4.1 MODIFIED ROOFING DETAILS

4.1.1 General Design Criteria:

The following Details for Ecology's Modified Membranes are based on those recommended by the National Roofing Contractor's Association for use with Modified Roofing Systems and also follow designs found in the SMACNA Architectural Sheet Metal Manual.

They represent the complete approved and accepted details for use with Ecology roofing membranes. Any changes to these details must be pre-approved in writing by Ecology Technical Services for any warrantee work being considered.

Ecology does not assume responsibility for the selection or performance of the metal and metal designs selected or for damage to Ecology materials due to the interaction of the metal with the membrane. Any improperly secured metal used in the assembly, which causes damage to the membrane or roofing system is not the responsibility of Ecology. Fasteners used in the construction of roofing details must be appropriate for the type of metal being used and the substrate used for attachment. Fasteners should be corrosion resistant and of sufficient length and thickness to offer the maximum holding strength.

Minimum flashing height is eight inches (8"). Maximum flashing height is eighteen inches (18") before special installation procedures are required. See Ecology Detail ERS-MB-8. The flashing membranes shall extend a minimum of six inches (6") unto the field of the roof.

It is recommended that all laps and edges on the flashings be heat welded with a propane torch and checked and/or buttered with a rounded trowel, even when the field is installed in hot asphalt.

Two plies of Ecology Flashing (Cap) Membrane shall cover the joints and space over and below the cant strip.

Metal copings or counterflashings shall extend over the top of the flashing membrane by a minimum of four inches (4").

Where edge details require stripping-in, the flashing piece shall extend a minimum of six inches (6") beyond the metal edging.

Sources of positive airflow behind the flashing membranes should be sealed.

Any deteriorated flashings, including all flashings and details on old coal tar pitch or single ply (PVC, EPDM, etc.) systems should be removed where the project involves a roof recover or replacement. Flashings on old APP systems should not be reused with specifications calling for mop or cold process applications.

Tests should be taken to test for asbestos in older flashings being considered for removal.

4.1.2 Acceptable Membranes:

Wherever possible, the selection of the flashing membrane should be in the same modified family as the field membrane, i.e., use APP with APP, etc. Any deviations from this general policy should be pre-approved by Ecology's Technical Services Manager.

4.1.2.1 SBS Cap Membranes

All Ecology SBS Cap Membranes, which have polyester and polyester/glass combination reinforcements are acceptable for flashing use. At present only ERS-505 & ERS-507, which are glass reinforced do not qualify for flashing use. These membranes should be used for specifications where an SBS field membrane is used and should not be incorporated into non-SBS field membrane specifications.

4.1.3 INSTALLATION:

4.1.3.1 General

Follow the specific Ecology General Design Recommendations & specific detail requirements for the proper selection and use of a particular detail.

5.1.3.2 Cant/Tapered Edge Strips

Cant strips, providing 45-degree slope, are required at the junction between the roof deck and the surface to be flashed. They should be installed prior to the installation of any roofing membranes. Tapered cant strips should be used to taper down at drains and at perimeter edges or other details requiring slope. They should be fire retardant and covered with a minimum of one layer of base membrane. The cant strip must be secured to the nailers at the vertical and horizontal surfaces using ERS-300 Mastic, hot applied bitumen or an appropriate fastener.

4.1.3.3 Masonry/Metal

Proper maintenance/ restoration must be done on all masonry walls to provide a smooth and sound surface for application of the new roofing materials and a watertight condition above the roof-line. All masonry wall and metal surfaces should be primed with ERS-301 Primer and allowed to dry prior to installing Ecology membranes. ERS Masonry Sealer should be used where necessary.

4.1.3.4 Drains

All drains should be sumped lower than the roof level that will be created by the new roof system. The drain must be solidly attached to the deck or framing. Any rusted, cracked, deteriorated, or otherwise unsatisfactory drains must be replaced. All connecting drainage pipes shall be clean and properly sealed.

Excessive use of roof mastic is discouraged.

Existing Drains: All roofing materials must be cleaned off the drain bowl and collar. The top of the old drain collar shall be pre-primed with Ecology's ERS-301 Primer. Torch weld a 4"-6" piece of system modified membrane to the primed surface. A 3 foot square target piece of Ecology Cap Membrane is to be heat welded, mopped or sealed in place to the bowl and base ply or roof substrate. Install field membrane over target. Reinstall clamping ring.

Any broken bolts shall be drilled out and the existing hole re-tapped to provide secure support for the collar. New bolt anchors should be not be tapped directly thru the existing drain bowl.

Broken domes and clamping rings must be replaced.

Retrofit Drains: Ecology accepts the use of retrofit drains, which are designed and manufactured for use with the particular drain detail being retrofitted. Retrofit drain liners with flanges compatible for use with modified roofing membranes should be used. Follow the manufacturer's guidelines to assure proper installation of the retrofit drain into the old drain with procedures followed to prevent water back-up into the new Ecology roofing system during heavy rains.

4.1.3.5 Pitch Pans

Pitch pan details should be filled with ERS Pitch Pan Sealer and covered with a secured, removable, and sealed metal cap placed over the detail as an acceptable method for sealing pipes and other roof penetrations. Uncovered pitch pans are not acceptable for warranty coverage.

4.1.3.6 Vent Stacks And Other Metal Projections

All metal projections and stacks to be flashed must be clean and free from rust and chipping paint. They should be pre-primed with ERS-301 Primer. Rusted units must be replaced. Lead flashings must be acid etched prior to torching.

Application of modified membranes to plastic piping is not recommended.

4.1.4 Base Plies:

The field base membrane(s) shall be carried up unto and over the cant strip covering the top of the cant strip by a minimum of one inch (1"). It is additionally recommended that a base ply be installed unto the vertical wall to provide greater strength and protection for this critical roof area.

Wood or plywood walls must be covered with a mechanically attached base membrane to serve as an acceptable substrate for the Ecology membrane.

If Ecology's ERS-304 Flashing Mastic is used to install the base membrane, the base ply should have a minimum thickness of 60 mils or no less than Ecology's ERS-500-4. ERS-400, ERS-400-6, ERS-401, ERS-403, and ERS-500 must be set in mopping asphalt when fully adhered.

4.1.5 Torch-Applied Flashing Membranes:

Cap membranes, which have a polyethylene backing, should only be installed by application with a torch-welding device. At present, these products would include Ecology's ERS-601, 602, 603, and 604T. The plastic backing on these membranes does not permit application with adhesives or mopping asphalt.

In the case of sand surface SBS membranes, a moppable or cold-process adhered Ecology Flashing Membrane may be substituted for a field torched membrane for flashing use. In all cases, the Ecology membrane shall be fully adhered to the substrate.

4.1.6 SBS Hot And Cold Process Membranes:

Ecology "SBS" sand-backed cap membranes can be installed with Ecology's ERS All Temp or Hot Flex hot asphalt or set in Ecology's ERS-302, or cold asphalt adhesive or ERS-304 Flashing Mastic. If set in Ecology's ERS-304, the laps must be left dry and heat welded with a roofing detail torch or hot air welding device.

Applications in hot asphalt require the temperature of the asphalt to be 400^{o}F at the point of application, to achieve adhesion to both the wall and membrane surface. Prompt setting and pressing into place to assure proper bonding is required. Heat welding of laps is suggested.

4.1.7 Temporary Terminations:

All Ecology flashing membranes are to be secured at the top with appropriate fasteners for the wall surface being flashed on 9" - 12" centers. Sealing of the top edge should also be done with 3" - 6" reinforcing glass mesh embedded in and covered with Ecology's ERS-300 or ERS-304 Roof Mastic. No flashing terminations should be left unsealed while work is in progress.

4.1.8 Metal Counterflashings:

Unless the flashing is designed to completely cover the wall, suitable metal counterflashings shall be provided to cover the top of the membrane flashing by a minimum of four inches (4") to provide proper water-shedding protection.

All base membrane flashings must have a termination bar (minimum 1/8" thick) or other suitable mechanical fastening at the top. The use of a termination bar without the counterflashing is not recommended nor a part of the standard approved Ecology Details.

4.1.9 Metal Securement:

Metal fascia, including metal copings, gravel stops and edge strips shall be secured on the outside with continuous hooked cleats, with provision made for metal expansion while continuing the waterproofing protection with appropriate joint covers as shown in NRCA Construction Details or recommended by Factory Mutual Loss Prevention Bulletin 1-49.

4.1.10 LISTING OF ECOLOGY MODIFIED ROOFING DETAILS

The following roofing details are typical for most modified roofing applications. Any changes should be approved by Ecology's Technical Manager, with the exact changes being requested shown on a copy of the standard details or in a form similar to those included in this manual:

ERS-MB-1	**Raised Perimeter Edge With Light-Gauge Metal Fascia**
ERS-MB-2	**Raised Perimeter Edge With Light-Gauge Metal Fascia**
ERS-MB-3	**Raised Perimeter Edge With Heavy Metal Fascia**
ERS-MB-4	**Parapet Wall With Light-Metal Cap**
ERS-MB-5	**Surface Mounted Counterflashing For Concrete/Parapet Wall**
ERS-MB-6	**Base Flashing For Vented Base Sheet**
ERS-MB-7	**Reglet Mounted Counterflashing For Concrete/Parapet Wall**
ERS-MB-8	**High Wall Flashing**
ERS-MB-9	**Expansion Joint**
ERS-MB-10	**Expansion Joint**
ERS-MB-11	**Area Divider**
ERS-MB-12	**Equipment Or Sign Support**
ERS-MB-13	**Skylight, Hatch & Smoke Vent**
ERS-MB-14	**Curb Detail For Rooftop Air Handling Units**
ERS-MB-15	**Mechanical Equipment Stand**
ERS-MB-15-1	**Insulated Deck Steel Frame**
ERS-MB-16	**Flashing Structural Members Through Roof Deck**
ERS-MB-17	**Stack Flashing**
ERS-MB-18	**Piping Through Roof Deck**
ERS-MB-19	**Plumbing Vent Flashing**
ERS-MB-20	**Heat Stack**
ERS-MB-21	**Clearance For Multiple Pipes, Between Pipes, & From Walls & Curbs**
ERS-MB-22	**Pipe Roller Support**
ERS-MB-23	**Scupper Placed Through Parapet Wall**
ERS-MB-24	**Scupper Placed Through Roof Edge**
ERS-MB-25	**Gutter**
ERS-MB-26	**Roof Drain**
ERS-MB-27	**Crickets**
ERS-MB-28	**Shingle Roof Transition**
ERS-MB-29	**Roof Relief Vent**