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## **Conservation Consulting Report**

Results of: Examination and Assessment of Rail Cars

Including Buildings, Rooms and Structures On-Site

For

Canadian Museum of Rail Travel

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<b>TABLE OF CONTENTS</b>	<b>PG</b>
1) Summary	2
2) Format of this Report	5
3) General Notes on Assessment Inspection	5
4) Examination Procedures	6
5) General Condition Report Observations	7
6) Materials	8
7) Environmental Assessments	9
8) Conservation of Railcars & Artifacts	11
9) Comments on Recommendations	11
10) Recommendations for Wood Treatment	12
11) Recommendations for Metals Treatment	14
12) Recommendations for Rail Car Interiors Treatment	14
13) Recommendations for Furniture Treatment	14
14) List of Rail Cars & Locations of Examination	15
15) Exterior Project for Rail Cars; Description and Schedule	16
16) Documentation Sketches, Drawings and Photographs	17
17) An Overall Treatment Project Plan	17
18) Safety	17
19) Handling Artifacts	18
20) Protection of Artifacts During Construction of New Rail Car Storage Shed	19
21) Examination of Exterior Buildings and Structures as well as Artifact Room in the Museum	19
21 A) Water Tower Site Examination	20
21 B) Elko Station Site Examination	20
21 C) Royal Alexandra er Hall; Examination and Recommendations	20
21 D) Freight Shed; Examination and Recommendations	21
22) Preventive Maintenance	22

### 1) Summary;

The first stage examination and assessment of the twenty eight rail cars owned by the Canadian Museum of Rail Travel in Cranbrook (CMRT) was conducted 12 – 16 August 2010. Between that time and the final of this report in Sept/2011, a number of changes have taken place that reflect both on-going maintenance/conservation and special projects related to this type of work. These changes may affect some of the observations made at that time, and new concerns arise as part of the normal process over time, particularly for the railcar collection. These will continue to arise and be corrected as funds and time permit. This process will continue until a solution is developed for the railcar collection.

This report is submitted to advise on the conservation conditions that were observed, measured and assessed. Preservation recommendations for the 28 manufactured rail cars are based on findings of the examination and with consideration for the best methods of preserving, restoring and protecting the materials related to the collection owned by the Museum. The report is provided with reference to international standards for conservation and “Standards and Guidelines for the Conservation of Historic Places in Canada”. A conservation treatment program has been developed and is outlined at the end of the report.

A new design structure is recommended for preservation of the rail cars. Research into conservation standards and practices have been incorporated into the treatment recommendations. This conservation report provides a general view of the conservation issues faced by the CMRT and is designed to assist in the development of a business plan. The CMRT has done significant work in developing restoration and conservation plans of its collection to this point. Building on this past work of the CMRT, the consultants recognize that there will be the need to do ongoing assessments, environmental study, and conservation. Should a new storage facility be constructed, there will also be the need coordination between conservators, contractors, architects and engineers. Our firm is prepared to assist with this process with special consulting provided by Murray Frost.



Overall view of Track #3, Business Car “British Columbia”

Our understanding of conservation needs at the Canadian Museum of Rail Travel is based on a combination of three levels of information. The first, our on-site inspection is combined with past experiences and the research material received describing the site and

the history and goals of the museum. The purpose of the conservation project is understood in clearer, broader terms with these combined packages of information.

The Canadian Museum of Rail History has taken important historic artifacts and with historical records created a social history of the era of grand rail travel. While the actual artifacts provide the venue and ambience of the site, emphasis on style, design and fashion have been used to preserve the social history of an era. A focus on the style of the time has created an environment that takes a step back in time to the era of grand rail travel. This era of travel is reflected most opulently in the interiors of the cars. Attention to details by the finest of craftsmen has created an ambience of luxury and style from days gone by. The skills and knowledge of furniture conservation including all of the associated specialties of inlaid marquetry, metal set into wood and framing glass are skills that have been mastered by only a few museum conservators. This quality of preservation work is required to preserve the interior details of the luxury cars.

It is the material history of the structure that holds the social fabric together. So, efforts to preserve the structural and decorative elements must be carried out. However, the cost to provide conservation service for the material history is very high if the work is carried out as would be done for a “national” museum. Since the region and the City of Cranbrook may have less resources than the federal government to support the “traditional” conservation mode, our report attempts to provide guidelines for reasonable cost solutions without compromising the integrity for historical value of the collection. However, if the collection is deemed to be deserving of national museum standards of care, then this report could be updated to reflect that interest.

Protection and preventive conservation will need to be the force of direction. Preventive conservation is a large field that has been developing in the museum world since the early 1970's. It is the foundation theory of most environmental developments in museums. This theory of preservation, based on research is adapted in our recommendations for the Canadian Museum of Rail Travel. Protection is the basic requirement for providing preventive conservation conditions for the collection. After our initial survey of the site it was clear that protection in the form of a building to shelter the collection is the first requirement for improving the environmental conditions at the museum.



Overall rooftops view looking south east from caboose.

## 2) Format of this Report

A general overview of the examination procedures and general findings is provided in the introductory pages. General condition reports are provided based on a draft project outline for each rail car unit with a draft treatment proposal. The conclusion of this summary outlines a treatment program and recommendations for priorities and procedures. Environmental recommendations are provided as an appendix to the report.

## 3) General Notes on Assessment Inspection

The preliminary inspection was able to complete an overview examination of the 28 rail cars in the collection owned by the Museum. Photographs and measurements were recorded in files for each of the rail car units along with specific condition reports and recommendations. In addition the Royal Alexandra Hall inside the museum, the Water Tower, Freight Shed and the Elko Station were also examined along with ALCO Diesel locomotive A&B UNITS in the outdoor museum precinct. Subsequent research for this report provides the types of danger that are normally considered threats to the condition of artifacts.

They are:

- a) **Light**, at the top of the list is considered the most serious threat to museum collections. Since windows have been covered with UV filers and exterior mirrored glass shields on most of the rail cars, the interiors have been somewhat protected. There are still cars where a lot of sunshine can affect decorated wood, fabric and organic materials.
- b) **Relative humidity** is the next threat on the list of dangers to these artifacts. Moisture content in the air can affect deterioration rates by being either too high or too low. Ambient relative humidity needs to fluctuate at a gradual rate and is dependent on temperature.
- c) **Temperature** is the next factor in controlling the environment for suitable preservation conditions. Along with relative humidity, temperature needs to rise and fall at a gradual rate as well. Currently the museum uses a combination of active and passive means for protecting the cars including HAVC systems in 13 of the cars. Filters and shades on windows have also been introduced to reduce heat gain. Where possible, the museum has also introduced extra insulation in the steel cars. During the winter heating to about 7C has been introduced in some of the cars to help both protect the interiors and exterior and make access during tours more comfortable. Not all cars can be heated in winter. The wooden Soo cars as an example suffer from major ice build up if heated. The consultant also supports a proposal to add shade cloth frames over the existing exterior mirrored glass covers to reduce the heat build up on the glass that is transferred to the inside of the cars and requiring more cooling. Another important benefit is that they would also reduce the light intensity further while not affecting interior or exterior interpretation. Once a building is constructed, all could be easily removed.
- d) **Air pollution** is considered another major contributing factor in the deterioration of artifacts in an outdoor environment especially. The present outdoor collection of rail cars is also subject to wind-blown rain and snow in winter and blowing sand in summer which causes weathering, etching and a sand-blasting effect to exposed surfaces. Indoor

environments can also suffer from ingress of noxious fumes carrying gaseous and particulate pollutants. The railway yard environment of the Canadian Museum of Rail Travel is particularly corrosive for the railcar collection. While the yard is not as active as it once was, it still introduces dust, oil, fumes into close proximity to the collection, as does the major arterial highway 3/95 along the other side of the museum. A protective enclosure with mechanical air filters would reduce this threat considerably.

**e) Pest infestation** in the form of wood tunneling insects, insects that consume fabric fibres are the small scale dangers to the collection. Rats and mice can also cause damage to the collection and finally birds and larger animals such as racoons and skunks need to be managed for protection purposes. The museum does have an active program of professional pest control, but being open to the environment makes this a significant effort that would be significantly reduce in an enclosed environment.

**f) Shock and vibration** are considered threats as well. In the location of the museum, there are a considerable number of events of this nature on a regular basis as the result of active rail yard shunting. While the existing springs of the wheel assemblies do reduce the impact, it still happens as does wind movement. Further consideration should be given to how to buffer fragile objects from this activity and should be implemented.

**g) Natural emergencies** are considered to be those rare but potentially devastating events such as fire and floods. Emergency response policies should consider these natural situations along with other kinds of mechanical or service failures, such as power and again floods. While existing procedures and policies such as fire fighting plans have been put in place with the fire department, and control of weeds that can dry out around the site is maintained, being open to the elements contribute to the potential danger.

**h) Theft, vandalism and misplacing objects** are factors that threaten damage to collections as well. Security and limiting access to collections can prevent instances of loss or damage. The existing fire and entry alarm system helps reduce some of the danger, but the fact that a rock, a bullet, or other item can be easily hurled into the car storage location or even a vehicle could easily smash through the fence. These risks are an ongoing concern of the present outdoor storage.

#### **4) Examination Procedures:**

A review of the history of the collection and restoration changes to the finishes was made and included a review of all conservation references to present and past treatments and comments on the condition of each railcar. This research was recorded as an appendix to the examination file. Conservation handling and safety techniques were followed during the examination and no incidents of any nature occurred. Physical measurements of penetration depths in deteriorated exterior wood were made by traditional penetration instruments. Records of penetration depths and measurements of cracks and splits in the wood are included in the individual reports for each rail car unit. Assessments of exterior metal deterioration were undertaken. The threats that cause damage were reviewed in relation to all the conditions on the site and are referred to in the report.

Given on-going management of the site, weather conditions, and manufactured materials, no evidence of insect activity was observed, other than pre-existing biological plant growth of some mosses and lichens. Nevertheless, the environment could invite wood

boring insects and other pests. A history of pigeon occupations was mentioned by staff at the museum which, though limited to some degree by the installation of some pointed wire strips on possible roosting spots on the corridor roofs, will continue to be an issue to deal with as long as the cars are in the open. Further temporary enclosure of the cars from the corridor roof to help shed water is challenged by the potential introduction of more pigeon roosting places.

### 5) General Condition Report Observations

The Condition Reports for each rail car unit in the collection records the specific findings but there are some general similarities which are noted, and most relate to the exteriors. Most of the rail car units are weathered seriously to the point of surface loss of materials in certain locations. This weathering has



Overall view of weathered surfaces on Track #3.

affected all painted surfaces, all exposed wooden surfaces, metal surfaces as well as details of handrails, steps and mouldings and decorative features on the exterior of the cars. In spite of repeated preparation and painting of the exteriors of many cars, some locations have suffered complete loss of paint. All of the wood surfaces that were tested exhibited levels of moisture content indicating that there is not always sufficient surface water repellent protection in many locations. Unprotected wood end grain exhibited serious deterioration and included losses at edges of decorative areas on most of the wooden rail cars. Efforts are made to keep water shedding away, but this is difficult to control in an exposed windy environment. Those with existing metal covering components appeared to have better condition as a result of the protection afforded by the metal. In these cases the metal clad cars are newer than the older wooden cars.

In some cases there are levels of biological growth on upper surfaces of rail cars. This of course traps moisture and speeds deterioration. The general appearance is also that of weathered paint and wood and deteriorated metal as a result of exposure to the elements. These factors affect the meaning and interpretation as well as the appreciation of the rail cars. Combined, these conditions all add up to a rate of deterioration which, without any intervention will continue to contribute to further loss and decay. The impact of the environment on the outside of the cars is also reflected on what has happened inside the

cars. Examples of fading of surfaces and warping of wood panels are evident, although much of this happened prior to the cars being under museum control, but this still needs to be monitored on an ongoing basis. Organic surfaces are also prone to mould, which can develop and spread between surfaces and remain undetected visually but can be harmful for visitors and staff. With the deterioration of the outside surfaces, water penetration is inevitable and cause for concern in all of the threats mentioned. Being open to the outside environment raises concerns for pests, insects of various kinds can find their way inside the cars and cause damage throughout their lifecycles.

The museum has made efforts to reduce the impact of the environment on the cars, from adding drip edges in some situations to reduce water impact on surfaces. This includes adding mirrored glass covers over the wooden window sash and glass and over some wooden doors, leaving some of the existing buildup of paint layers (in some cases up to 15 layers) to act as barriers, and in some cases covering up windows. In some cases the deterioration of the paint on the exterior of the car may just be cosmetic at this point, though over time even these will eventually lead to exposure of the substrate material. As a policy the museum has put up with some of this exterior paint deterioration and some public criticism that has resulted from a marketing/appearance point of view. The option would be to spend the \$10,000 or so cost per car to repaint them when they will still be exposed to the environment and the re-paint not last a long time.

## 6) Materials

Materials found in the collection were compared to standard and recommended treatment methods. The project to assess and record the technical needs for preservation of the rail car artifacts examined a selection of materials that included a variety of woods, from fine veneers and inlaid exotic wood to structural milled timbers. Metals in the collection also cover a range of fine finished bronze hardware components to structural cast iron beams, flat panels used to construct the cars and pipes found throughout all of the cars. The cars contain a historical cross-section of electrical components.



Metals in many forms exposed to environmental effects leading to deterioration



A historical cross section of electrical components



Glass occurs in many forms.

Glass that was observed ranged from windows to decorative stained glass, frosted glass and even exists as glass lenses for instruments in many locations of the trains. Rubber hoses and linoleum floors were noted in the long lists of materials. Furniture with horsehair, fabric, leather and metal hardware, as well as modern materials including formica, masonite and decorative coatings such as varnish, shellac and paint were all noted. Other materials in the industrial category were assessed for deterioration factors. The Canadian Association for the Conservation of Cultural Properties published Code of Ethics and Guidelines for Practice was followed for assessment of the collections.



Mixed metals exposed to environmental conditions causing corrosion. Even though this deterioration likely started prior to the object coming to the museum, this is a classic example of what will continue to happen to exposed materials.

## 7) Environmental Assessments

Assessment guidelines followed a plan of examination starting with the overall site, large scale surface observations, structural observations; environmental assessments of condition were also made from a scale of general to particular. The list of environmental issues affecting the collection covers all weather conditions for the Cranbrook location. Summer heat, direct sunlight and even dry winds blowing sand and dust particles head the list of deleterious conditions for the

types of materials that form the structure of the rail cars. Winter freeze-thaw cycles can have serious effects on materials as well. Ice forming on the edges of roof lines and on flat surfaces can contribute to mechanical, weight related degradation of structural components. Ice can have an abrasive force on surfaces.

The effect of direct moisture, rain and snow on surfaces of the railcars was considered and that stage was followed by observation of more indirect effects of moisture ingress, through details around windows, cracks in the structural condition of the cars and finally small scale detail observations were made. Photos were taken of numerous stains on interior surfaces, ceilings, walls and inside smaller chambers of the cars. This procedure of overall examination of the site took place in order to place the collection of artifacts within the environment of the Cranbrook town and the valley and in relation to traffic flow on 3-95 highway and the railway yards to the north of the site.

Annual weather patterns and some highs and lows of temperature and rainfall were collected and in addition winter snowfall records were reviewed. Security issues of the site were viewed from the point of view of potential access and potential hazard to the artifacts if such ingress were to take place. Vandalism remains a potential threat to all public collections. A high strong fence around the site and a monitored intrusion and smoke detection system was noted and there were no observations of any ingress and subsequent vandalism although the potential was also noted. In general terms, exposure to the outdoor environment was the most obvious threat to the valuable collection of artifacts. Roofs of the rail cars were seen from above at two locations, from the boardroom of the museum building through windows facing east along the whole site. The other location for observing and recording the roofs from above was from the upper windows of the caboose. In both locations observations of the roof conditions were made using binoculars to assist in assessment.



Leaking from rainfall and melting snow is the cause of extensive damage to interior ceilings, walls, furnishings that occurred prior to being in the CMRT care. Current protection efforts combined with enclosure of the cars will reduce possible repeat of this type of expensive damage.

## **8) Conservation of Railcars & Artifacts**

The background historical information about production, manufacture and materials of railway artifacts in research reveals superior quality craftsmanship and, building, engineering and finishing skills were used in construction and finishing of all the cars in the collection at the Canadian Museum of Rail Travel. This has been carefully documented and has been prepared as background information for designation as a National Historic Site by Canada's Historic Sites and Monuments Board. Our assessment and examination of the cars at the Canadian Museum of Rail Travel site have definitely confirmed that the quality and craftsmanship of the rail travel cars and artifacts is outstanding. Common kinds of transportation artifacts and the types of locations were compared for the latest conservation developments for each material. This process remains on-going. Finally we observed the state of restoration that has been undertaken at the museum and found that the quality of this work has returned valuable traditional craftsmanship back to a very fine state. However, on-going exposure to environmental damage threatens to undo this impressive achievement. In some cases materials have been added over the years both during their service life and in other museums for appearance and interpretive reasons.

## **9) Comments on Recommendations**

The environmental issues raised above are the most critical factors affecting the preservation of the railcar collection. A recommendation for an environmentally planned facility to enclose, cover and protect the artifacts is the most important protection for the collection now. Treatment proposals for each unit have been outlined and a treatment program with priorities can be developed out of this report. Treatment steps are suggested as a basic conservation program to be undertaken either at once or after the railcar collection has been covered and protected. Interim protection is recommended during the process of providing the new protective facility. So, while the conditions as described generally above indicate surface deterioration, weathering of paint and wood and some losses, the basic structural condition of the cars in most cases appears to still be strong. Surface conditions can be repaired, restored, repainted and finally covered with a protective water repellent coating but are suggested as restoration steps to follow after the new building facility is developed.



Consolidation of wooden components using epoxy adhesive systems.



Consolidation of wooden components using epoxy adhesive systems.

## 10) Recommendations for Wood Treatment

Initial steps involve cleaning. Dry cleaning is the first stage, using soft bristle brushes and sharpened wooden scrapers. The dry brush cleaning is followed by epoxy consolidation of loose and flaking sections of wood. Stabilization of end grain at the top of the cars and as required elsewhere is carried out at this time with the same epoxy adhesive. This stabilization will require some new wood to be attached to the car at the areas of loss. Weathered surfaces requiring consolidation will be filled with a tested light weight yet strong epoxy boat-building material that will consolidate surface wood and provide a sound base for applying new paint and for roof areas an appropriate covering material. Consolidation and stabilization of the surfaces will need to be carried out overall. Once complete, the stabilization and consolidation treatments can be followed with a water and non-ionic detergent solution wash. The cleaning solution can be applied with soft bristle brushes also. The wash solution cleaning is followed by a complete rinse.

While the car is still damp, a borate based treatment, “Tim-Bor” can be applied to wooden end grain and horizontal cut sections. Tim-Bor is dissolved in a water-based solution and applied by use of hand sprayers. (The “Tim-Bor” solution is a “diffusible preservative” and penetrates into the wood better when it is moist). “Tim-Bor” will act to prevent any future fungal growth and stops moss, mould and algae growths as well. It also prevents infestation by any wood boring insects such as carpenter ants or termites. Tim Bor is also noted for its’ fire retardant properties. It is especially recommended in circumstances with public access because it is very benign in the environment for humans, including children and also animals. After treatment with borates, the car is allowed to dry again. After drying time, new paint can be applied, while not recommended for museum objects; new paint is recognized as a protective surface coating for outdoor sculptural and industrial transportation objects, even with museum value. This step will provide a great enhancement of the appearance of the rail cars.

Once the repaint is completed then a final water repellent coating is sprayed on any areas that would have remained natural unpainted surfaces. The water repellent that is recommended here is a custom recipe now used especially for outdoor wooden surfaces and does not change or darken the appearance of the wood. The protection is provided to prevent free water from being so easily absorbed by the surface. Final finishing to the tops of the cars will involve attaching new zinc roofing covers where appropriate and required.

Treatment of this nature could be started prior to the completion of a new storage building. Timelines should be determined by the museum with the understanding that the earlier that treatment can be put in place the more of the original fabric can be saved. Replacement can be done if the items are not original.



Roofing materials subjected to environmental degradation, weathering and effects of wind.

## 11) Recommendations for Metals Treatment

The varieties of metals in need of conservation treatment are large and the scale is considerable. Structural members with rust need attention to remove, clean and treat the metal. Tannic acid treatments are recommended for iron artifacts that are protected from the environment or are in locations not subject to direct moisture contact. Protective coatings for metals once they are cleaned and prepared for treatment are available for the range of artifacts that need to be re-coated.



Temporary environmental protection on Track #2 with tarps is a band aid treatment.  
A building is the only viable long-term solution

## 12) Recommendations for Rail Car Interiors Treatment

Conservation assessments of the interiors have revealed both areas of finely preserved original finishes and areas where restoration has brought back an original appearance to the interiors of the rail cars. In addition, as mentioned there are many examples of damaged and deteriorated finishings and even structural systems in the interiors. While the museum has taken steps to reduce or eliminate further deterioration once they came into their care, the reality is that the interiors will continue to face the impact of the surrounding environment and the increasing costs to prevent or repair. Once environmental conditions have been stabilized, it is recommended to proceed with standard treatments for preserving the existing fine finishes. Finely finished clear coatings, painted coatings and areas with fabric and hardware require different conservation treatment steps.

## 13) Recommendations for Furniture Treatment

The original furniture collections, as well as built-in seating and sleeping units have another range of materials that require different specialized care. Fabric exposed to even indirect sunlight will deteriorate quickly. Wood will deteriorate and fade in sunlight and this affect can be irreversible. Of course, the effects of temperature and relative humidity are very harmful to fine finishes, fabrics and upholstery.

As these artifacts are protected within the cars, their needs can be addressed as time is available to undertake treatment. It should be noted that the outside environmental

conditions of the site are having an effect on the deterioration rate of the furniture. With nearly 500 exterior window in the cars, efforts to put on shades, plastic UV filters, double panes glass, etc., have gone a long way towards helping preserve the interior environment, but the simple fact remains that things like intense sunlight, wind, rain, pests, etc will continue to impact both the interior and exterior surfaces of the cars.

#### **14) List of Rail Cars & Locations of Examination**

##### **TRACK #1**

###### **The Trans-Canada Limited (1929)**

- 1.) Solarium-Lounge Car "River Rouge" (restored)
- 2.) Sleeping Car "Glen Cassie" (restored)
- 3.) Sleeping Car "Somerset" (1/2 restored to original, 1/2 restored to modernization)
- 4.) Sleeping Car "Rutherglen" (restored)
- 5.) Dining Car "Argyle" (restored)
- 6.) Day Parlour #6751 (restored)
- 7.) Combination Car #4489 (restored)
- 8.) Locomotive Tender (*no interior*) (NOT ON TOUR)
- \* *Locomotive (future)*

##### **TRACK #2**

###### **The Soo-Spokane Train Deluxe (1907)**

- 9.) Sleeper/Observation "Curzon" (original)
- 10.) Palace Sleeper "Omeme" (original)
- 11.) Car #621 (First Class day car) (original)
- 12.) Car #4144 (Baggage) (*major structural work needed*) (NOT ON TOUR)

###### **The Pacific Express (1887)**

- 13.) Car #52 (First Class) (original, *most of interior removed & major structural work needed*) (NOT ON TOUR)
- 14.) Baggage Car #736 (original) (NOT ON TOUR)

###### **Interpretive Cars**

- 15.) Caboose (original) 1928
- 16.) Sleeper "Redvers" (original/modernized) 1929 (*a sister car to Rutherglen*)
- 17.) Café Lounge Modern Via Rail #758 (original/modernized) 1954
- 18.) GM Diesel Locomotives (A & B Units) (original) 1953

##### **TRACK #3**

###### **Business Cars and Royal Cars**

- 19.) Business Car "British Columbia" (original) 1928

20) Sleeping Car “Grand Pre” 1928 (*on the 1939 Royal Train*) (original, but much of interior missing)

21.) Executive Car “Strathcona” (original) 1926

### **The Chinook (1936)**

22.) Mail-Express 3612 (original, *but much of original interior missing*) (NOT ON TOUR)

23.) Combination Car #3051 (original) (NOT ON TOUR)

24.) First Class Car #2104 (original) (NOT ON TOUR)

25.) Smoking Car #1700 (original) (NOT ON TOUR)

\* *Locomotive (future)*

### **Other Cars**

26.) Sleeping Car “Newcastle” 1921 (*- partially gutted stored for future “Technical” Interpretation*) (NOT ON TOUR)

27.) Dining Car “Wingfield” 1921 (*partially gutted– for future interpretation*) (NOT ON TOUR)

28) Full Baggage Car # 4481 (*for storage only*) (NOT ON TOUR)

## **15) Exterior Project for Rail Cars; Description and Schedule**

Treatments to stabilize the exteriors of the railcars can be undertaken before an overall protective structure is provided, and again certainly afterwards as well to maintain the historical integrity of these artifacts. Permits, proposals and approvals are to be arranged before project set-up. On-site treatment will require scaffolding to allow access for working. In addition the scaffolding, work will need to be covered with a tarpaulin for a few days at least to allow the wooden cars to remain dry before epoxy consolidation, final water repellent and repainting. Work on-site will require basic time commitments which vary slightly for each rail car location. The variations in time scheduling for the individual rail cars is a result of different conditions and size considerations. For instance, the wooden cars, while needing consolidation, will not need the same treatment as metal cars. The basic steps are calculated to take the time as detailed using an experienced 3-person conservation team in addition to a lead conservator. The conservator will provide training as required but would prefer to choose team members based on the management requirements for the project.

Daily safety meetings are required with the added attention expected for handling historic and artistic detail with extreme care for fragile historic surfaces, as well as the attention to the visitors if cars on public tour are involved. An awareness of railway history and the art of rail car design, historic finishes and painting are considered important qualities in each team member. Steps have been developed to be included in a treatment proposal format and are recommended in the appropriate case for exterior and interior treatments of the 28 rail cars at the Museum. In each case there will be some more emphasis on one or other of the steps in the procedures. Consolidation and stabilization will require a great

deal of time for each of the rail cars. Further research and development are advised for each car before treatment.

### **16) Documentation Sketches, Drawings and Photographs**

The conditions were recorded using standard assessment systems that rely on examination techniques assisted by magnification, portable light sources, hand-held instruments and scientific instruments for measuring moisture readings as well as structural density of wooden support structures. Tactile testing methods for artifacts were employed in addition. The condition reports, resulting from use of measuring and recording equipment provide reference for future care of the objects at the site. Reporting styles for condition diagrams include technical/freehand as-found sketches. Sketches, drawings and photographs can be used in conjunction with colour and paint research to form the guidelines for repainting the surfaces as required for the rail cars. These drawings, as well as being the record of condition can be used to approve paint colour choices and will record all original colours and existing colours that are discovered as further research and treatment takes place. The photography to record condition was taken with a Canon “Rebel” digital camera and images are currently downloaded to our hard drive with back-up. The large format digital images have been recorded as part of the assessment project.

Historical reference to the collection of rail cars in Cranbrook has been reviewed for this report. The museum maintains curatorial, conservation and restoration files on all the cars, and it is important to keep this record going as it will be invaluable for future curators and conservators.

### **17) An Overall Treatment Project Plan**

The treatment proposals and recommendations drawn from the condition report findings of the examination require further development prior to implementation. For the sake of planning, each railcar is given a separate proposal and separate timetable for carrying out the work. This is developed sequentially in order to give an overall description of the work. The project could be planned in a consecutive manner in order to carry out more work at the same time. A schedule for that would be drawn up and be available separately from this report.

Integrated Pest Management systems are addressed in the application of the “Tim-Bor” diffusible pesticide. Further prevention of pests is described in “preventive maintenance” below.

### **18) Safety:**

Risk management analysis of safety issues on the site have been listed and described both for the artifacts, the site buildings and the human presence of staff and visitors.



*Unfinished restoration awaiting skilled personnel.  
Some pre-laid coded wiring for future circuits*

Worker safety is a major concern for projects requiring daily morning safety meetings, which focus on all aspects of a written safety plan including operation of all equipment and procedures for use of safety equipment. Attention to all environmental requirements is always part of any project that is undertaken. These observations and concerns obviously extend to the public in any instance where visitors are present. Throughout the railcars exhibits there are some safety concerns for the public, which while efforts have been made to mitigate them, will have to be addressed in treatment projects. The most common example are the result of having to do restoration projects in stages, thus there are parts of the rails cars that are in the middle of repair and other processes.

In some cases this has lead to having to support trim pieces in a temporary manner, with finishing nails that are not totally set fully in due to the particular restoration process used by this Museum (see photo's above for examples). While generally these are not in areas that the public have direct contact to, it is something to be aware of for workers. While electrical work done by the museum to date has been to code, there are some examples of older 32-volt wiring and some new pre-positioned wires neither of which are currently connected, but all are coded with tape for future work and they are on any drawings of the car showing future circuits. Clear signage must be maintained to make sure that future workers understand what they are dealing with.

## **19) Handling Artifacts**

Handling large and small-scale industrial/transportation artifacts requires a specialized understanding of materials, historic machinery and systems. Observations of condition have been made in the static state but understood in relation to methods of use and the potential moving and supporting of the object. Structural conditions and concern for weight in relation to fragility have been considered in terms of preservation and the in some cases a possible urgent need for stability of the artifact. In some cases artifacts may be too fragile to handle.

## 20) Protection of Artifacts During Construction of New Rail Car Storage Shed

When the recommendations for protection of the artifacts are implemented and a new protective structure is undertaken for the collection, a careful method of building must provide for the care and safety of the artifacts during the construction process. The assembly of supports and overhead systems must insure that no damage occurs to the collection of railcars. A conservation manager should be part of the team to oversee the day-to-day process of construction and be available for all construction site meetings and safety meetings to insure that full knowledge of all construction steps is available to make sure the artifacts are always protected.

## 21) Examination of Exterior Buildings and Structures as well as Artifact Room in the Museum



Overall view of north end of the former museum site including diesel engine 4090, Elko Station and Water Tower



The Water Tower landmark of railway history showing some of the weathering of the prevailing wind.

### **21 A) Water Tower Site Examination**

Assessment of the Water Tower revealed weathering of surfaces and deterioration of the wood cladding. A few boards along the edges were loose and at least one vertical trim board was missing. Groundcover conditions are noted below for maintenance. An overall spray application of the borate treatment is recommended with a follow-up application of the custom water repellent. Treatment should extend the life of the material, but ongoing monitoring should take place and decisions made about replacing pieces that have deteriorated beyond repaint.



The Elko Station at the former Museum site

### **21 B) Elko Station Site Examination**

The Elko station was viewed from the ground and visual examination was assisted with binoculars. While generally in good condition as a result of previous restoration, some weathering was noted and in a few potential locations of ingress by pests and birds is a danger. Security and fire monitoring systems are in place.

### **21 C) Royal Alexandra Hall; Examination and Recommendations**

The Royal Alexandra Hall was examined and information was noted about the history and rebuild project. Since the room has been reassembled according to modern building code requirements yet with attention to historic finish details, the condition is very good. Restoration during the rebuild project has returned the once grand ballroom to its almost original condition. Maintenance is recommended as would be applied to any historic interior. Keeping light levels low, ie 150 lux is recommended to prevent photo-chemical degradation. Obviously, higher light levels will be required during events and perhaps occasionally during tours. Currently lighting is kept dim for tours and many events. Mirrored glass and awnings have been added to the exterior with plans for exterior shade blind to be installed as funding become available. A stable temperature and relative humidity range should be maintained for the room.

Regular housekeeping is recommended and especially after any event that is scheduled in the room. The same preservation steps that are in place for similar heritage facilities such as the Craigdarroch Castle in Victoria and the Rideau Chapel at the National Gallery of Canada are

recommended and are currently used as guidelines for any special events in the Royal Alexandra Hall. The existing “Facility Rental Request” explains housekeeping rules and expectations for guests in a comprehensive way and should be maintained due to the artifact nature of the Hall. It can not be emphasized enough that the Hall is an artifact and thus needs to be respected as such.

### **21 D) Freight Shed; Examination and Recommendations**

The Freight Shed, which is part of the Museum and attached to the new buildings, was examined. Main intended uses in the Freight Shed annex include, temporary exhibit gallery space, the Cranbrook History Gallery, activity room, café space, and model railway. The gallery space may require controlled lighting as well as standard recommendations for temperature and relative humidity in the area. Since this wing of the museum has been recently renovated and incorporated with new foundations into the facility, the standard recommendations for environmental conditions should be followed. Concern for dust and grit residue from the new concrete materials should be dealt with in a housekeeping clean-up. Concrete areas are known to remain dust producing for at least several months (sometimes longer) after construction has been completed. CCI has produced studies with recommendations for gallery and display case paint coatings. This information should be followed for finish coatings in the gallery areas.

A restaurant area at the end of the Freight Shed should probably be kept separately ventilated and closed from access into the gallery and storage areas, so the proposed auto closing doors should be adequate. Light levels from windows in the restaurant appear to be too high for conservation standards, thus the decision not to have artifacts in this location should be kept. Cooking and food preparation should be kept at a distance from the art gallery and storage spaces. Regular housekeeping activities for the restaurant should be kept at a similar level to those outlined for rental of the Royal Alexandra Hall.



Northwest corner of site at present showing fence protection edge of Track #3  
Ground cloth, for weed control, has blown off the back berm due to wind,  
but is replaced as required

**22) Preventive Maintenance**

In terms of ground cover, the site of the railcars is in very good condition; some weed growth was noted in the northwest corner of the site (this has subsequently been dealt with as part of the professional grounds keeping program). Maintenance of the ground conditions is required to improve preservation. This includes the removal of weeds that can dry out and be a potential fire danger, diverting rainwater courses (including the monitoring of the existing drainage system installed under the train site prior to the tracks being placed), and improvements for ground cover around the artifact location. In both cases the Elko Station and the Water Tower are in need of some upgrades to the ground cover around the buildings. Ingress of pests including birds is possible in the Elko Station and potentially into the Water Tower as well.

Respectfully Submitted:  Andrew Todd                      February 2011

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