 1.25                   |
| 3559    | 4147             | Old Model       | Old Model       | 4146               | Old Model       | Old Model       | 580         | 12        | 509.55    | 494.54    | 494.17      | 15.01         | 0.06% | 0.428          | 1.50                | 0.64    | 0.20                   |
| 3590    | 8655             | Survey          | Survey          | 8807               | Survey          | Survey          | 344         | 15        | 403.73    | 381.93    | 381.44      | 21.80         | 0.14% | 0.243          | 1.35                | 0.27    | 1.28                   |
| 3591    | 8624             | From COR - SSA  | From COR - SSA  | 8604               | From COR - SSA  | From COR - SSA  | 1014        | 21        | 369.55    | 362.05    | 357.99      | 7.50          | 0.40% | 0.949          | 2.22                | 0.25    | 6.07                   |
| 3601    | 8520             | Old Model       | Old Model       | 8523               | From COR - SSA  | From COR - SSA  | 260         | 10        | 371.52    | 361.52    | 357.60      | 10.00         | 1.51% | 0.022          | 0.27                | 0.08    | 1.87                   |
| 3602    | 8514             | Record Drawings | Record Drawings | 8515               | Record Drawings | Record Drawings | 319         | 10        | 402.93    | 393.00    | 391.37      | 9.93          | 0.51% | 0.005          | 0.77                | 0.05    | 1.09                   |
| 3604    | 8519             | Old Model       | Old Model       | 8529               | Old Model       | Old Model       | 707         | 10        | 405.67    | 395.67    | 393.33      | 10.00         | 0.33% | 0.019          | 1.04                | 0.10    | 0.86                   |
| 3605    | 8528             | Old Model       | Old Model       | 8530               | Old Model       | Old Model       | 522         | 12        | 401.88    | 391.88    | 390.72      | 10.00         | 0.22% | 0.027          | 0.31                | 0.10    | 1.15                   |
| 3606    | 8529             | Old Model       | Old Model       | 8530               | Old Model       | Old Model       | 565         | 10        | 403.33    | 393.33    | 390.72      | 10.00         | 0.46% | 0.019          | 0.27                | 0.09    | 1.03                   |
| 3609    | 8534             | Old Model       | Old Model       | 8544               | Record Drawings | Record Drawings | 305         | 10        | 406.23    | 390.33    | 389.48      | 15.90         | 0.28% | 0.001          | 0.33                | 0.03    | 0.81                   |
| 3614    | 8557             | Inv+10          | Straight Grade  | 8558               | Inv+10          | Straight Grade  | 260         | 12        | 396.49    | 386.49    | 385.92      | 10.00         | 0.22% | 0.012          | 0.74                | 0.07    | 1.16                   |
| 3619    | 8664             | Survey          | Survey          | 8663               | Survey          | Survey          | 165         | 10        | 403.34    | 395.44    | 393.05      | 7.90          | 1.45% | 0.007          | 1.28                | 0.04    | 1.84                   |
| 3621    | 8687             | Inv+10          | Straight Grade  | 8671               | Inv+10          | Straight Grade  | 498         | 14        | 402.84    | 392.84    | 390.82      | 10.00         | 0.41% | 0.619          | 3.20                | 0.36    | 1.78                   |
| 3631    | 8620             | Inv+8           | Straight Grade  | 8621               | Record Drawings | Record Drawings | 363         | 18        | 379.73    | 371.73    | 370.64      | 8.00          | 0.30% | 1.146          | 3.00                | 0.38    | 2.89                   |
| 3634    | 8622             | Old Model       | Old Model       | 8624               | From COR - SSA  | From COR - SSA  | 232         | 12        | 373.56    | 363.56    | 362.05      | 10.00         | 0.65% | 0.001          | 0.63                | 0.02    | 1.76                   |
| 3635    | 8629             | Inv+8           | Straight Grade  | 8620               | Inv+8           | Straight Grade  | 420         | 18        | 380.86    | 372.86    | 371.73      | 8.00          | 0.27% | 1.146          | 2.87                | 0.39    | 2.67                   |
| 3636    | 8634             | Record Drawings | Record Drawings | 8633               | Record Drawings | Record Drawings | 298         | 18        | 360.80    | 354.95    | 353.87      | 5.85          | 0.36% | 0.001          | 0.25                | 0.01    | 4.43                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                        |                   | Downstream Manhole |                        |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|------------------------|-------------------|--------------------|------------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|-------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source             | Invert Source     | ID                 | Rim Source             | Invert Source     |             |           |           |           |             |               |       |                |                     |         |                        |
| 3637    | 8633             | Record Drawings        | Record Drawings   | 8636               | AsBuilts               | AsBuilts          | 153         | 12        | 364.70    | 353.87    | 353.50      | 10.83         | 0.24% | 0.001          | 0.35                | 0.02    | 1.22                   |
| 3641    | 8638             | AsBuilts               | AsBuilts          | 8637               | AsBuilts               | AsBuilts          | 439         | 12        | 360.00    | 352.98    | 352.08      | 7.02          | 0.21% | 0.300          | 1.86                | 0.36    | 0.83                   |
| 3655    | 8683             | Default to Legacy      | Default to Legacy | 8682               | Default to Legacy      | Default to Legacy | 172         | 12        | 400.90    | 390.89    | 390.51      | 10.00         | 0.22% | 0.013          | 0.83                | 0.09    | 1.16                   |
| 3663    | 8579             | Old Model              | Straight Grade    | 8575               | Survey                 | Survey            | 465         | 18        | 396.25    | 386.75    | 386.18      | 9.50          | 0.12% | 0.373          | 1.07                | 0.26    | 2.20                   |
| 3664    | 8661             | AsBuilts               | AsBuilts          | 8660               | AsBuilts               | AsBuilts          | 334         | 12        | 359.00    | 350.25    | 349.30      | 8.75          | 0.28% | 0.301          | 2.07                | 0.32    | 1.03                   |
| 3665    | 8750             | Old Model              | Straight Grade    | 8748               | Old Model              | Old Model         | 400         | 12        | 386.89    | 374.97    | 370.85      | 11.92         | 1.03% | 0.057          | 2.08                | 0.11    | 2.48                   |
| 3673    | 8785             | Default to Legacy      | Default to Legacy | 7703               | Old Model              | Old Model         | 145         | 12        | 378.00    | 368.00    | 367.67      | 10.00         | 0.23% | 0.005          | 0.64                | 0.06    | 1.19                   |
| 3732    | 8788             | Existing Survey        | Existing Survey   | 6169               | Old Model              | Old Model         | 199         | 18        | 391.41    | 385.70    | 385.70      | 5.71          | 0.00% | 0.750          | 0.81                | 0.77    | -0.59                  |
| 3759    | 8670             | Survey                 | Survey            | 8816               | Survey                 | Survey            | 390         | 18        | 404.35    | 386.15    | 385.58      | 18.20         | 0.15% | 0.328          | 1.59                | 0.23    | 2.48                   |
| 3762    | 8805             | Survey                 | Survey            | 8804               | Survey                 | Survey            | 349         | 18        | 383.70    | 376.96    | 375.78      | 6.74          | 0.34% | 1.126          | 3.00                | 0.36    | 3.06                   |
| 3763    | 8804             | Survey                 | Survey            | 8793               | Survey                 | Survey            | 444         | 18        | 386.18    | 375.78    | 374.84      | 10.40         | 0.21% | 1.146          | 2.41                | 0.40    | 2.24                   |
| 3765    | 8799             | Survey                 | Survey            | 8805               | Survey                 | Survey            | 346         | 18        | 385.81    | 377.91    | 376.96      | 7.90          | 0.27% | 1.125          | 2.92                | 0.39    | 2.71                   |
| 3766    | 8803             | Survey                 | Survey            | 8799               | Survey                 | Survey            | 424         | 18        | 386.02    | 379.28    | 377.91      | 6.74          | 0.32% | 1.126          | 2.92                | 0.35    | 3.06                   |
| 3767    | 8645             | Inv+8                  | Straight Grade    | 8794               | Default to Legacy      | Default to Legacy | 372         | 14        | 394.33    | 386.33    | 385.77      | 8.00          | 0.15% | 0.019          | 0.75                | 0.09    | 1.44                   |
| 3768    | 8800             | Survey                 | Survey            | 8803               | Survey                 | Survey            | 271         | 18        | 386.57    | 380.12    | 379.28      | 6.45          | 0.31% | 1.127          | 3.22                | 0.40    | 2.71                   |
| 3769    | 8794             | Default to Legacy      | Default to Legacy | 8795               | Survey                 | Survey            | 376         | 10        | 392.44    | 385.77    | 381.22      | 6.67          | 1.21% | 0.019          | 0.15                | 0.10    | 1.67                   |
| 3770    | 8807             | Survey                 | Survey            | 8795               | Survey                 | Survey            | 348         | 15        | 400.74    | 381.44    | 381.22      | 19.30         | 0.06% | 0.246          | 0.77                | 0.38    | 0.89                   |
| 3771    | 8801             | Survey                 | Survey            | 8800               | Survey                 | Survey            | 267         | 18        | 387.08    | 381.01    | 380.12      | 6.07          | 0.33% | 1.103          | 2.82                | 0.35    | 3.14                   |
| 3772    | 8795             | Survey                 | Survey            | 8801               | Survey                 | Survey            | 63          | 18        | 389.72    | 381.22    | 381.01      | 8.50          | 0.33% | 1.158          | 3.11                | 0.43    | 2.17                   |
| 3773    | 8793             | Survey                 | Survey            | 8630               | Inv+8                  | Straight Grade    | 328         | 18        | 380.39    | 374.84    | 374.08      | 5.55          | 0.23% | 1.145          | 2.84                | 0.47    | 2.66                   |
| 3774    | 8630             | Inv+8                  | Straight Grade    | 8629               | Inv+8                  | Straight Grade    | 453         | 18        | 382.08    | 374.08    | 372.86      | 8.00          | 0.27% | 1.145          | 2.84                | 0.38    | 2.67                   |
| 3775    | 8796             | Survey                 | Survey            | 8795               | Survey                 | Survey            | 280         | 18        | 389.17    | 381.52    | 381.22      | 7.65          | 0.11% | 0.869          | 1.89                | 0.43    | 1.62                   |
| 3776    | 8797             | Survey                 | Survey            | JCT_MP-476         | Survey                 | Survey            | 116         | 18        | 387.02    | 382.02    | 381.82      | 5.00          | 0.17% | 0.213          | 0.74                | 0.25    | 2.85                   |
| 3777    | 8802             | Survey                 | Survey            | 8797               | Survey                 | Survey            | 375         | 18        | 387.68    | 382.23    | 382.02      | 5.45          | 0.06% | 0.145          | 1.05                | 0.24    | 1.37                   |
| 3778    | 8798             | Survey                 | Survey            | 8802               | Survey                 | Survey            | 377         | 18        | 388.81    | 382.89    | 382.23      | 5.92          | 0.18% | 0.153          | 1.26                | 0.16    | 2.68                   |
| 3779    | 8809             | Survey                 | Survey            | JCT_MP-464         | Survey                 | Survey            | 136         | 18        | 390.18    | 383.32    | 383.01      | 6.86          | 0.23% | 0.607          | 2.48                | 0.31    | 2.91                   |
| 3780    | 8810             | Survey                 | Survey            | 8809               | Survey                 | Survey            | 376         | 18        | 390.15    | 383.90    | 383.32      | 6.25          | 0.15% | 0.610          | 2.00                | 0.33    | 2.25                   |
| 3781    | 8808             | Survey                 | Survey            | 8810               | Survey                 | Survey            | 376         | 18        | 395.42    | 384.92    | 383.90      | 10.50         | 0.27% | 0.609          | 2.47                | 0.29    | 3.03                   |
| 3782    | 8811             | Survey                 | Survey            | 8808               | Survey                 | Survey            | 376         | 18        | 394.41    | 385.16    | 384.92      | 9.25          | 0.06% | 0.625          | 1.78                | 0.47    | 1.23                   |
| 3783    | 8815             | Survey                 | Survey            | 8811               | Survey                 | Survey            | 326         | 14        | 399.66    | 388.46    | 385.16      | 11.20         | 1.01% | 0.355          | 3.07                | 0.23    | 2.91                   |
| 3784    | 8816             | Survey                 | Survey            | 8811               | Survey                 | Survey            | 415         | 18        | 401.98    | 385.58    | 385.16      | 16.40         | 0.10% | 0.319          | 0.96                | 0.25    | 2.02                   |
| 3785    | 8814             | Survey                 | Survey            | 8815               | Survey                 | Survey            | 202         | 14        | 398.76    | 389.06    | 388.46      | 9.70          | 0.30% | 0.363          | 2.31                | 0.34    | 1.69                   |
| 3786    | 8669             | Inv+10                 | Straight Grade    | 8814               | Survey                 | Survey            | 385         | 14        | 399.20    | 389.20    | 389.06      | 10.00         | 0.04% | 0.396          | 1.42                | 0.52    | 0.32                   |
| 3821    | 7892             | COR Survey             | COR Survey        | 7895               | COR Survey             | COR Survey        | 189         | 12        | 391.36    | 385.56    | 384.83      | 5.80          | 0.39% | 0.240          | 2.92                | 0.30    | 1.31                   |
| 3822    | 6209             | Benton Cnty Z - NGVD29 | Default to Legacy | 6208               | Benton Cnty Z - NGVD29 | Default to Legacy | 310         | 12        | 447.04    | 437.04    | 436.36      | 10.00         | 0.22% | 0.479          | 2.01                | 0.45    | 0.69                   |
| 3823    | 6207             | Benton Cnty Z - NGVD29 | Default to Legacy | 6091               | Record Drawings        | Record Drawings   | 307         | 12        | 445.68    | 435.68    | 430.65      | 10.00         | 1.64% | 0.479          | 4.42                | 0.27    | 2.65                   |
| 3824    | 6091             | Record Drawings        | Record Drawings   | 6104               | Record Drawings        | Record Drawings   | 442         | 12        | 445.40    | 430.65    | 428.68      | 14.75         | 0.45% | 0.904          | 3.60                | 0.58    | 0.70                   |
| 3825    | 6104             | Record Drawings        | Record Drawings   | 6105               | Record Drawings        | Record Drawings   | 383         | 12        | 451.53    | 428.68    | 426.92      | 22.85         | 0.46% | 0.904          | 3.30                | 0.56    | 0.70                   |





**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                 |                         | Downstream Manhole |                 |                         | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-----------------|-------------------------|--------------------|-----------------|-------------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source      | Invert Source           | ID                 | Rim Source      | Invert Source           |             |           |           |           |             |               |        |                |                     |         |                        |
| 3826    | 6106             | Record Drawings | Record Drawings         | 6094               | Record Drawings | Record Drawings         | 401         | 12        | 437.88    | 425.05    | 418.60      | 12.83         | 1.61%  | 0.911          | 7.22                | 0.41    | 2.22                   |
| 3827    | 6094             | Record Drawings | Record Drawings         | 6095               | Record Drawings | Record Drawings         | 399         | 12        | 430.33    | 418.60    | 414.45      | 11.73         | 1.04%  | 0.911          | 4.48                | 0.43    | 1.58                   |
| 3829    | 6096             | Record Drawings | Record Drawings         | 6092               | Record Drawings | Record Drawings         | 587         | 12        | 421.25    | 410.44    | 407.59      | 10.81         | 0.49%  | 0.931          | 3.49                | 0.53    | 0.81                   |
| 3830    | 6092             | Record Drawings | Record Drawings         | 6093               | Record Drawings | Record Drawings         | 601         | 12        | 417.59    | 407.59    | 404.29      | 10.00         | 0.55%  | 0.933          | 3.15                | 0.51    | 0.89                   |
| 3831    | 6093             | Record Drawings | Record Drawings         | 6101               | Record Drawings | Record Drawings         | 601         | 12        | 415.50    | 404.29    | 401.23      | 11.21         | 0.51%  | 1.460          | 3.95                | 0.73    | 0.30                   |
| 3834    | 6101             | Record Drawings | Record Drawings         | 6100               | Record Drawings | Record Drawings         | 600         | 12        | 412.44    | 401.23    | 398.18      | 11.21         | 0.51%  | 1.462          | 3.14                | 0.75    | 0.29                   |
| 3836    | 6114             | Record Drawings | Record Drawings         | 6115               | Record Drawings | Record Drawings         | 283         | 12        | 372.98    | 354.72    | 353.97      | 18.26         | 0.26%  | 0.456          | 2.64                | 0.45    | 0.74                   |
| 3842    | 8672             | Record Drawings | Record Drawings         | 8687               | Inv+10          | Straight Grade          | 156         | 14        | 403.50    | 393.47    | 392.84      | 10.03         | 0.40%  | 0.716          | 3.24                | 0.40    | 1.67                   |
| 3843    | 8671             | Inv+10          | Straight Grade          | 8669               | Inv+10          | Straight Grade          | 401         | 14        | 400.82    | 390.82    | 389.20      | 10.00         | 0.40%  | 0.518          | 2.15                | 0.32    | 1.88                   |
| 3846    | 8575             | Survey          | Survey                  | 8577               | Survey          | Survey                  | 102         | 18        | 403.68    | 386.18    | 386.44      | 17.50         | -0.26% | 0.302          | 0.88                | 0.45    | 3.42                   |
| 3847    | 8509             | Survey          | Survey                  | 8578               | Survey          | Survey                  | 173         | 18        | 394.35    | 387.55    | 386.87      | 6.80          | 0.39%  | 0.521          | 3.16                | 0.26    | 3.55                   |
| 3848    | 8578             | Survey          | Survey                  | 8579               | Old Model       | Straight Grade          | 100         | 18        | 397.17    | 386.87    | 386.75      | 10.30         | 0.12%  | 0.492          | 2.05                | 0.31    | 2.05                   |
| 3850    | 8567             | Inv+10          | Battelle Record Drawing | 8568               | Inv+10          | Battelle Record Drawing | 293         | 12        | 383.87    | 373.87    | 373.06      | 10.00         | 0.28%  | 0.178          | 1.63                | 0.25    | 1.13                   |
| 3952    | 2121             | Old Model       | Old Model               | 2123               | Old Model       | Old Model               | 186         | 10        | 527.47    | 517.47    | 517.05      | 10.00         | 0.23%  | 0.290          | 1.99                | 0.47    | 0.44                   |
| 3953    | 2115             | Old Model       | Old Model               | 2122               | Old Model       | Old Model               | 331         | 10        | 530.16    | 520.16    | 518.83      | 10.00         | 0.40%  | 0.011          | 0.79                | 0.08    | 0.96                   |
| 3975    | 467              | Old Model       | Old Model               | 466                | Old Model       | Old Model               | 176         | 30        | 360.80    | 348.92    | 348.74      | 11.88         | 0.10%  | 3.499          | 2.34                | 0.48    | 5.68                   |
| 3976    | 449              | Old Model       | Old Model               | 478                | Old Model       | Old Model               | 335         | 30        | 358.41    | 348.41    | 348.08      | 10.00         | 0.10%  | 3.802          | 2.54                | 0.48    | 5.21                   |
| 3977    | 478              | Old Model       | Old Model               | 479                | Old Model       | Old Model               | 333         | 30        | 358.08    | 348.08    | 347.74      | 10.00         | 0.10%  | 3.801          | 2.52                | 0.48    | 5.38                   |
| 3978    | 479              | Old Model       | Old Model               | 480                | Old Model       | Old Model               | 195         | 30        | 357.74    | 347.74    | 347.55      | 10.00         | 0.10%  | 3.800          | 2.54                | 0.49    | 5.18                   |
| 3979    | 480              | Old Model       | Old Model               | 481                | Old Model       | Old Model               | 436         | 30        | 357.55    | 347.55    | 347.11      | 10.00         | 0.10%  | 3.799          | 2.59                | 0.47    | 5.33                   |
| 3980    | 481              | Old Model       | Old Model               | 4104               | Old Model       | Old Model               | 431         | 30        | 357.11    | 347.11    | 346.68      | 10.00         | 0.10%  | 3.798          | 2.58                | 0.47    | 5.28                   |
| 3981    | 4104             | Old Model       | Old Model               | 4096               | Old Model       | Old Model               | 428         | 30        | 356.68    | 346.68    | 346.25      | 10.00         | 0.10%  | 3.797          | 2.58                | 0.47    | 5.31                   |
| 3982    | 4096             | Old Model       | Old Model               | 4097               | Old Model       | Old Model               | 321         | 30        | 356.25    | 346.25    | 345.93      | 10.00         | 0.10%  | 3.797          | 3.22                | 0.47    | 5.27                   |
| 3983    | 4098             | Old Model       | Old Model               | 4123               | Old Model       | Old Model               | 1155        | 30        | 354.60    | 344.60    | 338.75      | 10.00         | 0.51%  | 3.797          | 3.43                | 0.29    | 16.65                  |
| 3984    | 4097             | Old Model       | Old Model               | 4098               | Old Model       | Old Model               | 314         | 30        | 355.93    | 345.93    | 344.60      | 10.00         | 0.42%  | 3.797          | 4.57                | 0.32    | 14.90                  |
| 3985    | 472              | Old Model       | Old Model               | 459                | Old Model       | Old Model               | 50          | 12        | 361.85    | 351.15    | 350.50      | 10.70         | 1.30%  | 0.711          | 2.77                | 0.57    | 0.66                   |
| 3986    | 390              | Old Model       | Old Model               | 389                | Old Model       | Old Model               | 360         | 21        | 406.20    | 396.20    | 373.60      | 10.00         | 6.28%  | 2.584          | 10.12               | 0.21    | 25.25                  |
| 3987    | 372              | Old Model       | Old Model               | 371                | Old Model       | Old Model               | 216         | 21        | 446.40    | 436.40    | 423.50      | 10.00         | 5.97%  | 2.584          | 10.78               | 0.21    | 24.55                  |
| 3988    | 370              | Old Model       | Old Model               | 372                | Old Model       | Old Model               | 319         | 21        | 456.16    | 443.16    | 436.40      | 13.00         | 2.12%  | 2.529          | 8.07                | 0.30    | 13.62                  |
| 3989    | 369              | Old Model       | Old Model               | 370                | Old Model       | Old Model               | 122         | 21        | 457.00    | 443.51    | 443.16      | 13.49         | 0.29%  | 2.529          | 4.22                | 0.52    | 3.42                   |
| 3991    | 371              | Old Model       | Old Model               | 390                | Old Model       | Old Model               | 429         | 21        | 433.50    | 423.50    | 396.20      | 10.00         | 6.37%  | 2.584          | 11.12               | 0.21    | 25.44                  |
| 4009    | 6292             | Record Drawings | Record Drawings         | 6324               | Inv+10          | Straight Grade          | 357         | 12        | 394.53    | 388.68    | 387.97      | 5.85          | 0.20%  | 0.125          | 1.04                | 0.23    | 0.99                   |
| 4010    | 6322             | Record Drawings | Record Drawings         | 6308               | Inv+10          | Record Drawings         | 599         | 12        | 393.58    | 387.48    | 386.28      | 6.10          | 0.20%  | 0.454          | 1.94                | 0.44    | 0.66                   |
| 4011    | 6308             | Inv+10          | Record Drawings         | 6312               | Inv+10          | Record Drawings         | 573         | 12        | 396.28    | 386.28    | 385.29      | 10.00         | 0.17%  | 0.503          | 2.00                | 0.50    | 0.53                   |
| 4012    | 7895             | COR Survey      | COR Survey              | 7785               | COR Survey      | COR Survey              | 486         | 12        | 392.56    | 384.83    | 384.02      | 7.73          | 0.17%  | 0.074          | 1.76                | 0.22    | 0.94                   |
| 4013    | 8706             | COR Survey      | COR Survey              | 8732               | Record Dwg      | Straight Grade          | 422         | 12        | 393.63    | 379.74    | 378.81      | 13.89         | 0.22%  | 0.047          | 1.14                | 0.14    | 1.12                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                 |                         | Downstream Manhole |                   |                         | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-----------------|-------------------------|--------------------|-------------------|-------------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source      | Invert Source           | ID                 | Rim Source        | Invert Source           |             |           |           |           |             |               |        |                |                     |         |                        |
| 4014    | 6002             | Old Model       | Old Model               | 6036               | Default to Legacy | Default to Legacy       | 253         | 12        | 363.00    | 353.00    | 352.19      | 10.00         | 0.32%  | 1.050          | 2.81                | 0.65    | 0.36                   |
| 4015    | 6031             | AsBuilts        | AsBuilts                | 6030               | AsBuilts          | AsBuilts                | 473         | 42        | 363.70    | 347.30    | 347.07      | 16.40         | 0.05%  | 7.944          | 2.51                | 0.52    | 7.59                   |
| 4016    | 8775             | Old Model       | Old Model               | 8774               | Old Model         | Old Model               | 400         | 12        | 368.76    | 358.76    | 357.88      | 10.00         | 0.22%  | 1.014          | 2.83                | 0.82    | 0.16                   |
| 4017    | 8771             | Old Model       | Old Model               | 8775               | Old Model         | Old Model               | 384         | 12        | 374.81    | 364.81    | 358.76      | 10.00         | 1.58%  | 1.014          | 3.58                | 0.39    | 2.12                   |
| 4018    | 6079             | Record Drawings | Record Drawings         | 6078               | Record Drawings   | Record Drawings         | 399         | 12        | 412.40    | 403.88    | 402.85      | 8.52          | 0.26%  | 0.757          | 2.48                | 0.59    | 0.45                   |
| 4037    | 8806             | Survey          | Survey                  | 8809               | Survey            | Survey                  | 302         | 10        | 399.38    | 390.58    | 383.32      | 8.80          | 2.40%  | 0.008          | 0.14                | 0.04    | 2.36                   |
| 4038    | 8663             | Survey          | Survey                  | 8806               | Survey            | Survey                  | 103         | 10        | 402.10    | 393.05    | 390.58      | 9.05          | 2.40%  | 0.007          | 1.48                | 0.04    | 2.37                   |
| 4039    | 8665             | Survey          | Survey                  | 8664               | Survey            | Survey                  | 130         | 10        | 404.50    | 395.90    | 395.44      | 8.60          | 0.35%  | 0.006          | 0.86                | 0.18    | 1.00                   |
| 4042    | 8577             | Survey          | Survey                  | 8670               | Survey            | Survey                  | 328         | 18        | 406.44    | 386.44    | 386.15      | 20.00         | 0.09%  | 0.280          | 1.34                | 0.25    | 1.91                   |
| 4045    | 8564             | Survey          | Survey                  | 8677               | Survey            | Survey                  | 74          | 15        | 399.64    | 383.39    | 383.52      | 16.25         | -0.18% | 0.162          | 0.70                | 0.40    | 1.73                   |
| 4046    | 4670             | Asbuilts        | Asbuilts                | 4669               | Asbuilts          | Asbuilts                | 232         | 18        | 519.98    | 513.05    | 511.92      | 6.93          | 0.49%  | 0.124          | 1.24                | 0.11    | 5.01                   |
| 4049    | 8573             | Inv+10          | Battelle Record Drawing | 8567               | Inv+10            | Battelle Record Drawing | 227         | 12        | 384.45    | 374.45    | 373.87      | 10.00         | 0.26%  | 0.178          | 1.75                | 0.26    | 1.08                   |
| 4050    | 8569             | Inv+10          | Battelle Record Drawing | 8573               | Inv+10            | Battelle Record Drawing | 187         | 12        | 385.08    | 375.08    | 374.45      | 10.00         | 0.34%  | 0.178          | 1.81                | 0.24    | 1.27                   |
| 4051    | 8570             | Inv+10          | Battelle Record Drawing | 8569               | Inv+10            | Battelle Record Drawing | 141         | 10        | 385.50    | 375.50    | 375.08      | 10.00         | 0.30%  | 0.178          | 1.93                | 0.33    | 0.66                   |
| 4055    | 8561             | Inv+10          | Straight Grade          | 8557               | Inv+10            | Straight Grade          | 404         | 12        | 398.10    | 388.10    | 386.49      | 10.00         | 0.40%  | 0.008          | 0.60                | 0.05    | 1.57                   |
| 4056    | 8558             | Inv+10          | Straight Grade          | 8559               | Inv+10            | Straight Grade          | 221         | 12        | 395.92    | 385.92    | 385.43      | 10.00         | 0.22%  | 0.012          | 0.75                | 0.07    | 1.16                   |
| 4058    | 8555             | Inv+10          | Straight Grade          | 8564               | Survey            | Survey                  | 428         | 15        | 398.36    | 384.36    | 383.39      | 14.00         | 0.23%  | 0.153          | 1.11                | 0.19    | 1.83                   |
| 4060    | 8659             | Survey          | Survey                  | 8651               | Survey            | Survey                  | 371         | 15        | 404.10    | 382.65    | 382.15      | 21.45         | 0.13%  | 0.177          | 1.30                | 0.22    | 1.48                   |
| 4061    | 8651             | Survey          | Survey                  | 8655               | Survey            | Survey                  | 216         | 15        | 404.25    | 382.15    | 381.93      | 22.10         | 0.10%  | 0.177          | 1.12                | 0.24    | 1.27                   |
| 4065    | 8660             | AsBuilts        | AsBuilts                | JCT_MP-440         | Record Drawings   | Record Drawings         | 213         | 12        | 360.00    | 349.30    | 348.44      | 10.70         | 0.40%  | 0.302          | 2.63                | 0.34    | 1.14                   |
| 4066    | 8639             | AsBuilts        | AsBuilts                | 8661               | AsBuilts          | AsBuilts                | 438         | 12        | 359.00    | 351.18    | 350.25      | 7.82          | 0.21%  | 0.301          | 1.93                | 0.37    | 0.85                   |
| 4067    | 8637             | AsBuilts        | AsBuilts                | 8639               | AsBuilts          | AsBuilts                | 439         | 12        | 360.00    | 352.08    | 351.18      | 7.92          | 0.21%  | 0.300          | 1.83                | 0.35    | 0.83                   |
| 4068    | 8636             | AsBuilts        | AsBuilts                | 8638               | AsBuilts          | AsBuilts                | 208         | 12        | 361.50    | 353.50    | 352.98      | 8.00          | 0.25%  | 0.002          | 0.03                | 0.03    | 1.25                   |
| 4090    | 8546             | Old Model       | Old Model               | 8545               | Old Model         | Old Model               | 381         | 10        | 408.27    | 398.27    | 396.42      | 10.00         | 0.49%  | 0.001          | 0.52                | 0.03    | 1.07                   |
| 4091    | 8545             | Old Model       | Old Model               | 8513               | Record Drawings   | Record Drawings         | 315         | 10        | 406.42    | 396.42    | 393.61      | 10.00         | 0.89%  | 0.002          | 0.48                | 0.03    | 1.45                   |
| 4094    | 8513             | Record Drawings | Record Drawings         | 8514               | Record Drawings   | Record Drawings         | 140         | 10        | 403.01    | 393.61    | 393.00      | 9.40          | 0.44%  | 0.004          | 0.71                | 0.05    | 1.01                   |
| 4095    | 8515             | Record Drawings | Record Drawings         | 8544               | Record Drawings   | Record Drawings         | 314         | 10        | 402.67    | 391.37    | 389.48      | 11.30         | 0.60%  | 0.005          | 0.83                | 0.05    | 1.15                   |
| 4096    | 8533             | Old Model       | Old Model               | 8534               | Old Model         | Old Model               | 203         | 10        | 398.97    | 390.90    | 390.33      | 8.07          | 0.28%  | 0.001          | 0.31                | 0.02    | 0.81                   |
| 4097    | 8544             | Record Drawings | Record Drawings         | 8543               | Old Model         | Old Model               | 255         | 10        | 402.93    | 389.48    | 387.96      | 13.45         | 0.60%  | 0.006          | 0.63                | 0.05    | 1.18                   |
| 4099    | 8522             | From COR - SSA  | From COR - SSA          | 8523               | From COR - SSA    | From COR - SSA          | 507         | 21        | 366.87    | 357.57    | 357.60      | 9.30          | -0.01% | 0.977          | 1.71                | 0.54    | -0.12                  |
| 4100    | 8604             | From COR - SSA  | From COR - SSA          | 8522               | From COR - SSA    | From COR - SSA          | 419         | 21        | 370.99    | 357.99    | 357.57      | 13.00         | 0.10%  | 0.978          | 1.37                | 0.39    | 2.53                   |
| 4103    | 8538             | Old Model       | Old Model               | 8528               | Old Model         | Old Model               | 465         | 12        | 404.98    | 394.98    | 391.88      | 10.00         | 0.67%  | 0.005          | 0.46                | 0.04    | 2.03                   |
| 4104    | 8621             | Record Drawings | Record Drawings         | 8616               | From COR - SSA    | Record Drawings         | 20          | 18        | 382.53    | 370.64    | 369.63      | 11.89         | 5.01%  | 1.158          | 5.50                | 0.36    | 13.68                  |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                 |                 | Downstream Manhole |                 |                 | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-----------------|-----------------|--------------------|-----------------|-----------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source      | Invert Source   | ID                 | Rim Source      | Invert Source   |             |           |           |           |             |               |        |                |                     |         |                        |
| 4105    | 8616             | From COR - SSA  | Record Drawings | 8617               | Old Model       | Old Model       | 589         | 24        | 383.17    | 369.63    | 369.06      | 13.54         | 0.10%  | 0.221          | 1.26                | 0.18    | 5.08                   |
| 4106    | 8623             | From COR - SSA  | From COR - SSA  | 8624               | From COR - SSA  | From COR - SSA  | 419         | 21        | 380.04    | 366.79    | 362.05      | 13.25         | 1.13%  | 0.951          | 3.75                | 0.19    | 10.85                  |
| 4107    | 8607             | Record Drawings | Record Drawings | 8604               | From COR - SSA  | From COR - SSA  | 404         | 12        | 375.00    | 359.21    | 357.99      | 15.79         | 0.30%  | 0.041          | 1.14                | 0.15    | 1.10                   |
| 4108    | 8606             | Record Drawings | Record Drawings | 8607               | Record Drawings | Record Drawings | 400         | 12        | 376.50    | 360.10    | 359.21      | 16.40         | 0.22%  | 0.041          | 1.17                | 0.15    | 1.10                   |
| 4109    | 8605             | Record Drawings | Record Drawings | 8606               | Record Drawings | Record Drawings | 401         | 12        | 375.90    | 360.99    | 360.10      | 14.91         | 0.22%  | 0.041          | 1.15                | 0.15    | 1.10                   |
| 4110    | 8619             | Record Drawings | Record Drawings | 8605               | Record Drawings | Record Drawings | 347         | 12        | 374.30    | 361.64    | 360.99      | 12.66         | 0.19%  | 0.041          | 1.07                | 0.16    | 1.00                   |
| 4111    | 8618             | Record Drawings | Record Drawings | 8619               | Record Drawings | Record Drawings | 198         | 12        | 375.90    | 362.16    | 361.64      | 13.74         | 0.26%  | 0.040          | 1.15                | 0.13    | 1.18                   |
| 4112    | 8614             | Record Drawings | Record Drawings | 8618               | Record Drawings | Record Drawings | 303         | 12        | 375.50    | 362.77    | 362.16      | 12.73         | 0.20%  | 0.040          | 1.15                | 0.16    | 1.03                   |
| 4113    | 8615             | Record Drawings | Record Drawings | 8614               | Record Drawings | Record Drawings | 285         | 12        | 377.00    | 363.37    | 362.77      | 13.63         | 0.21%  | 0.040          | 1.07                | 0.15    | 1.06                   |
| 4129    | 8523             | From COR - SSA  | From COR - SSA  | 8525               | From COR - SSA  | From COR - SSA  | 117         | 21        | 367.30    | 357.60    | 357.07      | 9.70          | 0.45%  | 0.987          | 1.90                | 0.25    | 6.48                   |
| 4130    | 8521             | Record Drawings | Record Drawings | 8520               | Old Model       | Old Model       | 228         | 10        | 399.50    | 383.65    | 361.52      | 15.85         | 9.71%  | 0.021          | 2.38                | 0.05    | 4.77                   |
| 4134    | 8525             | From COR - SSA  | From COR - SSA  | 8524               | From COR - SSA  | From COR - SSA  | 388         | 24        | 367.02    | 357.07    | 357.08      | 9.95          | 0.00%  | 0.986          | 1.42                | 0.43    | -0.18                  |
| 4135    | 8524             | From COR - SSA  | From COR - SSA  | 8378               | Old Model       | Straight Grade  | 429         | 24        | 366.33    | 357.08    | 356.66      | 9.25          | 0.10%  | 1.080          | 1.62                | 0.32    | 3.87                   |
| 4136    | 8378             | Old Model       | Straight Grade  | 8379               | Old Model       | From COR - SSA  | 335         | 24        | 367.56    | 356.66    | 356.34      | 10.90         | 0.10%  | 1.097          | 1.18                | 0.41    | 3.80                   |
| 4138    | 8531             | Old Model       | Old Model       | 8527               | Old Model       | Old Model       | 411         | 12        | 400.88    | 390.88    | 390.38      | 10.00         | 0.12%  | 0.055          | 0.75                | 0.17    | 0.81                   |
| 4139    | 8530             | Old Model       | Old Model       | 8531               | Old Model       | Old Model       | 40          | 12        | 400.72    | 390.72    | 390.88      | 10.00         | -0.40% | 0.045          | 0.44                | 0.35    | 1.54                   |
| 4144    | 6108             | Old Model       | Old Model       | 6112               | Old Model       | Old Model       | 363         | 21        | 365.00    | 355.00    | 355.00      | 10.00         | 0.00%  | 1.856          | 2.14                | 0.67    | -1.67                  |
| 4145    | 6058             | Old Model       | Old Model       | 6108               | Old Model       | Old Model       | 373         | 21        | 366.95    | 356.95    | 355.00      | 10.00         | 0.52%  | 1.855          | 2.40                | 0.33    | 6.17                   |
| 4146    | 6063             | Old Model       | Old Model       | 6058               | Old Model       | Old Model       | 278         | 21        | 373.38    | 363.38    | 356.95      | 10.00         | 2.31%  | 1.856          | 5.33                | 0.22    | 15.02                  |
| 4147    | 6064             | Old Model       | Old Model       | 6063               | Old Model       | Old Model       | 535         | 21        | 374.38    | 364.38    | 363.38      | 10.00         | 0.19%  | 1.856          | 3.77                | 0.48    | 2.94                   |
| 4148    | 6070             | Record Drawings | Record Drawings | 6062               | Old Model       | Old Model       | 472         | 21        | 399.09    | 366.54    | 365.40      | 32.55         | 0.24%  | 1.850          | 3.03                | 0.41    | 3.60                   |
| 4153    | 6944             | Record Drawings | Record Drawings | 6079               | Record Drawings | Record Drawings | 91          | 12        | 414.55    | 404.55    | 403.88      | 10.00         | 0.74%  | 0.757          | 3.22                | 0.43    | 1.25                   |
| 4155    | 6072             | Record Drawings | Record Drawings | 6071               | Record Drawings | Record Drawings | 370         | 14        | 427.91    | 398.36    | 397.71      | 29.55         | 0.18%  | 0.951          | 2.21                | 0.60    | 0.54                   |
| 4156    | 6071             | Record Drawings | Record Drawings | 6073               | Record Drawings | Record Drawings | 337         | 14        | 427.10    | 397.71    | 397.21      | 29.39         | 0.15%  | 0.951          | 2.44                | 0.66    | 0.38                   |
| 4157    | 6073             | Record Drawings | Record Drawings | 6074               | Record Drawings | Record Drawings | 249         | 14        | 429.79    | 397.21    | 396.73      | 32.58         | 0.19%  | 0.997          | 2.74                | 0.62    | 0.57                   |
| 4158    | 6075             | Record Drawings | Record Drawings | 6076               | Old Model       | Old Model       | 225         | 14        | 412.43    | 396.18    | 389.37      | 16.25         | 3.02%  | 0.951          | 2.79                | 0.26    | 5.56                   |
| 4159    | 6067             | Old Model       | Old Model       | 6065               | Old Model       | Old Model       | 350         | 21        | 377.80    | 367.80    | 367.10      | 10.00         | 0.20%  | 1.021          | 2.35                | 0.31    | 3.94                   |
| 4160    | 6068             | Old Model       | Old Model       | 6067               | Old Model       | Old Model       | 473         | 21        | 378.76    | 368.76    | 367.80      | 10.00         | 0.20%  | 1.021          | 2.48                | 0.31    | 3.98                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                |                | Downstream Manhole |                |                | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|----------------|----------------|--------------------|----------------|----------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source     | Invert Source  | ID                 | Rim Source     | Invert Source  |             |           |           |           |             |               |        |                |                     |         |                        |
| 4161    | 6069             | Inv+10         | Straight Grade | 6068               | Old Model      | Old Model      | 163         | 21        | 379.11    | 369.11    | 368.76      | 10.00         | 0.22%  | 1.021          | 2.44                | 0.32    | 4.13                   |
| 4162    | 6202             | Old Model      | Old Model      | 6069               | Inv+10         | Straight Grade | 286         | 21        | 379.74    | 369.74    | 369.11      | 10.00         | 0.22%  | 1.021          | 2.48                | 0.31    | 4.18                   |
| 4163    | 6189             | Old Model      | Old Model      | 6202               | Old Model      | Old Model      | 301         | 21        | 380.29    | 370.29    | 369.74      | 10.00         | 0.18%  | 1.013          | 2.40                | 0.33    | 3.73                   |
| 4164    | 6188             | Old Model      | Old Model      | 6189               | Old Model      | Old Model      | 186         | 21        | 380.71    | 370.71    | 370.29      | 10.00         | 0.23%  | 1.013          | 2.41                | 0.30    | 4.26                   |
| 4165    | 6187             | Old Model      | Old Model      | 6188               | Old Model      | Old Model      | 90          | 21        | 380.95    | 370.95    | 370.71      | 10.00         | 0.27%  | 1.013          | 2.53                | 0.31    | 4.72                   |
| 4166    | 6186             | Old Model      | Old Model      | 6187               | Old Model      | Old Model      | 116         | 21        | 381.23    | 371.23    | 370.95      | 10.00         | 0.24%  | 1.013          | 2.49                | 0.31    | 4.43                   |
| 4167    | 6185             | Old Model      | Old Model      | 6863               | Record Drawing | Record Drawing | 68          | 21        | 381.63    | 371.63    | 371.26      | 10.00         | 0.54%  | 0.920          | 2.61                | 0.31    | 4.29                   |
| 4260    | 6190             | Old Model      | Old Model      | 6185               | Old Model      | Old Model      | 256         | 18        | 389.90    | 379.90    | 371.63      | 10.00         | 3.23%  | 0.920          | 3.68                | 0.18    | 12.31                  |
| 4261    | 6191             | Old Model      | Old Model      | 6190               | Old Model      | Old Model      | 277         | 18        | 390.40    | 380.40    | 379.90      | 10.00         | 0.18%  | 0.920          | 3.24                | 0.41    | 2.20                   |
| 4262    | 6193             | Old Model      | Old Model      | 6191               | Old Model      | Old Model      | 132         | 18        | 390.70    | 380.70    | 380.40      | 10.00         | 0.23%  | 0.920          | 2.23                | 0.37    | 2.58                   |
| 4263    | 6192             | Old Model      | Old Model      | 6193               | Old Model      | Old Model      | 195         | 18        | 391.10    | 381.10    | 380.70      | 10.00         | 0.21%  | 0.919          | 2.40                | 0.37    | 2.42                   |
| 4264    | 6195             | Old Model      | Old Model      | 6192               | Old Model      | Old Model      | 203         | 18        | 391.50    | 381.50    | 381.10      | 10.00         | 0.20%  | 0.919          | 2.34                | 0.38    | 2.35                   |
| 4265    | 6196             | Old Model      | Old Model      | 6195               | Old Model      | Old Model      | 141         | 18        | 391.81    | 381.81    | 381.50      | 10.00         | 0.22%  | 0.919          | 2.36                | 0.37    | 2.53                   |
| 4266    | 6197             | Old Model      | Old Model      | 6196               | Old Model      | Old Model      | 56          | 18        | 391.99    | 381.99    | 381.81      | 10.00         | 0.32%  | 0.919          | 2.46                | 0.36    | 3.26                   |
| 4267    | 6199             | Old Model      | Old Model      | 6197               | Old Model      | Old Model      | 110         | 18        | 392.25    | 382.25    | 381.99      | 10.00         | 0.24%  | 0.918          | 2.46                | 0.37    | 2.66                   |
| 4268    | 6200             | Old Model      | Old Model      | 6199               | Old Model      | Old Model      | 42          | 18        | 392.43    | 382.43    | 382.25      | 10.00         | 0.43%  | 0.918          | 2.55                | 0.34    | 3.88                   |
| 4270    | 6152             | Old Model      | Old Model      | 6151               | Old Model      | Old Model      | 41          | 18        | 403.29    | 393.29    | 383.05      | 10.00         | 24.80% | 0.002          | 0.03                | 0.00    | 37.21                  |
| 4271    | 6153             | Old Model      | Old Model      | 6151               | Old Model      | Old Model      | 75          | 18        | 393.25    | 383.25    | 383.05      | 10.00         | 0.27%  | 0.770          | 2.50                | 0.33    | 3.03                   |
| 4273    | 6155             | Old Model      | Old Model      | 6150               | Old Model      | Old Model      | 149         | 18        | 393.78    | 383.78    | 383.46      | 10.00         | 0.21%  | 0.769          | 2.31                | 0.34    | 2.64                   |
| 4274    | 6156             | Old Model      | Old Model      | 6155               | Old Model      | Old Model      | 136         | 18        | 394.07    | 384.07    | 383.78      | 10.00         | 0.21%  | 0.768          | 2.25                | 0.34    | 2.63                   |
| 4275    | 6168             | Old Model      | Old Model      | 6156               | Old Model      | Old Model      | 100         | 18        | 394.30    | 384.30    | 384.07      | 10.00         | 0.23%  | 0.767          | 2.26                | 0.34    | 2.76                   |
| 4276    | 6167             | Old Model      | Old Model      | 6168               | Old Model      | Old Model      | 148         | 18        | 395.45    | 385.45    | 384.30      | 10.00         | 0.78%  | 0.760          | 2.85                | 0.23    | 5.73                   |
| 4278    | 6165             | Old Model      | Old Model      | 6167               | Old Model      | Old Model      | 159         | 18        | 395.78    | 385.78    | 385.45      | 10.00         | 0.21%  | 0.759          | 2.71                | 0.36    | 2.59                   |
| 4279    | 6164             | Old Model      | Old Model      | 6165               | Old Model      | Old Model      | 54          | 18        | 395.87    | 385.87    | 385.78      | 10.00         | 0.17%  | 0.758          | 2.01                | 0.37    | 2.26                   |
| 4280    | 6166             | Old Model      | Old Model      | 6164               | Old Model      | Old Model      | 130         | 18        | 396.06    | 386.06    | 385.87      | 10.00         | 0.15%  | 0.757          | 1.94                | 0.37    | 2.05                   |
| 4281    | 6162             | Record Dwg     | Old Model      | 6166               | Old Model      | Old Model      | 26          | 18        | 396.30    | 386.20    | 386.06      | 10.10         | 0.55%  | 0.756          | 2.16                | 0.32    | 4.68                   |
| 4285    | 6112             | Old Model      | Old Model      | 6111               | Old Model      | Old Model      | 452         | 21        | 365.00    | 355.00    | 353.75      | 10.00         | 0.28%  | 1.923          | 3.49                | 0.42    | 3.91                   |
| 4289    | 8459             | From COR - SSA | From COR - SSA | 8460               | From COR - SSA | From COR - SSA | 105         | 18        | 370.56    | 358.96    | 358.70      | 11.60         | 0.25%  | 0.246          | 1.67                | 0.18    | 3.42                   |
| 4290    | 8458             | From COR - SSA | From COR - SSA | 8459               | From COR - SSA | From COR - SSA | 199         | 18        | 371.66    | 359.51    | 358.96      | 12.15         | 0.28%  | 0.246          | 1.85                | 0.17    | 3.62                   |
| 4291    | 8456             | From COR - SSA | From COR - SSA | 8457               | From COR - SSA | From COR - SSA | 154         | 18        | 376.97    | 360.27    | 360.10      | 16.70         | 0.11%  | 0.244          | 1.50                | 0.23    | 2.20                   |
| 4292    | 8489             | From COR - SSA | From COR - SSA | 8456               | From COR - SSA | From COR - SSA | 449         | 24        | 375.63    | 361.18    | 360.27      | 14.45         | 0.20%  | 0.244          | 1.28                | 0.13    | 6.89                   |
| 4322    | 8380             | Old Model      | Old Model      | 8379               | Old Model      | From COR - SSA | 105         | 12        | 374.90    | 364.90    | 356.34      | 10.00         | 8.16%  | 0.090          | 0.32                | 0.08    | 7.05                   |
| 4323    | 8379             | Old Model      | From COR - SSA | 8382               | From COR - SSA | Old Model      | 158         | 24        | 366.69    | 356.34    | 356.51      | 10.35         | -0.11% | 1.173          | 1.27                | 0.53    | 4.03                   |
| 4324    | 8367             | From COR - SSA | From COR - SSA | 8366               | From COR - SSA | From COR - SSA | 111         | 27        | 366.99    | 356.29    | 356.11      | 10.70         | 0.16%  | 1.171          | 1.01                | 0.43    | 7.58                   |
| 4328    | 8358             | From COR - SSA | From COR - SSA | 8362               | From COR - SSA | From COR - SSA | 66          | 27        | 367.76    | 356.31    | 356.23      | 11.45         | 0.12%  | 1.215          | 1.35                | 0.37    | 6.31                   |
| 4329    | 8365             | From COR - SSA | From COR - SSA | 8358               | From COR - SSA | From COR - SSA | 40          | 27        | 367.64    | 356.29    | 356.31      | 11.35         | -0.05% | 1.169          | 1.30                | 0.39    | 3.68                   |
| 4333    | 8362             | From COR - SSA | From COR - SSA | 8364               | Old Model      | Old Model      | 57          | 24        | 366.78    | 356.23    | 356.18      | 10.55         | 0.09%  | 1.239          | 1.43                | 0.44    | 3.45                   |
| 4343    | 6005             | Old Model      | Old Model      | 6008               | AsBuilts       | AsBuilts       | 327         | 42        | 357.83    | 348.12    | 347.84      | 9.71          | 0.09%  | 6.896          | 2.63                | 0.44    | 13.72                  |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                   |                   | Downstream Manhole |                |                | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------|-------------------|--------------------|----------------|----------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source        | Invert Source     | ID                 | Rim Source     | Invert Source  |             |           |           |           |             |               |        |                |                     |         |                        |
| 4344    | 6015             | Record Drawing    | Old Model         | 6005               | Old Model      | Old Model      | 176         | 42        | 363.18    | 348.26    | 348.12      | 14.92         | 0.08%  | 6.883          | 2.60                | 0.45    | 12.99                  |
| 4345    | 6003             | Inv+10            | Straight Grade    | 6005               | Old Model      | Old Model      | 88          | 12        | 358.97    | 348.97    | 348.12      | 10.00         | 0.97%  | 0.015          | 0.04                | 0.68    | 2.44                   |
| 4346    | 8342             | Old Model         | Old Model         | 8503               | Old Model      | Old Model      | 81          | 12        | 405.96    | 395.96    | 390.69      | 10.00         | 6.48%  | 0.094          | 4.71                | 0.09    | 6.26                   |
| 4347    | 8339             | Old Model         | Old Model         | 8340               | Old Model      | Old Model      | 85          | 12        | 389.65    | 379.65    | 373.37      | 10.00         | 7.36%  | 0.095          | 4.71                | 0.08    | 6.68                   |
| 4348    | 8332             | Old Model         | Old Model         | 8331               | Old Model      | Old Model      | 83          | 12        | 368.75    | 358.75    | 358.00      | 10.00         | 0.90%  | 0.186          | 1.84                | 0.19    | 2.19                   |
| 4349    | 8329             | From COR - SSA    | From COR - SSA    | 8330               | From COR - SSA | From COR - SSA | 124         | 24        | 365.98    | 355.63    | 355.74      | 10.35         | -0.09% | 1.255          | 1.23                | 0.55    | 3.46                   |
| 4351    | 8335             | From COR - SSA    | From COR - SSA    | 8310               | From COR - SSA | From COR - SSA | 291         | 24        | 369.78    | 355.43    | 355.47      | 14.35         | -0.01% | 1.445          | 1.34                | 0.56    | 0.41                   |
| 4360    | 8466             | From COR - SSA    | From COR - SSA    | 8415               | From COR - SSA | From COR - SSA | 311         | 18        | 369.87    | 358.00    | 357.58      | 11.87         | 0.14%  | 0.367          | 1.44                | 0.25    | 2.34                   |
| 4361    | 8415             | From COR - SSA    | From COR - SSA    | 8416               | From COR - SSA | From COR - SSA | 31          | 18        | 369.18    | 357.58    | 357.58      | 11.60         | 0.00%  | 0.378          | 1.43                | 0.30    | 0.04                   |
| 4363    | 8408             | From COR - SSA    | From COR - SSA    | 8400               | From COR - SSA | From COR - SSA | 124         | 18        | 364.32    | 355.32    | 355.20      | 9.00          | 0.10%  | 0.386          | 1.23                | 0.31    | 1.90                   |
| 4364    | 8403             | From COR - SSA    | From COR - SSA    | 8406               | From COR - SSA | From COR - SSA | 85          | 18        | 366.11    | 355.96    | 355.77      | 10.15         | 0.22%  | 0.384          | 1.95                | 0.24    | 3.10                   |
| 4365    | 8400             | From COR - SSA    | From COR - SSA    | 8474               | From COR - SSA | From COR - SSA | 187         | 18        | 364.10    | 355.20    | 355.11      | 8.90          | 0.05%  | 0.401          | 1.51                | 0.33    | 1.21                   |
| 4366    | 8286             | From COR - SSA    | From COR - SSA    | 8273               | From COR - SSA | From COR - SSA | 312         | 18        | 364.85    | 354.40    | 353.62      | 10.45         | 0.25%  | 0.403          | 1.89                | 0.22    | 3.27                   |
| 4374    | 8310             | From COR - SSA    | From COR - SSA    | 8312               | Old Model      | Straight Grade | 197         | 24        | 370.03    | 355.47    | 355.26      | 14.56         | 0.11%  | 1.482          | 1.38                | 0.49    | 3.69                   |
| 4375    | 8312             | Old Model         | Straight Grade    | 8311               | From COR - SSA | From COR - SSA | 136         | 24        | 365.39    | 355.26    | 355.11      | 10.13         | 0.11%  | 1.482          | 1.20                | 0.56    | 3.78                   |
| 4376    | 8311             | From COR - SSA    | From COR - SSA    | 8314               | From COR - SSA | From COR - SSA | 183         | 24        | 366.56    | 355.11    | 355.25      | 11.45         | -0.08% | 1.487          | 1.26                | 0.62    | 2.90                   |
| 4377    | 8314             | From COR - SSA    | From COR - SSA    | 8373               | From COR - SSA | From COR - SSA | 176         | 24        | 364.60    | 355.25    | 355.21      | 9.35          | 0.02%  | 1.517          | 1.50                | 0.51    | 0.87                   |
| 4378    | 8373             | From COR - SSA    | From COR - SSA    | 8265               | From COR - SSA | From COR - SSA | 281         | 24        | 365.26    | 355.21    | 355.01      | 10.05         | 0.07%  | 1.547          | 1.50                | 0.49    | 2.68                   |
| 4379    | 8115             | From COR - SSA    | From COR - SSA    | 8163               | From COR - SSA | From COR - SSA | 192         | 24        | 372.66    | 355.00    | 354.76      | 17.66         | 0.12%  | 1.592          | 1.49                | 0.48    | 4.00                   |
| 4402    | 6036             | Default to Legacy | Default to Legacy | 6035               | AsBuilts       | AsBuilts       | 45          | 12        | 362.19    | 352.19    | 352.05      | 10.00         | 0.31%  | 1.050          | 3.57                | 0.74    | 0.35                   |
| 4403    | 6035             | AsBuilts          | AsBuilts          | 6034               | AsBuilts       | AsBuilts       | 12          | 12        | 361.50    | 352.05    | 347.58      | 9.45          | 35.89% | 1.050          | 7.87                | 0.39    | 8.13                   |
| 4404    | 6034             | AsBuilts          | AsBuilts          | 6031               | AsBuilts       | AsBuilts       | 375         | 42        | 363.01    | 347.58    | 347.30      | 15.43         | 0.07%  | 7.945          | 2.50                | 0.50    | 11.31                  |
| 4405    | 6030             | AsBuilts          | AsBuilts          | 6029               | AsBuilts       | AsBuilts       | 470         | 42        | 361.40    | 347.07    | 346.87      | 14.33         | 0.04%  | 7.945          | 2.82                | 0.50    | 6.59                   |
| 4406    | 6029             | AsBuilts          | AsBuilts          | 6028               | AsBuilts       | AsBuilts       | 128         | 42        | 367.10    | 346.87    | 346.78      | 20.23         | 0.07%  | 7.945          | 3.85                | 0.43    | 8.53                   |
| 4407    | 6028             | AsBuilts          | AsBuilts          | 6027               | AsBuilts       | AsBuilts       | 336         | 42        | 368.10    | 346.78    | 346.57      | 21.32         | 0.06%  | 7.945          | 2.56                | 0.51    | 7.91                   |
| 4408    | 6017             | Old Model         | Old Model         | 6002               | Old Model      | Old Model      | 121         | 12        | 363.39    | 353.39    | 353.00      | 10.00         | 0.32%  | 1.049          | 2.91                | 0.69    | 0.37                   |
| 4409    | 8776             | Survey            | Survey            | 6017               | Old Model      | Old Model      | 649         | 12        | 365.38    | 355.18    | 353.39      | 10.20         | 0.28%  | 1.049          | 2.81                | 0.69    | 0.26                   |
| 4410    | 8778             | Old Model         | Old Model         | 8779               | Old Model      | Old Model      | 253         | 12        | 372.94    | 362.94    | 361.41      | 10.00         | 0.60%  | 0.017          | 1.00                | 0.07    | 1.72                   |
| 4411    | 8777             | Old Model         | Old Model         | 8778               | Old Model      | Old Model      | 410         | 12        | 375.36    | 365.36    | 362.94      | 10.00         | 0.59%  | 0.016          | 1.06                | 0.06    | 1.90                   |
| 4412    | 8779             | Old Model         | Old Model         | 8780               | Old Model      | Old Model      | 337         | 12        | 371.41    | 361.41    | 360.13      | 10.00         | 0.38%  | 0.017          | 1.07                | 0.39    | 1.51                   |
| 4415    | 8774             | Old Model         | Old Model         | 8776               | Survey         | Survey         | 396         | 12        | 367.88    | 357.88    | 355.18      | 10.00         | 0.68%  | 1.022          | 3.96                | 0.51    | 0.98                   |
| 4416    | 8748             | Old Model         | Old Model         | 8771               | Old Model      | Old Model      | 527         | 12        | 380.85    | 370.85    | 364.81      | 10.00         | 1.15%  | 0.057          | 0.95                | 0.10    | 2.61                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                   |                   | Downstream Manhole |                   |                   | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source        | Invert Source     | ID                 | Rim Source        | Invert Source     |             |           |           |           |             |               |        |                |                     |         |                        |
| 4419    | 6027             | AsBuilts          | AsBuilts          | 6026               | AsBuilts          | AsBuilts          | 498         | 42        | 368.60    | 346.57    | 346.31      | 22.03         | 0.05%  | 7.944          | 2.66                | 0.50    | 8.16                   |
| 4420    | 6026             | AsBuilts          | AsBuilts          | 6025               | AsBuilts          | AsBuilts          | 126         | 42        | 364.90    | 346.31    | 346.15      | 18.59         | 0.13%  | 7.968          | 2.86                | 0.47    | 12.88                  |
| 4424    | 8197             | Old Model         | Old Model         | 8182               | Old Model         | Old Model         | 123         | 12        | 365.79    | 355.79    | 355.10      | 10.00         | 0.56%  | 0.121          | 1.91                | 0.17    | 1.75                   |
| 4427    | 8175             | Old Model         | From COR - SSA    | 8177               | From COR - SSA    | From COR - SSA    | 153         | 24        | 366.58    | 354.66    | 354.96      | 11.92         | -0.20% | 1.606          | 1.76                | 0.58    | 5.40                   |
| 4429    | 8241             | From COR - SSA    | From COR - SSA    | 8240               | From COR - SSA    | From COR - SSA    | 357         | 24        | 358.50    | 352.25    | 351.97      | 6.25          | 0.08%  | 0.500          | 1.48                | 0.24    | 3.94                   |
| 4432    | 8205             | From COR - SSA    | From COR - SSA    | 8086               | From COR - SSA    | From COR - SSA    | 301         | 24        | 356.94    | 350.69    | 350.61      | 6.25          | 0.03%  | 0.507          | 1.21                | 0.28    | 2.08                   |
| 4433    | 8211             | From COR - SSA    | From COR - SSA    | 8205               | From COR - SSA    | From COR - SSA    | 401         | 24        | 357.24    | 350.99    | 350.69      | 6.25          | 0.07%  | 0.506          | 1.23                | 0.23    | 3.83                   |
| 4434    | 8010             | Old Model         | Old Model         | 8008               | Old Model         | Old Model         | 299         | 10        | 363.30    | 353.30    | 352.36      | 10.00         | 0.32%  | 0.083          | 1.63                | 0.22    | 0.78                   |
| 4435    | 8148             | From COR - SSA    | From COR - SSA    | 8149               | From COR - SSA    | From COR - SSA    | 125         | 24        | 359.67    | 351.02    | 350.73      | 8.65          | 0.23%  | 1.825          | 1.90                | 0.43    | 5.82                   |
| 4436    | 8149             | From COR - SSA    | From COR - SSA    | 8150               | From COR - SSA    | From COR - SSA    | 179         | 24        | 360.23    | 350.73    | 350.61      | 9.50          | 0.07%  | 1.826          | 1.64                | 0.53    | 2.27                   |
| 4437    | 8101             | AsBuilts          | AsBuilts          | 8100               | Survey            | Survey            | 353         | 42        | 356.60    | 341.41    | 341.24      | 15.19         | 0.05%  | 8.044          | 1.96                | 0.62    | 7.42                   |
| 4438    | 8108             | AsBuilts          | AsBuilts          | 8104               | AsBuilts          | AsBuilts          | 299         | 42        | 361.90    | 342.06    | 341.86      | 19.84         | 0.07%  | 8.042          | 2.12                | 0.58    | 10.16                  |
| 4439    | 6032             | AsBuilts          | AsBuilts          | 8108               | AsBuilts          | AsBuilts          | 400         | 42        | 363.30    | 342.33    | 342.06      | 20.97         | 0.07%  | 7.977          | 2.22                | 0.55    | 10.33                  |
| 4440    | 6033             | AsBuilts          | AsBuilts          | 6032               | AsBuilts          | AsBuilts          | 302         | 42        | 365.00    | 342.61    | 342.33      | 22.39         | 0.09%  | 7.977          | 2.41                | 0.52    | 11.46                  |
| 4444    | 8021             | Old Model         | Record Drawings   | 8022               | Old Model         | Record Drawings   | 331         | 15        | 362.59    | 353.27    | 352.16      | 9.32          | 0.34%  | 0.358          | 1.71                | 0.25    | 2.26                   |
| 4445    | 8031             | Old Model         | Straight Grade    | 8021               | Old Model         | Record Drawings   | 133         | 15        | 362.28    | 353.47    | 353.27      | 8.81          | 0.15%  | 0.357          | 1.88                | 0.33    | 1.40                   |
| 4446    | 8030             | Old Model         | Straight Grade    | 8031               | Old Model         | Straight Grade    | 69          | 15        | 362.89    | 353.57    | 353.47      | 9.32          | 0.15%  | 0.354          | 1.56                | 0.33    | 1.37                   |
| 4447    | 8764             | Old Model         | Straight Grade    | 8761               | Old Model         | Straight Grade    | 160         | 15        | 364.16    | 357.57    | 355.56      | 6.59          | 1.26%  | 0.343          | 3.62                | 0.18    | 4.73                   |
| 4448    | 8761             | Old Model         | Straight Grade    | 8762               | Old Model         | Record Drawings   | 110         | 15        | 364.08    | 355.56    | 354.08      | 8.52          | 1.35%  | 0.346          | 2.38                | 0.17    | 4.91                   |
| 4449    | 8763             | Old Model         | Straight Grade    | 8764               | Old Model         | Straight Grade    | 51          | 15        | 364.99    | 358.26    | 357.57      | 6.73          | 1.35%  | 0.332          | 3.46                | 0.18    | 4.93                   |
| 4450    | 8753             | Old Model         | Record Drawings   | 8763               | Old Model         | Straight Grade    | 277         | 15        | 365.38    | 362.00    | 358.26      | 3.38          | 1.35%  | 0.330          | 3.59                | 0.17    | 4.92                   |
| 4451    | 8722             | Old Model         | Record Drawings   | 8754               | Old Model         | Straight Grade    | 440         | 12        | 380.49    | 371.35    | 366.19      | 9.14          | 1.17%  | 0.309          | 3.60                | 0.23    | 2.39                   |
| 4452    | 8742             | Record Dwg        | Straight Grade    | 8731               | Record Dwg        | Straight Grade    | 348         | 12        | 391.60    | 376.98    | 376.22      | 14.62         | 0.22%  | 0.058          | 0.24                | 0.15    | 1.11                   |
| 4453    | 8731             | Record Dwg        | Straight Grade    | 8749               | Old Model         | Straight Grade    | 166         | 12        | 390.50    | 376.22    | 375.85      | 14.28         | 0.22%  | 0.057          | 0.12                | 0.80    | 1.12                   |
| 4454    | 8746             | Old Model         | Old Model         | 8737               | Old Model         | Old Model         | 70          | 12        | 392.31    | 382.31    | 381.52      | 10.00         | 1.13%  | 0.001          | 0.19                | 0.01    | 2.65                   |
| 4455    | 8737             | Old Model         | Old Model         | 8738               | Old Model         | Old Model         | 135         | 12        | 387.33    | 381.52    | 381.25      | 5.81          | 0.20%  | 0.011          | 0.69                | 0.07    | 1.11                   |
| 4456    | 8738             | Old Model         | Old Model         | 6041               | Default to Legacy | Default to Legacy | 240         | 12        | 391.25    | 381.25    | 380.75      | 10.00         | 0.21%  | 0.011          | 0.69                | 0.07    | 1.13                   |
| 4457    | 6041             | Default to Legacy | Default to Legacy | 6043               | Default to Legacy | Default to Legacy | 77          | 12        | 390.75    | 380.75    | 380.60      | 10.00         | 0.19%  | 0.012          | 0.71                | 0.07    | 1.09                   |
| 4458    | 6043             | Default to Legacy | Default to Legacy | 8736               | Old Model         | Old Model         | 69          | 12        | 390.60    | 380.60    | 380.45      | 10.00         | 0.22%  | 0.012          | 0.61                | 0.07    | 1.15                   |
| 4459    | 8736             | Old Model         | Old Model         | 8735               | Old Model         | Old Model         | 422         | 12        | 390.45    | 380.45    | 379.65      | 10.00         | 0.19%  | 0.012          | 0.79                | 0.09    | 1.07                   |
| 4460    | 8735             | Old Model         | Old Model         | 8742               | Record Dwg        | Straight Grade    | 176         | 12        | 389.65    | 379.65    | 376.98      | 10.00         | 1.52%  | 0.013          | 0.54                | 0.05    | 3.06                   |
| 4461    | 8734             | Record Dwg        | Straight Grade    | 8742               | Record Dwg        | Straight Grade    | 107         | 12        | 391.50    | 377.22    | 376.98      | 14.28         | 0.22%  | 0.048          | 1.07                | 0.14    | 1.13                   |
| 4462    | 8732             | Record Dwg        | Straight Grade    | 8744               | Old Model         | Straight Grade    | 288         | 12        | 392.00    | 378.81    | 378.17      | 13.19         | 0.22%  | 0.046          | 1.08                | 0.14    | 1.13                   |
| 4463    | 8744             | Old Model         | Straight Grade    | 8733               | Record Dwg        | Straight Grade    | 75          | 12        | 387.90    | 378.17    | 378.01      | 9.73          | 0.21%  | 0.049          | 1.10                | 0.14    | 1.10                   |
| 4468    | 6039             | COR Survey        | COR Survey        | 8706               | COR Survey        | COR Survey        | 269         | 12        | 395.59    | 380.59    | 379.74      | 15.00         | 0.32%  | 0.048          | 1.23                | 0.13    | 1.35                   |
| 4469    | 8705             | COR Survey        | COR Survey        | 6039               | COR Survey        | COR Survey        | 110         | 12        | 395.53    | 381.13    | 380.59      | 14.40         | 0.49%  | 0.049          | 1.43                | 0.12    | 1.70                   |
| 4470    | 8691             | COR Survey        | COR Survey        | 8705               | COR Survey        | COR Survey        | 381         | 12        | 391.31    | 381.81    | 381.13      | 9.50          | 0.18%  | 0.050          | 1.15                | 0.17    | 1.00                   |
| 4471    | 8717             | Old Model         | Record Drawings   | 8730               | Old Model         | Record Drawings   | 488         | 12        | 388.66    | 373.35    | 372.35      | 15.31         | 0.20%  | 0.308          | 1.75                | 0.36    | 0.82                   |
| 4472    | 8743             | Old Model         | Record Drawings   | 8717               | Old Model         | Record Drawings   | 495         | 12        | 385.80    | 374.35    | 373.35      | 11.45         | 0.20%  | 0.307          | 1.87                | 0.36    | 0.82                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |        |                |                     |         |                        |
| 4473    | 8730             | Old Model          | Record Drawings    | 8722               | Old Model          | Record Drawings    | 460         | 12        | 381.58    | 372.35    | 371.35      | 9.23          | 0.22%  | 0.308          | 2.25                | 0.40    | 0.85                   |
| 4474    | 8692             | Old Model          | Old Model          | 8743               | Old Model          | Record Drawings    | 136         | 12        | 385.00    | 374.66    | 374.35      | 10.34         | 0.23%  | 0.306          | 1.87                | 0.35    | 0.89                   |
| 4475    | 8693             | Old Model          | Record Drawings    | 8692               | Old Model          | Old Model          | 298         | 12        | 385.60    | 375.35    | 374.66      | 10.25         | 0.23%  | 0.293          | 1.89                | 0.34    | 0.91                   |
| 4481    | 8003             | Old Model          | Record Drawings    | 8002               | Old Model          | Record Drawing     | 278         | 15        | 360.45    | 350.53    | 350.20      | 9.92          | 0.12%  | 0.380          | 1.32                | 0.34    | 1.18                   |
| 4482    | 8014             | COR Sewer Map Book | Record Drawings    | 7992               | Old Model          | Record Drawings    | 217         | 15        | 356.75    | 351.78    | 350.82      | 4.97          | 0.44%  | 0.363          | 1.87                | 0.23    | 2.64                   |
| 4483    | 8023             | Record Drawings    | Record Drawings    | 8013               | Record Drawings    | Record Drawings    | 154         | 15        | 359.00    | 352.07    | 351.89      | 6.93          | 0.12%  | 0.359          | 1.04                | 0.40    | 1.19                   |
| 4484    | 8022             | Old Model          | Record Drawings    | 8023               | Record Drawings    | Record Drawings    | 72          | 15        | 362.16    | 352.16    | 352.07      | 10.00         | 0.12%  | 0.357          | 1.27                | 0.37    | 1.24                   |
| 4487    | 8107             | AsBuilts           | AsBuilts           | 8108               | AsBuilts           | AsBuilts           | 267         | 12        | 359.90    | 345.17    | 342.06      | 14.73         | 1.16%  | 0.105          | 1.58                | 0.21    | 1.13                   |
| 4489    | 8104             | AsBuilts           | AsBuilts           | 8103               | AsBuilts           | AsBuilts           | 275         | 42        | 361.40    | 341.86    | 341.71      | 19.54         | 0.05%  | 8.045          | 2.06                | 0.60    | 8.40                   |
| 4490    | 8103             | AsBuilts           | AsBuilts           | 8102               | AsBuilts           | AsBuilts           | 334         | 42        | 360.60    | 341.71    | 341.54      | 18.89         | 0.05%  | 8.044          | 2.10                | 0.61    | 0.58                   |
| 4491    | 8102             | AsBuilts           | AsBuilts           | 8101               | AsBuilts           | AsBuilts           | 260         | 42        | 358.50    | 341.54    | 341.41      | 16.96         | 0.05%  | 8.044          | 2.00                | 0.61    | 7.70                   |
| 4492    | 8100             | Survey             | Survey             | 8099               | Survey             | Survey             | 100         | 42        | 356.04    | 341.24    | 341.34      | 14.80         | -0.10% | 8.044          | 2.03                | 0.63    | 14.25                  |
| 4493    | 7922             | Survey             | Survey             | 7913               | Survey             | Survey             | 28          | 18        | 354.36    | 349.01    | 341.16      | 5.35          | 27.68% | 0.672          | 10.70               | 0.11    | 32.18                  |
| 4494    | 7992             | Old Model          | Record Drawings    | 8003               | Old Model          | Record Drawings    | 257         | 15        | 360.71    | 350.82    | 350.53      | 9.89          | 0.11%  | 0.380          | 1.57                | 0.35    | 1.14                   |
| 4497    | 7966             | Record Drawings    | Record Drawings    | 7965               | Record Drawings    | Record Drawings    | 217         | 30        | 358.50    | 342.64    | 342.39      | 15.86         | 0.12%  | 2.012          | 2.23                | 0.33    | 7.74                   |
| 4504    | 7985             | Old Model          | Record Drawings    | JCT_MP-378         | Record Drawings    | Record Drawings    | 49          | 10        | 361.38    | 351.65    | 340.39      | 9.73          | 22.87% | 0.059          | 5.34                | 0.07    | 5.92                   |
| 4505    | 8088             | Old Model          | Old Model          | 8092               | Old Model          | Old Model          | 104         | 12        | 362.09    | 352.09    | 351.92      | 10.00         | 0.16%  | 0.069          | 1.27                | 0.20    | 0.94                   |
| 4513    | 7775             | Old Model          | Old Model          | 7795               | Old Model          | Old Model          | 290         | 12        | 391.33    | 387.03    | 385.49      | 4.30          | 0.53%  | 0.002          | 0.52                | 0.03    | 1.82                   |
| 4514    | 7783             | Record Drawings    | Record Drawings    | 7784               | Record Drawings    | Record Drawings    | 187         | 12        | 390.04    | 384.54    | 383.97      | 5.50          | 0.30%  | 0.003          | 0.60                | 0.04    | 1.37                   |
| 4515    | 7784             | Record Drawings    | Record Drawings    | 7786               | COR Survey         | COR Survey         | 50          | 12        | 390.87    | 383.97    | 383.38      | 6.90          | 1.18%  | 0.004          | 1.19                | 0.03    | 2.59                   |
| 4516    | 8702             | Old Model          | Old Model          | 8700               | COR Sewer Map Book | COR Sewer Map Book | 286         | 12        | 375.00    | 365.00    | 360.24      | 10.00         | 1.67%  | 0.095          | 2.62                | 0.12    | 3.12                   |
| 4517    | 8703             | COR Sewer Map Book | COR Sewer Map Book | 8702               | Old Model          | Old Model          | 93          | 12        | 383.70    | 367.46    | 365.00      | 16.24         | 2.64%  | 0.095          | 3.05                | 0.11    | 3.96                   |
| 4518    | 7787             | Old Model          | Record Drawings    | 8693               | Old Model          | Record Drawings    | 547         | 12        | 385.51    | 376.35    | 375.35      | 9.16          | 0.18%  | 0.293          | 1.81                | 0.38    | 0.77                   |
| 4519    | 7897             | Old Model          | Old Model          | 7787               | Old Model          | Record Drawings    | 504         | 12        | 387.35    | 377.35    | 376.35      | 10.00         | 0.20%  | 0.292          | 1.76                | 0.35    | 0.82                   |
| 4520    | 7887             | Old Model          | Straight Grade     | 7891               | Old Model          | Record Drawings    | 315         | 12        | 393.00    | 378.97    | 378.35      | 14.03         | 0.20%  | 0.288          | 1.81                | 0.36    | 0.82                   |
| 4521    | 7777             | COR Survey         | COR Survey         | 8691               | COR Survey         | COR Survey         | 399         | 12        | 389.61    | 382.76    | 381.81      | 6.85          | 0.24%  | 0.059          | 1.22                | 0.15    | 1.16                   |
| 4522    | 7786             | COR Survey         | COR Survey         | 7777               | COR Survey         | COR Survey         | 155         | 12        | 390.68    | 383.38    | 382.76      | 7.30          | 0.40%  | 0.056          | 1.42                | 0.13    | 1.52                   |
| 4523    | 7785             | COR Survey         | COR Survey         | 7786               | COR Survey         | COR Survey         | 79          | 12        | 391.62    | 384.02    | 383.38      | 7.60          | 0.81%  | 0.067          | 2.51                | 0.12    | 2.09                   |
| 4527    | 7890             | Old Model          | Record Drawings    | 7887               | Old Model          | Straight Grade     | 140         | 12        | 388.80    | 379.25    | 378.97      | 9.55          | 0.20%  | 0.258          | 1.67                | 0.33    | 0.86                   |
| 4528    | 9112             | COR Sewer Map Book | COR Sewer Map Book | 7888               | Old Model          | Record Drawings    | 481         | 12        | 393.86    | 381.38    | 380.25      | 12.48         | 0.24%  | 0.257          | 1.81                | 0.31    | 0.95                   |
| 4530    | 7879             | COR Sewer Map Book | COR Sewer Map Book | 7878               | COR Sewer Map Book | COR Sewer Map Book | 156         | 12        | 394.40    | 384.00    | 383.66      | 10.40         | 0.22%  | 0.013          | 0.82                | 0.09    | 1.15                   |
| 4532    | 7649             | Old Model          | Old Model          | 7702               | Old Model          | Old Model          | 125         | 12        | 367.07    | 357.07    | 355.07      | 10.00         | 1.60%  | 0.014          | 1.20                | 0.05    | 3.14                   |
| 4536    | 7676             | Old Model          | Old Model          | 7663               | Old Model          | Old Model          | 322         | 15        | 362.52    | 352.52    | 351.80      | 10.00         | 0.22%  | 0.032          | 0.93                | 0.09    | 2.11                   |
| 4540    | 7648             | Record Drawings    | Record Drawings    | 7647               | Old Model          | Old Model          | 407         | 54        | 356.70    | 339.57    | 339.43      | 17.13         | 0.03%  | 11.190         | 2.08                | 0.52    | 14.34                  |
| 4541    | 7647             | Old Model          | Old Model          | 7679               | Record Drawings    | Record Drawings    | 428         | 54        | 353.80    | 339.43    | 339.28      | 14.37         | 0.04%  | 11.189         | 2.07                | 0.52    | 14.58                  |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                    |                    | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source         | Invert Source      | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |        |                |                     |         |                        |
| 4542    | 7679             | Record Drawings    | Record Drawings    | 7646               | Record Drawings    | Record Drawings    | 418         | 54        | 353.10    | 339.28    | 339.14      | 13.82         | 0.03%  | 11.213         | 2.07                | 0.52    | 14.00                  |
| 4543    | 7678             | Record Drawings    | Record Drawings    | 7679               | Record Drawings    | Record Drawings    | 41          | 10        | 353.00    | 343.28    | 339.28      | 9.72          | 9.71%  | 0.038          | 3.00                | 0.08    | 3.13                   |
| 4544    | 7659             | Record Drawings    | Record Drawings    | 7678               | Record Drawings    | Record Drawings    | 72          | 10        | 352.50    | 343.56    | 343.28      | 8.94          | 0.39%  | 0.037          | 1.20                | 0.16    | 0.73                   |
| 4545    | 7669             | Record Drawings    | Record Drawings    | 7667               | Record Drawings    | Record Drawings    | 28          | 10        | 353.00    | 344.69    | 344.60      | 8.31          | 0.32%  | 0.018          | 0.92                | 0.12    | 0.70                   |
| 4547    | 7748             | Old Model          | Record Drawings    | 7750               | Old Model          | Record Drawings    | 37          | 10        | 359.52    | 348.79    | 348.65      | 10.73         | 0.38%  | 0.017          | 0.87                | 0.11    | 0.74                   |
| 4550    | 7487             | Record Drawings    | Record Drawings    | 7394               | Record Drawings    | Old Model          | 442         | 54        | 353.80    | 338.85    | 338.68      | 14.95         | 0.04%  | 11.225         | 2.04                | 0.52    | 15.79                  |
| 4552    | 6930             | Default to Legacy  | Default to Legacy  | 7506               | Old Model          | Old Model          | 96          | 10        | 356.13    | 346.13    | 345.92      | 10.00         | 0.22%  | 0.038          | 1.06                | 0.16    | 0.68                   |
| 4554    | 7664             | Old Model          | Old Model          | 7665               | Old Model          | Old Model          | 299         | 15        | 361.08    | 351.08    | 350.36      | 10.00         | 0.24%  | 0.039          | 1.06                | 0.09    | 2.18                   |
| 4555    | 7665             | Old Model          | Old Model          | 7479               | Old Model          | Old Model          | 300         | 15        | 360.36    | 350.36    | 349.64      | 10.00         | 0.24%  | 0.039          | 1.02                | 0.09    | 2.18                   |
| 4556    | 7479             | Old Model          | Old Model          | 7434               | Old Model          | Old Model          | 282         | 15        | 359.64    | 349.64    | 348.92      | 10.00         | 0.25%  | 0.039          | 1.14                | 0.10    | 2.24                   |
| 4557    | 7434             | Old Model          | Old Model          | 7433               | Old Model          | Old Model          | 356         | 15        | 358.92    | 348.92    | 347.24      | 10.00         | 0.47%  | 0.040          | 0.90                | 0.08    | 3.06                   |
| 4558    | 7433             | Old Model          | Old Model          | 7438               | Survey             | Survey             | 374         | 15        | 357.24    | 347.24    | 346.87      | 10.00         | 0.10%  | 0.042          | 0.82                | 0.13    | 1.39                   |
| 4559    | 7438             | Survey             | Survey             | 7439               | Survey             | Survey             | 365         | 15        | 355.22    | 346.87    | 345.35      | 8.35          | 0.42%  | 0.042          | 1.18                | 0.10    | 2.23                   |
| 4560    | 7441             | Survey             | Survey             | 7440               | Survey             | Survey             | 35          | 18        | 357.07    | 344.82    | 342.67      | 12.25         | 6.17%  | 0.653          | 5.03                | 0.18    | 11.17                  |
| 4561    | 7395             | Record Drawings    | Record Drawings    | JCT_MP-362         | Record Drawings    | Record Drawings    | 41          | 18        | 358.20    | 342.46    | 338.50      | 15.74         | 9.78%  | 0.691          | 6.50                | 0.13    | 17.45                  |
| 4562    | 7427             | Old Model          | Record Drawings    | 7426               | Old Model          | Record Drawings    | 188         | 10        | 354.96    | 346.07    | 345.51      | 8.89          | 0.30%  | 0.039          | 1.08                | 0.15    | 0.80                   |
| 4564    | 7731             | Old Model          | Old Model          | 7732               | Old Model          | Old Model          | 19          | 10        | 375.02    | 365.02    | 364.78      | 10.00         | 1.25%  | 0.160          | 2.48                | 0.21    | 1.56                   |
| 4565    | 7469             | Old Model          | Old Model          | 7468               | Old Model          | Old Model          | 10          | 10        | 370.00    | 360.00    | 359.22      | 10.00         | 7.49%  | 0.169          | 2.37                | 0.14    | 4.04                   |
| 4603    | 7060             | Old Model          | Old Model          | 7062               | Old Model          | Old Model          | 93          | 10        | 376.76    | 366.76    | 363.53      | 10.00         | 3.47%  | 0.232          | 3.06                | 0.19    | 2.63                   |
| 4604    | 7062             | Old Model          | Old Model          | 7064               | Old Model          | Old Model          | 165         | 10        | 373.53    | 363.53    | 362.65      | 10.00         | 0.54%  | 0.232          | 2.91                | 0.34    | 0.89                   |
| 4605    | 7095             | Old Model          | Old Model          | 7057               | Old Model          | Old Model          | 220         | 10        | 363.00    | 353.00    | 352.00      | 10.00         | 0.45%  | 0.001          | 0.02                | 0.02    | 1.03                   |
| 4610    | 7038             | Old Model          | Old Model          | 7044               | Old Model          | Old Model          | 90          | 12        | 354.49    | 344.49    | 344.48      | 10.00         | 0.01%  | 0.005          | 0.31                | 0.08    | 0.26                   |
| 4613    | 7036             | Assumed            | Straight Grade     | 7034               | Record Drawings    | Record Drawings    | 28          | 10        | 355.00    | 342.17    | 337.64      | 12.83         | 16.31% | 0.027          | 4.96                | 0.06    | 4.98                   |
| 4614    | 6990             | Old Model          | Old Model          | 6991               | Old Model          | Old Model          | 52          | 10        | 366.66    | 356.66    | 356.06      | 10.00         | 1.15%  | 0.026          | 1.77                | 0.09    | 1.62                   |
| 4620    | 6345             | Old Model          | Straight Grade     | 6344               | Record Dwg         | Straight Grade     | 148         | 10        | 360.40    | 350.74    | 350.40      | 9.66          | 0.23%  | 0.002          | 0.40                | 0.04    | 0.74                   |
| 4621    | 6344             | Record Dwg         | Straight Grade     | 6333               | COR Sewer Map Book | Straight Grade     | 184         | 10        | 357.30    | 350.40    | 349.97      | 6.90          | 0.23%  | 0.003          | 0.17                | 0.04    | 0.74                   |
| 4622    | 6333             | COR Sewer Map Book | Straight Grade     | 6340               | COR Sewer Map Book | Straight Grade     | 315         | 10        | 355.20    | 349.97    | 349.23      | 5.23          | 0.23%  | 0.022          | 1.56                | 0.14    | 0.67                   |
| 4623    | 6340             | COR Sewer Map Book | Straight Grade     | 6338               | COR Sewer Map Book | COR Sewer Map Book | 204         | 10        | 354.35    | 349.23    | 348.75      | 5.12          | 0.23%  | 0.031          | 1.20                | 0.17    | 0.63                   |
| 4624    | 6338             | COR Sewer Map Book | COR Sewer Map Book | 6339               | COR Sewer Map Book | COR Sewer Map Book | 147         | 10        | 353.82    | 348.75    | 348.28      | 5.07          | 0.32%  | 0.031          | 1.11                | 0.14    | 0.74                   |
| 4625    | 6335             | Old Model          | Old Model          | 6336               | AsBuilts           | AsBuilts           | 139         | 10        | 354.90    | 347.57    | 347.17      | 7.33          | 0.29%  | 0.108          | 1.57                | 0.29    | 0.61                   |
| 4631    | 6369             | Old Model          | Old Model          | 6353               | Old Model          | Old Model          | 303         | 12        | 377.52    | 367.52    | 366.63      | 10.00         | 0.29%  | 0.172          | 1.74                | 0.24    | 1.18                   |
| 4636    | 6371             | Inv+10             | AsBuilts           | 6372               | AsBuilts           | Old Model          | 247         | 12        | 349.84    | 339.84    | 339.14      | 10.00         | 0.28%  | 0.072          | 1.34                | 0.19    | 1.05                   |
| 4637    | 6370             | AsBuilts           | Old Model          | 6371               | Inv+10             | AsBuilts           | 220         | 12        | 352.24    | 340.47    | 339.84      | 11.77         | 0.29%  | 0.073          | 1.22                | 0.16    | 1.26                   |
| 4638    | 6387             | Old Model          | Old Model          | 6370               | AsBuilts           | Old Model          | 234         | 12        | 352.24    | 341.08    | 340.47      | 11.16         | 0.26%  | 0.073          | 1.37                | 0.19    | 1.09                   |
| 4639    | 6381             | Old Model          | Old Model          | 6387               | Old Model          | Old Model          | 119         | 12        | 351.43    | 341.43    | 341.08      | 10.00         | 0.29%  | 0.073          | 2.02                | 0.23    | 1.07                   |
| 4640    | 6388             | Old Model          | Old Model          | 6381               | Old Model          | Old Model          | 364         | 12        | 352.43    | 342.43    | 341.43      | 10.00         | 0.27%  | 0.012          | 0.80                | 0.08    | 1.16                   |





**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                 |                 | Downstream Manhole |                    |                    | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope  | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-----------------|-----------------|--------------------|--------------------|--------------------|-------------|-----------|-----------|-----------|-------------|---------------|--------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source      | Invert Source   | ID                 | Rim Source         | Invert Source      |             |           |           |           |             |               |        |                |                     |         |                        |
| 4641    | 6389             | Old Model       | Old Model       | 6388               | Old Model          | Old Model          | 194         | 12        | 352.96    | 342.96    | 342.43      | 10.00         | 0.27%  | 0.012          | 0.70                | 0.07    | 1.29                   |
| 4643    | 6380             | AsBuilts        | AsBuilts        | 6381               | Old Model          | Old Model          | 387         | 12        | 351.97    | 342.81    | 341.43      | 9.16          | 0.36%  | 0.057          | 1.89                | 0.15    | 1.32                   |
| 4651    | 7042             | Record Drawings | Record Drawings | JCT_MP-356         | Record Drawings    | Record Drawings    | 21          | 10        | 355.00    | 346.49    | 337.46      | 8.51          | 42.16% | 0.015          | 4.02                | 0.03    | 7.12                   |
| 4652    | 7043             | Old Model       | Old Model       | 7039               | COR Sewer Map Book | COR Sewer Map Book | 166         | 12        | 352.98    | 342.98    | 342.30      | 10.00         | 0.41%  | 0.014          | 1.19                | 0.07    | 1.58                   |
| 4655    | 7048             | Old Model       | Old Model       | 7046               | Old Model          | Old Model          | 232         | 12        | 359.69    | 349.69    | 348.00      | 10.00         | 0.73%  | 0.258          | 3.09                | 0.25    | 1.87                   |
| 4656    | 7059             | Old Model       | Old Model       | 7057               | Old Model          | Old Model          | 194         | 12        | 369.00    | 359.00    | 352.00      | 10.00         | 3.60%  | 0.030          | 0.82                | 0.06    | 4.71                   |
| 4657    | 7063             | Old Model       | Old Model       | 7059               | Old Model          | Old Model          | 193         | 10        | 383.12    | 373.12    | 359.00      | 10.00         | 7.33%  | 0.015          | 2.33                | 0.04    | 4.14                   |
| 4658    | 7058             | Old Model       | Old Model       | 7063               | Old Model          | Old Model          | 264         | 10        | 385.85    | 375.85    | 373.12      | 10.00         | 1.03%  | 0.014          | 1.70                | 0.07    | 1.55                   |
| 4659    | 7334             | Old Model       | Old Model       | 7058               | Old Model          | Old Model          | 152         | 10        | 387.12    | 377.12    | 375.85      | 10.00         | 0.83%  | 0.013          | 1.18                | 0.07    | 1.39                   |
| 4660    | 7258             | Old Model       | Old Model       | 6790               | Inv+10             | Straight Grade     | 245         | 10        | 396.25    | 386.25    | 383.10      | 10.00         | 1.28%  | 0.005          | 1.00                | 0.04    | 1.73                   |
| 4661    | 6790             | Inv+10          | Straight Grade  | 7335               | Old Model          | Old Model          | 78          | 10        | 393.10    | 383.10    | 382.10      | 10.00         | 1.28%  | 0.006          | 1.00                | 0.04    | 1.73                   |
| 4676    | 7315             | Old Model       | Old Model       | 7316               | Old Model          | Old Model          | 12          | 10        | 404.19    | 394.19    | 394.02      | 10.00         | 1.42%  | 0.037          | 0.73                | 0.11    | 1.79                   |
| 4688    | 7024             | Inv+10          | Record Drawings | JCT_MP-354         | Straight Grade     | Straight Grade     | 19          | 12        | 356.95    | 346.95    | 335.80      | 10.00         | 57.79% | 0.099          | 12.92               | 0.14    | 18.93                  |
| 4693    | 7168             | Inv+10          | Record Drawings | 6627               | Inv+10             | Record Drawings    | 381         | 10        | 399.78    | 389.78    | 388.85      | 10.00         | 0.24%  | 0.177          | 1.75                | 0.34    | 0.58                   |
| 4694    | 6627             | Inv+10          | Record Drawings | 6628               | Inv+10             | Record Drawings    | 93          | 10        | 398.85    | 388.85    | 388.58      | 10.00         | 0.29%  | 0.177          | 1.77                | 0.32    | 0.65                   |
| 4695    | 6628             | Inv+10          | Record Drawings | 6599               | Inv+10             | Record Drawings    | 357         | 10        | 398.58    | 388.58    | 387.69      | 10.00         | 0.25%  | 0.177          | 1.75                | 0.33    | 0.59                   |
| 4708    | 7212             | Old Model       | Old Model       | 7104               | Old Model          | Old Model          | 177         | 10        | 403.55    | 393.55    | 393.16      | 10.00         | 0.22%  | 0.081          | 1.34                | 0.23    | 0.64                   |
| 4720    | 6324             | Inv+10          | Straight Grade  | 6322               | Record Drawings    | Record Drawings    | 253         | 12        | 397.97    | 387.97    | 387.48      | 10.00         | 0.19%  | 0.545          | 2.23                | 0.54    | 0.55                   |
| 4733    | 1041             | Old Model       | Old Model       | 1040               | Old Model          | Old Model          | 285         | 12        | 406.70    | 391.04    | 390.50      | 15.66         | 0.19%  | 0.022          | 0.86                | 0.11    | 1.06                   |
| 4734    | 1039             | Old Model       | Old Model       | 1038               | Old Model          | Old Model          | 398         | 12        | 402.80    | 389.50    | 388.50      | 13.30         | 0.25%  | 0.022          | 0.77                | 0.21    | 1.22                   |
| 4735    | 1038             | Old Model       | Old Model       | 1037               | Old Model          | Old Model          | 397         | 12        | 401.90    | 388.50    | 387.60      | 13.40         | 0.23%  | 0.048          | 1.17                | 0.28    | 1.19                   |
| 4736    | 1037             | Old Model       | Old Model       | 1036               | Old Model          | Old Model          | 401         | 12        | 403.90    | 387.60    | 386.60      | 16.30         | 0.25%  | 0.048          | 1.17                | 0.20    | 1.19                   |
| 4737    | 306              | Old Model       | Old Model       | 305                | Old Model          | Old Model          | 398         | 12        | 404.30    | 385.70    | 384.72      | 18.60         | 0.25%  | 0.048          | 1.15                | 0.14    | 1.19                   |
| 4738    | 304              | Old Model       | Old Model       | 303                | Old Model          | Old Model          | 243         | 12        | 403.50    | 383.74    | 382.80      | 19.76         | 0.39%  | 0.048          | 1.47                | 0.13    | 1.50                   |
| 4739    | 303              | Old Model       | Old Model       | 272                | Old Model          | Old Model          | 111         | 12        | 403.80    | 382.80    | 381.20      | 21.00         | 1.45%  | 0.067          | 2.47                | 0.11    | 2.93                   |
| 4742    | 272              | Old Model       | Old Model       | 284                | Old Model          | Old Model          | 308         | 12        | 405.50    | 381.20    | 375.38      | 24.30         | 1.89%  | 0.068          | 2.66                | 0.10    | 3.36                   |
| 4743    | 284              | Old Model       | Old Model       | 283                | Old Model          | Old Model          | 329         | 12        | 398.00    | 375.38    | 368.12      | 22.62         | 2.21%  | 0.072          | 2.85                | 0.10    | 3.64                   |
| 4744    | 283              | Old Model       | Old Model       | 281                | Old Model          | Old Model          | 245         | 12        | 380.15    | 368.12    | 362.80      | 12.03         | 2.17%  | 0.072          | 2.15                | 0.10    | 3.60                   |
| 4745    | 282              | Old Model       | Old Model       | 286                | Old Model          | Old Model          | 196         | 12        | 374.16    | 360.95    | 360.01      | 13.21         | 0.48%  | 0.073          | 2.16                | 0.16    | 1.65                   |
| 4757    | 405              | Old Model       | Old Model       | 401                | Old Model          | Old Model          | 286         | 15        | 369.15    | 359.15    | 358.34      | 10.00         | 0.28%  | 1.059          | 3.72                | 0.51    | 1.35                   |
| 4758    | 401              | Old Model       | Old Model       | 484                | Old Model          | Old Model          | 406         | 15        | 368.34    | 358.34    | 357.69      | 10.00         | 0.16%  | 0.548          | 2.11                | 0.42    | 1.26                   |
| 4759    | 484              | Old Model       | Old Model       | 477                | Old Model          | Old Model          | 458         | 15        | 367.69    | 357.69    | 356.79      | 10.00         | 0.20%  | 0.439          | 2.05                | 0.33    | 1.57                   |
| 4760    | 477              | Old Model       | Old Model       | 476                | Old Model          | Old Model          | 362         | 15        | 366.79    | 356.79    | 355.93      | 10.00         | 0.24%  | 0.428          | 2.12                | 0.30    | 1.78                   |
| 4761    | 476              | Old Model       | Old Model       | 475                | Old Model          | Old Model          | 345         | 15        | 365.93    | 355.93    | 355.17      | 10.00         | 0.22%  | 0.422          | 1.99                | 0.30    | 1.70                   |
| 4762    | 475              | Old Model       | Old Model       | 470                | Old Model          | Old Model          | 459         | 15        | 365.17    | 355.17    | 354.34      | 10.00         | 0.18%  | 0.419          | 1.94                | 0.33    | 1.50                   |
| 4763    | 470              | Old Model       | Old Model       | 471                | Old Model          | Old Model          | 396         | 15        | 364.34    | 354.34    | 353.58      | 10.00         | 0.19%  | 0.417          | 1.93                | 0.31    | 1.57                   |
| 4773    | 626              | Old Model       | Old Model       | 632                | Old Model          | Old Model          | 385         | 10        | 541.35    | 531.35    | 530.23      | 10.00         | 0.29%  | 0.003          | 0.42                | 0.05    | 0.82                   |
| 4833    | 4123             | Old Model       | Old Model       | 1170               | Old Model          | Old Model          | 440         | 30        | 348.75    | 338.75    | 338.31      | 10.00         | 0.10%  | 3.795          | 2.59                | 0.47    | 5.29                   |
| 4834    | 1170             | Old Model       | Old Model       | 1171               | Old Model          | Old Model          | 440         | 30        | 348.31    | 338.31    | 337.87      | 10.00         | 0.10%  | 3.795          | 2.58                | 0.47    | 5.29                   |
| 4835    | 1171             | Old Model       | Old Model       | 1172               | Old Model          | Old Model          | 444         | 30        | 347.87    | 337.87    | 337.43      | 10.00         | 0.10%  | 3.794          | 2.59                | 0.47    | 5.25                   |
| 4836    | 1172             | Old Model       | Old Model       | 1173               | Old Model          | Old Model          | 436         | 30        | 347.43    | 337.43    | 336.99      | 10.00         | 0.10%  | 3.793          | 2.60                | 0.47    | 5.33                   |
| 4837    | 1173             | Old Model       | Old Model       | 1174               | Old Model          | Old Model          | 445         | 30        | 346.99    | 336.99    | 336.54      | 10.00         | 0.10%  | 3.793          | 2.60                | 0.47    | 5.34                   |
| 4838    | 1174             | Old Model       | Old Model       | 1175               | Old Model          | Old Model          | 440         | 30        | 346.54    | 336.54    | 336.09      | 10.00         | 0.10%  | 3.792          | 2.58                | 0.47    | 5.39                   |
| 4839    | 1175             | Old Model       | Old Model       | 1176               | Old Model          | Old Model          | 468         | 30        | 346.09    | 336.09    | 335.64      | 10.00         | 0.10%  | 3.792          | 2.58                | 0.47    | 5.12                   |



**City of Richland - 2015 General Sewer Plan Update**  
**Appendix H - Master Plan Model Results - Existing System Pipes**

| Pipe ID | Upstream Manhole |                               |                 | Downstream Manhole |                 |                 | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | Slope    | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|---------|------------------|-------------------------------|-----------------|--------------------|-----------------|-----------------|-------------|-----------|-----------|-----------|-------------|---------------|----------|----------------|---------------------|---------|------------------------|
|         | ID               | Rim Source                    | Invert Source   | ID                 | Rim Source      | Invert Source   |             |           |           |           |             |               |          |                |                     |         |                        |
| 4840    | 1176             | Old Model                     | Old Model       | 1199               | Old Model       | Old Model       | 435         | 30        | 345.64    | 335.64    | 335.19      | 10.00         | 0.10%    | 3.791          | 2.56                | 0.47    | 5.44                   |
| 4841    | 1194             | Old Model                     | Old Model       | 2180               | Old Model       | Old Model       | 470         | 30        | 344.72    | 334.72    | 333.75      | 10.00         | 0.21%    | 4.003          | 2.93                | 0.39    | 9.04                   |
| 4842    | 2180             | Old Model                     | Old Model       | 1193               | Old Model       | Record Drawings | 228         | 36        | 343.75    | 333.75    | 333.33      | 10.00         | 0.18%    | 6.736          | 3.48                | 0.60    | 13.31                  |
| 4843    | 2150             | Old Model                     | Old Model       | 2180               | Old Model       | Old Model       | 462         | 24        | 345.82    | 335.82    | 333.75      | 10.00         | 0.45%    | 2.155          | 3.35                | 0.39    | 5.47                   |
| 4844    | 2151             | Old Model                     | Old Model       | 2150               | Old Model       | Old Model       | 398         | 24        | 346.58    | 336.58    | 335.82      | 10.00         | 0.19%    | 2.155          | 2.91                | 0.40    | 4.77                   |
| 4845    | 2179             | Old Model                     | Old Model       | 2151               | Old Model       | Old Model       | 351         | 24        | 347.29    | 337.29    | 336.58      | 10.00         | 0.20%    | 2.155          | 2.92                | 0.39    | 4.97                   |
| 4846    | 1104             | Old Model                     | Old Model       | 10                 |                 |                 | 10          | 10        | 348.40    | 336.50    | 0.00        | 11.90         | 3217.29% | 0.425          | 2.89                | 0.52    | 0.64                   |
| 4867    | 6315             | Old Model                     | Old Model       | 6313               | Old Model       | Old Model       | 124         | 10        | 407.50    | 397.50    | 393.60      | 10.00         | 3.15%    | 0.097          | 3.55                | 0.13    | 2.63                   |
| 4887    | 6599             | Inv+10                        | Record Drawings | 6596               | Inv+10          | Record Drawings | 273         | 10        | 397.69    | 387.69    | 387.00      | 10.00         | 0.25%    | 0.177          | 1.75                | 0.33    | 0.60                   |
| 4888    | 6596             | Inv+10                        | Record Drawings | 6637               | Inv+10          | Record Drawings | 909         | 10        | 397.00    | 387.00    | 384.68      | 10.00         | 0.26%    | 0.177          | 1.78                | 0.33    | 0.60                   |
| 4889    | 6637             | Inv+10                        | Record Drawings | 6643               | Inv+10          | Record Drawings | 452         | 10        | 394.68    | 384.68    | 383.48      | 10.00         | 0.27%    | 0.177          | 1.64                | 0.32    | 0.61                   |
| 4890    | 6643             | Inv+10                        | Record Drawings | 6642               | Inv+10          | Record Drawings | 235         | 10        | 393.48    | 383.48    | 383.03      | 10.00         | 0.19%    | 0.177          | 1.63                | 0.37    | 0.49                   |
| 4898    | 6610             | Record Drawings               | Record Drawings | 6608               | Record Drawings | Record Drawings | 97          | 54        | 354.92    | 334.82    | 334.84      | 20.10         | -0.02%   | 12.287         | 2.35                | 0.52    | 7.52                   |
| 4899    | 6602             | Record Drawings               | Record Drawings | 6697               | Record Drawings | Record Drawings | 618         | 54        | 356.46    | 334.57    | 334.30      | 21.89         | 0.04%    | 12.305         | 2.58                | 0.48    | 16.46                  |
| 4909    | 2163             | Old Model                     | Old Model       | 2162               | Old Model       | Old Model       | 385         | 21        | 355.55    | 345.55    | 344.83      | 10.00         | 0.19%    | 2.156          | 3.11                | 0.51    | 2.64                   |
| 4910    | 2164             | Old Model                     | Old Model       | 2163               | Old Model       | Old Model       | 126         | 21        | 355.71    | 345.71    | 345.55      | 10.00         | 0.13%    | 0.797          | 1.11                | 0.44    | 3.16                   |
| 4911    | 2165             | Old Model                     | Old Model       | 2164               | Old Model       | Old Model       | 357         | 21        | 356.62    | 346.62    | 345.71      | 10.00         | 0.25%    | 0.798          | 1.68                | 0.25    | 4.80                   |
| 4912    | 2166             | Old Model                     | Old Model       | 2165               | Old Model       | Old Model       | 295         | 21        | 357.36    | 347.36    | 346.62      | 10.00         | 0.25%    | 0.798          | 2.49                | 0.26    | 4.76                   |
| 4913    | 2167             | Old Model                     | Old Model       | 2166               | Old Model       | Old Model       | 211         | 21        | 357.99    | 347.99    | 347.36      | 10.00         | 0.30%    | 0.798          | 2.55                | 0.25    | 5.27                   |
| 4914    | 2168             | Old Model                     | Old Model       | 2167               | Old Model       | Old Model       | 353         | 21        | 365.78    | 355.78    | 347.99      | 10.00         | 2.21%    | 0.798          | 3.65                | 0.15    | 15.69                  |
| 4915    | 2173             | Old Model                     | Old Model       | 2172               | Old Model       | Old Model       | 497         | 21        | 410.39    | 400.39    | 400.32      | 10.00         | 0.01%    | 0.798          | 1.43                | 0.45    | 0.52                   |
| 4916    | 2152             | Old Model                     | Old Model       | 2153               | Old Model       | Old Model       | 45          | 12        | 484.56    | 474.56    | 466.93      | 10.00         | 17.01%   | 1.340          | 9.77                | 0.24    | 9.03                   |
| 4917    | 2181             | Old Model                     | Old Model       | 2152               | Old Model       | Old Model       | 440         | 12        | 486.78    | 476.78    | 474.56      | 10.00         | 0.50%    | 1.340          | 4.78                | 0.84    | 0.43                   |
| 4926    | 4503             | Asbuilts - Check vs Old Model | Asbuilts        | 2149               | Old Model       | Old Model       | 294         | 16        | 510.20    | 499.30    | 490.65      | 10.90         | 2.94%    | 0.642          | 5.95                | 0.18    | 8.57                   |
| 4927    | 2149             | Old Model                     | Old Model       | 2146               | Old Model       | Old Model       | 307         | 16        | 500.65    | 490.65    | 479.74      | 10.00         | 3.55%    | 0.645          | 5.52                | 0.17    | 9.48                   |
| 4928    | 2146             | Old Model                     | Old Model       | 2144               | Old Model       | Old Model       | 194         | 16        | 489.74    | 479.74    | 472.81      | 10.00         | 3.57%    | 0.689          | 7.49                | 0.20    | 9.47                   |
| 4929    | 2144             | Old Model                     | Old Model       | 2143               | Old Model       | Old Model       | 198         | 16        | 482.81    | 472.81    | 430.34      | 10.00         | 21.42%   | 0.689          | 3.40                | 0.11    | 24.47                  |



City of Richland - 2015 General Sewer Plan Update

Appendix H - Master Plan Model Results - Master Plan Pipes

| Pipe ID    | Upstream Manhole |                       |                | Downstream Manhole |                       |                | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | MP Design Slope | 10 State Standard Min. Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|------------|------------------|-----------------------|----------------|--------------------|-----------------------|----------------|-------------|-----------|-----------|-----------|-------------|---------------|-----------------|------------------------------|----------------|---------------------|---------|------------------------|
|            | ID               | Rim Source            | Invert Source  | ID                 | Rim Source            | Invert Source  |             |           |           |           |             |               |                 |                              |                |                     |         |                        |
| CDT_MP-1   | JCT_MP-1         | 2ft contours from COR | design         | JCT_MP-244         | Asbuilts              | Calc           | 151         | 18        | 540.00    | 526.64    | 526.00      | 13.36         | 0.42%           | 0.12%                        | 0.116          | 1.36                | 0.15    | 2.75                   |
| CDT_MP-2   | JCT_MP-2         | 2ft contours from COR | design         | JCT_MP-1           | 2ft contours from COR | design         | 346         | 18        | 534.00    | 527.16    | 526.64      | 6.84          | 0.15%           | 0.12%                        | 0.116          | 1.60                | 0.18    | 2.45                   |
| CDT_MP-3   | JCT_MP-3         | 2ft contours from COR | design         | JCT_MP-2           | 2ft contours from COR | design         | 385         | 18        | 548.00    | 528.23    | 527.16      | 19.77         | 0.28%           | 0.12%                        | 0.116          | 1.50                | 0.13    | 3.57                   |
| CDT_MP-4   | JCT_MP-6         | 2ft contours from COR | design         | JCT_MP-3           | 2ft contours from COR | design         | 173         | 18        | 532.00    | 528.78    | 528.23      | 3.22          | 0.32%           | 0.12%                        | 0.116          | 1.47                | 0.14    | 3.20                   |
| CDT_MP-6   | JCT_MP-8         | 2ft contours from COR | design         | JCT_MP-6           | 2ft contours from COR | design         | 297         | 15        | 542.00    | 536.00    | 528.78      | 6.00          | 2.43%           | 0.15%                        | 0.075          | 2.88                | 0.07    | 6.92                   |
| CDT_MP-8   | JCT_MP-10        | 2ft contours from COR | design         | JCT_MP-8           | 2ft contours from COR | design         | 390         | 15        | 558.00    | 549.41    | 536.00      | 8.59          | 3.44%           | 0.15%                        | 0.075          | 3.26                | 0.07    | 8.28                   |
| CDT_MP-10  | JCT_MP-12        | 2ft contours from COR | design         | JCT_MP-10          | 2ft contours from COR | design         | 380         | 15        | 570.00    | 557.72    | 549.41      | 12.28         | 2.19%           | 0.15%                        | 0.053          | 2.50                | 0.06    | 6.60                   |
| CDT_MP-12  | JCT_MP-14        | 2ft contours from COR | design         | JCT_MP-12          | 2ft contours from COR | design         | 449         | 15        | 588.00    | 567.76    | 557.72      | 20.24         | 2.24%           | 0.15%                        | 0.053          | 2.52                | 0.06    | 6.68                   |
| CDT_MP-14  | JCT_MP-16        | 2ft contours from COR | design         | JCT_MP-14          | 2ft contours from COR | design         | 369         | 15        | 588.00    | 572.66    | 567.76      | 15.34         | 1.33%           | 0.15%                        | 0.042          | 1.95                | 0.06    | 5.11                   |
| CDT_MP-16  | JCT_MP-18        | 2ft contours from COR | design         | JCT_MP-16          | 2ft contours from COR | design         | 393         | 15        | 593.00    | 577.96    | 572.66      | 15.04         | 1.35%           | 0.15%                        | 0.042          | 1.97                | 0.06    | 5.16                   |
| CDT_MP-18  | JCT_MP-20        | 2ft contours from COR | design         | JCT_MP-18          | 2ft contours from COR | design         | 280         | 15        | 596.00    | 581.66    | 577.96      | 14.34         | 1.32%           | 0.15%                        | 0.042          | 1.95                | 0.06    | 5.09                   |
| CDT_MP-20  | JCT_MP-22        | 2ft contours from COR | design         | JCT_MP-20          | 2ft contours from COR | design         | 369         | 15        | 604.00    | 587.00    | 581.66      | 17.00         | 1.45%           | 0.15%                        | 0.042          | 2.02                | 0.06    | 5.35                   |
| CDT_MP-22  | JCT_MP-24        | 2ft contours from COR | design         | JCT_MP-22          | 2ft contours from COR | design         | 510         | 15        | 620.00    | 606.42    | 587.00      | 13.58         | 3.81%           | 0.15%                        | 0.021          | 2.31                | 0.04    | 8.78                   |
| CDT_MP-52  | JCT_MP-54        | Inv+10                | Straight Grade | JCT_MP-24          | 2ft contours from COR | design         | 428         | 15        | 630.00    | 624.00    | 606.42      | 6.00          | 4.11%           | 0.15%                        | 0.000          | 0.00                | 0.00    | 9.15                   |
| CDT_MP-54  | JCT_MP-56        | Inv+10                | Straight Grade | JCT_MP-54          | Inv+10                | Straight Grade | 403         | 15        | 650.00    | 637.31    | 624.00      | 12.69         | 3.30%           | 0.15%                        | 0.000          | 0.00                | 0.00    | 8.19                   |
| CDT_MP-136 | JCT_MP-138       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-140         | BMS 50% Plan          | BMS 50% Plan   | 522         | 10        | 818.00    | 806.41    | 805.26      | 11.59         | 0.22%           | 0.28%                        | 0.553          | 2.17                | 0.66    | 0.17                   |
| CDT_MP-138 | JCT_MP-140       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-144         | BMS 50% Plan          | BMS 50% Plan   | 444         | 10        | 815.00    | 805.26    | 804.28      | 9.74          | 0.22%           | 0.28%                        | 0.552          | 2.28                | 0.70    | 0.17                   |
| CDT_MP-140 | JCT_MP-144       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-142         | BMS 50% Plan          | BMS 50% Plan   | 500         | 10        | 812.00    | 804.28    | 801.99      | 7.72          | 0.46%           | 0.28%                        | 0.622          | 3.37                | 0.60    | 0.42                   |
| CDT_MP-142 | JCT_MP-142       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-146         | BMS 50% Plan          | BMS 50% Plan   | 582         | 10        | 809.00    | 801.99    | 796.17      | 7.01          | 1.00%           | 0.28%                        | 0.622          | 2.69                | 0.44    | 0.91                   |
| CDT_MP-144 | JCT_MP-146       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-148         | BMS 50% Plan          | BMS 50% Plan   | 281         | 10        | 805.00    | 796.17    | 794.88      | 8.83          | 0.46%           | 0.28%                        | 0.621          | 2.50                | 0.81    | 0.10                   |
| CDT_MP-146 | JCT_MP-148       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-150         | BMS 50% Plan          | BMS 50% Plan   | 242         | 10        | 803.00    | 794.88    | 793.79      | 8.12          | 0.45%           | 0.28%                        | 0.621          | 2.99                | 0.58    | 0.41                   |
| CDT_MP-148 | JCT_MP-150       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-152         | BMS 50% Plan          | BMS 50% Plan   | 293         | 10        | 801.00    | 793.79    | 792.47      | 7.21          | 0.45%           | 0.28%                        | 0.621          | 2.42                | 0.56    | 0.41                   |
| CDT_MP-150 | JCT_MP-152       | BMS 50% Plan          | BMS 50% Plan   | JCT_MP-154         | BMS 50% Plan          | BMS 50% Plan   | 317         | 10        | 800.00    | 792.47    | 789.47      | 7.53          | 0.95%           | 0.28%                        | 0.620          | 2.49                | 0.81    | 0.10                   |
| CDT_MP-152 | JCT_MP-154       | BMS 50% Plan          | BMS 50% Plan   | BMS_LS             |                       |                | 153         | 18        | 798.00    | 789.47    | 0.00        | 8.53          | 517.38%         | 0.12%                        | 1.942          | 4.02                | 0.46    | 3.25                   |



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Appendix H - Master Plan Model Results - Master Plan Pipes

| Pipe ID    | Upstream Manhole |                 |                 | Downstream Manhole |                 |                 | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | MP Design Slope | 10 State Standard Min. Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|------------|------------------|-----------------|-----------------|--------------------|-----------------|-----------------|-------------|-----------|-----------|-----------|-------------|---------------|-----------------|------------------------------|----------------|---------------------|---------|------------------------|
|            | ID               | Rim Source      | Invert Source   | ID                 | Rim Source      | Invert Source   |             |           |           |           |             |               |                 |                              |                |                     |         |                        |
| CDT_MP-192 | JCT_MP-196       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-198         | BMS 50% Plan    | BMS 50% Plan    | 324         | 12        | 808.00    | 797.02    | 795.20      | 10.98         | 0.56%           | 0.22%                        | 1.028          | 4.10                | 0.62    | 0.74                   |
| CDT_MP-194 | JCT_MP-198       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-200         | BMS 50% Plan    | BMS 50% Plan    | 264         | 12        | 807.00    | 795.20    | 793.68      | 11.80         | 0.58%           | 0.22%                        | 1.028          | 3.57                | 0.57    | 0.74                   |
| CDT_MP-196 | JCT_MP-200       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-202         | BMS 50% Plan    | BMS 50% Plan    | 423         | 12        | 804.00    | 793.68    | 791.37      | 10.32         | 0.55%           | 0.22%                        | 1.028          | 4.07                | 0.61    | 0.73                   |
| CDT_MP-198 | JCT_MP-202       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-204         | BMS 50% Plan    | BMS 50% Plan    | 140         | 12        | 799.00    | 791.37    | 790.32      | 7.63          | 0.75%           | 0.22%                        | 1.028          | 3.50                | 0.59    | 0.74                   |
| CDT_MP-200 | JCT_MP-204       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-154         | BMS 50% Plan    | BMS 50% Plan    | 148         | 15        | 797.00    | 790.32    | 789.47      | 6.68          | 0.57%           | 0.15%                        | 1.325          | 3.64                | 0.47    | 1.89                   |
| CDT_MP-210 | JCT_MP-214       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-216         | BMS 50% Plan    | BMS 50% Plan    | 554         | 10        | 827.00    | 818.80    | 817.08      | 8.20          | 0.31%           | 0.28%                        | 0.561          | 2.40                | 0.77    | 0.16                   |
| CDT_MP-212 | JCT_MP-216       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-234         | BMS 50% Plan    | BMS 50% Plan    | 1005        | 10        | 825.00    | 817.08    | 811.95      | 7.92          | 0.51%           | 0.28%                        | 0.561          | 3.28                | 0.52    | 0.53                   |
| CDT_MP-214 | JCT_MP-218       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-196         | BMS 50% Plan    | BMS 50% Plan    | 870         | 10        | 816.00    | 806.79    | 797.02      | 9.21          | 1.12%           | 0.28%                        | 0.709          | 3.90                | 0.52    | 0.66                   |
| CDT_MP-236 | JCT_MP-244       | Asbuilts        | Calc            | 5025               | Asbuilts        | Asbuilts        | 122         | 18        | 537.00    | 526.00    | 523.55      | 11.00         | 2.01%           | 0.12%                        | 0.116          | 2.89                | 0.07    | 10.32                  |
| CDT_MP-238 | JCT_MP-222       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-214         | BMS 50% Plan    | BMS 50% Plan    | 397         | 10        | 833.00    | 820.07    | 818.80      | 12.93         | 0.32%           | 0.28%                        | 0.461          | 3.45                | 0.69    | 0.26                   |
| CDT_MP-240 | JCT_MP-234       | BMS 50% Plan    | BMS 50% Plan    | JCT_MP-218         | BMS 50% Plan    | BMS 50% Plan    | 365         | 10        | 819.00    | 811.95    | 806.79      | 7.05          | 1.41%           | 0.28%                        | 0.702          | 4.56                | 0.45    | 1.00                   |
| CDT_MP-346 | JCT_MP-348       | Record Drawings | Straight Grade  | 6602               | Record Drawings | Record Drawings | 307         | 54        | 355.50    | 334.88    | 334.57      | 20.62         | 0.10%           | 0.10%                        | 12.300         | 2.65                | 0.45    | 31.47                  |
| CDT_MP-348 | JCT_MP-350       | Record Drawings | Straight Grade  | 6703               | Record Drawings | Record Drawings | 105         | 54        | 357.00    | 334.16    | 333.90      | 22.84         | 0.25%           | 0.10%                        | 12.493         | 2.94                | 0.41    | 56.13                  |
| CDT_MP-350 | 1196             | Record Drawings | Record Drawings | 1195               | Record Drawings | Record Drawings | 337         | 54        | 355.00    | 330.24    | 329.59      | 24.76         | 0.19%           | 0.10%                        | 17.864         | 5.26                | 0.41    | 42.65                  |
| CDT_MP-360 | JCT_MP-356       | Record Drawings | Record Drawings | 7041               | Record Drawings | Record Drawings | 164         | 54        | 355.80    | 337.46    | 337.40      | 18.34         | 0.04%           | 0.10%                        | 11.866         | 2.34                | 0.50    | 14.50                  |
| CDT_MP-362 | 1197             | Record Drawings | Record Drawings | 1196               | Record Drawings | Record Drawings | 432         | 54        | 336.00    | 330.42    | 330.24      | 5.58          | 0.04%           | 0.10%                        | 17.864         | 3.86                | 0.52    | 10.23                  |
| CDT_MP-364 | JCT_MP-392       | AsBuilts        | AsBuilts        | JCT_MP-390         | AsBuilts        | AsBuilts        | 441         | 12        | 380.27    | 370.19    | 367.78      | 10.08         | 0.55%           | 0.22%                        | 0.011          | 0.92                | 0.06    | 1.83                   |
| CDT_MP-366 | JCT_MP-360       | Record Drawings | Record Drawings | JCT_MP-362         | Record Drawings | Record Drawings | 220         | 54        | 357.00    | 338.57    | 338.50      | 18.43         | 0.03%           | 0.10%                        | 11.266         | 2.06                | 0.53    | 18.08                  |
| CDT_MP-368 | JCT_MP-362       | Record Drawings | Record Drawings | 7492               | Record Drawings | Record Drawings | 88          | 54        | 358.80    | 338.50    | 338.47      | 20.30         | 0.03%           | 0.10%                        | 11.687         | 2.16                | 0.53    | 13.70                  |
| CDT_MP-370 | JCT_MP-364       | Record Drawings | Straight Grade  | 7912               | Survey          | Survey          | 48          | 42        | 352.53    | 341.16    | 341.13      | 11.37         | 0.06%           | 0.10%                        | 8.525          | 2.32                | 0.58    | 9.15                   |
| CDT_MP-372 | JCT_MP-354       | Straight Grade  | Straight Grade  | JCT_MP-352         | Assumed         | Assumed         | 57          | 54        | 355.90    | 335.80    | 335.77      | 20.10         | 0.06%           | 0.10%                        | 12.258         | 2.65                | 0.47    | 21.24                  |
| CDT_MP-374 | JCT_MP-352       | Assumed         | Assumed         | 7020               | Record Drawings | Record Drawings | 328         | 54        | 355.77    | 335.77    | 335.39      | 20.00         | 0.12%           | 0.10%                        | 12.268         | 2.52                | 0.45    | 34.59                  |
| CDT_MP-376 | 7041             | Record Drawings | Record Drawings | JCT_MP-358         | Record Drawings | Record Drawings | 261         | 54        | 355.80    | 337.40    | 337.27      | 18.40         | 0.05%           | 0.10%                        | 11.866         | 2.38                | 0.49    | 18.88                  |
| CDT_MP-380 | JCT_MP-366       | Record Drawings | Record Drawings | 7648               | Record Drawings | Record Drawings | 118         | 54        | 359.00    | 339.62    | 339.57      | 19.38         | 0.04%           | 0.10%                        | 11.165         | 2.07                | 0.52    | 17.19                  |



JUB ENGINEERS, INC.

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Appendix H - Master Plan Model Results - Master Plan Pipes

| Pipe ID    | Upstream Manhole |                 |                 | Downstream Manhole |                 |                 | Length (ft) | Size (in) | Ground Up | Invert Up | Invert Down | Depth Up (ft) | MP Design Slope | 10 State Standard Min. Slope | Max Flow (mgd) | Max Velocity (ft/s) | Max d/D | Reserve Capacity (mgd) |
|------------|------------------|-----------------|-----------------|--------------------|-----------------|-----------------|-------------|-----------|-----------|-----------|-------------|---------------|-----------------|------------------------------|----------------|---------------------|---------|------------------------|
|            | ID               | Rim Source      | Invert Source   | ID                 | Rim Source      | Invert Source   |             |           |           |           |             |               |                 |                              |                |                     |         |                        |
| CDT_MP-384 | JCT_MP-368       | Record Drawings | Record Drawings | JCT_MP-366         | Record Drawings | Record Drawings | 112         | 54        | 360.00    | 339.65    | 339.62      | 20.35         | 0.03%           | 0.10%                        | 11.154         | 2.04                | 0.53    | 11.36                  |
| CDT_MP-386 | JCT_MP-372       | Record Drawings | Record Drawings | 7942               | Record Drawings | Record Drawings | 107         | 54        | 362.80    | 339.82    | 339.77      | 22.98         | 0.05%           | 0.10%                        | 11.132         | 1.97                | 0.54    | 18.60                  |
| CDT_MP-388 | 7942             | Record Drawings | Record Drawings | JCT_MP-370         | Record Drawings | Record Drawings | 193         | 54        | 362.80    | 339.77    | 339.72      | 23.03         | 0.03%           | 0.10%                        | 11.131         | 1.99                | 0.54    | 11.01                  |
| CDT_MP-392 | JCT_MP-374       | Record Drawings | Record Drawings | 7959               | Old Model       | Old Model       | 84          | 54        | 364.00    | 339.92    | 339.89      | 24.08         | 0.04%           | 0.10%                        | 11.091         | 1.94                | 0.55    | 14.90                  |
| CDT_MP-394 | JCT_MP-376       | Record Drawings | Record Drawings | JCT_MP-378         | Record Drawings | Record Drawings | 114         | 54        | 360.00    | 340.44    | 340.39      | 19.56         | 0.05%           | 0.10%                        | 10.523         | 1.88                | 0.54    | 19.20                  |
| CDT_MP-396 | JCT_MP-378       | Record Drawings | Record Drawings | JCT_MP-380         | Record Drawings | Record Drawings | 284         | 54        | 360.00    | 340.39    | 340.30      | 19.61         | 0.03%           | 0.10%                        | 10.551         | 1.89                | 0.54    | 13.55                  |
| CDT_MP-398 | JCT_MP-380       | Record Drawings | Record Drawings | 7916               | Record Drawings | Record Drawings | 34          | 54        | 361.00    | 340.30    | 340.29      | 20.70         | 0.03%           | 0.10%                        | 10.594         | 1.91                | 0.54    | 13.16                  |
| CDT_MP-402 | 8461             | Old Model       | Old Model       | 8460               | From COR - SSA  | From COR - SSA  | 9           | 10        | 369.00    | 359.00    | 358.70      | 10.00         | 3.18%           | 0.28%                        | 0.068          | 1.16                | 0.11    | 2.66                   |
| CDT_MP-412 | JCT_MP-390       | AsBuilts        | AsBuilts        | 8777               | Old Model       | Old Model       | 424         | 12        | 378.11    | 367.78    | 365.36      | 10.33         | 0.57%           | 0.22%                        | 0.016          | 1.13                | 0.07    | 1.87                   |
| CDT_MP-414 | 6334             | AsBuilts        | Old Model       | BRAD_LS            |                 |                 | 59          | 15        | 359.40    | 341.90    | 0.00        | 17.50         | 579.20%         | 0.15%                        | 0.112          | 2.44                | 0.11    | 4.63                   |
| CDT_MP-416 | 6372             | AsBuilts        | Old Model       | COL_PT_LS          |                 |                 | 37          | 15        | 352.88    | 339.14    | 0.00        | 13.74         | 927.51%         | 0.15%                        | 0.127          | 2.91                | 0.14    | 4.60                   |
| CDT_MP-426 | JCT_MP-400       | Record Drawings | Record Drawings | 6982               | Record Drawings | Record Drawings | 390         | 54        | 355.20    | 337.21    | 336.93      | 17.99         | 0.07%           | 0.10%                        | 12.158         | 2.48                | 0.47    | 24.76                  |