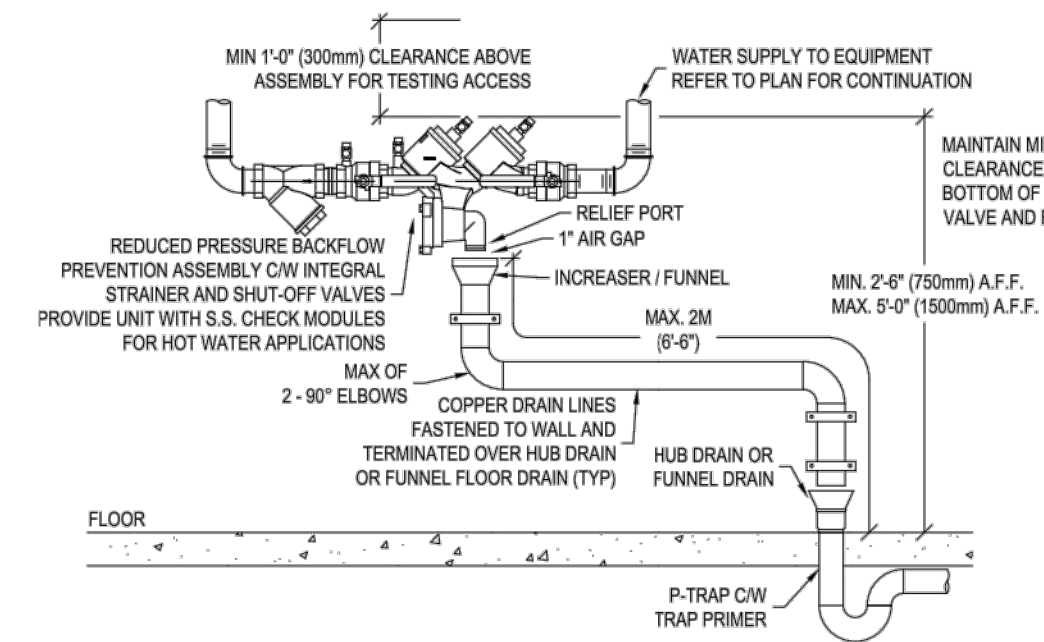


| FIRE PROTECTION HYDRAULIC CALCULATION                              |       |       |         |
|--|-------|-------|---------|
| 1. AVAILABLE PRESSURE AT THE MANFOLD                               |       |       |         |
| FLOW REQUIRED FOR HOSE BIBBS                                       | 220   | USGPM |         |
| FLOW REQUIRED FOR FIRE PROTECTION (2 HOSE STATIONS)                | 100   | USGPM |         |
| TOTAL REQUIRED FLOW  | 220   | USGPM |         |
|  |       |       |         |
| PRESSURE AVAILABLE AT CITY CONNECTION                              | 110   | PSI   |         |
| CITY CONNECTION ELEVATION ( DATUM: FLOAT LEVEL)                    | 15    | FT    | 6.5 PSI |
| PRESSURE DROP IN PIPE RUN TO MANFOLD FOR 4" HDPE                   |       |       |         |
| PIPE (C FACTOR = 150)  | 14.58 | PSI   |         |
| PRESSURE DROP IN THE DOUBLE CHECK VALVE                            | 5     | PSI   |         |
|  |       |       |         |
| PRESSURE AVAILABLE AT THE MANFOLD                                  | 96.92 | PSI   |         |
| MINIMUM RESIDUAL PRESSURE REQUIRED AT THE MOST REMOTE HOSE STATION | 65    | PSI   |         |
| PRESSURE DROP IN THE FIRE WATER LINE DOUBLE CHECK VALVE            | 5     | PSI   |         |
| AVAILABLE PRESSURE DROP  | 26.9  | PSI   |         |
|  |       |       |         |
| 2. PIPE SIZING (GALVANIZED SCH.40 STAINLESS STEEL C=120)           |       |       |         |
| SEGMENT  | 1 - 2 |       |         |
| PIPE DIAMETER  | 4     | INCH  |         |
| ADJUSTED PIPE RUN  | 135   | FT    |         |
| FLOW   | 100   | USGPM |         |
| PRESSURE DROP  | 0.327 | PSI   |         |
|  |       |       |         |
| SEGMENT  | 2 - 3 |       |         |
| PIPE DIAMETER  | 3     | INCH  |         |
| FLOW   | 100   | USGPM |         |
| ADJUSTED PIPE RUN  | 330   | FT    |         |
| PRESSURE DROP  | 3     | PSI   |         |
|  |       |       |         |
| SEGMENT  | 3 - 4 |       |         |
| PIPE DIAMETER  | 3     | INCH  |         |
| FLOW   | 100   | USGPM |         |
| ADJUSTED PIPE RUN  | 100   | FT    |         |
| PRESSURE DROP  | 0.91  | PSI   |         |
|  |       |       |         |
| SEGMENT  | 4 - 5 |       |         |
| PIPE DIAMETER  | 3     | INCH  |         |
| FLOW   | 100   | USGPM |         |
| ADJUSTED PIPE RUN  | 231   | FT    |         |
| PRESSURE DROP  | 14.36 | PSI   |         |
|  |       |       |         |
| SEGMENT  | 5 - 6 |       |         |
| PIPE DIAMETER  | 3     | INCH  |         |
| FLOW   | 50    | USGPM |         |
| ADJUSTED PIPE RUN  | 105   | FT    |         |
| PRESSURE DROP  | 1.8   | PSI   |         |
|  |       |       |         |
| 3. SYSTEM VERIFICATIO  |       |       |         |
| TOTAL PRESSURE DROP  | 20.4  | PSI   |         |
| AVAILABLE PRESSURE DROP  | 26.9  | PSI   |         |
|  |       |       |         |



| REDUCED PRESSURE DEVICE SIZE | FLOOR DRAIN GRATE OPENING AND OUTLET | DRAIN LINE SIZE HUB DRAIN C/W 24" INLET STANDPIPE & FUNNEL | OPEN PIPE TO OUTSIDE C/W 24" OF VERTICAL DROP AT DEVICE PRIOR TO 90° CHANGE OF DIRECTION |
|------------------------------|--------------------------------------|--|--|
| 1/2"                         | 2"                                   | 1 1/2"   | 2"   |
| 3/4"                         | 2"                                   | 2"   | 2"   |
| 1"                           | 3"                                   | 2"   | 2"   |
| 1 1/4"                       | 4"                                   | 3"   | 3"   |
| 1 1/2"                       | 6"                                   | 3"   | 3"   |
| 2"                           | 6"                                   | 3"   | 3"   |
| 2 1/2"                       | 6"                                   | 4"   | 4"   |
| 3"                           | 6"                                   | 4"   | 4"   |
| 4"                           | 8"                                   | 6"   | 4"   |
| 6"                           | 8"                                   | 6"   | 4"   |

- NOTES:
1. THE INSTALLATION FOR ALL THE TESTABLE CROSS CONNECTION DEVICES TO CONFORM WITH THE CAN/CSA-B84 10.01 STANDARD.
  2. ALL THE PIPING ON THE DISCHARGE SIDE OF A TESTABLE CROSS CONNECTION CONTROL DEVICE TO BE LABELED TO CAN/CSA-B84 3-82 STANDARD FOR IDENTIFICATION OF PIPING SYSTEMS.
  3. ALL THE TESTABLE CROSS CONNECTION CONTROL DEVICES REQUIRE THE PERMANENT LAWAQID IDENTIFICATION TAGS (IE. RPBA-PREMISE ISOLATION, DCVA - LAWN IRRIGATION, ETC).
  4. THE INSTALLATION OF AN INLINE STRAINER SHALL BE REQUIRED WHERE WATER CONTAINS FOREIGN MATERIAL THAT COULD LODGE ON OR ERODE SEATING SURFACES.
  5. PROVIDE C.P. ESCUTCHEONS WHERE PIPING ENTERS EXITS WALL (TYP).

REDUCED PRESSURE BACKFLOW ASSEMBLY

SCALE: NOT TO SCALE



SITE PLAN  
SCALE: 1/164 = 1' = 0"

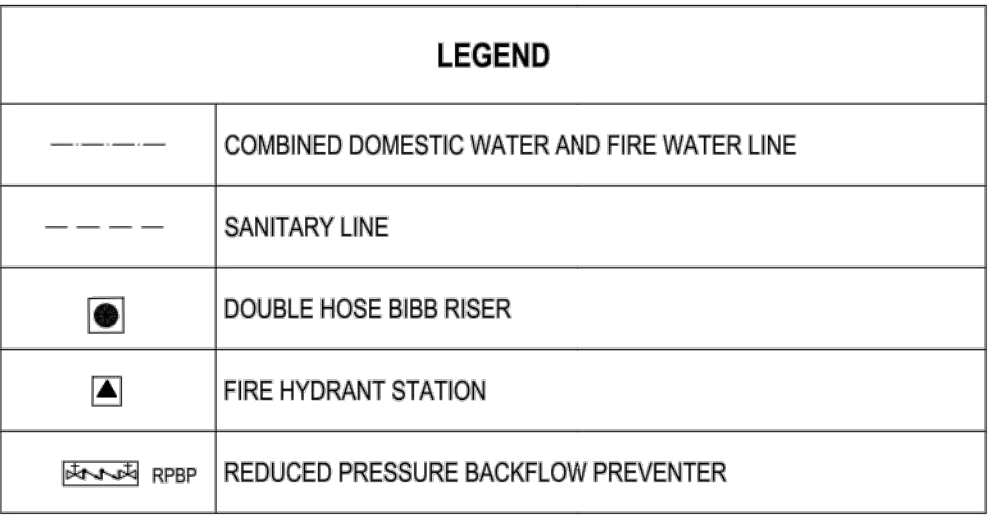
| LEGEND |                                      |
|--------|--------------------------------------|
| ---    | EXISTING SANITARY LINE               |
| ----   | EXISTING COMBINED FIRE & WATER LINE  |
| ----   | NEW DOMESTIC WATER LINE              |
| ----   | NEW FIRE PROTECTION LINE             |
| ●      | DOUBLE HOSE BIB RISER                |
| ▲      | FIRE HYDRANT STATION                 |
| BS-124 | REDUCED PRESSURE BACK FLOW PREVENTER |
| ISOL   | ISOLATION + BLOW OUT VALVES          |

| DRAWING LIST |  |
|--------------|--|
| M-100        | SITE PLAN                                    |
| M-200        | EXISTING PLUMBING AND FIRE PROTECTION LAYOUT |
| M-300        | PLUMBING AND FIRE PROTECTION LAYOUT          |

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DESTROY ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE.

THIS DRAWING SHALL ONLY BE USED WHEN SIGNED FOR THE  
PURPOSE SPECIFIED BELOW.

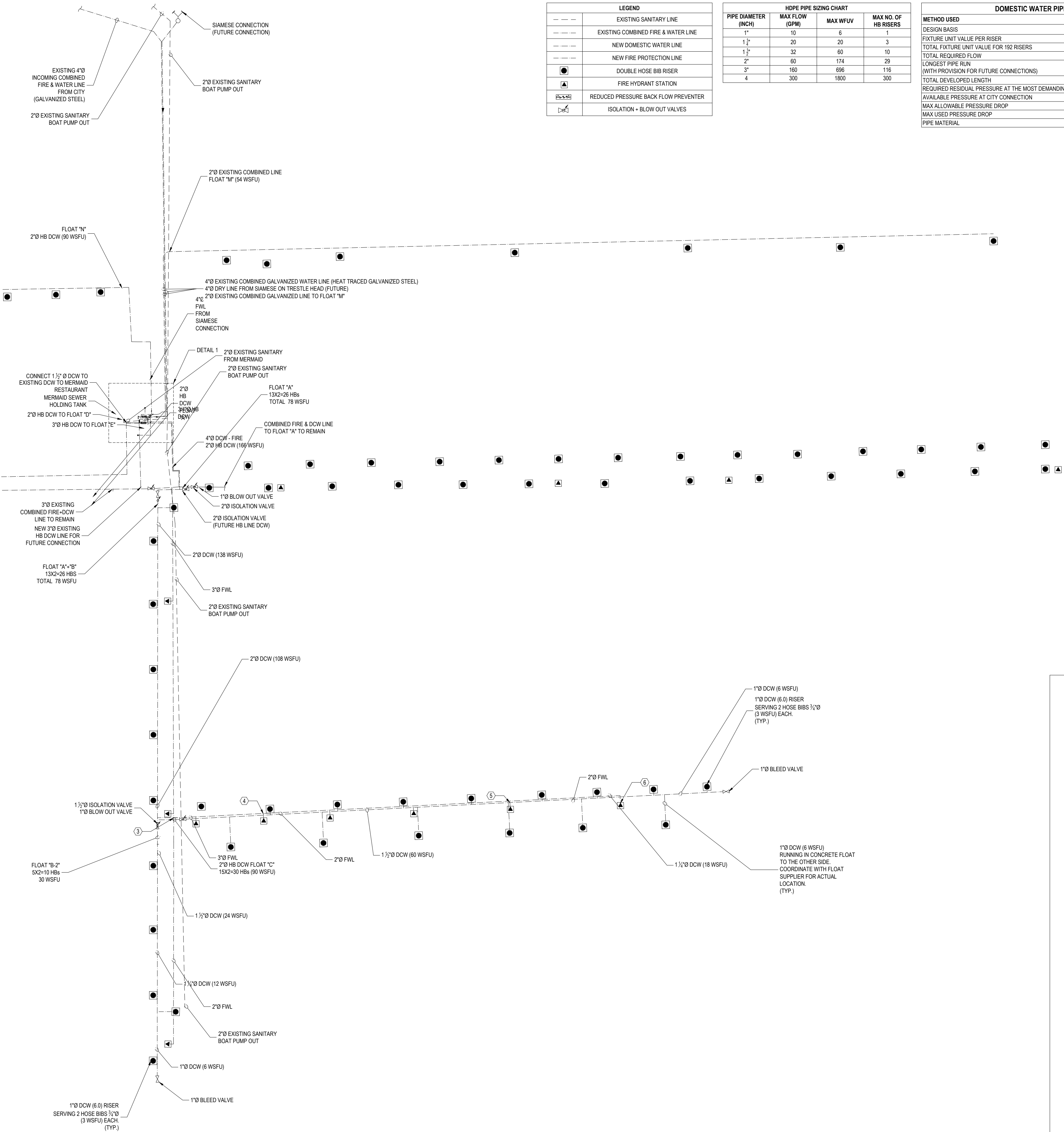
THESE DRAWINGS ARE THE PROPERTY OF THE ENGINEER AND MUST BE  
RETURNED AT COMPLETION OF WORK OR UPON REQUEST.

21 Mar, 2018

950 STANLEY PARK DRIVE  
VANCOUVER, BC

|                                      |              |
|--------------------------------------|--------------|
| SCALE<br>$\frac{1}{48}'' = 1' - 0''$ | DRAWING No.  |
| DATE<br>21 Mar, 2018                 | <b>M-200</b> |





| LEGEND |                                      |
|--------|--------------------------------------|
| ---    | EXISTING SANITARY LINE               |
| ---    | EXISTING COMBINED FIRE & WATER LINE  |
| ---    | NEW DOMESTIC WATER LINE              |
| ---    | NEW FIRE PROTECTION LINE             |
| ●      | DOUBLE HOSE BIB RISER                |
| ▲      | FIRE HYDRANT STATION                 |
| ⚡      | REDUCED PRESSURE BACK FLOW PREVENTER |
| ⚡      | ISOLATION = BLOW OUT VALVES          |

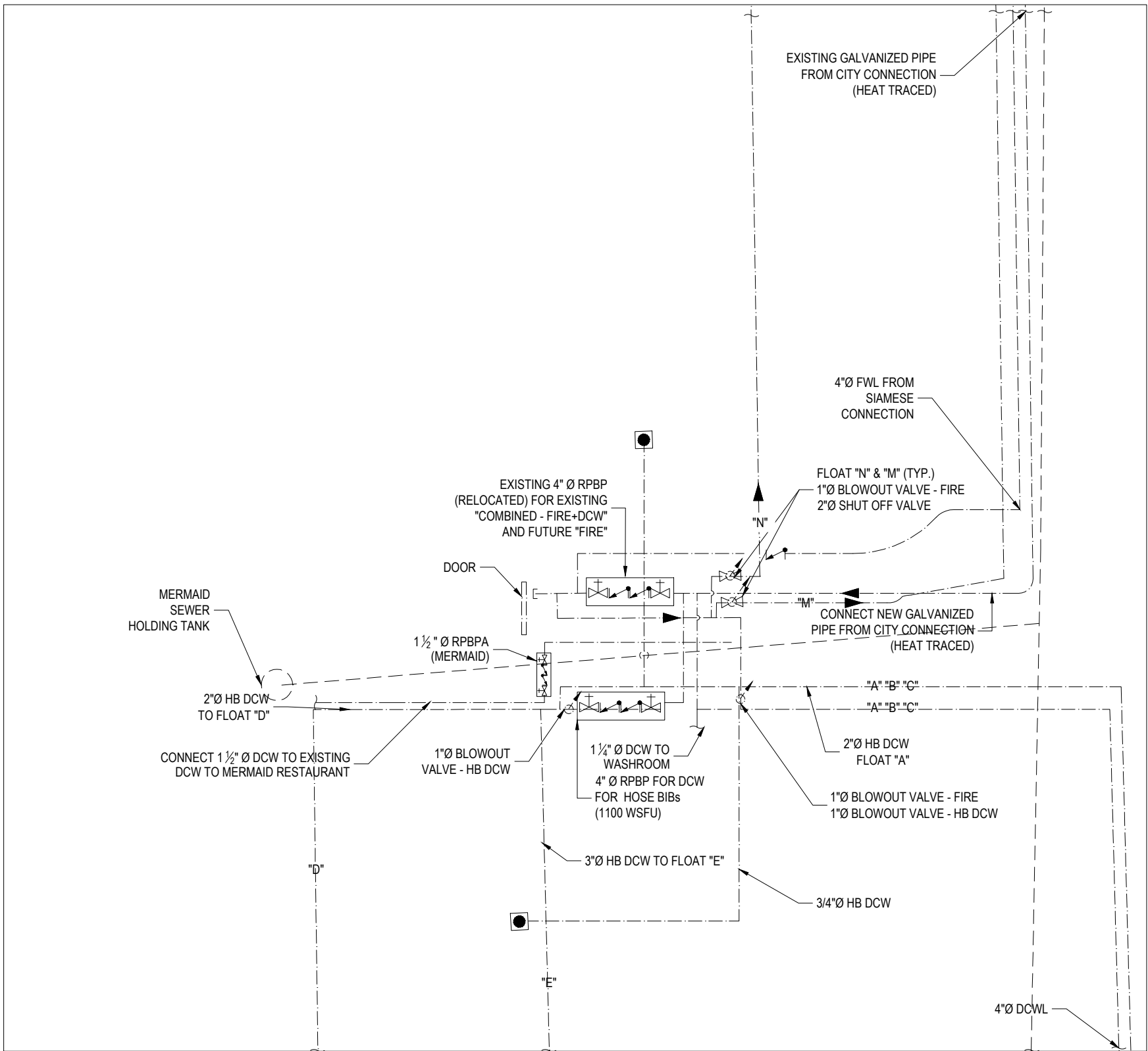
| HDPE PIPE SIZING CHART |                |          |                      |
|------------------------|----------------|----------|----------------------|
| PIPE DIAMETER (INCH)   | MAX FLOW (GPM) | MAX WFUV | MAX NO. OF HB RISERS |
| 1"                     | 10             | 6        | 1                    |
| 1 1/2"                 | 20             | 20       | 3                    |
| 1 1/2"                 | 32             | 60       | 10                   |
| 2"                     | 60             | 174      | 29                   |
| 3"                     | 180            | 696      | 118                  |
| 4"                     | 300            | 1800     | 300                  |

| DOMESTIC WATER PIPE SIZING                               |                      |            |
|--|----------------------|------------|
| METHOD USED  | DETAILED ENGINEERING |            |
| DESIGN BASIS   | 6                    | FU         |
| FIXTURE UNIT VALUE PER RISER                             | 1152                 | WFUV       |
| TOTAL FIXTURE UNIT VALUE FOR 192 RISERS                  | 227                  | GPM        |
| TOTAL REQUIRED FLOW                                      | 2000                 | FT         |
| LONGEST PIPE RUN (WITH PROVISION FOR FUTURE CONNECTIONS) | 3000                 | FT         |
| TOTAL DEVELOPED LENGTH                                   | 15                   | PSI        |
| REQUIRED RESIDUAL PRESSURE AT THE MOST DEMANDING HB      | 110                  | PSI        |
| AVAILABLE PRESSURE AT CITY CONNECTION                    | 3.17                 | PSI/100 FT |
| MAX ALLOWABLE PRESSURE DROP                              | 3                    | PSI/100 FT |
| MAX USED PRESSURE DROP                                   | HDPE                 |            |
| PIPE MATERIAL  |                      |            |

| DOMESTIC WATER - FIXTURE COUNT TABLE     |               |      |
|--|---------------|------|
| 1/2" HOSE BIBB FIXTURE UNIT VALUE = 3 FU |               |      |
| NO. OF HB PER RISER = 2                  |               |      |
| WSFU PER RISER = 3 FU                    |               |      |
| FLOAT                                    | NO. OF RISERS | WSFU |
| FLOAT "A"                                | 27            | 162  |
| FLOAT "B"                                | 10            | 60   |
| FLOAT "C"                                | 15            | 90   |
| FLOAT "D"                                | 8             | 48   |
| FLOAT "E"                                | 22            | 132  |
| FLOAT "F"                                | 6             | 36   |
| FLOAT "G" - NORTH                        | 4             | 24   |
| FLOAT "G" - SOUTH                        | 19            | 114  |
| FLOAT "H"                                | 13            | 78   |
| FLOAT "I"                                | 5             | 30   |
| FLOAT "K"                                | 26            | 156  |
| FLOAT "M"                                | 20            | 120  |
| FLOAT "N"                                | 15            | 90   |
| MAIN FLOAT                               | 2             | 12   |
| TOTAL                                    | 192           | 1152 |

- GENERAL NOTES**
- ALL PIPING MATERIALS SHALL CONFORM TO THE B.C.B.C. 2012 EDITION.
  - ALL SANITARY AND DOMESTIC WATER SHOWN AGAINST EXTERIOR AND DEMISING WALLS SHALL BE FURRED IN AND INSTALLED ON WARM SIDE OF INSULATION AND VAPOR BARRIER. WHERE FURRING IS NOT PRESENT, PROVIDE CAVITY WITHIN BATT-INSULATED WALL FORMED FROM RIGID FOAM INSULATION AND SEAL AIRTIGHT AROUND INSULATED PIPE.
  - PRIOR TO COMMENCING ANY PIPING INSTALLATION WITHIN THE BUILDING, THE MECHANICAL CONTRACTOR MUST CHECK THE SIZES, LOCATION, AND INVERT ELEVATIONS OF ALL CAPPED SERVICES, INCLUDING SANITARY SEWER, STORM SEWER, WATER MAINS, AND GAS MAINS WITH THE CIVIL RECORD DRAWINGS TO ENSURE THAT THESE BUILDING SERVICES CAN BE INSTALLED AS SHOWN.
  - COORDINATE ALL PIPE SLEEVE PLACEMENT WITH GENERAL CONTRACTOR.
  - FIRE STOP ANY PIPES THAT PENETRATE FIRE SEPARATIONS AND SLAB. FIRESTOPPING SHALL COMPLY WITH CAN4-S115-M85 STANDARD.
  - ALL DHW AND DCW FIXTURES AND BRANCH LINES TO BE COMPLETE WITH ISOLATION VALVES.

- SEISMIC NOTES**
- MECHANICAL CONTRACTOR TO PROVIDE STRUCTURAL SEISMIC RESTRAINTS FOR ALL MECHANICAL AND PLUMBING EQUIPMENT TO THE SATISFACTION OF THE SEISMIC ENGINEER. COORDINATE MOUNTING TO BUILDING STRUCTURE WITH THE BUILDING STRUCTURAL ENGINEER.
  - ENGAGE THE SERVICES OF A SEISMIC RESTRAINT ENGINEER TO PROVIDE DETAILS, FIELD REVIEWS AND LETTER OF ASSURANCE AND COMPLIANCE FOR MECHANICAL RELATED EQUIPMENT AND CONNECTED SERVICES. LETTER OF ASSURANCE AND COMPLIANCE TO BE PROVIDED PRIOR TO OCCUPANCY AND SUBSTANTIAL COMPLETION. ALSO, REFER TO SPECIFICATIONS.



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| 1   | MAR 09, 2018                | ISSUED FOR REVIEW    |
| No.   | DATE                        | DESCRIPTION          |
| DESTROY ALL PRINTS DATED PREVIOUS TO FINAL DATE ABOVE.  |                             |                      |
| REVISIONS   |                             |                      |
| THIS DRAWING SHALL ONLY BE USED WHEN SIGNED FOR THE PURPOSE SPECIFIED BELOW.  |                             |                      |
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| <b>TAG</b><br>ENGINEERING INC.<br>#001, 16505 54 Avenue<br>Surrey, BC V3S 1X7<br>PH: 604.790.0579<br>www.tagengineering.ca  |                             | 21 Mar, 2018         |
| PROJECT<br>ROYAL VANCOUVER YACHT CLUB   |                             |                      |
| 950 STANLEY PARK DRIVE<br>VANCOUVER, BC   |                             |                      |
| TITLE<br>PLUMBING AND FIRE PROTECTION LAYOUT  |                             |                      |
| DRAWN<br>MLC  | CHECKED<br>SS               | PROJECT No.<br>13225 |
| SCALE<br>AS NOTED   | DRAWING No.<br><b>M-300</b> |                      |
| DATE<br>21 Mar, 2018  |                             |                      |

## DOMESTIC WATER - FIXTURE COUNT TABLE

$\frac{3}{4}$ " HOSE BIBB FIXTURE UNIT VALUE = 3 FU








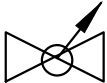
NO. OF HB PER RISER = 2

WSFU PER RISER = 3 FU

| FLOAT             | NO. OF RISERS | WSFU |
|-------------------|---------------|------|
| FLOAT "A"         | 27            | 162  |
| FLOAT "B"         | 10            | 60   |
| FLOAT "C"         | 15            | 90   |
| FLOAT "D"         | 8             | 48   |
| FLOAT "E"         | 22            | 132  |
| FLOAT "F"         | 6             | 36   |
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| FLOAT "M"         | 20            | 120  |
| FLOAT "N"         | 15            | 90   |
| MAIN FLOAT        | 2             | 12   |
| TOTAL             | 192           | 1152 |

### HDPE PIPE SIZING CHART

| PIPE DIAMETER<br>(INCH) | MAX FLOW<br>(GPM) | MAX WFUV | MAX NO. OF<br>HB RISERS |
|-------------------------|-------------------|----------|-------------------------|
| 1"                      | 10                | 6        | 1                       |
| 1 $\frac{1}{4}$ "       | 20                | 20       | 3                       |
| 1 $\frac{1}{2}$ "       | 32                | 60       | 10                      |
| 2"                      | 60                | 174      | 29                      |
| 3"                      | 160               | 696      | 116                     |
| 4                       | 300               | 1800     | 300                     |

| LEGEND  |                                      |
|---|--------------------------------------|
|    | EXISTING SANITARY LINE               |
|    | EXISTING COMBINED FIRE & WATER LINE  |
|    | NEW DOMESTIC WATER LINE              |
|    | NEW FIRE PROTECTION LINE             |
|    | DOUBLE HOSE BIB RISER                |
|  | FIRE HYDRANT STATION                 |
|  | REDUCED PRESSURE BACK FLOW PREVENTER |
|  | ISOLATION + BLOW OUT VALVES          |

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## DOMESTIC WATER PIPE SIZING

| METHOD USED   | DETAILED ENGINEERING |            |
|---|----------------------|------------|
| DESIGN BASIS  |                      |            |
| FIXTURE UNIT VALUE PER RISER                                | 6                    | FU         |
| TOTAL FIXTURE UNIT VALUE FOR 192 RISERS                     | 1152                 | WFUV       |
| TOTAL REQUIRED FLOW   | 227                  | GPM        |
| LONGEST PIPE RUN<br>(WITH PROVISION FOR FUTURE CONNECTIONS) | 2000                 | FT         |
| TOTAL DEVELOPED LENGTH                                      | 3000                 | FT         |
| REQUIRED RESIDUAL PRESSURE AT THE MOST DEMANDING HB         | 15                   | PSI        |
| AVAILABLE PRESSURE AT CITY CONNECTION                       | 110                  | PSI        |
| MAX ALLOWABLE PRESSURE DROP                                 | 3.17                 | PSI/100 FT |
| MAX USED PRESSURE DROP                                      | 3                    | PSI/100 FT |
| PIPE MATERIAL   | HDPE                 |            |