

ROOF TECH 2000 CONSULTANTS LTD.  
PROJECT #: 10-315

CITY OF VANCOUVER - FIRE HALL # 1  
900 HEATLEY AVENUE, VANCOUVER, BC  
YEAR 2010 RE-ROOF(S): RA # 1

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## **1.0 MODIFIED BITUMEN ROOFING SAFETY CONDITIONS AND SAFETY MEASURES**

### **1.1 SAFETY CONDITIONS**

- 1) Contractors are required to maintain a **TWO (2) HOUR MINIMUM FIRE WATCH** at the end of each working day, after open flame roofing application methods have been utilized. All roof areas worked shall be checked for hot spots and signs of smouldering.
- 2) Caution should be taken when working around roof openings, penetrations or flashing. Extreme caution should be exercised when working around exhaust vents that may have grease or lint accumulations. Such accumulations should be cleaned before roofing work is started.
- 3) Torches should be used according to manufacturers' instructions. Torch stands should be used to direct flame upward when momentarily not in use. Torches should not be used near gas lines, electrical wires or flammable liquids. All equipment should be inspected regularly and kept in good working order.
- 4) Contractor should have adequate fire extinguishing equipment. A minimum of five 20-lb. multi-purpose dry chemical extinguishers is suggested. There should be at least one fire extinguisher within 20 ft. horizontal travel distance of any torch-applied roofing equipment. For larger roof areas, additional protection such as charged hose lines or additional extinguishers may be required. (Contractor should be made aware of the location of fire hoses if they are available. Outside faucets from "domestic" water supply may also be useful.)
- 5) **No propane or combustible liquids** are to be left on site and/or any roof areas after roofing crews vacated the work site at the end of the day.
- 6) **All equipment** used for roofing applications must be either removed from the work site at the end of working shifts or the equipment must be secured and rendered immovable and inaccessible, "as is reasonable" to vandals.
- 7) The site is to be secured using all barricades, and/or other materials as are necessary to enclose and isolate the site.
- 8) **In all modified bituminous membrane roofing applications, a "PEEL and STICK" membrane must be used as the first ply stripping on all combustible wall surface areas where fire damage may occur.**
- 9) All other normal site safety concerns, that are either stated elsewhere within this specification, and/or are required and/or implied by others, are to form part of the safety requirements.

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## 1.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY CONDITIONS AND SAFETY MEASURES (CONTINUED)

### 1.2 SAFETY CONDITIONS

- |    |    |   |                     |
|----|----|---|---------------------|
| 1. | .1 | Observe and enforce construction safety measures required by Part 8 of NBC 1990, Provincial Government, Work Safe BC of B.C. and municipal statutes and authorities.  | Construction Safety |
|    | .2 | In event of conflict between any provisions of above authorities the most stringent provision will apply.   |                     |
|    | .3 | Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.   |                     |
| 2. | .1 | Comply with all Provincial and local Fire Safety Regulations. The section 5.0.1 Safety Precautions – Torching published in the Roofing Contractors Association of B.C. “Roofing Practices Manual” form part of this Specification.  | Fire Safety         |
| 3. | .1 | The Contractor shall comply fully with all WHMIS (Workplace Hazardous Materials Information System) requirements. In addition, provide to the Owner, prior to commencement of the work, one complete set of current MSDS (Material Safety Data Sheets) for all materials to be used on this job site. | WHMIS Requirements  |

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## 2.0 MODIFIED BITUMEN ROOFING

## SAFETY PRECAUTIONS

1. Modified bitumen roofing membranes represent the latest in the evolution of bituminous roofing systems. However, some systems require that applicators use a propane-fueled open flame torch to adhere the membrane. When working with an open flame on the construction site, applicators must use extreme caution to prevent accidents. Carelessness could lead to loss of property or life.

Torching

This section contains precautions for applying modified bitumen roofing. The applicator will find proper procedures for working with equipment of the jobsite, and dealing with personnel.

NOTE: If a fire occurs for any reason, call the Fire Department immediately, even if you put out the flames. Some material may smoulder for hours before bursting into flames, and could be smouldering in places where the layman may not think to look. Let the fire fighters do their job. Safety is no accident.

2. .1 Applicators use an open flame to soften the bitumen of the underside of the membrane to make it adhere to the roofing substrate. At a temperature of 1100°C (2000°F), the flame produced by liquid propane gas does an excellent melting job. But used incorrectly or carelessly, the flame could damage the roof or the buildings and seriously injure the applicator.

Equipment

Applicators should receive training in proper application, maintenance and safety procedures when handling torching equipment.

Operators should handle their equipment carefully. Protect the soft brass valve of the gas cylinder. It is easy to crack or break it. A broken valve could turn the cylinder into a torpedo. Check all cylinders before refilling. Never overfill a cylinder. It could explode.

All applicators of modified bitumen should participate in the safety and training program.

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

2. .2 a) Use well-built durable products that feature safety devices and are listed by Underwriters Laboratories of Canada (ULC).
- b) Follow the Manufacturer's safety and operating instructions provided with the torch system.
- c) Check all equipment for wear. Repair and/or replace as necessary.
- d) Use soap solution to test for gas leaks before lighting, then check for the proper operation of the torch.
- e) Check all fittings and other equipment on the applications equipment for leakage.
- f) Be sure that torch equipment is in good working order and that the cylinder valves are clean.
- g) Stop work and shut off flame if propane odour is detected.
- h) Stop work and make repairs if a leak occurs.
- i) Keep non-applicators at least 3 m (10') from the flame.
- j) Protect your equipment: store it in a tool box.
- k) Do not use matches or cigarette lighter to test for gas leaks.
- l) Containers which hold or may have held flammable material must be kept clear of the torch or other heat sources.
- m) Do not use equipment that has been damaged or that is in need of repair.

General

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

- |    |  |            |
|----|--|------------|
| 2. | .3 a) Protect cylinder valves; where possible use cylinders that have valve protection welded to the cylinder.                                       | Tanks      |
|    | b) Propane tanks are pressurized – do not puncture or subject to extreme heat.   |            |
|    | c) Secure propane tanks in an upright position and place them at least 3 m (10') from the open flame.  |            |
|    | d) Increase the size of the bottle or cylinder to keep frosting from occurring.  |            |
|    | e) Close the propane cylinder valve first and let the remaining gas burn out of the hose before closing the torch valve when shutting off the torch. |            |
|    | f) Plug the valve with a plastic plug when cylinder is not in use.   |            |
|    | g) Do not turn a vapour cylinder on its side to increase pressure – liquid could escape.   |            |
|    | h) Do not heat a cylinder to increase pressure.  |            |
|    | i) Do not fill gas cylinder or bottle in need of repair.   |            |
|    | j) Do not tighten the brass fittings too tightly with a wrench.  |            |
| 2. | .4 a) Use an adjustable ULC listed regulator with the torch.   | Regulators |
|    | b) Make sure flow of gas through the regulator is in the proper direction. Directional flow is stamped on regulator.                                 |            |
|    | c) Keep vent in pressure regulator clear at all times.   |            |
|    | d) Use a pressure gauge on every regulator.  |            |

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

2. .4 e) Do not use an adjustable regulator with a higher pressure range than the one that came with the torch.
- f) Do not operate any pressure gauge beyond the top of its scale or near excessive heat (above 65 Celsius) or where there is excessive vibration.
- g) Do not use equipment without an operating pressure gauge.

Regulators (Continued)

2. .5 a) Check hoses for wear and tear.
- b) Use only hoses listed for liquid propane gas.
- c) Use less than 15 m (50') of hose at one time.

Hoses

2. .6 a) Use an adjustable pilot light with a complete shut-off.
- b) Use a torch stand to direct flame upward when not in use.
- c) Use only torch machines equipped with the same safety features as described for torches. They should also have individually adjustable torches. Use only torch trolleys and multiple head machines with approved safety valves.
- d) Ignite burner with a flint or electronic lighter. Matches or disposable lighters are unsafe substitutes.
- e) Treat the torch as if it is always burning. On bright days it is very hard to see the flame, and when working around mechanical equipment, it is impossible to hear the torch operating.
- f) Be very careful when working with torches in areas where you cannot see. Pull material away, heat it, and then apply it to the flashing.
- g) Do not leave lighted torch unattended.
- h) Do not lay an operating torch over the edge of a roof.

Torches

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

- |    |  |                     |
|----|--|---------------------|
| 2. | .6 i) Do not use a trowel as a torch stand.  | Torches (Continued) |
|    | j) Do not lay an operating torch to rest on a gas cylinder. If there is a gas leak in the cylinder area, there could be a fire.  |                     |
|    | k) Do not play with a torch. A flame can be hard to see on a bright day and can ignite skin or clothing instantly.   |                     |
| 2. | .7 a) Have at least one Class ABC fire extinguisher within 6 m (20') of each worker using the torch.   | Extinguishers       |
|    | b) Train each worker in the proper use of the fire extinguishers.  |                     |
|    | c) Direct the stream from a dry chemical-type fire extinguisher at the base of the fire from a distance of at least 3 m (10'). Sweep the fire away from you, starting at its nearest point and moving the chemical stream toward the farthest point.   |                     |
|    | d) Do not try to put out a cylinder fire if it cannot be done without tipping the cylinder. Let it burn and call the Fire Department.  |                     |
|    | e) Do not place fire extinguisher too close to liquid propane gas equipment. If fire results, you may not be able to get at fire extinguisher to put out the fire.   |                     |
| 2. | .8 Each building is different from every other building, and each roof design presents a new set of challenges to the Roofing Contractor. The applicator of modified bitumen systems must adapt his standard safety procedures to meet the special requirements of the current job. However, roofers should follow the basic rules presented in these pages. | BUILDINGS           |

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

### 2. .8 (Continued)

The job supervisor should take extra care when working on the modified bitumen roofing job. The supervisor should walk the job one hour after all torches have been extinguished. The delay will help guard against a smouldering fire going undetected at the end of the work day. Check for potential “hot spots” – especially cants, wall flashings, and around penetrations such as vent pipes, intake vents and skylights.

Applicators must take special care when torching at flashings, corners, or voids in the roof deck. Never torch directly at these locations. Always torch the membrane and then adhere it to the corner or joint.

### BUILDINGS (CONT'D)

2. .9 a) Install metal flashing on penetrations or flashings with a tight fitting felt collar before torching.

General

b) Shut down air conditioning units, exhaust fans and air intake fans in the work area at the roof control.

c) Do not work in an enclosed area where gas can accumulate.

2. .10a) Use perlite, fiberglass, or concrete cant strips if cant strips are required.

Substrates

b) Use glass or organic base sheet on all wood decks and over flammable insulation, cant strips or other flammable surfaces.

c) Look for any void, hole or gap in substrate and fill with non-combustible or perlite cant strip.

d) Use a base ply over all flammable insulation surfaces and edges and over all joints between rigid insulation boards. The base ply provides a protective covering for underlying combustibles.

e) Install a base ply or a layer of roof insulation, acceptable to the membrane manufacturer, to separate polyurethane or polyisocyanurate roof insulation from the modified sheet and the torch.

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

2. .10f) Install a base ply over all flammable surfaces and rigid board insulations. Be sure base ply fits tightly around all roof deck openings and turns up the wall, so the flame cannot flash down and start a fire underneath the deck.
- g) Do not torch to wood fiber insulation, cant strip, wood or any flammable material.
2. .11a) Follow the Manufacturer's recommendations on torching to insulation and recover board surface.
- b) Use a small torch when flashing near details.
- c) Shield air conditioning units and other protrusions with perlite panels or similar material when using the torch around them.
- d) Heat the membrane away from air conditioning units, fans, soil pipes and all other protrusions. Care must be taken to avoid flame being pulled into the building interior.
- e) Feather seams around details with hot trowel, not open flame.
- f) Heat membrane and then attach to flashings, corners, or voids in the roof deck. Never torch directly.
- g) Use caution when torching near pipes in the event there is suction present.
- h) Do not torch anything you cannot see such as under air conditioning units or behind counter flashing.
- i) Do not torch near gas lines or near electric wires (such as around roof top equipment, etc.).
- j) Do not torch around flammable vents or plastic projections.

Substrates (Continued)

Torching Methods

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

2. .11k) Do not point the torch under roof top equipment.
- l) Do not point the torch down open roof penetrations.
  - m) Do not point the torch into corners or roof edges where dried wood or fiber may ignite (such as wood blocking or cant strip).
  - n) Do not point the torch at low flashings where there is an overhang and flame could get up under the counter flashing, such as around skylights or prefabricated curbs with fiberboard sidewall insulation.
  - o) Do not apply modified bitumen products directly over exposed conduits or pipes lying on the roof deck.
  - p) Avoid prolonged contact with heat sensitive metals such as lead, as overheating of these metals could ignite underlying flammable services.
  - q) Do not lay an operating torch directly onto the membranes – there is danger both of fire and of damaging the membrane.
  - r) Do not lay an operating torch on an open penetration on the roof. If the penetration is part of an air intake system, the flames could be sucked into the building.

### Torching Methods

2. .12 Many construction-industry tradesmen use open flames or flame tools in their jobs. Heating and air conditioning contractors, welders and plumbers all use open flame at the job site. These professionals are responsible for the safe use of their tools, just as the roofing contractor is responsible for the safe application of the modified bitumen roofing systems.

### Personnel

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

### 2. .12 (Continued)

Contractors must not only train their own men in using open flame application, but must also make sure the general contractor and his superintendents are familiar with the necessary safety precautions for using torch application of roofing membrane.

Personnel (Continued)

Some of the safety precautions will be considered unpleasant, such as wearing long-sleeve shirts and long pants in the summer, but the results, - a safe, injury-free job site – are worth the effort.

### 2. .13a) Wear proper clothing: non-synthetic fabrics, long-sleeve shirt, long pants, boots, gloves and proper eye protection.

General

b) Keep non-applicators at least 3 m (10') from open flame.

c) Train, instruct, and warn employees on the use or torching equipment.

d) Use extra caution around edges of insulation board. Cover exposed edges with inflammable base ply to prevent flame from coming in contact with any flammable material. Contact for any length of time with lead or other materials affected by heat should be avoided.

e) Do not take anything for granted. Be on guard against lapses in on-the-job safety.

### 2. .14 For years Fire Departments have been learning the proper safety precautions necessary to prevent fires. Their expertise and assistance should be utilized whenever possible to supplement a company's safety training program. By making the local fire department a part of your team, you are giving notice that in all cases Safety Comes First.

Fire Department

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## 2.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## SAFETY PRECAUTIONS (CONTINUED)

2. .15a) Strict compliance with local fire codes must be maintained.
- b) Give written notice to the local Fire Department where required, and obtain any necessary permits.
- c) The required number of fire extinguishers shall be on the roof at all times. They shall be Class ABC extinguishers of the size specified by the local fire code; one per each torch operator.
- d) Install portable smoke detectors in attics as required by the local Fire Department.
- e) Foremen on the job shall have fire safety training and shall remain at job site at least one hour after the application has ended for the day.
- f) No flammable liquids shall be stored or used on the roof excluding liquid propane gas in approved containers. All liquid propane gas not in use shall be stored on the ground.

Fire Department Recommendations

REPORT ALL FIRES TO THE FIRE DEPARTMENT, EVEN THOSE THAT ARE EXTINGUISHED QUICKLY. THERE MAY STILL BE FIRE AND/OR SMOULDERING IN AREAS WHERE A LAYMAN MAY NOT THINK TO LOOK.

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### 3.0 MODIFIED BITUMEN ROOFING & SHEET METAL CLADDING/ FLASHING

### SCOPE OF WORK

- |  |   |
|--|---|
| <p>1. The Contractor shall furnish all labour, materials and equipment necessary to remove and dispose of existing roofing materials, flashings, etc. to the existing deck and/or walls as required. Rework and prepare all decks, perimeters, and walls as required to facilitate the written Specifications, Roof Plans and Details enclosed.</p>  | <p>Labour, Materials &amp; Equipment</p>      |
| <p>2. The Contractor to furnish all labour, materials and equipment deemed necessary to install new wood, roof system, sheet metal flashings and components, etc., as required by the written Specifications. Roof Plans and Details attached.</p>   |   |
| <p>3. The Contractor to supply all protection deemed necessary to grounds, structure and persons involved.</p>   | <p>Protection</p>                             |
| <p>4. All materials, roofing or otherwise, to be installed by qualified "BC licensed trades people." Roofing crew to have a minimum of sixty (60%) percent journeymen with past experience applying the products specified.</p>  | <p>Qualification of Crew</p>                  |
| <p>5. Manufacturer's certification of crew members confirming past experience will be required prior to start-up of Work as related to the Modified Bitumen Membranes, and / or Sheet Metal Flashing.</p>  | <p>Certification of Crew</p>                  |
| <p>6. .1 Upon completion, submit to Owners a ten (10) year RCABC Guarantee.</p>  | <p>GUARANTEES / WARRANTIES<br/>Contractor</p> |
| <p>.2 Upon completion, the Membrane and/or Sheet Metal Manufacturer, care of the "Roofing Contractor", to provide Owners with a written ten (10) year Guarantee for membrane manufacturer defects including granule loss.</p>  | <p>Membrane</p>                               |
| <p>7. Only those products listed in the following roof system components, and/or materials listing, are acceptable for use in this Specification. Inclusion of a non-specified product(s) may result in the rejection of the affected work. Correction of the rejected work shall be undertaken at no cost to the Owners and the satisfaction of the Consultant and/or his Representative.</p> | <p>Acceptable Products</p>                    |

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#### 4.0 MODIFIED BITUMEN ROOFING & SHEET METAL CLADDING / FLASHING

#### PROCEDURES & INSTRUCTIONS FOR ROOF SYSTEM RELATED WORK

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|--|--|
| <p>1. .1 All inspections are to be on a one (1) per thirty (30) squares bases. (10' X 10' = 1 square)</p> <p>.2 All occurrences on site are to be documented in the daily reports and include photos.</p> <p>.3 All extras and changes to work are to be confirmed by the Owner's Representative prior to the work being done.</p> | <p>Quality Control Inspections</p>             |
| <p>2. All work must be continuous from start to completion as to be negotiated and agreed upon between Owners, Contractors and Roofing Consultant prior to start up of Work, with crews of adequate size and experience on each site as will be required to facilitate completion of the Contracts as agreed upon.</p>             | <p>Sequence of Work / Crew Quantity</p>        |
| <p>3. All roof top unit, plumbing, electrical, phone, gas, etc. disconnections and reconnections, both labour and materials are to be included in this Tender. All materials and work are to be provided by the Contractor.</p>  | <p>Related Work Connections, Plumbing, Gas</p> |
| <p>4. All damage to plumbing, electrical, phone, gas, etc., due to penetrations of screws, nails, etc., are to be repaired to original standards as required to the satisfaction of the Owners' Representative.</p>  | <p>Plumbing, Electrical - Damage</p>           |
| <p>5. All damage during the performance of the Work to the interior or exterior structure or grounds, walls, sidewalks, etc., is to be cleaned, or repaired to the satisfaction of the Owner's Representative at the Contractor's own cost.</p>  | <p>Structure, Ground - Damage</p>              |
| <p>6. Access to the interior of the structure is to be supplied as required to perform work as related to this Contract ONLY. Phones and interior washrooms are NOT to be used without prior permission of the Owners' Representative.</p>   | <p>Access to Structure</p>                     |

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#### **4.0 MODIFIED BITUMEN ROOFING & SHEET METAL CLADDING / FLASHING (CONTINUED)**

#### **PROCEDURES & INSTRUCTIONS FOR ROOF SYSTEM RELATED WORK (CONTINUED)**

- |     |  |                      |
|-----|--|----------------------|
| 7.  | Contractor is to provide all on site sanitary requirements.  | Sanitary Facilities  |
| 8.  | The Contractor shall make provisions with the Owner for domestic power and/or provide generators as required.  | Electrical Power     |
| 9.  | All materials shall be new unless specific written approval has been given by Specifying Authority for any component.  | New Materials        |
| 10. | The Contractor shall obtain permits, pay all fees therefore, and comply with all Provincial and Municipal and other legal regulations and by-laws as applicable to the Work. If no local regulations, comply with the National Building Code of Canada, latest revision.   | Permits, Regulations |
| 11. | The location of existing features has been determined from available records, but is not guaranteed. The location of all such features shall be investigated and verified in the field by the Contractor.  | Existing Features    |
| 12. | Protect existing road, paving, buildings, finished surfaces, equipment, trees, lawns, utilities, heating, lighting, power and telephone services during the Work. Make good, repair or replace any damage to Owner's approval.   | Protection           |
| 13. | Provide, maintain and remove on completion, hoardings, barriers and warning signs for the protection of workmen and the public as required and approved by the Specifying Authority. All the necessary precautions shall be taken to protect the public at all times. No hoisting or lowering of roofing materials will be permitted in areas accessible to the public or employees. | Climatic Conditions  |
| 14. | Provide protection at all times against weather so as to maintain work, material, equipment and property free from injury or damage and as necessary ensure work is carried out expeditiously in accordance with agreed time schedule and completion date.   |                      |

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#### 4.0 MODIFIED BITUMEN ROOFING & SHEET METAL CLADDING/ FLASHING (CONTINUED)

#### PROCEDURES & INSTRUCTIONS FOR ROOF SYSTEM RELATED WORK (CONTINUED)

- |   |                        |
|---|------------------------|
| 15. Parking for workmen employed on the Work shall be restricted to the area assigned for the purpose by the Owner or Authority having jurisdiction.  | Parking                |
| 16. All roof areas to be made water-tight as soon as possible before proceeding. No roof system components to be removed which are greater in area than can be made water-tight under climatic conditions existing at the time  | Procedure              |
| 17. Access to buildings roofs are to be confirmed by: Owner's Representatives.  | Access to Work         |
| 18. To minimize odour from plant, keep the length of operations to a minimum. Locate odour producing equipment away from mechanical vents, intake ducts and/or prevailing winds which will redirect fumes.  | Odours                 |
| 19. Contractor shall ensure that the work is carried out in such a way as to inconvenience as little as possible the proper functioning of the premises.  | Sequence of Work       |
| 20. It is intended that the Contractor attends the site during normal daytime working period and no restriction will be made on the general continuity of his work. If a major restriction on operation is required due to unforeseen circumstances, it shall be recorded and signed for by the Owner Representative and subject to additional costs.   | Daily Working Period   |
| 21. This Contractor shall provide protection to the property and the surrounding properties under this section, from damage resulting from his work, particularly during the removal of any of the existing roofs. All damages caused by this Contractor shall be made good by him at no cost to the Owner. The Contractor shall maintain adequate fire suppression equipment on roof area and for all torch applied roofs shall also <b><u>maintain a minimum two (2) hour fire watch standby</u></b> after work operations have ceased for the day, and/or when fire is at a risk | Protection of Property |

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#### **4.0 MODIFIED BITUMEN ROOFING & SHEET METAL CLADDING/ FLASHING (CONTINUED)**

#### **PROCEDURES & INSTRUCTIONS FOR ROOF SYSTEM RELATED WORK (CONTINUED)**

- |     |  |                                 |
|-----|--|---------------------------------|
| 22. | This Contractor shall maintain the site in as clean a condition as possible, to the satisfaction of the Consultant during his work daily, and shall remove from this and the surrounding properties, any debris from his work on the completion of the job. Failure to do this will result in this cleaning and removal being instituted by the Owner and the cost then deducted from the amount owing this Contractor.  | Clean-up                        |
| 23. | <p>.1 All demolished material to be carefully contained and removed by chutes or other approved means from roof surfaces in order of procedure. Demolished materials are to be deposited in secure and tarped containers.</p> <p>.2 Disposal containers are to be located in only those areas that do not interfere with the daily operations of the building.</p> <p>.3 All disposal containers must be cordoned off utilizing ultra-visible combination of flags, ropes and / or barricades, to comply with Work Safe BC requirements regarding public safety.</p> <p>.4 No stock piling of roofing debris on existing roofs or ground will be permitted.</p> <p>.5 To prevent fire and / or vandalism, disposal containers are to be removed from the site immediately upon filling and to be tarped and secured if partially filled and left overnight. All related liability will be included in the Contractor's responsibilities.</p> <p>.6 Any disposal container left on site, without the presence of the roofing crew, must be located a minimum of ten (10) meters away from the building wall or roof overhang, unless otherwise approved by the Owners Representative.</p> | Demolition, Debris and Disposal |

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**4.0 MODIFIED BITUMEN ROOFING &  
SHEET METAL CLADDING/ FLASHING  
(CONTINUED)**

**PROCEDURES & INSTRUCTIONS  
FOR ROOF SYSTEM RELATED  
WORK (CONTINUED)**

- .7 Common areas surrounding the work site must be kept clean at all times. **Daily clean-up and disposal of all debris is MANDATORY.**

**Note:** Fire related vandalism and unauthorized access to the roof areas is of paramount concern and all stipulations will be rigidly enforced.

24. Storage of the specified roof replacement products are restricted to only those roof areas governed by this Contract.

Storage

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## 5.0 MODIFIED BITUMEN ROOFING

## PROCEDURES AND INSTRUCTIONS FOR ROOF SYSTEM COMPONENTS

- |    |    |   |  |
|----|----|---|--|
| 1. | .1 | Provide two plies 12 lb, Type 4, fibreglass felt, mopped throughout the mainfield roof area, as required for waterproofing.   | TEMPORARY ROOF SYSTEMS / VAPOUR BARRIERS |
|    | .2 | Tape all joints and perimeters, etc. as required to prevent asphalt drippage.   | Steel & Gypsum Decks                     |
|    | .3 | Glazing will be required for all installed membranes, due to rain and/or areas that are not going to be completed within the same day. Prior to glazing ensure that the areas are watertight, therefore stripping and/or other necessary procedures will be as required. All moppings and glaze coats to be 100% coverage of asphalt, hot enough to saturate the membrane substrate. Coverage as required so that the membranes are not exposed.  |  |
| 2. |    | The following are the categories of drains to be used within this Re-roof Program:  | DRAINS                                   |
|    | .1 | All existing cast iron drains are to be reused complete with new lead sheets. Upgrade all securements clamping rings and screens as required.   | Cast Iron                                |
|    | .2 | All roof areas drained by means of interior drains are to have an equal number of shop formed 24 oz copper flange type overflow drains protruding at a downward angle two inches beyond the perimeter fascia. Caulk sheet metal as required. See the typical detail.  | Overflow Drains                          |
|    | .3 | Overflow scupper type to be shop formed 24 oz. (689 gram) copper, braised and/or silver soldered only.  | Scupper Drains                           |
| 3. |    | All existing plumbing vent stacks are to be extended a minimum of 12" above the finished roofing systems. All plumbing vent stacks are to have new shop formed and/or pre-manufactured 32 oz copper, or 14 gauge aluminium sleeves complete with settle caps. All sizes to be compatible with existing. Copper is to be brazed or silver soldered only, aluminium is to be welded. Vent flashing sleeves are to be 12" high and have a 6" wide retainer flange with pre-punched holes for securement at 4" o.c. See the Typical Detail. | Plumbing Vent Stacks                     |

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## 5.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## PROCEDURES AND INSTRUCTIONS FOR ROOF SYSTEM COMPONENTS (CONTINUED)

4. Curbs and all components to be extended as necessary to comply with required new curb heights, municipal standards, drawn details and roof plans.

Heat / Air Vents

5. .1 All interior walls are to be clad with 5/8" treated and primed plywood (see details) secured with galvanized screws and/or pins as required, and sealed with stripping plies and flashings that extend 2" above the exterior perimeter walls with a minimum of 12" above the finished roof systems. All structural block mortar joints, stucco, wood or steel wall cladding is to be cut as required to facilitate this installation.

Interior Walls

.2 **Self-adhesive membrane stripping must be used on all interior combustible wall surfaces.** Preheating only, of this stripping membrane is allowed. No open flame application is to be used on any combustible interior wall surface directly above roofed area.

**Note: A minimum of a two (2) hour fire watch is required after all torch application procedures.**

6. All exterior perimeters are to be built up and sloped towards the roof system, as and if required, to a minimum of 4" above the highest point of the finished roof system. All perimeters of each roof area are to maintain one level throughout. All adjacent roof areas that are on the same level are to have perimeters of equal height unless otherwise noted.

Exterior Perimeters

7. Sheet metal fascia other than noted on roof plans are to be 24 ga. galvanized iron baked enamel finish. All fascia metal widths greater than 8" are to have reverse cross breaks incorporated. Panels are to equal the existing metal coverage plus a minimum 1 1/2". All exterior fascia drip edges are to be secured to structure with continuous clips, secured using screws and/or drill & pin and have a minimum one ply base sheet underlayment running from four (4") inches beyond the interior wall to down the outside fascia to under the continuous clip.

Exterior Fascia

8. Remove and dispose.

Existing Insulation

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## 5.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## PROCEDURES AND INSTRUCTIONS FOR ROOF SYSTEM COMPONENTS (CONTINUED)

9. Prior to the installation of any new roofing system the roof deck is to be evaluated to verify that its condition is capable of supporting the new system. Existing Decks' Condition
10. .1 All extras are to be recorded by the roofing foreman and approved, in writing, by the Consultant or Owner's Representative, daily.
- .2 **System:** Upon completion of each roof area, to second ply membrane and first ply stripping stage plus components, i.e. drain leads, vent flashings, etc., the roof area is to be subjected to a 'free flow' flood test. Drains are not to be blocked allowing water to run from all surfaces to drains, and areas are to be evaluated for ponding. All areas that retain standing water are to be upgraded with layers of membrane and/or fiberboard to eliminate standing water. All additional labour and materials are to be included in this Tender and not deemed extra to the Contract. Ponding
- .3 **Ponding is defined as an area that contains standing water for a time which will result in stains, plant or algae growth developing on the roof surface.** Definition of Ponding
11. The Contractor to submit unit prices to provide for levelling in ponded locations one (1") inch and 7/16" x 100 sq. ft (1 sq.) permaboard in this Tender. All extras are to be recorded by the roofing foreman and site inspector, daily. Overlay
12. All roof areas require Polyisocyanurate insulation and are to be mopped to the substrate with hot asphalt in two layers, totalling an 'R' value of 'R-20'. Polyisocyanurate Insulation
- .1 Joints are to be staggered at butt and side joints of underlying insulation layers.

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## 5.0 MODIFIED BITUMEN ROOFING (CONTINUED)

## PROCEDURES AND INSTRUCTIONS FOR ROOF SYSTEM COMPONENTS (CONTINUED)

### Permaboard

13. Install Permaboard over Polyisocyanurate insulation. Adhere using 100% coverage of hot asphalt.
- .1 Side and butt joints are to be staggered with the insulation below.
  - .2 Nail Permaboard to all wood surfaces to receive torch applied membrane at 12" o.c. Fasten with large head Simplex nails.
  - .3 Tape all joints at horizontal / vertical transitions using 6" 'Peel and Stick' tape.

### Curbs and Sleepers

14. All existing protrusions through the roof deck are to be built up with wood and are to be extended to a height of 2" above the perimeter of each roof area with a minimum of 10" above the finished roof system. Extend all metal liners, etc., as required to equal existing.

### Plywood to Walls

15. Install plywood and secure to all block and/or concrete walls using 'drill and pin' type fasteners and to steel, stucco, and wood walls using appropriate length and type of screws as required to provide a secure substrate.

### Wood, General

16. Construction grade, treated and free of deterioration. Coat all surfaces to receive asphalt with primer, sizes to conform to site requirements, roof plans, written specification and details.

### Sheet Metal Flashings

17. Over completed stripping plies, supply and install 24 gauge galvanized iron baked enamel sheet metal flashings as per written Specifications, Roof Plans, Details and as required to complete as intended; colour to be pre-approved in writing by owner's representative. All tendered colours to be only as supplied by manufacturer's standard range of stock colours. The installation criteria are as follows:
- .1 Re & re all existing sheet metal flashings secure with screws. Further, provide touch up paint as required.

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## MATERIALS

### 6.0 MODIFIED BITUMEN ROOFING

1. Construction grade, free of deterioration, and pressure treated. Coat all surfaces to receive modified bituminous membranes with primer, sizes to conform to site requirements, Roof Plans, written Specifications, Details and as required to suit site conditions.
2. S.B.S. / modified bituminous primer compatible with membranes.
3. To be galvanized and of the appropriate size and type.
4. To be HAL Industries permaboard or equal.
5. Overflow scupper type to be shop formed 24 oz. (689 gram) copper, braised and/or silver soldered only.
6. Shop formed or manufactured “stacks and caps” to be 32 oz. copper or 14 gauge aluminium welded, braised or silver solder only. DO NOT use tin solder. Set flange in a trowel coat of mastic.
7. Alternate stripping for combustible wall surfaces. 3.0 mm 180 g/m<sup>2</sup> non-woven polyester fleece plus glass grid, top surface is covered with a thermofusible plastic film and the bottom side contains a self-adhesive surface CGSB 37GP56M, Type-2, Class-C, Grade-2. This self-adhesive membrane must be used on all interior combustible wall surfaces as the first ply stripping. **NO OPEN FLAME** torch welding is allowed on the first ply stripping to those areas.
8. To be 4.0 mm 250 g/m<sup>2</sup> non-woven polyester fleece, top surface is covered with coloured ceramic granules and the bottom surface has a thermofusible plastic film for torch welding application CGSB 37GP56M, Type-1, Class-A, Grade-2. Colours to be pre-approved, in writing, by Owner’s Representative.
9. Mastic, compatible to S.B.S. modified bitumen membranes.
10. To be 6” wide strip of No. 15# perforated asphalt felt. Back coat **only**.
11. To be 6” wide strip of Peel and Stick tape with poly-release on bottom and sanded surface on top.

Wood

Primer

Fasteners

Permaboard

Scupper/Drains

Plumbing Vent Stacks

(Torch applied) Base Sheet for “Combustible”  
Walls

**Note:** A Minimum two (2) hour fire watch is required for all torch applications.

(Torch applied) Granulated Cap Sheet Mainfield  
Membrane and Stripping Ply

Mastic

Tape

Peel & Stick Tape

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**6.0 MODIFIED BITUMEN ROOFING  
(CONTINUED)**

12. Asphalt to C.G.S.B. standard A123.7= 1973, Type 3, bearing manufacturer's identification label stating asphalt type and maximum temperature. Tankers to have supplier verification on site.
13. To be galvanized and of the appropriate size and type.
14. Silver solder and/or weld.
15. To be Schnee-Morehead SM7100 (or equal) colour to match materials in use.
16. Mastic compatible to S.B.S. Modified Bitumen membranes.
17. To be copper Napthate or equal.
18. Drill and pin type or equal.

**MATERIALS (CONTINUED)**

Bitumen (Blown Asphalt)

Screws and Nails

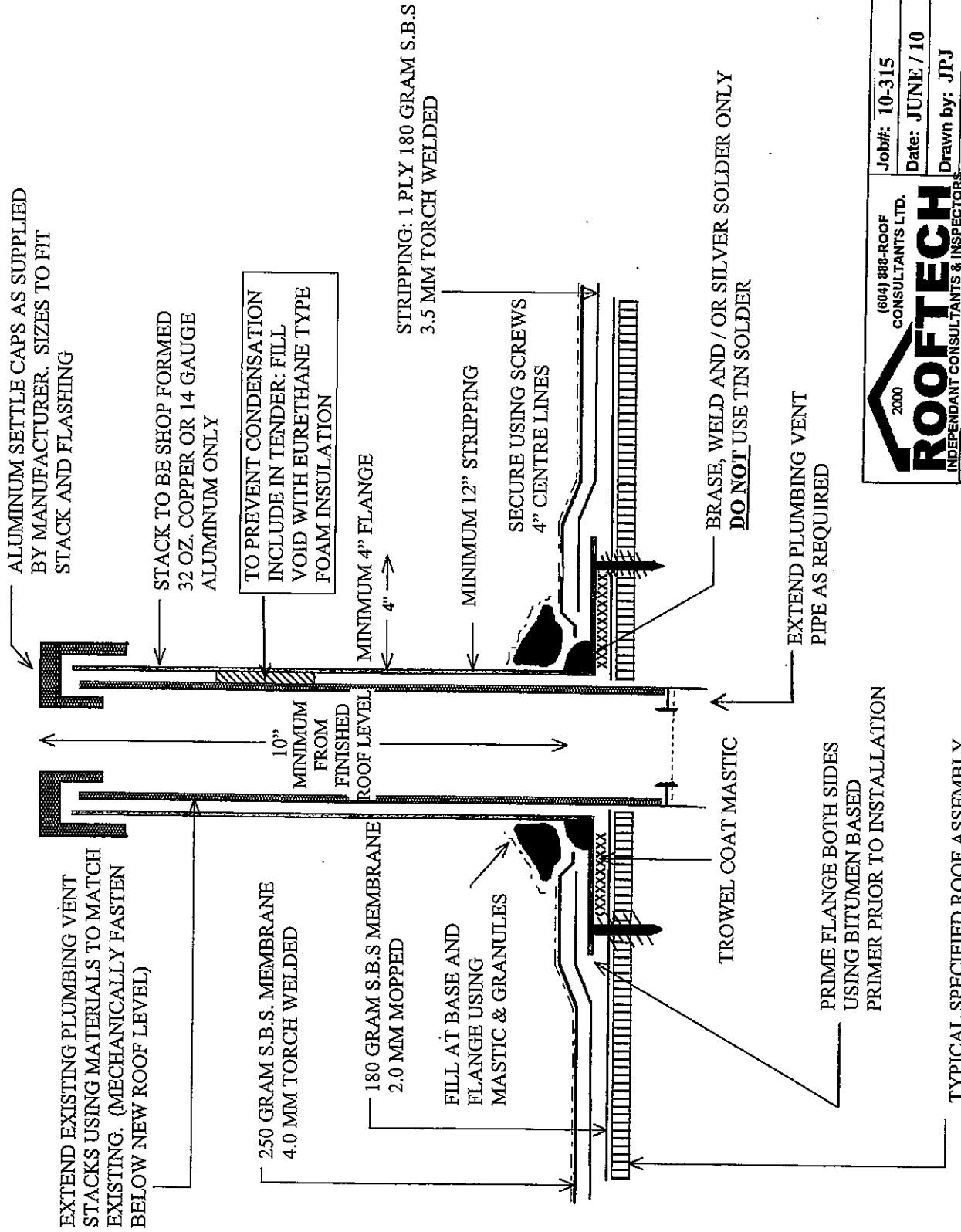
Solder

Caulking

Roofing Mastic

Wood Preservative

Masonry Fasteners



ALUMINUM SETTLE CAPS AS SUPPLIED BY MANUFACTURER. SIZES TO FIT STACK AND FLASHING

STACK TO BE SHOP FORMED 32 OZ. COPPER OR 14 GAUGE ALUMINUM ONLY

TO PREVENT CONDENSATION INCLUDE IN TENDER: FILL VOID WITH EURETHANE TYPE FOAM INSULATION

MINIMUM 4" FLANGE

STRIPPING: 1 PLY 180 GRAM S.B.S. 3.5 MM TORCH WELDED

MINIMUM 12" STRIPPING

SECURE USING SCREWS 4" CENTRE LINES

BRASE, WELD AND / OR SILVER SOLDER ONLY **DO NOT USE TIN SOLDER**

EXTEND PLUMBING VENT PIPE AS REQUIRED

EXTEND EXISTING PLUMBING VENT STACKS USING MATERIALS TO MATCH EXISTING. (MECHANICALLY FASTEN BELOW NEW ROOF LEVEL)

250 GRAM S.B.S. MEMBRANE 4.0 MM TORCH WELDED

180 GRAM S.B.S. MEMBRANE 2.0 MM MOPPED

FILL AT BASE AND FLANGE USING MASTIC & GRANULES

TROWEL COAT MASTIC

PRIME FLANGE BOTH SIDES USING BITUMEN BASED PRIMER PRIOR TO INSTALLATION

TYPICAL SPECIFIED ROOF ASSEMBLY

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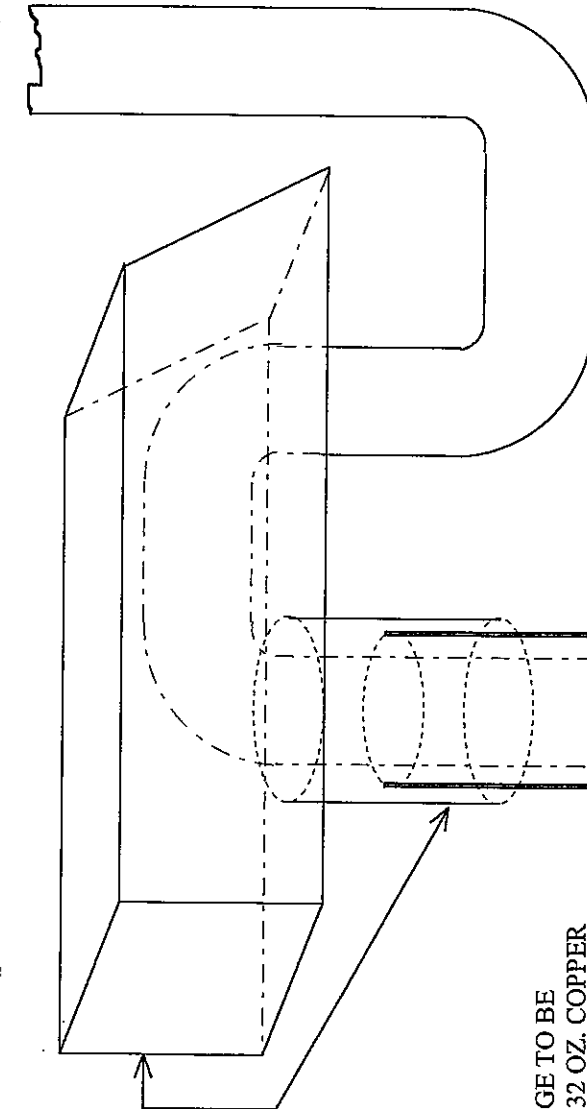
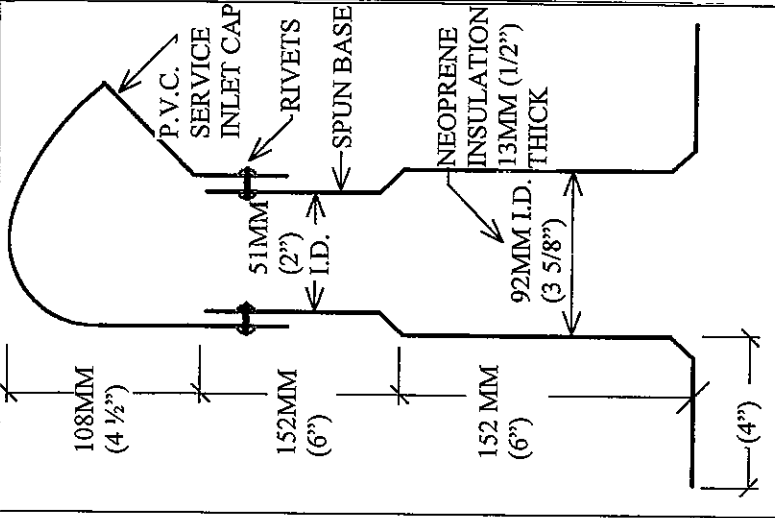
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Date: JUNE / 10  
Drawn by: JPJ

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FIRE HALL # 1 - STRATHCONA  
900 HEATLEY AVENUE, VANCOUVER, BC  
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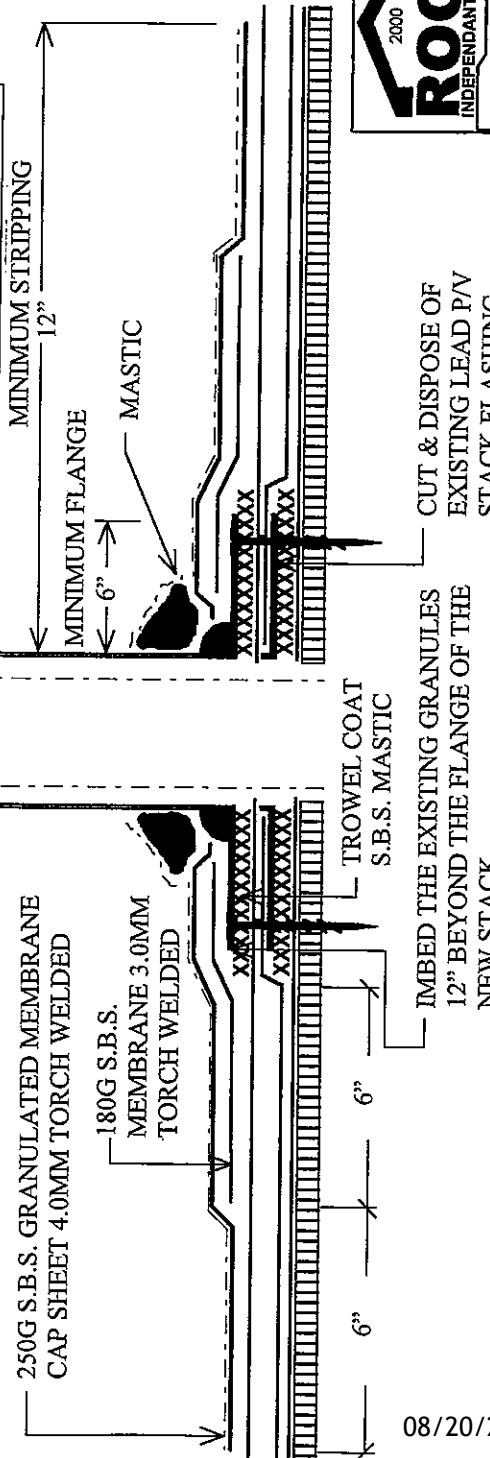
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NOT TO SCALE: Existing measurements & profiles NOT for Tender purposes. Contractor to confirm all site data.

# TYPICAL PLUMBING VENT FLASHING



**NOTE:**  
EXISTING ELECTRICAL & / OR PIPE TO BE EXTENDED AS NECESSARY TO SUIT SITE CONDITIONS & CODES. INCLUDE ALL RELATED COSTS IN TENDER.



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Drawn by: JPJ

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SHOP FORMED HOOD  
32 OZ. COPPER OR 14 GA.  
ALUMINUM OR WRAP  
USING 1.2MM E.P.D.M. &  
GALVANIZED CLAMPS

STACK & FLANGE TO BE  
SHOP FORMED 32 OZ. COPPER  
OR 14 GA. ALUMINUM ONLY

250G S.B.S. GRANULATED MEMBRANE  
CAP SHEET 4.0MM TORCH WELDED

180G S.B.S.  
MEMBRANE 3.0MM  
TORCH WELDED

TROWEL COAT  
S.B.S. MASTIC

IMBED THE EXISTING GRANULES  
12" BEYOND THE FLANGE OF THE  
NEW STACK

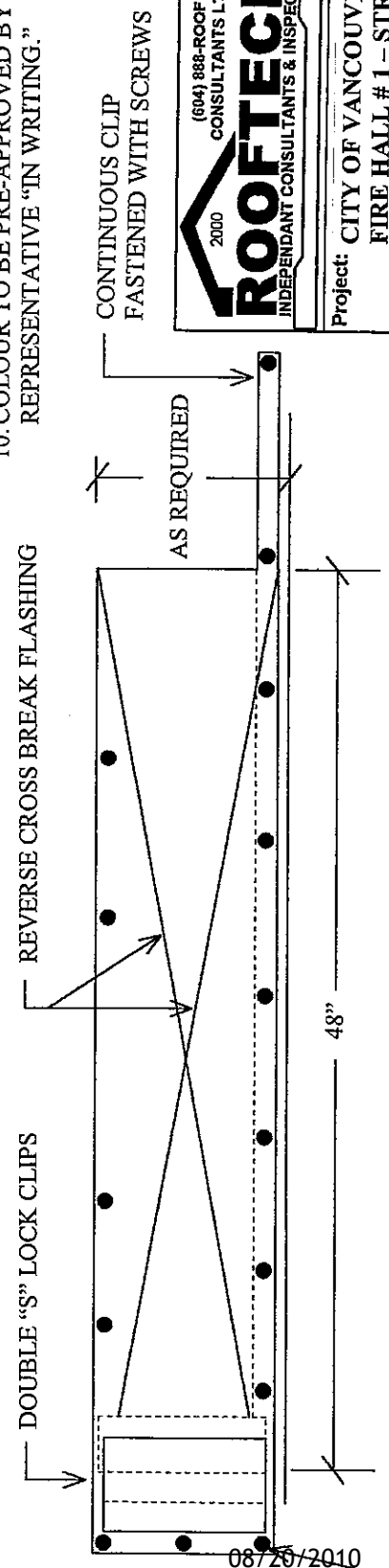
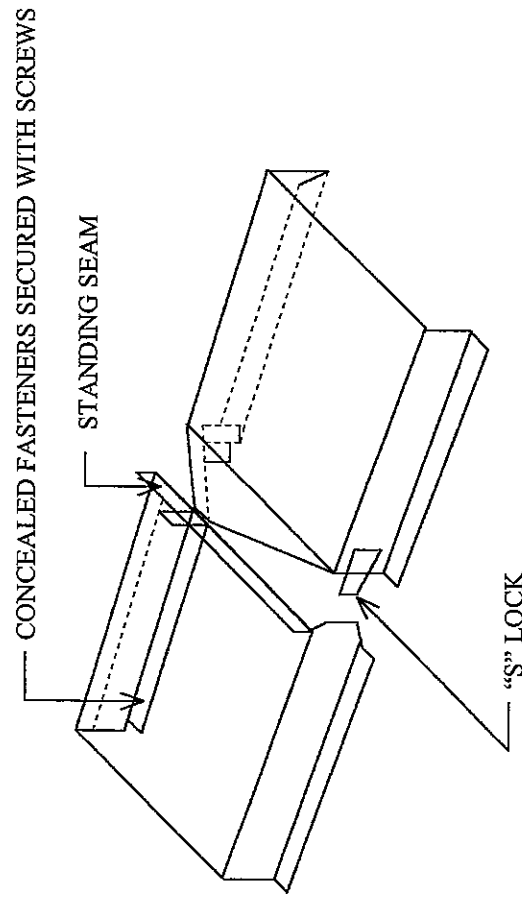
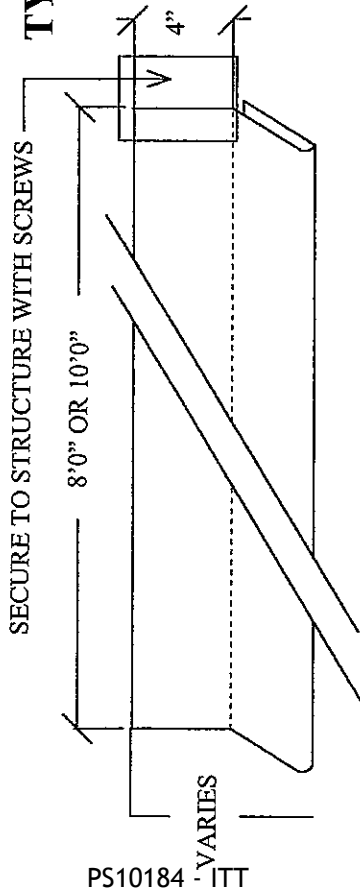
**TYPICAL DETAIL  
ELECTRICAL & / OR GAS FLASHING REPLACEMENT**

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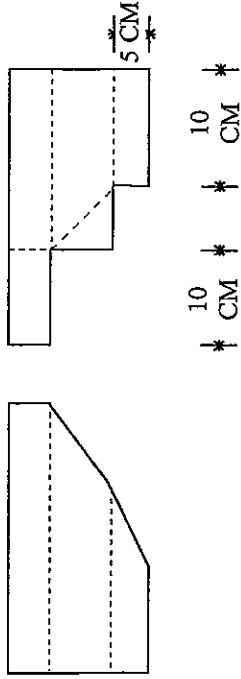
**TYPICAL SHEET METAL INSTALLATION CRITERIA**

1. ALL METAL SHALL HAVE PROPER ALLOWANCE FOR EXPANSION & CONTRACTION.
2. NO LAP JOINTS WILL BE PERMITTED.
3. ALL METAL TO BE JOINED BY LOCK CLIPS OR STANDING SEAM: SEE DETAILS.
4. ALL CAP FLASHINGS TO BE FASTENED WITH 24 GAUGE CLIPS AT 24" CENTRE LINES.
5. ALL JOINTS ARE TO BE CAULKED BOTH PRIOR TO AND AFTER CONNECTING.
6. ALL EXPOSED EDGE FLASHINGS SHALL BE HEMMED TO FORM A DRIP EDGE.
7. ALL METAL TO BE FIRMLY ATTACHED TO THE STRUCTURE WITH COMPATIBLE WOOD SCREWS.
8. NO SHEET METAL IS TO HAVE A FLAT SURFACE.
9. ALL SHEET METAL DETAILS ARE TO BE CONFIRMED BY THE ROOFING CONSULTANT VIA SHOP DRAWINGS PRIOR TO MANUFACTURE.
10. COLOUR TO BE PRE-APPROVED BY OWNER'S REPRESENTATIVE "IN WRITING."

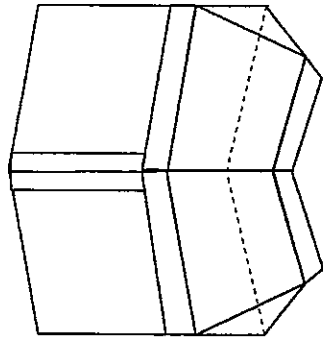


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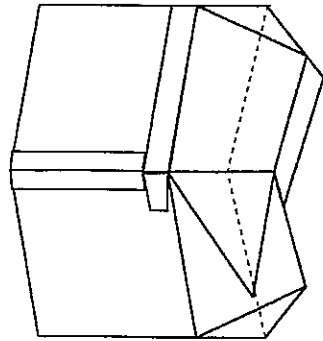
INSIDE CORNER STRIPPING CRITERIA FOR 180G 3.0MM S.B.S. BASE SHEET



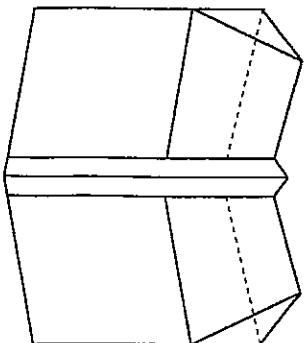
CORNER PATTERN FOR 180G 3.5MM "S.B.S. BASE SHEET" TORCH APPLIED WITH A 100% BOND



1

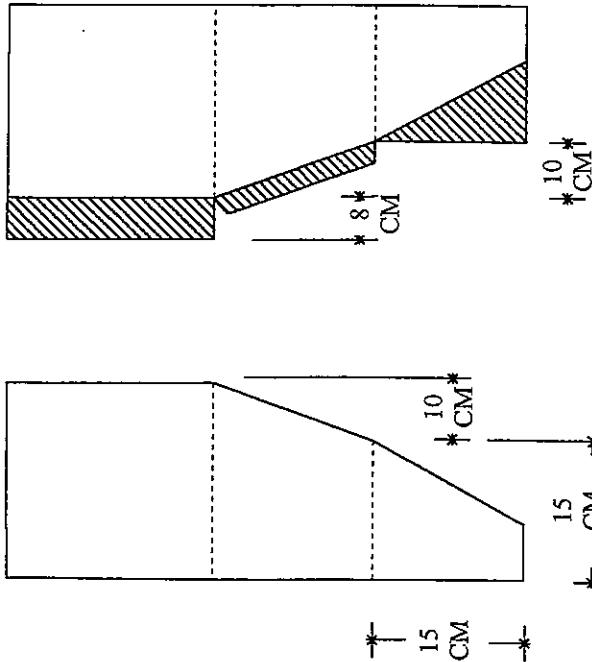


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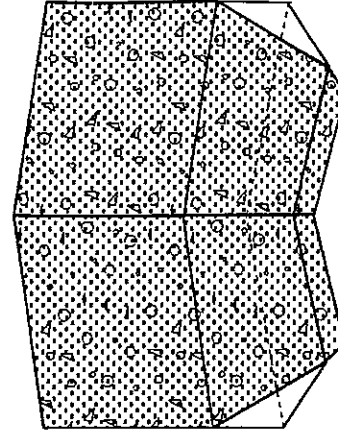
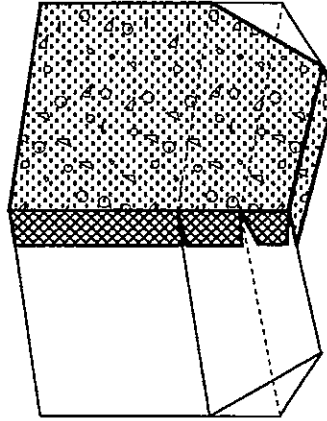


3

INSIDE CORNER STRIPPING CRITERIA FOR GRANULAR CAP SHEET



CORNER PATTERN FOR 250G 4.0MM "GRANULAR S.B.S. CAP SHEET" TORCH APPLIED WITH A 100% BOND



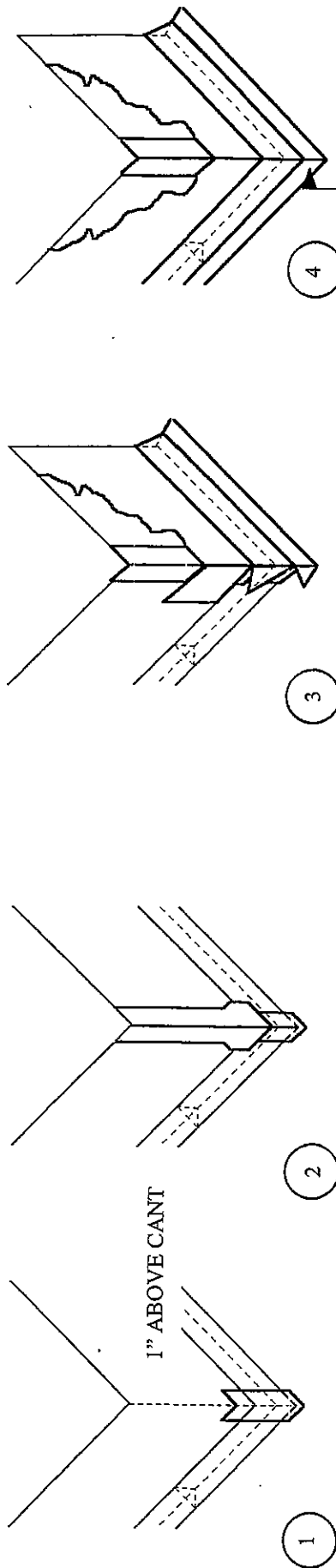
TYPICAL MEMBRANE INSIDE CORNER STRIPPING

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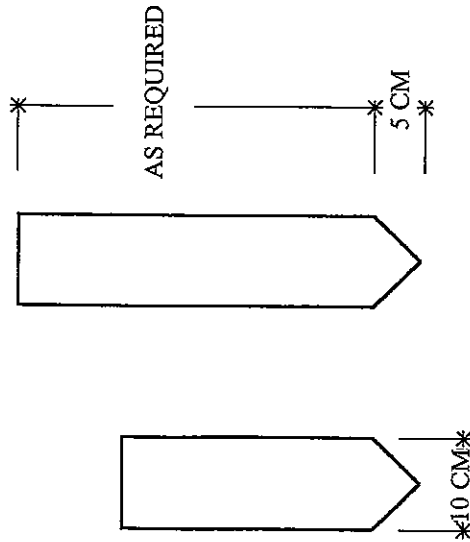
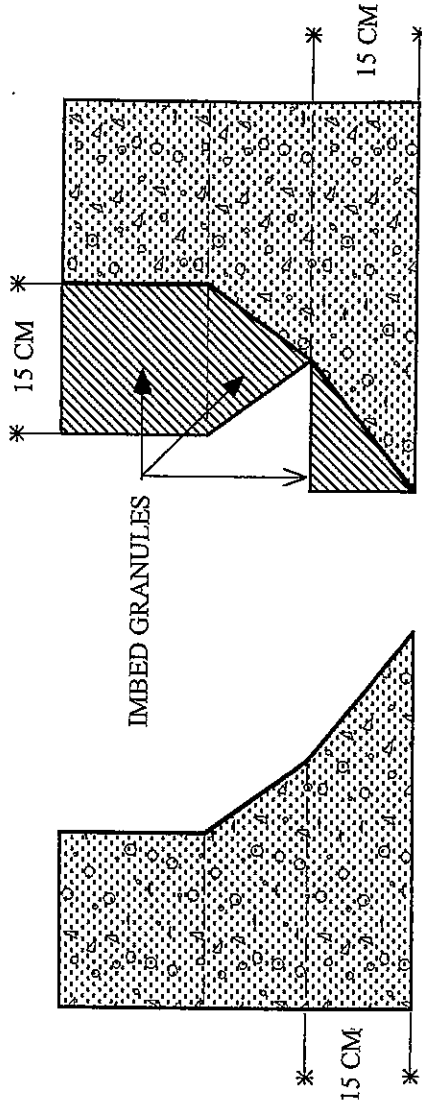
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OUTSIDE CORNER REINFORCEMENT & STRIPPING CRITERIA FOR 180G 3.0MM S.B.S.



OUTSIDE CORNER STRIPPING CRITERIA FOR 250G 4.0MM GRANULAR S.B.S.



TYPICAL OUTSIDE CORNER REINFORCEMENT & STRIPPING CRITERIA

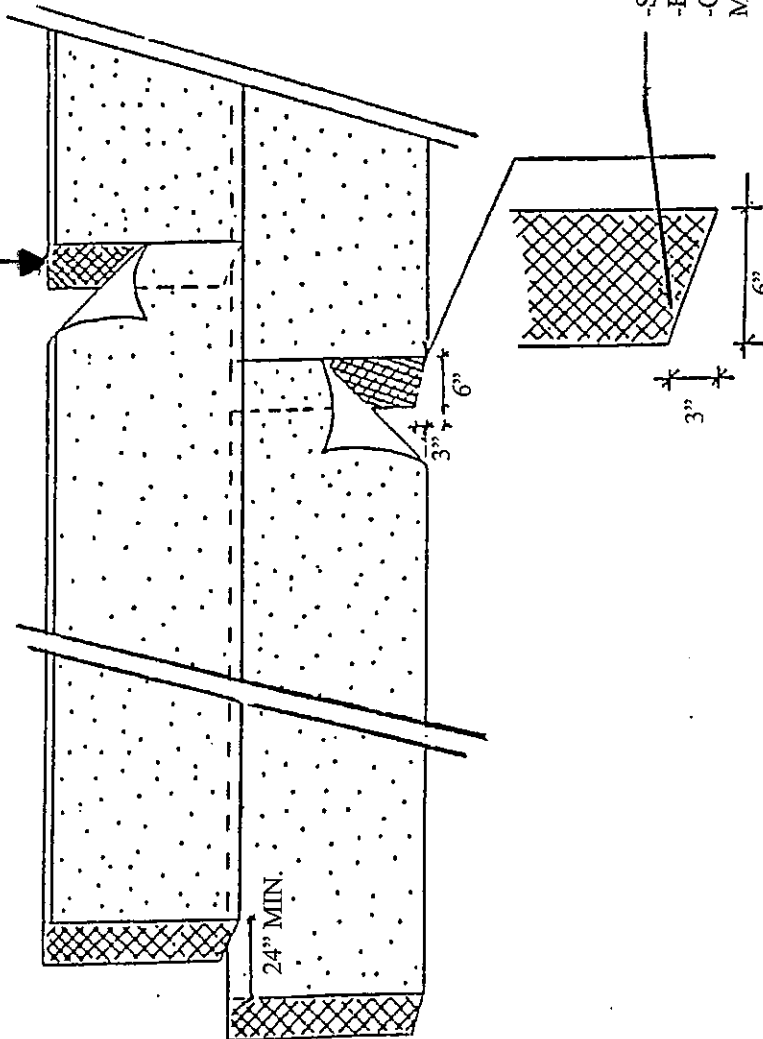
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HEAT TOP SURFACE & EMBED GRANULARS INTO MEMBRANE PRIOR TO ADHESION OF OVERLAP PLY

STAGGER END LAPS 24"  
250 (GRANULAR) MEMBRANE,  
TORCH WELDED



HANDLING CRITERIA

ALL ROLLS ARE TO BE UNROLLED & ALLOWED TO RELAX PRIOR TO INSTALLATION ON TO THE ROOF. TIME REQUIRED FOR RELAXATION IS DEPENDANT UPON WEATHER & MANUFACTURER. CRITERIA IS SMOOTH WRINKLE FREE BOND  
NOTE: HANDLING CRITERIA TO APPLY TO ALL 180G MEMBRANE

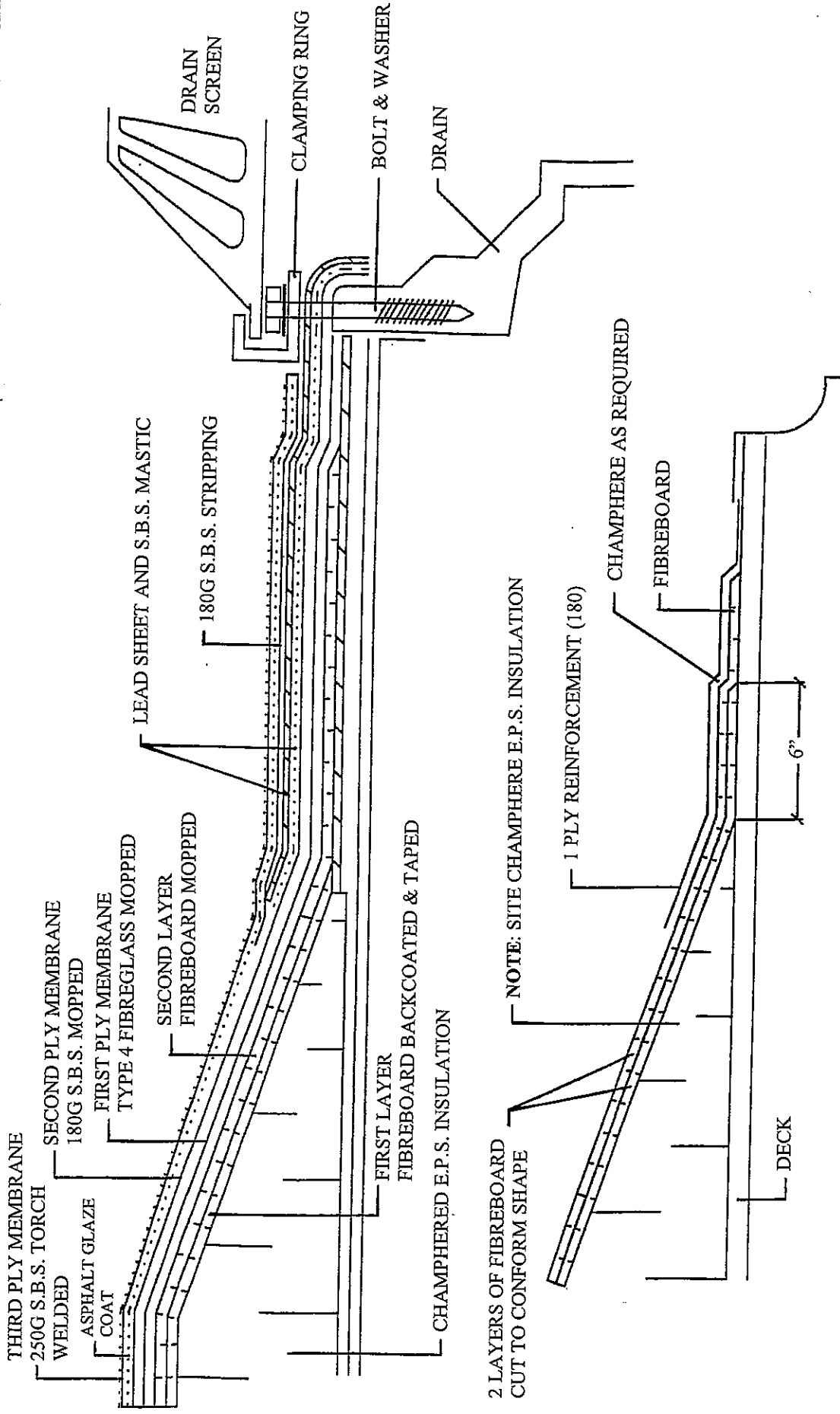
-SIDE LAPS 3"  
-END LAPS 6"  
-CUT IN AN ANGLE AT CORNERS OF THE MEMBRANE THAT WILL BE COVERED

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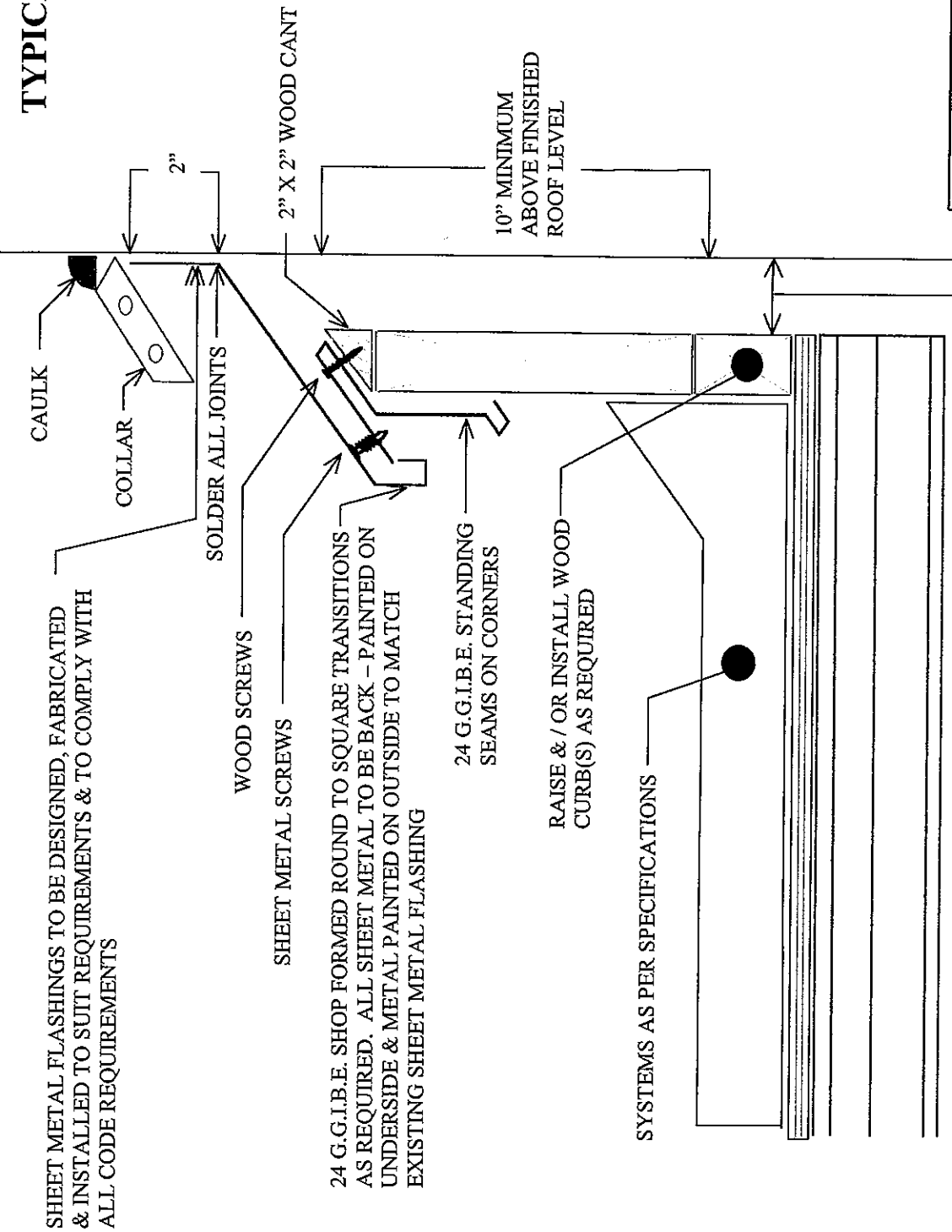
**GRANULATED CAP SHEET LAYOUT CRITERIA**



**TYPICAL DRAIN SUMP CRITERIA**

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TYPICAL CURB DETAIL



SHEET METAL FLASHINGS TO BE DESIGNED, FABRICATED & INSTALLED TO SUIT REQUIREMENTS & TO COMPLY WITH ALL CODE REQUIREMENTS

SOLDER ALL JOINTS

WOOD SCREWS

SHEET METAL SCREWS

24 G.G.I.B.E. SHOP FORMED ROUND TO SQUARE TRANSITIONS AS REQUIRED. ALL SHEET METAL TO BE BACK - PAINTED ON UNDERSIDE & METAL PAINTED ON OUTSIDE TO MATCH EXISTING SHEET METAL FLASHING

24 G.G.I.B.E. STANDING SEAMS ON CORNERS

RAISE & / OR INSTALL, WOOD CURB(S) AS REQUIRED

SYSTEMS AS PER SPECIFICATIONS

CLEARANCE AS REQUIRED

Job#: 10-315  
 Date: JUNE / 10  
 Drawn by: JPJ

(604) 888-ROOF CONSULTANTS LTD.  
**ROOFTECH**  
 INDEPENDANT CONSULTANTS & INSPECTORS

Project: CITY OF VANCOUVER  
 FIRE HALL # 1 - STRATHCONA  
 900 HEATLEY AVENUE, VANCOUVER, BC  
 YEAR 2010 RE-ROOF; RA # 1

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NOT TO SCALE: Existing measurements & profiles NOT for Tender purposes. Contractor to confirm all site data.

1.



2.



3.



4.



5.



6.



7.



8.



9.



10.



11.

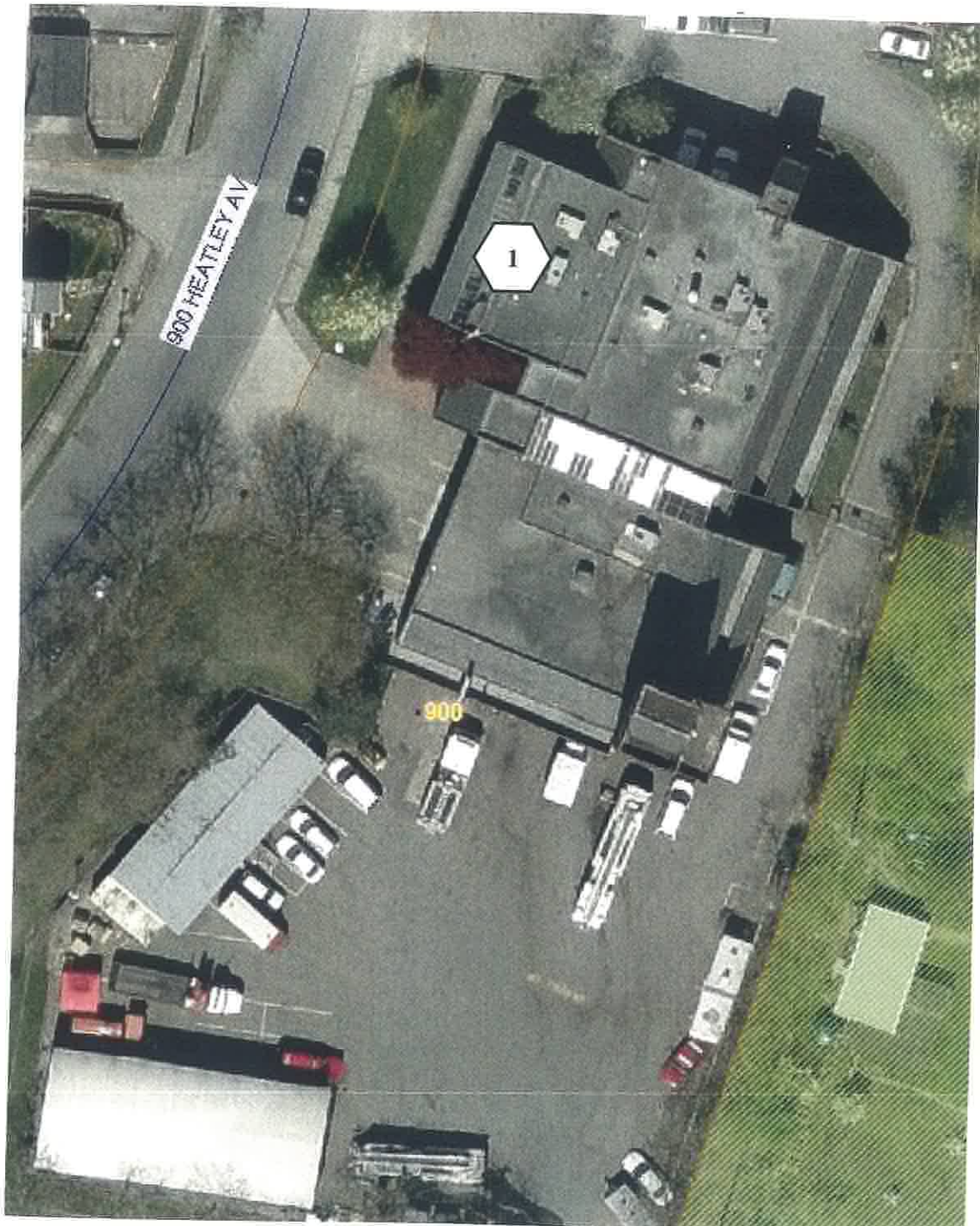


12.



13.





	(604) 888-ROOF CONSULTANTS LTD.	Job#: 10-315
	<b>ROOFTECH</b>	Date: JUNE / 10
	INDEPENDANT CONSULTANTS & INSPECTORS	Drawn by:

**CITY OF VANCOUVER**  
**FIRE HALL # 1 – STRATHCONA**  
**900 HEATLEY AVENUE, VANCOUVER, BC**  
**YEAR 2010 RE-ROOF: RA # 1**